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Developing standard operating procedures, infrastructure strengthening, and capacity building: Managing the pandemic Influenza A H1N1 in India

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The World Health Organization (WHO) raised the level of Influenza pandemic alert from phase 5 to 6 on 11th June, 2009. This alert was call for those countries which had not experienced community outbreak to remain vigilant and prepare to manage large number of cases of Influenza A H1N1 in the future.

The first H1N1 infected person in India had landed in Hyderabad from USA on 13th May, 2009, and was detected to be positive on 16th May 2009. Most of the cases reported subsequently were travel related - individuals traveling to India from affected countries. In the third week of July the infection spread among general population in Pune (Maharashtra in Western India) and moved rapidly to both rural and urban area of Maharashtra. Community spread was also seen in Karnataka, Gujarat, Tamil Nadu, Kerala, Andhra Pradesh and Rajasthan. Whereas a decline in cases has been seen in southern and western part of India, there is increased influenza activity in northern part (Rajasthan, Haryana, Delhi, Chandigarh, and Uttar Pradesh) during November 2009.

As of 3rd December, 2009, a total of 89 362 persons have been tested so far out of which 18 872 (21.1 %) were positive for pandemic Influenza A H1N1. Six hundred laboratory confirmed cases have died. Majority of those who died had some underlying diseases and had reported late to the identified health care facility.

Ministry of Health and Family Welfare, Government of India took a series of steps to limit the spread of the disease and to mitigate its impact.

Airport, Seaport and Border Surveillance

Screening of incoming passengers at international airports, sea ports and border checkpoints, ensured early detection and prompt treatment of these cases and also encouraged self reporting. Public health measures such as contact tracing and providing preventive treatment limiting the spread in the community. These measures provided

almost three months time to put the preparedness plan in action. By mid August 2009, more than 770 cases of the 2000 detected had been picked up through the airport screening.

Health screening of passengers coming from affected countries is continuing in 22 International airports. 225 doctors and 172 paramedics are manning 83 counters at these airports. A cumulative total of 95,77,561 passengers have been screened. Twenty eight thermal scanners have been installed at seven major airports. Having served the purpose for which this screening was instituted, it is now planned to gradually discontinue it.

Travel advisory was issued to defer non-essential travel to countries where active human to human transmission was known to be taking place.

Community Surveillance

Community surveillance to detect clusters of influenza like illness is being done through Integrated Disease Surveillance Project (IDSP) which has pan India presence. The Outbreak Monitoring Cell number has been widely publicized for persons with symptoms to report and seek advice. Private practitioners, nursing homes and hospitals have been requested to report such events to IDSP toll free Call Centre number. The States are also putting up their own help lines.

Diagnostic Capacity

Indian Council of Medical Research's National Institute of Virology, Pune and Directorate General of Health Services's National Centre for Disease Control, Delhi are the apex laboratories whch had started the testing in India. Realizing that two laboratories for a country of over 1 billion population were inadequate, a plan to rapidly train and equip other laboratories in various states was put in place. Presently 44 laboratories are performing the real time PCR test for the pandemic influenza (26 in public sector and 18 in private sector). Criteria for accreditation of private laboratories to carry out the tests was also laid down. Due to enhanced laboratory capacity soon the backlog of samples needing testing was cleared. To keep up with the evolving epidemiological picture the various guidelines have also been modified periodically. Presently only those who require indoor treatment are being tested.

Hospital Preparedness

All the States with International Airports have identified isolation facilities. The Union Minister of Health and Family Welfare has written to Chief Ministers of all the States to gear up State machinery and strengthen isolation facilities including critical care facilities at district level. Guidelines for setting up isolation facilities were issued. All states have identified hospitals with isolation facility and are being strengthened.

For better accessibility and to detect cases early, the States have been requested to open up a number of screening centres. Guidelines have been issued for categorization of cases during screening for home care, testing, treatment and hospitalization.

Closing of schools

Contrary to the guidelines some States in India took a decision of closing the schools in the cities where confirmed cases had been reported amongst school going children. In these cities this intervention reduced the speed and the spread of transmission. The role of the school in amplifying transmission of pandemic influenza virus both within and into the wider community is now well recognized. This evidence prompted some agencies to revise the guidelines about closing schools. that such an action can slow down virus spread considerably and help by crucial time to build up defences. The school closure has proved to be of greatest benefit when this is affected very early in an outbreak. If school are closed late in course of a community wide outbreak, resulting reduction in transmission is likely to be of limited value.

Stockpiles

Anti viral drug: Forty million Oseltamivir capsules (Tamiflu) have been stockpiled. Four hundred thousand bottles of pediatric syrup has also been procured. 18 million capsules of Oseltamivir have been distributed to the States/ UT Administrations. Restricted sale of Oseltamivir has also been allowed through pharmacies having valid license. A policy of limited access of the drug is being followed to prevent possible indiscriminate use and development of resistance.

Personal Protective Equipment: About 136,100 personal protective equipment (PPE) kits, 1 million three layered surgical masks and 97,000 N-95 masks are in central stockpile (as on 23rd November).

Vaccines: The first lot of indigenous vaccines for use in public health is expected in the second quarter of 2010. For the interim period it has been decided to import a limited quantity (about 4 million doses) of vaccines from the international market of Influenza A H1N1 vaccine. This would be used to vaccinate the high risk groups.

Training

The State Rapid Response teams have been trained. Teams of Physicians from all States/ UTs have been trained on clinical management. Now MOHFW is ensuring refresher training for all District level Response Teams. The training tool kit and the skill based training videos on Sample collection and personal protection equipment have been sent to the States. Funds have also been released to all the States.

Indian Medical Association has given a plan of action for country-wide continuing medical education for private practitioners. This is being supported by Ministry of Health & Family Welfare. Training of trainers workshop was conducted in second week of October, 2009. The country wide training is expected to be over by November, 2009. Their journal, having a circulation of about 150 000 copies among doctors, has come up with a special edition on pandemic influenza which is supported by Ministry of Health & Family Welfare.

Information, Education and Communication

The Task Force in Ministry of Information & Broadcasting has already undertaken short term media campaign. The publicity materials prepared by Ministry of Health & Family Welfare with assistance from UNICEF, are appearing in print and visual media. Travel advisory, 'Do's and Don'ts' and simple public health measures required to prevent/ mitigate the outbreak has been widely publicized including vernacular languages. Press briefing is being done by identified authority. Daily press releases are issued.

A comprehensive media plan in consultation with Directorate of Audio-Visual Publicity has been drawn up. The plan covers both electronic and print media. Media campaigns which would run throughout the year. The publicity material has started appearing in various television channels during prime time. Field publicity units of Ministry of Information & Broadcasting are also working on social mobilization.

Several media sensitization workshops have been held at New Delhi and State capitals.

International cooperation

Soon after the WHO made public the sequence of primers for use in the real time PCR, USA's Centres for Disease Control and Prevention, Atlanta, made available reagents for carrying out about 2000-3000 tests. The National Institute of Virology, Pune (which is also a WHO's H5 Regional Centre) helped the WHO train scientists/technologists of South-East Asia region for detection of pandemic influenza by conventional and the real time PCR. It also provided the standard operating procedures (SOPs) and reagents to the participants. The Indian scientists have helped to establish the testing laboratory in Nepal.

Research

Virus research: Several strains if the pandemic H1N1 virus have been isolated and grown in laboratories. Regular antiviral drug testing is being carried out to inform the policy on choice of drug for treatment. So far all the isolates have tested sensitive to oseltamivir. Full genome analysis of number of strains has been done and others are in progress. This is helping to monitor the mutations in the virus and proximity of the Indian isolates to the H1N1vaccine strains. Up till now all strains have shown 99-100% identity on amino-acid level.

Indigenous diagnostic test: In view of the high cost of the reagents of the RT-PCR test, the Government of India is encouraging development of indigenous test. Ten companies /individuals have shown interest and are engaged in working towards development of test system. Three of these are in advanced stage of evaluation, other three are undergoing internal validation, while four are at various stages of development.

Indigenous vaccine: Five Indian vaccine manufacturing companies are working towards making pandemic vaccine using different approaches: killed and inactivated vaccine (propagating the virus in hen's eggs/ cell culture, and using virus-like particle platform) and live attenuated vaccine. These vaccines are in advanced stages of development and some of them are likely to go in human trials by end 2009 or early 2010.

Shikimic acid: India has launched a programme to produce shikimic acid, which is the basic raw material for making oseltamivir. At least seven plants across the Western Ghats (in peninsular India) have been found to contain shikimic acid. In addition, a team has been assigned the responsibility to explore modalities of extracting shikimic acid from the plants. Majority of oseltamivir is produced by six major pharma companies in India.

Others: Groups of experts are working on mathematical models to project future trend, as well as developing a pandemic severity index for India.

Monitoring

The situation of pandemic influenza in India is being monitored at the highest political level. There is close co-ordination between the Central and the State health and other authorities. High ranking officers have visited all States and Union Territories to assess the preparedness for screening, testing and providing treatment for large number of patients.

The National Disaster Management Authority is also monitoring the situation closely to deal with a worst case scenario.

Conclusion

The preparedness plan that was developed to deal with the highly pathogenic H5 avian flu proved to be very useful. The details of how to implement the various interventions had been worked out. Within that framework the specifics had to be tailored and fine tuned to address the situation created by the pandemic influenza H1N1. Effective international co-operation and networks ensured rapid development of reagents for the diagnostic tests, drugs and vaccines. The determined response in India of the public health machinery, coupled with spirited enthusiasm of health research community, the academia and the industry increase India's confidence levels to be able to contribute meaningfully towards global development of public goods to meet the challenge of pandemic influenza H1N1.