April , 2017

Volume 2, Issue 2

NISB Newsletter

National Influenza Surveillance, Bangladesh

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Seasonal Influenza Vaccine

Vaccination is one of the effective measure to prevent seasonal influenza, its complications and thus reduces influenza related hospitalization and death. Availability of influenza vaccines is one of the key factors for effective coverage. Antigenic variation due to periodic antigenic drifts and shifts creates obstacle in vaccine production, as a result it is required to match the circulating antigenic configuration of the virus with composition of vaccine and that will be produced for each new influenza 'season'.

In order to find the best match and increase the vaccine effectiveness, World Health Organization (WHO) arranges experts meeting twice a year and to review the circulating strains precisely and select vaccines strains for the coming season. WHO technical committee recommends vaccine composition for the northern and southern hemispheres, respectively, in February and September. These recommendations are based on information provided by the WHO Global Influenza Surveillance and Response System (GISRS). In 2016, this network collected and tested up to three million clinical specimens and shared representative influenza viruses with the WHO Collaborating Centres for detailed analysis and for giving recommendations. These are used by the national vaccine regulatory agencies and the pharmaceutical companies to develop influenza vaccines.

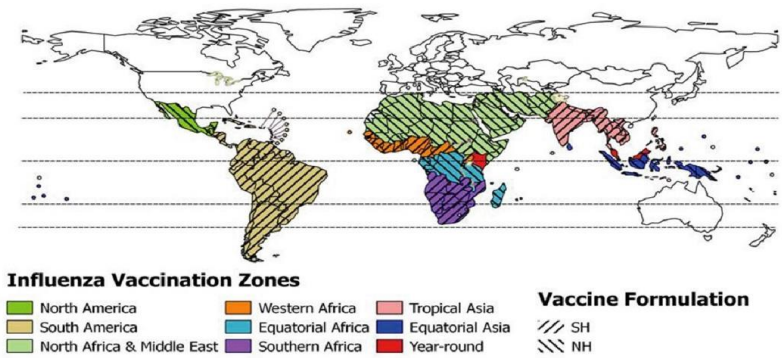
For countries considering the initiation or expansion of programs for seasonal influenza vaccination, WHO recommends that pregnant women should have the highest priority. Additional risk groups to be considered for vaccination (in no particular order of priority) are children aged 6–59 months, the elderly (≥65 years), individuals with chronic medical conditions (COPD, asthma, congenital or acquired heart conditions, diabetes mellitus etc.) and health care workers.

Influenza vaccination is the major method of prophylaxis. Hence, people have to be vaccinated annually prior to influenza season. During seasons when circulating strains of influenza virus are similar to the virus strains of vaccine, the risk of illness due to influenza virus reduces around 50-60%.

IEDCR

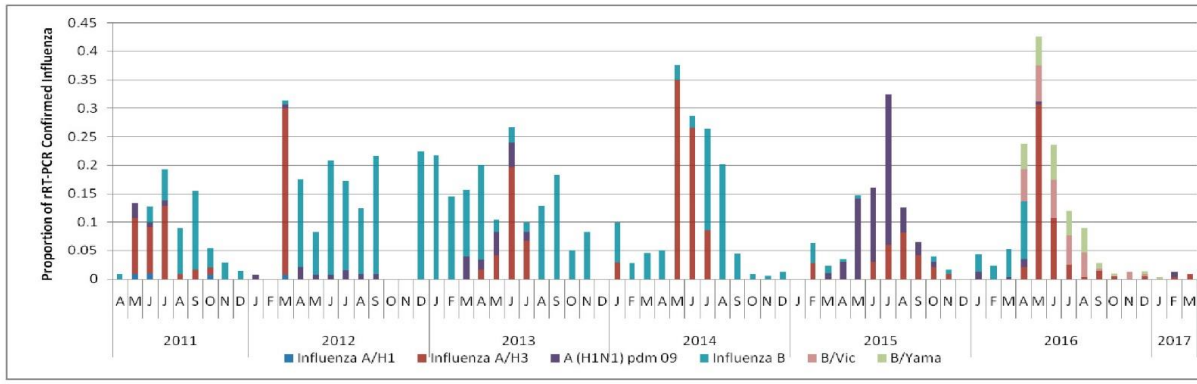
INSTITUTE OF EPIDEMIOLOGY, DISEASE CONTROL & RESEARCH (IEDCR)
NATIONAL INFLUENZA CENTRE (NIC)
Mohakhali, Dhaka - 1212, Bangladesh.
Contact: Tel. No. +880-2-9898796, 9898691, FAX : +880-2-8821237; email: info@iedcr.gov.bd; website:www.iedcr.gov.bd
Hot Line: +88 01937 000 011, +88 01937 110 011

Fig. 01 : Influenza vaccine formulation



Countries with a similar onset period of their main influenza season are grouped into eight geographical 'Influenza Vaccination Zones'. Bangladesh is in the zone of Tropical Asia and is placed in Northern Hemisphere but follows the vaccine composition that is recommended for Southern Hemisphere. It is due to the similarity of influenza virus strains circulating in Bangladesh and Southern Hemisphere.

Fig. 02 : Influenza activity in Bangladesh



Graph showing seasonality of influenza activity in Bangladesh from NISB data. It is apparent that, in the winter and spring period the proportion of influenza positive samples was very low whereas the influenza positivity peaks in summer.

EDITORIAL

The population based influenza surveillance in Kamalapur, a low economic urban area in Dhaka, was the first surveillance for influenza in Bangladesh. After two years of surveillance it was reported that 14% children with pneumonia had influenza.

Based on the knowledge gained from the Kamalapur study, investigators from icddr,b, IEDCR and CDC, Atlanta collaborated to broaden influenza surveillance in this country. Hospitals were identified across the country (tertiary care facilities) and the Hospital Based Influenza Surveillance (HBIS) was initiated in 2007 in twelve sites. The primary objective was to understand the epidemiology and seasonality of influenza strains in Bangladesh.

Later, the platform of National Influenza Surveillance, Bangladesh (NISB) was initiated by IEDCR in May, 2010. Currently, NISB is being carried out in ten sentinel sites including eight district hospitals (secondary care facilities) and two tertiary level hospital.

Surveillance in live bird market (LBM) workers in Dhaka city was initiated in 2012 in sixteen live bird markets of Dhaka which is currently conducted in six markets by IEDCR and icddrb.

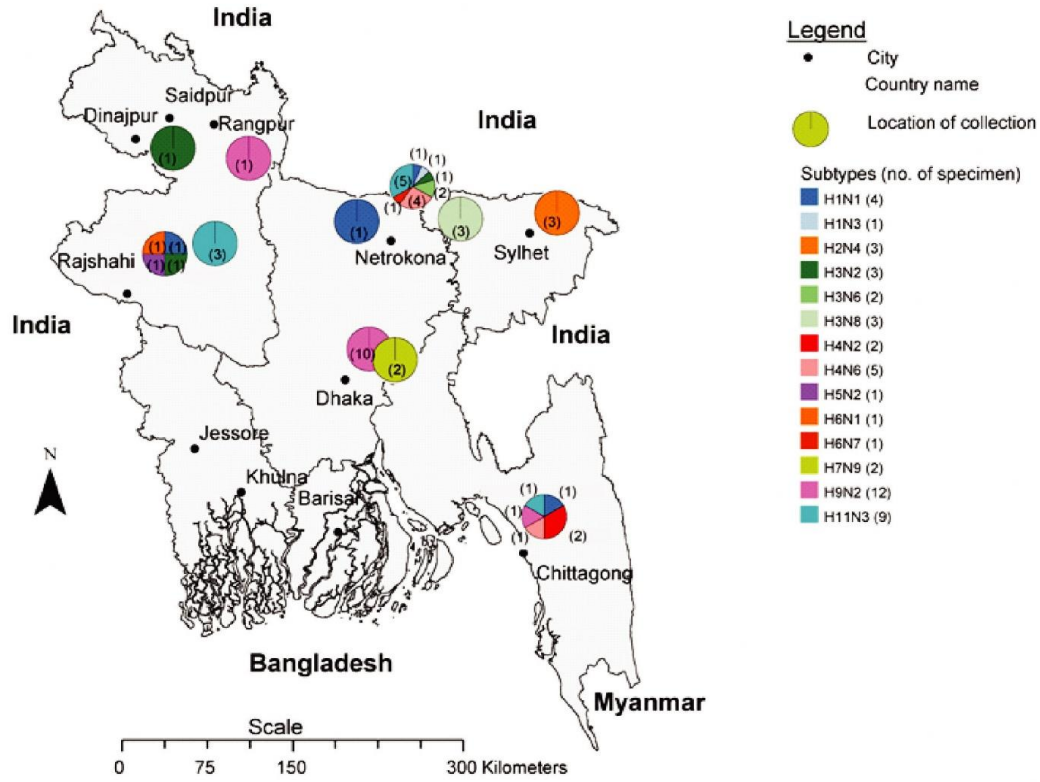
Influenza at Human Animal Interface: Global and Bangladesh Context

Seasonal influenza in humans is usually a relatively mild, self limiting disease, although severe complications can arise, primarily in children and in older age group. Avian influenza (AI) is a disease of domestic and wild birds. Most of the AI outbreaks in domestic poultry are of low pathogenic (LPAI) H5 and H7 viruses. Although, those have the potential to become highly pathogenic (HPAI).

Human infection with the avian influenza novel A/H7N9 virus was first reported in China in 2013. As of March 2017, a total of 1307 laboratory confirmed cases of human infection with avian influenza A/H7N9 viruses including 489 deaths have been reported to WHO. Almost all cases have been reported from mainland China. In contrast to avian influenza A/H5N1, this H7N9 virus has molecular markers suggesting "low pathogenicity" in chickens. Low pathogenicity of virus in birds adds difficulty in identifying its international spread through infected birds. However, there is no evidence of sustained human-to-human transmission, so far.

In Bangladesh, H7N9 has been identified from ducks and from environmental sample in live bird markets as part of its routine surveillance and research activities. To detect human infections, it is essential to initiate and enhance human influenza surveillance focusing SARI patients in commercial and backyard poultry concentrated areas. IEDCR aims to utilize and strengthen its existing influenza surveillance systems to detect any novel influenza viruses including H7N9 and H5N6.

Fig. 03 : Genetically diverse LPAI in Bangladesh

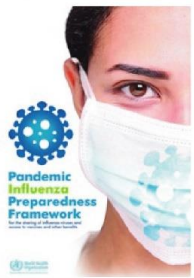


Map showing co-circulation of genetically diverse LPAI in Bangladesh (Source: Gerloff NA, Khan SU, Zanders N, Balish A, Haider N, Islam A, Chowdhury S, Rahman MZ, Haque A, Hosseini P, Gurley ES. Genetically diverse low pathogenicity avian influenza A virus subtypes co-circulate among poultry in Bangladesh. PloS one. 2016 Mar 24;11(3):e0152131.)

Pandemic Influenza Preparedness Framework: IEDCR Activities

The concern about new emergence of human pandemic virus mounted during outbreaks of human H5N1 influenza in 2006. In 2007, WHO and Member States came together to draft the Pandemic Influenza Preparedness framework. This framework was unanimously adopted by 194 Member States of the WHO during the World Health Assembly on 24 May 2011. The objectives of the framework is to increase the access of developing countries to vaccines and other pandemic related supplies and to improve and strengthen the sharing of influenza viruses with human pandemic potential for global monitoring, risk assessment and the development of safe and effective pandemic influenza vaccines.

Being the National Influenza Centre (NIC) in Bangladesh, IEDCR is the designated institution to implement the activities under PIP framework at country level. There are certain set of outcome and output detailed in the partnership contribution implementation plans which are to be achieved by the member states. As part of one of the activities that is to strengthen national capacity to detect respiratory disease outbreak due to a novel virus, IEDCR strengthened the cell culture laboratory for virus isolation in its virology department in 2017. Molecular characterization by next generation sequencing is also a priority activity. Mechanisms will be set to collect and transport surveillance samples on weekly basis from this year. SARI surveillance is focused to be strengthened. NIC, Bangladesh will continue shipment of selected clinical specimens to WHO collaborating centre for participation in vaccine selection process.



IEDCR NEWS

- Anti Microbial Resistance (AMR) surveillance activity has been initiated in 5 sentinel sites: Bangladesh Institute of Tropical and Infectious Disease (BITID), Mymensingh, Rajshahi, Rangpur, and Uttara Adhunik Medical College Hospital.
- To expedite the activity of Emergency Operation Centre (EOC) in IEDCR, a core committee has been formed and the formation of central PHEOC coordination committee including members from different stakeholders is in process.
- IEDCR arranged a graduation ceremony for the first cohort of FETP,B in presence of Mr. Zahid Maleque MP, the honorable State Minister of MOH&FW and Her Excellency Marcia Bernicat, the Ambassador of USA in March, 2017.

Graduation ceremony of FETP,B Advance

Graduation ceremony of Frontline FETP,B

Technical Support

CDC Centers for Disease Control and Prevention

World Health Organization