



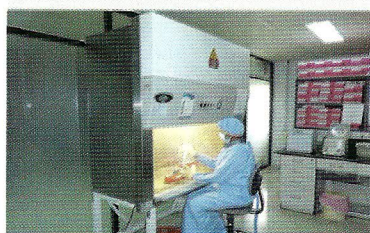
FBIS Newsletter

Food Borne Illness Surveillance (FBIS) in Bangladesh



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FBIS Laboratory IEDCR

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World Health Day 2015: Food Safety

Access to sufficient amounts of safe and nutritious food is key to sustaining life and promoting good health. Presence of harmful bacteria, viruses, parasites or chemicals is making our food unsafe for consumption. Unsafe food is responsible for numerous diseases, ranging from diarrhoea to cancers and is linked to deaths of an estimated two million people – including many children globally each year. New threats to food safety are constantly emerging. Changes in food production, distribution and consumption; changes to the environment; new and emerging pathogens; antimicrobial resistance, rapid unplanned urbanization, untreated dumping of waste - all pose challenges to national food safety systems. Increases in travel and trade enhance the likelihood that contamination can spread internationally.

World Health Organization is promoting efforts to improve food safety, from farm to plate (and everywhere in between). So the theme on World Health Day, 7 April 2015, was on Food Safety. In this issue of FBIS, we prepared this document based on information on food safety

from WHO fact sheet N°399, November 2014.

Key food safety facts

Access to sufficient amounts of safe and nutritious food is key to sustaining life and promoting good health.

Unsafe food containing harmful bacteria, viruses, parasites or chemical substances, causes more than 200 diseases - ranging from diarrhoea to cancers.

Foodborne and waterborne diarrhoeal diseases kill an estimated 2 million people annually, including many children.

Unsafe food creates a vicious cycle of disease and malnutrition, particularly affecting infants, young children, elderly and the sick.

Foodborne diseases impede socioeconomic development by straining health care systems, and harming national economies, tourism and trade.

Food supply chains now cross multiple national borders. Good collaboration between governments, producers and consumers helps ensure food safety.

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Laboratory based activities in FBIS

Laboratory-based foodborne illness surveillance is an active surveillance for systematic and ongoing collection, analysis, interpretation and dissemination of data based on laboratory-confirmed food borne infections or contaminations for public health action. Primarily, Laboratories of IEDCR, icddr,b and Public Health Laboratory/ National Food Safety Laboratory of the Institute of Public Health, Dhaka are utilized for clinical samples and food samples respectively. Additional supports as and when necessary, may be received from other laboratories of Department of Livestock Services, Department of Fisheries, Department of Agriculture, IFST of BCSIR as well as from other laboratories in home and abroad. Seven district hospitals from seven divisions along with two institutes from Dhaka and one from Chittagong are selected as the sentinel sites for FBIS. The patients meeting the case definition of diarrhoea, jaundice and febrile illness (**Diarrhoea** is defined for age > 2 months as any patient attending hospital with three or more loose or liquid stool within 24 hours or less than 3 loose or liquid stool causing dehydration; or at least 1 bloody loose stool in 24 hours; and for age < 2 months as changed stool habit from usual pattern in terms of frequency (more than usual number of purging) or nature of stool (more water than faecal matter). **Febrile illness** patients are those attending the hospital due to sustained fever (temperature of 38°C /100.4°F or greater or self reported sustained fever with no identified cause of fever or focal infection such as pneumonia, urinary tract infection, abscess etc.) irrespective of age, for three or more consecutive days. **Acute Hepatitis** is defined as acute illness (less than 6 months) with i. discrete onset of symptoms (e.g. nausea, anorexia, fever, malaise or abdominal pain; and, ii. Jaundice (yellow colouration of the sclera/skin) or elevated serum bilirubin and/or serum amino-transferase levels) at these sites are enrolled each week for this study.

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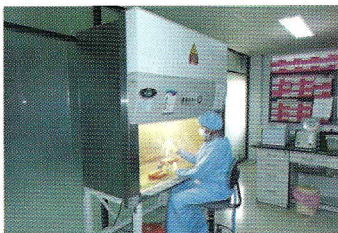


INSTITUTE OF EPIDEMIOLOGY, DISEASE CONTROL & RESEARCH (IEDCR)

MOHAKHALI, DHAKA - 1212, BANGLADESH.

CONTACT: Tel. NO. +880-2-9898796, 9898691. FAX : +880-2-9880440; email: info@iedcr.org; www.iedcr.gov.bd

Hot line : +8801937000011, +88 01937110011



FBIS Sentinel Hospitals

1. Hobiganj district hospital, Sylhet division;
2. Narshingdi district hospital, Dhaka division;
3. Cox's Bazar district hospital, Chittagong division;
4. Naogaon district hospital, Rajshahi division;
5. Patuakhali district hospital, Barisal division;
6. Thakurgaon district hospital, Rangpur division;
7. Satkhih district hospital, Khulna division;
8. BITID, Chittagong;
9. Uttara Adhunik Medical College Hospital, Dhaka Metropolis
10. Dhaka Medical College Hospital, Dhaka Metropolis

Laboratory based activities in FBIS

(cont. from Page 1)

A semi-structured questionnaire is used to collect demographic, socio-economic, clinical and other information. The same tool also collects the illness related hospital information including treatment received, length of stay, potential exposures to food and water during the past one week and past 24 hours. Along that, clinical samples like stool, blood, serum, rectal swab etc.; food and water, environmental or animal samples associated with the consented patients are collected and transported to IEDCR within the shortest possible time.

Faecal sample/rectal swabs are collected from the diarrheal patients visiting the participating hospitals. Faecal/rectal swabs are transported in Cary Blair media or buffered glycerol saline (BGS) media (for the invasive diarrhoea) to the laboratory. Stool specimens are cultured for *V. cholerae*, *Salmomella*, *Shigella* and *E. coli*.

Blood and stool specimens are collected from febrile patients meeting case definition of enteric fever. Blood samples are collected in specific tubes for culture and antimicrobial sensitivity, diagnostic TP Test for typhoid and paratyphoid fever. Blood specimens are also collected from hepatitis cases.

Leftover foods and other food samples are collected aseptically and placed in sterile jars or sterile plastic bags. At least 500gms of perishable foods e.g. meat, poultry, dairy products, fruits

etc., that are not frozen at the time of collection will be chilled rapidly at 4°C and maintained at that temperature until examined. For already packaged products, five randomly selected packages are collected. Collected samples are transported to the laboratory within 24 hours. Samples are stored in the refrigerator maintained at 2-8°C temperature in the laboratory of the District hospital until it is transported to the central laboratories in cold box.

At IEDCR and icddr,b human samples are tested for common enteric pathogens (bacterial, viral, fungal and parasitic). In case of food samples, collected samples are transferred to the IPH Laboratory using cool box following standard procedure.

If the number of patients are adequate, half of the samples will be collected from <5 years patients and the rest from 5 years and above age group. This stratified sampling will ensure that all important age groups are represented across the whole study period. From each of the ten sentinel sites/hospitals, specimens will be collected two days in a week. Based on these, it is expected to screen approximately 4,400 stool specimens over 2 years period from diarrheal and febrile patients. In addition, 2,200 blood specimens will be collected for diagnosis of enteric fever. Most of these tests will be carried out at the IEDCR, and the rest at icddr,b laboratories.

Editorial

World Health Organization along with UN Food and Agricultural Organization helps countries to detect, prevent and respond to food borne disease outbreaks and improve overall food safety by forecasting food safety emergencies. This year WHO has selected food safety as the prioritized public health issue that needs to be addressed properly by the countries. In this global world, increase in travel and trade is a threat to food safety as contaminated food in any supply chain may be spread internationally. Each country should take this shared responsibility to monitor food safety all along the food production and consumption chain from farmers and manufacturers to consumers. In this regard each country should formulate appropriate rules and regulations and at the same time should ensure strict implementation of those.

Food borne/enteric illnesses are predominant public health issues in Bangladesh which were not addressed adequately mainly due to absence of trustworthy data. We have acute watery diarrheal data, or disease profile data from the health facilities but those are of limited use. We do not know the disease burden of cholera or typhoid or other enteric diseases. As a result policy level decision making for proportionate deployment of resources are faulty. The Food Borne Illness Surveillance initiated by IEDCR hopefully will gradually fill in the gap. This central laboratory based surveillance, though has started with few sentinel sites but we have a vision to expand the net along with strengthened laboratory facilities in those surveillance sites.



FBIS Surveillance site, Narshingdi

World Health Day 2015: Food safety (cont. from Page 1)

Major foodborne illnesses and causes

Bacteria: Salmonella, Campylobacter, and Enterohaemorrhagic Escherichia coli are among the most common foodborne pathogens that affect millions of people annually – sometimes with severe and fatal outcomes. Symptoms are fever, headache, nausea, vomiting, abdominal pain and diarrhoea. Examples of foods involved in outbreaks of salmonellosis are eggs, poultry and other products of animal origin. Foodborne cases with Campylobacter are mainly caused by raw milk, raw or undercooked poultry and drinking water. Enterohaemorrhagic Escherichia coli is associated with unpasteurized milk, undercooked meat and fresh fruits and vegetables.

Listeria infection leads to unplanned abortions in pregnant women or death of newborn babies. Although disease occurrence is relatively low, listeria's severe and sometimes fatal health consequences, particularly among infants, children and the elderly, count them among the most serious foodborne infections. Listeria is found in unpasteurised dairy products and various ready-to-eat foods and can grow at refrigeration temperatures.

Vibrio cholerae infects people through contaminated water or food. Symptoms include abdominal pain, vomiting and profuse watery diarrhoea, which may lead to severe dehydration and possibly death. Rice, vegetables, millet gruel and various types of seafood have been implicated in cholera outbreaks.

Antimicrobials, such as antibiotics, are essential to treat infections caused by bacteria. However, their overuse and misuse in veterinary and human medicine has been linked to the emergence and spread of resistant bacteria, rendering the treatment of infectious diseases ineffective in animals and humans. Resistant bacteria enter the food chain through the animals (e.g. Salmonella through chickens). Antimicrobial resistance is one of the main threats to modern medicine.

Viruses: Norovirus infections are characterized by nausea, explosive vomiting, watery diarrhoea and abdominal pain. Hepatitis A virus can cause long-lasting liver disease and spreads typically through raw or undercooked seafood or contaminated raw produce. Infected food handlers are often the source of food contamination.

Parasites: Some parasites, such as fish-borne trematodes, are only transmitted through food. Echinococcus spp. may infect people through food or direct contact with animals. Other parasites, such as Ascaris, Cryptosporidium, Entamoeba histolytica or Giardia, enter the food chain via water or soil and can contaminate fresh produce.

Prions: Prions, infectious agents composed of protein, are unique in that they are associated with specific forms of neurodegenerative disease. Bovine spongiform encephalopathy (BSE, or "mad cow disease") is a prion disease in cattle, associated with the variant Creutzfeldt-Jakob Disease (vCJD) in humans. Consuming bovine products containing specified risk material, e.g. brain tissue, is the most likely route of transmission of the prion agent to humans.

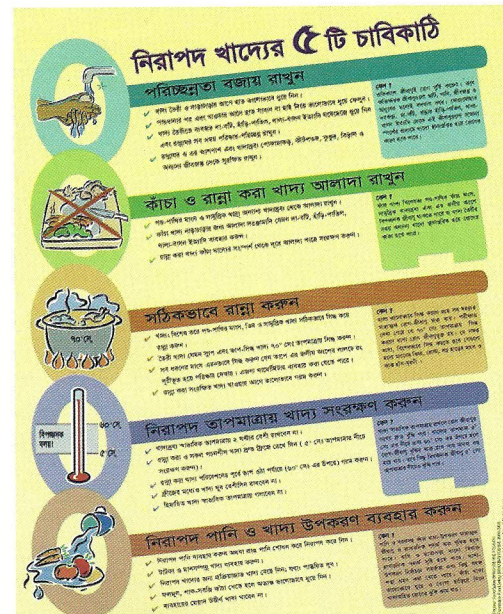
Chemicals: Of most concern for health are naturally occurring toxins and environmental pollutants.

Naturally occurring toxins include mycotoxins, marine biotoxins, cyanogenic glycosides and toxins occurring in poisonous mushrooms.

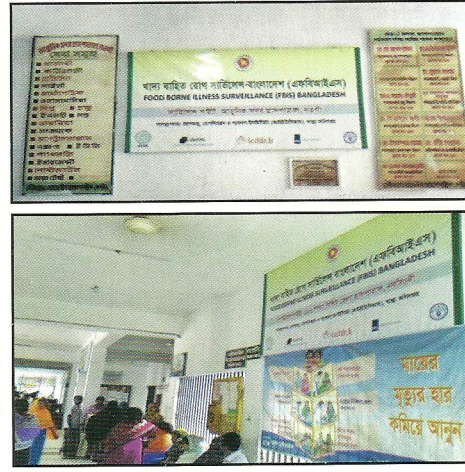
Staple foods like corn or cereals can contain high levels of mycotoxins, such as aflatoxin and ochratoxin. A long-term exposure can affect the immune system and normal development, or cause cancer.

Persistent organic pollutants (POPs) are compounds that accumulate in the environment and human body. Known examples are dioxins and polychlorinated biphenyls (PCBs), which are unwanted byproducts of industrial processes and waste incineration. They are found worldwide in the environment and accumulate in animal food chains. Dioxins are highly toxic and can cause reproductive and developmental problems, damage the immune system, interfere with hormones and cause cancer.

Heavy metals such as lead, cadmium and mercury cause neurological and kidney damage. Contamination by heavy metal in food occurs mainly through pollution of air, water and soil.



FBIS Surveillance sites



IEDCR News

IEDCR is a National Institute for the promotion and conduction of surveillance, outbreak investigation and research on current, emerging or unknown health problems in Bangladesh. It started its journey with 5 laboratories in virology, parasitology, microbiology, entomology and zoonosis departments. It is the national reference laboratory for Influenza, Nipah, Japanese Encephalitis (JE) and HIV. These laboratories play a significant role in the diagnosis of emerging infections, conduct and assist training programs for laboratory personnel, and take part in quality assurance program.

Virology laboratory:

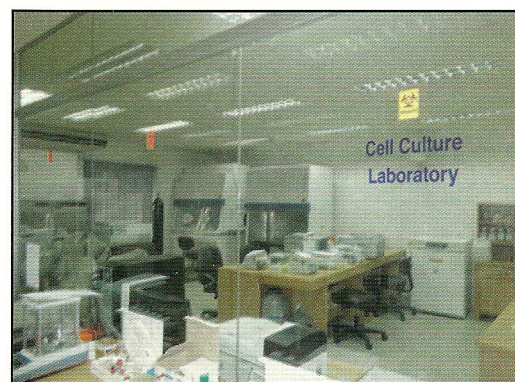
In Virology Department there are three reference laboratories of BSL-2 standard, i.e., Nipah Laboratory, Influenza laboratory as NIC and HIV laboratory and JE laboratory. One central serology and molecular laboratory with a wing of cell culture and one BSL3 laboratory are the important strengths of IEDCR. These labs are well equipped with ICT, ELISA, Western blot, real time and conventional PCR, Fluorescence Activated Cell Sorter (FACS) facilities.

Microbiology Laboratory:

Staining, bacteriological culture, microscopy, ICT and other rapid testing facilities are available for diagnosis of microbiological diseases. This BSL2 laboratory is capable of diagnosing anthrax, cholera, salmonella etc.

Parasitology Laboratory: Activities include rapid diagnostic test for Kala-Azar and Malaria.

Entomology laboratory: Act as referral laboratory for biological efficacy test for public health insecticides. Other activities includes outbreak investigation for vector borne diseases, vector surveillance.



Lab Based Surveillance Updates

Tested samples from different sites (May-2014 to June-2015)

Sample Collection Sites	No. of Stool Samples tested	No. of Blood Sample (Febrile) tested	No. of Blood Sample (Hepatitis) tested
100 Bedded District Hospital, Narshingdi	361	180	34
Adhunik Sadar Hospital, Hobiganj	485	165	137
250 Bedded District Hospital, Cox's Bazar	288	122	39
Adhunik Sadar Hospital, Naogaon	247	124	40
250 Bedded General Hospital, Patuakhali	330	166	32
Adhunik Sadar Hospital, Thakurgaon	318	122	25
District Sadar Hospital, Satkhira	208	97	77
Dhaka Medical College Hospital	39	127	94
Uttara Adhunik Medical College Hospital	114	174	48
BITID, Chittagong	368	110	17
Total	2,758	1,387	543

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