

Strategic Plan 2015-2018



Foreword

Dear friends and colleagues,

We are delighted to share our Strategic Plan, the result of extensive internal collaboration and external consultation, which will set the course for icddr,b for the next three years.

Our new strategic focus aligns our research with the most pressing global public health challenges today, including the ongoing threats of infectious disease as well as continued improvements needed in maternal and child health and nutrition, and health systems. It also embraces the need for expansion of our research focus to the emerging threats of non-communicable diseases and climate change, which many developing countries are facing.

Our strategic plan is dynamic, providing a foundation to achieve broader objectives by developing a greater international focus, promoting the growth of South-South collaborations and increasing engagement with the private sector.

We are proud of being the leading centre of public health research excellence and innovation in the global South. We believe that this Strategic Plan will help us to continue to be at the forefront of world class science that is 'made in Bangladesh'.

We look forward to working with you as collaborators and partners in the future.

Kind regards



Professor John D. Clemens
Executive Director, icddr,b

Our vision

A world in which more people can survive and enjoy healthy lives

Our mission

To solve public health problems through innovative scientific research

Our values

Excellence

We are single minded in our pursuit of scientific rigour and operational efficiency

Integrity

We are a responsible and accountable organisation, committed to the highest standards of behaviour

Inclusiveness

We work together collaboratively throughout the organisation and with our partners

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About icddr,b

icddr,b has a long and distinguished history. Instrumental in the development of oral rehydration therapy, our research in this area has been credited with saving millions of lives worldwide. From an early focus on cholera and diarrhoeal disease, our scope has expanded to encompass most of the contemporary health challenges facing developing countries.

Several factors have been central to our success. Being embedded within a developing country, we are intimately familiar with health and health systems challenges in such settings. We understand the socio-economic and cultural determinants of health, as well as local health priorities, and we develop and evaluate interventions appropriate to local settings. In addition, by emphasising rigorous testing and scalability, we generate evidence that is not just of relevance in Bangladesh, but also improves the health and wellbeing of people living in comparable low- and middle-income countries. We have a commitment to translating research into policy and practice, and vast experience disseminating and translating our scientific evidence for use by policy-makers, programme managers and the scientific community.

Our researchers collectively comprise one of the largest and strongest communities of scientific expertise in the developing world. They are extensively networked with leading research institutions in North America, Europe and Australasia.

Underpinning our research is a unique infrastructure that enables us to undertake a full spectrum of research – spanning population-based studies and demographic surveillance, large-scale clinical trials, hospital-based clinical studies and laboratory research utilising the very latest technologies. As well as being a major facility for clinical research, icddr,b's Dhaka Hospital is a beacon of health care excellence, treating more than 140,000 patients each year and setting the standard for treating infectious disease and malnutrition, among other conditions, in low-resource settings. Our Matlab Health and Demographic Surveillance Site, the longest

continuously running surveillance site in the developing world, is a model of how longitudinal data can be used to track and inform development policies and programmes to have maximum impact.

Bangladesh and beyond

We work in close collaboration with the Government of Bangladesh, generating evidence to inform policy development and implementation, and evaluating health service delivery. In its 40-year history, Bangladesh has undergone little short of a health revolution, achieving significant reductions in child and maternal mortality, reaching Millennium Development Goals (MDGs) 4 and 5 despite limited financial resources. It is predicted to be on course for achieving middle-income country status by 2021. Even so, there remains considerable scope to improve health. Just as icddr,b has contributed to Bangladesh's past successes, we aim to deliver the evidence that will underpin further improvements in the health and wellbeing of the people of Bangladesh, and other populations across the global South where the burdens of premature death and disability remain persistently high.

Shaping the future

With an illustrious past, our contemporary challenge is to pursue a clear set of strategic goals that will improve the quality of our research, enable us to achieve maximum impact and ensure that we are organisationally able to deliver our ambitious aims over the long term.

Our new strategy focuses our research on areas of unmet health need where we have existing strengths. We are also modernising our organisation to ensure it is fit for purpose, meets international standards of operation and provides a strong platform on which to execute our strategic goals. We take a three year perspective with this dynamic plan, which will be regularly monitored and updated given the need for our research to remain relevant and responsive to global health agendas such as the Sustainable Development Goals and major disease elimination initiatives.



Aim: To be the leading centre of public health research excellence and innovation in the global South

Goal 1 Implement a focused research strategy

We will focus our research on areas of unmet need, developing research programmes of excellence with a strong emphasis on relevancy in the global South.

Goal 2 Increase the visibility and impact of our research evidence

We will build skills and partnerships to ensure that our research evidence has impact on national and international policies, programmes and practices for improved health.

Goal 3 Invest in our research platforms

We will develop our research infrastructure—for population-based, clinical and laboratory-based research—to ensure it is aligned to our research objectives, internationally competitive and financially sustainable.

Goal 4 Invest in our people

We will build the skills and competencies of scientific and other staff, with a special focus on developing local research capacity, particularly at the mid-career level, and supporting female researchers.

Goal 5 Improve organisational efficiency and cost-effectiveness

We will modernise our organisation's operations to ensure maximum efficiency and cost-effectiveness.

Goal 6 Ensure financial sustainability

As well as carefully controlling expenditure, we will revise our fundraising strategy and identify additional opportunities for income generation.

GOAL 1 2 3 4 5 6

Implement a focused research strategy

We will focus our research on areas of unmet need, developing research programmes of excellence with a strong emphasis on relevancy in the global South.

Since the organisation was established in 1960, our research focus has broadened from cholera and diarrhoeal diseases to encompass many other health challenges facing people living in poverty. While still addressing a range of health issues, we are implementing a focused research strategy that builds on our location and proven strengths, and enables us to concentrate our resources on some of the most pressing and intractable health concerns of the global South. We are engaged with the Government of Bangladesh as well as actively sharing our evidence and experience with other low- and middle-income countries to ensure that our research benefits people in greatest need.

Our research priorities are organised around five public health goals:

- Reducing maternal and neonatal mortality
- Preventing and treating maternal and childhood malnutrition
- Controlling enteric and respiratory infections
- Detecting and controlling emerging and re-emerging infectious diseases
- Achieving universal health coverage

While these five themes will form the focus of our research, we will also establish and invest in two developmental research programmes in areas highly relevant to Bangladesh and other low-income countries:

- Examining health consequences of climate change
- Preventing and treating non-communicable diseases

Within each research priority, research will be conducted across the continuum of:

- Discovery – research that defines the nature and causes of the problem;
- Development – research that develops solutions or a response to a problem; and
- Delivery – research focusing on implementation, scale-up and/or sustainability of interventions in public health or health care practice.

While continuing to conduct research in Bangladesh, we are developing more collaboration with research institutions in the global South, leading and participating in research studies in South Asia and other low-income countries.

We are also reviewing and updating our scientific governance and research administration systems, including research ethics oversight, and will regularly convene our international Scientific Advisory Group to guide the delivery of world-class research and its dissemination and translation into policy and practice.

RESEARCH THEMES

Reducing maternal and neonatal mortality

We will discover, develop and evaluate new or improved interventions to prevent and treat obstetric complications, adverse birth outcomes and life-threatening neonatal conditions.

Preventing and treating maternal and childhood malnutrition

We will study biological and non-biological mechanisms underpinning maternal and childhood malnutrition, develop innovative interventions to prevent and treat these conditions and evaluate new interventions for efficacy, feasibility and scalability.

Controlling enteric and respiratory infections

We will generate a better understanding of key disease-causing organisms and host immune responses, and develop and evaluate low-cost potentially scalable preventive and therapeutic interventions.

Detecting and controlling emerging and re-emerging infections

We will work with partners in Bangladesh and internationally to detect, characterise and respond to emerging and re-emerging infectious disease threats.

Achieving universal health coverage

We will evaluate gaps in access, delivery, quality, financing, policy and governance in the health sector in Bangladesh, and test interventions to remedy deficiencies.

RESEARCH INITIATIVES

Examining the health consequences of climate change

We will evaluate the impacts of climate change and migration patterns on population health in Bangladesh and ways in which populations can adapt.

Preventing and treating non-communicable diseases

We will assess the burden of chronic diseases in Bangladesh, document current care practices and health-seeking behaviours and evaluate new interventions relevant to low-income countries to improve health outcomes and health care, with a focus on cardiovascular diseases and diabetes.

KEY RESEARCH THEMES

Reducing maternal and neonatal mortality

We will discover, develop and evaluate new or improved interventions to prevent and treat obstetric complications, adverse birth outcomes and life-threatening neonatal conditions.

The global context

Every two minutes a woman somewhere in the world dies from a pregnancy-related complication, and 70% of these deaths are caused by five preventable conditions: post-partum haemorrhage, eclampsia or pre-eclampsia, puerperal sepsis, complications from unsafe abortion and obstructed labour. Each year, 2.8 million neonates die globally, mostly from preterm birth, birth asphyxia or severe infections, while 2.6 million babies are stillborn.

Neonatal health and maternal health are inextricably linked. Improving women's health and the quality of care during and immediately after birth could substantially lower maternal and neonatal mortality, including stillbirth.

The situation in Bangladesh

Although Bangladesh has achieved remarkable progress towards MDG targets, mortality rates among mothers and children remain high. A dramatic decline in deaths among children under 5 years of age mostly reflects reduced post-neonatal mortality. Mortality among newborns has not declined as rapidly, and accounts for almost 60% of all deaths under 5 years of age. The main causes of neonatal deaths are severe infection, birth asphyxia, prematurity/low birth weight and acute respiratory infection.

About 70% of women in Bangladesh still deliver at home without a skilled birth attendant. Effective interventions during pregnancy and birth are often missing and the quality of available services is generally poor. Overall the health system remains weak, lacking skilled birth attendants, resources and appropriate policy support.

Our track record

We have a long history of developing maternal and child health interventions, and ensuring they are adopted into policy and practice in Bangladesh and globally. Several of our innovations have been scaled, including a community health worker-based family planning programme. Our findings on the antiseptic chlorhexidine to prevent umbilical cord infections have influenced national and global policy-making. We actively participate in the development of national policy, and continue to seek opportunities to apply the learning gained in Bangladesh in other low-income countries.

Research Goals	Three-Year Targets
Evaluate the biological pathways leading to preterm birth	<ul style="list-style-type: none"> ● Define the roles of maternal asymptomatic bacteriuria, immune responses, inflammation, and vaginal infections and colonisation in predicting premature birth outcomes
Define causes of serious neonatal infections	<ul style="list-style-type: none"> ● Define the commonest bacterial and viral aetiologies of serious neonatal infections for a large cohort in South Asia
Assess existing and new biomarkers for the early detection of pre-eclampsia/eclampsia, and improved interventions for the management of these conditions	<ul style="list-style-type: none"> ● Define the predictive value of the Congo red dot test for pre-eclampsia/eclampsia ● Evaluate community-based delivery of magnesium sulphate to treat severe pre-eclampsia/eclampsia
Evaluate at scale the feasibility, acceptability and impact on post-partum haemorrhage of an expanded birthing kit consisting of misoprostol and a birthing mat to monitor haemorrhage, for domestic, regional and global application	<ul style="list-style-type: none"> ● Complete a cluster-randomized effectiveness trial of the expanded birthing kit in rural Bangladesh ● Establish collaborations to evaluate the birthing kit in other low-income countries
Evaluate approaches to delay first pregnancies among married adolescents and to scale up non-surgical menstrual regulation	<ul style="list-style-type: none"> ● Complete assessment of the effect of integrated family planning intervention in delaying first and un-intended pregnancies and unmet need for family planning among married adolescent girls ● Complete policy research on countrywide implementation of non-surgical menstrual regulation in Bangladesh, including acceptability and feasibility of its use for an extended time period
Evaluate measures to improve health systems in Bangladesh for care of pre-eclampsia/eclampsia, post-partum haemorrhage, neonatal sepsis, preterm birth and birth asphyxia	<ul style="list-style-type: none"> ● Complete implementation research to support scale up of community management of neonatal sepsis, provision of kangaroo mother care for premature newborns and administration of antenatal corticosteroids during premature labour ● Complete an effectiveness trial to improve maternal and neonatal outcomes by use of a package of human resource skill enhancement, improved clinical protocols and enhanced management information systems for first-level care in rural Bangladesh

Preventing and treating maternal and childhood malnutrition

We will study biological and non-biological mechanisms underpinning maternal and childhood malnutrition, develop innovative interventions to prevent and treat these conditions and evaluate new interventions for efficacy, feasibility and scalability.

The global context

Two billion people in the world suffer from malnutrition. Some 45% of deaths of children under five years of age are attributable to under-nutrition. Malnutrition is an underlying cause of death of 2.6 million children each year – a third of child deaths globally. More than 165 million children under-five worldwide are affected by stunting. In some countries as many as half of all adolescent girls and women of child-bearing age are stunted, increasing the risk of poor foetal growth and low birth weight among their children.

The situation in Bangladesh

In Bangladesh, more than half the population suffers from malnutrition. Severe acute malnutrition affects 600,000 children, while close to 2 million children have moderate acute malnutrition. Stunting affects 40% of children under-five, while a quarter of women are underweight and around 15% have short stature, which increases the risk of difficult childbirth and low birth weight infants. Half of all women suffer from anaemia, mostly nutritional in origin. Malnutrition is estimated to cost Bangladesh more than US\$1bn every year in lost productivity.

Our track record

We have worked extensively with international partners to understand the causes and implications of malnutrition and to develop new products to prevent and treat malnutrition, including ready-to-use foods developed from locally available ingredients. We have published influential work on abnormalities in the gut microbiota of children with severe acute malnutrition, and are now investigating how these abnormalities can be reversed.

We have influenced the global nutrition research agenda through our engagement with the WHO and the New York Academy of Sciences. In Bangladesh, we led the development of the National Nutrition Policy and reviewed the nutrition background paper that will inform the country's seventh Five Year Plan.

Research Goals	Three-Year Targets
Measure the burden and costs of maternal and childhood malnutrition in Bangladesh to facilitate targeting of interventions and policy decisions regarding resource allocation for measures to control these conditions	<ul style="list-style-type: none"> ● Determine from census, demographic and health surveillance, and other data sources, small area estimation of costs of malnutrition and its impact on gross national product
Assess the biological and non-biological determinants of childhood stunting and severe acute malnutrition to discover new preventative and therapeutic interventions	<ul style="list-style-type: none"> ● Assess biological and non-biological factors responsible for childhood stunting in an eight country study ● Complete study of impact of the microbiome on the human metabolome in children with severe acute malnutrition
Evaluate the role of maternal malnutrition as a determinant of birth weight and subsequent childhood nutritional status to guide the development of new maternal supplementation strategies	<ul style="list-style-type: none"> ● Complete analysis of global data on maternal nutrition and birth weight and the subsequent nutritional development in their children
Develop and test through clinical and field trials, ready to use therapeutic (RUTF) and supplementary foods (RUSF), prepared with locally available ingredients, for the treatment of severe and moderate childhood malnutrition, respectively	<ul style="list-style-type: none"> ● Assess efficacy of RUTF and RUSF and effectiveness of RUSF in randomised clinical trials
Conduct clinical trials of new interventions to prevent and treat childhood stunting	<ul style="list-style-type: none"> ● Test omega-3 and omega-6 fatty acid rich diets for prevention of childhood stunting in clinical trials ● Test octadodecylsulphate, budesonide as treatment for childhood stunting in clinical trials
Conduct trials of new interventions to prevent and treat maternal malnutrition in pregnant and non-pregnant women	<ul style="list-style-type: none"> ● Test essential fatty acid and zinc-rich diet for prevention of maternal under-nutrition in clinical trials ● Test calcium supplementation via addition of lime to rice for acceptability, bioavailability and effect on maternal bone density in clinical trials
Conduct implementation research evaluating the scalability, acceptability and cost-effectiveness of RUTF and RUSF for the treatment of severe and moderate childhood malnutrition	<ul style="list-style-type: none"> ● Complete pilot scale up of RUTF into all levels of government and non-governmental organisation health care units for treatment of severe acute malnutrition
Evaluate programmatic constraints to effective interventions to improve maternal malnutrition	<ul style="list-style-type: none"> ● Undertake a systematic review from special projects and routine surveys to assess barriers to delivery of interventions to improve maternal nutrition in low- and middle-income countries in Asia and sub-Saharan Africa

Controlling enteric and respiratory infections

We will generate a better understanding of key disease-causing organisms and host immune responses, and develop and evaluate low-cost potentially scalable preventive and therapeutic interventions.

The global context

Globally, enteric diseases (diseases affecting the gut) and respiratory infections are the leading causes of mortality, morbidity, malnutrition and impaired growth and cognitive development in children, as well as in older age groups. In 2010, there were an estimated 1.7 billion episodes of diarrhoea and 120 million episodes of pneumonia in children less than five years of age, collectively causing more than 2 million deaths. Two-thirds of fatalities were of children under two years of age.

The situation in Bangladesh

Despite some improvements in the control of infectious disease, Bangladesh remains one of ten countries with the highest burden of pneumonia, tuberculosis and diarrhoea-related deaths and illness, collectively responsible for nearly one of every five deaths overall.

The burden of common infectious diseases has a profound impact on the health and economic conditions of Bangladesh's population. While existing interventions need to be delivered effectively to more people at risk, there is also a need to develop new interventions, based on our evolving understanding of pathogen biology and evolution and host-pathogen interactions.

Our track record

Our outstanding laboratory, clinical and population-based research capabilities have enabled us to make major contributions to the understanding of infectious disease epidemiology, immunology and microbial pathogenesis. We are internationally recognised for the quality of our research in cholera and other diarrhoeal diseases, including pioneering molecular-genetic studies of the cholera pathogen *Vibrio cholerae*.

We have a long history of developing effective interventions to prevent and treat diarrhoeal diseases and respiratory illnesses. We developed and proved the value of oral rehydration solution for treatment of paediatric diarrhoea, and later showed the positive impact of zinc supplementation of oral rehydration solution. Studies on several key vaccines, including cholera, rotavirus, pneumococcal, Hib and influenza, have generated evidence that has influenced global health policy, including WHO recommendations, and Bangladesh's national immunisation programme.

Research Goals	Three-Year Targets
Determine the molecular mechanisms governing the environmental ecology and pathogenesis of bacterial enteric pathogens to provide leads for new preventative and therapeutic interventions	<ul style="list-style-type: none"> ● Generate new knowledge on ecological, microbial and human host factors that affect dormancy of <i>V. cholerae</i> O1 ● Evaluate the epidemiological importance of the dormant form of <i>V. cholerae</i> O1 in the aquatic reservoir, and its reactivation in humans ● Evaluate the role of bacteriophages in the emergence and prevalence of new variants of toxigenic <i>V. cholerae</i> ● Incorporate these factors into models to predict cholera outbreaks
Study mechanisms of emergence of new pathogenic strains and their evolution	<ul style="list-style-type: none"> ● Identify new genetic determinants of virulence, and their horizontal transfer among enteric bacteria ● Study the coevolution of <i>V. cholerae</i> and its bacteriophages, and its role in the emergence of new epidemic strains ● Assess the role of commensal gut flora as a reservoir of antibiotic resistance and in dissemination of resistance genes
Elucidate the immune responses responsible for mediating immune protection against key enteric pathogens, and mechanisms to enhance protection via improved vaccines	<ul style="list-style-type: none"> ● Assess the impact of pre-existing microbiome and/or of co-administration of vitamin A, zinc and probiotics on immune responses to oral vaccines ● Develop new knowledge on the roles of innate and cellular immunity in cholera, enterotoxigenic <i>E. coli</i> (ETEC) infections and typhoid
Identify new vaccine antigens to provide leads for development of improved vaccines	<ul style="list-style-type: none"> ● Identify novel antigens for inclusion in vaccines against ETEC, typhoid and cholera
Better characterise disease burden and human susceptibility for improved targeting of interventions	<ul style="list-style-type: none"> ● Complete field studies of the burden of <i>Cryptosporidium</i>, cholera, ETEC, rotavirus, typhoid and hepatitis E virus ● Evaluate impact of human microbiota and genetic variations on the risk of cholera
Develop and evaluate improved diagnostics to facilitate detection and treatment	<ul style="list-style-type: none"> ● Develop and evaluate improved clinical diagnostics for typhoid, ETEC and cholera ● Develop improved diagnostics to detect food and waterborne pathogens
Evaluate new vaccines for pathogens of public health importance	<ul style="list-style-type: none"> ● Evaluate new or improved vaccines against cholera, ETEC, <i>Shigella</i>, typhoid, HEV, pneumococcus, respiratory syncytial virus and influenza
Evaluate new therapeutics to improve therapeutic outcomes	<ul style="list-style-type: none"> ● Evaluate at least one new anti-diarrhoeal therapeutic ● Assess an improved small volume plasma exchange therapy for post-<i>Campylobacter</i> Guillain-Barré syndrome. ● Evaluate improved antibiotic management of severe pneumonia in severely malnourished children
Develop and evaluate non-vaccine preventive interventions	<ul style="list-style-type: none"> ● Evaluate new approaches to modifying hygiene behaviours and low-cost water-sanitation hardware for impact on diarrhoea ● Evaluate improved cook-stoves for impact on respiratory infections ● Facilitate scale-up and deployment of improved diagnostics, and preventive and therapeutic interventions via implementation research ● Evaluate scale up strategies of oral cholera vaccine ● Assess day-care versus usual care for treatment of childhood pneumonia

Detecting and controlling emerging and re-emerging infections

We will work with partners in Bangladesh and internationally to detect, characterise and respond to emerging and re-emerging infectious disease threats.

The global context

Detection and control of some infectious diseases are important not because they represent a consistently high burden, but because of the risk they pose to susceptible populations, including resurgence of eliminated infectious diseases. History records the devastating impact of emerging infections and drug-resistant infectious agents, and the emphasis now is on early detection and control. With routine intercontinental travel, the cross-border dissemination of novel infectious diseases can be alarmingly rapid.

The situation in Bangladesh

Bangladesh provides opportunities to study emerging infections and their transmission within animal populations, from animals to humans and from person to person. As well as helping to control infections locally, such work has a vital role to play in identifying and containing emerging and re-emerging infections, including drug-resistant agents that pose a regional and global public health threat.

Dengue is common in Dhaka and an emerging risk in rural areas. Nipah virus causes yearly outbreaks of encephalitis in Bangladesh, with more than 75% case fatality. Avian influenza is endemic in Bangladeshi poultry, but has thus far caused only mild illness in humans. Yearly outbreaks of anthrax occur in ruminants such as cattle, with some human infections. Behavioural change interventions to prevent cross-species transmission are often hampered by local poverty and food insecurity.

Multidrug-resistant tuberculosis (MDR-TB) is common in Bangladesh, and the infrastructure to treat MDR-TB is limited. Global spread of antibiotic-resistant bacteria and malaria, some originating from South Asia, has caused international concern and Bangladesh is seen as one of the crossroads between Asia and Africa for their spread.

Our track record

We have a long-standing collaboration with the US Centers for Disease Control and Prevention, which has enabled us to build platforms to track infections, through hospital-based surveillance and population-based surveys. Our laboratory capacity, including a BSL-3 laboratory for dangerous pathogens, allows us to study emerging infections and antimicrobial-resistant pathogens. We are also partnering with USAID's Emerging Pandemic Threats programme, and routinely respond to infectious disease outbreaks in partnership with the Institute of Epidemiology, Disease Control and Research (IEDCR), and in collaboration with the local One Health initiative. As a member of the Asia Pacific Malaria Elimination Network, we are contributing to the elimination of malaria in the Asia Pacific Region by 2030.

Research Goals	Three-Year Targets
<p>Characterise the disease burden and risk factors, and identify hot-spots for ecological spillover from animals to humans to permit rational targeting of interventions</p>	<ul style="list-style-type: none"> ● Determine the risk factors, geographic localisation and disease burden in Bangladesh for human disease due to dengue, Nipah, anthrax, avian influenza, drug resistant-tuberculosis and selected hospital-acquired antibiotic resistant bacteria ● Measure the frequency of cross-species transmission of influenza in rural Bangladesh ● Develop a model to predict the risk of a South Asian regional outbreak and of a global pandemic of Nipah virus disease
<p>Test new vaccines and behavioural interventions as preventative interventions</p>	<ul style="list-style-type: none"> ● Assess the results for uptake of a combined intervention to prevent bats from contaminating date-palm sap and mass communication to discourage consumption of raw date-palm sap, to prevent human Nipah disease ● Conduct initial human trials of a novel measles-vectored Nipah vaccine ● Complete intervention studies on appropriate and practical personal protection of healthcare workers and family members to prevent person-to-person spread of Nipah ● Develop interventions to reduce exposure of live bird market workers and backyard poultry raisers to avian influenza through improved and feasible techniques and personal protection during poultry slaughter
<p>Evaluate new clinical treatments for human disease</p>	<ul style="list-style-type: none"> ● Complete a clinical trial of human monoclonal antibodies as a therapy for human Nipah disease
<p>Conduct implementation research on the sustainable scale up and acceptability of new preventative and therapeutic interventions</p>	<ul style="list-style-type: none"> ● Complete studies of scale up of private-public partnerships for tuberculosis detection and treatment in urban slums ● Complete studies on the scale-up of a mass communication strategy to prevent human Nipah disease by discouraging consumption of raw date-palm sap, found promising in previous small studies ● Evaluate new targeting strategies of immunising cattle against anthrax for feasibility, costs and impact

Achieving universal health coverage

We will evaluate gaps in access, delivery, quality, financing, policy and governance in the health sector in Bangladesh, and test interventions to remedy deficiencies.

The global context

Developing countries have made considerable gains in maternal health, child survival and nutrition and management of communicable diseases. Even so, inequities persist between and within countries, and threaten to grow in an era of global epidemiologic and demographic transitions, urbanisation and climate change. To ensure equitable and sustainable improvements in health, poverty and weak health systems must be addressed.

The situation in Bangladesh

Several factors contribute to the lack of universal health coverage in Bangladesh. With only 0.5 doctors and 0.2 nurses per 1000 people, in contrast to the WHO recommendation of 1 doctor and 3 nurses per 1000 population, the country's human resources for health are at crisis levels. Uneven distribution of the health workforce, and issues of retention and overwork, will require innovations in capacity building, incentives and task shifting. The lack of effective regulatory systems also contributes to poor quality services and a large informal sector catering to the poorest in society. Finally, high out-of-pocket health care expenditures create financial barriers for those least able to afford the cost of health care.

Our track record

icddr,b is committed to the principle that all people, irrespective of their social and economic position, should have access to affordable, acceptable, high quality and responsive health care. The conceptual framework for our work is provided by the six building blocks of health systems identified by the WHO: service delivery, the health workforce, information systems, medical products, financing and leadership and governance.

We have particular expertise in areas such as urban health, health care financing mechanisms, gender-related issues and innovative use of new technologies. Our field site in Chakaria in south east Bangladesh allows us to test interventions and monitor equity indicators over time.

We actively engage with policy makers and implementers in Bangladesh at national and grassroots levels, promoting universal health coverage and encouraging the use of evidence to inform decision-making and to strengthen health systems. The Research Policy Communication Cell established within the government's Directorate General of Health Services, with our support, provides a formal means to channel evidence to policy.

Research Goals	Three-Year Targets
<p>Assess current gaps in service availability, service utilisation by people of different socio-economic groups and living in marginalised communities, resource availability, healthcare cost and financing, policy, and governance for achieving universal health coverage (UHC)</p>	<ul style="list-style-type: none"> ● Complete surveys and qualitative studies on availability, adequacy and utilisation of services provided by public and private sectors for existing health problems and emerging ones (e.g., noncommunicable chronic diseases, violence against women), in both rural and urban areas ● Assess adequacy of policies and governance structure and mechanisms for achieving UHC in urban and rural areas ● Review mHealth and other information and communication technology (ICT) initiatives in the country and assess their quality in achieving UHC ● Assess adequacy of the existing governance and accountability framework for mHealth and ICT-based services ● Review state of health workforce and role of para-professionals and informal providers in the context of UHC
<p>Test new approaches to increase access to care, improve quality of services, reduce financial barriers in accessing services and provide evidence base for policies and programmes</p>	<ul style="list-style-type: none"> ● Evaluate the impact of introduction of transportation for pregnant women for emergency care ● Test service delivery models using ICT to increase access to services for people living in remote and hard to reach areas ● Test interventions to improve quality of services by informal healthcare providers and establish accountability ● Document operational challenges along with possible solutions based on the pilot micro health insurance and self financed healthcare schemes for informal workers ● Evaluate the impact of micro health insurance and self financed schemes on reduction of out of pocket healthcare cost and protection from poverty
<p>Develop a roadmap to UHC with defined stages of progress and a monitoring framework to assess progress, including development of methods and identifying indicators</p>	<ul style="list-style-type: none"> ● Establish a platform for discussing issues relevant to UHC through supporting and utilising the Centre of Excellence on UHC ● Participate in UHC-related national initiatives especially taken by the Government of Bangladesh and provide evidence and technical support ● Assist the Government to develop a roadmap and a monitoring framework for UHC
<p>Establish a learning platform for UHC</p>	<ul style="list-style-type: none"> ● Incorporate UHC-relevant data in the health and demographic surveillance system in the Matlab and Chakaria field sites, and test different UHC interventions ● Establish an urban surveillance site for UHC operations research ● Use the Centre of Excellence on UHC to facilitate sharing of learning, dissemination and advocacy on UHC, and international networking

RESEARCH INITIATIVES

Examining the health consequences of climate change

We will evaluate the impacts of climate change and migration patterns on population health in Bangladesh and ways in which populations can adapt.

Average global temperatures are projected to rise by several degrees during this century, accompanied by more intense rainfall and sea level rise. Bangladesh is highly vulnerable to climate change. It is likely to experience floods in the wet season, potentially balanced by droughts in the dry season as neighbouring countries limit cross-border fresh water supply. It is also likely to face more extreme weather events.

There are concerns that rates of vector-borne diseases such as malaria, dengue fever, kala-azar and Japanese encephalitis virus infections could increase with climate change. Cholera outbreaks may also become more frequent as sea surface and river temperatures rise.

Health may also be affected in other ways. Heat stress is already occurring in urban areas, while rising salinity levels in coastal districts are likely to reduce crop production and exacerbate conditions such as hypertension. Large-scale population displacements are highly likely.

We have a long history of research on the links between climate and spread of infectious diseases, and in recent years we have been building our expertise in environmental science. Our social scientists are participating in a major international interdisciplinary project examining impacts in vulnerable areas.

Drawing on our long experience in health and population research in Bangladesh, we are well placed to shape and inform discussions on the appropriate response to climate change, while also ensuring that discussions are relevant to other countries facing similar challenges.

Research Goals	Three-Year Targets
Evaluate the effects of climate change on population health	<ul style="list-style-type: none"> ● Analyse historical Matlab data for evidence that changing climate is impacting mortality, especially in vulnerable groups such as infants and the elderly ● Evaluate countrywide data evaluated for evidence of climate change effects on the prevalence and geographic range of hypertension, malaria, dengue, kala-azar and cholera
Assess the effects of climate changes on population migration patterns	<ul style="list-style-type: none"> ● Analyse population censuses and surveys to assess whether, and to what extent, climate change is affecting population movements within Bangladesh
Develop predictive models for how climate change will affect population health and migration patterns in the future	<ul style="list-style-type: none"> ● Generate a comprehensive model to predict the impact of climate change on livelihoods, poverty, health, and population movements in the Ganges-Brahmaputra-Meghna delta through 2050 ● Assess the applicability of this model for other low-income countries including in South Asia
Develop and evaluate adaptation strategies to climate change for vulnerable populations in Bangladesh and similar low-income countries	<ul style="list-style-type: none"> ● Develop strategies for how vulnerable families can most effectively adapt to climate change-induced risks using the predictive model
Synthesise on-going work on climate change in Bangladesh	<ul style="list-style-type: none"> ● Develop a biannual report updating knowledge on current status of climate forces and consequences and impacts in Bangladesh

Preventing and treating non-communicable diseases

We will assess the burden of chronic diseases in Bangladesh, document current care practices and health-seeking behaviours and evaluate new interventions relevant to low-income countries to improve health outcomes and health care, with a focus on cardiovascular diseases and diabetes.

Non-communicable diseases (NCDs) are major killers worldwide, causing 36 million deaths every year, including 29 million in low- and middle-income countries. NCDs also pose a huge threat to development and economic growth. The burden of NCDs is on the rise due to population ageing and an increase in unhealthy lifestyles, and they will cost health systems globally an estimated US\$30 trillion by 2030.

In South Asia, NCDs account for around half of annual mortality and burden of disease. All major risk factors for NCDs are widespread in Bangladesh, including tobacco use, inadequate intake of fruit and vegetables, low physical activity, obesity and high blood pressure. In response to this growing threat, Bangladesh has developed a national strategy for Surveillance and Prevention of Non-communicable Diseases, and a dedicated unit has been established within the Ministry of Health and Family Welfare, with new service delivery options being piloted.

NCDs are a relatively new area of icddr,b work. We have explored the shift from communicable to non-communicable diseases using Matlab surveillance data, and have developed research competency in cardiovascular and respiratory diseases, diabetes, indoor air pollution, smoking and other chronic diseases and risk factors. Future work will have a particular focus on cardiovascular diseases and diabetes.

Research Goals	Three-Year Targets
<p>Assess the incidence, prevalence and risk factors for diabetes and cardiovascular diseases to support development and rational targeting of interventions</p>	<ul style="list-style-type: none"> ● Complete study of risk factors for myocardial infarction in urban Bangladesh ● Assess risk factors for hypertension and pre-hypertension in urban and rural areas of Bangladesh ● Assess risk factors for childhood obesity in urban Bangladesh sites ● Evaluate intergenerational correlation of risk factors for diabetes and cardiovascular disease in three consecutive generations of families in rural Bangladesh ● Assess relationship between early life malnutrition and development of metabolic syndrome in rural Bangladesh
<p>Characterise health care utilisation patterns for diabetes and cardiovascular diseases to identify barriers to care</p>	<ul style="list-style-type: none"> ● Evaluate surveys to assess health care utilisation of informal health care providers, community clinics and referral to higher-level facilities for care of diabetes and hypertension in a rural area of Bangladesh ● Complete study of determinants of hospitalisation for diabetes in urban Bangladesh
<p>Enhance tools and systems of surveillance to permit tracking of temporal and spatial trends of risk factors and disease</p>	<ul style="list-style-type: none"> ● Evaluate tablet-based tool for entry and transmission of information about risk factors, disease and need for referral for diabetes and hypertension at the field level in Matlab, and assess scalability for Bangladesh and other low-income countries
<p>Conduct community-based trials for prevention and control of hypertension and diabetes relevant to low-income countries settings</p>	<ul style="list-style-type: none"> ● Evaluate intervention to improve detection, standardise treatment and augment continuity of care for hypertension in a clinical trial ● Assess the impact of an intervention to improve diet and physical activity to prevent progression from gestational diabetes to diabetes after delivery in a clinical trial ● Assess the impact on blood pressure of lifestyle interventions to improve diet and physical activity in a clinical trial of sedentary urban workers

GOAL 1 2 3 4 5 6

Increase the visibility and impact of our research evidence

We will build skills and partnerships to ensure that our research evidence has impact on national and international policies, programmes and practices for improved health.

We are committed to ensuring the research we generate reaches those who can utilise it, whether they are policy makers, implementing agencies, fellow researchers or donors. We already have a track record of publishing in high quality and high impact journals, influencing policy both in Bangladesh and at a global level, and sharing our evidence and experience through training conducted in Dhaka and abroad.

With an emphasis on improving the time taken for researchers to publish their results, we will continue to support our researchers to publish in appropriate high impact scientific journals.

To improve the impact of our research, we will strengthen our relationships with policy makers and other research users, and actively engage them in priority-setting and research design. We will ensure that our research findings and proven interventions are effectively disseminated, using a range of contemporary communication tools. Through such activities, we will promote uptake of our research evidence, and demonstrate to donors and others the value of investment in research.

We also aim to communicate to potential partners—policy makers, advocacy groups and implementers—the opportunities offered by collaboration with us, and of conducting research in Bangladesh.

We have a well-established training programme, running courses for health professionals from Bangladesh, the region and further afield. We will review and re-develop our portfolio of training activities to maximise their contribution to skill and knowledge development of global South researchers and health professionals.

As a founding member of the WHO Global Outbreak Alert and Response Network (GOARN), we will continue to respond to requests for our technical assistance in managing outbreaks of diarrhoeal disease worldwide.

Broad Goals	Three-Year Targets
Disseminate research findings through a range of scientific and other mainstream communication channels	<ul style="list-style-type: none"> ● Improve time to publication of research in appropriate high quality and high impact scientific journals ● Increase national and international media coverage ● Increase and optimize the use of digital platforms for knowledge dissemination ● Enhance the communication skills of research staff
Active engagement with policy makers, practitioners and advocacy groups	<ul style="list-style-type: none"> ● Improve strategic and proactive engagement with the Government of Bangladesh and other policy makers ● Increase representation in our priority areas on relevant national, regional and international policy making committees ● Improve research protocol design informed by engagement with policy makers and implementers
Deliver a portfolio of training activities reflecting our knowledge and expertise and aligned to our research priorities	<ul style="list-style-type: none"> ● Re-align our training offering and re-engineer our systems to ensure that our knowledge and expertise continues to build capacity in Bangladesh and internationally ● Increase numbers enrolling on training and customer satisfaction of attendees ● Maintain our capacity to deploy technical experts in response to international humanitarian crises

GOAL 1 2 **3** 4 5 6

Invest in our research platforms

We will develop our research infrastructure—for population-based, clinical and laboratory-based research—to ensure it is aligned to our research objectives, internationally competitive and financially sustainable.

Field sites have been integral to our research, supporting large-scale clinical trials in urban and rural settings and a context in which to evaluate interventions. We run seven sites covering populations from 19,000 to 600,000 people each. The Matlab field site 50 km south of Dhaka is the longest continuously running demographic surveillance system in the developing world, and a global public health resource. Covering 220,000 people, Matlab is the model for our other field sites, as well as for the international INDEPTH network of health and demographic surveillance sites.

We will continue to leverage these well-established sites to address critical national and global public health issues, and to ensure our researchers have access to population cohorts of the appropriate size and type.

Our two hospitals and one treatment centre, which provide care free of cost to patients, are central to our clinical research and to surveillance. They treat more than 200,000 patients each year, and the Government of Bangladesh, bilateral donors and civil society acknowledge the importance of their humanitarian role to the poorest in society. We believe it is essential that we continue to provide high-quality evidence-based clinical care to the populations among whom we work and to showcase what can be achieved clinically in a low-resource setting. We will continue to invest in our clinical services, while also looking to increase our portfolio of clinical research and to secure additional income streams to fund clinical care.

The comprehensive nature of our laboratories, which include facilities for working with highly pathogenic organisms, the calibre of our laboratory staff and our ability to bring modern molecular science to the study of human disease all distinguish us from many other institutions in the region. As advances in technological capabilities continue to transform research, it is critical that our researchers have in-house access to advanced technological platforms. As well as maximising the use of our existing equipment, we are committed to investing in laboratory resources that meet the ambition of our research.

Broad Goals	Three-Year Targets
Field sites:	<ul style="list-style-type: none"> ● Implement a strategy to position Matlab DSS as a resource for research into the health problems of countries undergoing demographic and health transitions ● Review operational capacity and operational and project costs at each field site ● Review alignment of research portfolio with field site capacity ● Consider the future of field sites not fully utilised by the focused research priorities ● Identify any additional field sites required over the longer term ● Ensure that the costs of maintaining sites are met by research projects that use them ● Review training opportunities offered by icddr,b that utilise the field sites as demonstration sites for state of the art research and health care services and innovative approaches to health care service delivery ● Explore potential for field sites not running at capacity to be utilised by external stakeholders/institutions
Hospitals:	<ul style="list-style-type: none"> ● Quantify the number of clinical studies currently undertaken, and identify which will be undertaken as part of the strategic plan ● Assess the capacity available, and then promote the hospitals as a platform for innovative clinical research ● Continue implementation of cost control programme ● Review the operating costs of the hospital on a regular basis ● Develop a fully costed business plan to expand clinical diagnostic services in order to increase capacity and income generation ● Monitor the provision of clinical care to assure quality of care whilst optimising the efficiency of care delivery ● Identify opportunities to showcase effective innovations and protocols that have been developed or adapted for use in a low-resource setting ● Identify opportunities afforded by the hospitals for the training and development of icddr,b and other researchers and clinicians ● Leverage philanthropic funding to ensure the continued delivery of free services to those most in need
Laboratories:	<ul style="list-style-type: none"> ● Assess capacity and identify any under- or over-capacity issues ● Audit all technologies and skills available in our labs and develop a costed future-proof investment plan to ensure laboratories keep pace with modern molecular science ● Ensure that laboratory costs are charged appropriately to the research protocols utilising the facilities ● Maintain strong laboratory management procedures to ensure that bio-safety procedures and other aspects of quality assurance conform to best international practices, and that equipment is maintained to a high standard to ensure long life spans ● Develop a training plan that enables icddr,b researchers and external stakeholders in the global South to access facilities to enhance their research and laboratory skills ● Develop partnerships with institutions in developed countries to provide skills training to our researchers

GOAL 1 2 3 **4** 5 6

Invest in our people

We will build the skills and competencies of scientific and other staff, with a special focus on developing local research capacity, particularly at the mid-career level, and supporting female researchers.

Our people, and their knowledge, skills and commitment, are essential to achieving our research goals. Our highly skilled multidisciplinary scientific staff is recognised as a distinctive asset. As well as our own researchers, we are committed to nurturing the next generation of public health leaders from the global South.

Important priorities for the next three years include recruiting, retaining and developing mid-level scientists, and supporting the career development of female researchers. We will also create a succession plan for senior scientific leadership. In addition, we will recruit senior administrative staff with the experience and leadership qualities necessary to deliver and sustain change.

A high-performance environment that encourages learning and supports career progression is key to our ability to carry out high-quality research and promote the use of research evidence. Across all functions, the overarching focus will be on building the capacity and competence of all employees.

Broad Goals	Three-Year Targets
Recruit and reward the best talent	<ul style="list-style-type: none"> ● Re-engineer the recruitment process including the use of behavioural and functional competencies to ensure selection of the best talent ● Recruit scientists with internationally recognised expertise ● Implement resource-planning across the organisation
Develop and nurture our emerging talent	<ul style="list-style-type: none"> ● Execute a multi-faceted talent development programme to develop operational, research and leadership talent ● Enable a 'high potential' development programme to accelerate the development of outstanding early-career and mid-level scientists ● Embed a succession planning process for senior leaders and key subject matter experts
Reward superior performance	<ul style="list-style-type: none"> ● Execute a performance management system to link with rewards and development processes ● Implement a structured performance improvement process ● Embed the behaviours associated with high performance including ethics, anti-corruption, risk management and fiscal prudence
Drive gender and diversity equality	<ul style="list-style-type: none"> ● Implement a diversity plan to enhance our gender programme to include sensitivity to race, religion, age, sexual orientation, marital status and disability ● Embed gender and diversity awareness in all aspects of our operation including research, operations and training
Engage and recognise our employees	<ul style="list-style-type: none"> ● Develop robust internal communication processes to drive delivery of our strategic goals ● Embed cross-functional continuous improvement teams to enhance our business processes and to improve collaboration throughout the organisation ● Embed employee recognition processes to enhance employee engagement

GOAL 1 2 3 4 **5** 6

Improve organisational efficiency and cost-effectiveness

We will modernise our organisation's operations to ensure maximum efficiency and cost-effectiveness.

Effective and efficient business systems underpin our ability to compete for international funds and deliver high quality research. As one of the region's leading research centres, it is essential that we operate to the highest possible standards, with oversight appropriate for an international research organisation. In particular we need to ensure that our policies, structures and procedures are compatible with an increased emphasis on accountability and transparency.

Championed by a strengthened leadership team, we are implementing a programme to modernise in-house business processes, systems and practices. We have reviewed and benchmarked support services against international standards and identified opportunities for streamlining and improved use of technology to achieve cost savings.

We have launched a recruitment drive to ensure that key leadership positions are filled by staff with the necessary competencies and experience to drive forward this organisational change programme.

Broad Goals	Three-Year Targets
Revise our business processes	<ul style="list-style-type: none"> ● Provide efficient and effective financial management and reporting ● Benchmark our business processes against peer groups ● Re-engineer our business processes including development and training in service level agreements ● Build a business continuity plan to ensure safety and security of our people and processes ● Strengthen our board effectiveness by reviewing mandate, membership and performance and implementing training
Implement a change management plan to facilitate delivery of the strategic plan with associated key performance indicators (KPIs) to implement the strategic plan	<ul style="list-style-type: none"> ● Define and implement a change management project plan with an associated accountability mechanism ● Implement a balanced scorecard with the dimensions of: financial, research delivery, operational excellence, learning and growth, with associated KPIs at strategic, operational and tactical levels, and linked with individual performance management processes ● Implement a regular governance process to review and improve our performance against KPIs
Restructure the organisation	<ul style="list-style-type: none"> ● Re-organise our structure to ensure delivery of the revised strategic plan and research priorities ● Review the span of control in each area to ensure accountability and delivery of objectives
Evaluate the adequacy and effectiveness of risk management, control and governance	<ul style="list-style-type: none"> ● Maintain an up to date risk register ● Prepare risk-based annual work plans for internal audit ● Complete annual audit work plan by issue of final audit report ● Address and implement audit recommendations in a timely manner

GOAL 1 2 3 4 5 6

Ensure financial sustainability

As well as carefully controlling expenditure, we will strengthen our fundraising strategy and identify additional opportunities for income generation.

Despite an increasingly competitive global funding environment, we have a strong track record of attracting funding, obtaining a wide range of research and implementation grants. The principal challenge is to sustain and increase the pipeline of funding to cover our humanitarian services, as well as to support our focused research agenda. In addition, it will be necessary to align all grants to the research strategy, ensure total cost recovery and support researchers to budget correctly for all in-house services and infrastructure costs.

We have identified three key income streams, each requiring investment and a strategy to ensure optimum success: research funding, humanitarian fundraising and income generation from services.

Underpinning these efforts to increase income are the on-going measures to control expenditure and enhance business efficiency.

Broad Goals	Three-Year Targets
Reduce overhead reduction and ensure cost recovery	<ul style="list-style-type: none"> ● Reduce to 15% total operating costs attributed to administrative and management ● Provide specific limits regarding use of restricted funds ● Ensure cost recovery for all projects within approved donor limits ● Ensure use of time management processes to support cost recovery
Increase research funding	<ul style="list-style-type: none"> ● Compete as prime beneficiary rather than sub recipient where possible ● Ensure wider portfolio in funding base for priority research priority areas ● Provide effective and timely budget support for all research applications ● Reduce focus on applications for small grants
Enhance fundraising function	<ul style="list-style-type: none"> ● Develop global comprehensive fundraising strategy including programme, corporate, government and philanthropic funding ● Develop new opportunities for income generation schemes ● Increase regional and international partnerships and collaboration for funding opportunities

Monitoring and evaluation

Monitoring and evaluation of the implementation of this strategic plan falls under the scope of Goal 5. It will involve (1) developing—and ensuring adherence to—a detailed, time-bound implementation plan, and (2) developing a revised set of indicators acceptable to our Core Donors and Board of Trustees to ensure that the plan is delivering the anticipated results.

Internal oversight will be strengthened further in order to detect fraud and prevent its occurrence. Vigorous internal audit reviews will deter financial impropriety and ensure value for money.

In addition, under Goal 6, specific monitoring and reporting requirements will be established using standard financial monthly and quarterly reports for grant holders, senior management and the Board of Trustees. Effective modification of the internal grant administration system and the chart of accounts will also be completed to automate reporting. These tools will facilitate budgetary control and assist corrective action to be taken.

The Senior Leadership Team will provide day-to-day oversight and be accountable to the Board of Trustees. Furthermore, an annual review commissioned by the Core Donor group provides an independent assessment of our performance, which will complement our own monitoring and evaluation.

Funding the strategic plan

The research currently itemised in the Strategic Plan Research Priorities is covered by grants already secured. Additional proposed projects will align with these research priorities, and will have full cost recovery incorporated into their funding applications.

The activities in Goals 2-6 will be funded by unrestricted/core funds. The proportion of funds directed to the delivery of each goal will be determined and agreed annually.

As investments in improving efficiency and effectiveness across the organisation deliver reductions in operational cost, the cost savings will be directed to investments benefiting our research and humanitarian provisions.

The operational plans for each of the goals will be accompanied by detailed budgets approved by our Board of Trustees.

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