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 2007

Chairperson
Professor Terence H Hull, Australia (until June 2007)
Dr Timothy G Evans, WHO (since July 2007)

Member-Secretary (ex-officio)
Professor David A Sack (until June 2007)
Dr Alejandro Cravioto
Executive Director, ICDDR,B

Members
Dr Mohammad Jalal Abbasi-Shavazi, Iran
Mr Md Aminul Islam Bhuiyan, Bangladesh
Dr Thomas Cheasty, United Kingdom
Mr Kul Gautam, UNICEF (until June 2007)
Dr AZM Zahid Hossain, Bangladesh (until June 2007)
Mr Ehsan Ul Fattah, Bangladesh (until June 2007)
Prof AHM Towhidul Anowar Chowdhury, Bangladesh

Datuk Dr Raj Bte Abdul Karim, Malaysia
Mr AKM Zafar Ullah Khan, Bangladesh
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, Mexico
Dr Suttilak Smitasiri, Thailand
Dr Peter Tugwell, Canada
Dr I Kaye Wachsmuth, USA (until June 2007)
Dr Haruo Watanabe, Japan
## Contents

**Introduction** 5  

**ICDDR,B addressing the Millennium Development Goals**

**MDG 1 Eradicate extreme poverty and hunger**  6  
- Improved Health for the Poor  7  
  - 40 years of population surveillance: sharing knowledge, improving health  8  
  - Hospital surveillance for diarrhoea  10  
  - The road to fortification  11  
  - At a glance – ICDDR,B and MDG 1  14  

**MDG 3 Promote gender equality and empower women**  15  
- Maturing our gender objectives  17  
- Gender and sexuality: negotiating marginalization  20  
- At a glance – ICDDR,B and MDG 3  22  

**MDG 4 Reduce child mortality**  24  
- The first national scale up for zinc treatment for diarrhoea in children under five passes its one year milestone  26  
- Umbilical cord cleansing: saving more newborn lives?  29  
- At a glance – ICDDR,B and MDG 4  32  

**MDG 5 Improve maternal health**  34  
- Incentives for safer motherhood: exploring new systems for a more equitable distribution of health  35  
- Ensuring safer choices for women  39  
- Maternal, neonatal and child health: strengthening services through a continuum of care  41  
- At a glance – ICDDR,B and MDG 5  44  

**MDG 6 Combat HIV/AIDS, malaria and other diseases**  45  
- Strengthening systems: examining the spread of communicable disease in prisons  47  
- Voluntary counselling and testing: a gateway to HIV prevention and care  49  
- Influenza: on our agenda  51  
- At a glance – ICDDR,B and MDG 6  57  

**MDG 7 Ensure environmental sustainability**  59  
- Climate change and cholera  61  
- What do we know about handwashing, sanitation and safe water use in Bangladesh?  63  
- Street dwellers’ health in Bangladesh  67  
- At a glance – ICDDR,B and MDG 7  71  

**MDG 8 Develop a global partnership for development**  72  
- Mainstreaming nutrition  73  
- A global partnership for child health and nutrition: CHNRI  77  
- Partnering for maternal and newborn health: MotherNewBorNet  79  
- What do we know about health systems?  83  
- Core Donors’ Group  84  
- At a glance – ICDDR,B and MDG 8  85  

**ICDDR,B institutional support and capacity**

- The Dhaka Hospital prepares for the future  88  
- Developing our most important resources: committed to capacity building  93  
- Managing performance  99  
- Scientific Council  100  
- A new monitoring and evaluation framework for ICDDR,B  102  
- Finance Report  103
In previous years, ICDDR,B has issued a comprehensive Annual Report, attempting to make a full report on activities but not necessarily highlighting any specific research or projects. In this year’s report we have tried to give a snapshot of the organization from the perspective of the MDGs, highlighting how ICDDR,B helped facilitate progress towards goals 1, 3, 4, 5, 6, 7 and 8 during 2007 through its research projects, capacity building activities and collaborations with national institutions.

Bangladesh is one of 189 countries that have pledged to achieve the Millennium Development Goals (MDGs) by 2015 and is one of only six developing countries on track to reach some of these goals. Some indicators have shown remarkable progress toward the MDGs in Bangladesh: achievements have been made in reducing under 5 mortality, reducing fertility, providing vaccines to children and mothers, and reducing vitamin A deficiency, among others. Nevertheless, Bangladesh still lags behind in other areas requiring a redoubling of efforts to reach the targets the MDGs have set.

The discussion of being on track to achieve the MDGs in a particular country sometimes gives the impression that progress towards a goal is linear: once on the track we will continue the trend and achieve the goal merely by continuing the efforts of the past. In fact, achieving the MDGs will require new solutions, beyond those that led us to our current position on the track. In like manner, failing to maintain the activities that got us here may cause us to lose ground.

In this report, as always, we attempt to highlight the important role of research and surveillance, without which many health issues would go unrecognized, progress would be impossible to monitor, we would have no new technologies or approaches to apply toward achieving the MDGs.

As we look back on 2007 and celebrate our achievements, we also look to the future and to the challenges ahead.

Achieving all of the MDGs will be a challenge for Bangladesh, requiring the continuation of our successful partnerships and collaborations with the Government of Bangladesh, as well as all of our other development partners.

We are extremely grateful to all those who have supported ICDDR,B in the past and we look forward to continuing to work together to better the lives of the people of Bangladesh and the world.

Alejandro Cravioto
Executive Director
Bangladesh is one of the few countries that have shown considerable progress in attainment both the income and nutrition targets of MDG 1. We've had particular success in improving nutrition, with an almost 20 percentage point reduction in prevalence of stunting and underweight status among under-five children in the last two decades. Despite this good news, levels are still almost double that of Sub-Saharan Africa, as observed in the baseline survey of the National Nutrition Programme conducted by ICDDR,B in 2004/05. Almost 50% of children in this age group were underweight.

To reach the poor effectively, we have to invest both in the quality development of public health facilities in Bangladesh and in prevention programmes. Reducing malnutrition has an amplifying effect, essential to global success on a number of other development goals, including maternal health, infant mortality, and education.

**Target 1**
Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day.

**Target 2**
Halve, between 1990 and 2015, the proportion of people who suffer from hunger.
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 three years, the project is expected to end in December 2008 and 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. We provide technical assistance in collaborations, facilitating Bangladesh’s progress towards reaching the health-related Millennium Development Goals. One of our guiding values is promoting partnerships and we actively seek to build the capacity of national institutes through this work.

Here we highlight how population surveillance and disease surveillance – two activities receiving funding from IHP – are working to improve the health of the poor in Bangladesh.

Further information is available at www.icddrb.org/activity/IHP.
ICDDR,B maintains one of the richest, most comprehensive and longest running, longitudinal data resources in the developing world, producing regular accurate demographic and health data for rural Bangladesh.

The Health and Demographic Surveillance System (HDSS) covers a population of about 225,000 in Matlab – a rural area of Bangladesh – and provides data necessary to plan, conduct, and evaluate various types of public-health intervention research. This surveillance system’s key role is to monitor population exposure accurately over time to derive health and demographic rates and ratios, and assess impacts of health and social interventions. Structured interviews are conducted to register birth, death, marriage, divorce, migration, internal movement and household split every two months in all households in the 142 villages. Periodic socio-economic surveys also collect information on occupation and household assets.

<table>
<thead>
<tr>
<th>What 40 years of our research and interventions have achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>A population of approximately 45 million less people in Bangladesh due to interventions that lowered the fertility rate</td>
</tr>
<tr>
<td>Knowledge that 63% of child deaths are due to vaccine-preventable disease and can be lowered close to nil through effective immunization campaigns</td>
</tr>
<tr>
<td>Increased life expectancy from 50 years to around 65 years in the past four decades due to child survival and fertility reduction interventions</td>
</tr>
<tr>
<td>Bangladesh is now in a pioneering position in reducing child mortality rate among the South Asian countries</td>
</tr>
</tbody>
</table>

Our surveillance data on 225,000 lives is recognized globally as best practice for calculating life tables, allowing us to predict:

- Burden of disease in Bangladesh
- The numbers of elderly people (over 60 years) will grow from 7 million now to 65 million by the end of this century
- The possibility that children born in a food-deprived phase of the year experience dramatically increased mortality after puberty compared to children born during a food-sufficient period of the year (e.g. harvest), irrespective of the overall levels of food availability

This data set comprises health, demographic, and social characteristics, at the individual and household level, and furthermore can be linked to numerous additional research and clinical information. This extraordinary array of interrelated information is invaluable in...
a country where there are no accurate vital registrations and scant resources to develop health information systems and monitor trends in the nation’s health. Already these data have enabled a diverse range of investigations which have resulted in significant contributions to our understanding of health, demographic and environmental issues and changes over time, at a national level and within the context of global health. The outcomes have also led to considerable improvement in the health of the field site populations and the whole of Bangladesh.

Under the Improved Health for the Poor: Health Nutrition and Population Research Project, public access to the data in the current database was improved in 2007 to facilitate further innovative analyses and promote a greater knowledge of the health of Bangladesh. A long-term workbook houses all demographic events indexed by area, year, sex, and age group.

Increasing access to 40 years of longitudinal health and demographic surveillance, research and hospital data collected in Bangladesh results in advanced scientific research and health decision-making on a global scale.

All HDSS information collected since 1983 is now available globally on the internet through a user-friendly data-management tool to facilitate inquiry, available at www.icddrb.org/activity/HDSS. It will soon be updated with historical data from 1974. A second workbook is currently being developed to house information relating to mortality, enabling inquiry into causes of death and burden of disease. Both the workbooks have been constructed to hold data to 2020, thereby providing an excellent tool for monitoring progress towards Millennium Development Goals.

Surveillance teams work closely with the government’s National Institute of Population Research and Training (NIPORT) by providing technical assistance for national surveys such as Demographic and Health Surveys, Bangladesh Maternal Services and Maternal Mortality Survey 2001 and the Urban Health Survey 2006. ICDDR,B also contributes to the coordination role of NIPORT in the Ministry of Health and Family Welfare’s research in health and population.
Hospital surveillance for diarrhoea

ICDDR,B has been operating the most comprehensive diarrhoeal disease surveillance system in Bangladesh for almost 30 years.

One in 50 patients attending the Dhaka Hospital and all patients attending the Matlab Hospital from the Health and Demographic Surveillance System area are enrolled into the surveillance programme.

Using structured questions, trained personnel interview patients and/or their attendants to collect relevant information on socioeconomic and demographic characteristics, housing and environmental conditions, feeding practices (particularly of infants and young children) and the use of drugs and fluid therapy at home.

Microbiological diagnosis of every fiftieth patient is also completed, providing a picture of the organisms responsible for the diarrhoeal disease. This provides valuable information to hospital doctors in their clinical decision-making processes and enables ICDDR,B to detect the emergence of new pathogens and identify outbreaks and their locations, thereby alerting the government early to take appropriate preventive and control measures. This valuable information is also disseminated through our Health and Science Bulletin to clinicians and professionals in decision-making positions for providing patient care in Bangladesh.

In 2007, the hospital surveillance identified the following pathogens in diarrhoeal patients:

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Dhaka Hospital</th>
<th>Matlab Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Vibrio cholerae</em> O1</td>
<td>26.7%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>20.9%</td>
<td>20.5%</td>
</tr>
<tr>
<td><em>Shigella</em></td>
<td>2.3%</td>
<td>8.8%</td>
</tr>
<tr>
<td><em>Salmonella</em></td>
<td>1.1%</td>
<td>4.2%</td>
</tr>
<tr>
<td>No pathogen identified</td>
<td>40.4%</td>
<td>59.1%</td>
</tr>
</tbody>
</table>

In the face of emergencies such as those seen during the natural disasters of 2007, the Dhaka Hospital maintains its low mortality rate due to its commitment to evidence-based therapy and medicine. The hospital surveillance, and the ongoing clinical trials, develop knowledge for lifesaving solutions. Along with tracking aetiology, not only of diarrhoeal but other important bacterial diseases, the surveillance conducted at ICDDR,B monitors crucial drug resistance of key pathogens in Bangladesh, immediately sharing results with clinicians and healthcare providers across the country.

ICDDR,B is quick to respond to clinical evidence of drug resistance, supported by the surveillance and data from its state-of-the-art laboratories. The flooding in August 2007 saw new drug-resistant pathogens emerge. Antimicrobial resistance testing resulted in a rapid change of antibiotics in the clinical management of cholera, from doxycycline as the first line of therapy, to single dose azithromycin.

The hospital disease surveillance also serves as an important database for conducting epidemiological studies, validating clinical study results, developing new research ideas and study designs, improving patient-care strategies, and introducing preventive programmes.

Clinical researchers at ICDDR,B are constantly working to find even more effective alternatives for clinical management of diarrhoeal disease.
The road to fortification

In developing countries 178 million children under five years suffer from stunting – a form of malnutrition. Countries in South Asia have the highest rates of malnutrition and the largest number of malnourished children, surpassing those in sub-Saharan Africa. The consequences of malnutrition have important and varied effects on health and economics: increased susceptibility to infection, impaired mental development, increased case fatality, and huge losses in productivity.

Bangladesh regards improved nutrition as a top government priority and is one of the few countries that has shown improvement in nutritional status and seems to be on track toward achieving the nutrition component of MDG 1. To ensure that this successful trend continues, ICDDR,B scientists are working on strategies to fight malnutrition, such as food supplementation, food fortification and food biofortification.

Paving the road to food fortification

Food fortification – adding essential vitamins and minerals to food – is one of the best ways to improve micronutrient status, allowing much needed micronutrients to reach a large number of people without requiring substantial changes in behaviour. Following the first pilot fortification trial in Bangladesh in 2005 conducted by ICDDR,B, where wheat flour was fortified with iron and vitamin A, the issue was placed firmly on the national-level agenda. Food fortification has now become an important element of the country’s strategy to reduce micronutrient malnutrition.

Bringing together key stakeholders, the Government of Bangladesh showed its commitment at the highest level, establishing the national Food Fortification Alliance – a strong public and private-sector partnership consisting of more than 30 members from the public and private sectors, civil society and international development partners. ICDDR,B researchers have also been appointed to the national and technical committees, and funding secured for the country from GAIN – a global alliance dedicated to supporting the use of food fortification and other strategies aimed at improving the health and nutrition of populations at risk.

Biofortification is the process of breeding food crops that are rich in bioavailable micronutrients such as vitamin A, zinc and iron. These crops ‘biofortify’ themselves by loading higher levels of minerals and vitamins in their seeds and roots, which are then harvested and eaten.

The last twelve months has seen much discussion and decision-making in planning the road to food fortification on a national scale in Bangladesh. ICDDR,B scientists are contributing knowledge for the major elements of a food fortification strategy for Bangladesh, including...
Food fortification is one of the best ways to improve micronutrient status.
the micronutrient formulation for the food vehicles identified as suitable for fortification, and for the mapping of an implementation strategy. The first fortification, to begin in 2008, will be vegetable oil enriched with retinol, to improve vitamin A status.

Looking to the future

While food fortification is effective, food biofortification – breeding new varieties of food that can absorb and deliver higher levels of micronutrients – offers even more hope for improving health and nutrition in Bangladesh and worldwide. Nutritionists have begun to recognize that the stunting and underweight status that occurs here and in other developing countries may be a proxy indicator for zinc deficiency. We already know how important zinc is for overall childhood nutrition and we know that Bangladesh leads other countries in scaling up zinc through supplementation. However, biofortification offers another strategy for achieving MDG 1 by 2015.

On track to improving the nutrition of 140 million people in Bangladesh

In Bangladesh, ICDDR,B researchers have begun laying the groundwork and establishing the collaborations necessary to begin zinc biofortification of rice in Bangladesh. Establishing current levels of zinc intake among populations here, and determining the bioavailability of zinc in the body will help us determine how much zinc will need to be incorporated into new varieties of rice. Scientists will then begin breeding rice and carrying out an efficacy trial of high-zinc rice, eventually leading to the introduction and scale up of high-zinc rice in Bangladesh.
ICDDR,B has developed a simple monitoring tool that measures the utilization of health services by the poor. These kinds of tools are of importance to programme managers in developing countries to assess the reach of their interventions to the populations they serve – especially the poor. The tool allows facility and programme managers to decide whether a community is performing adequately in reaching the poorest population (or any other specific group). Our results indicate that public health facilities in Bangladesh are more pro-poor than private health facilities, which means reaching the poor effectively will require investment in the quality development of public health facilities.

A poverty measurement tool consisting of indicators to assess shortfall in food, shelter, clothing, education, health and social participation has been developed and tested. This 30-minute tool incorporates the multidimensional nature of poverty and is considered to be of more practical application than previous conventional tools.

A one-week health equity training course was held by ICDDR,B for the Government of Bangladesh, NGOs and university representatives in collaboration with BRAC and World Bank Institute.

Nutrition scientists at ICDDR,B played a key role in formulating the national guidelines on management of severe malnutrition in Bangladesh, in collaboration with the Centre for Medical Education, the Institute of Public Health Nutrition, UNICEF and leading academics from different medical colleges.

Iron deficiency is estimated to be the most common nutritional deficiency in both developed and underdeveloped nations and the most common cause of anaemia. In response to recent studies that suggest *Helicobacter pylori* infection might be associated with iron-deficiency anaemia or the failure of iron supplementation in children, ICDDR,B conducted a study in Bangladesh to better understand the implications in the prevention and treatment of iron deficiency anaemia in developing countries. Scientists found that *H. pylori* is neither a cause of iron deficiency anaemia nor a reason for treatment failure of iron supplementation in young Bangladeshi children.
ICDDR,B focuses on the lives of women in Bangladesh and around the world for a simple reason: gender equality and the wellbeing of families go hand in hand. When women are empowered to live full and productive lives, their families prosper. Working to achieve MDG 3 will reap the double dividend of bettering the lives of both women and their communities. It will also contribute to achieving all the other goals, from reducing poverty and hunger to saving children’s lives, improving maternal health, ensuring universal education, combating HIV/AIDS, malaria and other diseases, ensuring environmental sustainability, and developing new and innovative partnerships for development.

Equity and gender are universal concerns for all health programmes in Bangladesh. There will always be groups who have better health and more access to health services than other groups, but society cannot tolerate differences which are not reasonable or inhumane. A female child needs the same level of care and support as a male child and women need health services that are geared for their needs.
As a working mother, the crèche was the answer to all my worries. I can nurse my baby and be more efficient at work.

Nasmeen Ahmed
Maturing our gender objectives

It’s been seven years since ICDDR,B strengthened its commitment to gender issues and we continue to be an organizational leader in Bangladesh, both in terms of numbers and value. Since launching the Gender Policy in 2003, we are on track to reaching our targets for a more equitable distribution of men and women across different job categories. But promoting gender equity and equality is much more than that. It is also about providing the tools, resources and environment which will enable all staff to contribute to the best of their ability and contribute equally to the fulfilment of organizational goals.

As the current Gender Policy reached its halfway point in 2007, the Centre began to consolidate on some of its initial achievements and move beyond quantitative success, to more responsive initiatives which serve the needs and interests of all staff.

Awareness

Having reached 95% of the 2500 ICDDR,B staff with gender awareness training and orientation on the organizational policy by 2007, our programme has been further developed to offer more tailored human resource development opportunities. A session on workplace gender issues was developed for inclusion in a new Customer Service Training course delivered to staff in critical frontline roles – such as nurses, librarians and drivers – to increase staff capacity to provide service conscious of both men’s and women’s needs. A tailored training programme was also designed and delivered to groups of subcontracted staff (such as security and office attendants) in the same regard.

Creating leaders

Promoting a cultural shift such as gender mainstreaming requires support and accountability at all levels. It also requires commitment and motivation from key people who can both champion the cause as well as act as resources.

Having completed a one-year pilot phase of Gender Focal Points (GFP) – staff who act as a contact point for gender-related issues for employees – the programme was rolled out in 2007 across the Centre. A nomination process resulted in 48 staff members – both male and female – being appointed representatives for their units for two-year terms across all eight organizational sites, to provide support and leadership for awareness-raising and mainstreaming. The GFPs were provided the knowledge and resources they need to act as ambassadors on gender issues within ICDDR,B.

As a new Gender Focal Point for Matlab Health Research Centre, I feel very proud to be a member of such an important programme. It gives me a lot of opportunity to promote gender sensitization, address equity issues and identify any gender disparities among staff members of the Matlab field site.

Dr Shalhar
ICDDR,B acknowledges the needs of dual career families
Work and life

Having renovated and redeveloped the daycare centre for staff in 2006 to a full-time facility, dedicated to developing the cognitive and psychomotor skills of their children which serves as a model for others in the country, ICDDR,B went a step further this year to open a breastfeeding facility onsite. Committed to both the promotion of exclusive breastfeeding practices and to supporting the childcare responsibilities of staff, a space has been created for ten infants up to the age of six months and their attendants while their mothers work, further acknowledging the needs of dual career families.

A grassroots first: women scientists and researchers forum

Science, research and medicine are all traditionally male-dominated fields in Bangladesh as they are elsewhere. ICDDR,B has been providing an opportunity for national women scientists and researchers to excel for over four decades but the challenges to balancing work and family life and other gender-specific matters can still be considerable. For the first time at ICDDR,B, women scientists and researchers have come together to create a platform for dialogue on these issues.

The Women Scientists and Researchers Forum at ICDDR,B is a grassroots staff-level initiative inspired by the Centre’s strengthened commitment to gender equity and equality. Members are encouraged from all female staff working directly in scientific research activities, from General Service-level and above, to participate in monthly meetings. The forum provides an opportunity to build skills, promote networking and to empower female scientists, further operationalizing the Gender Policy through women’s increased participation and representation. Meetings, frequently led by guest speakers, discuss issues such as mentoring and educational opportunities, and review articles salient to women scientists, managers and leaders.

Science is the primary mission of ICDDR,B. Although we have equal numbers of male and female scientists, professional advancement amongst the women is unacceptably slow. We cannot expect optimal scientific productivity until our women scientists have equal opportunity to grow to their full potential. A bird cannot fly forever with a single wing!

Dr Aliya Naheed

The group’s first agenda in 2007 was an analysis of internally-generated data to identify existing barriers specific to women scientists, in order to assess and develop the skills they need to achieve the same opportunities as their male counterparts. This exercise helped to prioritize the group’s agenda for the forthcoming year, which includes working towards the establishment of a national platform for women scientists in Bangladesh.

Organizational objectives of our Gender Policy

1. Ensure organizational commitment and the internal allocation of resources to ensure that the Gender Policy will be mainstreamed within the organization.

2. Raise awareness and understanding of gender issues at all levels of the organization to achieve gender equality.

3. Create and maintain a conducive environment within which women’s and men’s needs can be openly and freely articulated and addressed.
Gender and sexuality: negotiating marginalization

ICDDR,B researchers conceptualize gender and sexuality grounded in the framework of relationships, actions and interactions among all human beings, rather than in essentialist terms. Recognizing the complex interplay of historical, social, cultural and political constructions of gender and human sexuality, ICDDR,B is committed to addressing the inequality, discrimination, exclusion, oppression, injustice and subordination resulting from gender and sexual orientations and practices.

In light of this, ICDDR,B completed an ethnographic study in 2007 into the socialization and constructions of sexuality of the hijra community in Bangladesh, to better understand their implications for STI/HIV interventions.

**Hijra**: people whose lifestyle and roles do not conform to conventional notions of male or female gender; but combine or move between these

Long considered ‘asexual’ or ‘sexually impotent’, hijra are actually sexual beings with full potential to enjoy fulfilling sexual lives. In the heteronormative Bangladeshi society, gender is considered dichotomous – male/female, man/woman leaving no social space for people having ‘other’ gender orientations. Similarly, all other forms of sexual expressions and practices outside of heterosexuality are stigmatized.

As a result, hijra are often targets of abuse – physical, verbal and sexual – both at home and in other spheres of their lives. Sexual harassment diminishes self esteem, dignity and denies a sense of belonging to the society. The resulting social exclusion can lead to risky lifestyle choices including unprotected sex, both in commercial and non-commercial settings. Many hijra are involved in selling sex, and others have multiple non-commercial sex partners. Access to service facilities, including health, legal and social, is in many instances constrained due to this marginalized status.

Health professionals in Bangladesh have an inadequate understanding about human sexuality, especially pertaining to transgender populations. Issues relating to sex and sexualities of hijra are deeply grounded in the context of poverty, discrimination, and violations of human and sexual rights. All development work for the hijra community should therefore be designed within a health and rights framework, rather than a simple promotion of safer sex technologies and treatment of sexually transmitted infections (STI).

**Beyond research: initiating action**

Moving beyond a traditional research design, this ICDDR,B project aimed to organize and empower the hijra community, given their stigmatized and marginalized social status. Members of the hijra community are experts in their own circumstances and under a participatory approach, were involved throughout the project.

In response to a need identified by our community partner organization Badhan Hijra Shanga, behaviour change communication (BCC) materials were developed through extensive consultations with hijra leaders (gurus).
and other key members of the hijra hierarchy, to be used in interventions, as none such materials existed. Tree Foundation Limited assisted in developing the BCC materials.

A hijra community-based theatre group named Rongherong was also created with the assistance of Tree Foundation Limited, to use drama as a tool for depicting and reflecting on the lives of the community and the problems faced, and using improvisational theatre techniques to develop solutions. Staging the drama for audiences both inside and outside the hijra community, a marginalized group raised their voices collectively to challenge society’s attitudes towards them. Increased self-awareness, self-confidence and a stronger sense of community cohesion were results which all work towards protecting their human rights.

Vulnerabilities of indigenous people to STI/HIV

In an effort to understand the context of risk of STI/HIV and explore the sexual health vulnerabilities of the indigenous community of northwestern Bangladesh, ICDDR,B undertook an anthropological assessment of the santal and oraton populations.

Sociocultural and socioeconomic factors which impact the sexual lives of these groups include underprivileged living and occupational arrangements, marital culture and drinking traditions – all of which sometimes result in unprotected sex with multiple partners. Some indigenous women are the silent victims of traditional marriage customs which offer an unhappy future in marital and sexual life: forced marriages to acquire the preferred female body for sexual slavery and non-consensual sexual interactions were often reported by the tribal women.

Consuming local wine produced and served by women, especially at rituals, sometimes leads to violent behaviour including sexual abuse, especially under the influence of excessive consumption. The male-dominated patriarchy and overwhelming masculine attitudes rarely allow women’s consent, or consider pleasure as relevant in a sexual encounter. Indigenous men’s behaviours and lifestyles are influenced by cultural beliefs about masculinity and not only place women’s health at risk, but endanger their lives also. Non-indigenous Bengali men are also involved in forceful or exploitative sexual relations with these women. Beyond a sexual health framework, comprehensive structural and targeted needs-based interventions are required to safeguard this neglected population of Bangladesh.

Gender and sexuality: human rights agenda

Despite efforts in research and intervention for nearly two decades of the epidemic, HIV has continued to spread in most countries. Developing programmes to promote safer behaviours and lifestyles without sufficient consideration of the broader social, cultural, economical, political and environmental factors shaping peoples’ gender and sexuality constructions will often be ineffective.

Dominant gender relations, power inequalities, and cultural norms and expectations attached to gender, masculinity and sexuality are at the core of vulnerabilities to HIV. Rather than binary oppositional categories, gender and sexuality should be understood along a continuum of human relations and emotions, and diverse orientations and safety dimensions where sex-gender conformity is not obligatory. ICDDR,B envisions a society where people, irrespective of their sex, gender, ethnicity and sexuality, will have access to all kinds health, social and legal services by upholding their human and sexual rights.
ICDDR,B contributed to a WHO Multi-Country Study on Women’s Health and Domestic Violence against Women, collecting data from Bangladesh. Over half of adult women in Bangladesh were found to be victims of intimate partner violence, and these women and their children suffer many health and emotional consequences as a result. Most abuse is hidden to avoid shame. Interventions are desperately needed to stop the violence and make this behaviour unacceptable.

Marriage for women before age 18 is common in rural Bangladesh. Using data from an ICDDR,B surveillance site, we assessed the relationship between early marriage and duration of schooling for girls in rural Bangladesh. None of the women who were married before age 18 attained eleven or more years of schooling, whereas almost one in four of women who married at age 25 or above completed at least eleven years. Women who married below age 19 were also less likely to work outside the home. Delaying female marriage in Bangladesh may increase female schooling attainment, in addition to other known benefits.

An ICDDR,B study into the effects of spousal violence against women on children’s mortality risk found that in rural Bangladesh, there may be gender-biased consequences. Among relatively better-educated women, exposure to severe physical violence or to several types of behavioural control increased the mortality risk of daughter/s under the age of five by two to three times.

Studies suggest that the health vulnerability of female labour migrants might be twice as high as male labour migrants. ICDDR,B is conducting separate studies on male and female Bangladeshi migrants to better understand the health status of these semi-skilled and unskilled labourers. Assessing health upon return from overseas and identifying potential determinants, the study intends to understand and identify different dimensions of physical, mental and social health likely to be affected by migration.
To address a gap in data on the prevalence of human papillomavirus in Bangladesh, especially in the context of cervical cancer, ICDDR,B collected specimens from four regional health complexes in collaboration with a national institute. Early results show large numbers of women are affected by this virus. Information is also being collected on which types are circulating – information which may be used for designing an appropriate cervical cancer vaccine.

A study of the sexual behaviour of men in Bangladesh showed that most men know about HIV, but few consider themselves at risk of infection, and although symptoms of sexually transmitted infection are common, care seeking for these symptoms is low. Almost 27% of never-married men and 13% of ever-married men reported non-marital sex in the past year. Estimates based on these results suggest that there are 26.1 million unprotected sexual episodes per year in Bangladesh, placing a large number of men at risk once HIV starts circulating at higher levels among female sex workers.

Innovative efforts to reduce tuberculosis require better understanding of its epidemiology. Transmission patterns in Bangladesh are not clearly understood due to gaps in key data. For example, why do males have so much more TB than females? The male predominance suggests certain risk factors or transmission mechanisms that, if understood, could provide intervention strategies.

Limited information is available at national and district levels on causes of death among women of reproductive age in Bangladesh. Information collected from health services and medical records about the deaths of almost 30,000 women in 1996 and 1997 showed that 46.6% occurred due to medical causes, 29.5% due to pregnancy-related causes, 21.3% due to injuries, and 1.5% and 0.9% due to pregnancy-related injuries and medical causes. Cardiac problems (11.7%), infectious diseases (11.3%), and system disorders (9.1%) were the major medical causes of deaths. Pregnancy-associated causes included direct maternal deaths (20.1%), abortion (5.1%), and indirect maternal deaths (4.3%).
Under-five mortality in Bangladesh at the start of the MDG period was measured at 133 deaths per 1000 live births. To meet MDG 4, this mortality needs to be reduced to approximately less than 50 by 2015. To achieve success in MDG 4 in Bangladesh, we must reduce neonatal mortality, improve nutrition during the early months of life, prevent and treat the most common life-threatening infectious diseases, and develop strategies for reducing drowning. The interventions needed include a package of services in the community to make deliveries safer for both mother and child, to prevent and manage any complications or any illnesses that occur in the first few days of life. Greater efforts are needed to improve rates of exclusive breastfeeding and introduce proper complementary feeding. While maintaining the gains made with current vaccines and vitamin A programmes, new vaccines for pneumonia and diarrhoea are needed, as are renewed efforts to better manage pneumonia. Implementation of zinc as treatment for every episode of diarrhoea will be a critical new programme for the nation and Bangladesh has the opportunity to be a leader with this new strategy.

**Target 5**
Reduce by two thirds, between 1990 and 2015, the under-five mortality rate.
Zinc: saving lives under five
The first national scale up of zinc treatment for diarrhoea in children under five passes its one year milestone

The recent discovery of zinc supplementation in the management of diarrhoeal diseases in addition to oral rehydration therapy is a significant advance in public health. The use of zinc has the potential to dramatically cut the number of childhood deaths and contribute significantly to achieving MDG 4 for child mortality, both in Bangladesh and other developing countries.

Zinc treatment reduces the severity and duration of diarrhoea, but also prevents future episodes and the likelihood of non-injury deaths in children under five years of age.

Bangladesh is the global leader in adopting and scaling up the use of zinc for childhood diarrhoea. ICDDR,B has been translating research into country-level action through its implementing partners in the Scaling Up Zinc for Young children (SUZY) project since 2003. This year in 2007 saw the first full year of the Baby Zinc tablets’ public availability. Over the five year lifespan, the project facilitated the government’s acceptance of the scientific benefits of this new therapy, resulting in the Ministry of Health and Family Welfare revising its guidelines for diarrhoea treatment. ICDDR,B is now enabling the national scale up through ongoing monitoring and research.

In order to benefit all the children of Bangladesh, including the most vulnerable, equitable access to the new lifesaving treatment must be provided – ensuring that the product and the marketing is reaching the poorest and those in remote areas. In 2007, ICDDR,B worked with decision makers in the health sector and medical communities by providing training, enabling them to make an informed choice on the adoption and wide-scale promotion of these new recommendations. These efforts have doubled as a feedback mechanism during scale up, to monitor the implementation of zinc treatment, and respond to any necessary changes in strategy.

A key change was made early in the year when an advisory group identified community confusion about zinc being used as a substitute for oral saline in diarrhoea treatment, rather than as an auxiliary therapy. The mass communication campaign responded rapidly and messages now address this misconception: in each and every communication material the first emphasis is now given on the use of zinc in conjunction with oral rehydration solution (ORS).

What percentage of children receive ORS, with or without zinc?

Ongoing monitoring through nationally representative surveys in rural, municipal and large city corporation sites every three months, after a pre-launch baseline survey, suggest that a year of mass communications campaigning has been successful: the message about zinc treatment has reached all of the population – in slums and non-slums, in urban areas and even half of the rural population.

Within six months of launching zinc, surveys suggest that the use of ORS had not decreased,
Adherence to a ten-day course of zinc treatment is a critical factor in successfully reducing the duration and severity of a child's diarrhoea.
ONE YEAR INTO SCALE UP and…

- Three out of every four mothers of children under five in Bangladesh know about zinc treatment for diarrhoea.
- One out of two licensed doctors is prescribing zinc for the treatment of diarrhoea in children under five compared to one in five unlicensed providers.
- Up to five million Baby Zinc blister packs have been produced, far exceeding the original three million forecast.

but that the percentage of children receiving ORS during diarrhoea had actually increased. We observed a 6% rise in ORS use since the launch of Baby Zinc, and its use is 20% higher among caregivers who used zinc during the diarrhoeal episode of their children compared to those who did not. Another measure of the campaign’s impact looks at parents’ use of other zinc products, and specifically, zinc syrups. Dispersible Baby Zinc tablets have been formulated and manufactured to ensure maximum quality and effectiveness, especially compared to existing liquid zinc products. Our ongoing monitoring shows a six-fold increase in use of tablets within nine months of the launch, with a matching decrease in use of zinc syrups.

However, monitoring also highlights that although product awareness is high, adherence to the correct ten-day course of treatment is decreasing. Adherence is a critical factor in successfully reducing the duration and severity of the episode, and lowering the incidence of diarrhoea in the following two to three months. The ten-day treatment regimen remains a challenge, and clearly a two-way exchange between researchers and practitioners will be a critical factor in the long-term success of this scale up.

Despite the apparent success of the initial stages of scale up, research continues on how to maximize the impact of zinc further. In the future zinc may also be recommended with each Expanded Programme on Immunization visit as well as in the treatment of pneumonia. Additionally, studies continue into routine food supplementation so that children do not become zinc deficient.

This cutting edge research and transfer of knowledge to action was made possible through a grant from the Bill and Melinda Gates Foundation, however funding for the research augmenting the national scale up is scheduled to end in October 2008. In order to continue the task of scaling up in the non-state sector, in disadvantaged areas and to monitor the use of zinc after the initial 18 month period, ICDDR,B is actively seeking collaborative partners for further support of this critical intervention and globally significant programme which has the scope to affect child mortality goals worldwide.

For more information, visit www.icddrb.org/activity/SUZY.
Umbilical cord cleansing: saving more newborn lives?

Bangladesh is expected to be one of five countries to achieve the targets of MDG 4 – reduce the deaths of children less than 5 years old by two-thirds before 2015 – and the results of the neonatal study Projahnmo are key to that achievement.

While we are on target for MDGs on mortality rates among 1 to 4 year olds, we are lagging substantially behind with infant and neonatal mortality: newborns still account for almost one in two deaths under the age of five in Bangladesh. About half of newborn deaths take place within 24 hours of birth, and about three out of four within the first week of life. A baby’s risk of death during their first month is 15 times higher than during any other month of their first year. If we are to achieve MDG 4, then a significant reduction in neonatal mortality is necessary, requiring a greater emphasis on proven, cost-effective measures to save newborn lives.

Half of all neonatal deaths are due to infection so infection prevention is critical in our response to neonatal mortality. Omphalitis is an infection of the umbilical cord stump in a newborn child which contributes significantly to neonatal morbidity and mortality in developing countries. Umbilical cord cleansing with antiseptics can reduce infection and mortality risk, and one measure which has recently shown some success in a community-based trial in Nepal is cord cleansing with the antiseptic chlorhexidine.

The Projahnmo project has been working with a rural community over two and a half years to reduce newborn mortality and to improve care behaviour related to maternal and newborn health. A package of services including delivery of messages, development of skills, provision of essential supplies and treatment of newborn infection were delivered at household level to pregnant and recently-delivered women, newborns and families.
Out of 10.8 million deaths under 5 each year globally, 3.9 million are neonates.
Following Projahnmo’s initial success showing a 33% reduction in neonatal mortality in the home-care arm of this study, the service delivery is being scaled up in the final phase of the project. Delivery of the basic services package will continue while at the same time Projahnmo will be examining the impact of umbilical cord cleansing with chlorhexidine on neonatal mortality and omphalitis.

Only the second large trial of its kind, the first twelve months of the study in 2007 has been preparation for rolling out the package to half a million people. The study is assessing the impact of three different regimes of umbilical cord cleansing on a population of 28,500 newborns (comparing single day and multi-day cleansing to no cleansing). In June 2007 Projahnmo started enrolling newborns following a baseline survey and expanding the coverage area (from 8 administrative unions to 22) in preparation for full scale operation by January 2008.

Some key lessons have already been learned from the earlier phases of the Projahnmo project.

- Carefully designed behavioural assessments can find solutions or alternatives to entrenched and harmful practices in high-mortality settings.
- Involving household decision-makers and religious and community leaders in introducing the new behaviours has shown that it is possible to negotiate with the community to change attitudes. For example, traditional practices such as applying substances to the umbilical stump immediately after cord cutting, posing a significant risk for infection, were almost universal in nine out of ten births prior to intervention. Home-based counselling proved successful in reducing this behaviour by two-thirds.
- Success has also been demonstrated using low-cost interventions, such as the promotion of delayed bathing, suggesting that neonatal mortality can be reduced in low resource settings.

The lessons from the Projahnmo programme for neonatal health will be critical for reaching MDG 4 in Bangladesh. There are currently no similar programmes being implemented at scale in the government or NGO systems. Additional research is now needed to develop community-based strategies to address other specific causes of neonatal deaths, for example, birth asphyxia or neonatal infection.

Projahnmo is a partnership of ICDDR,B, the Government of Bangladesh’s Ministry of Health and Family Welfare, Shimantik, BRAC, Save the Children-USA, Dhaka Shishu Hospital, Institute of Child and Mother Health, and the Johns Hopkins Bloomberg School of Public Health. The funding for Projahnmo is provided by the United States Agency for International Development, and the Saving Newborn Lives Initiative of Save the Children Federation - USA through a grant from the Bill and Melinda Gates Foundation.
Health care utilization was analyzed to better understand the extent of inequalities among socially and economically marginal groups. Our rural surveillance showed a significant difference amongst people from different economic strata. The gap is greatest in utilization of safe motherhood services, with women from the highest asset group 13 times more likely to deliver at a health facility than women from the lowest.

ICDDR,B is conducting a clinical trial of the RotaTeq rotavirus vaccine in our key rural field site, Matlab, as part of a multi-centre study for the PATH Rotavirus Vaccine Program. Data from 1780 children is being collected and will represent the primary evaluation of the vaccine's effectiveness in low-income countries in Asia. The results will inform vaccine policy for Bangladesh and for tens of millions of children in the region.

Nutrition services have been strengthened in regional Medical College Hospitals in collaboration with Concern Worldwide. Improved services, including management of children with severe malnutrition, have resulted in reduced case fatality rates of children. These services (such as the establishment of a Nutrition Block in the hospital) are a means for providing hands-on training for medical and nursing students, doctors and nurses.

A previous feasibility study conducted in a hard-to-reach rural area found that the existing service delivery strategy is insufficient to improve immunization coverage. Barriers included irregular or cancelled Expanded Programme on Immunization sessions, mothers’ poor knowledge about the benefits of complete vaccination, geographical barriers and an inadequate number of field workers for the increased population. As a result ICDDR,B developed a proposal in collaboration with the government’s EPI programme to test evidence-based strategies to accelerate immunization coverage in rural hard-to-reach areas of Bangladesh.
Under a neonatal health research project in three areas of Bangladesh, doctors, paramedics and nurses of upazila health complexes, union health and family welfare centres and other NGO clinics were trained in essential newborn care. Some government facilities were also provided with essential equipment and supplies to manage normal deliveries and sick newborns.

The Expanded Programme on Immunization (EPI) coverage for children is low in urban slums in Bangladesh. An ICDDR,B study found that normal EPI session hours are inconvenient for working mothers, and so in collaboration with government and NGOs, began trialling services in more convenient hours. Support groups were created to actively promote EPI to the community and to act as regular communication channels. Service providers were given a checklist to assess children’s unmet needs, and training in valid dosing was provided. The package of interventions showed great success, with 99% of children fully immunized after its implementation compared to only 43% before, and less than 1% of children dropped out of the programme compared to one in three before. Policy makers should consider implementing this package in all the slums of Bangladesh to improve child immunization coverage in this marginalized population.

ICDDR,B is completing the seventh and final year of a multi-country evaluation of Integrated Management of Childhood Illness, assessing the health and economic impacts of the interventions when implemented in first-level health facilities, in association with community-based interventions to improve community and family practices. Interim results have been extremely useful in influencing national policy and plans on implementation of IMCI and the final results will demonstrate impact on under-5 mortality, and other health indicators of children.
Achieving MDG 5 will be difficult unless some basic changes are made to the strategy for providing maternal delivery-care for Bangladesh. Although maternal mortality has reduced somewhat in the country, and especially in ICDDR,B’s rural field area, much of this reduction is the result of the family planning programme and social changes rather than improvements in delivery-care. First births are occurring at a later age, and women are having fewer high-risk pregnancies and fewer total numbers of children. Although more hospitals have emergency obstetric facilities, many of these are not functional because they are not staffed consistently. Costs for delivery care, especially for caesarean deliveries, are not affordable for most families. Most deliveries still take place in the home and are assisted by unskilled birth attendants. Estimates of unmet obstetric need are very high in most upazilas, increasing significantly with distance from the emergency obstetric facility. Potentially serious complications of delivery are not always easy to detect since they may be extensions of a normal delivery. Providers, families, and mothers must learn how to detect these complications early so that medical help can be obtained quickly. Mortality from postpartum haemorrhage – one of the most common lethal complications – may be reduced through the use of active management of the third stage of labour, including the use of misoprostol.

Target 6
Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio.
Incentives for safer motherhood: exploring new systems for a more equitable distribution of health

Public health science contributes to understanding how health and disease interact in populations; how socioeconomic status affects, and is affected by, health; how existing health systems can be improved; and what role communities can play in enhancing their own health. As part of its focus on vulnerable and disadvantaged population groups, ICDDR,B searches for simple and cost-effective solutions to existing health problems with the ultimate objective of achieving an equitable distribution of health among groups.

The ICDDR,B demographic surveillance system found that the services of skilled birth attendants were not reaching poor women equally in Chakaria, a rural area of Bangladesh. More rich women, rather than poor, had access to skilled maternal care. To encourage a shift in poor pregnant women's careseeking practices – from unskilled care to skilled care – ICDDR,B trained a group of community volunteers in midwifery and employed them to provide free maternal health services to the community. The provision of free maternal services however did little to change the unbalanced utilization of safe motherhood services: the poorest women were still the least likely to seek help from a trained midwife.

Trained community midwives are female community health workers who have been trained in midwifery and have started safe motherhood activities in their own communities, while still attending monthly refresher training.

MDG 5
Trained community midwives are offered incentives to provide services to the poor.
To tackle this problem, a new approach to health financing was developed and piloted. Pregnant women from the two poorest income groups are now being provided with coupons which they can use to receive midwifery services free of cost as part of a study in the same rural area. Services available include antenatal checkups, delivery services and postnatal services – all delivered by a skilled birth attendant, with referral in the case of complications.

Trained community midwives are offered incentives to provide services to the poor. A trained midwife is paid per coupon for each type of service she delivers to a poorer pregnant woman, including if she has to refer a complicated case to another provider. Rather than acting as ICDDR,B employees, these women now exercise more control and ownership over the provision of their own skilled services. The more safe motherhood services she delivers the more frequently, the more money she can earn. The midwives bring the coupons they received in exchange of services they provide to ICDDR,B for encashment.

Each midwife has approximately 2000 designated households, making quarterly visits to each in order to list all the pregnant women for the delivery of coupons, for which she receives a small fee per person.

There are about 22,000 households in the intervention area, and almost 14,500 claims for safe motherhood services have been made in the last two years. Almost one in two of those were for antenatal care, which provides women with information critical to a safer pregnancy and health of the newborn. Proper diet during pregnancy, risks of heavy physical labour, the importance of skilled attendance during delivery, caring for the newborn, feeding the colostrums, and the importance of immunizations are all topics the mothers get counselled in during this time.

Two years of monitoring has shown an increased rate of using safer motherhood services amongst the poorest women. A performance-based remuneration system is showing potential to ensure enhanced utilization of safe motherhood services among women from the two lowest income groups, and the model can be extended to include other healthcare services. The key challenge to scaling the project up is the generation of funds to pay for the services.

What can trained community midwives do?

- Antenatal and postnatal services
  - physical examination
  - lab test (Hb%, urine albumin & sugar)
- Home deliveries
  - normal delivery
  - breech delivery
  - repairing perineal tears
  - management of haemorrhage
- Diagnosis and referral of complicated cases
- Use of oxytocic drugs and partograph
- Intravenous injection and fluid
- Management of asphyxiated baby
Pregnant women from the two poorest income groups are now being provided with coupons which they can use to receive midwifery services free of cost.
Ensuring safer choices for women

Bangladesh is unique in including menstrual regulation (MR) as part of its health services programme. Reproductive health and rights experts have lauded the programme internationally for its decentralized structure, however it has not been systematically evaluated, and its impact on mortality, fertility and reproductive rights is not clear.

Almost half of all abortions in the world occur under unsafe conditions and an estimated 68,000 women and girls die each year as a result, according to World Health Organization estimates. If the strategies of the Bangladesh MR programme can be demonstrated to have had a positive impact on unsafe abortion, the model could have implications for reducing abortion-related morbidity and mortality worldwide, helping countries to obtain the 75% reduction in maternal mortality between 1990 and 2015 for Millennium Development Goal 5.

Throughout 2007 scientists at ICDDR,B carried on a new study into unsafe abortion and MR. Laying the groundwork for future research, a situation analysis was conducted to determine the state of existing knowledge on unsafe abortion and MR in Bangladesh. The report brought together existing literature on the subject, and new secondary data analyses from other sources, and serves as a priority setting exercise to determine where further research is needed.

MR in Bangladesh: what we know

Although abortion is illegal in Bangladesh, menstrual regulation is legally sanctioned until the tenth week after a missed menstrual period. Services are delivered through public sector facilities, as well as non-governmental organizations (NGOs) and private providers.

Analyses of available data from ICDDR,B show that the total abortion rate (average number of abortions a woman would have over her lifetime assuming age-specific abortion rates remain constant) is minimized by high quality family planning programmes. It also showed that unsafe abortion remains a leading cause of maternal mortality in Bangladesh. Therefore, improving both means to prevent unwanted pregnancies and to address unsafe abortion remain important issues to address in Bangladesh.

Accessing services

Knowledge about abortion and menstrual regulation are important factors in service use. Women who do not know that menstrual regulation is available from trained providers at the local level may be more likely to use unsafe abortion services. Women also need to know that MR can only be done within the first ten weeks of pregnancy in order to access services within the allowable time frame.

Identifying groups at high risk for MR and abortion, particularly unsafe abortion, is important in terms of targeting efforts to ensure access to safe services and as a means to reduce unwanted pregnancies. Very little information is known about these groups in Bangladesh. Data from ICDDR,B surveillance sites do suggest that
only a small proportion of women are repeat service users.

Quality of care
Quality of MR service delivery is scantily documented in the public, NGO, and private sectors. A comprehensive evaluation, with the aim of improving services for the women who need them, is essential to understanding any needs for quality of care interventions. There are also gaps in knowledge about the costs of unsafe abortion to the health care system. In other countries, costing studies have highlighted such costs in terms of the proportion of gynaecology beds used to treat women with abortion complications. Such information for the Bangladesh context would help to provide insight into whether unsafe abortion remains a significant problem.

The quality of care provided through the Bangladesh MR programme is of particular interest because decentralization of services is a model that could be replicated in countries where abortion-related mortality is high. Although available data are limited, they provide some information on the quality of services and areas for improvement.

Areas of future research
The impact of the MR programme in Bangladesh remains undocumented. While originally established to address population issues, it has shifted focus during the last decade to address women’s reproductive health and rights. The programme’s contribution to the slowing of the population growth rate in Bangladesh, its contribution to a reduction in maternal mortality, and impact on reproductive rights remain to be measured thoroughly.

All the data found are likely to underestimate levels of abortion. More accurate estimates of MR and abortion are needed to better understand the demand for safe MR services. To aid the development of appropriate interventions, the duration of gestation at which women present, and the characteristics of women more likely to undergo unsafe abortion (compared to safe MR) need to be known and understood.

The majority of information on attitudes towards abortion and MR in Bangladesh was collected more than thirty years ago. Current data on both overall attitudes and those amongst specific populations, including women, providers and residents of conservative regions are needed to understand the social context that currently surrounds abortion. More information is also needed on the stigma surrounding abortion, which may limit women’s access to, and use of, services.

The reach of the MR programme in Bangladesh is inadequately documented. More accessible data are needed that indicate the distribution of working public, NGO, and registered private sector clinics. Unregistered private sector providers are thought to be widespread, but systematic documentation of their prevalence, qualifications and skills, or impact on women’s health is lacking.

More needs to be understood about decision-making regarding abortion services. In particular, who makes the decisions about type of care to use, what priorities inform the decision, and the impact of factors such as wealth, education, marital status and geographic location.

Almost one in ten women reporting to NGOs for MR are rejected from receiving MR services and rejections from public sector facilities are thought to be common. The characteristics of these women need to be known to develop appropriately targeted communication strategies, and what happens to these women after they are rejected also requires exploration.

Questions remain about the level of abortion complications in Bangladesh. While abortion complications appear to have decreased over time and Bangladesh has lower rates of hospitalization than most developing countries, the source of existing complicated cases and whether most women in need of treatment reach facilities remain to be answered. Questions also remain about the quality of post-abortion care for women who reach services, particularly about the quality of care and linkages to family planning and other health care services.
maternal, neonatal and child health

Strengthening services through a continuum of care

Achieving Millennium Development Goals 4 and 5 – to reduce child mortality and improve maternal health – remains a major challenge in developing countries. Barriers include gaps in recognition of severe morbidity and timely care-seeking behaviours, costs, poor quality of facility-based services, lack of an effective referral chain, and inadequate immediate newborn care.

ICDDR,B launched a new programme in 2007 to further improve maternal, neonatal and child health (MNCH) through the use of equitable, accessible, and high quality health services at both home and facility levels, provided through a continuum of care approach.

Situated at the existing Mother Child Health-Family Planning clinic in rural Matlab, obstetric care facilities have been strengthened, especially for delivery and newborn care. Part of ICDDR,B’s Matlab Hospital, this clinic provides maternal, newborn, child health and family planning-related services to all women of reproductive age and children under five years coming from the surrounding health and demographic surveillance area (of 110,000 people). The clinic provides 24 hour services for maternity care free of charge.

The comprehensive MNCH programme includes well-trained and committed providers from the community to the facility level. Community health research workers provide counselling and basic services at households and at 41 fixed-site clinics. Skilled paramedic and midwifery staff work out of four subcentres (each serving around 28,000 people), and the Matlab Hospital, staffed by nurses and physicians, provides basic obstetric care, including basic laboratory facilities.

The number of deliveries at Matlab Hospital has been increasing rapidly since 1999 following a change in emphasis towards facility-based deliveries. Since 2004, approximately 600 to 700 deliveries have been performed at the hospital each year, but the new MNCH programme hopes to increase this further. Aiming for 70% of deliveries to be facility-based will mean that the annual number of hospital deliveries may reach around 1200 within three to five years.

The new integrated programme offers a package of interventions with known effectiveness targeting pregnant women and newborns, offering a continuum of care to:

- increase the timely use of skilled birth attendants
- promote facility-based deliveries and
- provide immediate community-based postpartum care

The evidence-based interventions ICDDR,B is using at the community level include (the new services are highlighted in bold):

Household level (birth team, support person):
- motivating for antenatal care and facility delivery
- birth preparedness
- nutrition, hygiene, family planning counselling
- breastfeeding counselling
- home-based life saving skills and referral
- postpartum care

Fixed site clinic:
- Extended Programme on Immunization, family planning, tetanus toxoid, vitamin A, illness management

The evidence-based interventions ICDDR,B is using at the facility level include:

- antenatal care (4 visits)
- breastfeeding counselling
- partograph use
- prevention and resuscitation of asphyxiated babies
- Kangaroo Mother Care (for premature newborns)
- protocolized infection prevention
Improving maternal, neonatal and child health while reducing the rich/poor gap in use of services
At the community level, community health research workers are increasing community support and demand for maternal, newborn and child services. They identify pregnant women using urine tests and if consent is given, enroll them in the programme. The health workers train home-based birthing teams on timely recognition, stabilization 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, the programme is establishing high quality maternal, newborn and child health services by paramedics, midwives and doctors. New service components have been added and existing relevant components of the Matlab programme have been strengthened through refresher training and standardization of management protocols. For example, the use of a partograph has been standardized. Matlab Hospital is currently upgrading staff skills to provide basic emergency obstetric care. The doctors enable the provision of a higher level of care, especially in emergencies, such as ventouse delivery, blood transfusion, magnesium sulphate and onward referral to the larger regional hospital for operative delivery if necessary. Standardized forms have been developed to monitor quality of care at both community and facility levels.

The strengthened maternal, neonatal and child health services offered at Matlab now should result in reduced:

- perinatal, neonatal, infant and child mortality
- maternal mortality
- rich/poor gap in use of services and mortality rates
- birth-asphyxia-related mortality,

and an increased proportion of infants exclusively breastfed for 6 months.

As part of the four-year project, ICDDR,B will establish indicators to evaluate process and outcomes for the continuum of care model. Data collected will also be used to establish high quality databases for the capacity development of young researchers in the fields of safe motherhood, neonatal and child health.

Total costs (both facility and community) of the programme will be estimated to inform scale-up of future programmes. If found to be both efficacious and cost-effective, the model will be scaled up gradually in sub-district levels in collaboration with the Government of Bangladesh to strengthen the existing health system and to improve maternal and child health to MDG-stipulated levels. The programme will help to institutionalize evidence-based neonatal, child and maternal health practices in Bangladesh and other developing countries.
The 5-year follow up from the Maternal and Infant Nutrition Intervention Study (MINIMat) began in 2007, assessing growth, metabolic, micronutrient and development markers. This study had looked at the effects of different micronutrients and food supplementation on pregnant women and their babies, finding that no intervention affected birth weight. Infant mortality however was lower among live births of women who received multiple micronutrient supplements.

Assessing the distribution of emergency obstetric care facilities and human resources across districts in Bangladesh with varying rates of mortality decline, ICDDR,B found discrepancies in public sector facilities available, such as the availability of trained human resources or blood banks. These supply side barriers were accentuated by contextual factors in low performing districts like conservativeness, women’s poor mobility in accessing emergency services and low literacy. Interventions should be designed keeping contextual and sociocultural factors in mind, and geographical targeting should be considered for the maternal health of the country.

ICDDR,B is exploring the role of nurses in maternal and neonatal health care programmes in Bangladesh to provide recommendations to stakeholders about training, retention, deployment, regulations covering practices and pro-poor strategies. Specific focus will be given to increasing coverage, improving quality and ensuring equitable access to services.

An investigation into the extent and consequences of catastrophic household expenditure for caesarean deliveries in Bangladesh found that for 33% of households, catastrophic costs (more than 10% of their annual income) were incurred. The greatest out-of-pocket expenses were in private facilities, followed by public services and then NGOs. 55% of catastrophic costs were paid by the husband’s income followed by loan (17%), contribution from people other than household members (15%), and income of other household members (9%). The study indicates that government needs to either reduce costs of caesarean deliveries at facility level or increase the amount of money available for reimbursement, and needs to provide loans for any obstetric complications.
Infectious diseases remain a major problem in Bangladesh. Though mortality from diarrhoeal disease has decreased remarkably, mortality from pneumonia has not improved significantly. Tuberculosis is a major cause of adult death as well, with an estimated 70,000 deaths per year in Bangladesh. Adult deaths from tuberculosis leave children orphaned and worsen the cycle of poverty and illness. The national programme is effectively partnering with several NGOs including ICDDR,B to improve the quality of services through the DOTS strategy. However, additional resources and strategies are needed to identify cases earlier before they have transmitted their infection to others. Rapid control of tuberculosis is especially critical since the threat of HIV/AIDS will greatly complicate future efforts.

The prevalence of HIV/AIDS infection continues to be low in Bangladesh, however, high-risk behaviours are very common in most-at-risk groups as well as in the general population. HIV prevalence rates in one group of injecting drug users have already reached epidemic levels, and infection may easily spread to other groups of injecting drug users and sex workers, and then to the general population.

Target 7
Have halted by 2015 and begun to reverse the spread of HIV/AIDS.

Target 8
Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.
ICDDR,B actively screened the entire prison population of Dhaka Central Jail for pulmonary tuberculosis.
Examining the spread of communicable disease in prisons

Many studies have shown that infectious diseases are often far more prevalent in prisons than in the community. Communicable disease in prison populations still remains an important issue that has not been fully addressed, with wider implications for public health. This is especially true in countries like Bangladesh, where prison medical care is the responsibility of both justice and health ministries and separated from services in the community, making it difficult to provide equivalent services or adopt a public-health approach.

ICDDR,B has completed two years of an ongoing study providing active screening of the entire prison population of Dhaka Central Jail for pulmonary tuberculosis (TB). A congested environment, prevalent drug use and a population in flux are all factors contributing to making prisoners especially vulnerable to TB infection. In a collaboration with Dhaka Central Jail and the National TB Control Programme (NTP) – which has been providing Directly Observed Treatment, Short-course (DOTS) services in the prison for the last few years – ICDDR,B contributed its diagnostic facilities to the existing programme in order to strengthen detection capacity. In return, this provided an insight into TB prevalence in the largest prison in Bangladesh, rates of drug-resistant infection and understanding of transmission mechanisms.

Prisoners with a cough longer than three weeks’ duration had sputum samples taken for testing at the ICDDR,B tuberculosis laboratory. In addition to existing AFB microscopy services, culture analysis, PCR, antibiotic susceptibility, and DNA fingerprinting of M. tuberculosis strains were performed free of cost – all diagnostics currently not available as part of the routine TB control programme.

By the end of 2007, out of 11,786 prisoners who were screened, over 16% were investigated for suspected tuberculosis, and 13% of them tested positive for infection. At 1773 sputum-smear positive cases per 100,000 people, rates of TB infection have been found to be up to 19 times higher among prisoners than the general population, according to ICDDR,B prevalence studies in the rural area of Matlab. The rate is much higher (2239/100,000) if we calculate all the positive cases detected using AFB microscopy, culture and PCR. It is clear that any national strategy for controlling tuberculosis in Bangladesh should develop and include prison policies.

Researchers found a significant number of prisoners who tested positive using ICDDR,B’s diagnostic tools whose disease had not been previously detected with existing prison facilities. The active screening facilitated an increased detection rate for TB in the Dhaka Central Jail, and many prisoners who were previously suffering from unidentified infection are now able to seek appropriate DOTS treatment.

Risk factors for TB infection inside the jail have also now been identified. Longer prison terms,
previous history of imprisonment, malnutrition (inmates with severe malnutrition are 16 times more prone), a previous history of infection or previous exposure to TB patients have all shown to significantly increase a prisoner’s chances of becoming infected. Drug use was not found to be a risk factor.

The magnitude of the problem and its transmission dynamics have now been identified. Many people enter prison at an early stage of infection or with active disease, and TB transmission between prisoners is occurring inside the jail. It is urgent that an active screening system is established at the entry point to prevent or control transmission inside the jail. A screening tool needs to be developed to trace an early detection path based on these risk factors: a set of questions/markers for early screening for at-risk populations. For example, when a malnourished prisoner presents, prison health practitioners should consider screening for possible TB infection.

Two in five TB infections were detected in the first six months of a prisoner’s term, and about 40% of these had a history of previous imprisonment. By isolating cases of infection early, it is possible to more successfully control early transmission within this confined environment.

The diagnostic facilities provided by ICDDR,B to the existing programme have strengthened detection capacity: there have been twice as many cases diagnosed by ICDDR,B than the existing prison TB control system during the project period. Our laboratory services have allowed for positive identification of scanty or paucibacillary cases and to detect TB in cases previously diagnosed as negative through microscopy in the prevailing prison system. Moreover, more than one in five of all positive cases were confirmed by culture sampling that currently cannot be provided by the existing prison laboratory facilities.

There is an urgent need to continue this study to both ensure continuity of the service and enhanced diagnostic ability, and to generate sufficient information to support the scale-up of evidence-based interventions in prison settings.

This exploratory study highlighted some of the steps that prison authorities should take to reduce the public health risks of imprisonment, spawning some practical recommendations on controlling the spread of tuberculosis and other infectious diseases in the local context:

1. Active screening of at-risk prisoners at entry point into jail
2. Improvement in the prison laboratory facilities
3. Perform culture sampling of suspected cases which have negative sputum microscopy results
4. Improve prison x-ray facilities (for AFB -ve suspected cases)
5. Prisoner education/motivation (TB signs/ symptoms, stop spitting, regular anti-TB drug intake)
6. Develop proper referral system post jail release
7. Strengthening TB control programme in other jails of country
voluntary counselling and testing

A gateway to HIV prevention and care

HIV and AIDS are development issues, intrinsically linked to cultural, social and economic determinants, which therefore demand a wide and accelerated response. The Government of Bangladesh remains firm in its political commitment to combat HIV, to maintain Bangladesh’s status as a low prevalence country, and to achieve the goal of halting and reversing the spread of HIV by 2015.

In addition to HIV research for over a decade, ICDDR,B has been leading the way in the response to HIV/AIDS in Bangladesh through the provision of voluntary counselling and testing (VCT) services. Being a low prevalence country, efforts are focussed on HIV prevention in Bangladesh and the smaller number of people who are living with HIV/AIDS lack services. In 2002, ICDDR,B opened the first VCT centre to provide the full range of confidential and voluntary counselling and testing with quality control in Bangladesh, called Jagori. In just five years, Jagori services have been expanded to three key cities around the country and in 2007, several other organizations have more than fifty testing centres around the country.

VCT is a critical component of a comprehensive response to the HIV epidemic, providing entry points to HIV testing and promoting testing as a more routine practice. Counselling and testing services work to both determine people and populations who require care and treatment, as well as working as a key prevention technology.

People attending Jagori are offered counselling to reduce any high-risk behaviours, such as reducing the number of sexual partners, increasing condom use, and safer injecting practices. People testing positive to HIV are taught how to prevent transmitting the virus to others.

In addition to VCT, Jagori also provides clinical services. Primary health care, including management of sexually transmitted infections; referrals to other specialists, such as antenatal care, skin specialists, and clinical psychologists; and management of post-exposure prophylaxis are all available. As VCT is an entry point for care and support of people living with HIV or AIDS, clinicians also provide outpatient consultation, such as CD4 cell consultations, management of HIV-related opportunistic infections, nutritional counselling, clinical support for antiretroviral therapy, clinical counselling for adherence to antiretroviral drugs, anti-TB drugs, drug interactions and their management, and consultation regarding prevention of parent-to-child transmission of HIV. Jagori works closely with two HIV positive support groups in Bangladesh, referring anyone testing positive to HIV infection to services from either of these groups.

Other Jagori services include

- providing training for counselling and clinical practice to other organizations upon request
- providing a supportive environment for people who identify themselves at risk for HIV
- documenting HIV prevalence among people who identify themselves at risk for HIV
- contributing to the Government of Bangladesh’s passive case reporting for national HIV/AIDS figures

Jagori also works to promote a more positive community response to HIV and AIDS. Knowledge about HIV can stimulate discussion, thereby reducing stigma and discrimination. It encourages community action to address the issue, including the adoption of HIV/AIDS-sensitive policies.

For more information about Jagori services, visit www.icddrb.org/activity/Jagori.
Jagori in 2007

- Providing VCT for men-who-have-sex-with-men government projects in two cities
- Providing VCT for 20 NGOs working with most-at-risk populations
- Providing VCT services to staff of different organizations
- Providing VCT orientation to external healthcare workers
- Involved in a clinical study monitoring HIV-positive patients every six months, examining drug resistance and testing a new, cheaper tool for disease monitoring
- Offering full and comprehensive services related to Prevention of Parent to Child Transmission of HIV for the first time. All pregnant women coming to Jagori are invited to participate in the study which provides antiretroviral drugs for treatment and prophylaxis for both the HIV-positive mother and the baby; referral for delivery; different tests; and counselling for nutrition and safer infant-feeding practices.
Influenza: on our agenda

Acute respiratory infections cause more than one in five childhood deaths in Bangladesh and pneumonia is the leading cause of death among children under five years of age. ICDDR,B’s urban surveillance system identified influenza virus as an important pathogen causing acute respiratory illness, therefore efforts to reduce childhood mortality should consider strategies for influenza prevention.

The World Health Organization warns that there is a substantial global risk of an influenza pandemic that could kill millions of people within the next few years. Experts fear that the highly pathogenic H5N1 avian flu virus – which by the end of 2007 had killed 212 people globally out of 343 infections reported since 2003 – might mutate into a form that spreads easily from person to person or might combine with the highly contagious seasonal influenza virus.

Avian influenza was first detected in Bangladesh in February 2007 near the capital Dhaka, and has since spread to at least 22 of the country’s 64 districts, forcing authorities to kill more than 300,000 chickens and destroy nearly three million eggs in the first ten months since its outbreak. There are around 150,000 poultry farms in Bangladesh, with an annual turnover of approximately US$750 million, and about 4 million Bangladeshi people are directly or indirectly associated with poultry farming.

When an outbreak of avian flu in poultry was identified, ICDDR,B was prepared. The global strategy for pandemic influenza emergency preparedness seeks to ensure that developing countries have the systems and surveillance in place to identify any human avian flu infections. Encouraged by the international commitment to this issue, ICDDR,B had mobilized and leveraged resources, and in 2007 received a significant funding boost from the US Department of Health and Human Services and Centers for Disease Control and Prevention to elevate the issue on the national agenda and strengthen Bangladesh’s capacity to develop successful early warning systems to identify, contain and respond to a pandemic influenza.

In 2004, ICDDR,B established the first (and until this year, the only) community-based influenza surveillance system in the country. Beginning in April that year approximately 5200 children under five years in one urban area were under regular weekly surveillance for respiratory illness. By the end of 2007, almost 112,000 children had been assessed by our clinic, of which more than 12,000 met the criteria for acute respiratory illness surveillance and 13% were found infected with influenza. Testing revealed that both strains of Influenza A virus (H1N1 and H3N2) and Influenza B virus (Shanghai and Hong Kong) currently circulating within Asia are also circulating within Bangladesh, which suggested that if H5N1 avian influenza is circulating amongst poultry in Bangladesh, there is an opportunity for human co-infection with human and avian influenza strains.

These are data from children under five years. The impact of influenza infection on adult health in Bangladesh is unknown, but the high incidence among children and the multiple circulating strains suggest that influenza virus may also be an important respiratory pathogen in adults. Further research could clarify the magnitude of the problem and permit evaluation of the cost-effectiveness of routine influenza vaccination.
Poultry surveillance for influenza began for the first time in Bangladesh in 2007.
In 2007, ICDDR,B scaled up its influenza agenda in three directions: infrastructure, surveillance and epidemiology

Bangladesh is currently taking steps to understand transmission of influenza in poultry, to describe the epidemiology of human influenza infections, and to support pandemic planning and preparedness.

ICDDR,B is partnering with the Government of Bangladesh through the Institute of Epidemiology, Disease Control and Research, and the Department of Livestock Services, in a collaborative approach to improve local readiness by integrating livestock management structures with expertise in human health and zoonoses.

Building capacity: improving lab infrastructure

Initial steps to scale up capacity require building infrastructure – improving the technology available in-country to be able to detect which influenza viruses are circulating and how frequently they occur. Efficient and timely surveillance to identify and monitor the progress of influenza outbreaks is critical to the local and regional response.

Existing facilities at our ICDDR,B virology laboratory allowed for tissue culturing to determine the influenza strain collected from samples in population surveillance studies, but this can be both time and resource intensive. The high case-fatality associated with avian flu means that samples can only be cultured safely in a laboratory environment designed to protect staff, the environment, and the community, so in November 2007, to meet the demand of increasing surveillance, facilities were renovated to create a Biosafety Level 2 laboratory, with upgraded capacity for rapid testing of multiple influenza virus types, including H5N1. Simultaneously, construction of the first Biosafety Level 3 laboratory in Bangladesh also began which will enable a more thorough characterization of viruses found in human samples.

Surveillance in humans

In April 2007, ICDDR,B began collaborating with the Institute of Epidemiology, Disease Control and Research of the Government of Bangladesh to establish the country’s first nationwide influenza surveillance in humans. In a groundbreaking public-private partnership, samples are being collected from both public and private hospitals across the country – the first time for any disease surveillance system in Bangladesh.

Within a month of the H5N1 outbreak being identified in poultry farms across the country, ICDDR,B was collecting samples from patients with severe respiratory disease in one hospital. By September 2007, samples were being collected from 12 hospital sites. By December 2007, throat and nasal swabs had been taken from 1045 people around the country who reported to hospital with severe acute respiratory illness (fever, cough, sore throat, difficulty breathing) or influenza-like symptoms (fever, sore throat, cough). To date there have been no cases of human H5N1 infection identified. Scientists have also been looking for clusters of severe respiratory disease – two or more patients who reside within thirty minutes of each other – which would
In 2007, throat and nasal swabs were taken from 1045 people around the country who reported to hospital with symptoms of severe acute respiratory illness. No cases of H5N1 were found.
indicate a potential outbreak of human-to-human spread. In nine months of surveillance in 2007, no clusters were found but scientists did find large numbers of people with influenza – 42% of which worked with or raised poultry. Domestic poultry is raised on farms throughout Bangladesh, ranging from families raising a few chickens to produce eggs and meat for their own consumption, to small operators who sell eggs and poultry to their neighbours, all the way up to large commercial enterprises. Many residents of Bangladesh have regular contact with live poultry. Bangladesh also has one of the highest human population densities in the world, and as a result, there is a higher risk of new influenza strains emerging from Bangladesh than from most other countries.

Surveillance in poultry

Animal surveillance began for the first time in 2007 in three sites across Bangladesh (Chittagong, Rajshahi and Netrakona). ICDDR,B is collecting specimens from ducks at small live markets, which enables scientists to trace any infections back to a specific village, and often, the actual owner. Ducks have been selected for surveillance as they are silent carriers of influenza; they could shed influenza virus without showing any signs of disease. The opening of a specialized animal laboratory at ICDDR,B in 2008 will enable the frozen samples to be tested for influenza, providing an exciting advance in surveillance for outbreaks in poultry.

Strengthening epidemiology for prevention

Several epidemiological studies were in the planning phase during 2007, including studies to understand how treating patients with oseltamivir (Tamiflu) changes transmission dynamics in a community; the population incidence of infection, seasonality and age distribution; and the risk factors associated with severe influenza disease.

An exciting anthropological study will begin in early 2008 to understand interactions between backyard poultry raisers and their flocks – looking at cultural practices which may help or hinder the transmission of H5N1 and other avian influenza viruses to humans. The information will be used to describe risks faced by backyard poultry raisers and improve prevention messages in communities.
In nine months of surveillance in 2007, we found that 42% of people with influenza worked with or raised poultry.
To provide policy makers with adequate information for developing strategies to reduce childhood deaths in Bangladesh, ICDDR,B collaborates with government and non-government hospitals to generate essential data on pneumococcal disease and *Haemophilus influenzae* type B – two vaccine-preventable diseases that kill many children every year. The Centre conducts surveillance of pneumonia, meningitis and other severe illnesses among children less than 5 years of age at seven hospitals and at two community field sites. Establishing local evidence of the burden of pneumococcal disease is essential to the effort to prevent these infections. Effective vaccines exist for both these infectious diseases but a lack of data and high costs remain barriers for their introduction, acceptance and use.

Since 2001 there have been seven serious outbreaks of Nipah virus infection in Bangladesh, with a fatality rate of 71%. In response, ICDDR,B has been conducting a Nipah surveillance study in collaboration with the Institute of Epidemiology, Disease Control and Research since 2005 to identify outbreaks, understand transmission dynamics and improve local laboratory capacity for diagnosis. The project works with 6 medical college hospitals and 4 district hospitals, providing training and disseminations to key personnel and working with a study physician, responsible for case management, at each site.

ICDDR,B coordinated the efforts of the National AIDS/STD Programme and the Directorate General of Health to update the National Guidelines for Management of Sexually Transmitted Infections. The revised edition includes the most recent management practice for treating sexually transmitted infections in Bangladesh, providing an effective tool for service providers which should result in more effective control and prevention of STI and HIV in the country.

Responding to evidence that sexually transmitted infections increase the risk of HIV, ICDDR,B conducts surveillance for drug resistance of *N. gonorrhoea* in an urban field site. Initial resistance to ciprofloxacin, the drug of choice, was only 3%, but has increased steeply to over 95% in 2005. Surveillance helped identify the development of an antimicrobial resistance pattern and contributed to the application of the right antibiotic treatment against *N. gonorrhoea*. 
Very little is known about what factors are associated with drug-resistant tuberculosis (TB) in Bangladesh. Better understanding of prevalence and issues are key to the effective control of TB in the country. ICDDR,B works in collaboration with the National TB Control Programme to conduct surveillance of multi-drug resistant TB at one urban clinic in Dhaka. This surveillance is the only source of data on drug resistance patterns in Bangladesh using systematic sampling techniques. Out of 657 cases, resistance to one or more drugs was observed in 48.4%. Multi-drug resistance was observed in 5.5%, and significantly higher among persons who had previously received tuberculosis treatment of one month or more.

Visceral leishmaniasis (or kala azar) is a serious illness transmitted by sandflies, with a high mortality rate, endemic in many districts of Bangladesh. In collaboration with key government health institutes, ICDDR,B will strengthen the surveillance of kala azar as part of the government’s elimination programme. Partnering with CDC, a study was conducted in an area of high incidence in northern Bangladesh. Village health volunteers were trained to identify suspected cases and refer them to the government health care facilities. Some IT facilities were introduced to facilitate a faster response during an epidemic or non-response to therapy due to drug resistance.

The Health and Science Bulletin (HSB) is a quarterly publication from ICDDR,B which communicates results of our routine infectious disease surveillance, as well as other new health research findings, to the Bangladeshi public health community in both Bangla and English.

To address a gap in data on the prevalence of human papillomavirus in Bangladesh, especially in the context of cervical cancer, ICDDR,B collected specimens from four regional health complexes in collaboration with a national institute. Early results have shown that large numbers of women are in fact affected by this virus. Information is also being collected on which types are circulating, which can be used for designing an appropriate vaccine programme in the future to combat cervical cancer.

Visceral leishmaniasis (or kala azar) is a serious illness transmitted by sandflies, with a high mortality rate, endemic in many districts of Bangladesh. In collaboration with key government health institutes, ICDDR,B will strengthen the surveillance of kala azar as part of the government’s elimination programme. Partnering with CDC, a study was conducted in an area of high incidence in northern Bangladesh. Village health volunteers were trained to identify suspected cases and refer them to the government health care facilities. Some IT facilities were introduced to facilitate a faster response during an epidemic or non-response to therapy due to drug resistance.
The MDGs constitute an interconnected agenda for action, and making progress on the environmental goals of MDG 7 is essential to sustainable progress in meeting other goals. Environmental sustainability is about meeting human needs without undermining the capacity of the planet’s ecological systems to support life over the long term. For example, the livelihoods of the rural poor rely heavily on natural resources, affecting the eradication of extreme poverty and hunger. Policy interventions must factor in the strong links that exist between health and education outcomes, nutrition, and environmental factors — water and sanitation, pollution, and climate change.

About 80% of the world’s people live in places where the only available water is unsafe. In many countries, polluted water accounts for more sickness than all other causes of disease combined. Every year in Bangladesh 75 million episodes of diarrhoeal diseases occur that result in approximately 110,000 deaths. The Government of Bangladesh alone spends US$80 million per annum in addressing this problem. One of the key reasons for the high incidence of diarrhoeal diseases is the use of contaminated water.

**Target 9**
Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources.

**Target 10**
Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

**Target 11**
By 2020, have achieved a significant improvement in the lives of at least 100 million slum dwellers.
Blue-green algae share a highly successful symbiotic relationship with cholera bacteria.
Climate change and cholera

The ecology of cholera

Bangladesh provides a large natural ecological niche for *Vibrio cholerae* – contributing to the significant burden of diarrhoeal disease. Most vibrio bacteria are harmless to humans, but some toxin-producing *V. cholerae* cause severe human disease. At the ICDDR,B hospital, *V. cholerae* causes 20% to 30% of the cases of severe diarrhoeal disease each year.

Cholera is a disease of poverty and poor sanitation. Being waterborne, ecology has a significant mediating role in the relations between surface water *V. cholerae* and the population interacting with the water. Increased understanding of this water ecology over the last decade has revealed its role in the seasonal pattern of outbreaks of the disease in endemic areas. Recent studies are beginning to reveal the mechanisms associated with seasonal cholera epidemics in endemic areas such as Bangladesh, transmission and mode of persistence of *V. cholerae* in the environment, and the relationships between its evolution and selection through human disease.

In areas where cholera is endemic, there is a clear seasonal pattern of epidemics. Cholera occurs seasonally in Bangladesh: summer (March to May) and winter (September to November). The two annual peaks in the number of cases are variable in size, and the variability is directly related to climate events. A complex interplay of environmental, genetic, ecological and socioeconomic factors maintains cholera’s seasonality.

Cholera remains endemic in Bangladesh due to the mechanism *V. cholerae* has for surviving in the environment in between the two epidemic seasons. During non-epidemic time, the vibrio bacteria cannot be found in the environment, and ICDDR,B scientists have long been involved in the ongoing search for the natural reservoirs of cholera. The concept of an environmental reservoir of *V. cholerae* implies not only that the bacteria survive, in whatever form, but that they form an essential component of the ecosystem.

For almost three decades, ICDDR,B has been researching the role of aquatic flora and fauna as the reservoirs of cholera – mainly zooplankton (namely the copepod) and blue-green algae – to determine the mechanisms regulating the environmental persistence of cholera in brackish and freshwater ecosystems. Two kinds of reservoirs exist in the environment, both facilitating the survival of the cholera bacteria in association with zooplankton and blue-green algae: temporary reservoirs and permanent reservoirs. Closed water systems such as ponds, found everywhere throughout the country, can act as temporary reservoirs from where the vibrios can be transmitted seasonally into the local population due to seasonal multiplication of algal bloom that lead to zooplankton bloom. The regular and continuous microbiotic cycles.
of blue-green algae and zooplankton in ponds provide favourable growth conditions for vibrios: access to large sources of nutrients, optimal pH and increased salinity – all of which lead to a rapid multiplication of the bacteria.

Climate change and the transmission dynamics of cholera

ICDDR,B researchers interested in how global cyclic changes in climate might influence the spread of cholera study the survival of the bacteria in the environment and particularly, the evolution of the species to attain increased fitness both as a pathogen and an environmental organism. Bi-weekly clinical and environmental surveillance at remote coastal villages in a mangrove area close to the Bay of Bengal, where cholera is endemic, suggests that the aquatic environment close to the bay serves as the niche where the cholera bacteria survive year round. From ongoing ICDDR,B studies of the coastal ecosystem, it appears a number of climatic factors are predictive of cholera outbreaks. For example, numerous cholera cases are observed when water depth in water bodies falls, leading to elevation of water temperature, salinity and conductivity. Studying the bacterial community dynamics in the aquatic ecosystem in relation to the ecology of *V. cholerae*, further refines our model of cholera transmission.

How will climate change affect the habitat, and therefore the behaviour, of cholera? What are the triggering mechanisms which produce increases of *V. cholerae* in environment? Given that increased temperatures and exposure to sunlight both are favourable growth conditions for vibrios, climate change is likely to lead to the enhanced survival of cholera. Global warming will create more favourable conditions for multiplication of algae and zooplankton in aquatic environments, and therefore the reproduction of *V. cholerae*. Since cholera is waterborne and the species is part of the normal aquatic flora, increased survival in the environment may favour epidemic or pandemic spread of the pathogen: warmer waters will enhance the growth of the vibrio bacteria, causing more disease.

Our surveillance is proving successful and the data will be used for predicting outbreaks of cholera and related diarrhoeal infections not only in Bangladesh, but also in other countries with similar aquatic environments, thereby allowing early mobilization for treatment and preventive measures.
What do we know about handwashing, sanitation and safe water use in Bangladesh?

About 80% of the world’s people live in places where the only available water is unsafe. In many countries, polluted water accounts for more sickness than all other causes of disease combined.

Diarrhoea and respiratory disease are leading causes of childhood death both globally and in Bangladesh. Despite the fact that Bangladesh has experienced more than a 90% reduction in the incidence of childhood diarrhoea death over the last 25 years, of the four million children born each year, estimates suggest that over 20,000 children will die from diarrhoea.

Small-scale focused interventions have demonstrated that efforts to improve handwashing behaviour, sanitation and water quality can improve childhood health, and that handwashing with soap reduces diarrhoea. There is also evidence that handwashing with soap reduces respiratory disease.

Effective environmental sanitation is made difficult by the poverty and population density in Bangladesh. Various approaches are being used, but there has been little critical evaluation of their effectiveness in reducing diarrhoeal disease. Most important will be efforts to change community norms by not only educating how to effectively reduce contaminations through water purification and storage, but by motivating for behaviour change. Efforts to creatively deliver and assess behaviour-change messages at scale will therefore be critical.

**SHEWA-B**

The Sanitation, Hygiene Education and Water Supply in Bangladesh (SHEWA-B) programme is a large project being implemented by the Government of Bangladesh and UNICEF. It is perhaps the largest intensive hygiene, sanitation and water quality improvement programme ever attempted in a developing country.

The intervention uses community hygiene promoters to reach 30 million people by 2011 with improved hygiene practices and improved access and use of sanitation technologies. Over 5 million of these people will have year-round access to safe water ensured. Longer term, the project aims to influence the government’s water and sanitation policies.

ICDDR,B is evaluating the health impact of this intervention on the target communities, focusing on handwashing behaviours, safe water access, and sanitation. The potential impact of this intervention will be significant to the people of Bangladesh, but also important to the global public health community, as the effectiveness of this approach at this scale has not been evaluated previously.
The SHEWA-B project is reaching 30 million people in Bangladesh with safe water by 2011.
A baseline evaluation was completed in 2007 to assess original conditions, behaviours, and health in randomly selected intervention communities and matched nearby non-intervention communities.

The indicators for the evaluation of health impact include incidence and mortality of diarrhoea and acute respiratory illness. Changes in key health behaviours such as having access to a latrine and washing hands at key times are also being evaluated, as is the financial benefit to households from illness prevented. Importantly, careful evaluations of poverty will be performed to assess the effectiveness of these interventions in reaching the poorest households.

Handwashing

People's knowledge of key hygiene behaviour practices such as handwashing with soap or ash before eating, feeding a child, and after defecation or cleaning a child's anus at key times, using a hygienic latrine, disposal of children's faeces in pit/sanitary latrine and keeping the latrine clean, was measured. Overall a good proportion of mothers and children were able to demonstrate appropriate handwashing knowledge, however reported use of soap was much higher than actual use. More than 99% of people did not use soap for food-related activities, such as preparing food, eating or feeding a child. Higher-income households had a greater awareness of hygiene behaviour practices, while the use of ash rather than soap was more common among lower-income households.

Safe water use

Knowing to use water from safe sources such as a tubewell for drinking, cooking and cleaning food was assessed. This included the importance of drawing water from arsenic-free sources and its safe storage. Despite high awareness about these practices, a significant number of households are still using water from unprotected sources and from arsenic contaminated sources. Gender inequalities in terms of water collection, preservation and maintenance of household water points were found.

Sanitation

People's sanitation knowledge, infrastructure and practices were measured. Around 60% of households throughout the country were found to be using unhygienic latrines, and almost one in six people engage in open defecation, most commonly from the lower income groups. The majority of the latrines being used are not cleaned properly, soiled by faecal remnants. More than nine times out of ten a child's faeces is not being disposed of properly, but rather deposited in different locations outside of the home.

Overall, a surprising and significant number of people are not washing their hands and following basic standards of hygiene. There is a significant difference between people's 'reported' and 'observed' practices: people's adequate knowledge about safer water practices is not being reflected in their behaviour. Greater understanding of this gap between knowledge and behaviour is needed to improve the effectiveness of handwashing promotion programmes. Further qualitative research is required in order to ensure the success of the SHEWA-B project, especially if it is to be taken to scale nationally.

In 2009 these assessments will be repeated to monitor changes at the halfway point, and an endline survey is scheduled for 2011. Sentinel surveillance was also established in 2007 which will continue for two years collecting information on health outcomes and water quality.

<table>
<thead>
<tr>
<th>What we know...</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Handwashing is fairly common, but use of soap is not</td>
</tr>
<tr>
<td>2. Handwashing behaviours are over-reported compared to actual practice</td>
</tr>
<tr>
<td>3. Cleanliness of latrines is not being maintained</td>
</tr>
<tr>
<td>4. Unhygienic disposal of child faeces is common</td>
</tr>
<tr>
<td>5. The use of unhygienic latrines is high</td>
</tr>
<tr>
<td>6. Poorer households demonstrate a lower rate of hand hygiene behaviour &amp; sanitation practices</td>
</tr>
</tbody>
</table>
Drinking from dirty water sources can lead to diseases such as diarrhoea, which kills 5000 children every day.
Street dwellers’ health in Bangladesh

Studies in Dhaka city have found an increase in the number and proportion of people living on the streets and in urban public places due to the increasing pressures of internal migration and rapid urbanization. This floating population of street dwellers consists of thousands of people with no fixed dwelling in the major towns and cities of Bangladesh, who are likely to be amongst the most deprived in urban areas in terms of basic facilities and health indicators.

There are no reliable estimates of the total number of homeless people who live on the streets of Dhaka and in the smaller cities and towns of Bangladesh but the number could easily exceed a few million. Individuals and families take shelter where they can – under flyovers, in parks, at bus and railway stations, in shop fronts, or on pavements.

Regardless of the reasons people live on the street, they are often blamed for crime and other antisocial activities that occur in cities, including commercial sex work, begging and drug use. Lacking regular employment and trapped in a vicious cycle of poverty, deprivation and social ostracism, with barely sufficient income to keep them above starvation level, some turn to crime. If acknowledged at all, city authorities are likely to view street dwellers in terms of social and environmental problems they may cause, such as blocking footpaths or creating hygiene hazards. In terms of public health, large numbers of poor people living in unsanitary conditions without access to proper health care can constitute a source for disease transmission. People without sustainable access to safe drinking water and basic sanitation are also at significant risk for health problems.

In Bangladesh, while a few non-government organizations are providing health and related services for the urban homeless, there is no comprehensive programme and little coordination of activities between agencies to address health needs. Likewise, city corporations and government health service providers have not established specific policies or strategies for providing targeted health services for this population. Street dwellers in Bangladesh (apart from sex workers) are not organized or empowered to lobby authorities to address their needs, and consequently their health needs remain largely unmet through the formal government health structures. The Essential Services Package provided through the Government of Bangladesh and non-government organizations since 1998, includes reproductive health care, child healthcare, communicable disease control, limited curative care, and behaviour change communication at the primary healthcare level of rural and urban areas.

With a view to addressing MDG 7 in achieving significant improvement in the lives of at least 100 million slum dwellers globally by 2020, health systems researchers at ICDDR,B, in collaboration with Marie Stopes Clinic Society and Aparajayo Bangladesh, completed a project in 2007 working with this population for the first time. We sought to determine if, and to what extent, basic health care needs are being met through the existing Essential Services Package facilities near the main street dweller locations in Dhaka and identified care-seeking behaviour and perceived barriers to access by street dwellers.

The street dwellers reported extremely high levels of illness and disease. Access to maternal healthcare and family planning was poor and most street dwellers were not aware of the government services available to them and did not use any healthcare facilities. The street dwellers who did visit healthcare facilities went to the nearest pharmacy or the Marie Stopes mobile clinics.

Most street dwellers were not aware of the government services available to them and do not use any healthcare facilities
Street dwellers are amongst the most deprived populations in urban areas in terms of basic facilities and health indicators.
Living on the street also resulted in significant unhygienic practices, which both pollute the environment and threaten health. Little or no access to safe drinking water and basic sanitation results in almost all the street dwellers using roadside open spaces and drains for defecation. Options for hand washing after defecation are limited with some people able to use water but no soap, while others rubbing hands on the ground, or with ash.

Drug use, violence and sexual harassment were common features in the lives of this vulnerable population. Eighty-three percent of female street dwellers report being assaulted while living on the street.

83% of female street dwellers report being assaulted while living on the street

and government agencies working with this marginalized group of people. ICDDR,B is assisting the Ministry of Health and Family Welfare, city corporations and non-government services in acknowledging the presence and needs of this vulnerable group, and informing the development of strategies for providing more appropriate and tailored healthcare services.

I am Banu and I came to Dhaka from my village 200 kilometres away. After getting married in my village, I gave birth to a son, but my husband always used to assault me. After living with him for two years, he divorced me when my child was two and kept my son with him. After that I went to my father's house but my parents' financial condition is not good. So I left my father's house and came to Dhaka with one of my aunts who advised me to do sex work to earn money. I don't need to live in a rented house as I am a sex worker – I can work on the street and sleep on the street. But now I'm sick with a sexual infection and I can't eat and feel weak. Sometimes I can't work but people are always disturbing me for this. Sometimes I wish I lived in a rented house to avoid this problem but home owners don't want to rent to me as I'm a street dweller and I have no husband, plus I can't afford house rent with my income. Police often demand sex but I won't do this without getting paid so they beat me. A man who lives in the street with us has also raped me twice.

Banu lives at Dhaka's largest boat terminal

My name is Jorina and I am twenty-five years old. While living in my village I got married but my husband used to beat me for dowry, which my father was unable to give, so he divorced me. My father and stepmother have no property so I came to Dhaka to find work. Dhaka was totally unknown to me and at first I had no idea where to live or what to do. I came to the High Court shrine premises after roaming around for some time after seeing people begging and staying here at night. I had begun to earn money through sex work but stopped and now collect waste materials to sell. I married a man again seven months ago but he's a drug addict and spends all his money on drugs. I'm six months pregnant now but am very sick, suffering from fever, body pain and a sexual infection. I can't take any treatment for these problems because I can't afford it.

Jorina lives at the High Court shrine
People without sustainable access to safe drinking water and basic sanitation are at significant risk for health problems.
Efforts at improving drinking water quality through point of use purification can markedly reduce diarrhoea. ICDDR,B scientists have developed the Siraj Mixture – a precise combination of alum potash, bleaching powder and lime – which can purify 15 litres of surface water from a pond, river, lake or canal within 30 minutes, to meet the minimum WHO standard for drinking. It is especially useful during natural disasters like floods and in areas where ground water is contaminated with arsenic, but its effectiveness needs to be demonstrated at larger scale.

ICDDR,B scientists at our rural surveillance site have been using geographic information system (GIS) technologies to analyze trends and create disease maps. GIS allows a closer study of the epidemiology and ecology of V. cholerae, and has also been used to track Aedes larvae and dengue outbreaks in urban areas. Our rural health and demographic surveillance GIS collects spatial data identifying objects like tubewells, ponds, rivers, roads, and health and educational facilities as well as villages and bauris (clusters of households), to support ICDDR,B research.

Specialists for over 40 years in waterborne and diarrhoeal diseases, our researchers have considerable experience in measuring the effects of floods on the health of Bangladeshi people, and in developing solutions to address these. This led to a policy roundtable discussion with government this year to address public health issues in post-flood situations, such as food and nutrition, continuing outbreaks of disease, maternal and child health, and disease prevention.

Climate change is likely to have several important impacts on Bangladesh, the most significant of which may be sea-level rise. During 2007, ICDDR,B scientists have begun considering how climate change may affect the future public health of Bangladesh. Infectious diseases which may be susceptible to climate change include cholera, malaria, tuberculosis, kala azar, dengue fever, and Nipah virus. Therefore ‘environment, climate change and health’ was selected as one of the six priority areas for funding from the Centre’s core research funds.
MDG 8 represents a global partnership for development, addressing how countries can work together to achieve Goals 1 to 7. Developing countries need do more to ensure their own development, through greater accountability and more efficient use of resources. Developed countries should support them through more aid, debt relief, better opportunities for trade and accelerated transfer of technology. MDG 8 covers many areas, ranging from the fairness of the multilateral system to youth employment, technology, development assistance, debt relief and the special needs of developing states. The MDGs remain achievable for most countries if stronger efforts are made both by the countries themselves and their development partners in the spirit of mutual accountability for these goals.

Target 13
Address the special needs of the least developed countries.

Target 18
In co-operation with the private sector, make available the benefits of new technologies, especially information and communication.
Mainstreaming nutrition

As part of its collaboration in the Mainstreaming Nutrition Initiative (MNI) – a global partnership catalyzing the integration of priority nutrition actions into health sector policies and programmes worldwide – ICDDR,B works with the Program in International Nutrition at Cornell University, the Department of Health Promotion, Education, and Behavior at the University of South Carolina, Aga Khan University and the International Food Policy Research Institute, under this project funded by the World Bank. These key global players advocate for a convergence of the nutrition agenda with the maternal and child health agendas in countries trying to achieve hunger, child mortality and maternal health targets by 2015. Building on a network of existing programmes in different countries, MNI forms a learning network in order to build local capacity and leadership, share knowledge about successful programmes, and to develop eminent long-term programmes on nutrition.

Malnutrition remains the world’s most serious health problem – as well as the single largest contributor to child mortality. Half of all childhood mortality could be averted by eliminating malnutrition. Nearly one-third of children in the developing world are underweight or stunted, and more than 30% of the developing world’s population suffers from micronutrient deficiencies. Asia still has the largest number of malnourished children in the world. More than 3.6 million mothers and children die each year as a result of undernutrition. The very high mortality and disease burden resulting from these nutrition-related factors make a compelling case for the urgent implementation of proven interventions.

www.globalnutritionseries.org

A global review of nutrition interventions led by ICDDR,B and Aga Khan University contributed to the Lancet’s Series on Maternal and Child Undernutrition.

More than one third of child deaths and 11% of the total disease burden worldwide are due to maternal and child undernutrition. These and other stark findings are the conclusions of this international collaboration of investigators publishing new findings in this special Lancet issue.

Strengthening international action against undernutrition

A review of scaling up interventions through actions at national and global levels concluded that international action against undernutrition is currently ineffective and desperately in need of reform if Millennium Development Goals are to be achieved.

Progress is possible, if nutrition becomes a priority

The global nutrition system – made up of international and donor organizations, academia, civil society, and the private sector – is fragmented and ineffective. For example, most countries with high levels of undernutrition are failing to reach undernourished mothers and children with effective interventions. Lack of evidence for prioritized action, institutional inertia, and failure to link promising developments in parallel sectors, all contribute to missed opportunities to realize the priority of nutrition for development, and make a difference for the 67 million children born each year severely affected by undernutrition.

Nutrition issues are often dealt with in isolation by different sectors and organizations. This lack of communication and collaboration across sectors to address problems in a unified manner has contributed to poor nutritional outcomes.
Catalyzing the integration of priority nutrition actions into health sector policies and programmes worldwide
Many countries and their development partners need to work towards improving nutrition not only through health but through agriculture, rural development, water supply and sanitation, social protection, education, and community driven development. In order for this to occur, countries need to make nutrition a priority and establish clearly defined nutrition policies. Nutrition education, food distribution and security, nutritional rehabilitation, micronutrient programmes and immunization must be integrated together in a way that is sustainable.

With funding provided by international donors to combat undernutrition is grossly insufficient and poorly targeted: food aid and supply-led technical assistance is prioritized to the detriment of investment in human and institutional capacity for nutrition in low-income and middle-income countries.

5 priority areas for action identified

a. A new global governance structure, bringing all stakeholders in undernutrition together.
b. UN Standing Committee on Nutrition should make individual UN agencies accountable for results.
c. Less duplication by parallel organizations.
d. Increased investment in capacity strengthening in countries with high burdens of undernutrition, with strengthening of regional and sub-regional networks a priority.
e. Research leadership: academic journals to develop strategy to increase profile; major donors to clarify how funding will reduce imbalances; and research and training groups in high-income countries to progress scaling up of successful nutrition projects.

The MNI draft framework and approach for integrating health and nutrition actions were developed in 2006, and are being tested intensively in Pakistan, Vietnam, Bangladesh, Bolivia, Peru, Uganda, and Ethiopia. In each of these countries, MNI staff have worked closely with country focal persons to examine different issues pertaining to the mainstreaming of nutrition.

MNI in Bangladesh

MNI is working with the largest NGO in Bangladesh, BRAC, to identify the most effective and appropriate strategies for delivering interventions related to nutritional care during pregnancy and infant and young child feeding practices through BRAC’s new Maternal, Newborn and Child Health (MNCH) programme. Based on formative research, targeted behaviour change communication materials are being developed for mothers and health workers, providing key messages about breastfeeding, caring practices and complementary feeding.

MNI in Pakistan

In consultation with the National Program for Family Planning and Primary Health Care, Aga Khan University has initiated a mainstreaming programme to deliver enhanced packages of nutrition interventions in Sindh. Government-employed Lady Health Workers who visit homes with simple medications and messages now have zinc tablets, micronutrient sprinkles and information about complementary feeding as part of their new toolkit and training.

For further information visit mainstreamingnutrition.org.
Improving child health and nutrition in low- and middle-income countries through research that informs policy and practice.
A global partnership for child health and nutrition: CHNRI

The Child Health and Nutrition Research Initiative (CHNRI) is a dynamic grouping of individuals and entities interested and active in child health and nutrition research. The group includes:

- representatives of the scientific community, universities and research institutions in low- and middle-income countries
- international research institutions, groups and networks
- WHO programmes
- multilateral programmes, bilateral organizations and UN bodies
- non-government organizations
- donor foundations and funding agencies
- representatives from the public sector and policy makers.

The resulting collaboration takes advantage of the multiple strengths of these partners, encouraging progress at the most appropriate level considering the special needs of developing states. Activities are supported by the resources of all the partners who are committed to the vision and goals of CHNRI. ICDDR,B is both a partner and the current host of the secretariat, under a five-year term due to expire in December 2009.

CHNRI’s mission is to remedy the inequity in research affecting child health and nutrition in low and middle income countries. CHNRI achieves this by using evidence-based advocacy in influencing governments and funding agencies to place a higher priority on child health and nutrition research, and by strengthening the research capacity in this area.

Dedicated to advancing three of the Millennium Development Goals – eradicating extreme poverty and hunger, reducing child mortality, and combating HIV/AIDS, malaria and diseases in children – CHNRI’s vision is to improve child health and nutrition in low- and middle-income countries through research that informs health policy and practice.

In order to achieve these goals, CHNRI has defined an ambitious but realistic plan to achieve their objectives, which will serve to:

- expand global knowledge on childhood disease burden and the cost-effectiveness of interventions by commissioning and funding research into priority child health and nutritional problems, synthesis of the evidence, and disseminate the evidence to the broader global audience
- promote priority setting in research within a broadened approach to child health, nutrition and development, and thus guide investments in child health and nutrition research
- promote appropriate capacity development in low- and middle-income countries
- stimulate donor and country participation to support and increase resources for under-funded research activities
- create open forums and networks for heightened communication and discussion amongst stakeholders on child health and nutrition research to ensure research findings generate the desired impact for children with the greatest need.

Two key CHNRI activities in 2007 demonstrate the co-operation of the international community to strengthen support in addressing the special needs of developing states, operationalizing the goals of MDG 8.

Setting priorities for health research

Research can play a critical role in the response to global health challenges, but when resources are limited, tools are needed to better define the priorities for health research investments. CHNRI has been at the forefront of developing and using
a methodology to allow a more transparent and fairer approach towards setting health research priorities.

The point of difference in the CHNRI methodology is the realization that generating new knowledge should not be the sole endpoint of research. CHNRI methodology addresses several components of a research option, such as the likelihood that the results will lead to effective and deliverable interventions or the likelihood that the resulting new or improved interventions will be effective in reducing disease burden. It also incorporates the views of both technical experts and stakeholders in the process.

In 2008 CHNRI plans to implement this methodology in five low- and middle-income developing countries and identify research priorities that will help to overcome the barriers to achieving MDG4 in these countries.

At the global level, CHNRI and the Child and Adolescent Health Department of WHO have worked together in using this methodology and global childhood mortality burden estimates to define research priorities in eight topic areas that correspond to the leading causes of death in children globally: birth asphyxia, neonatal infections, low birth weight, pneumonia, diarrhoea, malaria, undernutrition and HIV/AIDS. CHNRI has also applied the methodology at the national level, setting priorities in child research investments for South Africa.

Creating a dedicated online community

CHNRI is committed to creating open forums and networks of key resources for heightened communication and discussion amongst key players working on child health and nutrition research, to ensure research findings generate the desired impact for children with the greatest need. Under Target 18 of MDG 8 – making available the benefits of new technologies, especially information and communication – CHNRI has created a web-based service that offers a one-stop portal for developing countries who both seek and want to exchange resources. The website offers the latest evidence base, providing valuable capacity building and informational resources, and a platform to initiate and maintain discussion on directions for research. Scientists and programmers can come together to assess current knowledge and directions for the future.

For further information or to join the CHNRI online community, visit www.chnri.org.
Partnering for maternal and newborn health: MotherNewBorNet

MotherNewBorNet is a regional network of organizations working on maternal and newborn health in Asia and the near east region. The network’s goal is moving research into practice: strengthening and scaling-up community-based maternal and newborn health programmes using evidence-based interventions. The secretariat is hosted by ICDDR,B with funds from the Global Research Activity of Johns Hopkins Bloomberg School of Public Health, and the CATALYST, BASICS, ACCESS and POPHI projects.

Since the first meeting was held in 2005 with 76 partners from nine countries, the network has grown to include 53 countries with 523 partners.

**Core members** are USAID-funded projects with ongoing initiatives that include one or more community-based postpartum components (such as birth spacing, neonatal, maternal health/survival, breast feeding promotion, immunization). Countries participating include India, Bangladesh, Nepal, Pakistan, Afghanistan, Indonesia, Cambodia, East Timor, Yemen, Egypt, West Bank Gaza and Jordan. Other important core members are USAID partner agencies with interests or components that could address community-based postpartum care on a wider scale in the region, provide targeted assistance to the bilateral partners, or that already have ongoing projects with such components. USAID, WHO and UNICEF representatives in the region with an interest in community-based postpartum care are also eligible and encouraged.

**Allied members** include representatives of other regional projects identified that may provide scope for learning or with whom integrated community-based projects might be developed. Bilateral or multilateral donors who may be interested in taking lessons learned to scale, addressing operations research gaps, or who have relevant community-based projects are invited, as are partnership alliances such as the White Ribbon Alliance, Healthy Newborn Partnership, Technical Group of the Safe Motherhood and Newborn Health Partnership, and professional alliances, such as midwifery associations.

MotherNewBorNet works closely with these partners to share information and ultimately, increase the use of the prevention measures to save mothers’ and newborn lives. The network is fostering regional leadership, strengthening linkages, providing technical assistance, disseminating resources and supporting national professional associations.

The current focus of the network is to improve community-based early postpartum care for mother and newborn. Early postpartum care for mother and newborn has been neglected in the past despite the heavy toll of death in this period. About 45% of postpartum maternal deaths occur during the first 24 hours post-delivery, and more than two thirds during the first week. The global toll of postpartum maternal deaths is accompanied by the great and often overlooked numbers of early newborn deaths and stillbirths.

MotherNewBorNet utilizes a number of strategies to foster collaboration and exchange amongst its members to address needs. A website and listserv for timely communication; sharing progress reports of member organizations; identifying hot topics and facilitating discussion; mapping of programmes and research; developing advocacy tools and forming advocacy groups; arranging country level workshops; developing annotated bibliographies on key issues; developing a
Strengthening and scaling-up community-based maternal and newborn health programmes using evidence-based interventions.
Collecting research evidence to scale up maternal-newborn health

In addressing the hurdle that is transferring knowledge to policy and programmatic action, MotherNewBorNet has mapped out some critical steps in its response:

- facilitating response to research and programme gaps
- advocating to promote the use of evidence-based best practices at scale
- expanding global knowledge on community-based integrated postpartum care
- sharing information on models and approaches for scaling up
- promoting donor and country support and resources for program and research activities.

The biannual MotherNewBorNet newsletter which documents and supports learning across projects and countries to address gaps in knowledge, programmes and practices outlined a package of interventions to guide NGO programming called Minimum Activities for Mothers and Newborns (MAMAN) in its late 2006 issue. The next twelve months saw members of the MotherNewBorNet network begin to implement these in their respective countries.

Providing the evidence base on best practice for post-partum haemorrhage in the 2007 newsletter saw almost immediate results, with evidence of countries going to scale within the year. Pakistan has been a leader in adopting active management of third stage of labour strategies, and Bangladesh itself has also been quick to respond. Within the government’s NGO Service Delivery Program, changes have been made to reflect the research synthesis on early postpartum care and active management of the third stage of labour.

The third annual MotherNewBorNet meeting was held in Bangkok with over 450 participants, and an almost equal representation from government and non-government agencies. Almost forty delegates from Bangladesh attended, of which a third were sponsored by MotherNewBorNet. Representatives shared information, tools, and guidelines on maternal and neonatal health, including evidence-based best practices developed by bilateral programmes, which was followed by discussion and planning for working with governments for scaling up.

Simultaneous country-level meetings provided Bangladesh with the opportunity to develop a five-year Plan of Action to scale up maternal, neonatal, child health and family planning programmes. The group examined existing programmes in country and then agreed to the best practices to be strengthened. The Plan includes discussion of challenges to priority setting while outlining opportunities to overcome these. Monitoring mechanisms and clear steps of action were also outlined. A collaborative committee was formed for implementation, with the MotherNewBorNet secretariat and the White Ribbon Alliance agreeing to work with the Government of Bangladesh for scale up. Initially eight regional and one national workshops were planned with professional bodies and policy makers to outline and discuss implementation.

For further information visit www.icddrb.org/MotherNewBorNet.
The non-state sector covers providers and services falling outside of the realm of the government’s direct structure for the provision of health services.
What do we know about health systems?

The Alliance for Health Policy and Systems Research (WHO and the Global Forum for Health Research) aims to promote the generation and use of health policy and systems research as a means to improve the health systems of developing countries. Under the auspices of this Alliance, four centres have been established globally to conduct systematic reviews focusing on health systems research, with the aim of generating policy-relevant information and building capacity in conducting systematic reviews among researchers in low and middle-income countries. The Centre for Systematic Review at ICDDR,B was chosen as one of these centres in April 2007, under a three-year grant from the Alliance, establishing a global network of centres in Bangladesh, Chile, China and Uganda. Under this grant the Alliance provides training opportunities in the conduct of systematic reviews and technical support.

The Centre for Systematic Review at ICDDR,B will be a centre of excellence in systematic reviews and a globally recognized knowledge-base on non-state sector issues in health

The Alliance currently focuses on specific high priority themes to sharpen its focus and ensure that its work has maximum impact. The themes focus work in the areas of knowledge generation, synthesis, evidence-informed policy and capacity development, and currently include the health workforce, health financing and the role of the non-state sector in health.

All four centres will work closely together to produce a systematic review answering a priority policy question every year for the duration of the project. At ICDDR,B, the Centre for Systematic Review of non-state sector issues is collating and synthesizing information from both published and unpublished sources in the non-state sector in health systems and policy in order to determine the effect of social franchising on access to and quality of health services in low- and middle-income countries.

A review of the current evidence on effectiveness of social franchising as a public health intervention is expected by early 2008. The Alliance hopes that future policy and planning directives will be informed by this systematic review. The published protocol is already available in the Cochrane Database of Systematic Reviews and the full report will be available there soon. Look out for more information at www.icddrb.org/activity/CSR.

What is social franchising?

Social franchising is defined as a system of contractual relationships ‘usually run by a non-governmental organization which uses the structure of a commercial franchise to achieve social goals’ (Montagu 2002). The definition can further be expanded to mean:

The social franchise is an adaptation of a commercial franchise in which the developer of a successfully tested social concept (franchisor) enables others (franchisees) to replicate the model using the tested system and brand name to achieve a social benefit.
Core Donors’ Group

The Core Donors’ Group (CDG) was established in 2007 to coordinate donor funding to ICDDR,B in accordance with the Paris Declaration on Aid Effectiveness. The Paris Declaration is a practical, action-orientated roadmap to improve the quality of aid and its impact on development. Currently there are seven core donors providing unrestricted support to ICDDR,B:

- Australian Agency for International Development (AusAID)
- Canadian International Development Agency (CIDA)
- Department for International Development, UK (DFID)
- Embassy of the Kingdom of the Netherlands (EKN)
- Government of Bangladesh (GoB)
- Swedish International Development Cooperation Agency (Sida)
- Swiss Agency for Development and Cooperation (SDC).

The objective of the CDG is to ensure and strengthen cooperation between the core donors and ICDDR,B through developing the capacity and supporting Centre resources in advancing its vision and mission, and in achieving the goals of its Strategic Plan. The CDG also ensures that cooperation between the donors and ICDDR,B is based on a shared commitment to the values and principles expressed in ICDDR,B’s vision and mission, and mutual respect for the autonomy, values and principles of all the core donors.

The CDG also aims to ensure progressive harmonization of the processes in the provision of support and resources, and the reporting and monitoring of progress and performance by ICDDR,B, following the agreed Monitoring and Evaluation Framework, to enable the Centre to decide on the best use of its available resources to build capacity and achieve its goals.

The CDG nominates a rotating chair annually, alternating between the donors and ICDDR,B. The effective functioning of the group has been further strengthened through the signing of a Partnership Agreement between the CDG members, which provides the guidelines for a more effective relationship between ICDDR,B and its core donors.

A representative of AusAID Bangladesh is the current Chair of the CDG. From ICDDR,B, the External Relations and Institutional Development office is responsible for liaison with CDG members.
After seven years as part of the multi-country study of the Integrated Management of Childhood Illness, ICDDR,B completed the final evaluation survey in 2007 in collaboration with the Government of Bangladesh. Testing the effectiveness of policies and strategies implemented, the evaluation will hopefully serve as a tool to support policy and decision makers in prioritizing interventions known to have impact and be cost-effective in reducing under-five mortality. IMCI in Bangladesh is primarily implemented through government health services, and the underlying goal of the evaluation is to assess health and economic impacts, in association with community-based interventions to improve community and family practices.

The 11th Annual Scientific Conference (ASCON) was held in March 2007 at ICDDR,B, co-sponsored by the Government of Bangladesh, the Royal Danish Embassy in Bangladesh, and the Mainstreaming Nutrition Initiative. An opportunity for scientists, researchers, health professionals, and other stakeholders globally to exchange experiences, research results, inferences, and direction for ‘Partnerships in Achieving the Millennium Development Goals’, more than 500 participants from 15 countries attended with 184 presentations made, emphasizing the research and interventions undertaken to achieve the goals by 2015.

The ICDDR,B Board of Trustees, chaired by Dr Timothy Evans, met in November 2007. The Board approved the development of a Strategic Plan for the Centre through to 2020 to be developed and finalized in 2008, and emphasized that recommendations of recent organizational reviews be implemented following the newly-developed monitoring and evaluation framework. Two new members were welcomed to the Board: Dr Mohammad Jalal Abbasi-Shavazi (Iran), Head of the Department of Demography at the University of Tehran, Iran, and Dr Ann Larson (Australian-American), Director and Associate Professor at the Combined Universities Centre for Rural Health, Geraldton, Western Australia. The Board bade farewell to Mr Kul Gautam who represented UNICEF for several years, and lauded him for his outstanding contribution to ICDDR,B as a member of the Board.
ICDDR,B institutional support and capacity
August 2007 saw the admission of a record number of patients in one day (1045) – a number never seen before in the history of the hospital.
The Dhaka Hospital prepares for the future

Saving lives: responding to natural disasters

The worst monsoon rains in years saw severe flooding in Bangladesh in July 2007. Scarcity of water supplies led to outbreaks of diarrhoeal disease with people arriving at the doors of ICDDR,B’s Dhaka Hospital in severe states of dehydration and collapse. Record numbers of patients came to the hospital, with over 21,400 people presenting in August – more than 26% of the year-to-date’s total in one month, and 17.5% of the total patient visits this year.

Despite this acute crisis stretching resources, the hospital continued to save lives and keep mortality low. Hospital staff worked efficiently and effectively to make sure patients were treated and released, often within 24 hours. The hospital was operating at well beyond maximum capacity and ICDDR,B had to rapidly secure additional resources to address the increasing patient numbers. Additional tents, beds, staff, intravenous saline, and pharmaceuticals were desperately needed to provide treatment to up to 1000 new patients arriving every day at the hospital in severe states of dehydration. The Centre is grateful to all of our remarkable supporters who immediately assisted with donations to the Flood Relief Fund, raising more than US$1 million.

Dhaka Hospital patient numbers in 2006 and 2007

<table>
<thead>
<tr>
<th>Number of patients</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>500</td>
<td>4</td>
</tr>
<tr>
<td>1000</td>
<td>6</td>
</tr>
<tr>
<td>1500</td>
<td>8</td>
</tr>
<tr>
<td>2000</td>
<td>10</td>
</tr>
<tr>
<td>2500</td>
<td>12</td>
</tr>
<tr>
<td>3000</td>
<td>14</td>
</tr>
<tr>
<td>3500</td>
<td>16</td>
</tr>
<tr>
<td>4000</td>
<td>18</td>
</tr>
<tr>
<td>4500</td>
<td>20</td>
</tr>
<tr>
<td>5000</td>
<td>22</td>
</tr>
<tr>
<td>5500</td>
<td>24</td>
</tr>
<tr>
<td>6000</td>
<td>26</td>
</tr>
<tr>
<td>6500</td>
<td>28</td>
</tr>
</tbody>
</table>

2007

2006
July–September 2007
43,359 patients
34% had culture-confirmed cholera
84% of the cholera patients had severe dehydration
93% of the patients required intravenous fluids for rehydration
75% of cholera patients presented within 24 hours of diarrhoea onset
Guided by results of clinical trials that provide information on the efficacy of antimicrobial agents in the management of diarrhoea, and data longitudinally derived from the Diarrhoeal Disease Surveillance System, which provides microbiological diagnosis of every fiftieth patient, August 2007 saw changes in the antimicrobial therapy at the Dhaka Hospital. Poor clinical response to the first line of therapy used, doxycycline, caused the Dhaka Hospital to switch to azithromycin for the management of cholera patients during the flood-related outbreaks.

In November 2007 Cyclone Sidr smashed into the southwestern coast of Bangladesh devastating the area and leaving thousands of casualties in its wake. While Dhaka itself was largely spared, those across central and southern Bangladesh struggled to survive as new outbreaks of disease spread, with shortages of water and shelter in places relief agencies could not immediately reach.

The Dhaka Hospital saw an increase in patient numbers soon after, almost doubling normal levels, as large numbers of people moved to the city to seek refuge and treatment. Patients were again severely dehydrated, and tents were erected as temporary wards to treat the additional patients arriving.

Looking to the future: expanding hospital services

The second half of 2007 saw the Dhaka Hospital moving into a new and exciting direction. The appointment of a Hospital Administrator and Consultant Physician, Dr Mark Pietroni, as part of an organizational shift from the Clinical Sciences Division to the Executive Director’s Division, saw the development of a strategy where the hospital’s clinical services are becoming more aligned with ICDDR,B’s strategic research goals, while continuing existing diarrhoea services.

I travelled a long distance to reach here because of the reputation of the cholera hospital in treating diarrhoeal patients and our faith in your services. I am financially well-off and could go to any private clinic, but I will always prefer to come to this hospital.

a patient during 2007 flood crisis

The hospital will be expanding its services to offer treatment to a wider spectrum of patients, providing both specialist and general medical services, including the construction of paediatric, emergency and general wards. Clinical services will move beyond specializing only in diarrhoea and move into other infectious diseases, particularly those of research interest to scientists at the Centre. The facilities will be equipped to be more dynamic and responsive to emerging public health issues, such as pneumonia, dengue and HIV, enhancing the hospital’s role as a platform for science, fostering research that enhances patient care, challenges clinical practice and promotes innovative health service delivery in the local context. This will both encourage and support hospital staff to participate in research activity and optimize the translation of research into clinical practice and health policy.

In order to be poised to deliver a greater range and quality of services to the people of Bangladesh, significant improvements to infrastructure began in 2007. A large amount of money is being committed to improving the infrastructure necessary to meet these.
Clinical services are becoming more aligned with ICDDR,B's strategic research goals.
A permanent emergency facility, which was acutely needed during the mid-year flooding crisis, will be operational by early 2008. Piped oxygen is now being provided to 20 beds in the Long Stay Ward and medical records are being computerized using existing Matlab Hospital technology. Operations management has also been reviewed with projects to improve infection control, waste disposal and implementation of universal precautions currently underway.

The Dhaka Hospital is committed to the parallel goals of providing quality patient service and advancing medical education for all those who work and study at the hospital. ICDDR,B is working towards improving training facilities and programmes and a number of exciting developments began this year. The Clinical Fellowship is being revised to a longer, three-year programme with an increased emphasis on teaching, training and involving the fellows in the research activities of the hospital. Links with other institutions are being actively sought so that the Fellowship can develop into an accredited residency training programme.

To further facilitate the transfer of skills, senior physicians at the hospital will be re-organized into teams to maximize senior supervision of junior staff, and to improve the training for the clinical fellows, as well as providing continuity of care for patients. ICDDR,B is also re-strengthening its commitment to the professional development of its nurses in 2007, and to creating a supportive environment for ongoing clinical skills training. A dedicated nursing education programme and leadership team is being developed which includes a reassessment of existing nursing skills and competencies, and of the existing routine education programme and services.

Over 120,000 patients attended the Dhaka Hospital – the clinical service of ICDDR,B – in 2007 for the treatment of potentially life-threatening diarrhoeal disease. At a glance:

- 122,126 patients
- 2 out of every 5 patients were under 5 years
- 4 out of every 5 admitted to Short Stay Unit
- Only 4 out of every 100 patients admitted to longer stay wards
- 1 in 5 was referred to external service provider
- 158 patients died at the hospital (0.1% of all admissions)
- More than 45,000 received lifesaving intravenous saline treatment
- Almost 4000 children under 2 years received EPI vaccines
- 15,688 women of a reproductive age received a tetanus toxoid injection
- Over 6100 children under 6 received vitamin A
- Almost 11,000 health education sessions were delivered to mothers/caregivers of hospitalized children
- Breastfeeding counselling was delivered to more than 5700 mother-infant pairs

Donate now to help Dhaka Hospital continue saving lives

www.icddrb.org/activity/donate
developing our most important resources

Committed to capacity building

The Centre’s mandate emphasizes research with training, which ICDDR,B offers predominantly in the form of short courses in clinical subjects and laboratory or research techniques. We are increasingly involved in the capacity building of national and other developing country institutions. Every year many doctors and nurses from other institutions, both from within Bangladesh and other developing countries in Asia and Africa receive case management training in areas of competency at our Centre.

During 2007, 1074 trainees, students and interns from 30 countries attended training courses and fellowship programmes at the Centre. A USAID-sponsored international training course alone attracted 31 participants from thirteen countries, including Afghanistan, Indonesia and Sudan – countries which have been facing challenges of both manmade and natural emergencies.

ICDDR,B has been involved in the capacity building of local government institutions by internally facilitating relevant programmes, and pairing faculty with focal points of collaborating agencies. We train the workforce who deliver health and family planning services to the community – especially children, women, and the poor – by:

- identifying training needs
- developing training curricula
- providing hands-on training.

Courses offered this year included a five-day training course on Epidemiology, Clinical Management, and Prevention of Diarrhoeal Diseases and Malnutrition for doctors; and a five-day course on Laboratory Diagnosis of Common Diarrhoeal Diseases Agents for laboratory technicians and medical technologists.

As of December 2007, ICDDR,B had trained over 240 government doctors, nurses and laboratory technicians to deliver quality health services through diagnosing, treating and managing diarrhoeal disease and malnutrition as part of the Improved Health for the Poor project funded by the Government of Bangladesh.

Partnering in public health education

ICDDR,B completed its third year as a partner institution with BRAC University in the delivery of the Masters of Public Health (MPH) programme at the James P Grant School of Public Health. ICDDR,B supported the MPH course with the needed facilities both at the Centre and its field sites, hospital, training venues and the library, in addition to its internationally-renowned faculty for teaching and mentoring MPH students.

In 2007 a total of 26 students participated in the Masters programme – almost half from eleven countries in Asia, Africa and North America, and half from Bangladesh. Twelve of these students were medical doctors and fourteen other allied professional such as development specialists, nutritionists, physiotherapist, engineers and psychologists.

A new dimension for the collaboration began this year with the development of a new short course on health systems to be delivered in 2008.

Our researchers and scientists are well qualified and encouraged to participate in academic teaching as part of their performance and research appraisal system. Participation in faculty positions in the BRAC School of Public Health offers an ideal opportunity to realize the goals of both organizations as well as to train professionals in the field of public health to the highest level within a unique setting unavailable to any other School of Public Health.

A faculty development programme offering training and support was given priority during 2007. Workshops on bio-ethics and teaching methodologies were designed for staff development to address teaching skills
Since 1978, over 27,000 people have been trained at ICDDR,B, of which more than 50% have been from Bangladesh.
### ICDDR,B’s training courses/workshops/fellowship programmes conducted in 2007

<table>
<thead>
<tr>
<th>Title of course, workshop, or programme</th>
<th>Type of participants</th>
<th>Countries represented</th>
<th>No. of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>International</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master of Public Health–James P. Grant School of Public Health, BRAC University (6 months)</td>
<td>• Doctors &lt;br&gt; • Development specialist &lt;br&gt; • Nutritionist &lt;br&gt; • Physiotherapist &lt;br&gt; • Engineer &lt;br&gt; • Psychologist</td>
<td>Afghanistan-1 &lt;br&gt;Bangladesh-14 &lt;br&gt;Ethiopia-1 &lt;br&gt;India-1 &lt;br&gt;Kenya-1 &lt;br&gt;Myanmar-1 &lt;br&gt;Nepal-1 &lt;br&gt;Pakistan-1 &lt;br&gt;Singapore-1 &lt;br&gt;Tanzania-2 &lt;br&gt;Uganda-2 &lt;br&gt;USA-1</td>
<td>26</td>
</tr>
<tr>
<td>Emergency Response to Cholera and Shigella Epidemics (2 weeks)</td>
<td>• Programme Director &lt;br&gt; • Programme/project manager &lt;br&gt; • Desk officer in disaster operations &lt;br&gt; • Epidemiologist &lt;br&gt; • Medical doctors &lt;br&gt; • Health and nutrition specialist &lt;br&gt; • Technical advisor for environmental health</td>
<td>Afghanistan-1 &lt;br&gt;Bhutan-1 &lt;br&gt;China-2 &lt;br&gt;Ethiopia-3 &lt;br&gt;India-1 &lt;br&gt;Japan-1 &lt;br&gt;Liberia-1 &lt;br&gt;Malaysia-2 &lt;br&gt;Sudan-8 &lt;br&gt;Uganda-1 &lt;br&gt;Uzbekistan-1 &lt;br&gt;United Kingdom-3</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>57</td>
</tr>
<tr>
<td><strong>National</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical Management of Diarrhoeal Disease for Doctors (5 days)</td>
<td>• Doctors enrolled in Postgraduate Medical FCGP course at BCGP</td>
<td>Bangladesh</td>
<td>19</td>
</tr>
<tr>
<td>Epidemiology, Clinical Management and Prevention of Diarrhoeal Diseases for Doctors</td>
<td>• Medical doctors from upazila health complexes and district hospital and medical college</td>
<td>Bangladesh</td>
<td>51</td>
</tr>
<tr>
<td>Training Course on Diagnostic Laboratory Methods</td>
<td>• Chief Laboratory Technicians &lt;br&gt; • Laboratory technologists working at district hospitals</td>
<td>Bangladesh</td>
<td>16</td>
</tr>
<tr>
<td>Introductory Course on Epidemiology and Biostatistics</td>
<td>• Doctors &lt;br&gt; • Counsellors &lt;br&gt; • Public health managers &lt;br&gt; • Junior researchers &lt;br&gt; • Centre staff from laboratory sciences, public health sciences, health systems and infectious diseases</td>
<td>Bangladesh</td>
<td>36</td>
</tr>
<tr>
<td>Bio-ethics Workshop</td>
<td>• Scientific staff and Ethical Review Committee members from ICDDR,B, and faculty from BRAC School of Public Health</td>
<td>Bangladesh</td>
<td>17</td>
</tr>
<tr>
<td>Workshop on Teaching Methodology</td>
<td>• ICDDR,B faculty for different courses</td>
<td>Bangladesh</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>155</td>
</tr>
</tbody>
</table>

*continued...*
Title of course, workshop, or programme | Type of participants | Countries represented | No. of participants
--- | --- | --- | ---
Orientation training | Students from different institutions such as government and private medical colleges, public health institutes | Bangladesh | 739

Total | 945

Fellowships

International and national | University students enrolled in medicine and/or public health | Australia-1, Austria-1, Bangladesh-52, Canada-7, China-1, Germany-1, India-1, Indonesia-1, Japan-7, Jordan-1, New Zealand-1, Sweden-1, Thailand-3, Uganda-3, Vietnam-1, United Kingdom-1, USA-16 | 99

Clinical | Medical doctors | Bangladesh | 15
Nursing | Staff nurses | Bangladesh | 15

Total | 129
Grand total | 1074

required for the particular context of this MPH programme, conducted jointly with technical assistance from Centre for Medical Education and Harvard School of Public Health. In addition, students from 46 universities were provided support through fellowship training.

Capacity building of junior scientists in developing countries

ICDDR,B seeks diverse and dynamic ways to develop a scientifically literate and empowered world community of junior scientists. The career development of new scientists needs to be supported in a manner relevant to local opportunities and constraints. One of the strengths of our human resource development programme is the commitment to providing maximum opportunities for young scientists to obtain postgraduate qualifications in their chosen disciplines. Each year ICDDR,B sends a number of staff to pursue PhDs and post-doctoral fellowships in order to create a dynamic new generation of scientists.

Postgraduate degrees completed in 2007

| PhD | 6 (3 male, 3 female) |
| Masters | 7 (3 male, 4 female) |

Disciplines included

- Maternal and child nutrition
- Medical anthropology
- Public health
- Nutrition biology
- Nutrition
- Population and reproductive health
- International health
- Geodesy and geoinformatics
The 2007 training budget increased by 55% (US$ 188,926) compared to the previous year.
Universities attended
- Cornell University, USA
- University of Amsterdam, The Netherlands
- Edith Cowan University, Australia
- University of California, Davis, USA
- Mahidol University, Thailand
- University of Melbourne, Australia
- University of Heidelberg, Germany
- University of Berlin, Germany
- Royal Institute of Technology, Sweden
- University of New South Wales, Australia

Postgraduate courses started by ICDDR,B staff in 2007

<table>
<thead>
<tr>
<th>Program</th>
<th>Number</th>
<th>Gender Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD</td>
<td>12</td>
<td>(6 male, 6 female)</td>
</tr>
<tr>
<td>Masters</td>
<td>12</td>
<td>(4 male, 8 female)</td>
</tr>
</tbody>
</table>

Mentoring: investing in early career scientists
ICDDR,B introduced a new mentoring scheme in 2007 for post-doctoral returnees to realize their full potential and further develop their newly acquired skills. Currently, only staff with a pre-existing agreement with the unit that sponsored their training returned to the Centre. Now, graduates have the choice of either returning to the sponsoring unit or applying to this new programme.

The main aim of this programme is to provide an opportunity for post-doctoral graduates recently completing their PhD degrees or post-doctoral fellowships to become the next generation of scientists – both for ICDDR,B and for the country.

Close mentoring by senior staff is provided to facilitate accelerated growth within the organization and to develop leadership skills at all levels across the organization.

To see the current training courses offered by ICDDR,B, visit www.icddrb.org/training

Benefits for early career scientists
- strengthening newly acquired knowledge and skills in the development of new research proposals, including funding opportunities
- improving organizational capacity and research leadership
- broadened professional development

Benefits for ICDDR,B
- retaining a pool of talented scientists and developing them for future leadership positions
- ensuring selection of future research studies to support the strategic direction of the Centre
- creating a balance between the needs of ICDDR,B and the needs of the individual in terms of staff development

Journal Club: cultivating cross-disciplinary interactions
The Inter Divisional Journal Club provides a comfortable, relaxed forum where junior and mid-level researchers can get together to strengthen their skills, share information and build networks. Participants discuss papers published and improve skills in critical review of articles, scientific writing, research priority setting, and presentation skills amongst others. Members also have the opportunity to present any research concept or protocol under development and get feedback from the members, as well as feeding into the Scientific Council through two nominated representatives. In addition to scientific papers, presentations in 2007 included information technologies for research, postgraduate opportunities and strengthening application skills.

Masum Billah, Research Fellow
ICDDR,B started piloting a new Performance Management and Development System (PMDS) in July 2007 with 65 senior staff members, with the objective of rolling out the system Centre-wide next year for all fixed-term staff.

This initiative provides a common performance management framework for all fixed-term staff members with the view to increase the Centre’s organizational performance. The PMDS is a cyclical programme designed to promote communication between the staff member and supervisor. The revised system provides for evaluation of staff against an established work plan and job analysis document, ensuring supervisor accountability and incorporating the Centre’s Core Values.

**Overview of PMDS**

1. Enables review of staff performance
2. Promotes dialogue between staff members and supervisors
3. Helps identify staff development needs
4. Is an integrated part of ICDDR,B planning and performance process
5. Assesses staff performance in a transparent and fair manner

**Anticipated outcomes of an effective PMDS**

1. Clarifies job responsibilities and expectations
2. Enhances individual and team productivity
3. Develops staff capabilities through effective feedback and coaching
4. Drives behaviour to align with ICDDR,B Core Values, goals and strategies
5. Improves communication between staff member and supervisors
6. Increases organizational performance
Scientific Council

The Scientific Council brings together a diverse group of scientists from across different disciplines at ICDDR,B to direct the scientific strategy and establish priorities and procedures. A new Council membership in 2007 redefined the scientific decision-making process to include voices from a greater variety of areas and levels – increasing scientific representation and reducing administrative membership. As a result, the Council has taken on a new and enhanced role at the Centre.

The Scientific Council defines and decides on the overall scientific funding and management strategy, and advises the ICDDR,B Directorate and Board of Trustees on matters relating to research and scientific support.

The Council ensures that ICDDR,B supports the most significant and relevant research, and members act as representatives for other staff – channelling a two-way exchange of information between this advisory body and all staff.

The group’s agenda in 2007 included issues of core funding, training and staff development, health systems research, data management, and a new monitoring and evaluation framework, which resulted in the following policies becoming effective this year.

Distribution of Core Research Funds

This policy outlines the prioritization and distribution of core research funds at ICDDR,B. Each year, core research funds will be allocated to staff for projects which address these new priority research themes:

1. Emerging issues in health and nutrition
2. Poverty, gender health and rights
3. Population and urbanization
4. Health systems, policies and programmes
5. Environment, climate change and health
6. Basic science and innovation.

In order to support research by less senior scientists, the policy specifies that twenty percent of the core research funding will be allocated to research staff at mid-level (NOB) and below.

Mentoring Programme for Post-Doctoral Returnees

Providing a new avenue for staff returning from post-doctoral studies to rejoin ICDDR,B, this programme works to facilitate and strengthen opportunities and the ongoing professional development of early career scientists. Returnees accepted into the programme will work in collaboration with a mentor chosen who is currently a principal investigator, receive a salary with all admissible benefits, a working space with a computer, a printer and internet access.

In addition, those selected for the scheme will be eligible for up to US$25,000 for a specific research project developed in collaboration with the mentor under the Policy for Distribution of Core Research Funds.

Data Centre Access and Internal Data

ICDDR,B has recognized the value and importance of providing increased access to its information and is in the process of developing a Data Centre to enable others to access our data under the conditions outlined in this policy. The Internal Data Policy focuses on the rights and responsibilities of ICDDR,B and its staff regarding access to and ownership of data collected at the Centre.
Promotion of Scientists at the International Professional Level

This policy establishes a procedure and minimum requirements for further advancement for national and international scientists after their initial appointment at the International Professional Level.

The composition of the Scientific Council is as follows:

Dr Alejandro Cravioto
Executive Director

Dr M Abdus Salam
Director, Clinical Sciences Division

Mr Peter Thorpe
Director, Information Sciences Division

Dr Charles Larson
Director, Health Systems and Infectious Diseases

Dr Marjorie Kohlinsky
Director, Public Health Sciences Division

Dr Hubert Ph Endtz
Director, Laboratory Sciences Division

Mrs Ann Gauvin Walton
Director, Human Resources Department

Mr Aniruddha Neogi
Director, Finance Department

Dr Shams El Arifeen
Head, Child Health Programme

Dr Peter Kim Streatfield
Head, Population Programme

Dr Stephen P Luby
Head, Infectious Diseases & Vaccine Sciences Programme

Dr Tahmeed Ahmed
Head, Nutrition Programme

Dr Abbas Uddin Bhuiya
Head, Poverty & Health Programme

Dr Tasnim Azim
Head, HIV/AIDS Programme

Dr Tracey L P Koehloos
Head, Health and Family Planning Systems Programme

Dr ASG Faruque
Clinical Sciences Division

Dr Jena D Hamadani
Clinical Sciences Division

Dr KMA Jamil
Clinical Sciences Division

Dr SM Faruque
Laboratory Sciences Division

Dr Anowar Hossain
Laboratory Sciences Division

Dr Rubhana Raqib
Laboratory Sciences Division

Dr Rukhsana Gazi
Health Systems and Infectious Diseases

Dr Abdullah Brooks
Health Systems and Infectious Diseases

Dr M Yunus
Public Health Sciences Division

Dr K Zaman
Public Health Sciences Division

Dr Ruchira Tabassum Naved
Public Health Sciences Division

Mr Firoz Ahmed
Laboratory Sciences Division/ Journal Club

Dr Eliza Roy
Public Health Sciences Division/ Journal Club

Dr Ishtiaque A Zaman
Head, External Relations & Institutional Development

Mr Michael Behan
General Counsel

Dr Mark Pietroni
Administrator, Dhaka Hospital

Mr Henry Richards
Observer, Communications

Mr ABM Fazlur Rahman
Observer, Research and Project Support Department
A new monitoring and evaluation framework for ICDDR,B

In 2007, ICDDR,B introduced a new, comprehensive, monitoring and evaluation framework as part of an agreement with our development partners providing increased unrestricted funding, and funding over longer periods. An earlier review report recommended that ICDDR,B develop and report more regularly against measurable indicators which clarify how pooled funds are used, and provide more transparent accountability to and monitoring of progress against the Strategic Plan.

The key objectives of the new framework are to:

- reduce transaction costs in reporting to multiple development partners
- allow for a single, annual, combined monitoring and evaluation mission
- provide clear and transparent evidence of progress against strategic objectives
- provide a single combination of accurate financial data that meets the various needs of a maximum number of development partners
- encourage development partners to simplify and converge their progress and financial monitoring data requirements.

This is extremely important for the future of ICDDR,B since continued unrestricted funding, which currently represents 45% of the Centre’s budget, will absolutely depend on the success of this new framework. ICDDR,B has made a commitment to our donors to develop and implement this framework.

It was essential to pre-test the framework’s format to ensure that it provides relevant and meaningful information to the donors; that the data provided is consistent and not subject to different interpretations; and that its provision will not be too cumbersome for ICDDR,B scientists. Based on a consultant’s report and the development of a reporting log frame, data collection procedures and tools were developed, and piloting of the framework was accomplished using 2006 data, and the report shared with the Core Donors Group.

A consultant assisted ICDDR,B to review the initial progress, suggesting potential improvements including the identification of areas for possible in-depth analyses for future external reviews. The newly determined system and criteria for allocating unrestricted funds to research protocols and other core activities was also reviewed.

Our monitoring and evaluation unit was established within the Executive Director’s Division in August 2007 with one co-ordinator and one of the Centre’s directors facilitating its operationalization. A core team of four supports the activities and divisional point people facilitate the generation of requisite information.
The Centre spent US$30,042,000 in the fiscal year 2007 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$30,173,000, resulting in a surplus of US$131,000 for the year.

The Centre’s total revenue primarily consists of contributions from donors in the form of restricted and unrestricted grants. In 2007 the total contribution from donors was US$28,874,000 – an increase of US$5,124,000 (22%) over the previous year. The unrestricted contribution increased by US$3,163,000 (44%) compared to the previous year, and the restricted contribution increased by US$1,961,000 (12%) while the Centre’s total expenditure increased by US$5,344,000 (22%) over the fiscal year 2006.

The cumulative deficit on operating account decreased in 2007 by US$209,000 (US$131,000 operating surplus and US$78,000 transferred from reserve fund) from US$1,933,000 to US$1,724,000.

The year end fund balance in the endowment funds increased by US$778,000 (8%) over the previous year from US$9,844,000 to US$10,622,000.

ICDDR,B launched a building expansion project in 2006. The objective of the project is to expand vertically and modernize 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 for June 2011 with an estimated total cost of US$18 million and till 2007 the expenditure was US$2,683,000.

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, 2007, from which these abridged financial statements were derived.

2. Balance of 'ICDDR,B Employees Separation Payment Fund' as at December 31, 2007 of US$ 15,242,833 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 statement 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 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.

Dhaka, March 10, 2008

S.F. Ahmed & Co
Chartered Accountants

Gurgaon, March 11, 2008

KPMG
STATEMENT OF FINANCIAL POSITION AS AT DECEMBER 31, 2007 (US $ 000) ABRIDGED

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and bank</td>
<td>8,095</td>
<td>8,616</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>5,309</td>
<td>6,082</td>
</tr>
<tr>
<td>Hospital Endowment Fund Investments</td>
<td>6,264</td>
<td>5,739</td>
</tr>
<tr>
<td>Centre Endowment Fund Investments</td>
<td>4,358</td>
<td>4,105</td>
</tr>
<tr>
<td>Inventories</td>
<td>413</td>
<td>474</td>
</tr>
<tr>
<td>Fixed assets</td>
<td>7,691</td>
<td>5,685</td>
</tr>
<tr>
<td><strong>Total Liabilities and Fund Balances</strong></td>
<td>32,130</td>
<td>30,701</td>
</tr>
<tr>
<td><strong>Current Liabilities and Provisions</strong></td>
<td>13,537</td>
<td>15,099</td>
</tr>
</tbody>
</table>

**Fund Balances**

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Assets Fund</td>
<td>7,691</td>
<td>5,685</td>
</tr>
<tr>
<td>Hospital Endowment Fund</td>
<td>6,264</td>
<td>5,739</td>
</tr>
<tr>
<td>Centre Endowment Fund</td>
<td>4,358</td>
<td>4,105</td>
</tr>
<tr>
<td>Reserve Fund</td>
<td>2,004</td>
<td>2,006</td>
</tr>
<tr>
<td>Operating Fund</td>
<td>(1,724)</td>
<td>(1,933)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contributions</td>
<td>28,874</td>
<td>23,750</td>
</tr>
<tr>
<td>Other Items</td>
<td>1,299</td>
<td>1,159</td>
</tr>
<tr>
<td><strong>Expenditure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salaries and benefits</td>
<td>16,030</td>
<td>13,889</td>
</tr>
<tr>
<td>Supplies and materials</td>
<td>2,829</td>
<td>2,268</td>
</tr>
<tr>
<td>Capital expenditure and commitments</td>
<td>3,175</td>
<td>2,667</td>
</tr>
<tr>
<td>Other Items</td>
<td>8,008</td>
<td>5,874</td>
</tr>
<tr>
<td><strong>Surplus for the year before depreciation</strong></td>
<td>131</td>
<td>211</td>
</tr>
<tr>
<td><strong>(Deficit) for the year after depreciation</strong></td>
<td>(1,170)</td>
<td>(925)</td>
</tr>
</tbody>
</table>

STATEMENT OF CASH FLOW (US$ 000) - ABRIDGED

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flows from operating activities</td>
<td>2,422</td>
<td>4,890</td>
</tr>
<tr>
<td>Cash used in investing activities</td>
<td>(2,944)</td>
<td>(2,418)</td>
</tr>
<tr>
<td><strong>Net Increase/(Decrease) in cash and cash equivalents</strong></td>
<td>(522)</td>
<td>2,472</td>
</tr>
<tr>
<td><strong>Cash and cash equivalents at beginning of the year</strong></td>
<td>8,616</td>
<td>6,144</td>
</tr>
<tr>
<td><strong>Cash and cash equivalents at end of the year</strong></td>
<td>8,095</td>
<td>8,616</td>
</tr>
</tbody>
</table>

Executive Director, ICDDR,B
Dhaka, March 10, 2008

Member, Board of Trustees

This is the abridged form of the Financial Statement referred to in our report of same date.

S. F. Ahmed & Co.
Chartered Accountants
Dhaka, March 10, 2008

KPMG
Gurgaon, Dhaka, March 11, 2008
**Contributions:**

<table>
<thead>
<tr>
<th>Organization and Source</th>
<th>2007</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia-AusAID</td>
<td>731</td>
<td>337</td>
</tr>
<tr>
<td>Bangladesh-IHP</td>
<td>1,168</td>
<td>2,254</td>
</tr>
<tr>
<td>Bangladesh-WB &amp; BINP</td>
<td>2,622</td>
<td>1,441</td>
</tr>
<tr>
<td>Bangladesh Rural Advancement Committee (BRAC)</td>
<td>385</td>
<td>137</td>
</tr>
<tr>
<td>Canada-CIDA</td>
<td>1,368</td>
<td>1,965</td>
</tr>
<tr>
<td>Centers for Disease Control (CDC)-Atlanta</td>
<td>934</td>
<td>490</td>
</tr>
<tr>
<td>Endowment Fund-Centre</td>
<td>30</td>
<td>54</td>
</tr>
<tr>
<td>Gates Foundation</td>
<td>2,002</td>
<td>923</td>
</tr>
<tr>
<td>Global Forum for Health Research</td>
<td>207</td>
<td>146</td>
</tr>
<tr>
<td>Japan-JICWELS &amp; others</td>
<td>105</td>
<td>160</td>
</tr>
<tr>
<td>Johns Hopkins University (JHU)</td>
<td>947</td>
<td>631</td>
</tr>
<tr>
<td>Johns Hopkins University (JHU)/USAID</td>
<td>674</td>
<td>1,163</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>2,483</td>
<td>1,310</td>
</tr>
<tr>
<td>Save the Children, USA</td>
<td>567</td>
<td>225</td>
</tr>
<tr>
<td>Sweden-Sida/SAREC</td>
<td>2,580</td>
<td>1,855</td>
</tr>
<tr>
<td>Switzerland-SDC</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Thrasher Research Fund</td>
<td>84</td>
<td>156</td>
</tr>
<tr>
<td>United Kingdom-DFID</td>
<td>3,596</td>
<td>3,636</td>
</tr>
<tr>
<td>United States-AID etc.</td>
<td>29</td>
<td>1,523</td>
</tr>
<tr>
<td>USA-NIH</td>
<td>1,640</td>
<td>1,562</td>
</tr>
<tr>
<td>USA-Other Sources</td>
<td>1,050</td>
<td>307</td>
</tr>
<tr>
<td>UNICEF</td>
<td>263</td>
<td>44</td>
</tr>
<tr>
<td>United Nations Population Fund-UNFPA</td>
<td>120</td>
<td>211</td>
</tr>
<tr>
<td>WHO</td>
<td>1,112</td>
<td>472</td>
</tr>
<tr>
<td>World Bank</td>
<td>1,424</td>
<td>940</td>
</tr>
<tr>
<td>The Royal Danish Embassy-Flood 2007</td>
<td>55</td>
<td>-</td>
</tr>
<tr>
<td>UNDP/DFID-Bangladesh-Flood 2007</td>
<td>345</td>
<td>-</td>
</tr>
<tr>
<td>Other (Net) (a)</td>
<td>1,353</td>
<td>808</td>
</tr>
<tr>
<td><strong>Total Contribution</strong></td>
<td><strong>28,874</strong></td>
<td><strong>23,750</strong></td>
</tr>
</tbody>
</table>


Executive Director, ICDDR,B
Dhaka, March 10, 2008

Member, Board of Trustees