

glimpse

Spring 2014

Boosting Response of Polio Vaccine

New Evidence for Influenza Vaccine in Pregnancy

Evaluating Measles-Rubella Campaign



icddr,b

Message from the Executive Director



John D. Clemens, MD
Executive Director

I'm delighted to introduce our new issue of Glimpse, and to share with friends and supporters icddr,b's recent achievements and news. An important goal for icddr,b is to generate research and evidence not just for Bangladesh, but to improve health and development regionally and globally. Evidence of the broad reach of our innovations is captured in a recent Bangladesh clinical trial, led by icddr,b researchers with international colleagues, that has impacted health policy and also won a recent award.

Although influenza immunization (the flu shot) has been recommended during pregnancy for many years, there had been no evidence from a randomized controlled trial (RCT) to support the importance of that policy for birth outcomes until now. And the RCT to provide the needed evidence was not done in North America or Europe, but in Bangladesh by an international team, providing critical insights to help guide clinical practice, immunization policy, and women's informed decision-making.

The Bangladesh evidence, drawn from secondary analyses of an RCT involving 340 pregnant women, shows that a flu shot given in the third trimester increased the mean birth weight of infants by 200 grams. It was part of the Mother's Gift project demonstrating the safety and effectiveness of pneumococcal and influenza vaccines in pregnant women, previously reported in the *New England Journal of Medicine*. This new information is valuable

for health policy and care: women who get flu during pregnancy may risk complications for themselves or their babies, and yet there is low uptake of vaccination - in many countries, less than one in five pregnant women has had a recent flu shot. The second paper from this trial renewed attention recently when it won the award for top paper in the *Canadian Medical Association Journal* for 2013.

You can read more about the trial, along with a host of other research achievements, in this issue of Glimpse.

Staff at icddr,b and patients at our Dhaka hospital received a special treat in March, when members of the Australian cricket team - in Bangladesh for ICC T20 cricket tournament - paid a visit to see our work and how the support of the Australian government is helping save and improve lives in Bangladesh and beyond.

We're proud of the work we do, and couldn't do it without the support of our core donors and other supporters. ■

For more than 50 years, icddr,b has provided practical, low-cost solutions to the health problems affecting billions of people living in poverty in Bangladesh and across the globe. The institution's unique proximity to the health challenges of the developing world, both urban and rural, allows for the development of evidence-based interventions that are relevant, rigorously tested, translatable and scalable in resource-limited settings.

icddr,b

Mohakhali, Dhaka 1212, Bangladesh
T 880.2.9827001-10
F 880.2.8819133
E info@icddr.org
W www.icddr.org

Executive Director

John D. Clemens, MD
jclemens@icddr.org

Executive Editor

Dr. Jocalyn Clark
jocalyn.clark@icddr.org

Editor

Louise Dettman
louise@icddr.org

Photography

Cover page: Emdadul Islam Bitu
UCLA, Shumon Ahmed, Emdadul
Islam Bitu, Rabiul Hassan and all other
photos are icddr,b's file photo

Graphic Designer

Mohammad Inamul Shahrir



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Study Reveals Inadequate Access to EmONC Services ■■■■■



EmONC services are critical to addressing complications that arise for mothers and babies in childbirth

Emergency services for expectant mothers and their babies have been part of Bangladesh's national health agenda for the last 30 years, but the system has lacked a tool to effectively monitor and evaluate quality and availability. Unless mothers can reach life-saving care in the event of an emergency, government services are of little use.

To ensure that they can, the Government of Bangladesh (GoB) has partnered with icddr to develop a Geographic Information System (GIS) to assess the country's emergency obstetric and newborn care (EmONC) services (<http://ga.icddr.org/emocgis/>).

"The GIS technology allows us to see the big picture and all pieces of the puzzle—to assess individual facilities to ensure that equipment, supplies, human resources and quality care are being provided during pregnancy, birth and the postnatal period," said Dr. Mahub Elahi Chowdhury, scientist with the icddr Centre for Equity & Health Systems, which released results from its needs assessment on 17 February.

Study Findings

The study was conducted at medical college hospitals, district and upazila hospitals and some private health facilities in 24 districts between May and October 2012. icddr's web-based GIS application allowed programme managers and policymakers to map the GPS locations of publicly designated EmONC facilities and evaluate how their distribution and geographical accessibility related to population, road and waterway networks and more.

The study estimated that there are 1.2 comprehensive and 2.5 basic government-run EmONC facilities for every 500,000 people in the selected 24 study districts. Although private facilities in Bangladesh are not designated as EmONC facilities, a substantial number of them do offer obstetric and newborn care services in urban areas. In both public and private sectors combined, most of the study districts have more than the five facilities per 500,000 residents that United Nations guidelines require.

Of these five, at least one should function as a comprehensive facility by providing caesarean sections and blood transfusions. This is in addition to the basic services

provided by the remaining facilities—administration of parental antibiotics, oxytocin and anticonvulsants; manual removal of the placenta; removal of retained products; assisted vaginal delivery and neonatal resuscitation.

Even though Bangladesh meets the minimum acceptable number of facilities, poor infrastructure and lack of trained personnel mean a reduced availability of services. Various GIS modeling exercises undertaken by the needs assessment study revealed that in 24 districts about 72% of the population had accessibility to a publicly designated comprehensive EmONC facility within two hours' travel time. However, accessibility within the optimum one hour of travel time to a basic EmONC facility was 41%. In hill districts and hard-to-reach areas, the accessibility was much lower.

The study found 90% of obstetrician, gynaecologist and paediatric posts to be occupied, but only 65% of anaesthesiologist posts were filled. Around 80% of senior staff nurse and staff nurse posts, and 50% of assistant nurse posts, were found vacant. At the sub-district level, a substantial proportion of medical doctor posts were vacant. More than 60% of obstetrician/gynaecologist posts, and more than 70% anaesthesiologist and paediatric consultant posts were vacant.

The Way Forward

On the basis of a needs assessment study of the 24 districts, researchers recommend undertaking a strategic plan for increased coverage of EmONC services, developing a human resource plan for EmONC service delivery, strengthening infrastructural facilities and ensuring supply of drug equipment and logistics for EmONC services. At the 17 February presentation of results at icddr, GoB Health Secretary MM Niazuddin called the study unique and said the ministry will factor in the recommendations when conducting a midterm review of a different operation plan. ■

icddr,b Hosts Two Major International Conferences



Professor Keith Klugman, director for pneumonia at the Bill & Melinda Gates Foundation

icddr,b brought together researchers and policymakers working to address the global burden of emerging infectious diseases and cholera at two conferences in February on its main campus. Marking the first time each event has been held

in Bangladesh, the 16th International Conference on Emerging Infectious Disease (EID) in the Pacific Rim was followed by the 48th U.S.-Japan Cooperative Medical Science Program Conference (U.S.-Japan CMSP) on Cholera and Other Bacterial Enteric Infections. Over 350 participants from 16 countries took part in the conferences.

In Bangladesh for the first time, Professor Keith Klugman, director for pneumonia at the Bill & Melinda Gates Foundation, was pleasantly surprised at the “fantastic” turn out of researchers and scientists in Dhaka for the five consecutive days of conferences on emerging infectious diseases. A leading expert on antibiotic resistance in pneumonia pathogens, Professor Klugman helped develop the pneumococcal vaccine that is now given to all children born in the United States and will soon be available globally.

“The Gates Foundation is focussed on reducing childhood deaths by improving the development and delivery of pneumonia vaccines and by expanding the use of antibiotic treatments and diagnostic tools. Diseases like childhood pneumonia are global emergencies that need to be addressed immediately,” he said. “About 40% of under-five deaths occur within the first month of life, probably due to bacterial and viral infections. These deaths may be vaccine-preventable.”

Professor Klugman said the Gates Foundation is focussing on maternal immunisations that would protect newborns. He was among the presenters at the two conferences to introduce scientific and public health information on key diseases to fellow researchers and policymakers, helping to identify areas of research that need additional emphasis or support. ■

High Burden of Rotavirus Requires Action

Findings from hospital-based surveillance conducted by icddr,b from July 2012 to January 2014 show that 67% of children below five years of age hospitalised for diarrhoea in seven hospitals in Bangladesh had rotavirus, a potentially deadly viral infection. More than 52% of the isolated strains of the virus were found to be preventable by introducing one of the two currently licensed rotavirus vaccines.

These data provide invaluable support for the Government of Bangladesh’s plans to include the rotavirus vaccine in the country’s immunisation programme. “We have to reduce hospitalisations due to this virus. I urge the government to prioritise the introduction of the rotavirus vaccine in the national Expanded Program for Immunisation,” said principal investigator Dr. Emily Gurley,

acting director of icddr,b’s Centre for Communicable Diseases (CCD).

Rotavirus is the most common cause of severe diarrhoea among infants and young children globally. WHO has recommended that a rotavirus vaccine be included in all national immunisation programmes, but many countries, especially low- and middle-income countries, have not done so.

The CCD—in collaboration with the Institute of Epidemiology, Disease Control and Research (IEDCR), the US Centers for Disease Control & Prevention and USAID—established hospital-based Rota-



Each year rotavirus kills half a million children under five around the world and 16,000 children in Bangladesh alone. The disease is deadly but preventable

virus & Intussusception Surveillance (HBRIS) in seven hospitals in each of the country’s divisions. Seventy-seven percent of children infected with rotavirus were between 6 and 17 months of age, and the peaks of infection were between November and February. ■

Study Could Boost Response to Polio Vaccine

New research by icddr and collaborators reveals that under-nutrition, shorter duration of breastfeeding and diarrhoea are associated with the poor response to trivalent oral polio vaccine (OPV) sometimes observed in developing countries. The study, published in January in *Vaccine*, found breastfed infants to have a greater response to OPV than those given formula milk.

This suggests that a simple intervention, such as promoting exclusive breastfeeding, would help reduce diarrhoea incidence and decrease malnutrition, making OPV more effective and maximising the success of vaccination programmes. This is key, as more than 120 countries currently use OPV as their only line of defense against the disease.

Study findings come at a critical time: World Health Organization (WHO) recently certified Bangladesh, as part of the Southeast Asia region, polio-free. "The new information is groundbreaking given that OPV is known to have low "per-dose" efficacy rates in developing countries, with a 21% efficacy in India compared to the estimated 50% in the United States," said the study's principal investigator, Dr. Rashidul Haque, senior scientist with icddr's Centre for Vaccine Sciences (CVS). "If we can understand the biological basis for underperformance of OPV, we can boost its success rate worldwide."

The WHO certification comes as countries prepare to introduce inactivated polio vaccine (IPV) into their routine immunisation programmes as part of the eventual phasing out of the less effective OPV. Countries will introduce a dose of IPV by the end of 2015 as part of their commitment to the global polio eradication plan, which aims to ensure a polio-free world by 2018. In



The Government of the People's Republic of Bangladesh undertook a nation-wide oral polio vaccination programme in early 2014

the meantime, and in countries with no plans for change, icddr research can show the way for more effective use of the only available tool at this time.

The study's researchers hypothesised that chronic or recurrent inflammation of the gut due to exposure to pathogens (also known as environmental enteropathy), malnutrition and associated immunodeficiency and premature weaning of breast milk affected the ability of some infants' immune systems to respond to oral vaccines. Researchers tested their hypothesis in a slum in Mirpur, a suburb of Dhaka.

The study tested response to OPV in breastfed infants (enrolled within one week of birth and followed for up to a year) who were also malnourished and experiencing diarrhoea at the time of vaccination. Four hundred thirty-five children in the cohort received OPV

(any number of doses) with 314 children receiving at least three doses of OPV by 12 months—of whom 258 received three doses by six months of age. These same infants were tested for serum neutralising antibodies to measure their vaccine response. Duration of breastfeeding was measured as a variable in the level of response to OPV. The researchers also took into account nutritional status and the episodes of diarrhoea within the first six months of life.

CVS scientists collaborated with the University of Virginia, Northwestern University, Centers for Disease Control & Prevention and the University of Vermont College of Medicine. The study was funded by the US National Institutes of Health and the Bill & Melinda Gates Foundation. For the full article, please see <http://www.sciencedirect.com/science/article/pii/S0264410X13015909>. ■

New Project Aims to Prevent Childhood Drowning

In Bangladesh, drowning is the leading cause of death among children between the ages of 1 and 4 years, accounting for 12,000 deaths per year and 43% of all mortality in this age group. That's more than 32 drowning deaths per day. Lack of or inadequate supervision, high exposure to water hazards and poor education due to poverty are some of the major risk factors for childhood drowning in Bangladesh.

In order to address this preventable cause of death, icddr has partnered with the Johns Hopkins International Injury Research Unit (JH-IIRU) and the Center for Injury Prevention and Research, Bangladesh (CIPRB) to implement the SoLiD project—Saving of Lives from Drowning—that aims to prevent and reduce the burden of childhood drowning in rural Bangladesh. The project is funded by USA-based Bloomberg Philanthropies.

SoLiD will collect injury surveillance data for more than 1.2 million people, with the goal of reaching 80,000 children living in 270,000 households over a two-year period. The project also will assess the effectiveness of two drowning prevention interventions—enrollment in community day care (crèche) facilities and the provision of playpens. These two interventions will be provided to eligible children (9 to 36 months of age) in seven upazilas/sub-districts.

In the crèche intervention, a caregiver with an assistant will supervise up to 25 children six days a week during the peak period when children are most at risk for drowning (9 am-1 pm). The caregiver will



Rural Bangladesh relies heavily on its rivers and streams to sustain villages and farmlands. However, more children now die of drowning than from infectious and other diseases

provide education in safety, development, hygiene and nutrition. The project already has established about 1,600 community day care facilities (with 30,000 children enrolled) with the goal of establishing 3,200 during the project period. ■

Recognition for Ground-breaking Work on Pregnancy



Study results show for the first time that flu immunisation during pregnancy benefits mother and child

Award-winning Article

In Canada, less than one in five pregnant women has had a recent flu shot. Researchers hope that will soon change thanks to the work of icddr scientists and a team of international collaborators. They won the prestigious CMAJ Bruce Squires Award this year for their article, 'Neonatal outcomes after influenza immunization during pregnancy: a

randomized controlled trial'. The Canadian medical journal CMAJ showcases innovative research and ideas aimed at improving health for people in Canada and globally.

The randomised control trial involving 340 pregnant women in Bangladesh showed that a flu shot given in the third trimester increased the mean birth weight of infants by 200 grams. Since the study was published, several

other researchers in the US and Canada have conducted secondary analyses of data and showed similar results. To read this year's winning article, see <http://www.cmaj.ca/content/184/6/645.full.pdf>.

Grant to Study Preterm Birth

In rural Bangladesh, the current rate of prematurity is about 13%, and the risk is

associated with a range of socio-behavioural, medical, infectious, inflammatory, nutritional, environmental and genetic factors that need to be better understood.

Now, the Global Alliance to Prevent Prematurity and Stillbirth (GAPPS), an initiative of Seattle Children's Hospital in the United States, has awarded a US\$1.5 million grant to Dr. Anisur Rahman, head of icddr's Matlab Health Research Centre, and his colleagues at the Centre for Reproductive Health to research the high burden of preterm birth and stillbirth in Bangladesh.

They will conduct the population-based cohort study in Matlab, enrolling 4,700 women in early pregnancy over a three-year period to collect information and biological specimens during pregnancy and delivery. For more information on the study, see <http://www.youtube.com/watch?v=lil-git9Mcl>. ■

Evaluating the National MR Vaccination Campaign



The recent measles-rubella (MR) campaign sought to immunise more than 52 million children—one third the population of Bangladesh

Measles is one of the world's most contagious diseases and is an important cause of death and disability among children. Rubella can cause foetal death or severe birth defects. Both are easily preventable with vaccines. Because these diseases are so contagious, a majority of the population (90-95% in this case) must be immunised in order to slow an outbreak and prevent an epidemic.

To achieve this “community” or “herd” immunity in Bangladesh, the GAVI Alliance supported a recent measles-rubella (MR) campaign to immunise more than 52 million children—one third the population of Bangladesh—and boost the country's present measles coverage of 86% up to 98%. The government of Bangladesh's (GoB) Ministry of Health and Family Welfare (MOHFW) implemented the three-week MR campaign 25 January-13 February, and GAVI asked icddr to evaluate its impact.

Unlike previous measles vaccination campaigns, this one also provided protection against rubella. In 2012, the GoB introduced the combined MR vaccine into its Expanded Programme on Immunisation (EPI) schedule for routine vaccination. As with the introduction of any new vaccine into the EPI, icddr provided disease-burden research and prevention and control recommendations to government

policymakers throughout the process. The GoB plans to incorporate the mumps vaccine by 2016.

The three-week MR campaign was the largest in the country's history and vaccinated children between nine months and 15 years of age. This increased age range (beyond 15 months of age) was based on routine surveillance by the MOHFW that showed about 80% of the country's 2011 measles and rubella cases were contracted by children up to 15 years old. The GoB is planning a subsequent campaign to offer the crucial second dose of the MR vaccination shown to be key to prevention.

It was the largest-ever MR campaign launched to date with support from the GAVI Alliance—a public-private global health partnership committed to increasing access to immunization in poor countries. GAVI selected icddr to evaluate the campaign based on icddr's impact evaluation of the GoB's 2006 measles catch-up and 2010 measles follow-up campaigns. That evaluation showed

that these supplementary immunisation activities had a positive impact on the health and immunisation systems and created a framework on which other healthcare interventions for bacterial and viral diseases could be based.

The GoB used the same evidence put forth in that report to secure the GAVI financial and technical assistance, making the 2014 MR campaign possible. The 2011 evaluation was supported by the World Health Organization (WHO), through the London School of Hygiene & Tropical Medicine, and is available at http://jid.oxfordjournals.org/content/204/suppl_1/S90.full.

Dr. Jasim Uddin, scientist with the icddr Centre for Equity & Health Systems, is the principal investigator of both the 2011 evaluation and the current US\$450,000 evaluation project. He expects to disseminate results this summer to policy-level stakeholders, such as the GoB, UNICEF, WHO and others.



Thousands of health personnel and community volunteers worked to carry out the three-week MR immunisation campaign, the country's largest ever

“The 2014 MR campaign evaluation will provide critical findings for Bangladesh and other countries implementing similar approaches—as well as provide an important template for future evaluation efforts here and elsewhere,” said Dr. Uddin. GAVI plans to support 49 countries to introduce the combined MR vaccine immunising close to 700 million boys and girls by 2020. ■

The Dhaka Hospital: an Eye Opener for Australian Cricketers



ICC World Twenty20 Australian cricketers (from left) Aaron Finch, David Warner and James Muirhead meet with 16 month old boy Siyam and his mother Shuma in icddr's Nutrition & Rehabilitation Unit on 27 March 2014

Six Australian cricketers took time from their schedule at the ICC T20 cricket tournament hosted in Bangladesh in March to learn how Australian taxpayers' money is saving lives in Bangladesh and other developing countries.

Cricketers Aaron Finch, David Warner, Cameron White, Glenn Maxwell, Nathan Coulter-Nile and James Muirhead were joined by Cricket Australia Chief Medical Officer Justin Paoloni. The visit took place on 27 March as part of Cricket Cares, Cricket Australia's community

action programme that uses cricket as an agent of change in the community.

The players spent an hour at icddr's main campus, where icddr's Executive Director John D. Clemens briefed them on health issues and achievements in Bangladesh. Next, they toured the Dhaka Hospital, which treats more than 120,000 of Dhaka's poorest residents each year free of charge.

The players also met with Australian researchers working at icddr, as well as a number of national staff who have studied in Australia on Australian government

scholarships. "It was great to see engagement of these high-profile cricket stars in the health issues faced by people from low-income communities here in Bangladesh," said Dr. Leanne Unicomb, an Australian scientist with the Centre for Communicable Diseases.

Australian cricketer James Muirhead, 20, said the visit made him realise how fortunate he is. "It's a real eye-opener, and something I'm really glad I've experienced. It was pretty hard to look at, but I am glad to see all the work that is being done that come at no cost to the people who need it." He said he was proud that Australian development assistance was supporting the work of icddr.

Dr. Clemens noted that the players' visit strengthened the many existing links between Australia and icddr. "I thank them for the lives saved and transformed by Australian taxpayer funding," he said. "They should be as proud of this as they are when representing their country on the cricket field. Although many challenges remain, we are sure icddr and other key players will achieve more great results in the next five years thanks to continued support from donors in Bangladesh and around the world." ■



icddr,b thanks its core donors for their continued support



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