Communications

Avian Influenza: Preparedness of Sri Lanka in the event of a Highly Pathogenic Influenza Pandemic

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Global scenario

The situation of avian influenza (AI) is evolving rapidly in Asia. Since 2003, sixteen countries have reported outbreaks in poultry or wild birds (1). Since ofJuly 2005, H5N1 virus which is highly pathogenic has been expanding geographically. The most recent human case a 17 year old youth from the Nothern Thai province of Phicit was confirmed on 17 July 2006 (2). Recently, Nigeria reported H5N1 virus in poultry while the same virus was detected in dead swans in Greece and Southern Italy. The appearance of the highly pathogenic virus in these countries is ample testimony to the fact that the virus is spreading its tentacles geographically.

The wild water fowl has been the widely known natural reservoir of all influenza A viruses. Outbreaks are attributed to contact between domestic birds and wild fowls *via* shared water sources. Migratory wild birds play an important role in the spread of the virus as they carry the virus over long distances without themselves developing symptoms. Very large die offs of migratory birds are considered unusual and is an eye opener to the outbreak of AI infection. Control of AI infection in the wild bird population is neither feasible nor promoted.

The virus does not transmit easily from poultry to humans. Human to human transmission is negligible at the moment. The South East Asian experience demonstrated that human cases are rare. So far human cases have been reported from seven countries namely, Vietnam, Cambodia, Thailand, China, Turkey, Iraq and Indonesia. Among the cases reported so far, the majority were from Vietnam (4). As of 26 July 2006, the H5N1 virus has caused 232 human cases of which 134 have been fatal (4). The case fatality rate was around 58% although accurate assessment is not possible owing to difficulties in detecting mild cases. Two features have been noteworthy: most cases have been among apparently healthy children and young adults; and most of the cases have been linked to direct exposure to dead or diseased poultry, notably during slaughtering, defeathering and in a few cases during food preparation. No cases have been confirmed in poultry workers or cullers up to now. No cases have been linked to the consumption of properly cooked poultry meat or eggs. However, factors related to farming density, and systems may also influence the risk of transmission to humans (2).

Why is H5N1 of particular concern?

There is a growing concern regarding the imminent threat of an influenza pandemic. Human cases continue to occur in new areas, countries and are likely to do so in the future as H5N1 has now become endemic in Asia. The host range of H5N1 is expanding. Outbreaks in animals are occurring among an array of wild birds as well as in domestic birds such as chicken, duck, geese and animal species such as cats, tigers and pigs (6). The increasing number of animals infected means that there is a greater likelihood of human exposure to an influenza virus originating from birds and animals. Consequently, there is a real possibility that human beings may serve as the mixing vessel for re-assortment of avian and human influenza genes to produce a novel subtype that could trigger a pandemic (1,7). Moreover, proximity of humans with birds and pigs increase the possibility of reassortment (1).

There is mounting evidence that a future influenza epidemic is imminent. Nobody can be sure when it will happen, how quickly it will spread and what the extent of morbidity, mortality and the degree of economic loss would be. By all existing standards, the forecast would be that 25% of the global population will be affected with the death sentence falling on 2-7 million of them. It has been predicted that a future pandemic will invariably lead to a global economic collapse (1).

There are three pre-requisites for an AI pandemic: emergence of a novel virus to which all are susceptible; ability of the new virus to replicate and cause disease in humans; and efficient transmission from human to human. The H5N1 virus has achieved the first two and only the last one remains to be overcome (1).

The epidemiological pattern is changing in Vietnam, the country with the longest running epidemic. The number and size of clusters have increased. Incubation periods have lengthened. The age range has expanded from 17-30 years in 2003 to 1-80 years in 2005. Milder disease, low case fatality and more asymptomatic infection in close contacts have been a striking features in recent times (1). These changes have been accompanied by an increasing pathogenicity of avian species. All the changes provide ample evidence of adaptation of the virus to human

beings indicating that the world now may be in the pre-pandemic stage.

Country scenario

According to the WHO's staging of the pandemic of AI, Sri Lanka is in the first phase where no new influenza virus subtypes have been detected in humans. A subtype of influenza virus that has caused human infection may be present in animals. Even if the virus is present in animals, the risk of human infection is considered to be low. No avian influenza virus (H5N1) has been reported in birds in Sri Lanka so far.

Yet, despite being an island, Sri Lanka is vulnerable to the potential threat of a pandemic. Poultry farming is widely spread in the island and a considerable number of people are actively involved in poultry farming. In addition to large scale poultry businesses, backyard poultry farming is also common in the country. A larger number of people who are involved in meat processing are also at risk of contracting the disease. The presence of migratory birds in Sri Lanka also increases the risk. Another significant risk factor that needs attention, considering the possibility of emergence of a novel pandemic virus is the increased travel of people to and from areas which are currently affected by AI (5).

Country Preparation

Considering the importance of the problem, the Cabinet of ministers has approved the establishment of a joint steering committee (JSC), a joint technical committee (JTC) and provincial /district committees. Both the JSC and JTC are already functioning. The function of the JSC is to oversee the finalization and implementation of a National Influenza Pandemic Preparedness Plan (NIPPP), take policy decisions and giving directions to monitor the programme or control of AI.

The functions of the JTC are to monitor the global situation of AI, identify the high risk population, establish an early warning system, to carry out rapid risk assessment, issue recommendations to prevent entry of disease into the country, evaluate animal and human surveillance activities, implement capacity building and to facilitate the implementation of the NIPPP.

Provincial and district committees will compile ground level information on the disease status and report to the JTC. Capacity building of middle level technical officers, educating the general public including poultry farmers on the prevention and control of AI and implementing the NIPPP at provincial level are the functions of provincial and district committees.

National Influenza Pandemic Preparedness Plan (NIPPP)

The aim of NIPPP is to facilitate a coordinated and effective national response in the event of an influenza pandemic. It provides specific advice and actions, and assists both national and local public health services and other agencies to prepare their own contingency plans. Besides these disease-related actions, pandemic preparedness can be used as a model to strengthen the infrastructure and multidisciplinary collaboration in case of major outbreaks in general.

The National Influenza Pandemic Preparedness Plan has already been designed and is available on the website of the Epidemiology Unit (www.epid.gov.lk). It contains clearly defined strategies and activities to be undertaken by the Ministry of Health, in close collaboration with the other key agencies, namely, the Ministry of Medium and Small Scale Plantation Industries, the Ministry of Rural Human Resource Development and Livestock and related stakeholders in preparation for and response to influenza .

Objectives of the NIPPP are as follows:

1. To reduce transmission of the virus and the opportunities for human infection from infected animals
2. To strengthen the early warning system of surveillance for early and coordinated response to outbreaks
3. To contain or delay the spread of virus at the source
4. To reduce the impact of the pandemic virus on morbidity and mortality and minimize social disruption
5. To monitor and evaluate the evolving response to the pandemic.

Strategies and key activities of the NIPPP

In order to carry out control and preventive activities of AI effectively, five major strategies and multiple activities under each strategy have been identified. The defined strategies with their activities are:

1. Planning and coordination

The organizations and individuals involved and the mechanisms for collaboration during each phase have been identified under this strategy. A JSC and JTC committee comprising multi-disciplinary experts from various agencies have been formed. Advocacy programmes directed at various strata have already been launched with a

view to implementing the NIPPP.

2. Surveillance

Measures have already been taken to strengthen the surveillance of influenza like illness (ILI) with a focus on AI cases. The guidelines for the preparedness and response to an AI pandemic threat (General Circular No. 02-164/2005) and www.epid.gov.lk deal extensively with surveillance requirements. While strengthening the routine surveillance and early warning system, twenty sentinel surveillance sites have already been identified in a manner to cover the whole island geographically.

As a move to strengthen laboratory surveillance, the Medical Research Institute (MRI) has been identified as the national reference laboratory. The MRI staff was trained by Professor Malik Siyal Pieris of the Hong Kong University, the world renowned authority on AI. The Ministry of Health has already established good rapport with the Veterinary Research Institute at Gannoruwa which is the national focal point for animal laboratory surveillance. The Molecular Biology Unit of the University of Kelaniya serves as an additional focal point for animal surveillance for the Department of Health Services.

3. Prevention and control

The strategies to minimize spread of the virus in human populations include pharmaceutical and non pharmaceutical interventions. The pharmaceutical control of AI is achieved through the use of the neuraminidase inhibitor oseltamivir (**Tamiflu**). Stockpiling of this drug is a part of pandemic preparedness plans. Basic, relevant information on the drug is given in Table 1. Oseltamivir is already registered in Sri Lanka and ordered for procurement by the Medical Supply Division. NIPPP aims to develop a strategy for use of antiviral drugs and vaccine stockpiles.

The development of a strategy and decision-making scheme for implementing public health measures have been identified as non pharmaceutical interventions. The guidelines for the preparedness and response to an AI pandemic threat, circulated to all medical officers, contain

Table 1 – Basic information on antiviral drug: Oseltamivir (Tamiflu®)

Indications	Is effective against all subtypes of influenza viruses A (including H5N1) and indicated for both therapeutic and prophylactic use.
Formulations	Capsule-75 mg, Oral suspension – 12 mg per ml (to be reconstituted in water)
Storage	25° C; excursions permitted to 15-30 ° C
Therapeutic use	Treatment of influenza in patients one year of age and above who have been symptomatic for no more than two days
Duration of treatment	Twice daily x 5 days
Dose	Adults and adolescents (13 years of age or more) : 75 mg twice daily Children (>1 years) : <15 kg body weight : 30 mg twice daily 15-23 kg body weight : 45 mg twice daily 24-40 kg body weight : 60 mg twice daily, >40 kg body weight : 75 mg twice daily
Prophylactic use	Indicated for chemoprophylaxis in persons 13 years and above. – Close contacts: 75 mg once daily for at least 7 days – Community contacts: 75 mg once daily up to 6 weeks (Protection lasts only during the period of chemoprophylaxis)
Cost	75 mg tablet 3.78 US$
Adverse reactions	Most frequent side effects in adults are nausea and vomiting. These are transient and generally occur with the first dose. In children, most frequently reported side effect is vomiting. Other reported events include abdominal pain, epistaxis, ear disorder and conjunctivitis. These events do not require discontinuation of treatment in a majority of cases.
Contraindications	In persons with known hypersensitivity to any of the components of the product.
Pregnancy and lactation	Should be used during pregnancy or lactation only if the potential benefit justifies the potential risk to the foetus or breast-fed baby.

all aspects pertaining to prevention and control of AI. The Infectious Disease's Hospital, Angoda is the national referral isolation facility while the Lady Ridgeway Hospital will be the isolation facility for children. There are 20 sentinel sites in the country to provide care for the AI patients and to facilitate the AI surveillance activities. All other major hospitals have been informed of the need for identifying and upgrading an isolation facility. Infection control procedures in hospitals and the community, disposal of dead bodies of AI patients and disposal of bio-waste are included in the guideline for reference.

District Emergency Teams has been formed in Colombo, Gampaha, Kalutara, Kurunegala, Puttalam, Anuradhapura, Polonnaruwa, Matara, Hambantota, Galle, Kegalle and Ratnapura districts. These teams include a veterinary surgeon as the key person and two other officials. The public can easily contact these teams in an emergency.

With a view to protecting health workers handling patients, dead bodies and bio waste, access to personal protective equipment (PPE) has been ensured. Provision has been made for stockpiling PPE in the Medical Supplies Division (MSD) of the Department of Health Services in sufficient quantities. Guidelines on who should use PPE are available in the circular and PPE will be issued to hospital directors during the pandemic.

4. Health system response

As the pandemic phases progresses, the role of health services and facilities will become more crucial. Plans are underway to get all sectors of the health system involved. This will include delineating resources and capacity required for responding to the health care needs during the emerging situation. The Ministry of Health through individual plans of public health service units and health institutions expects to prepare national and sub-national health care systems, equip identified referral hospitals and other health care facilities and train health personnel of all categories to effectively respond to the pre pandemic and pandemic phases.

5. Risk communication

A communication committee including senior technical and communication staff with expertise in risk communication has been formed to advise senior management on all relevant issues of communication. Surveillance of public and media concerns is currently being conducted to allow the development of more targeted key messages.
An information brochure is already in circulation mainly among the high risk groups, poultry farmers, health staff, school children and general public.

Roles and responsibilities

Since many sectors in Sri Lanka have been decentralized, the roles, responsibilities and authorities of the decentralized areas are very crucial for implementing guidelines for the pandemic phases. Work in close collaboration with each other is very important in terms of full mobilization of health services and strict enforcement of epidemic law during a pandemic. The success will depend on the full participation of decentralized levels (districts, municipalities and down to the grassroots level).

The programme addressing the issue of the current threat of AI will be collectively managed by participation of all stakeholders. The primary agency for response will change over the course of the stages of pandemic and this will depend on the phase in effect in Sri Lanka. During the pandemic phase, the Ministry of Health will be the leading agency; other stakeholders will include: the Ministries of Medium and Small Scale Plantation Industries and Rural Human Resource Development and Livestock and civil societies, military police, private sectors, as the situation demands.

Summary

AI is an unprecedented challenge for the socio-economic status of the Asian region. National preparedness to meet this challenge is a matter of urgency. Sri Lanka has passed the critical phase of planning and entered the phase of initiating adequate national measures to counter the outbreak. Against the background of an imminent pandemic, all what the country can do is to be prepared. The framework in this regard has been established and what is needed is an effective and pre- emptive response.

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