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ICDDR,B is growing

2009 was a year of change. Entering into the second decade of this century, and as we approach the fifty year anniversary of the institution—50 years of saving lives—ICDDR,B looks forward to the challenges that lie ahead.

In 2009 we have continued to grow, finalising a new strategic plan that will ensure that the best research is available to inform health policy and practice, enabling innovative research to drive health improvements in Bangladesh and beyond. Work also began on an organisational restructure that will support both staff and facilities to further accelerate excellence in organisational research capacity.

Over the last twelve months, we have continued to be a high-achieving organisation.

In 2009,

- ICDDR,B received almost US$39 million in funding—an increase of 11% over the previous year. 90% of the contributions came from 18 major donors.
- Our expenditure on research was almost US$41 million.
- We employed more than 160 researchers, undertaking public and clinical health and health services research into Bangladesh health priorities.
- We began 85 new research protocols and activities.
- We worked on 136 ongoing protocols.
- We partnered in research with more than 120 institutions and organisations, including educational, government, research, non-government, and private, in more than 30 countries.

The new ICDDR,B Strategic Plan 2020 has been informed by extensive consultation with the health sector and the research community. ICDDR,B, in partnership with the Government of Bangladesh, has encouraged investment in research to address national health priorities.

In 2009, knowledge creation and the translation of research outcomes have been our priority, while continuing to support innovation. Discovery research still drives improved clinical practice and enhanced health service delivery, but informed by a strong evidence base, ICDDR,B provided authoritative advice on major and emerging health issues.

In an effort to foster increasing multi-disciplinary collaborations, ICDDR,B is using the following themes to guide its strategic scientific projects: healthy life course, mitigating risks and vulnerability, combating priority diseases and equitable health systems. This report includes examples of our success in this approach across three key health issues in Bangladesh: influenza, cholera and HIV.

While both strategic and operational change is going on, ICDDR,B continues to respond.

Considerable effort has been put in to grow clinical, public health and health services research in Bangladesh, and in 2009, new developments at the Centre have included launches of a new biosafety laboratory, a blood bank, ISO accreditation for the laboratories, and an integrated clinical patient management system. We have supported leadership in evidence-based healthcare, research and its translation and implementation in clinical settings, and education, resulting in initiatives such as the Clinical and Nursing Fellowships, a consolidating partnership with the James P Grant School of Public Health of BRAC University for delivering Master of Public Health graduates, improving the international scholars and fellows programme, strengthening manuscript writing skills, and fostering cross-disciplinary research interest groups. Our organisational strategy is focused on the ongoing development of outstanding health and medical research capacity. This development of health knowledge precedes the clinical, therapeutic and behavioural changes that lead to health improvement.

ICDDR,B has continued to respond to changes in the local environment. This year witnessed a third diarrhoeal outbreak in November in addition to the seasonal peaks in April and September—the first time this has happened in almost fifty years of the Dhaka Hospital. In 2009, ICDDR,B responded to more national and international calls for assistance than ever before, sending specialist health teams to assist in the recovery after Cyclone Aila in Bangladesh, and to Papua New Guinea, Nepal and Zimbabwe. We have continued to respond to emerging health threats. The 2009 pandemic influenza A (H1N1) gave ICDDR,B the opportunity to provide leadership in evidence-based medicine and health system response in Bangladesh.
ICDDR,B has invested in new priority areas such as chronic disease, climate change and environmental health, zoonoses, and social determinants of health. We have focused attention on removing health inequalities and played a vital role in closing the gap in health disadvantage for all Bangladeshi people. Our capacity to drive research translation and the implementation of research evidence continues to strengthen and we are focusing activities on accelerating the uptake of research evidence and increase the capacity of health professionals to implement that evidence.

To improve human health, research outcomes must be translated into clinical practice. The process is a dynamic one and includes the creation, dissemination, exchange and finally, the application of knowledge in clinical settings. Where we can do this in partnership with others, we do. In this way, investment in health research provides more effective health services and products, strengthens the healthcare system and delivers better health outcomes for all.

Alejandro Cravioto
Executive Director
Vision
Healthier people – Better lives through evidence-based solutions

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

Guiding Values
Excellence in research, training and service
High ethical standards
Promotion of human rights, gender equality and diversity
Open and responsive to change
Partnership development
Needs of the poor and vulnerable as a priority
Environmental awareness and sustainability
Transparency and accountability
Fiscal prudence
The new Strategic Plan, operational from 2010 to 2020, was developed according to the changing trends and needs both locally and globally in the healthcare and research sectors. The strategy is the result of the time and effort of many who work at the Centre scientifically, academically and administratively, as well as our partners who continue to support the development of ICDDR,B. The approach was inclusive and encompasses all perspectives, and for this reason the result is transparent, can be managed, put into action, and evaluated.

The strategic objectives of the plan are:

a) Contribute to the improvement in health of the Bangladeshi population through effective translation of knowledge and research at a national level

b) Achieve excellence in the priority areas of research

c) Provide services that support the mission statement by leveraging research and the generation of knowledge and its effective application

d) Develop organisational capacity to achieve identified objectives

Research priorities

More flexibility in the nature and type of research will be achieved through the management of programmes across broader research themes allowing greater opportunity for more extensive and multidisciplinary studies.

Healthy Life Course focusing on factors that affect the health and wellbeing of the population from birth to old age, such as population characteristics, genomics and lifestyle.

Mitigating Risks and Vulnerability encompassing research that identifies and modifies the factors and choices which influence health and quality of life.

Combating Priority Diseases concentrating on disease burden and the development of strategies for preventing and treating diseases that have a high public health priority.

Equitable Health Systems relates to the development and evaluation of systems that provide access to quality services, information, medical interventions and technologies for all sectors of the population.
### 4Ds Framework

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<th>Description</th>
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<tbody>
<tr>
<td>DISCOVERY</td>
<td>Research to define the nature and causes of a problem/issue, including diagnosis/determinants and description/detection</td>
</tr>
<tr>
<td>DEVELOPMENT</td>
<td>Research to develop solutions or response to a problem/issue</td>
</tr>
<tr>
<td>DELIVERY</td>
<td>Research to deliver these solutions, including demand/diffusion and dissemination</td>
</tr>
<tr>
<td>DELIVERY EVALUATION</td>
<td>Research to evaluate whether the delivery of the solutions is having the anticipated impact</td>
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Within these thematic areas, research will be categorised according to one of four types within the 4Ds framework, allowing the focus of ongoing and future research at ICDDR,B to be assessed.

The research programmes that will be carried out within this framework will include, but not be limited to:

- Reproductive Health
- Child Health and Development
- Nutrition
- Infectious Diseases and Vaccine Sciences
- Health Systems
- Population Sciences
- Poverty and Health
- HIV/AIDS, TB, Malaria
- Environmental Health, Urbanisation and Climate Change
- Non-Communicable Diseases
- Gender, Health and Human Rights

Environmental responsibility continues to be a major policy and ICDDR,B is committed to promoting sustainability and environmental awareness at all levels of decision making. The Strategic Plan 2020 includes requisite safeguards to ensure that the Centre reduces energy consumption, purchases renewable, reusable, recyclable and recycled materials to the maximum extent possible, minimises the generation of solid and hazardous waste, conducts environmentally significant research, employs non-toxic materials for research purposes, and avoids research and activities that may have a detrimental impact on the environment.

With an increased flexibility to adapt to situations, and its current strengths, ICDDR,B is well placed to face the challenges and take advantage of the opportunities that will arise in the next decade, especially in the areas of climate change, urbanisation, environmental health and non-communicable diseases for which most development partners have earmarked a significant part of their future donations. Further information on new directions is provided on the next few pages.

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

The full SP2020 report is available online at [www.icddrb.org/SP2020](http://www.icddrb.org/SP2020).
Bangladesh, like many transitional nations, is straddling a demographic and epidemiological shift. With improvement in public health, reduced mortality rate, and demographic transitions, life expectancy has increased in Bangladesh. However, simultaneously, the incidence of chronic diseases is increasing. In a review of 23 developing countries, Bangladesh was found to have the ninth highest rate of age-standardised mortality due to chronic disease, primarily cardiovascular diseases and diabetes. Therefore, combating chronic disease has become a national priority. National data show that chronic disease is the most common cause of death and that risk factors are common. For example, three quarters of men smoke, with smoking being more common among the poor and illiterate.

This increase is observed not only in the urban areas but also in the rural population. High levels of non-insulin dependent diabetes mellitus, impaired glucose tolerance and hypertension have been found. Diabetes has also started to be documented in the tribal populations of Bangladesh. The ICDDR,B Matlab Health Research Centre in rural Bangladesh is the oldest and largest developing country demographic surveillance site, being monitored for 50 years, with a current population of 225,000. Recent data reveal that non-communicable/chronic disease accounted for less than 10% of deaths in 1986 and by 2006 had increased to 60%. To mitigate the health problems of the Bangladeshi people in light of this new leading cause of death and to increase institutional responsiveness, ICDDR,B has introduced a new programme on chronic disease.

The Centre for Control of Chronic Diseases in Bangladesh (CCCDB) is a consortium partnership between BRAC, ICDDR,B, Institute of Development

CCCDB’s objectives are to ensure better understanding of risk factors, preventive and curative measure for chronic diseases and enhance awareness across the levels of care.
Studies and Johns Hopkins Bloomberg School of Public Health (JHSPH), with the secretariat based at ICDDR,B in Dhaka. Initial funding for the Centre came from the United Health Group of the USA.

In collaboration with BRAC and JHSPH, ICDDR,B is conducting an initial assessment of current chronic disease programmes in Bangladesh. Identification of a potential model primary and secondary prevention programme, as well as a review of methods and literature on linking chronic diseases and poverty will be done during the first years. At present national policies that deal with prevention and treatment are being reviewed. Studies are also planned in four of ICDDR,B’s eight field sites: rural Matlab, Abhoynagar, Mirsarai and Kamalapur (an urban slum in Dhaka).

In addition to assessing risk factors and burden with an emphasis on chronic obstructive pulmonary disease and hypertension, research will focus on the economic impact of chronic illness and the health system response. Studies will also examine care-seeking behaviour, as upward of three-quarters of the population uses unlicensed, informal providers as a first line source of care. A review of Asian programmes is also being conducted to prevent and control chronic disease and review relevant policies and initiatives of the Bangladesh government. The Centre also has a particular interest in the link between chronic disease and poverty, and would like to explore the mechanisms through which chronic disease may cause families to slip into poverty.

In July 2009, the Centre for Control of Chronic Diseases began a five-year partnership with the National Heart, Lung and Blood Institute of the National Institutes for Health in the United States. This collaboration will allow the CCCDB to pursue three of its core goals: research, education and knowledge translation.

In order to develop the capacity to conduct rigorous chronic disease research within Bangladesh, the Centre will implement an advanced Master of Public Health programme with an emphasis on chronic disease issues in resource-poor settings through the James P Grant School of Public Health at BRAC University. Further, the Centre will fulfil the long term goal of establishing a PhD programme in public health that will enable junior Bangladeshi scientists to earn a high quality degree without having to travel abroad, which has long been a barrier to the success and development of women scientists in particular.
Climate change, health and population

a new research priority

Bangladesh is considered highly vulnerable in the context of climate change, frequently at the mercy of forces of nature, especially water from the sky, land and sea. The effects of climate change on the environment interact with health and population in Bangladesh at numerous complex levels. There are direct health effects through various vector- and waterborne diseases, but arguably more important indirect effects as well. Threats to water supply, crops, and food production—and thus nutritional status—and effects on population movement—especially loss of rural agricultural and homestead lands driving very rapid urbanisation—are all associated with undesirable health, economic and social consequences.

As a leading health and population research institute from the developing world, with its combination of rural and urban research field sites, laboratories, and scientists, ICDDR,B has much to contribute to this knowledge by elucidating the mechanisms through which climate change is influencing health and economic wellbeing. ICDDR,B has a number of rural and urban field sites which are well set up to monitor the changes happening in many areas of social and economic life. Through the longitudinal health and demographic surveillance systems the Centre can provide invaluable data on impacts and interventions on climate change.

Water vulnerability

Situated in the delta of several of the world’s greatest rivers, which cause regular flooding but do not provide sufficient water during the dry winter season, Bangladesh faces a water paradox. Predictions suggest global warming will accelerate melting of the Himalayan glaciers that feed the big rivers flowing into Bangladesh. The country’s annual flooding can also be exacerbated and prolonged by high sea levels obstructing river outflows, which is what occurred in the unusually high floods of 1998 and 2004. High sea levels also result in a creeping salination of the groundwater aquifer in southern Bangladesh, especially in areas where excessive extraction for irrigation has occurred. In the longer term, even a one metre rise in sea level would inundate some 16% of...
the coastal surface area of the country, which would affect some 15 to 20 million people (UNEP GRID/Arendal, 2009).

Bangladesh is widely known for its susceptibility to cyclones, often with devastating consequences. The 1991 cyclone killed 140,000 in Chittagong; the 1970 cyclone killed 300,000.

**Health impacts**

Where disease vectors are sensitive to temperature, as is the case with malaria, dengue, *kala azar*, and cholera, among others, effects of climate change will be seen on disease levels. Heat stress may play a role in times of weather extremes, and unusually low temperatures may contribute to increased rates of respiratory infections. For example, the malaria parasite, *Plasmodium*, prefers a temperature range of 24 to 27°C for reproduction. The virus that causes dengue fever is also temperature sensitive and it is believed that a 3 to 4°C rise in average temperature may result in doubling of the rate of its reproduction. Floodwater contaminates drinking water supplies, increasing rates of cholera and other diarrhoeal diseases. Just as floods are usually associated with disease outbreaks, they are also associated with crop damage and destruction, and subsequent food scarcity. Floods can also impact health by restricting mobility and access to health and other services.

Cholera is considered as a model for climate-related infectious diseases. In Bangladesh, cholera epidemics occur during summer and winter seasons but it is not yet known how climate variability influences the seasonality of cholera. For the first time in the history of ICDDR,B, the Dhaka Hospital witnessed three cholera epidemic peaks in 2009 (with the additional one in November). ICDDR,B has begun monitoring the variability pattern of cholera events in relation to local climate variables in its rural field site Matlab. When there is sunshine for more than four hours per day and the temperature is more than 28°C, the highest cholera occurrence was observed, suggesting that in summer and winter seasons in Bangladesh, the temperature and length of sunshine hours compensate for each other. This synergistic effect leads to an increased incidence of cholera.

**Agriculture**

The indirect effects of climate change on health are likely to revolve around agriculture, with erratic rainfall and temperature extremes wreaking havoc on cropping patterns and agricultural production. Bangladeshi agricultural production and drinking water supply rely disproportionately on groundwater that is being withdrawn at a non-sustainable pace. Although some surface water is available, it is heavily contaminated by human and agricultural waste, and increasingly by industrial waste as well.

**Population and urbanisation**

The negative impact of climate change on livelihoods will probably result in lowered incomes for farmers, and contribute to poverty—a pattern already known to be driving migration of rural populations to district towns and major urban areas. The result of these
forces acting to push rural populations to the cities is a very rapid urbanisation (currently 3.5% per annum), particularly to the slums (7% per annum, doubling time of 10 years in Dhaka). From 2025 the rural populations will stop growing, and due to rural-urban migration, all population growth in Bangladesh will be in the cities, where infrastructure is already stretched to the limit. Future water supplies will have to come from the lower aquifer which cannot be recharged from surface water, and droughts can only exacerbate the hardship with drinkable surface water supplies being limited or non-existent. The density of the slum populations in some areas of Dhaka (well over 200,000 people per square kilometre) is contributing to high rates of the diseases found in overcrowded settings, such as acute respiratory infections and tuberculosis.

**Food security**

Bangladesh is the most densely populated country in the world, other than small city states. Although marked increases in agricultural productivity during the last 30 years have allowed Bangladesh to avoid widespread famine, with its low income and high population growth rate the nutritional status of the population is tenuous. Forty-three percent of the children in Bangladesh meet the WHO criteria for malnutrition, and there are a number of forces that threaten the current delicate balance in Bangladesh between food production and need. Although the rate of fertility has declined in Bangladesh, the present young population is projected to continue to grow by a further 50% by the middle of this century, and consist of 100 million more people than at present before population growth stops.

In developing countries, climate change will cause yield declines for the most important crops, and Bangladesh will be particularly affected. Price increases for the most important agricultural crops—rice, wheat, maize, and soybeans—will mean that calorie availability in 2050 will not only be lower than it would without climate change; it will actually decline relative to 2000 levels throughout the developing world. Given the contribution of agriculture to the livelihoods of general people of the country, any significant change in climate can have far-reaching impacts on overall food security in Bangladesh.

Food security critically requires the promotion of food availability (e.g. diversification of agricultural production, food processing and storage infrastructure); enhancing pro-poor market mechanisms; continual food access (income diversity, prices, employment creation, control of assets and resources); and reducing risk (improving coping mechanisms, better risk management, adequate disaster shelters, household and community focused flood-proofed facilities development).

In addition to assessing the impact and mitigation of climate change on health, ICDDR,B has the scope to widen its vision through research on the nutritional enrichment of foods, food processing for better nutrition, and storage and methods of delivering integrated interventions to the poor, the most vulnerable to climate change. These data would be central not only to assist the government and people of Bangladesh in optimising their response to this oncoming crisis, but also to inform regional and global decision-makers of the interconnectedness of these forces and the relationships among policy decisions, food security and health.
Gender, human rights and health

a new research priority

The importance of gender equity and its implications for human rights and health have increasingly been recognised internationally, and the relationship between biological sex, the social construction of gender, rights, and health are now identified in international agreements. Gender has become an important component in the human rights framework due to the clear relation between gender and access to basic human rights, health and wellbeing.

In Bangladesh, as elsewhere, gender inequalities and sex/gender non-conformities create barriers for members of these marginalised and frequently stigmatised groups (e.g. females, same-sex oriented and transgender people). These barriers can include lack of access to resources such as food, education, healthcare and employment. Social, cultural, political and economic forces exacerbate the processes that result in measurable dimensions of gender inequity, gender-based violence and other human rights violations.

Gender refers to the socially-constructed roles, rights, responsibilities, possibilities, and limitations that, in a given society and at a given time, are assigned to men, women and the transgender population. It is one of the most important social determinants of health worldwide.

Gender is women. Gender is men. Gender is transgender…
programme uses a ‘gender lens’ to explore ways in which the social construction of gender affects health and related human rights and can inform solutions to health problems.

The research programme is conducting a thorough situation analysis on gender, health and rights in Bangladesh, which will identify links between these issues in the local context; describe current work on gender in the country; and identify priorities for policy and action-related research.

While gender analysis and research often identifies the burden that women bear due to their gender roles, the Centre’s programme looks at ways in which social constructs and pressures influence women, men and transgender populations, particularly in terms of risk taking and risk exposure. Important studies have been conducted on social exclusion, gender-based violence, gender and nutrition, same-sex orientated communities, and the transgender population.

In order to develop ICDDR,B’s research capacity in this area, a training course for young researchers on gender analysis was organised in April 2009. The course provided a theoretical background as well as the opportunity to develop a plan for the analysis of existing data from a gender perspective. Issues included gender violence, transgender and reproductive health. The programme plans to organise further trainings for mid-level and senior scientists.

A special issue of the Journal of Health, Population and Nutrition was published in August 2009 on Social Exclusion, as an inaugural issue of the new Gender, Health and Human Rights section.

In 2009, a total of 26 articles were published by ICDDR,B on gender-related issues in international peer-reviewed journals.

ICDDR,B’s work on gender, health and human rights has important policy implications. The Centre’s evidence based advocacy has led the Global Fund to recognise the need to move beyond the male-female dichotomy, to recognising transgender as a possibility.

In addition, cutting edge research on violence against women enabled ICDDR,B to make an important contribution to drafting the domestic violence bill (prevention and protection) in Bangladesh, participating in the Citizen’s Initiative Against Domestic Violence network.

The Gender, Human Rights and Health research programme places ICDDR,B at the forefront of this important field in Bangladesh. Researchers are currently carrying out a countrywide situation analysis with the aim of identifying the gaps in knowledge, programme development and evaluation in order to further develop its own agenda. It is also engaged in developing in-house capacity in using a gender lens while working on different health issues, and building linkages with other relevant organisations. This will also open up opportunities for better understanding links between gender and for example chronic diseases, infectious diseases and malnutrition.
Healthy Life Course
Mitigating Risks and Vulnerability
Combating Priority Diseases
Equitable Health Systems
Influenza is a viral infection caused by influenza viruses A and B. It is easily spread from person to person and can cause severe respiratory illness and mortality, and sometimes it can also be responsible for secondary complications, such as bacterial pneumonia, and exacerbation of diabetes mellitus.

In Bangladesh, very little information is known regarding the public health impact of influenza. The results of a pilot study conducted in urban Dhaka in 2002 suggested that influenza might account for a substantial proportion of acute febrile respiratory illnesses in children. Several types of influenza viruses circulate in Dhaka during April to October, which suggest that this densely-populated city may be an ideal location for the spread of multiple influenza viruses. As a result of this study, ICDDR,B began community-based influenza surveillance in 2004 in an urban slum in Kamalapur, in south-eastern Dhaka city, with an approximate population of 200,000. During 2004 to 2008, staff collected data from children under 5 but since May 2008 the surveillance has been expanded to all age groups to identify bacterial and viral pathogens including influenza responsible for respiratory and febrile illness in this study area.

In March and early April 2009, a pandemic A (H1N1) virus emerged in Mexico and the United States which quickly spread throughout many parts of the world. According to the World Health Organization 2009 pandemic influenza A (H1N1) spread throughout the world and caused more than 318,925 laboratory-confirmed cases and 3917 deaths. However, the actual figure could be greater. During the first months of the pandemic, the Bangladesh Ministry of Health and Family Welfare enhanced national surveillance and developed treatment recommendations based on its knowledge of seasonal influenza and emerging data from the World Health Organization and Centres for Disease Control and Prevention. To better understand the epidemiology of the 2009 pandemic influenza A (H1N1) virus and to guide regional response, the Bangladesh government through the Institute of Epidemiology, Disease Control and Research (IEDCR) enhanced its surveillance and the first case was detected at ICDDR,B.

Bangladesh has remained vigilant since the first global outbreaks. ICDDR,B and the government have worked closely together for years to quickly and efficiently identify disease outbreaks and improve public health in Bangladesh. ICDDR,B has been working with IEDCR to examine samples of throat swab and nasal wash of suspected influenza patients. In response to a rising number of cases in the country, and in order to protect patients and staff from cross-infection, ICDDR,B quickly established a respiratory ward at its Dhaka Hospital. During the pandemic, when the new respiratory triage system opened and started functioning from 6 September 2009, a total of 755
patients with fever and cough attended the respiratory triage in the first seven weeks. Of the admitted patients, 10 had laboratory-confirmed pandemic (H1N1) 2009 virus infection and they received oseltamivir in addition to antibiotics; all improved and were discharged.

There are a number of lessons learnt from this effort. Despite providing high quality care free of cost to all comers during a time of acute media interest and some panic, the number of people presenting to the respiratory triage was less than 10% of those presenting with diarrhoea. This is a timely reminder that in developing countries the background burden of disease, especially from infectious diseases, is large and does not go away during a new pandemic. Rather the new cases simply add more stress to the already over-burdened health systems. Second, there is insufficient information to predict which people infected with pandemic (H1N1) 2009 virus are at high risk of serious illness and who should be prioritised for treatment when resources are limited.

The new respiratory ward of Dhaka Hospital has locally-appropriate triage and management protocols that might be considered to be reproduced in the same form, or with some modification, at other healthcare facilities in Bangladesh. This treatment unit could also serve as a model of a rational approach to meet the emerging pandemic (H1N1) 2009 virus influenza situation in other low income countries. As the pandemic progresses, the ICDDR,B respiratory triage will continue to refer patients to both the respiratory ward and to the diarrhoea triage. ICDDR,B is confident that its Dhaka Hospital can provide effective and efficient care for all that patients presenting with any symptom of this pandemic.

The collaborative work between Institute of Epidemiology, Disease Control and Research of the Bangladesh government, ICDDR,B, and its partners, allowed for the early identification of 2009 pandemic influenza A and guided response efforts. Surveillance systems continue to collect data that have yielded a wealth of information about the burden of seasonal and 2009 pandemic influenza A (H1N1). For example, the data demonstrate how the 2009 influenza pandemic doubled the influenza disease burden for the year, and disproportionately affected children under the age of five in Bangladesh. Complementary IEDCR and ICDDR,B data from community-based surveillance demonstrated that influenza is an important contributor to childhood pneumonia—the most common cause of childhood mortality in Bangladesh. Lessons learned during 2009, coupled with data collected through ongoing IEDCR and ICDDR,B mortality and economic burden studies, will help guide investments to prevent and control respiratory diseases.

Due to the limited supply of 2009 pandemic influenza A (H1N1) vaccines being supplied to Bangladesh, a policy brief was jointly developed by the Evidence to Policy Project at ICDDR,B and the Government of Bangladesh following WHO recommendations, to prioritise recipients of the limited vaccines.
Over half a century of work dedicated to cholera by ICDDR,B and its predecessor organisations has immensely increased awareness of the disease in Bangladesh, and decreased morbidity and mortality.

The inception of cholera research in Bangladesh can be, to a large part, credited to the South East Asia Treaty Organization, which established a Cholera Research Laboratory in Dhaka in the early 1960s. This laboratory studied the epidemiology of cholera and efforts to determine treatment and prevention strategies. Historically, cholera was a disease fatal to every third person who contracted it.

Within a few years both a hospital in Dhaka and a field site in Matlab were opened to support the laboratory activities, and numerous studies began on appropriate rehydration treatment for cholera patients and preventive strategies using vaccines. The administration of an oral rehydration solution resulted in a spectacular reduction of disease fatality rate. By 1966 this rate was already reduced to less than 1% of cases.

Clinical and biochemical research on oral rehydration solution led to its widespread acceptance as a treatment, saving over 50 million lives around the world in less than five decades. Efforts to improve outcomes by using the most appropriate antibiotic treatment could further decrease the duration of illness in patients. ICDDR,B remains at the forefront of this research. Other attempts to improve clinical outcomes include research on zinc therapy and its impact on morbidity and mortality related to cholera. Zinc is a success story, a therapy which has been able to reduce death of children suffering from diarrhoeal diseases and cholera by up to 50%.

In addition to oral rehydration therapy and zinc treatment strategies, studies on immune response measures using vaccines have been conducted, with ICDDR,B playing a lead role in all six field trials of cholera vaccines in Bangladesh since the 1960s. These first trials of injected vaccines showed short-lived protection as well as side effects. In the 1970s, oral cholera vaccines were developed. The Cholera Research Laboratory, which then became ICDDR,B,
supported these studies in Dhaka and Matlab resulting finally, in the 1980s, in the first and largest field trial of an inactivated oral cholera vaccine. The result of this trial provided the basis for the design of further large vaccine trials and also revealed that cholera vaccines can provide both direct and indirect/herd protection from the disease.

Patients were admitted with cholera, of whom 70% were dangerously dehydrated. There was a general feeling of helplessness amongst staff, seeing so many people ill with a disease that could be prevented to a large extent by vaccination. This is a scenario that ICDDR,B has witnessed frequently over the last five years as cholera hospitalisation rates have dramatically escalated in Dhaka.

During the 2007 epidemic ICDDR,B sought support from the Bill & Melinda Gates Foundation to assist in reducing cholera epidemics through the use of an effective oral vaccine. Conceived and initiated in August 2007, the plans were approved in August 2009.

The Introduction of Cholera Vaccine in Bangladesh project is a collaboration with the Government of Bangladesh and is being conducted in the Mirpur area of Dhaka city amongst 240,000 people.

Much collaborative work between ICDDR,B and the Government of Bangladesh has shown that vaccines given to children and pregnant mothers can decrease the burden of disease caused by certain infectious agents. Bangladesh continues to be a model country in this regard: an Expanded Programme on Immunization (EPI) has been successfully implemented with 90% coverage—a much higher coverage than that achieved in many other developing countries. Research at ICDDR,B and the government has contributed to the inclusion of measles, Haemophilus influenzae type B (Hib) and hepatitis B vaccines to the EPI schedule. As a result of this collaborative work, as of 2009, infants receive nine vaccines for the prevention of major infant and childhood diseases. The next step may be the inclusion of diarrhoeal vaccines for children. At present both cholera and rotavirus vaccines are licensed in Bangladesh but not yet available for the general population.

The need to improve access to oral cholera vaccines in Bangladesh has been an ongoing issue. The availability and affordability of the vaccine has been a major hindrance to this process to date. The void was seriously felt by researchers at ICDDR,B during the August 2007 major diarrhoeal epidemic in Bangladesh where 21,400 patients were admitted in a three week period to our Dhaka Hospital. More than one in three patients were admitted with cholera, of whom 70% were dangerously dehydrated. There was a general feeling of helplessness amongst staff, seeing so many people ill with a disease that could be prevented to a large extent by vaccination. This is a scenario that ICDDR,B has witnessed frequently over the last five years as cholera hospitalisation rates have dramatically escalated in Dhaka.

The ICDDR,B hospital surveillance system has identified this area as one with the highest rates of cholera and diarrhoeal hospitalisation. The project objective is to decrease disease burden by using a killed cholera vaccine to immunise children and adults. Behaviour change communication strategies will additionally be used in the local area to improve water treatment and handwashing habits. This five year feasibility study will involve the transfer of cholera vaccine technology to Bangladesh to ensure vaccine supply for the country in the future. An overarching goal is to find ways and means to implement the cholera vaccine and behaviour change interventions throughout the national health system in Bangladesh within the next five years.
The first HIV case in Bangladesh was detected in 1989 and by December 2009, the Ministry of Health and Family Welfare had confirmed 1745 cumulative cases of HIV in the country, with 619 cases that developed into AIDS and 204 deaths. The number of reported cases rose sharply in 2006-2007, however the prevalence remains less than 0.1% among the general population.

Early research at ICDDR,B in the mid 1990s into sexually transmitted infections led to advocacy of the Government of Bangladesh for HIV surveillance in an attempt to better understand the epidemic in Bangladesh: the population groups that are most vulnerable; the geographical areas in which the disease has spread; the coverage and impact of services; and barriers and facilitators of risk behaviours.

Surveillance, which includes both HIV and risk behaviours, has focused on selected groups of individuals more at-risk such as sex workers, injecting drug users (IDU), males having sex with males (MSM), and hijra (transgender). In addition, particular subgroups such as regular partners of sex workers and mobile men have been identified as high risk and hence subject to surveillance. Prevalence among these sentinel populations is still less than 1% (0.7%). IDUs in central Bangladesh have far exceeded the 1% threshold, with prevalence increasing to 7% in the 2007 surveillance—changing the status to a ‘concentrated’ epidemic. IDUs in Dhaka city have shown an increase in HIV prevalence from 1.4% to 7% in six years and, in one locality, it has risen up to 11% by 2007.

In addition to serological surveillance, in order to better understand and respond to HIV in Bangladesh and to contribute to modelling the future of the epidemic, several national behavioural surveys have been undertaken. Understanding certain groups’ behaviours and vulnerabilities is crucial for averting escalation of infection. For example, these data show that risk behaviours among both male sex workers and hijra are very high. Hijra, of whom 99.8% were reported to have sold sex in the last week, reported a very high average number of weekly clients (30) and condom use was uncommon, at only 66.5%. The survey data also show more than 60% of IDUs in Dhaka either borrowed or lent needles/syringes at the time of their last injection. These high risk practices provide fertile ground for a larger epidemic.
Prevention: reducing HIV transmission among most-at-risk populations

Much HIV research provides critical insight into the HIV/AIDS situation by segmenting most-at-risk populations. This strengthens the national response, influencing policy makers and experts to focus the fight against HIV/AIDS on these crucial areas.

**IDUs and international migrant workers**

Current research suggests two different and parallel streams of HIV in the country. Estimates place the number of injecting drug users between 20,000 and 40,000, with approximately 7400 in Dhaka, and a prevalence of 7% within this sub-group. Returned international migrant workers, which constitute the majority of the passively reported cases of HIV in the country, may be a potential source of HIV transmission. In addition, rising HIV prevalence rates in Indian states bordering Bangladesh coupled with cross border mobility signals a need for concern. Risk behaviour data from all groups suggest that spread from one group to another is likely to occur, increasing Bangladesh’s vulnerability. Other structural factors such as homelessness, poverty, and gender discrimination further heighten the risk of an escalation in the epidemic.

**MSM and hijra**

In 2009, ICDDR,B became one of the three Principal Recipients in the HIV Global Fund Rolling Continuation Channel programme in Bangladesh, responsible for ensuring provision of HIV prevention services for MSM and hijra. The overall objective is to maintain HIV prevalence below 5% amongst each most-at-risk population—the mark of a concentrated epidemic.

In order to prevent an epidemic among MSM and hijra, specific activities include:

- conducting participatory situation assessments
- establishing and operating drop-in-centres for 9500 hijra and 23,500 MSM
- conducting peer-to-peer outreach services
- providing STI clinical management
- developing guidelines on drop-in-centre operations and STI management
- developing behaviour change communication materials
- social mobilisation, community participation and advocacy
- establishing a project monitoring and evaluation system and documenting lessons learned in interventions

**Residence-based sex workers**

There are an estimated 90,000 female sex workers in Bangladesh and except for some small clusters, the prevalence of HIV has remained at less than 1%. High-risk behaviours, including low levels of condom use, anal sex, and group sex have been found among all types of workers. Group sex is quite common, reported by up to 46% of some groups. Residence-based sex workers however are a hidden population. Recent qualitative study suggests they are considerable in number, very heterogeneous, and at increased risk of STIs due to lack of access to services. Their vulnerability is very much context-dependent, varying according to whether they work in permanent or temporary venues. Their low rate of condom use is a combined result of clients’ dislike of condoms, lack of knowledge about their effectiveness, low risk perceptions, and poor situational availability.

**Men**

ICDDR,B studies indicate that migration may be a factor in HIV transmission. People whose work separates them from their spouse are much more likely to report non-marital sex, with very low condom
use. The rising HIV prevalence rate in Indian states bordering Bangladesh coupled with cross border mobility and risky sexual behaviours all signal concern.

ICDDR,B completed an assessment of sexual behaviour of men in Bangladesh to better understand the likely outcome once HIV becomes more prevalent among most-at-risk groups. Results indicated that while most men know about HIV, the majority consider themselves at little risk of infection and, despite high prevalence of STI symptoms, care-seeking is low.

Non-marital sex with high-risk partners was found to be very common: almost 27% of never-married men, and 13% of ever-married men, reported non-marital sex in the past year. Only one-quarter of penetrative sex acts involved condoms and national estimates of sexual behaviour amongst men suggest 26.1 million unprotected sexual episodes per year in Bangladesh, placing a large number of people at risk once HIV starts circulating at higher levels.

**Youth**

A nationally representative survey conducted by ICDDR,B in 2005 showed that knowledge on HIV transmission and prevention is generally low: 22% among both young males and females, aged 15 to 24. Around 22% of unmarried males reported having premarital sex, with one in four respondents reporting having visited a female sex worker and half of these episodes not involving condoms. ICDDR,B was the research partner in the Global Fund awareness raising project for youth—the biggest HIV prevention programme to date in Bangladesh. Awareness and prevention information was provided through radio and television programmes, workshops, concerts and print media, youth organisations and clubs, secondary schools and advocacy with opinion leaders, including imams.

**Methadone therapy for injecting drug users: on trial in Bangladesh**

Following extensive advocacy by UNODC and ICDDR,B, the Government of Bangladesh approved a pilot study on opioid substitution treatment with methadone in 2008. Funded with technical support by UNODC as part of their regional project Prevention of Transmission of HIV Among Drug Users in SAARC Countries, and conducted by ICDDR,B, the project will work with around 200 injecting drug users in Dhaka. Milestones for the groundbreaking project in 2009 included being issued an import licence and user permit for the methadone from the Department of Narcotics Control.

**Care and support**

Jagori is a critical arm in ICDDR,B’s multi-pronged approach to HIV prevention and treatment. It comprises a voluntary counselling and testing centre, clinical services including a hospital ward, and delivery of a prevention of parent-to-child transmission (PPTCT) programme—the first and only one of its kind in Bangladesh.

**Jagori inpatients ward**

This specialised tertiary HIV care centre provides a high standard of patient care and hopes to serve as a model for the development of inpatient facilities around the country. Open 24 hours per day, it provides a base to develop research and training in HIV/AIDS care. Care is provided free of charge to patients, with facilities to manage opportunistic infections and drug side effects and co-infection with other infectious diseases. A dedicated team also provides clinical advice and training to external healthcare staff engaged in the care of HIV patients in Bangladesh. 2009 highlights include:

- revised and strengthened hospital infection control protocol
- ensured practice of 100% universal precautions by all staff
- developed and executed post-exposure prophylaxis
A 40 year old man from Sylhet... I worked as a day labourer in Bahrain for 15 years and returned to Bangladesh two years ago. Suffering from continuous loose watery stools and abdominal pains for the last year and a half, I lost half of my body weight, had difficulty in taking food, and developed swelling in both my legs. I consulted with many distinguished doctors but they couldn’t find the cause of my illness. I was ordered many costly investigations from expensive hospitals, which left me in financial distress. Screening for HIV finally revealed I was positive, after which the doctors contacted the ICDDR,B hospital and referred me to the Jagori ward. I was very surprised to see that I don’t have to pay a single taka for my hospitalisation at ICDDR,B. The doctors and nurses provided me with all manner of support, including investigations, drugs, food, everything. When I arrived at Jagori I weighed only 32 kilograms...I had damaged liver function and a low CD4 cell count. I remained at Jagori for 49 days, and during this period my weight gained to 42 kilograms and my cell count rose. Now I am well and I can manage my work, and am planning to start a small grocery shop in my village. I am very fortunate that I have recovered from such a grave condition, and am very grateful to the whole Jagori team.

<table>
<thead>
<tr>
<th>Total Jagori Inpatients 2009</th>
<th>102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>70</td>
</tr>
<tr>
<td>Female</td>
<td>32</td>
</tr>
<tr>
<td>Age Group (years)</td>
<td></td>
</tr>
<tr>
<td>&lt;5</td>
<td>6</td>
</tr>
<tr>
<td>5-15</td>
<td>8</td>
</tr>
<tr>
<td>15-25</td>
<td>7</td>
</tr>
<tr>
<td>25-55</td>
<td>78</td>
</tr>
<tr>
<td>55+</td>
<td>3</td>
</tr>
<tr>
<td>Total Deaths</td>
<td>5</td>
</tr>
</tbody>
</table>

protocol for accidental injury of hospital staff and made antiretroviral drugs available for staff if needed

- arranged training sessions for all general hospital staff (physicians, nurses, paramedics, cleaners) on:
  - basics of HIV/AIDS, confidentiality, stigma and discrimination, awareness and sensitisation, clinical management, continuing medical education, clinical case presentation
- E-learning on HIV/AIDS
**Dedicated to preventing HIV infections in children**

Since 2008, 131 pregnant women have been tested for HIV infection at the Jagori voluntary counselling and testing centre (VCT), of whom 13 have been found to be living with HIV. With technical and financial support from UNICEF, pregnant women are provided antenatal care, delivery and postnatal care and given anti-retroviral drugs, including a single dose of nevirapine given to both mother and child at birth, which can reduce the rate of HIV transmission by almost 50%.

Once an HIV positive mother delivers her baby, the programme shifts its focus to the child.

Notwithstanding that the risk of transmission through breast milk is about 15%, given the high infant mortality rate in Bangladesh the benefits of being fortified against diarrhoea and other life threatening infections far outweighs the risk of HIV transmission through breastfeeding. To date, all the children delivered under Jagori’s parent-to-child prevention project are HIV negative, however it takes up to 18 months after birth for absolute confirmation of antibody status.

ICDDR,B works in partnership with other agencies in Dhaka such as Marie Stopes Clinic Society and Bangabandhu Sheikh Mujib Medical University to increase the number of PPTCT service delivery points and strengthen referral linkages for the future integration of such services within existing maternal and child health facilities. Critical to this is the training and sensitisation provided to these providers on VCT, PPTCT, universal precautions, and issues of stigma and discrimination.

**Regional capacity building**

**Technical Support Facility South Asia**

The Technical Support Facility (TSF) South Asia is an initiative being implemented by ActionAid International, in partnership with ICDDR,B and Tata Institute of Social Sciences India, and supported by UNAIDS. The programme covers eight countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka, and provides timely, quality-assured technical support in all areas of planning, management, and implementation of HIV/AIDS programmes. TSF is committed to building capacity of country partners and harmonisation while delivering technical support, resulting in a sustained and enhanced capacity of country partners. An important part of the initiative is to provide technical support to implementers of the Global Fund and large-scale grants.

As a TSF partner, ICDDR,B has been organising training workshops to develop the professional capacity of consultants and country partners in order to provide needs-based technical assistance to governments and NGOs. The first workshop was held in late December 2009 in Dhaka on project proposal development for interventions on most-at-risk populations.

**Introducing HIV surveillance in Bhutan**

ICDDR,B has been involved in a project designed to help the Ministry of Health of the Royal Government of Bhutan to conduct surveys and surveillance for HIV risk. Personnel from the Ministry of Health and private organisations have been trained on designing, conducting and analysing the data for different kinds of surveys: general population on HIV risk and vulnerability; pre-surveillance qualitative assessment to determine populations most-at-risk; behavioural surveillance amongst the most-at-risk populations; and a health facility survey for STIs, VCT and HIV.
More than 140,000 patients visited the Dhaka Hospital in 2009, making it the second busiest year in the hospital’s history. For the first time, a third seasonal cholera epidemic was witnessed in November, in addition to the seasonal outbreaks in April and September. More than 1000 patients on three separate days in February/March made it the busiest spring in history also.

More than 65,000 patients to the hospital in 2009 were under 5 years old.

Age distribution of patients admitted

<table>
<thead>
<tr>
<th>Age group (year)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2 years</td>
<td>39%</td>
</tr>
<tr>
<td>2-4 years</td>
<td>7%</td>
</tr>
<tr>
<td>5-14 years</td>
<td>8%</td>
</tr>
<tr>
<td>&gt;15 years</td>
<td>46%</td>
</tr>
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</table>

Ward admission of patients

<table>
<thead>
<tr>
<th>Ward</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Stay</td>
<td>103,000</td>
</tr>
<tr>
<td>Longer Stay</td>
<td>4155</td>
</tr>
<tr>
<td>Special Care</td>
<td>630</td>
</tr>
<tr>
<td>Research Wards</td>
<td>296</td>
</tr>
<tr>
<td>Nutrition Rehabilitation</td>
<td>260</td>
</tr>
<tr>
<td>Jagori HIV/AIDS</td>
<td>193</td>
</tr>
</tbody>
</table>

In total 209 (0.15%) patients died at the hospital in 2009; 7 of these were in the Short Stay Unit. Of all patients treated in the hospital, 37.6% required administration of intravenous fluid for their management.

3703 children under 2 were EPI immunised [BCG tuberculosis, pentavalent vaccine (hepatitis B + diphtheria + pertussis + tetanus + Haemophilus influenzae type B), oral polio, measles]
- 10,194 women of reproductive age were immunised (tetanus toxoid)
- more than 1000 babies were given vitamin A capsules
- more than 200 children between 1 and 5 years received vitamin A capsules
- 9422 health education sessions were conducted with mothers and female caregivers of hospitalised children
- 2580 mother-infant pairs were included in the breastfeeding counselling sessions

### Annual patient numbers since 1962, Dhaka Hospital

![Graph showing annual patient numbers since 1962, Dhaka Hospital]

### Distribution of 688 organisms isolated from patients’ blood, Dhaka Hospital 2009

![Graph showing distribution of 688 organisms isolated from patients’ blood, Dhaka Hospital 2009]
A new respiratory ward met the challenge of the first wave of pandemic (H1N1) 2009 virus in Bangladesh

The general respiratory ward at the Dhaka Hospital is an 18-bed sub-unit of the Longer Stay ward, staffed by a team of paramedics, nurses and physicians. In response to the first wave of pandemic (H1N1) 2009 virus in Bangladesh, in order to protect patients and staff from cross infection, and supported by the UK's Department for International Development (DFID), the Dhaka Hospital established a separate acute respiratory infection treatment unit at the entrance to the hospital on 6 September 2009.

Low risk patients were evaluated and discharged with necessary treatment, while those assessed to be intermediate or high risk were kept in the observation area, and a nasopharyngeal wash for H1N1 was administered. A temporary ventilated tent was constructed as an isolation ward, divided into three compartments: a reception/triage area, a holding area for observation of suspected patients and H1N1 area to treat confirmed cases. A digital scoring system, case management protocols, and infection control manual were developed to deliver quick and effective treatment to all patients with influenza-like illness.

Supplies made available on the ward included adequate quantities of personal protective equipment, disinfectants and medications, a portable x-ray machine, ambu-bags, large oxygen cylinders, pulse oximeters, and nebulizers, and all staff entering the room used high efficiency masks, gowns, goggles, gloves, caps and shoe covers. Oseltamivir was prescribed for suspected or confirmed pandemic (H1N1) 2009 virus infected patients, and beta-lactam, azithromycin or fluoroquinolone antibiotics were used to treat community-acquired pneumonia, diagnosed using WHO criteria.

Between September and December 2009, a total of 33,372 patients presented to ICDDR,B for care. Of these, 1181 were referred to respiratory triage: 1015 were treated as outpatients and the remaining 166 patients were admitted to the respiratory ward. Eleven tested positive for pandemic (H1N1) 2009 virus; all of them improved and were discharged. There were no recorded cases of hospital-acquired infection due to the virus, and none of the health staff working in this ward reported any respiratory illness.

ICDDR,B is confident that this new respiratory ward can provide effective and efficient care for all that patients presenting with any symptom of pandemic (H1N1) 2009 virus infection. Expenditure per hospitalised patient per day is approximately US$30. As the pandemic progresses, the respiratory triage will continue to provide evidence-based clinical care, and probably represents the best way for poor countries including Bangladesh to use limited resources to address this pandemic. The surveillance of pandemic (H1N1) 2009 virus is a collaborative effort between respiratory ward and laboratory staff, and mechanisms ensure timely reporting, collection and analysis of data. Enhanced measures to meet the needs of respiratory triage activities will be developed and implemented as the pandemic evolves.
Clinical Fellowship Programme

A Clinical Fellowship is an opportunity for a physician to obtain advanced training and/or to acquire more specialised expertise not normally acquired during residency training. The new Clinical Fellowship at ICDDR,B is intended to increase the number of skilled clinicians in general internal medicine, paediatrics and infectious disease. The programme is designed to provide hands-on clinical training to junior doctors, and possibly prepare them for academic careers in research. The Fellowship has both clinical and academic components, with maximum time spent in direct patient contact, being mentored in the various wards of the Dhaka Hospital, the Mirpur centre and Matlab, and the rest in classroom-based skills development.

Following a series of faculty development workshops run in partnership with HR Development in 2008-2009, what became the pilot programme for clinical fellows’ training started in June 2009. During the six months, the 24 clinical fellows were timetabled to attend an academic half-day once a week, with additional tutorial times to develop individual learning plans. The programme focuses on clinical skills development and problem solving, translating textbook knowledge into logical clinical practice. Professional development sessions include ethics, accessing learning material online, and audit. A mid-term review with participants and tutors resulted in significant changes, and the programme finished in December with a written exam. Objective Structured Clinical Examinations were used to evaluate the fellows’ clinical skills.

The 2010 programme has been revised as follows:

**Year 1**
18 clinical fellows, 9 at Matlab and Mirpur for 6 months rotating with 9 at Dhaka Hospital on the Short Stay ward.

Teaching focuses around the evidence-based management of the two most common problems in Bangladesh, diarrhoea and respiratory infections, mainly in small groups with a few lectures. There is a strong emphasis on skills development, and review of basic clinical evaluation skills.

**Year 2**
14 clinical fellows distributed on 6 month placements to Jagori ward, the ARI wards, Long Stay and Special Care.

Those who do well at the end of the year can go on to year 2, which aims to be a more problem-orientated year, maximising fellows’ learning experience from patients who don’t present with the usual clinical problems.

The curriculum is broadened in terms of clinical topics, but also professional development, to include fellows doing an audit of quality of care during the year. Progression to senior fellow posts is dependent on the quality of their work, but also a log of cases seen and managed, and a reading journal.

**Senior Clinical Fellows**
5 fellows who perform well will remain with the Dhaka Hospital and continue to develop their clinical expertise, and hopefully complete their postgraduate qualifications.

Objective Structured Clinical Examinations

An OSCE is a clinical exam characterised by a number of stations, with a specific marking schedule for each. Candidates move around stations at timed intervals, each consisting of a directly observed activity. This can be a simulated patient interview, or examination, or an xray to report for example. It is generally considered a more standardised and equitable way of evaluating doctors’ clinical skills than the old fashioned ‘short’ or ‘long’ case.

Two afternoon workshops with tutors planned a tailored OSCE for Clinical Fellows, resulting in stations on ECGs, xrays, blood cultures, and basic clinical skills. Feedback from fellows suggested they appreciated the objectivity of the exam, and felt they had been fairly evaluated.
In 2009, the 15-member Infection Control Committee was revitalised, completing:

- update of Infection Control Policy and Guideline
- orientation and re-orientation lectures/sessions for new staff and fellows on infection control measures, occupational safety, policies and practices
- periodic water quality tests and microbiological tests from the hospital sewerage pits in collaboration with the ICDDR,B Water Safety Committee
- inspections for hospital kitchen staff
- monitoring of hospital waste disposal
- campaigns promoting hand-hygiene, personal hygiene and hospital bed hygiene.

Significant achievements for 2009 included:

- preparing a guideline and policy formulation on post-exposure prophylaxis for needlestick injury from HIV-infected patients
- conducting one-day certificated training courses on hospital infection control measures for 70 participants including hospital staff nurses, fellow nurses and student nurses
- strengthening universal precautions practices
- further promotion of alcohol-based hand rub (prepared in hospital pharmacy) with portable bottle for hand hygiene, increasing use of hand gloves significantly and use of heavy gloves and wearing of leather shoes significantly improved
- over-filling of sharps boxes dramatically fell and cessation of needle re-capping
- needle stick injury significantly reduced
- data capture introduced for nosocomial infection
- steps towards ensuring hepatitis B vaccination for all staff
- measures for risk assessment and management of accidental exposures to work related injury
- different training materials updated, posters displayed and logo for infection control developed
- hospital staff training on prevention measures for pandemic H1N1 (2009) influenza
- an Infection Control Manual developed for H1N1 pandemic influenza.

As part of continuous quality improvement, two new research proposals were developed in 2009:

1. determination of the incidence, risk factors, and costs and outcome of nosocomial infections at the Dhaka Hospital
2. screening of MRSA-carriage status of direct patient care staff and a 2-year surveillance to detect drug-resistant bacteria including that causing nosocomial infection.
New technologies and equipment at the Dhaka Hospital

Arterial blood gas analyser machine

New ambulance

Syringe pump

Radiant warmer

Ventilator

Multiparameter cardiac monitor

Defibrillator

Pulse oximeter
Bangladesh is a country of 55,000 square miles with 150 million people, 25% of whom currently live in urban slums. Despite success in population control, the size of the population is expected to stabilise at 250 million by 2025-30. One of the very striking features of the future population of the country is that nearly 60% will live in urban slums by 2030. In the absence of appropriate health services, the health of newborn infants and their mothers is likely to suffer. This makes urban health issues, especially of the slum dwellers, of high priority.

In 2007, BRAC began a maternal, newborn and child health programme in Dhaka slums to be gradually extended to all the slums of Bangladesh by 2011. Manoshi endeavours to provide community-based essential maternal, newborn and child health services as well as timely referral to comprehensive emergency obstetric care at facility level for the urban poor.

At the community level, simple birthing centres were established in urban slums to provide the poor an option of safe and clean delivery within close proximity.

ICDDR,B has been a research partner in Manoshi in studies on:
- healthcare and cultural practices during pregnancy and childbirth in Korail slum in Dhaka
- characteristics of traditional birth attendants serving the slums of Dhaka
- perceptions of slum dwellers regarding childbirth: how poor urban men and women make delivery decisions
- knowledge about the Manoshi services and utilisation of safe motherhood services
- acceptance of Manoshi birthing centres within the slum communities
- providers’ perspectives on Manoshi: issues and their recommendations
- causes of death in Dhaka slums
- oxytocin use during labour at home in a Dhaka slum
- the willingness to pay for maternal, newborn and child healthcare in slums, and

Traditional cultures, beliefs, and religious practices permeate all aspects of a mother’s preparation in bringing a new life into the world. As most traditional birth attendants (TBA) have had very little schooling, their knowledge of infection, infection control, modern medicine, birthing practices and causes of complications is at a minimum. Their near illiteracy prevents them from increasing their knowledge and hence their practices in a meaningful way. It is thus important to find ways of making solutions such as the Manoshi birthing huts, work.

A normal delivery is considered, by both men and women, to be a delivery that takes place at home, no matter how long the duration of the labour or whether a birth attendant (dai) was present at delivery.
or not. A complicated delivery is a delivery that takes place in a hospital, as perceived by both men and women.

Different fears are associated with the delivery process for women and men. For women, the principal concerns were:

i) fear of losing life
ii) fear of hospital/doctor, specifically that of a caesarian section and that the baby would be stolen
iii) fear of cost
iv) fear of delivery complications.

For men, the principal worries were:

i) fear of cost
ii) fear of additional responsibility
iii) fear of lack of cooperation.

Some of the sociocultural factors leading to neonatal or maternal deaths in Dhaka slums are:

- the family and/or TBA not recognising the problem and delaying care seeking
- difficulty in arranging transport to hospital facilities
- poor quality of care at hospitals.

The study on the use of oxytocin during delivery found that:

- the belief about the necessity of a painful delivery and the use of oxytocin or medicines to speed labour to facilitate delivery is strong; even poor women feel the necessity to pay for oxytocin
- both village doctors/medicine sellers and TBAs had limited knowledge about the harmful effects of oxytocin use, especially on the baby.

The willingness to pay for maternal, newborn and
Maternal death due to postpartum haemorrhage in Kamrangir Char slum

35-year old housewife Julie lived with her husband and three children. Her first three pregnancies were normal, without complications. She delivered her fourth at home with the assistance of a traditional birth attendant. When Julie's water broke in the afternoon, she didn’t experience strong labour pains. The birth attendant suggested a medicine seller who subsequently gave her saline and other medicines to increase the labour pains. A few minutes later, the baby was born, and the medicine seller left. Since the placenta was not delivered, the birth attendant tried to remove it, but severe bleeding ensued, and two hours after delivery, the placenta had still not been removed. The family sought the medicine seller's help but he refused to come. Another birth attendant was then found who was able to remove the placenta, more than three hours after birth. At that time, the bleeding had decreased, however Julie eventually stopped breathing. Using a rickshaw van, she was taken to hospital but the doctor declared her dead on arrival.

The delay in seeking care led to her death because the family and birth attendant were unable to recognise the extent of bleeding. There are several things that could have been done to decrease this delay.

Child healthcare in slums study found that:
- majority of respondents are willing and able to pay Bangladeshi taka 400 (USD5.50) as registration fees for the services provided by Manoshi
- majority of respondents preferred to pay in instalments
- careful consideration of appropriate waivers or safety net measures for the poorest of the poor should be considered

A traditional birth attendant (TBA) on how she came to this profession:

We had a neighbour who used to deliver babies. One day she told me that she needed an assistant. I thought since I am a mother, I can handle this and I joined her. After assisting her with several deliveries I started to do this on my own.

How to improve the Manoshi programme:
- TBAs should be taught to recognise postpartum haemorrhage
- TBA practices of removing the placenta should be examined and discouraged
- counselling by shastya shebika (health volunteer) and shastya kormi (health worker) to promote deliveries in birthing huts is needed
- timely transportation.
Access to reproductive health services in Bangladesh still remains low and maternal morbidity and mortality rates are still unacceptably high, especially among adolescents and the poor. In recent years, ICDDR,B’s research in reproductive health has focused on developing simple and cost effective solutions to augment the Government’s efforts to minimise the morbidity and mortality rates in the country.

A key component of the reproductive health programme has also been to develop strategies to facilitate an increase in utilisation of skilled care during delivery and decreasing the rich-poor gap in use of services. A variety of operations research studies have been completed in an effort to strengthen the health system by implementing evidence-based interventions.

Based on the recognition that the wellbeing of newborns and children are interrelated to the wellbeing of their mothers, ICDDR,B introduced a new programme to improve maternal, newborn and child health at Matlab in 2007. The programme is characterised by its commitment to promote equitable, accessible and quality health services for the intended audience (children and mothers from every strata of the society). Services related to the programme are rendered at two levels: community (fixed site clinic and household) and facility (sub-centres and hospital), employing community health workers, nurses, and doctors.

The principal objective of focused maternal, neonatal and child health services offered by ICDDR,B is to bring about a positive change in the health and wellbeing of the newborn children and their mothers in terms of:

- reduced perinatal, neonatal, infant and child mortality
- significantly lower maternal mortality rates
- reduced gap between the rich and poor in usage of health services and consequently mortality rates
- reduced incidence of birth-asphyxia-related mortality.

As a result of this programme, in the last two years institutional deliveries in the Matlab area have increased from 46% to 78%. Perinatal mortality has reduced from 48 deaths per 1000 births in 2006 to 29 per 1000 births in 2009.
The World Health Organization considers malaria to be a major public health concern in Bangladesh. There are 34 *Anopheles* mosquito species in Bangladesh. Malaria was nearly eradicated from the country in the 1970s but never disappeared in the eastern regions in which there are numerous tea gardens and forests. An entomological investigation conducted by ICDDR,B scientists identified seven species that tested positively to malaria with a high infection rate. It re-emerged as a major public health concern in the 1990s and remains so.

Malaria transmission is mostly seasonal and concentrated in the border regions of Bangladesh. Of 64 districts, 13 districts bordering the east and northeast parts of Bangladesh belong to the high risk malaria zone.

The Global Fund began funding a malaria control programme implemented by BRAC and the Government of Bangladesh in the 13 malaria-endemic districts in 2007. This programme aimed to reduce the prevalence of malaria in the country, focusing on both preventative and curative measures.

ICDDR,B was requested to conduct a cross-sectional survey with these partners in 2007-2008, to identify the prevalence of malaria. The overall prevalence in these 13 districts was found to be 3.1% and significantly higher in children: up to four years of age it was 8.5%, and between 5 and 14 years, 6.6%. In Khagrachari district notably, the average prevalence was over 15%. Understanding this spatial distribution of malaria, identifying geographic risk factors and identifying the population at risk are important steps toward effective control.

A lack of proper data to date has prevented targeted interventions taking place in any of these endemic districts. In response to this, a three-year active, randomised, blood-based population surveillance with a smaller sub group of at-risk people and a passive
A malaria case detection study began in 2009, in two areas of Bandarban district. Surveillance on 20,000 people aims to achieve:

- mapping malaria epidemiology
- recording benchmark information on prevalence
- validating diagnostic methods
- characterising the epidemiological patterns of parasite prevalence
- defining the local vectors which transmit malaria and their biting patterns
- assessing levels of awareness and health seeking behaviour, and
- observing socioeconomic differentials in the community.

Once this information has been gathered, malaria control interventions will be launched.

In a recently conducted, district-wide, cross-sectional survey by ICDDR,B researchers in collaboration with the Medical University of Vienna, Austria, the importance of targeting asymptomatic malaria carriers was highlighted. The mean malaria prevalence in the rainy season was found to be 14.4% in Bandarban district and that in these areas the proportion of asymptomatic infections was 71%. At only 7.7% the malaria prevalence in a winter survey was significantly lower. This survey indicates the existence of a large reservoir of asymptomatic malaria infections during the monsoon months, which likely acts as a source of transmission. This situation highlights the need to develop new intervention strategies specifically targeting asymptomatic carriers. New strategies for malaria control are required in this region, where malaria control currently relies entirely on the treatment of symptomatic patients.

The treatment of resistant malarial strains is another crucial issue identified and studies began in 2008. Artemisinin is a drug used to treat multi-drug resistant strains of falciparum malaria, but recent data from the Cambodian-Thai border has indicated the first cases in Asia of resistance to the treatment and according to WHO, this resistant strain could spread further across south and southeast Asia. To address this WHO is funding ICDDR,B to determine the sensitivity and efficacy of new types of therapy for the treatment of malaria in Bangladesh.

The new knowledge generated from these projects will be used to fill gaps in our understanding of the social aspects of malaria in Bangladesh, and will help various organisations to develop intervention components strategically appropriate for the malaria-prone areas.
Zinc campaign increases awareness, but use lags behind

An ICDDR,B evaluation recently assessed the impact of this first national campaign to scale up zinc treatment for diarrhoea, revealing that community awareness about the product was high, but usage lagged behind. ICDDR,B found that awareness of this treatment was less than 10% in all communities before the launch and peaked 10 months later at 90% in urban non-slum, 74% in municipal, 66% in urban slum and 50% in rural sites. After almost two years of the campaign, 25% of urban non-slum, 20% of municipal and urban slum, and 10% of rural children under 5 years were actually receiving zinc for childhood diarrhoea.

Use of zinc was found to be safe, with few side effects reported, and did not affect the use of traditional treatments for diarrhoea (oral rehydration solution, ORS). The research also found, however, that many children were not being given the correct 10-day course of treatment: 50% of parents were sold seven or fewer zinc tablets.

Although the Gates funding for the SUZY project ended in October 2008, some vestiges of the project remain and a majority of the leadership, researchers and secretariat have remained with ICDDR,B. In 2009 ICDDR,B funded a round of monitoring in order to assess the progress of the national scale up in terms of zinc awareness and use, choice of providers and use of ORS and zinc.

Awareness has continued to grow as a result of the ongoing advertising being funded by the tablet manufacturer, ACME Pharmaceuticals: 2.5 Bangladeshi taka from the sale of each blister pack of Baby Zinc. However, the table below shows that the translation from awareness to action continues to prove difficult and has stagnated significantly in the rural area, non-slum and municipality areas. Progress has been made in zinc use in the urban slums (22%) but levels remain below the amount needed to significantly impact child mortality.

In 2003, ICDDR,B initiated the Scaling Up of Zinc for Young Children (SUZY) project to reach every child under 5 years in Bangladesh, with the help of the Bill & Melinda Gates Foundation. The campaign included the production and distribution of zinc tablets called Baby Zinc, and a media campaign to raise awareness of the benefits of zinc and promote its use throughout Bangladesh.
Sustaining the promotion of zinc and ORS use for childhood diarrhoea has been another aspect of the SUZY project. Between October 2008 and December 2009, ICDDR,B spent US$65,000 on advertising through the project mass media partner, Dhansiri. Activities funded by this money included advertisements through electronic media, both television and radio; and displaying signboards in rural areas.

Knowledge gained through the zinc scale-up project activities continues to be disseminated through a variety of fora including a range of conferences, both at national and international levels. In addition, the secretariat and the project leadership contributed to a number of media reports about the scaling up of zinc use that took place during 2009.

In 2010, the advertising agreement with ACME Pharmaceuticals will expire. Work on zinc usage begun by the SUZY project may still continue, however, as both ACME and Dhansiri have expressed interest in sustaining the work in the national scaling up of zinc awareness in the future.
Recent ICDDR,B research revealed the extreme vulnerability of street dwellers in terms of both their health needs and healthcare seeking behaviours. Street dwellers are people who sleep on streets, railway terminals and platforms, bus stations, parks and open spaces, religious centres, construction sites, around graveyards, and other public places. These studies showed they are malnourished, routinely use illicit drugs and experience violence.

There are no health service delivery mechanisms specifically tailored towards this marginalised group of people, as there are for other groups like slum dwellers and people living in hard-to-reach areas. As a result, street dwellers rarely access general essential healthcare services.

To begin addressing these health needs, ICDDR,B, in collaboration with the Ministry of Health and Family Welfare (MOHFW), Dhaka City Corporation, Second Urban Primary Health Care Project (UPHCP), Bangladesh Railway, National Sports Council, and several non-government organisations, launched a project funded by the German Technical Cooperation (GTZ), with the specific aim of developing a mechanism to provide essential healthcare services to urban street dwellers in Bangladesh.

The project activities include providing essential healthcare services to urban street dwellers through static and satellite clinics from 6:00 pm to 9:30 pm in three central locations in Dhaka city. A package of essential services is being provided to the street dwellers by the clinics when they are returning from work. All components of primary healthcare are included, with a special focus on general health, reproductive and maternal health, child health, environmental issues, and health education. These services are free-of-charge and are being provided to those street dwellers that have slept in the study areas for the previous week; patient cards are provided to all clients to facilitate tracking of subsequent visits.

To ensure a high quality of service the paramedics were trained by experts from the primary healthcare programme of MOHFW, Marie Stopes Clinic Society and ICDDR,B following the essential services delivery
Due to the sensitive nature of working with members of these extremely marginalised groups, paramedics were given specific training in non-discrimination. Local pharmaceutical shop owners are being encouraged to inform street dwellers about the availability of services through the clinics. A decorated rickshaw van is being used to carry clinic staff and materials in order to more visibly promote the clinics.

Since the beginning of the project there has been a surprisingly strong demand for services: 45 to 50 patients come each day and more than half are women. The main health issues presenting include: general health, sexually transmitted/reproductive tract infections, antenatal care, pneumococcal disease, family planning methods, acute respiratory infections, diarrhoea, dysentery, and immunisation. A system of referral linkages has been established from these clinics to the nearby health facilities of Marie Stopes, Urban Primary Health Care Project and MOHFW, and patients are always followed up after referral.

This 18-month project will act as a model for further provision of essential healthcare services to urban street dwellers in Bangladesh. The static and satellite clinics will be compared in terms of their cost and effectiveness—a comparison which will enable ICDDR,B to identify the model which is financially most affordable and programmatically most effective.
Hepatitis E infection is most common in adults between the ages of 15 and 40, but it is a ‘self-limiting’ disease: it goes away by itself and the patient recovers. In pregnant women however, hepatitis E is often severe and associated with a clinical syndrome called fulminant hepatic failure. Those in the third trimester suffer an elevated mortality rate, where one in five cases is likely to die. Mortality due to hepatitis E virus during pregnancy has been reported to be between 10-30%, and although many of the women miscarry or deliver stillborn babies, children born alive are infected by their mothers in 50 to 100% of cases and may subsequently die from the infection.

Hepatitis E is prevalent in most developing countries and common in any country with a hot climate. A recent outbreak of hepatitis E virus occurred in a low income urban community adjacent to Dhaka city. As a part of the surveillance for the Manoshi urban slum project, ICDDR,B staff reported a cluster of 10 deaths in women of reproductive age affected by jaundice since August 2008. Four of the women were pregnant and the cause of the deaths was thought to be hepatitis E. ICDDR,B and the Institute for Epidemiology, Disease Control and Research jointly investigated the outbreak to determine the health burden and to identify possible risk factors.

The survey was conducted in the first quarter of 2009 in two adjacent communities in the urban slum of Tongi, just north of Dhaka, where the population density reaches approximately 100,000 people per square kilometre. The pipelines in the slum areas were found to be submerged in flood water, and passed through sewerage pipes, with reports of leakage. Water supply is intermittent in the affected areas and when the water pipelines are empty, negative pressure sucks sewerage water into the pipelines.
This large outbreak of hepatitis E is a great public health concern and was apparently due to water contamination through an ineffectively maintained water distribution system. To prevent further transmission, practical, affordable and effective approaches to improve drinking water quality in these rapidly growing communities in urban Dhaka are needed.

Community awareness raising programmes need to be implemented in order to ensure adequate medical assistance is sought in cases of jaundice, a step which will assist in reducing mortality as well as allowing for more rapid identification of an outbreak.

They usually go to the traditional local healers (kabiraj) for treatment rather than a medical practitioner as they don’t consider it a serious disease and believe doctors cannot treat jaundice.

Water samples were collected from two municipal pumps and were found to be clean, however the water coming from the household taps was highly contaminated with faecal bacteria. Between August and December 2008, 3% of the population experienced jaundice, resulting in 20 deaths. Testing revealed 70% of people with jaundice were infected with the hepatitis E virus.

Anthropological investigation discovered that the community does not perceive impure water to be the reason behind jaundice; rather they understand jaundice to be originated by the foul air caused by faecal matter mixed with water which floats over the submerged roads and drains. In the survey area, 14% of households had at least one jaundice patient.
The first chikungunya outbreak identified in Bangladesh

Chikungunya is a mosquito-borne disease caused by the *Aedes* mosquitoes. The word chikungunya means to walk bent over—derived from an African language indicating the severe joint pain experienced by persons with the disease.

In late December 2008 however, the Civil Surgeon of northern Rajshahi district sent a list of patients and a brief report to the Director of Institute of Epidemiology, Disease Control and Research (IEDCR), describing the increase of incidence of fever and joint pain among the residents of Poba sub-district. A joint team from IEDCR and ICDDR,B went to Rajshahi immediately to investigate this first outbreak. Thirty nine patients were identified but with no fatalities. Three-quarters of the patients continued to suffer from incapacitating joint pain for one to two months after recovering from infection. Due to this pain the fever became widely known as *lenga jor* (limping fever).

The investigation found that patients in affected areas were largely Hindus (87%) and the majority (62%) were potters. Unfortunately, many details in this outbreak remain unknown. Both districts surveyed were close to the Indian border; however none of the sick people had travelled to India. There was insufficient information on the extent of the outbreak in India, though it was likely that outbreaks extended to neighbouring districts across the border.

There is no specific treatment for chikungunya and care is based on the symptoms. As no vaccine is available to prevent the disease, reducing mosquito populations is an important method to limit virus transmission. Steps to prevent chikungunya virus include use of insect repellent, protective clothing and destroying or frequently emptying potential breeding sites and cleaning or treating these places with insecticides. Also, establishing syndromic surveillance for patients with fever and severe joint pain supported by prompt laboratory diagnosis of mosquito-borne diseases will alert public health authorities to incipient outbreaks.

Since the first chikungunya outbreak was recorded in Tanzania in 1952, epidemics have been reported in many countries in both Africa and Asia. Chikungunya re-emerged as a public health problem in several districts of Andhra Pradesh and Karnataka, India, in 2005. The increased incidence of chikungunya in India prompted testing of blood samples from feverish patients from two different surveillance projects in Dhaka city in 2006, however none of the 175 blood samples tested positive.
In November 2007, a cluster of deaths occurred in northern Bangladesh, with patients presenting with vomiting, restlessness, unconsciousness, and elevated liver enzymes. In total, 76 patients were identified from 11 villages in Sylhet, of whom almost one in four died within hours of symptom onset. An expert medical committee from the Institute for Epidemiology, Disease Control and Research (Ministry of Health and Family Welfare) and ICDDR,B was formed to evaluate patients. Initial laboratory tests indicated that patients experienced severe liver damage.

Blood, urine, vomit and water samples from tubewells and ponds were collected from the villages affected over the 10-day period. The average patient age was 17 years, and all patients experienced vomiting, and more than half also experienced an altered mental status within hours of symptom onset, including disorientation and unconsciousness. Nineteen out of 76 patients died, and 84% of deaths were in children under 15 years. Diagnostic tests for malaria, Japanese encephalitis, Nipah virus, and influenza were all negative; toxic poisoning was suspected as the cause of illness.

An ICDDR,B anthropological team visited outbreak villages, collecting illness timelines, travel and food histories, and documenting contact with sick animals and humans. Exposure to possible man-made chemicals was assessed, and all goods which had been purchased or brought into affected households prior to the outbreak were recorded. Consumption of uncultivated plants was investigated based on evidence from India where outbreaks with similar clinical characteristics were caused by consuming toxic wild plants.
Households who cooked *ghagra shak*, a local uncultivated plant, were 21 times more likely than others to have experienced vomiting and unconsciousness during the outbreak period. *Ghagra shak* is the local plant name for *Xanthium strumarium* and consumption of this species’ leaves or seeds has been associated with illness and death in livestock and an outbreak of toxic poisoning in children in other countries. Carboxyatractyloside has been found in immature plants and seeds and is believed to be the toxic agent responsible for causing illness.

Outbreak villages were located in remote areas in northern Sylhet district on the Indian border and affected households were poor; many reported eating less than three meals per day. The household wage earners were day labourers engaged primarily in collecting stones, fishing, and digging. Locals described their usual *ghagra shak* collection and preparation practices: typically, they don’t eat the seedlings as they are considered to be poisonous, instead eating the stems and stalks of older plans, believed to be safe, and discarding the root and leaves. Villagers reported that they deviated from their usual *ghagra shak* consumption practices this year because their crops were destroyed by severe and late flooding and they were unable to purchase enough food from the markets. Flooding also contributed to the immaturity and toxicity of *ghagra shak* plants available.

This outbreak is an example of how poverty puts individuals at higher risk of disease and death.

Physicians should be alerted to clusters of patients presenting with vomiting and altered mental status, especially during years and seasons when access to food is limited. Any suspect clusters of illness should be immediately reported to health officials. Preliminary public health messages against eating *ghagra shak* have since been developed and disseminated to prevent a recurrence of similar outbreaks. Follow-up studies to assess the true magnitude of the outbreak and the role of uncultivated plants in the diets of rural Bangladeshis would prove useful in a stronger response to this emerging health issue.
New studies in 2009

New protocols by type of research

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<thead>
<tr>
<th>Type of Research</th>
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<tr>
<td>Discovery</td>
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<tr>
<td>Development</td>
<td>8%</td>
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<td>Delivery</td>
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<td>Delivery evaluation</td>
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**Discovery**

A study on selected micronutrient intake of 2-4 years old children into different socio-economic status

Understanding physician and patient perspectives on ‘hysterical conversion reaction’ as a cause of women’s hospitalisation in two tertiary-care hospitals

Descriptive epidemiology of infant shaking in urban Dhaka and rural Matlab in Bangladesh

Inpatient surveillance project for HIV ward of Dhaka Hospital of ICDDR,B

Micronutrient (especially vitamin A, iron, calcium and vitamin C) intake pattern of the adolescent girls in slum area of Dhaka city and their relationship with nutritional status

Estimating the economic burden of influenza, RSV, parainfluenza 1&3, rhinovirus, adenovirus, bocavirus or human metapneumovirus, Mysoplasma, Legionella and Chlamydia in four tertiary hospitals in Bangladesh

Study on appropriateness of hospital diets for patients of diabetes, coronary heart disease, kidney disease, liver diseases and severe protein energy malnutrition in selected hospitals of Bangladesh

Effects of climate change on major vector-borne diseases in Bangladesh

Socio-cultural aspects and women’s perceptions on menstrual regulation and menstrual regulation services in Bangladesh

The influence of *Helicobacter pylori* infection and gastric acid secretion on bioavailability of iron from non water soluble iron compounds; Implications for food fortification as a strategy to combat iron deficiency anaemia in developing countries

National sero-survey for visceral leishmaniasis infection in the endemic areas of Bangladesh

Mapping malaria epidemiology in Bangladesh

Pilot study to determine the prevalence and transmission of tuberculosis in an urban community of Bangladesh

Pregnancy termination in Matlab, Bangladesh: time trends, methods, correlates, and decision-making process

Estimating respiratory syncytial virus (RSV) mortality in Bangladesh

Formative research on maternal, neonatal, and child care knowledge and practices among indigenous peoples of Bangladesh and Sunamgonj districts in Bangladesh

Beliefs, attitudes, and practices towards nutrition supplementation programmes in Bangladeshi women

Evolutionary and comparative models of the demographic transition

Use of electronic nose for the rapid diagnosis of pulmonary tuberculosis: A pilot study

Nursing practices in the Special Care Unit of the Dhaka Hospital, ICDDR,B: Perception, knowledge and application

Improving knowledge, recognition, referral, and prevention practices for sexually transmitted infections among medicine sellers in Bangladesh

A role for wild waterfowl in avian influenza?

The ‘blind spot’ in Bangladeshi sexuality: bisexualy active men telling their own stories

Determining local conceptions of malaria in pregnancy in Bangladesh

Health seeking behaviour and health systems response: consequences of chronic obstructive pulmonary disease (COPD) and hypertension (HT) on household functioning in Bangladesh

Hypophosphatemia in severely malnourished children with diarrhoea and sepsis or septic shock

The informed decision making process of guardians during childhood immunisation in Dhaka, Bangladesh: A qualitative study from the perspectives of the vaccinator and the guardian
Detection of cryptic leishmania infection among the blood donors in kala-azar endemic areas of Bangladesh

Understanding possibilities and barriers to design HIV intervention for international legal migrant workers of Bangladesh

Microbiological and molecular studies of antimicrobial potentials of medicinal plants, spices and herbs in Bangladesh

A pilot study of the gut microbiota and microbiome in adults during and following cholera

Disease burden and aetiologic studies of diarrhoea patients visiting rural Kumudini Hospital, Mirzapur

Factors responsible for delay in diagnosis and treatment of pulmonary tuberculosis in selected urban and rural areas of Bangladesh

Exploration of genetic diversity within the *Leishmania donovani* isolates from VL patients in Bangladesh: correlation with geographic origins

A population based study of prevalence and determinants of chronic obstructive pulmonary disease (COPD) and assessment of the rate of decline in pulmonary function in COPD cases in rural and urban settings in Bangladesh

A population study of prevalence of arterial hypertension and its risk factors, and management among the adults 20 year or older in rural and urban Bangladesh

Association of school environment with childhood overweight and obesity in affluent society

Demand assessment of 4% chlorhexidine solution among potential users and promoters in rural Bangladesh

The economic, social and health consequences of maternal mortality: evidence from Matlab, Bangladesh

Detection of Ascaris antigen in house dust in rural Bangladesh

Qualitative investigation of Bangladesh Maternal Mortality Survey (BMMS)

Soil transmitted helminthic infections (STHI) among primary school age children in Trishal sub-district of Bangladesh

Estimate burden of influenza associated mortality through severe acute respiratory infection and postmortem respiratory sampling in Matlab population-based surveillance

Social-cultural dynamics among migrant population: explanation for the risk of HIV/AIDS transmission in Bangladesh

Vulnerability to HIV/AIDS among Bangladeshi street children: a situation analysis

**Development**

Prevention of secondary transmission of human influenza by promoting handwashing with soap: the Bangladesh Interruption of Secondary Transmission of Influenza Study (BISTIS)

Community based intervention to prevent type 2 diabetes through lifestyle modification and cessation of smoking among individuals with impaired glucose tolerance (IGT): a pilot study

The effects of handwashing and indoor air pollution on child mortality from acute respiratory infections

Trial of point-of-use chlorination to control an outbreak of hepatitis E

Impact of zinc supplementation on the clinical responses in adult with severe dehydrating diarrhoea

Antenatal vitamin D supplementation to improve neonatal health outcomes in Dhaka, Bangladesh: Preliminary dose finding and safety study (AViDD-1)

Strengthening Menstrual Regulation Management Information System (MR-MIS) in Bangladesh

Reducing risk of ALRI by improving indoor air pollution

Efficacy and acceptability of ready-to-use therapeutic food (RUFF) in children aged 6-24 months with severe acute malnutrition in Bangladesh

Control and prevention of transmission of pulmonary tuberculosis in Dhaka Central Jail, the largest prison in Bangladesh.

Role of vitamin B12 supplementation during pregnancy and postpartum to reduce nutritional anaemia and improve immunity in Bangladeshi women and their infants
Effectiveness of multiple micronutrient powder (sprinkles) to reduce anaemia and malnutrition in children in a community-based programme

Efficacy of ready-to-use therapeutic food using soy protein isolate in under-5 children with severe acute malnutrition in Bangladesh

Use of mobile phone to strengthen the health systems for improving maternal and newborn health care in rural Bangladesh

A randomised, open level, controlled clinical trial of cefixime in the treatment of enteric fever caused by multi drug resistant S. Typhi and S. Paratyphi A and B

Randomised, double-blind, placebo-controlled trial, to evaluate the safety and immunogenicity of orally administered, killed, bivalent whole-cell, cholera vaccine, ShanChol in Bangladeshi adults and children

Piloting interventions to promote home water treatment and handwashing in Dhaka

A randomised controlled trial of use of needle removal devices during routine immunisation

Piloting handwashing, water treatment and sanitation interventions and outcome measures in rural Bangladesh

Influenza vaccine efficacy against childhood pneumonia in an urban tropical setting

Validating immunisation coverage with saliva (VICS): can a non-invasive biomarker of measles immunity improve conventional methods for estimating population immunity?

The effect of antenatal vitamin D supplementation on maternal-fetal vitamin D status and neonatal immune function: a randomised controlled trial in Bangladesh

Efficacy of orange-fleshed sweet potato in improving vitamin A status of preschool-age children in Bangladesh

Delineation of optimum catchment of community health workers for community case management of childhood illness in rural Bangladesh: a GIS-based approach

Protection against Shiga toxin-producing Escherichia coli O157 infection in an animal model by oral immunisation with Shiga toxin-non-producing E. coli O157

A randomised, double blind, community trial to assess the efficacy of a combination of anti-helminth, and vitamin A, zinc and iron supplementation in preventing visceral leishmaniasis (VL) disease among asymptomatic individuals with VL

Clinical trial of oral phenylbutyrate and vitamin D adjunctive therapy in pulmonary tuberculosis in Bangladesh: a pilot study

Improving the immune response to rotavirus vaccine

Effect of maternal zinc supplementation during pregnancy and lactation on infants’ immunity

Promoting better infant and child feeding practice in the slums through performance based payment

Developing a toolkit to measure the effectiveness of development activities which target or include people with disabilities

**Delivery**

Strengthening health system capacity to monitor and evaluate programs targeted at reducing abortion-related maternal mortality

**Delivery Evaluation**

Arsenic contamination of underground water: is communication for behaviour change working?

Assessment of behaviour change communication (BCC) interventions of Manoshi in slums of Dhaka City

Good health at low cost 2010: identifying factors within health systems and the wider policy context, which influence health outcomes

Evaluation of management of neonatal sepsis, birth asphyxia and low-birth-weight provided by Manoshi programme in urban slums of Dhaka

Operational research on community-based management of neonatal sepsis

Impact of measles eradication activities on routine immunisation services and health systems in Bangladesh

Impact of dropout of Shasthya Shebika of Manoshi in Dhaka urban slums

Baseline survey of programme on micronutrient powder (MNP) for children, pregnant and lactating women participating in food and cash for work under EMOP of World Food Programme
our footprints
In recent years, the Diarrhoeal Disease Surveillance System of the Dhaka Hospital has revealed increasing numbers of patients come to our central urban location from Mirpur, in the northern outskirts of the city. During the 2007 floods, approximately 50,000 patients came from here in two and a half months. No one died of dehydrating diarrhoea alone, but 42 lives were lost in the time it took to travel the distance to ICDDR,B in Mohakhali. Ongoing advocacy with the Directorate General of Health Services and the Ministry of Health and Family Welfare (MOHFW) for satellite centres specialised in diarrhoeal disease in areas of the city and outskirts from where most patients originate, finally proved successful.

The government responded and ICDDR,B opened up a new 60 bed treatment centre in Mirpur on April 30 on the ground floor of a Government Unani and Ayurvedic Degree College and Hospital—an important step in the replication of ICDDR,B technical know-how and management success at national level in Bangladesh. This joint collaborative effort between ICDDR,B and the Ministry had treated more than 5850 patients by December 2009, of whom one in four presented with severe dehydration. An ambulance is available 24 hours for emergency transfers; a total of 60 patients were referred to ICDDR,B’s Dhaka Hospital and 34 to other hospitals for associated illnesses during the year.
In September 2009 a team from ICDDR,B went to Papua New Guinea to share their technical experience in response to a suspected cholera/shigella outbreak. Nationwide scaling up of ORS and knowledge transfer on establishing appropriate case management in healthcare facilities in the affected areas, including triage criteria, infection control and treatment guidelines, were the key outcomes of the visit.

In June 2009 a medical team from ICDDR,B went to southwest Bangladesh in response to the diarrhoea outbreaks taking place as an aftermath of Cyclone Aila. The team visited the affected areas to assist in managing the health situation and offering assistance to those in need, while assessing outbreak conditions on the ground.

A cholera epidemic started in the Nepali district of Jajarkot in April 2009 which later spread to other districts in the mid and far western regions. Hundreds of people lost their lives. A high level investigation team consisting of Dr Jean Michel from FAO headquarters in Rome, environmental microbiologist Dr Md Sirajul Islam from ICDDR,B and Mr Shane Prigge from WFP regional office in Bangkok were invited to assess the possible role of food relief products in spreading the epidemic. The team arrived on September 20, and investigations revealed that the dry rice and lentils being provided to the poorest of the poor couldn’t be responsible for the disease spread. *Vibrio cholerae* cannot survive in dry foods as they’re very prone to desiccation, and moreover, a high infective dose is required. These foods are also not eaten raw, and proper cooking destroys the bacteria. The team concluded that contaminated drinking water supply, poor awareness of health and hygiene, protracted drought, climate change and other environmental factors were responsible for the cholera outbreaks in Nepal.
A cholera outbreak began sweeping across Zimbabwe in August 2008, spreading to Botswana, Mozambique, South Africa and Zambia. By end of 2009 there had been approximately 98,000 reported cases and more than 4000 deaths, making it the deadliest African cholera outbreak in the last 15 years. The Zimbabwean government declared the outbreak a national emergency and requested international aid.

Following a request from WHO’s Global Outbreak Alert and Response Network (GOARN) ICDDR,B sent a team of 3 clinicians, 1 lab scientist and 2 medical epidemiologists to Harare. They worked together with the WHO team and the Ministry of Health of the Government of Zimbabwe to combat the situation.

ICDDR,B worked in parallel teams at Bulawayo and Chinoyi. A number of factors were identified leading to the crisis: loss of trained manpower, lack of infrastructure, contaminated water supply and bad sanitation. An overuse of IV fluids, under-utilisation of ORS, deficiencies in dehydration assessment and irregularities in antibiotic use were also weaknesses in the epidemic response. The ICDDR,B team provided the necessary training and updated the treatment guideline and management flowchart.

The Director General of World Health Organization, Dr Margaret Chan, in a note of thanks to the government, praised Bangladesh for its prompt action in sending cholera experts to tackle the epidemic in Zimbabwe.
Blood transfusion is a lifesaving measure for a number of disease conditions, syndromes, or as replacement of acute blood loss in the event of severe injuries, violence, haemorrhage, and pregnancy. Transfusion involves the use of whole blood or components of blood which must be immediately available wherever and whenever they are required.

Although no reliable data are available, estimates suggest that around 300,000-350,000 bags of blood are required every year in Bangladesh. About 51% of these come from professional donors, 19% from relatives, and 30% from voluntary unpaid donors.

Unfortunately, 35% of the professional donors suffer from hepatitis B and C and 22% from syphilis. Fifty per cent of the all donated blood is used for patients suffering from thalassaemia.

Within the scope of its corporate social responsibility activities, the Dutch-Bangla Bank Foundation chose to support the establishment of a blood bank service at ICDDR,B and provided approximately USD$167,960 to set up the service in June 2009.

Objectives of the Blood Bank and Transfusion Services Unit include:

- achieving self-sufficiency in the supply of quality blood and blood products for in-house consumption and provide support to others as needed
- ensuring transfusion of safe and quality blood or blood components and minimise unnecessary transfusions through appropriate clinical use of blood and blood components
- recruiting voluntary (non-paid) blood donors and collect blood in accordance with the guidelines of an expert panel on safety of blood and blood products for protection and welfare of donors and recipients
- reviewing and improving the blood transfusion service from time to time to develop the best practices to limit the transmission cycle of infections
- screening blood for infectious pathogens, manufacture blood derivatives and distribute to hospitals in accordance with international and local quality standards
- striving for environmental protection by adopting the 4R principles of waste reduction (reduce, reuse, recycle, and replace) in activities where practicable
- acting as a reference blood bank to provide support to other hospitals in developing good transfusion practice
International media footprint
ICDDR,B has Health and Demographic Surveillance System sites in Bangladesh at:

1. Matlab (225,000, rural)
2. Abhoynagar & Mirsarai (74,000, rural)
3. Kamalapur (70,000, urban)
4. Chakaria (45,000, rural)

Plus 4 other sites for special studies conducting vaccine trials, IMCI and neonatal health interventions.
The ICDDR,B hospital in rural Matlab offers diarrhoeal treatment, and maternal and child health services. The former is open to all who have been suffering from an episode of diarrhoeal disease regardless of geographic location, and includes an outpatient unit, short stay unit and long stay unit. The maternal and child health services are available to the ICDDR,B field site population, which includes 112,000 people, and comprises an outpatient unit, basic obstetric care, neonatal care, pneumonia care, general mother and child care and kangaroo mother care. A laboratory facility onsite supports the hospital services.

**Diarrhoea**

In 2009, 18,014 patients with diarrhoea were treated at the Matlab Hospital, with

- 13% managed as inpatients
- overall case fatality rate of 0.08%
- 8.5% patients came from the Matlab Health and Demographic Surveillance System (HDSS) area

Stools of all HDSS patients were cultured, and the following bacteria isolated:

- *Vibrio cholerae* O1 (7.5%)
- *Shigella* species (7.4%): *Shigella flexneri* was the most common (82.5%)
- no patients were infected with *V. cholerae* O139 or *S. dysenteriae* type 1.

**Mother and child health**

In 2009, around 21,571 patients (13,065 women of reproductive age and 8506 under-five children) were treated and managed as part of the Maternal and Child Health programme. Almost 20% (4223) were managed as inpatients including 1321 women with labour pain.

1097 women delivered at the Matlab Hospital, and 17% were referred to the Chandpur District Hospital for emergency and specialised care such as caesarian section. One in three inpatients were children under five years, with almost half (44.7%) diagnosed with acute lower respiratory infections.
Dr Mohammad Yunus joined the Pakistan-South East Asia Treaty Organization’s Cholera Research Laboratory in 1968. It was a significant decision for him to move to Matlab, a rural area of Bangladesh, from Dhaka, to join the centre as Second Medical Officer under the supervision of Dr ASM Mizanur Rahman. At that time the Matlab field station ran in a small complex under the Government Rural Health Centre mainly working on research on the injectable cholera vaccine and demographic surveillance.

Dr Yunus and Dr Mizan worked seven days a week with alternate night calls as they were the only two doctors at the hospital. There was no electricity supply and patient management during night was done by lantern. There was no supply of oxygen for resuscitation of critically ill patients and mouth-to-mouth breathing to cholera patients was the last resort.

Highlights of his career include:

- 1969, clinical study of oral rehydration solution (ORS) conducted with David Nalin and Richard Cash using glycine and glucose for management of cholera patients at Matlab Hospital
- 1970, working with Kenneth Bart on an epidemiological investigation and to set up an emergency treatment clinic for the first suspected El Tor cholera outbreak in Rangpur district
- 1970s, evaluation of injectable cholera vaccine proved it ineffective as public heath tool for control of cholera
- 1977, conducted research on a new antibiotic for treatment of shigella
- 1979, conducted oral rehydration therapy (ORT) field trial of home-based ORT with salt and molasses, found to be safe and effective for management of diarrhoea in the community.

Population growth was one of the major concerns in the late seventies and promotion of contraceptive distribution in rural areas was sub optimal. The child mortality rate was also very high. To remedy this, in 1977, a project to provide basic maternal and child health services along with information, counselling and distribution of family planning devices was
launched. It targeted all married women of child-bearing age through household distribution of various contraceptive methods and primary care for mothers and under five children by a cadre of locally recruited young, educated and married female village workers. The programme was highly successful in reducing both fertility and under-five mortality. The lessons learned from this project were later transferred by the MCH-FP (management of maternal child health/family planning) extension project of ICDDR,B to the Government of Bangladesh, resulting in greater population control and the reduction of under-five mortality in Bangladesh. Dr Yunus played a critical role in these efforts.

I have known Dr Yunus since 1979, when I first joined as a Medical Officer at Matlab under his direct supervision. He was undoubtedly a great mentor and guide to me, and still is. I see him as a problem-solving man and an incomparable administrator. He has made a great contribution towards establishing the Matlab Hospital and I am very lucky to have him as my guide, mentor and co-worker.

Dr Md Khalequzzaman
Senior Scientist, Child Health Unit

Dr Yunus brought a radical change in physical location and the facilities after becoming the Head of Matlab Health Research Centre in 1978. He arranged to buy land to establish ICDDR,B’s own complex and in February 1990 ICDDR,B’s new Matlab Health Research Centre started its journey. Matlab has now become a comprehensive health and research centre on diverse public health issues concerning Bangladesh and other developing countries. A key achievement has been establishing the additional maternal and child health sub-centres at community level.

Dr Yunus was always actively involved in clinical and epidemiological research on diarrhoeal diseases and other public health issues, and significantly contributed in the development and promotion of ORS, oral cholera vaccine, rotavirus vaccine, promotion of family planning, maternal and child health, nutrition and the health consequences of arsenic contamination of tubewell water. During his career Dr Yunus also mentored many young physicians who later became excellent scientists at ICDDR,B and at institutions abroad.

According to Dr Yunus, the Matlab Health Research Centre is moving forward with new public health research, training and diversified studies. Demographic transition and increased life expectancy has shifted research towards the dynamics of chronic diseases. Simultaneously, research should continue with a focus on health systems and health services. Arsenic contamination of underground water and food chain is a serious health hazard to be addressed. The resulting skin lesions and cancers of internal organs and other health consequences will increase adult mortality and likely become a serious health hazard; mitigation of arsenic is a very urgent priority. He believes the adverse effects of climate change on cropping and illness patterns will emerge as a major public health issue in the near future and research needs to be planned ahead, centring on those new areas.
Kamalapur is a densely populated area in the south-eastern corner of Dhaka city with an approximate population of 200,000. It's an area with poor sanitation, inadequate waste disposal, water crisis, low income, low education, and low immunisation coverage.

ICDDR,B began pneumonia surveillance on the site in 1998 in an effort to reduce the incidence of morbidity and mortality. Intervention with zinc as a preventive therapy against diarrhoea in children under two years of age is also undertaken at the site. There are around 15 doctors, 17 nurses and 13 health workers working in the field clinic, and a total of 150 staff, including 50 field research assistants and 3 field research officers, manage these surveillance activities. Current activities include:

- demographic surveillance
- active morbidity surveillance
- clinical services
- training
- monitoring and evaluation.

Fifteen years back 28 year old Rubi came to stay at Maniknagar, Kamalapur after being married to her husband at the age of 13. Her husband works as a cleaner at the Dhaka City Corporation office, and she has two sons, aged 7 and 11. If the water, sanitation and electricity crisis could be resolved, she says it would be a very good place to live, but she’s been concerned regarding some thefts happening recently and about the impact of the drug addicts living at the slum on her children. She looks forward to a brighter future for her children.
Hazi Alauddin has been living in the Maniknagar slum for the last 25 years. Having access to collecting water during summer is the greatest problem for everyone there, he says, but he also worries about the risks of cooking in an open space, as they don’t have any kitchens in the slum, and the difficulties faced during the rainy season when everything floods, are considerable.

Several disease burden studies and randomised control drug and vaccine trials have utilised the Kamalapur site. In 2009 the following studies were conducted.

**Pneumonia and febrile illness surveillance**

Underway since 2004, this project concentrated on children under five years. Since May 2008, all adults and children are now observed to identify bacterial and viral pathogens including influenza and other viruses responsible for respiratory and febrile illness. There are 8 to 10 separate but associated studies being conducted.

**Oseltamivir drug trial**

Randomised and controlled, this drug trial involves one patient in one family at one time to understand the effects of the oseltamivir drug on the duration and severity of influenza illness, as well as effects on person-to-person transmission, observing the pattern of community transmissions.

**Rapid diagnostic**

A rapid diagnostic kit has been developed to enable rapid influenza detection through nasal wash samples in people aged above one year (excluding pregnant women). This is a new rapid detection device—the Meso Scale Diagnostics Point of Care reader—to identify influenza with sub typing using a nasal swab and nasal wash samples. The specificity and sensitivity of the new device will be compared with the real time polymer chain reaction (rt-PCR) test results. This trial test is used to identify type A or type B of influenza as well as the subtypes.

Census

Since 2000, a population census is conducted across all age groups in Kamalapur annually. The total land area covered under the census has increased from 2.4 to 3.82 square kilometres.

At the Kamalapur clinic, the most common patients are children with acute respiratory infections, skin diseases, diarrhoea and typhoid. Patients are always advised to make a follow up visit to evaluate treatment compliance. Approximately 85% of patients are self-referred and their records are kept in the file.

Kamalapur is a perfect site to observe the diseases that circulate in Dhaka city as it is highly representative of many other slum areas. Such observation and monitoring is useful for further treatment of disease outbreaks across the entire city.
Impact of umbilical cord cleansing with 4.0% chlorhexidine on neonatal mortality and omphalitis in rural Sylhet district, Bangladesh. This second phase of the highly successful Projahnmo (Project to Advance the Health of Newborns and Mothers), has been conducted since 2007. The two primary outcomes of this trial include an understanding of neonatal mortality and infection of the umbilical cord stump (omphalitis). There is a population of approximately 536,000 in the three study areas and each year between 12,000 and 13,000 newborns are delivered. Irrespective of which of the three cord care regimens are used (cord cleansing with 4.0% chlorhexidine for seven days, cord cleansing with 4.0% chlorhexidine for one day and dry cord care), all the participant women and newborns receive standard maternal and newborn care packages. The cord care interventions are provided by village-based health workers.

This is a partnership project of the Johns Hopkins Bloomberg School of Public Health, USA, and a number of organisations including ICDDR,B, the Ministry of Health and Family Welfare of the Government of Bangladesh, Save the Children USA (Bangladesh) and local NGO Shimantik.
Diarrhoeal disease in infants and young children in developing countries: an aetiological study.
This project, implemented by the Clinical Sciences division, began in 2007 to identify the origin of moderate-to-severe diarrhoeal disease through a study of cases of hospitalisation at Kumudini Hospital, Mirzapur. The study aims to quantify the diarrhoeal disease burden among children up to five years of age living in Mirzapur sub-district as part of a multi-centre study. It is funded by the University of Maryland, USA and is being implemented with the collaboration of Laboratory Sciences and Child Health, as well as Kumudini Hospital.

A Demographic Surveillance System was established in 2007 by the Child Health Unit. This system is linked with the diarrhoea aetiology study and involves a survey every four months to record births, deaths and migration in and out of the community. Approximately 240,000 people living in 58,000 households in the eight unions of Mirzapur sub-district are covered by the surveillance. This information is used to identify the number of children under the age of five for the selection of controls in the diarrhoea aetiology study. It also provides information about healthcare utilisation and attitudes, as well as providing samples for verbal autopsy. The ninth round of surveillance was completed in 2009, and the tenth is currently underway.

Burden of pneumococcal and invasive bacterial disease in children in Bangladesh: a project to enhance laboratory capacity and to create awareness, and to prepare for the introduction of a pneumococcal vaccine. The third phase of this study began in November 2009 and is being implemented by the Child Health Unit with the collaboration of Dhaka Shishu Hospital and Kumudini Hospital. Around 12,000 children under the age of five are included in the surveillance through weekly household visits by 53 trained village health workers. These workers enquire about the children’s health and assess sick children. Where necessary, they refer sick children to Kumudini. Cases from rural surveillance areas are assessed in the hospital by a group of physicians and sicknesses are classified for inclusion in the study. Detailed clinical records, blood/cerebrospinal cultures and management of cases are then done to estimate incidence of invasive pneumococcal and other bacterial diseases, the most common serotypes and describe their antimicrobial resistance.
Chakaria is one of the 465 sub-districts in Bangladesh, on the south-eastern coast of the Bay of Bengal, with a population of around 410,770 in 2006.

ICDDR,B started its activities in Chakaria in 1994. The focus of the activities has been to facilitate local initiatives for the improvement of health of the villagers in general and of children, women, and the poor in particular. Thus, activities have been participatory with an emphasis on empowering the people by raising awareness about health, inducing positive preventive behaviour through health education, and providing technical assistance to any health initiatives taken by the village-based indigenous self-help organisations. Some major initiatives taken by the villagers included assessment of health needs, defining actions for health, implementing them, and monitoring their implementation and outputs. Among the health-related activities, identification of volunteers for health education, mobilising local resources for the establishment of village health posts and their management, introduction of a pre-paid family health card, and establishment of health cooperatives have been the major ones.

The area is divided into intervention and comparison areas with six unions in the intervention and two unions in the comparison area.

Present activities in Chakaria are of three types: research projects, health and demographic surveillance, and support to the community-initiated primary healthcare.

**Research**

The Social and Behavioural Sciences Unit managed 6 projects in Chakaria in 2009.

**Future Health Systems**

Exit interviews and community surveys on the use of appropriate drugs by village doctors have been conducted.

**Shasthya Sena**

135 village doctors received training on harm reduction and 131 village doctors graduated successfully from the Health Soldier Network. Nine union-level *Shasthya Sena* committees have been formed.

**Local Health Watch**

Union-level committees have been formed to monitor the activities of government health facilities through participatory impact monitoring and evaluation.
**Improved Health for the Poor**

The project team is actively monitoring the meetings of the Union Health and Family Planning Committees and is providing reports to the sub-district and ministry-level decision makers.

**Patient-led chronic disease management**

In one union, community volunteers have collected information on the prevalence of diabetes and hypertension among people aged 40 years and above. Clubs have been established for those with these two chronic diseases to enable mutual support in the management of their conditions. This will induce sustained lifestyle changes and reduce unnecessary dependence on healthcare providers.

**Health and Demographic Surveillance System (HDSS)**

This includes collection of data from sample households on a quarterly basis. Chakaria HDSS has been ongoing in both the intervention and comparison areas since 1999. The primary purpose of this surveillance system is to monitor the impact of interventions with an equity focus and generate relevant health, demographic and socioeconomic information for policies and programmes, and further research.

**Community-initiated primary healthcare**

There are seven Village Health Posts established by the villagers. A project physician attends these health posts once a week, partly paid by the villagers. The rest of the week local female community paramedics trained in midwifery (formerly employed by ICDDR,B) attend the village health posts.
Mirsarai is in the south-eastern Chittagong division. Because of its high labour migration, Mirsarai has a relatively high mean age at marriage of both men and women and a relatively low fertility for a conservative area. As an important proportion of the adult males are working in the Middle East Gulf region, this is a unique site for studying the effects of labour migration. A longitudinal follow up study of potential migrants is currently underway. School-based adolescent reproductive health and community preparedness towards a youth HIV prevention study, and non-communicable disease surveys have been undertaken. The site is geographically very diverse: there are fishing communities near the coast, having a very low educational participation; the central area sends many migrants to the Middle East, while the foothills are one of the few areas of Bangladesh plagued by malaria.

**Risk factors survey**

Health and Demographic Surveillance infrastructure was used to collect risk factor data to support four studies funded by the National Heart Lung and Blood Institute. Information has been collected from 12,600 people in Abhoynagar; 13,232 people in Mirsarai and 13,232 in Kamalapur over 25 years of age.

**Production cost estimation of child healthcare in Bangladesh**

To strengthen the national health system through operations research on cost effective and replicable strategies for rural and urban settings, Abhoynagar and Mirsarai Health and Demographic Surveillance System sites supported the implementation of a collaborative research project. This collaboration with the Ministry of Health and Family Welfare aims to estimate the production cost of medical care for children below the age of 10 admitted to hospital. At the institutional level, the sites identify information gaps about medical care production costs to consumers and help improve the public-private medical care systems in Bangladesh.

**Comparison of selected indicators of maternal health for demand side financing**

Information on user perspectives on the demand side financing (DSF) maternal healthcare package was collected from 1011 women (328 women with maternal healthcare vouchers and 683 women not utilising vouchers) in Mirsarai, a means-tested pilot DSF area and 881 in comparison area Abhoynagar. Data analysis will continue into 2010.
Piloting occupational injury methodology in Mirsarai

In order to capture information specific to occupational injury, the existing Health and Demographic Surveillance System (HDSS) was used. Given the pilot nature of the project, paucity of time and limited resources, 3000 men and 150 women over 18 years were randomly selected from the HDSS database. Their information was assessed to ascertain prevalence of occupational injury relating to any of three types of occupations (6 months in farming, 3 months in earth cutting and 3 months in bamboo fence making) in a year. 2017 working men and 120 women were interviewed under the project. There were 652 events of severe occupational injury found, of which 602 occurred within their current occupation, and 26 in their previous occupation.

Abhoynagar

Abhoynagar is in the Khulna division, which was the first in Bangladesh to reach replacement level fertility. Among the surveillance population, women with more than one year of education have a fertility rate below replacement levels. This creates a unique opportunity to study the effects of low fertility on the family and social structure in Bangladesh. Because of these low rates many studies have taken place at this site, such as work on unintended births, stalling fertility and safe motherhood. Abortion figures from the demographic surveillance have been used for a nationwide study.
ICDDR,B conducts training and education activities in order to achieve two-fold objectives:

1. increase capacity for conducting research, especially in developing countries

2. build capacity of the local health workforce to combat diarrhoeal disease and nutritional problems, and respond to new and emerging issues related to health and population.

In 2009, ICDDR,B conducted many training courses/workshops/orientations in response to requests from national and international stakeholders: the Government of Bangladesh, universities, and UN agencies such as WHO. A student field experience programme offers health and allied professionals, and students from home and abroad the opportunity for hands-on research, project and clinical experience at the Centre.

Who did we train?

In 2009, 1581 trainees, students, fellows, and interns (55% males and 45% females), from 26 countries
attended the Centre’s training and education programmes.

Of the 40 international trainees, 28 were James P Grant School of Public Health students from 11 countries in Asia, Africa and North America, and 12 were public health professionals from Iraq for training on investigation and control of cholera outbreak and laboratory investigation.

Of the 239 trainees who attended the national training courses/workshops, 98% were Bangladeshi. More than a third of the participants of the field experience programme were overseas students from 43 different institutes/universities around the globe.

Training, capacity building and technical assistance

- Diversifying local capacity building for research has been a distinct priority. The Centre organised training on both quantitative and qualitative methods, for various skill levels, from early career participants to faculties involved in teaching and research. In total, 120 participants were trained: 56% males and 44% females; 97% local and 3% international.
Capacity building of local health workforce for delivering clinical services has also been prioritised. Increasing competence of local health professionals for delivering clinical and laboratory services has been a priority for the ICDDR,B training programme. For example, during 2009, 131 trainees participated in clinical and laboratory courses. Training sessions were conducted on epidemiology, clinical aspects, recognition/diagnosis, management and prevention of diarrhoeal diseases. 119 government health staff—doctors, nurses and paramedics—were trained to provide quality clinical and laboratory services for better management of diarrhoeal and malnutrition cases at different government health facilities at district and sub-district levels.

**Training monitoring and evaluation**

Using checklists, all training courses were monitored and evaluated at different stages to ensure quality performance and achievement of training objectives. At the end of each session as well as at the end of each training course, assessment tools were applied for the quality checks. Analysis of the evaluation scores for the year indicated that both facilitation and facilities provided during each training course were considered excellent and helped trainees achieve a great deal of their expectations.

**Good training practices: guidelines and training database**

Developing training guidelines and standards was one of the important milestones set for 2009, aiming to promote excellence in performance, quality and outcomes in all external trainings. A comprehensive draft document was prepared for finalisation with stakeholders from both inside and outside the Centre. We expect to gradually apply the guidelines and standards in order to strengthen good training practices in the Centre.

As a part of the Training Management Information System a comprehensive training database was developed to cater for the needs of both field experience students and training participants. During 2009, the database was employed for managing the students’ experience, while data for external training will begin in 2010.

**Collaborations**

Locally, during 2009, the collaboration between ICDDR,B and James P Grant School of Public Health (BRAC University) proved to be very effective in building capacity of the local health workforce by jointly organising an executive certificate course in health management, in addition to the existing Master of Public Health course support. The collaboration with the government’s Ministry of Health and Family Welfare to build capacity of health facilities and service providers has been successful. Globally, the numerous collaborations with international universities and UN agencies including WHO, continued. For example, WHO’s request to build the capacity of health managers and leaders in Iraq in order to combat outbreaks of cholera, other diarrhoeal diseases and malnutrition is indicative of the Centre’s international footprint and responsiveness.

**Next steps**

The new external training strategy will see a restructuring and re-organisation of the training unit and its emergence as a paid service, better defined according to needs of the local health workforce, delivering good training practices in the areas of ICDDR,B’s expertise.
| Courses/workshops/fellowships and participant profiles 2009 |
|---------------------------------|-----------------|-----------------|
|                                | Occupations                                      | Countries | Numbers |
| **NATIONAL COURSE, WORKSHOP OR PROGRAMME** |                                                |            |         |
| Introductory Course on Epidemiology and Biostatistics | Medical doctors, young researchers, ICDDR,B staff and faculty from Khulna Medical College | Bangladesh  | 64 |
|                                                | Japan                                           | 1          |
|                                                | Cambodia                                        | 1          |
| Introductory Course on Qualitative Research Methods | Masters students from Psychology Department of Dhaka University; young researchers, ICDDR,B staff | Bangladesh | 52 |
|                                                | Afghanistan                                     | 1          |
|                                                | Cambodia                                        | 1          |
| Clinical Management of Diarrhoeal Diseases for MD/DCH/FCPS | Doctors enrolled in Fellowship Course at Bangladesh College of Physicians and Surgeons | Bangladesh | 20 |
| Clinical Management of Diarrhoeal Diseases for FCGP students | Doctors enrolled in Fellowship Course at Bangladesh College of General Physicians | Bangladesh | 27 |
| Course on Epidemiology, Clinical Management and Prevention of Diarrhoeal Diseases and Malnutrition | Doctors working in Upazila Health Complex, District Hospital and Medical College | Bangladesh | 57 |
| Training Course on Diagnostic Laboratory Methods | Medical technologists working at District Hospital and Upazila Health Complex | Bangladesh | 15 |
| **FELLOWSHIP/ELECTIVES/INTERNSHIPS** |                                                |            |         |
| International and national fellowship training | Students studying medicine and or public health in universities/colleges at national, regional and international levels | Australia (3) Bangladesh (74) Canada (4) Denmark (1) India (3) Italy (1) Japan (2) Mozambique (3) New Zealand (2) Netherlands (1) Nigeria (1) Norway (5) Poland (1) S. Korea (2) S. Africa (1) Sweden (1) UK (2) USA (32) | 139 |
| Clinical fellowship | Young medical doctors | Bangladesh | 15 |
| Nursing fellowship | Staff nurses | Bangladesh | 20 |
43 international universities sent 63 students in 2009

<table>
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<th>University/Institution</th>
<th>Country</th>
<th>Level of Study</th>
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</table>
Changing the face of nursing

The Dhaka Hospital continued undergoing significant developments in its nursing programme in 2009 as part of its ongoing commitment to further professionalise the practice and offer a leading workplace for nurses in Bangladesh.

Developing management practices

The hospital has introduced participatory management practices and the formation of different units, unique in that more staff are now empowered to take responsibility for identifying both problems and solutions in their workplace. In a ‘bottom-up’ approach, everyone now has the opportunity to raise their voices and concerns and contribute more actively in the delivery of healthcare services at the hospital.

Training programme: Nursing Fellowship

This year saw the development of the Nursing Fellowship programme that aims to address the continual professional development of recently registered nurses. The Fellowship has been run in previous years, but in 2009 the course design was changed to meet the needs of both the nurses and the hospital, and 40 new nurses were recruited. Led by Alison Moebus, Australian Youth Ambassador for Development and Mohammad Ullah, Professional Practice Leader (Nursing), the Fellowship is designed on a block system education: two full days of didactic lectures per month, and providing care for patients for rest of the month. Areas of focus have included diarrhoeal disease and dehydration, malnutrition, respiratory infections, HIV/AIDS, preventable disease and immunisations. Current permanent nursing staff are encouraged to participate also.

In 2009, ICDDR,B almost doubled its nursing workforce!

By the end of 2009, a team of 87 nurses worked at the Dhaka Hospital, of whom 55 were fixed-term Nurses and 32 were Fellow Nurses. 45 nurses were additionally recruited on a daily basis.
Mohammad Ullah, Professional Practice Leader (Nursing)…

I enjoy the opportunities for collaboration we have with international nurses who visit our hospital every year—the sharing of ideas. Nursing goes beyond the horizon—it’s without borders. Nurses working in resource-constrained countries share their views and ideas for the development of nursing globally.

For example, some Norwegian nursing students were amazed at how we manage to look after so many patients. The working conditions are so different. In Norway, 100% of maternal deliveries occur in a hospital whereas, in Bangladesh, 85% of deliveries occur in the village homes. The nurses could not believe how this is possible, coming from an environment where (in Norway) a helicopter equipped with all the systems to aid a delivery, with a doctor, midwife, and paramedic is on round-the-clock duty to bring the woman to hospital.

I encourage these nurses to pursue their careers in international health and community health nursing. We have a great need to serve rural people as most of our nurses serve in urban areas. In particular, we still need to address gaps in mother and childcare, obstetrics and gynaecology, and primary healthcare services in Bangladesh.

Other staff development initiatives in 2009 included training all nurses on:
- PC literacy
- Suchona (administrative software)
- Sheba (medical information management)
- Performance Management & Development System

Some new collaborations with local partners were forged this year to further strengthen staff capacity and offer skills exchange opportunities. Training on intensive care and critical care nursing was provided at Square Hospital—one of Dhaka’s leading private hospitals, and undergraduate nursing students from the International University of Business Agriculture and Technology in Dhaka spent time at the Dhaka Hospital for clinical practicum.

Special Care Unit: from primary care to tertiary care

In 2009 the Special Care Unit underwent preparations to become an intensive care unit. In order to meet
the challenges of caring for increasingly unwell patients the nursing team underwent training as they will soon be called upon to care for sicker patients than ever before. Intensive care nursing requires specialised knowledge and skills, while care delivery mechanisms evolve to support patients’ needs for continuous monitoring and treatment. These patients require complex assessment, high intensity therapies and interventions, and continuous nursing vigilance. Critical-care nurses rely upon a specialised body of knowledge, skills, and experience to provide care to patients. In support, 2009 also saw the introduction of new equipment into the Special Care Unit such as a cardiac monitor, radiant warmer, defibrillator, arterial blood gas analyser, syringe pump and a pulse oximeter. The nursing team has been quick to learn how to use the new equipment enabling the unit to care for more complex patients improving patient outcomes.

Short Stay Unit

In 2009, the nurses in the Short Stay Unit yet again responded to the needs of the community providing essential care to patients with diarrhoea. Along with a medical team, the short stay team responded to the unprecedented three diarrhoeal outbreaks this year. In the aftermath of Cyclone Aila which hit Bangladesh in May 2009, nurses made up a critical part of the medical emergency response team sent to assist the people of Satkhira in southern Bangladesh.

August 2009 saw pandemic H1N1 (2009) influenza reach Bangladesh, at which time the nurses of the unit worked hard to meet the needs of these patients, while simultaneously learning and employing new nursing skills and diagnostic tests to care for this new patient population.

Longer Stay Unit

This year saw many changes in the Longer Stay Unit, where the nurses continue to meet a wide range of patients including patients with nutritional problems, gastrointestinal problems, respiratory infections, HIV/ AIDS and malnutrition. The unit has now developed a High Dependency Unit which acts as a transitional level of care between the Special Care Unit and the Longer Stay Unit. Nurses in the Jagori ward in 2009 worked to provide essential nursing care for patients with HIV and AIDS.
Strengthening the public health workforce

28 new MPH graduates in 2009

13 students from 11 countries of Asia, Africa, Europe and North America and 15 students from Bangladesh completed in the Master of Public Health programme at JAMES P GRANT SCHOOL OF PUBLIC HEALTH, BRAC University.

As a key partner of James P Grant School of Public Health, ICDDR,B has been playing an important role in most of its training programme by providing access to the many facilities at the Centre including its professional staff, laboratories, training facilities across the main campus, field sites and the library. In February 2009, the fifth batch of Master of Public Health students began, with a semester of classes in rural Savar, a second semester at ICDDR,B, and then independent research/study.

ICDDR,B staff members offer technical guidance and support to a number of selected students for conducting the independent research/study towards completion of their dissertation, in addition to teaching as adjunct staff throughout the year.

Students at a glance

Thirty students enrolled in 2009, with 28 of them completing the year (14 males and 14 females) from 11 countries of Asia, Africa and North America. This includes 15 Bangladeshi nationals. Of the students, 17 were medical doctors and 11 were non-medical: programme and project coordinators and managers, community health specialists, public health trainers, researchers, microbiologists, documentation executives, and anthropologists.
In order to improve language proficiency of Centre staff, HR Development arranged English language training onsite with the help of the British Council. A total of 93 participants were enrolled in the training in two batches for 10 weeks, and demonstrated an excellent improvement in English language skills.
In February 2009, a new hospital management system, named Sheba, went live in the Dhaka Hospital. Sheba is an integrated computerised system for recording and analysing clinical information for improved patient care and hospital administration. It comprises a paperless medical record and covers all the units of the hospital: registration triage and short stay ward, Travellers’ Clinic, and auxiliary units like pharmacy, stores, laboratory, medical audit, fellowship programme, imaging, diet and the kitchen.
Laboratory sciences
biosafety and quality assurance

At the end of 2008 Family Health International (FHI) partnered up with Laboratory Sciences at ICDDR,B to provide assistance to the Clinical Laboratory Services (CLS) to gain Medical Laboratories—Particular Requirements For Quality And Competence accreditation according to the International Organization for Standardization (ISO 15189:2007).

Clinical Laboratory Services is a multidisciplinary laboratory providing diagnostic support to patient-care activities of the Clinical Research and Service Centre in Dhaka and Matlab and to paying outpatients. In 2009, CLS handled 104,166 patients and performed 529,156 laboratory tests.

January 2009  Quality Assurance Specialist was employed to work with FHI and CLS in meeting the requirement of ISO 15189

May 2009  Quality Assurance Manager was employed to assist CLS in quality management programme

September 2009  Biosafety Manager was employed to support biosafety activities in the laboratories

October 2009  Board of Trustees approved the new position of a Head of the newly installed Biosafety and Quality Assurance Unit for Laboratory Sciences.

During the course of 2009 all 83 Clinical Laboratory Services staff were trained in ISO 15189, Quality Systems for Medical and Diagnostics Laboratories, Biosafety and Biosecurity. Additional training was provided to managers and supervisors, including Document Control, Quality Management, Measurement of Uncertainty, Equipment Management and Internal Audit, and other in-house training on new procedures and processes as part of the development of the Quality Assurance programme.

A major part of meeting ISO requirements is to document all procedures and processes. CLS laboratories perform over 230 various types of medical laboratory tests for customers. All of the procedures have been documented and incorporated into a document control system. This includes all laboratory and management processes for
specimen preparation, equipment maintenance, decontamination of work areas, personnel, document control, purchasing and inventory, process control, occurrence management, assessment, information management, service satisfaction and safety. A total of approximately 695 documents are required for CLS’s accreditation, the majority of which were implemented in 2009.

Many other activities have taken place to improve the standard care that is provided by CLS and improve the safety in the laboratory. Internal audits and safety audits have been conducted resulting in corrective measures taken to improve quality and safety. A customer service satisfaction survey conducted in October 2009 of research staff, staff clinic, hospital staff and walk-in customers indicated the laboratories are highly regarded. Calculations of measurement of uncertainty are beginning to be implemented for all quantitative testing, which will provide users with a meaningful result alongside potential variance for any particular test method. This will provide more accurate result and this will help CLS identify areas of improvement for testing processes. An equipment maintenance programme has been established moving from break down maintenance to preventative maintenance. Staff competency was another area of improvement addressed in 2009. Staff were assessed, areas for development identified, and extra training provided, leading to improved testing and better safety practices.

Two committees have been formed to help improve biosafety and quality assurance practices at ICDDR,B:
- Biosafety Committee and
- Laboratory Management Committee.

Both are integral to maintaining good quality systems. Monthly meetings oversee the quality management, including review of audits, complaints, incidents and documents; monitoring corrective actions and any other relevant issues. The laboratories and safety issues associated with them are complex and diverse and the team of professionals that assemble on a monthly basis reflect that.

Clinical Laboratory Services will apply for accreditation early 2010. If successful, CLS will be the first medical laboratory in Bangladesh and one of the few in the Asia Pacific Region to gain ISO 15189 accreditation.

Future activities for 2010 for the Biosafety and Quality Assurance Unit include assisting in the certification of the biosafety level 3 (BSL3) laboratory, and support the Tuberculosis and Virology laboratories in the development of the BSL3 Safety Manual and Technical Manual, which are critical for BSL3 certification and safety of staff and community. We will work with Tuberculosis, Virology, Food and Enteric Microbiology, Water Microbiology, Nutritional Biochemistry, Media Lyophilization and the Blood Bank to develop strategies for ISO 15189 and 17025 accreditation of testing services, and improve biosafety practices and implement Good Clinical Laboratory Practices. The biosafety programme will also introduce a medical surveillance programme to help insure the wellbeing of our staff and community, and finally an ongoing training programme for all laboratory personnel will be available to insure that all perform their work in a consistent and safe way.

The establishment of ICDDR,B as a state-of-the-art quality and reference laboratory platform which meets ISO requirements will create new opportunities to explore collaboration with government and non-government laboratories to initiate biosafety and quality assurance projects with partner organisations.
Manuscript writing course

Human Resource Development addressed the expressed needs of scientific staff for a systematic process of collaboration in scientific writing by developing a manuscript writing course. The course aims at developing scientific writing skill among staff so that they produce quality protocols as well as pursue funding from donors. A consultant was appointed to facilitate, develop and conduct the course, which began with a special session including both students and supervisors advocating a mentoring approach to the manuscript writing process.

Students engaged in one-to-one tutorials with the course leader and also attended structured group learning sessions. The group sessions covered key information on writing each section of a manuscript and also addressed critical topics related to scientific writing. Most importantly, the students that completed the course developed a draft manuscript ready for submission to a scholarly journal and the tools and resources needed to replicate this process again for future publishing.

Nineteen scientific staff members attended the course with their supervisors and received necessary study materials, workshops and sample protocols designed for the course. This training was arranged in two batches each lasting for three months. A resource toolkit was developed to be used across the Centre for all staff interested in improving their scientific writing and/or drafting a manuscript for eventual publication.

Strengthening health economics

It is a little explored area of research at ICDDR,B; vast areas within health economics studies remain, as yet, untouched. A Health Economics Discussion Group at ICDDR,B first met in 2008, but it was not until the first health economist joined the Health Sciences and Infectious Diseases division in 2009 that the group really began to flourish.

Through this discussion group, interested cross-disciplinary health researchers focus on established theories and empirical analyses, and exchange views on how to better incorporate economic analysis into different projects. The group also focuses on broader policy issues related to the economics of health. For instance,

- health budget
- healthcare in private hands
- healthcare financing
- quality of healthcare from patient’s perspective, and
- access to healthcare.

The monthly discussion group aims to work with research and policy dialogue, and develop a common consensus on applied health economics tools in Bangladesh in collaboration with other research and educational institutions in the country.

Health economics addresses the efficient utilisation of resources in the health sector based on a defined concept of social justice.
ICDDR,B offers Research Fellowships under different divisions and projects to provide hands-on training in the development of research protocols, data collection, data analysis, and writing manuscripts. Fellows are usually recent medical graduates and Masters degree holders who are interested in making a career in health research.

Infectious disease and vaccine science fellows

The Programme on Infectious Disease and Vaccine Science (PIDVS) has supported seven Fellows to date. The Fellowship begins with an initial six month appointment and successful Fellows can be retained for up to three years. Each Fellow is supervised by the Programme Head under the guidance of Head of the Training Cluster. The first Fellow has already successfully completed the programme and is currently working as Research Investigator in the Outbreak Cluster, supporting collaborative efforts between ICDDR,B and the Institute of Epidemiology, Disease Control and Research to investigate emerging threats to public health. Current Fellows include two women and four men, and each is given a major focus from which to develop a protocol for their own research project, in addition to being assigned one or two ongoing projects with which to assist. Research proposals must meet the Centre’s high standards and be approved by both the Research Review and the Ethical Review Committees. Upon successful completion of their training and final evaluation, the Fellows are eligible to apply for any research investigator position throughout the Centre.

Current Fellows are focusing on a wide variety of disciplines that impact the lives of the people of Bangladesh including the financial burden of Japanese encephalitis; case fatality of typhoid fever; the contribution of dengue, malaria, leptospirosis, rickettsia and bartonella to fever-related illness in Bangladesh; HIV prevalence among migrants; incidence and prevalence of tuberculosis among healthcare workers; and Nipah virus sero-surveillance in cattle and goats.
After completing his MBBS in 2004 and MPH in 2007 Labib Imran joined ICDDR,B as a Research Fellow.
His major project was a protocol to monitor hospital-based selected febrile illnesses in six divisional hospitals.

**It’s a unique Fellowship to have exposure to learn from both surveillance and outbreak situations and it will act as a landmark in my career as a scientist.**

Sadia Afreen joined PIDVS as a Research Fellow in May 2009, after completing her MPH from BRAC University’s James P Grant School of Public Health.
She is developing a protocol to identify tuberculosis among healthcare workers, and assisting in research into exposure to the fungus, aflatoxin, among Bangladeshi children.

This Fellowship is a rare opportunity to develop Bangladeshi scientists under the direct supervision and guidance of renowned scientists. The concept of Fellowship is new in Bangladesh and should be encouraged and adapted Centre-wide.

**ICDDR,B introduces Dr Stan D’Souza Fellowship**

The Dr Stan D’Souza Fellowship programme is in remembrance of the life and work of this dedicated demographer, statistician and development researcher who served as the Head of Community Services Research Programme at ICDDR,B from 1980 to 1984.
Dr D’Souza played a critical role in improving the Matlab Demographic Surveillance System and developing ICDDR,B’s research activities and profile on population, health and development, with a special emphasis on socioeconomic inequalities in health. This Fellowship is supported by friends and colleagues of Dr Stan D’Souza.

The D’Souza Fellowship provides opportunities for research and leadership training in a flexible 12-month non-degree programme for young Bangladeshi researchers and academics in the field of population, health and development. Md. Abdullah Al Mamun is the first to receive this Fellowship, in 2009. Mamun completed his Masters in Statistics from Department of Applied Statistics at Dhaka University.

**Mentorship**

Human Resource Development coordinates a mentorship scheme for all staff members returning from higher studies. The Mentoring Programme for Post-Doctoral Returnees is an excellent source of appropriate opportunities for returning post-doctoral staff members to develop and incorporate their newly acquired skills in different divisions at ICDDR,B. Since its inception, 7 staff members with scientific research background have taken advantage of the programme. In 2009 one new staff member was selected to participate.

A total of US $25,000 is allocated for each participating staff member for research over a two-year period within which they have to successfully acquire further funding for their projects. As of December 2009, an amount of US$202,651 (US$49,366 in 2008, US$153,285 in 2009) has been spent for the 7 participants enrolled in the programme.

In return, a number of the mentored staff have already secured a notable amount of funding for their projects and continuing to pursue further funding through their proposals. As of December 2009, a total of US$212,113 has been generated, of which US$75,000 was contributed by the Centre to support two individual projects.

**Number of participants enrolled in the programme**

<table>
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<th>Name of Division</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
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<td>5</td>
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<tr>
<td>Health Sciences and Infectious Diseases Division</td>
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<td><strong>4</strong></td>
<td><strong>2</strong></td>
<td><strong>6</strong></td>
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Improving the student experience

The Student Field Experience programme underwent some dramatic changes in 2009 to develop capacity and responsiveness, resulting in a more streamlined, expanded and diversified programme. Policies and guidelines were updated, new formats for application and tools for monitoring and evaluation were introduced, and a computerised student database developed. Most importantly, a Student Welfare desk was created—the first of its kind at the Centre.

ICDDR,B is now capable of accommodating various student population groups to accomplish their public health practicum, masters or doctoral dissertations. For example, 29 overseas students this year worked on their research theses (13 masters and 4 PhDs), and 19 students completed elective training. An increased number of students (63 against 52) from an increased number of overseas institutions (43 against 31) visited the Centre compared to 2008.

In 2009, ICDDR,B hosted students from...

US
- Johns Hopkins, Emory, Berkeley, Cornell, Virginia, South Carolina, Florida, Michigan, Vermont, George Washington University, University of California–San Francisco, Buffalo New York

Canada
- McGill University

Europe
- Erasmus, Netherlands; University of Oslo, Norway; Trondheim, Norway; Karolinska Institute, Sweden; Ruprecht-Karls University–Heidelberg, Germany

UK
- Leicester University, Bristol University, Northumbria University, Oxford University

Australia
- University of Melbourne, University of Queensland

Student Welfare Unit
- The Student Welfare Unit provides support to all international students who come to ICDDR,B, from the time of their arrival to the conclusion of their studies and research.
- The unit coordinates with Technical Training Unit, with the latter providing admission/placement and liaison with research scientists.
- Student Welfare support includes:
  - pre-arrival information
  - advice and arranging suitable short/long term accommodation
  - comprehensive orientation package
  - full logistical support and advice on any day-to-day issues during their stay in Dhaka
  - arranging transportation and any other requirements at departure
  - raising awareness of all student matters to relevant departments in ICDDR,B

2009 highlights for Student Welfare include:
- Established a dedicated office committed to the welfare and support of all international students/interns
- Production and distribution of the Student Handbook
- Ongoing development of the student website
- Organisation of a comprehensive orientation package
- Arrangement of free access to American School campus facilities
- Regular coffee breaks together with other students
- Free staff transport for daily pick-up and drop
- Discount on tariff for students at all ICDDR,B Guest Houses
- Acquisition, set up and management of 4 bed/4 bath student apartment
- Awareness raising about international students on campus
- Continuing active pursuit of a vision of establishing Student Welfare within the structure and fabric of ICDDR,B

For more information visit
www.icddrb.org/students
ICDDR,B, in collaboration with University of California, Berkeley, organised a workshop on Methodological Tools for Social Scientists. A team of eight early career qualitative researchers from the Infectious Diseases and Vaccine Sciences Programme attended Berkeley for two weeks in September 2009.

Qualitative research is all about exploring issues, understanding phenomena and answering questions. Social science is used to gain insight into people’s attitudes, behaviours, value systems, concerns, motivations, aspirations, cultures or lifestyles. Data on such issues are collected through group discussions, in-depth interviews, informal conversations, as well as observations, and analysed in the light of content and context. Collecting and analysing this unstructured information can often be messy and time consuming, thus researchers are often faced with large volumes of material from which finding themes and extracting meaning can be a daunting task. Since appropriate interpretation of qualitative data is crucial for public health research, proficiency in such research is necessary.

The qualitative team is an essential component of our outbreak investigation support to the Government of Bangladesh, says Dr Steve Luby, Head of the Programme. They are consistently sensitive to the community’s perspective. They inform the broader investigation team of the general social conditions that contributed to the outbreak and the feasibility of interventions to reduce future risks.

The two-week long course included workshops on:
- research/survey design
- interviews, coding and interpretation
- poverty analysis and gender
- participatory research and applied anthropology
- community-based participatory research
- experimental design for project evaluation
- writing as a social scientist.

The workshop covered different ways of writing manuscripts from a public health point of view, an anthropological point of view, as well as developing manuscripts for journals. It also covered some basic issues regarding quantitative research which are of paramount importance for qualitative researchers likely to incorporate quantitative methods in their research.

I carry a message with me from Berkeley: those who are working in the public health sector and using anthropological methods should remember and remind others as well that when we use qualitative approach—slow cooked food is tastier than pressed cooked food. There are certain ways to conduct research but we should avoid the shortcuts.

Aasma Afroze, Research Investigator

Anthropological work contributes to further understanding local backyard poultry farming practices, particularly those which may pose an infection risk from avian influenza to humans.
Significant change and improved services for the staff

Since the establishment of Infrastructure Services in June 2008, the organisation has made a number of significant improvements to the ICDDR,B premises. The improvements have focused on lifting the level of service and providing better facilities for staff located in Dhaka and the field sites. This includes:

- the completion of the civil structure for the vertical building extension
- construction of hospital facilities including a Central Sterilisation Room
- renovation of the Staff Clinic
- establishment of the Mirpur Treatment Centre, and
- upgrading facilities at the various field sites.

The introduction of new equipment and renovation of both the Staff Canteen and Corridor Café have improved cafeteria services at ICDDR,B. The introduction of the G4S security guards and a security hotline has increased security for all staff and assets. Infrastructure Services has taken over the responsibility for the cleanliness in the hospital and has established standard operating procedures. The renovation of the Guest House has increased its popularity and it is now the 'place to stay' when visiting ICDDR,B. Apart from providing dedicated transport services for patient care and research activities, Transportation Unit has also established an online vehicle request system. The international and domestic per diem rates were revised by the Travel Office.
success stories
ICDDR,B selected inaugural chair of Tropical Bacteriology at Erasmus MC

ICDDR,B is the medical centre of Erasmus University Rotterdam—an internationally-recognised centre for high-quality, compassionate care and fundamental and translational scientific research in The Netherlands. Erasmus MC has broadened its horizon and scope of research and education in particular, and further internationalisation of its activities is an important new strategic goal. With an aim to develop expertise at Erasmus MC through a strong collaboration with renowned international research institutions that will offer opportunities for exchange of students, scientists, and teaching staff, a new special chair in Tropical Microbiology has been created, with emphasis on Bacteriology at the Department of Medical Microbiology and Infectious Diseases. The development of Tropical Bacteriology will contribute to the course for International Research Masters in Infection and Immunity at Erasmus MC. ICDDR,B has been selected to act as the founding institution for this new special chair.

ICDDR,B and Erasmus share a common vision and mission—the acquisition and implementation of new knowledge and know-how, along with aspirations to play a leading role in health-related issues worldwide. Since 2007 Erasmus has seconded its senior staff member Dr. Hubert Ph Endtz from the Department of Medical Microbiology and Infectious Diseases to ICDDR,B, and in March 2009, Dr. Endtz was announced as the inaugural ICDDR,B Chair in Tropical Bacteriology at Erasmus. Dr. Hubert Ph Endtz is a well-known medical researcher specialising in bacterial diarrhoea, epidemiology and pathogenesis of Campylobacter infections, including the pathogenesis of the Guillain-Barré syndrome, antimicrobial resistance, and diagnostic microbiology.

The creation of an ICDDR,B chair in Tropical Bacteriology at Erasmus will further strengthen the collaboration between the two organisations, and will also reinforce the work with other international research and training institutions.
On 22 December 2009 in Rotterdam, Dr Hubert Ph Endtz delivered his inaugural lecture as the new Professor in Tropical Bacteriology at Erasmus MC. An excerpt from his oration, Children’s Corner…

Universities play an increasingly important role in addressing global health problems. Renowned universities have extended their focus from local problem-solving to facing global challenges. The focus of these universities is also changing from local and regional, to international. Various new international ventures explore and initiate research and aim to train a new generation to collaborate across international boundaries in the health sciences. Mono-disciplinary or oligodisciplinary stay-at-home research is gradually being replaced by cross-disciplinary, international research and training in other parts of the world.

Erasmus has widened its educational horizon by increasing the number of overseas students in Masters degree programmes and by increasing the options to complete traineeships and fellowships abroad. Seize those opportunities. Spread out your wings and travel. Work in other medical or research institutions. Learn and try to understand the challenges faced by your generation, not just here, but over there as well. Learn about the enormous gap between the rich and the poor, about the consequences for underprivileged children in developing countries. Go to where the problems lie. Learn about climate change and about its implications for health. These can be life-changing and life-shaping experiences that will help you grasp the challenges of our global village. Over three hundred and fifty thousand children are born every day, almost four every second. Their future is in your hands.

The primary focus of the new chair will be on:

- bacterial diarrhoeal disease, including Campylobacter infections and its complications
- bacterial respiratory infections, including pneumococcal disease and tuberculosis
- innovative research, including the development of new diagnostic tools and therapeutic interventions in diarrhoeal and respiratory diseases
- microbial discovery and the development of local capacity in ‘hotspots’ for infectious disease outbreaks.

The tasks of the new chair are mainly in the areas of research, training and education. ICDDR,B seeks to develop a scientifically-literate and empowered world community of scientists; the career development of new scientists needs to be supported. As the leading international institution involved in health sciences in Bangladesh, ICDDR,B attracts the most talented excelling students from its national universities each year. Through its human resource development programme, it is committed to providing maximum opportunities to these bright young scientists to obtain further postgraduate education.

Each year ICDDR,B sends a number of its staff members to pursue Masters, PhD or post-doctoral fellowships in leading institutions and universities in the world to create a new and dynamic new generation of top scientists. Longstanding relations and programmes exist with institutions such as Johns Hopkins University and Harvard University. The new International Research Masters Programme in Infection and Immunity, and other Masters programmes in Rotterdam, offer excellent opportunities for exchange and enrolment of young and talented Bangladeshi scientists and ICDDR,B research/teaching staff. ICDDR,B, although formally not part of the national educational system in Bangladesh, is a world-renowned leading international research and training institution in the tropics. The exchange of students and (junior) scientists between Erasmus MC and ICDDR,B, is envisaged and will be an added value in the partnership between the institutions.
Dr Stephen P Luby, Head of the Programme on Infectious Diseases and Vaccine Sciences, won the 2009 Oklahoma University International Water Prize. This prize recognises and honours an individual who has made significant international contributions, either through research or teaching or service activities, in the field of water supply and sanitation, with a focus on the world’s poorest living in small villages/communities in rural or remote regions. The prize is a biennial award sponsored by the Water Technologies for Emerging Regions Center at the University of Oklahoma.

The Lancet published an article on Dr Luby in 2009, as a promoter of water and sanitation (Vol. 374, 12 December). Dr Luby has devoted the 30 years of his career to public health, water, sanitation and communicable disease, mostly in developing countries where these issues take the highest toll on health. This achievement was further recognised by the award of the 2009 Oklahoma University International Water Prize. Despite an early professional interest in non-violent conflict resolution, he realised that this would be difficult to implement and that a career in medicine would be a better way to achieve his aims.

One of the nice things about international public health is that you can really work towards social justice, work to lessen social conflict.

Developing countries like Bangladesh and Pakistan face infrastructure problems that impact on water supply. The water supply system is intermittent, with many breakages that can cause contamination. Water supply and contamination issues have the largest impact in the developing world with the single biggest problem of causing diarrhoea. According to Dr Luby, it is as simple as washing ones hands. A basic handwashing intervention with soap is a cost-effective way to reduce the burden of diarrhoeal disease in developing countries.

If people could wash their hands regularly with soap we could reduce the burden of diarrhoeal disease and the burden of respiratory disease by 25-50%. Such a reduction would massively reduce deaths, including among the under five year olds.

Luby’s commitment to live in the low-income countries where many of his studies are currently taking place has won the respect of his peers and ICDDR,B is proud to have such a talent within its ranks.
The Journal of Health, Population, and Nutrition at ICDDR,B provides a forum for the rapid publication of new findings on issues pertinent to maternal, child and family health, and related issues of population and nutrition.

**free online, bimonthly**

The journal publishes articles in the areas of maternal and child health, reproductive health, child mortality, nutrition, impact of poverty and social determinants of health, immunisation, public health, sexually transmitted diseases, communicable diseases, chronic diseases, demographic transitions and evolutions, population, family planning, sanitation, gender and human rights.

Sections include:
- emerging diseases
- health systems
- immunisation
- nutrition
- population
- reproductive and neonatal health
- water and sanitation
- gender, health and human rights
- social determinants of health
- case studies.

This peer-reviewed international journal is one of the most reputable scientific publications in south-east Asia, evolving from the quarterly Journal of Diarrhoeal Diseases Research, commencing in 1983 with the support of International Development Research Centre, and subsequently Swiss Agency for Development and Cooperation.

The journal is accredited as ‘the Lancet of the East’ for its quality and widespread exposure, and is available online at the ICDDR,B website as a part of its commitment to prioritise visibility over earning paid subscriptions.

Occasionally JHPN releases theme-based issues such as health equity, healthcare use, arsenic contamination...
and health effects, arsenic mitigation measures, reproductive and newborn health, safe motherhood, and social exclusion.

The journal is very widely covered by several scientific index agencies, such as Current Contents: Clinical Medicine, Research Alert, SCI Expanded, SCI JCR, Index Medicus, PubMed/MEDLINE, POPLINE, Google Scholar, Elsevier Bibliographic Databases (Scopus, Embase, EM Biology, and EM Care), Cambridge Scientific Abstracts, CAB Abstracts, CAB Health, Bioline International, Portico, EBSCO, Hinari, INASP, Gale, ProQuet and many more.

In 2009, JHPN
- published 6 issues
- published 84 papers, including editorials, letters, and case studies
- received papers from more than 38 countries
- employed 10 editors, including the Editor-in-Chief, and over 250 reviewers
- achieved a cumulative impact factor of 1.15
- printed 550 copies of each issue
- planned for the introduction of an online manuscript-submission system

The journal is available online at
www.icddrb.org/jhp
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www.portico.org
www.inasp.info
Based on studies conducted by ICDDR,B to evaluate the effectiveness of the Hib conjugate vaccine in children under two years among 68,000 children in Dhaka city, a combination vaccine for *Haemophilus influenzae* type b was introduced in Bangladesh for the first time in January 2009 by the Ministry of Health and Family Welfare. The study was implemented in partnership with Dhaka Shishu Hospital, Johns Hopkins University, Dhaka City Corporation, Expanded Programme on Immunization of the Government of Bangladesh, and other partners. Children who received at least two doses of the vaccine were 34% less likely to have pneumonia, demonstrating that Hib is an important cause of pneumonia in Bangladesh.

The new pentavalent combination vaccine includes Hib, diphtheria, tetanus, pertussis and hepatitis B. This vaccine is now included in the routine government immunisation programme that immunises about four million children each year. Since about one in four deaths under-five years in Bangladesh are caused by pneumonia the vaccine is expected to save 20,000 lives yearly.

ICDDR,B will continue to collaborate with Dhaka Shishu Hospital, Ministry of Health and Family Welfare and other stakeholders and strengthen its research activities on Hib through population-based surveillance and the assessment of the impact of vaccine introduction on the health of children in Bangladesh.
ICDDR,B received the Islamic Development Bank Award for Science & Technology in 2009. With a prize of US$100,000, the award was given in acknowledgement of ICDDR,B as a noted scientific research institution in Islamic Development Bank least developed member countries.

In the presence of the Deputy Prime Minister of Turkmenistan, the award was received during the 34th IDB Board of Governors meeting at Ashgabat, Turkmenistan in June.

Decades of dedication to ICDDR,B

In 2009, senior staff members—many of whom have spent more than half their lives working at ICDDR,B—were specially recognised. A ceremony was held during the last day of the Board of Trustees meeting in June, where the Executive Director acknowledged their dedicated service to the Centre.

204 staff have worked at ICDDR,B for more than 25 years

Jatindra Chandra Das, an attendant at the Intensive Care Unit, joined ICDDR,B in 1968 when it was known as the Cholera Research Laboratory. During the Liberation War he cared for patients and was later shifted to the research study ward. He loves working at ICDDR,B and is always happy to see the gradual improvements. "There is no other hospital which serves its patients for free, often transferring them to other hospitals at its own cost and even paying their transport cost at times to go home after treatment."

Mrs Hazera Nazrul, Operations Researcher, Health Systems and Infectious Diseases, joined in 1978 as a Field Research Officer and regards ICDDR,B as her second home. She remembers her supervisors with great integrity and love, as they taught her at the beginning of her career, trained her and helped improve her research skills. She expects that zinc treatment will reach the same popularity as ORS did in the 1980s and that ICDDR,B will be recognised again for its great contribution to saving lives. "Back then everyone worked like a family and the working environment was great where everyone's opinions were appreciated. We consider ICDDR,B as our own child."

An excerpt from Taking the doctors back to where they belong: achieving health for all in Bangladesh

The need for monetary incentives can never be overlooked in an economy-driven society... This is the reason why, with the increasing availability of opportunities, doctors are getting more involved in the private and urban sectors, contributing to the urban bias... One cannot ignore the thirst of doctors to gain more knowledge and the desire to excel in their career path. The desire to obtain higher degrees is another important reason why doctors prefer to stay in urban areas... Hence, over the years, we have created an inequitably distributed and urban-focused health workforce, leaving the majority of potential recipients of the health services unattended and gravely neglected... I still strongly believe that doctors can be placed at the rural centres to render primary healthcare services. But the model must reflect the needs of the doctors, and there has to be monitoring involving all the stakeholders to keep the model viable.
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Combating diseases together

IEDCR and ICDDR,B

The Institute of Epidemiology, Disease Control and Research (IEDCR), Ministry of Health and Family Welfare, has primary responsibility within the Government of Bangladesh for infectious disease surveillance, outbreak detection and response. IEDCR’s surveillance and research activities include diarrhoeal diseases, malaria, kala azar, tuberculosis, leprosy, encephalitis and a variety of unknown diseases.

ICDDR,B and IEDCR have worked closely together for years to quickly and efficiently identify disease outbreaks and improve public health in Bangladesh, and this collaboration continues to grow stronger. The credit for this goes to two people: Professor Mahmudur Rahman, IEDCR Director, and Dr Stephen Luby, ICDDR,B Head of Infectious Disease and Vaccine Sciences.

ICDDR,B was invited by the government to work with IEDCR to conduct a Nipah outbreak investigation in 2005. Staff from IEDCR and ICDDR,B worked together constructively to build surveillance for Nipah in ten selected hospitals. Relevant hospital authorities were responsible for sending monthly reports of suspected Nipah cases and samples were collected from the sites and tested on a periodic basis. As more diseases were discovered through this surveillance, their partnership during outbreaks became routine, and surveillance collaboration expanded to other diseases including avian influenza, meningitis, kala azar, and H1N1 influenza.

In 2007, IEDCR and ICDDR,B began influenza surveillance in 12 hospitals across the country to identify individuals and groups who have life threatening infections. The surveillance identifies clusters of patients, healthcare workers and poultry workers with severe acute respiratory illness and influenza-like illness. With a vision of creating a sustainable monitoring system IEDCR and ICDDR,B established a mode of coordination. During an investigation the team collects news on outbreaks from local newspapers, IEDCR, and hospitals in the country. Immediately, a team is formed and sent to the outbreak location where it then contacts the Civil Surgeon or government Health and Family Worker. Then the team collects information from the hospital/affected community/patient. Following set guidelines for information collection, samples are sourced from suspected patients and sent back to ICDDR,B or Centres for Disease Control and Prevention (CDC, in the United States) for investigations. A report is presented to the Directorate General’s office through IEDCR as well as to ICDDR,B.

This unique working relationship enabled ICDDR,B to support the response to the H1N1 pandemic in 2009, which some have called the biggest risk of a large-scale pandemic since avian influenza re-emerged in 2003. ICDDR,B has been working with IEDCR to examine samples of throat swabs and nasal wash of suspected patients since the pandemic. Regular meetings are held, and two researchers from ICDDR,B are seconded to work full time at IEDCR.

The collaboration with IEDCR provides access and opportunities for ICDDR,B to participate in emerging health problems during the acute stages of an outbreak. It also allows easier access to relevant communities at an early stage, where information and biological samples can be collected. Through it, ICDDR,B has substantial learning and research opportunities, as well as the opportunity to learn more about government systems and individual government officials. Working collaboratively on these surveillance systems, outbreak investigations, and research projects, the team is in a position to directly translate the results of scientific work into government action and policies. This relationship with IEDCR therefore enhances ICDDR,B’s relevance to public health in Bangladesh.

IEDCR and ICDDR,B are developing a new strategy called One Health Bangladesh which will involve animal health, agriculture, wildlife, and healthy environment, veterinary and livestock services. This project aims to have a considerable impact on the public health of the people of Bangladesh in the future.

Dr Steve Luby says of the collaboration,

IEDCR and ICDDR,B share a common vision of what needs to be done, and so we strive to assist by providing scientific and modest logistic support. With ICDDR,B support, IEDCR becomes more effective. The country is fortunate to have such a well trained epidemiologist in Professor Rahman to direct the Institute. He has a remarkable understanding of infectious disease threats facing the country, but he is also a natural collaborator and manager.
A collaborative clinical research team co-led by Dr Firdausi Qadri at ICDDR,B and Drs Stephen B Calderwood, chief, and Edward T Ryan, member, of the Division of Infectious Diseases at Massachusetts General Hospital (MGH) in the US have made finding a solution for cholera a top priority. It’s an initiative that began 15 years ago, when the Mass General group teamed up with Dr Qadri, a fellow immunologist who was working on cholera and *E. coli* infections and their vaccines, and colleagues at ICDDR,B.

WHO is advocating for more widespread use of cholera vaccines, with the recognition that protecting hygiene in densely populated urban areas, particularly in crisis situations, is often insufficient. Less than a handful of cholera vaccines exist, however these offer only short-term protection. Natural immunity, gained from contracting cholera, offers protection for about five to seven years. So the Mass General-ICDDR,B team is trying to understand the difference between natural immunity and vaccination, which it hopes will lead to a vaccine that will give longer-term protection. In studies so far, the team has discovered that immunologic memory develops following cholera, and it is now studying how long this memory lasts and comparing development of memory after natural infection with what happens in the body after vaccination.

Today, about 50 scientists are working on the Mass General-ICDDR,B vaccine project, with most of the investigators at ICDDR,B. Members of the Mass General team come frequently to work with Dr Qadri and her team and also conduct lab research at Mass General. Various grants—including from the National Institutes of Health and the Harvard Initiative for Global Health—support both research and training, enable MGH to send doctoral students and post-docs to Bangladesh and bringing Bangladeshi trainees for year-long training stints at Mass General and Harvard University.
In 1991, the world’s leading scientist on amoebiasis, Dr William A Petri from the University of Virginia Medical School, began collaborating with Dr Rashidul Haque at ICDDR,B—a scientific partnership which continues to this day and has seen over 50 collaborative scientific publications to address this neglected disease. Dr Petri is the Wade Hampton Frost Professor of Medicine, with joint appointments in the Departments of Microbiology and Pathology, as well as the Chief of the Division of Infectious Diseases and International Health, at the University of Virginia.

Caused by *Entamoeba histolytica*, amoebiasis remains one of the great neglected diseases—estimated to infect up to 50 million people worldwide. Working together over this time, Drs Petri and Haque developed specific antigen tests and other molecular diagnostic tools for this protozoan parasite. Supported by National Institutes of Health and the Howard Hughes Medical Institute in the USA, they have studied human immunity to amoebiasis, its genetic diversity and natural history, and together have demonstrated the link between amoebiasis and malnutrition.

Recently Dr Petri is investigating how malnutrition and intestinal infections lead to serious lifelong physical and mental problems in children living in developing countries. He received an award from the Gates Foundation to chair the Malnutrition Biomarkers Discovery section of the Mal-ED network, a five-year multicentre study for the study of malnutrition and enteric diseases. At ICDDR,B, the Mal-ED projects are being led by Drs Rashidul Haque and Tahmeed Ahmed in collaboration with Dr Petri and others at the University of Virginia.
Improved Health for the Poor

**Health, Nutrition and Population Research**

Improved Health for the Poor: Health, Nutrition and Population Research is a project of the Government of Bangladesh, funded by Japan Debt Relief-Fund Grant Assistance. Project parameters are guided by Millennium Development Goals 1, 4, 5 and 6, and it is the largest grant received by ICDDR,B to date.

Improved Health for the Poor is a collaboration between scientists from ICDDR,B and the government. ICDDR,B is the implementing agency, working with many relevant institutions, both governmental and non-governmental. One of the Centre’s guiding values is promoting partnerships and we actively seek to build the capacity of national institutes through this project.

**Child Health**

Scale-up and evaluation of evidence based child and newborn care interventions in Bangladesh

**Collaborating Institutes**

Directorate General of Health Services, Directorate General of Family Planning

**Highlights**

- supported IMCI planning and district review meeting
- supported and facilitated 5-day IMCI facilitators training
- supported IMCI section of DGHS for developing national strategy on newborn health and action plan
- supported IMCI section and UNICEF in developing modules on counselling, Basic Health Worker Packages and Antenatal Care, Postnatal Care & Essential Newborn Care
- supported IMCI section of DGHS and UNICEF in conducting IMCI visit follow up and mentoring
- conducted technical review meeting

**Nutrition 1**

Effectiveness of multiple micronutrient sprinkles in a large community-based nutrition program

**Collaborating Institute**

National Nutrition Programme, Institute of Public Health and Nutrition Programme, Directorate General of Health Services, Directorate General of Family Planning

**Highlights**

- extensive review of micronutrient powder (MNP) in the control of childhood anaemia was undertaken
- chapter written on the evidence of MNP in controlling child anaemia and improving growth; soon to be published by Oxford University Press in a book on nutrition
- a research proposal on effectiveness of multiple micronutrient powder in a large community-based nutrition programme has been prepared, externally reviewed, and approved by the Research and Ethical Review Committees at ICDDR,B. A memorandum of understanding between ICDDR,B and NNP has been prepared
- implications for policy and programme: The generation of MNP evidence has influenced the Directorate General of Family Planning to incorporate this intervention in its programme

**Nutrition 2**

a) Complementary feeding

b) Rehabilitation of severely malnourished infants aged <6 months: a randomised, double-blind comparison of two recovery diets (F-100 and diluted F-100)
Collaborating Institute
Department of Paediatrics, Dhaka Medical College Hospital

Highlights
- training course was undertaken on Research Methods for FCPS/MD Paediatrics Students of Dhaka Medical College. 30 students received ten-day training
- external review of the next phase of the research is ongoing

Nutrition 3
Effect of comprehensive psychosocial stimulation on short term developmental outcome of severely malnourished children at a hospital setting

Collaborating Institute
Institute of Public Health Nutrition (IPHN), Ministry of Health and Family Welfare

Highlights
- in the hospital Nutrition Rehabilitation Unit, 45 children have been enrolled since August 2009
- they were assessed for mental and psychomotor development at baseline using Bayley Scales of Infants Development and the endline developmental tests will start in February 2010
- training materials – poster, pictorial card, health message-card and video clips – are being developed
- another research component into this programme was the long term follow up of malnourished children attending community nutrition centres under the Bangladesh integrated nutrition programme. These children participated in an early programme of psychosocial stimulation about 9 years ago and their developmental levels at school age were assessed. There were benefits in all the measurements and the children who received stimulation showed a trend of higher scores at the age of 10-12 years

Poverty and Health
Making health and family planning programme work better especially for the poor in a low performing upazila of Bangladesh

Collaborating Institute
BRAC School of Public Health, Health Economics Unit, Ministry of Health and Family Welfare

Highlights
- Two sites were identified at Chakaria and Brahmanbaria. Activities included:
  - participating in and observing local administrative health committees
  - observing and cataloguing the activities of the Expanded Programme on Immunization (EPI), Family Planning in the various health facilities
  - collaborative monthly meeting with Joint Chief and Joint Secretary of the Health Economics Unit (MOHFW)
  - conducting analysis of data collected in Chakaria and Brahmanbaria on the service utilisation of government health services and facilities
  - findings disseminated to the local community groups, local health and administrative officials

Safe Water
Safe water

Collaborating Institute
Primary Health Care, Directorate General of Health Services

Highlights
- the recently developed Siraj Mixture at ICDDR,B has been field tested in Matlab to assess its efficacy and
acceptability in the community. 420 families were provided the mixture and asked to treat surface water before using for drinking and other household purposes.

There were 1613 neighbouring households who were not provided the mixture used as control. The diarrhoeal cases from both the study (420) households and neighbouring (1613) households were monitored for one year. There were 29 diarrhoeal patients reported to ICDDR,B hospital from the control households but only one from the study households. The patient who reported cholera from study households is a captain of a ship who contracted cholera when he was on duty. This suggests Siraj Mixture is very effective in treating surface water.

The use of this mixture also reduced the incidence of diarrhoeal diseases in the study households. Regarding social and cultural acceptance, not a single household refused to use this mixture as the ingredients of this mixture are well known to them. They use these ingredients of this mixture for various household purposes for a long time.

Siraj Mixture can be an easier, simpler and cheaper point-of-use water treatment strategy to prevent water-borne diseases in the community.

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**Infectious Disease 1**
Campylobacter infections and non-polio acute flaccid paralysis (NPAFP) in Bangladesh: clinical

**Collaborating Institute**
Dhaka Medical College Hospital

**Highlights**

A prospective case-control study was performed including 100 patients fulfilling the National Institute of Neurological Disorders and Stroke criteria for Guillain-Barré Syndrome (GBS) during the study period from March 2006 to June 2008. Detailed clinical, electrophysiological, serologic and microbiological data were obtained during a follow-up of at 6 months. There appeared to be a seasonal peak between January and March. 69% of patients had clinical evidence of a preceding infection. The most frequent symptom was diarrhoea (36%).

The majority of patients had a pure motor variant of GBS (92%) with relatively infrequent cranial nerve involvement (30%). Twenty-five percent of patients required respiratory support and 33% patients were bed-bound at entry level. Electrophysiological studies in 64 patients showed 67% of patients had an axonal variant of GBS. There was strong evidence of recent *C. jejuni* infection in 57% of patients, as compared to 8% of family controls and 3% of age and sex-matched controls with other neurological diseases. Of the 55 patients with *C. jejuni* infection, 27 (49%) reported having had a diarrhoeal illness during 4 weeks prior to the onset of Guillain-Barré Syndrome.

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**Infectious Disease 2**
Soil transmitted helminthic infections (STHI) in Bangladesh. Activities started from July 2009

**Collaborating Institute**
National Institute of Preventive and Social Medicine (NIPSOM)

**Highlights**

A research protocol was developed and approved by the Research Review Committee and pending for Ethical Review Committee review. After approval sample collection of school children from Trishal upazila of Mymenshingh will begin. ICDDR,B and NIPSOM will actively participate to conduct the study. Techniques to study STHI will be transferred to NIPSOM.

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**Infectious Disease 3**
Extended surveillance to include quality assurance for supporting kala azar elimination programme in Bangladesh

**Collaborating Institute**
Communicable Disease Control, Directorate General of Health Services

**Highlights**

Kala azar pilot study was completed in May 2009, partially supported by Improved Health for the Poor. Diagnosis of kala azar was confirmed in 200 cases who were treated with injection sodium stibogluconate (SSG) according to
national guidelines. Patients who survived were followed for 6 months after treatment. Results provided evidence to continue using SSG for treatment of kala azar in Bangladesh until we have access to safer and alternative drugs.

**Infectious Disease 4**  
Genomic characterisation of human rotaviruses in Bangladesh  

**Collaborating Institute**  
Institute of Epidemiology, Disease Control and Research (IEDCR)

**Highlights**
- Rotavirus strains have been successfully typed: major types are G1, G2, and G9.
- Interspecies transmission of rotavirus strain from pig to human was identified.
- An emerging human G12 rotavirus strain was detected for the first time.

**Infectious Disease 5**  
New and rapid diagnostics for detection of multi-drug resistant (MDR) tuberculosis  

**Collaborating Institute**  
TB Control & Leprosy Elimination Programme, Directorate General of Health Services

**Highlights**
From July to December 2009, 95 sputum samples were processed for culture and susceptibility testing using conventional method. Rapid testing will be applied to all those sputum samples processed for conventional test. From each sputum sample, DNA will be extracted following heat extraction method and polymerase chain reaction (PCR) will be performed following standard method. PCR product will be hybridised with special blot for rapid detection of MDR. Results of the conventional culture will be matched with rapid test.

**Infectious Disease 6**  
Control and prevention of transmission of pulmonary tuberculosis in Dhaka Central Jail  

**Collaborating Institute**  
Directorate General of Health Services; Directorate General of Prisons; National Institute of Diseases of Chest & Hospital

**Highlights**
A system for active screening for TB at the entry point of the prison in the Dhaka Central Jail began in January 2009. Every inmate entering the prison is interviewed by medical officer for TB. A combination of certain risk factors, AFB microscopy, culture and PCR are using as screening tools. Over 40,000 inmates entering the prison have been screened and a large number of TB cases identified. This was not possible by the existing TB control programme inside Dhaka Central Jail. There is an urgent need to continue this study to both ensure continuity of service/enhanced diagnostic ability and to generate sufficient information to support the scale-up of evidence-based interventions in prison settings.

**Infectious Disease 7**  
Surveillance of multi drug resistant tuberculosis (MDR-TB) in Bangladesh  

**Collaborating Institute**  
National TB Control Programme (NTP)
Highlights

- Results from TB prevalence survey at Matlab have been used by the National Tuberculosis Control Programme (NTP) of Bangladesh to design national prevalence survey
- The NTP has designed nationwide drug resistance survey and DOTS plus strategy based on our results of the multidrug resistant tuberculosis survey conducted in rural and urban Bangladesh
- The first ever systematic surveillance on TB drug resistance established at Shyamoli Chest Clinic, Dhaka which provides routine feedback to NTP and ICDDR,B’s Health and Science Bulletin

Infectious Disease 8
Drug resistance against fluoroquinolone and cephalosporins in Shigella and Salmonella

Collaborating Institute
Drug Testing Laboratory, Institute of Public Health

Highlights

Emergence of extended-spectrum $\beta$-lactamases (ESBLs) in Shigella species imparting resistance to third-generation cephalosporins is a growing concern worldwide. There is no systematic study on molecular characterisation of ESBL-producing Shigella species in Bangladesh yet. Therefore, molecular characterisation of the ESBL-producing Shigella strains has been done in this study. A total of 4583 Shigella species were serotyped, isolated from patients with diarrhoea at ICDDR,B Dhaka treatment centre between January 2000 and December 2008. Of 4583, 200 strains were randomly selected for this study in details. Among these 8 (4%) were found as ESBL producers by double-disk synergy test. The most prevalent serogroups among the ESBL were S. flexneri 2a. All ESBL positive isolates were resistant to 3rd generation cephalosporins, monobactam, nalidixic acid whereas 3 strains (38%) were resistant to ciprofloxacin. All isolates were susceptible to carbapenem, a drug that is currently used for the treatment of ESBL-producers.

Reproductive Health, Including Family Planning and Maternal Health
Research synthesis for evidence-informed policy and practice for MDG 5

Sub-objectives

- How far can ICDDR,B research influence the reproductive health policy and practice in Bangladesh?
- What are the constraints for evidence-based policy making in Bangladesh?
- How can these constraints be overcome for better reproductive health outcomes?

Collaborating Institute
Directorate General of Health Services (DGHS)

Highlights

Qualitative research methods were used to address these questions during January 2009 to April 2009, in a process that included a documentary review, in-depth interviews and a brainstorming workshop with researchers, policymakers and other relevant national level reproductive health stakeholders. Data analysis was complete and compiled in a 40 page report. Results were also disseminated to relevant stakeholders and civil society groups in a one-day conference in 21 July 2009.

Relevant stakeholders and civil society groups who are in policy making process and potential users of research synthesis are now aware of constraints/barriers in evidence-based policy making in reproductive health in Bangladesh. In collaboration with the research and planning unit of DGHS, ICDDR,B researchers and DGHS policy planners are now motivated to work together to increase communication between researchers and policy makers so that future policy making is more research-informed.
Training and Capacity Building
Training of government health officials

Collaborating Institute
Directorate General of Health Services, Ministry of Health and Family Welfare

Highlights
In building up the capacity of government institutions from national to upazila levels, a good number of health personnel including physicians and laboratory technicians developed their clinical and laboratory skills. We developed and conducted training courses on clinical, diagnostic, and preventive skills related to diarrhoeal diseases and malnutrition for:
- doctors working at sub-centres, Upazilla Health Complex, District Hospital, and Medical College Hospitals
- medical technologists (Laboratory Technicians) working at Upazilla Health Complex and District Hospital

Hospital Surveillance
Technical assistance in data management, archiving, and information dissemination on diarrhoeal diseases in Bangladesh

Collaborating Institute
Directorate General of Health Services, Ministry of Health and Family Welfare

Highlights
- provides valuable information disseminated through ICDDR,B’s Health and Science Bulletin to clinicians and para-professionals of Bangladesh to assist them in clinical decision-making process in providing care to the patients
provides information on daily and weekly patient load in ICDDR,B Dhaka Hospital and Matlab Hospital as well as Mirpur treatment centre

enables detection of new enteropathogens emerging, re-emergence of conventional enteropathogens, and early identification of outbreaks and their locations, thereby helping the Government of Bangladesh to take appropriate preventive and control measures

provides weekly, monthly, and annual surveillance reports. When needed additional information on clinical presentation, course of illness, and outcome of treatment

monitors changes in the characteristics of patients and antimicrobial susceptibility of important bacterial pathogens

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

makes oral and poster presentations, and publications in peer reviewed journals

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### Health and Demographic Surveillance

**Health and Demographic Surveillance**

**Collaborating Institute**

National Institute for Population Research and Training (NIPORT)

**Highlights**

Continue to work with NIPORT, in the form of providing technical assistance, in conducting and improving quality of data of the Bangladesh Maternal and Morbidity Survey 2009 to be conducted by the participating institution.

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### Matlab Community Health Research

**Community Health Research**

**Collaborating Institute**

Office of the Upazila Health and Family Planning Officer (Ministry of Health and Family Welfare); Office of the Resident Medical Officer, Upazila Health Complex, Matlab South; Office of the Family Planning Officer, Upazila Health Complex, Matlab; Office of the Medical Officer, Maternal and Child Health, Upazila Health Complex, Matlab

**Highlights**

The health and family planning services provided by the Matlab Community Health Research activities achieved wide acceptance and coverage in the catchment population of 112,000 people. For example, delivery at facility including sub-centre and Matlab clinics reached almost 80 percent.

The EPI coverage is over 95%, contraceptive use prevalence rate (CPR) is over 68%. The overall impact of the health services delivery programme has resulted in substantial reduction of infant, child and maternal mortality as well as fertility in the programme area.

The lessons learnt from the service delivery programme have the potential to be adapted in government and NGO service delivery programmes for overall improvement of health of the people specially women and children under five years of age.

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### Planning and Health Systems Research

**Systematic review of health policy and systems research issues for the poor in Bangladesh**
Collaborating Institute
Bangladesh Medical Research Council, Ministry of Health and Family Welfare

Highlights
- systematically analysed the quantity, quality, use and usefulness of economic evaluation studies done in the healthcare interventions in Bangladesh
- identified 1784 abstracts that were screened down to 53 full articles
- 13 were considered to be economic evaluations eligible for inclusion

Planning and Health Systems Research
Strategies to improve low child immunisation coverage in urban slums and rural hard-to-reach areas of Bangladesh

Collaborating Institute
Directorate General of Health Services, Ministry of Health and Family Welfare, Dhaka City Corporation, Marie Stopes Clinic Society, Shasta Paricharja O Kallyan Shangsta; Upazila Health and Family Planning Office, Radda Maternal and Child Health–Family Planning Centre

Highlights
- Strategies to improve low child immunisation coverage in urban slums of Bangladesh (completed)
- Acceptability of alternative strategies in rural hard-to-reach haor areas of Bangladesh (completed)
- Improving low child immunisation coverage in rural hard-to-reach areas of Bangladesh (ongoing)
- 4 papers (2 peer reviewed journals and 2 working papers) published
- Working with collaborative institutions for scaling up of successful strategies
institutional
Human Resources

Human Resource Development is a dynamic component of ICDDR,B’s Human Resources strategy, committed to ensuring continuous development and capacity building for staff members as well as achieving organisational excellence. The unit assists the Centre by maximising the efficiency and performance of its personnel in sustaining high scientific productivity and achieving goals described in its Strategic Plan. In partnership with HR, Human Resource Development emphasises training and development, counselling, career and organisational development, in order to build a link between the Centre’s strategic goals and the career development of individual staff.

Summary of training courses arranged by HRD in 2009

<table>
<thead>
<tr>
<th>Event/Achievements</th>
<th>Number of Course</th>
<th>Male</th>
<th>Female</th>
<th>Total Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMDS Training (GS Level)</td>
<td>30</td>
<td>472</td>
<td>481</td>
<td>953</td>
</tr>
<tr>
<td>PMDS Training (NO &amp; International Level)</td>
<td>7</td>
<td>78</td>
<td>34</td>
<td>112</td>
</tr>
<tr>
<td>New Staff Orientation</td>
<td>19</td>
<td>286</td>
<td>288</td>
<td>574</td>
</tr>
<tr>
<td>MS Office 2007 Training</td>
<td>5</td>
<td>40</td>
<td>25</td>
<td>65</td>
</tr>
<tr>
<td>Manuscript Writing</td>
<td>2</td>
<td>9</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>Effective Interviewing Skills</td>
<td>2</td>
<td>21</td>
<td>15</td>
<td>36</td>
</tr>
<tr>
<td>Mentorship Program</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>English Language Course</td>
<td>2</td>
<td>61</td>
<td>31</td>
<td>92</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>971</td>
<td>885</td>
<td>1856</td>
</tr>
</tbody>
</table>

Annual Training Plan

Based on the Annual Training Plan 2009, Human Resource Development successfully conducted 67 training courses for Centre staff, with a total of 1856 staff members participating (male 971, female 885), and also provided support to other units in arranging specific training events.

Performance Management Development System rolls out

The Centre-wide application of the Performance Management Development System (PMDS) was a remarkable achievement for 2009. Initiated in 2006, the HR Development team successfully implemented the last phase of PMDS this year and incorporated all fixed term staff members under the system. This involved conducting PMDS training for 1065 staff members (male 550, female 515) including International, National and General Services level staff. The unit also acts a custodian of the PMDS in terms of record management and follow-up activities.

MS Office 2007 training

HR Development developed numerous PC software training courses for staff on various MS Office 2007 products with the help of Scott Rippon, an Australian Youth Ambassador for Development and Computer Information Services. As per the training plan, more than 65 staff members have already participated in this IT training with a very positive impact on their performance.

Higher study

HR Development facilitates higher study for staff members, with around 77 personnel enrolled in different staff development programmes at present. Forty staff members are pursuing PhD degrees while 22 staff members are studying Masters degrees in various local and foreign universities. In 2009, 13 staff successfully completed their higher study and returned to ICDDR,B (3 PhD, 10 Masters).

e-Recruitment

In order to make the recruitment process quicker, more cost effective and efficient, Human Resources began an electronic recruitment system in April 2009. Now applicants can view all advertisements online and apply electronically for any position. HR personnel can see a tabulated summary of all applications and filter them according to criteria. Subsequent communications regarding short listing, testing and regret letters are also sent through email. This system has sped up the recruitment cycle and streamlined the process, reducing costs, reaching a wider pool of applicants, offering access to vacancies 24 hours a day, reaching a global audience and helping to handle high volume job applications in a standardised way.

Human Resources Policy and Procedure Manual

ICDDR,B’s Human Resources Manual, containing 19 sections, was revised in 2009 incorporating changes in certain designations and relevant service conditions. The manual is available on the intranet for all staff.

Recruitment and selection

Human Resources completed the selection and recruitment of 1560 staff from 307 advertisements in 2009. As of December 31 there were 42 international staff and 2822 national staff working at ICDDR,B.
The Centre’s gender initiatives were reviewed as part of the 2008 monitoring and evaluation exercise for the Core Donors Group. The consultant stated in his report,

ICDDR,B has made meaningful and substantial steps toward promoting gender-related research and institutional policy to support gender equality and mainstreaming. There is no doubt that staff knowledge and awareness regarding gender issues have evolved and that gender is now a strength of ICDDR,B.

ICDDR,B has made impressive strides in the development of a gender-sensitive culture throughout the organisation; this has become a point of pride for many staff, and relative to Bangladesh may constitute a model for domestic (national) policy development.

The most important achievement for the gender office in 2009 was the inclusion of measures of gender equality and gender policy implementation into the new Performance Management Development System implemented for staff across the whole organisation for the first time this year.

ICDDR,B is currently exploring the possibility of establishing safer and more secure accommodation in its field sites for female staff. Gender sessions are now being included in the staff orientation program to familiarise new personnel with organisational policies, procedures and benefits. The communication strategy for gender mainstreaming has achieved all its targets in the past year, and a new budget line for the gender office has now been operationalised.

The Women Scientists and Researchers Forum has been meeting for two years now as a platform through which issues specific to female scientists can be openly addressed, such as identifying factors that lead to a gender gap among scientists.

Key challenges for the future include increasing the representation of women in management decision making processes. Recruiting women into the last four occupational areas within the Centre which have no female staff (animal laboratory, information technology, transport and cafeteria services) is a goal for 2010. Reducing the gender gap, particularly amongst female scientists and researchers, is an ongoing concern, and the development of an organisational gender analysis framework still remains a critical challenge, as does the completion of a gender audit.
The weekly Centre Scientific Forums offer another platform for dissemination of new ICDDR,B research knowledge amongst other scientists and researchers, and key local stakeholders.

Profiles of pregnancy-related complication of women who delivered in Matlab Hospital and other facilities in Chandpur.
Dr Fauzia Akhter Huda

Health and vulnerability of migration workers: A study among the returned Bangladeshi labour migrants.
Ms Rumana A Saifi, PhD

Preliminary findings from the Matlab Maternal and Neonatal Child Health Programme.
Dr Allisyn Moran & Dr Anisur Rahman

Missing in action: International aid agencies in poor countries to fight chronic disease.
Prof Gerard Anderson, Director, Centre for Hospital Finance and Management and Professor of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health.

Jagori Ward: Our experience to date.
Dr M Moshtaq Parvez & Dr Brent Ohata

Study on effectiveness of pneumonia case management through community Integrated Management of Childhood Illness in National Service Delivery Program, Bangladesh.
Dr Mizanur Rahman

Prevalence and seasonality of influenza in Bangladesh: Finding from hospital based surveillance.
Dr Rashid Uz Zaman

Vitamin A in the management of children with severe acute malnutrition: how much is safe?
Dr Md Iqbal Hossain

Introduction to the Novartis Vaccine Institute for Global Health and an overview of new candidate vaccines.
Dr Allan Saul, CEO, Dr Audino Podda, Head of Clinical Development, Novartis Vaccines Institute for Global Health

Efficacy of standardised protocol using local diet during nutritional rehabilitation of severely malnourished children in Bangladesh.
Dr M Munirul Islam

Human resource situation for maternal health care services in public sector facilities in Bangladesh.
Dr Mahbub Elahi Chowdhury

Child health services by village doctors: Our experience from a rural community in Bangladesh.
Dewan Md Emdadul Hoque & Rasheda Khan

Willingness to pay among urban slum dwellers for Manoshi birthing huts in Dhaka, Bangladesh.
Dr Ziaul Islam

Impact of mass media on knowledge, attitudes and risk perception about HIV/AIDS among youth in a peri-urban area of Bangladesh.
Dr Elizabeth Oliveras

Surveillance of risk factors for non-communicable diseases in rural Bangladesh.
Dr Tracey Koehlmoos & Ali Ashraf

Fatal outbreak from consuming xanthium strumarium seedlings during time of food scarcity in northeastern Bangladesh.
Emily Gurley

Molecular characterisation and bioinformatics-based epitope mapping of sapovirus isolated from rural children under Global Enteric Multi-centre Study Project at Mirzapur, Bangladesh.
Mr Firoz Ahmed & Md Ruhul Amin

Food adulteration in Dhaka city: are we eating safe?
Dr Sharifa Nasreen

Listening to poor people’s realities about primary healthcare and primary education: is the Reality Check study a useful tool?
Dr Britta Nordstrom, MD, MPH, Deputy Sida Country Director, Poverty & Health Programme.

ICDDR,B in Zimbabwe: Controlling cholera epidemics.
Dr P K Bardhan

Salmonella Typhi—superbug?
Dr John Wain, PhD, Head of Laboratory Services, Gastrointestinal, Emerging and Zoonotic, Infections Centre for Infections Health Protection Agency, Colindale London

Climate change and Bangladesh—what do we need to monitor?
Dr Peter Kim Streatfield
Introduction to Gender, Human Rights and Health Programme at ICDDR,B.
Dr Ruchira Tabassum Naved
Why are gender and human rights issues important for men and transgender people?
Dr Shariful Islam Khan
Examples of using gender lens in health research.
Dr Elizabeth Oliveras Gender
Gender: adding another dimension to the analysis of pneumonia among children admitted in hospitals in Bangladesh.
Dr Aliya Naheed
Availability of evidence-based maternal, neonatal, and child healthcare practices in Bangladesh.
Dr Malay Kanti Mridha
Epidemiology of pandemic (H1N1) 2009 in Bangladesh: implications for clinical and public health response.
Eduardo Azziz-Baumgartner
An introduction to South Asia network for chronic diseases.
Disease association study of genetic markers related to type 2 diabetes.
Dr Soumik Kalita, Associate Professor, and Dr Vipin Gupta, Research Fellow (Genetic Epidemiology), South Asia Network for Chronic Diseases, India.
Bridging the know-do gap: Understanding the role of evidence in policy making in Bangladesh.
Ms Mashida Rashid
Prophage–prophage interactions potentiate horizontal transfer of virulence determinants.
Dr Asadulghani
Impact of a short film on HIV/AIDS in Bangladesh.
Mr Mejbah Uddin Bhuiyan
Centre’s new surveillance activity: where and why?
Dr Wasif Ali Khan
Dr Md Iqbal Hossain
A pilot study to find ways to reduce pandemic influenza risks by improving respiratory hygiene and hand washing.
Dr Sharifa Nasreen, Ms Aasma Afroz & Mr Fosiul Alam Nizame

Research Administration

Since 2008, Research Administration has been providing Research and Project Support, General Counsel and Contract Attorney functions. The unit strives to provide the necessary support and services to further develop research and researchers at ICDDR,B in line with strategic objectives.

Key functions include:
- One stop unit for the management of all research grants and protocols
- Finding funding, proposal development and approval (IRB), grant documents and contract agreements, grant management, grant/protocol closeout
- Assisting with national dissemination workshops/seminars/conference
- Assisting with international conferences and national meetings
- Institutional Review Board Secretariat (Research Review Committee, Ethical Review Committee and Animal Ethical Review Committee) conducts monthly RRC and ERC meetings and AERC as and when required
- Funding alerts sent to all researchers
- Collecting all datasets from completed protocols
- Core Research Funds allocation – facilitate the entire process for final selection by Core Research Funds Allocation Committee
- Assists in writing generic policy documents
- Head, Research Administration part of the Centre Directorate
The Centre expended US$40,682,000 in fiscal year 2009 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$40,778,000, resulting a surplus of US$96,000 for the year.

The Centre’s total revenue primarily consists of contributions from donors in the form of restricted and unrestricted grants. In 2009 the total contribution from donors was US$38,596,000—an increase of US$3,935,000 (11%) over the previous year. The unrestricted contribution increased by US$2,072,000 (18%) compared to the previous year, and the restricted contribution decreased by US$480,000 (2%). In 2009, 90% of the contributions came from 18 major donors, depicted in a pie chart. The Centre’s total expenditure enhanced by US$4,364,000 (12%) over the fiscal year 2008 and the expenditure trend for 2008 and 2009 are represented by major cost components in the bar chart.

The cumulative deficit on operating account decreased in 2009 by US$99,000 (US$96,000 operating surplus and US$3,000 transferred from interest income against reserve fund) from US$1,487,000 to US$1,388,000. The year end fund balance in the endowment funds increased by US$1,760,000 (19%) over the previous year from US$9,394,000 to US$11,154,000 due to appreciation of the market value of investments.

The Centre launched the building infrastructure expansion project in 2006 with an objective to expand vertically and modernise existing facilities to accommodate the growing activities and enable the Centre to more effectively contribute to international efforts to reduce poverty and improve public health. The estimated total cost for the project is US$28 million and till 2009 the expenditure was US$10,821,000, financed by the Government of Bangladesh and US Department of Agriculture (USDA).

The audit report and audited abridged financial statements for the year 2009 are annexed.

Director, Finance
Aniruddha Neogi

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**Finance Report**

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Director, Finance
Aniruddha Neogi

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**Donor contributions to ICDDR,B in 2009 (US$38,596,000)**

- Others 7.8%
- World Bank 1.4%
- WHO 1.8%
- UNFPA 0.3%
- UNICEF 2.1%
- USA-Other Sources 2.1%
- USA-National Institutes of Health 6.6%
- United Kingdom-DfID 9.3%
- Switzerland-SDC 1.6%
- Sweden-Sida/SAREC 5.7%
- Save the Children, USA 0.5%
- Embassy of the Kingdom of the Netherlands 6.2%
- Johns Hopkins University-USAID 1.0%
- Australia-AusAID 3.2%
- Bangladesh-Improved Health for the Poor 2.6%
- Bangladesh-USDA 13.2%
- Bangladesh- Others 3.4%
- BRAC 1.3%
- Canada-CIDA 12.4%
- Centers for Disease Control & Prevention (CDC) 10.9%
- Bill & Melinda Gates Foundation 3.2%
- Global Forum for Health Research 0.4%
- Johns Hopkins University 3.0%
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, 2009, from which these abridged financial statements were derived.

2. Balance of ‘ICDDR,B Employees Separation Payment Fund’ as at December 31, 2009 of US$17,694,537 and corresponding investments with Generali Worldwide Insurance Company Limited of Guernsey, Channel Islands have not been recognized in the financial statements.

3. In our report of same date we expressed an opinion that the financial statements, from which these abridged financial statements were derived, present fairly the financial position of the Centre in all material respects in accordance with the accounting policies disclosed therein, subject to our observation in Paragraph 2 above.

4. In our opinion, the attached abridged financial statements are consistent, in all material respects, with the aforesaid financial statements from which they were derived and on which we issued a qualified report as indicated above.

5. For a better understanding of the Centre’s financial position and the results of its operations for the year and of the scope of our audit, the abridged financial statements should be read in conjunction with the financial statements from which these abridged financial statements were derived and our report thereon.

S. F. Ahmed & Co
Chartered Accountants
Dhaka, March 24 2010

KPMG
Gurgaon, March 25 2010
# International Centre for Diarrhoeal Disease Research, Bangladesh

## Statement of Financial Position as at December 31, 2009 (US$ 000)-Abridged

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Assets</strong></td>
<td>48,380</td>
<td>40,267</td>
</tr>
<tr>
<td>Cash and bank</td>
<td>12,340</td>
<td>14,064</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>6,824</td>
<td>4,204</td>
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<tr>
<td>Hospital Endowment Fund Investments</td>
<td>6,548</td>
<td>5,683</td>
</tr>
<tr>
<td>Centre Endowment Fund Investments</td>
<td>4,606</td>
<td>3,711</td>
</tr>
<tr>
<td>Inventories</td>
<td>624</td>
<td>360</td>
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<tr>
<td>Fixed Assets</td>
<td>17,438</td>
<td>12,245</td>
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<tr>
<td><strong>Total Liabilities and Fund Balances</strong></td>
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<td>40,267</td>
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<tr>
<td>Current Liabilities and Provisions</td>
<td>19,171</td>
<td>18,110</td>
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<tr>
<td><strong>Fund Balances</strong></td>
<td>29,209</td>
<td>22,157</td>
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<tr>
<td>Fixed assets fund</td>
<td>17,438</td>
<td>12,245</td>
</tr>
<tr>
<td>Hospital Endowment Fund</td>
<td>6,548</td>
<td>5,683</td>
</tr>
<tr>
<td>Centre Endowment Fund</td>
<td>4,606</td>
<td>3,711</td>
</tr>
<tr>
<td>Reserve Fund</td>
<td>2,005</td>
<td>2,005</td>
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<tr>
<td>Operating Fund</td>
<td>(1,388)</td>
<td>(1,487)</td>
</tr>
</tbody>
</table>

## Statement of Activity (Operating Fund) (US$ 000)-Abridged

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income</strong></td>
<td>40,778</td>
<td>36,510</td>
</tr>
<tr>
<td>Contributions</td>
<td>38,596</td>
<td>34,661</td>
</tr>
<tr>
<td>Other items</td>
<td>2,182</td>
<td>1,849</td>
</tr>
<tr>
<td><strong>Expenditure</strong></td>
<td>40,682</td>
<td>36,318</td>
</tr>
<tr>
<td>Salaries and benefits</td>
<td>20,562</td>
<td>17,968</td>
</tr>
<tr>
<td>Supplies and materials</td>
<td>4,104</td>
<td>3,551</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>6,694</td>
<td>5,773</td>
</tr>
<tr>
<td>Other items</td>
<td>9,322</td>
<td>9,026</td>
</tr>
<tr>
<td><strong>Surplus for the year before depreciation</strong></td>
<td>96</td>
<td>192</td>
</tr>
<tr>
<td>Depreciation (without effect on Operating Fund)</td>
<td>(1,496)</td>
<td>(1,219)</td>
</tr>
<tr>
<td>(Deficit) for the year after depreciation</td>
<td>(1,400)</td>
<td>(1,027)</td>
</tr>
</tbody>
</table>

## Statement of Cash Flow (US$ 000)-Abridged

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flows from operating activities</td>
<td>4,698</td>
<td>11,357</td>
</tr>
<tr>
<td>Cash used in investing activities</td>
<td>(6,422)</td>
<td>(5,388)</td>
</tr>
<tr>
<td><strong>Net Increase/(Decrease) in cash and cash equivalents</strong></td>
<td>(1,726)</td>
<td>5,969</td>
</tr>
<tr>
<td>Cash and cash equivalents at beginning of the year</td>
<td>14,064</td>
<td>8,095</td>
</tr>
<tr>
<td>Cash and cash equivalents at end of the year</td>
<td>12,340</td>
<td>14,064</td>
</tr>
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</table>

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Dhaka, March 24 2010

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

S. F. Ahmed & Co.
Chartered Accountants
Dhaka, March 24 2010

Executive Director, ICDDR,B
Member, Board of Trustees

Gurgaon, March 25 2010

S. F. Ahmed & Co.
Chartered Accountants

KPMG
Auditors' Report

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

Contributions:

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia-AusAID</td>
<td>1,224</td>
<td>1,534</td>
</tr>
<tr>
<td>Bangladesh/USDA</td>
<td>5,101</td>
<td>3,038</td>
</tr>
<tr>
<td>Bangladesh-HP</td>
<td>1,021</td>
<td>1,122</td>
</tr>
<tr>
<td>Bangladesh-Others</td>
<td>1,316</td>
<td>672</td>
</tr>
<tr>
<td>Canada-CIDA</td>
<td>4,773</td>
<td>2,380</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2,404</td>
<td>2,483</td>
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<tr>
<td>Centers for Disease Control (CDC)-Altanta</td>
<td>4,208</td>
<td>3,293</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td>Sweden-Sida/SAREC</td>
<td>2,205</td>
<td>1,905</td>
</tr>
<tr>
<td>Switzerland-SDC</td>
<td>600</td>
<td>1,000</td>
</tr>
<tr>
<td>United Kingdom-DFID</td>
<td>3,599</td>
<td>3,308</td>
</tr>
<tr>
<td>Endowment Fund-Hospital</td>
<td>280</td>
<td>750</td>
</tr>
<tr>
<td>Endowment Fund-Centre</td>
<td>55</td>
<td>576</td>
</tr>
<tr>
<td>Bangladesh Rural Advancement Committee (BRAC)</td>
<td>517</td>
<td>576</td>
</tr>
<tr>
<td>Gates Foundation</td>
<td>1,239</td>
<td>2,646</td>
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<tr>
<td>Global Forum for Health Research</td>
<td>155</td>
<td>186</td>
</tr>
<tr>
<td>Japan-JICWELS &amp; Others</td>
<td>34</td>
<td>140</td>
</tr>
<tr>
<td>Johns Hopkins University (JHU)</td>
<td>1,147</td>
<td>1,280</td>
</tr>
<tr>
<td>Johns Hopkins University (JHU)/USAID</td>
<td>384</td>
<td>566</td>
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<tr>
<td>Save the Children, USA</td>
<td>208</td>
<td>960</td>
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<tr>
<td>Thrasher Research Fund</td>
<td>-</td>
<td>17</td>
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<tr>
<td>USA-NIH</td>
<td>2,530</td>
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<tr>
<td>USA-Other Sources</td>
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<td>1,195</td>
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<tr>
<td>UNICEF</td>
<td>809</td>
<td>494</td>
</tr>
<tr>
<td>United Nations Population Fund-UNFPA</td>
<td>108</td>
<td>117</td>
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<tr>
<td>WHO</td>
<td>681</td>
<td>712</td>
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<tr>
<td>World Bank</td>
<td>539</td>
<td>1,529</td>
</tr>
<tr>
<td>Other (net) (a)</td>
<td>2,590</td>
<td>1,734</td>
</tr>
<tr>
<td><strong>Total Contributions</strong></td>
<td><strong>38,596</strong></td>
<td><strong>34,661</strong></td>
</tr>
</tbody>
</table>

(a) Contributions in 2009 from “others” for project funds include: Akthelia Pharmaceuticals-Iceland, ActionAid International, ACME Laboratories Ltd., Ashar Alo Society, Bhutan-Ministry of Health, BRAC Bank Ltd., Bangladesh Health Watch (BHW), CTK Biotech Inc. USA, CARE Bangladesh, Cincinnati Children’s Hospital Medical Center-USA, Dhaka Shishu Hospital, Drugs for Neglected Diseases Initiative (DNDi), Dutch Bangla Bank Foundation-Bangladesh, Embassy of France, Erasmus University-Rotterdam, Food and Agriculture Organization of the United Nations (FAO), FGF Basel, German Technical Cooperation (GTZ), GFATM, Gynuity Health Projects, HarvestPlus-USA, Islamic Development Bank (IDB), International Center for Research on Women, International Vaccine Institute (IVI), Ipas-USA, International Atomic Energy Agency (IAEA)-Austria, International Nutrition Foundation, INDEPTH Network, Institute of Tropical Medicine (ITM)-Belgium, International Organization for Migration (IOM), InBios International, Inc.-USA, Japan Food Hygiene Association (JFAA), JIVita Bangladesh, KNCV Tuberculosis Foundation-Netherlands, London School of Hygiene & Tropical Medicine, Lunds Universitet-Sweden, Malta Grants for Leprosy Research-France, Mattra-Dhaka, Emory University-USA, MP Biomedical Asia Pacific Ptd. Ltd., Malaria Research Initiative Bangladesh (MARIIB), Nestec Ltd.-Switzerland, Napo India Private Ltd., Novartis Consumer Health SA, Nestle Foundation-Switzerland, National Institute of Infectious Diseases (NIID)-Japan, Northumbria University, OneWorld Health, Population Services and Training Center (PSTC), Research Institute for Humanity and Nature (RIHN), Social Sciences & Humanities Research Council of Canada, The Rockefeller Foundation, The City University of New York-USA, University of North Carolina at Chapel Hill-USA, UNAIDS-Bangladesh, USB Optimus Foundation, Uppsala University, UNDP-Bangladesh, United Nations Office for Project Services (UNOPS), United States AID etc., Veolia EAU-Compagnie Generale des Eaux S.C.A.-France, Venture Strategies Innovations-USA, Village Education Resources, Vanderbilt University-USA, Wyeth Pharmaceutical Inc., World Food Programme (WFP), World Vision Bangladesh, Wildlife Trust-USA, Yuki Maehira, Zephyr Biomedicals-India, and donations from various individuals.

(b) Includes receivables from certain donors aggregating $273,712 (2008: $278,240) relating to earlier years that are considered doubtful of recovery and hence provided for (refer Note 9). Efforts are being made for recovery of such amounts.

Executive Director, ICDDR,B

Dhaka, March 24 2010