

**Swine flu: A preliminary study of the planning and policies of Nepal to deal with H1N1.**

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In the early April 2009, the world was hit by H1N1 subtype of Influenza A virus. The first outbreak occurred in Mexico, which then spread to United States. On June 11, 2009, with the global contagious spread of the novel influenza virus (H1N1) with 74 countries reporting approximately 30,000 confirmed laboratory cases, the World Health Organization, WHO raised the pandemic alert level to pandemic phase 6. During the period, US reported 13,217 laboratory confirmed cases with 27 deaths, India 9 cases, China 174 cases and Nepal no cases of H1N1. As of 27 November 2009, more than 207 countries had reported the laboratory confirmed cases of pandemic influenza H1N1 with a total death count of more than 7,820. WHO reported heightened disease activity in US and high ILI (Influenza like illness) cases in India and Nepal. With the arrival of year 2010, as of 28 February, worldwide more than 213 countries reported laboratory confirmed cases with at least 16,455 deaths. By the time, most areas indicated declining disease activity, US indicated low prevalence of influenza virus with low and declining pattern of pandemic influenza activity, however, active transmission were observed in Southeast Asia. According to WHO/SEARO, as of 2 February 2010, Nepal has reported cumulative cases of 172 with 2 deaths. However, no cases of H1N1 have been reported since that date. In the mean time the candidate vaccine virus (CVV) has been developed, H1N1 vaccine now has been manufactured, antiviral susceptible to the subtype been identified. WHO is making an effort to distribute the donated H1N1 vaccines, antiviral and PPE (Personal Protection Equipment) to the countries in need of vaccine.

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### **Introduction**

Influenza usually causes an acute self-limiting upper respiratory tract infection. The causative agent of influenza is “the Influenza A virus”. The virus through continuous point mutation, a phenomenon called as antigenic shift, can possibly generate the reassortant virus, bringing about the potential pandemic. H1N1 2009 virus is a consequence of antigenic shift, identified as a triple reassortant virus, developed as a result of reassortment among swine, avian and human influenza strain, pigs acting as the intermediate host or mixing vessels for gene reassortment among strains. The transmission of swine flu occurs by inhalation of infectious air borne droplets or droplet nuclei through direct or indirect contact. The incubation period is 1-7 days. The symptoms include fever, cough, sore throat, runny or stuffy nose, myalgia, body aches, headache, chills and fatigue and occasional gastrointestinal upset with complication as pneumonia, respiratory failure. The infection can further exacerbate with rhabdomyolysis on renal failure, myocarditis on worsening of underlying condition as asthma and cardiovascular disease on mixed infection with bacteria. The other unusual symptoms reported are conjunctivitis, parotitis, hemophagocytic syndrome. Individuals that are at high risk of developing severe disease falls among the group of younger less than five years, elderly people with suppressed immunity and pregnant women with chronic systemic illnesses, adolescents on aspirin and immune-compromised patients with lower respiratory tract infection. Vulnerable population includes children and young adults below the age of 65. Diagnosis of H1N1 2009 pandemic virus is based upon three tests; PCR/RT-PCR, viral culture and 4-fold rise in virus-specific neutralizing antibodies. Control and prevention consist of isolation (social distancing), good infection control practices (standard droplet and contact precaution, practicing respiratory and hygiene etiquette), supportive care and use of antiviral drugs as oseltamivir, zanamivir and peramivir, and immunization.

### **Nepal Influenza Pandemic Plans and Policies**

To predict the proper measures to be taken in harmonizing the global health with the emergence of the new influenza virus subtype capable of uncertain pandemic threat, WHO has developed guidelines regarding the preparedness and preventive measures and requires every country to follow the guidelines in formulating national pandemic and response plans plus implementing the measures effectively with regular monitoring. With the emergence of H1N1 infection worldwide, the Government of Nepal has considered the “National Avian Influenza and Influenza Pandemic Preparedness and Response Plan” (NAIIPPRP), the plan developed in

2005 to deal with the Avian Influenza. The main objective of NAIIPPRP is to prepare the country for early recognition and containment of a possible outbreak of avian influenza (AI), to reduce the risk of human infection in the presence of animal disease and identifying and promptly treating human influenza cases where they occur. In the event of human to human transmission of H5N1 or other novel virus and a possible influenza pandemic affecting Nepal, the plan aims at building preparedness to contain it rapidly and mitigate its health and socio-economic impacts.

The NAIIPPRP provides a strong basis on which to detect and combat possible outbreaks of AI and other related virus such as H1N1 that occurred in 2009. The plan also outlines the institutional mechanisms for carrying out those activities being candid about the capacity and resources constraint associated with the country as low financial resources, underdeveloped health care system, centralized planning and administration, low health profile, low literacy rate with diminished development in transportation and communication. The plan has detailed various actions and improvement which need to be accomplished in the health care system, under two main components, the Animal Health component and the Human Health component. These components to control and contain the Highly pathogenic Avian Influenza (HPAI) mainly focus on strengthening the surveillance and epidemiological Investigation, strengthening animal and human quarantine services, strengthening the capacity of the veterinary and human laboratory and its network, improving public awareness information and communication, developing health care delivery system preparedness and response plans, developing compensation and rehabilitation.

The Government of Nepal, to implement the plan requested for the World Bank assistance which was approved in 19 January 2007 with a total grant of \$18.2 million under a four year project plan, “Avian Influenza Control project (AICP) – Nepal, 2007/08-2010/11”, which is ongoing with a completion date of 31 July 2011. The goal of AICP is to reduce the risk of human avian influenza infection in the presence of animal disease, to be able to identify and treat promptly humans infected with avian influenza, and to build preparedness to contain rapidly and mitigate the health and socio-economic impact of an influenza pandemic affecting Nepal. With the completion of the four year AICP, it is hoped the health care system of Nepal will be enhanced so as to prevent, detect and contain an avian influenza or related outbreaks.

Under the animal health component, the project will enhance AI prevention and preparedness programs through strengthening the

veterinary services, disease surveillance and diagnostic capacity. The project will be focused on strengthening the laboratory capacity of one of the eight animal disease diagnostic laboratories to BSL (Bio-safety level) 3 and the remaining seven to BSL 2. The project will focus on controlling and containing the outbreak as well as providing compensation fund to assist the poultry owners for their loss.

Under the human health component, the project aims to prevent the human influenza caused by HPAI through enhanced year round surveillance by strengthening the existing disease surveillance capacity at the national, regional and district level. This will be accomplished by building and implementing an influenza surveillance system on the existing surveillance system and building the capacity to detect the occurrence of human cases of avian influenza. Additionally, it calls for providing and ensuring a laboratory network support at the health care facilities to assist in implementation of the national influenza surveillance system. This focuses on improving the laboratory capacity to enable accurate and effective diagnosis and case detection with conventional and real-time Polymerase chain reaction (RT-PCR) and enzyme linked immunosorbent assay (ELISA), developing virus isolation capabilities (typing, subtyping and strain identification capacities). There is a need to enhance BSL 3 capacity at NPHL (National Public Health Laboratory), development of laboratory information management system and appropriate trainings of personnel.

Under the prevention and containment measures, the project aims to prevent avian and seasonal influenza transmission in high risk occupational settings. This attempts to accomplish in developing a modern human quarantine system in main points of international transit and building the capacity for pharmacological and non-pharmacological interventions as antivirals. PPE (Personal Protection Equipment) and vaccination will need to be provided to the public plus information about social distancing and monitoring the occurrence of infection during different pandemic phases. This requires planning for the acquisition and use of pandemic vaccines and developing a legal and regular framework for public health interventions during epidemics.

Under the health care system delivery and preparedness response, the project aims on developing and implementing a system of acute respiratory disease triage and referral. Capacity building of the primary health care system (district and below) together with the preparation and

implementation of contingency plans is necessary to meet the health care needs during an influenza pandemic.

The project also aims on enhancing the communication strategy to ensure accurate information being relayed to the general public through the resources available. Nepal government, with the progress on ongoing AICP on overcoming the constraint associated with the health care system is modifying the NAIIPPRP. According to WHO-SEARO, with the ongoing H1N1 pandemic, Nepal has developed the first draft of the revised NAIIPPRP under the heading “Avian Influenza Pandemic Preparedness and Response Plan for Government of Nepal, (AIPPRP)”.

### **Mitigation Measures and Controversial Scenario**

According to the press release made by MoHP, with the pandemic alert 5 declaration on 28 April 2009, the Government of Nepal initiated the following activities:

- a. Conducted series of planning and coordination meeting with various line ministries, departments and other stakeholders.
- b. All district health offices and regional health directorates were alerted on influenza like illnesses surveillance. Trainings events were conducted on surveillance, case management, infection control and community mitigation to health workers and other relevant people at central, regional and district levels.
- c. Initiated surveillance activity and health screening at Tribhuvan International Airport on 29 April, 2009 and major land crossing (India and China border).
- d. Developed and circulated guidelines on who should get laboratory test; who should seek immediate medical care; and who should get antiviral.
- e. Public and private hospitals including security forces hospitals have been instructed to establish an isolation room. Control Room is established at Epidemiology and Disease Control Division (EDCD).
- f. Standard Operating Procedures on patient management have been circulated widely to all hospitals. The community mitigation and health promotion materials have been disseminated to the community.
- g. Media messages on H1N1 and preventive measures have been disseminated to the general public. Risk communication templates and leaflets (Flu Dos and Don'ts) have been distributed to all districts.
- h. Laboratory capacity was strengthened to carry out the testing of H1N1 in NPHL. International and National trainings have been provided to Laboratory person to conduct testing of H1N1.

- i. Nepal government in coordination with WHO, is scheduled to receive vaccine in the first quarter of 2010

*No cases as of 11 June 2009:* Government of Nepal with porous Indo-Nepal border, and country sheltering the refugees with the incidence of H1N1 infection in neighboring countries and country's associated capacity constraint and lack of transparency regarding the improvement in the health care system with low health profile and nutritional status, poor sanitary condition and hygiene etiquette, is highly prone to contagious airborne infection. However, with neighbor countries reporting confirmed cases of H1N1, Nepal had not reported any cases as of 11 June 2009. H1N1 influenza, being a contagious airborne disease, no borders or boundaries can prevent its spread. No cases indicate a high health profile and advanced health care system in Nepal. However, considering the facts of Nepal and the characteristics of H1N1 infection, the report does not seem to convey accurate information.

*Surveillance activity and effectiveness:* The fact that no cases were reported as of 11 June 2009 raises questions regarding the surveillance activities and its effectiveness. Screening at the International airport though revealed the identification of the first three cases on 28 June 2009, screening done on the borders still remain under question indicating ineffective and inadequate surveillance with no cases among the massive mobility population entering and exiting the country at these levels. The government of Nepal has not made public information about the surveillance being done on pig farming regarding H1N1 and probable cases.

*Diagnostic capability of Nepal:* The Government of Nepal had reported confirmed cases on the basis of report submitted by NPHL. Strengthening the laboratory capacity of NPHL is one of the main aspects of AICP. The AICP focuses on three staged development of the NPHL. The first phase is distribution and use of rapid antigen detection kits, the second phase involves use of polymerase chain reaction (PCR) methods, and the third involves virus isolation and tissue culture, the development of BSL facilities.

According to AICP, strategic and operational plan 2006, NPHL has basic laboratory equipment, much of which is substandard, outdated, and unreliable. NPHL is limited to performing rapid tests distinguishing influenza A and B virus only. Though the laboratory is equipped with

PCR equipment and can perform conventional PCR for other organisms. It is in need of reagents, chemicals, and accessories to do conventional PCR for influenza. To perform the more reliable and sensitive test of detection, the real-time PCR (RT-PCR), NPHL will require facilities renovations necessary to do PCR testing and the training needs together with need of equipments, primers, reagents, supplies, and accessories and laboratory management information system, and computer equipment to run and interpret PCR. However, BSL-3 is a long term goal and requires facility renovations, equipment, and supplies necessary for BSL-3, training to operate such a facility, and personnel requirements.

According to WHO report, 13 May 2009, Nepal was not listed as one of the countries able to perform PCR to diagnose influenza A (H1N1) virus infections in human. According to the report of the WHO/SEARO, partners meeting on H1N1 2009 at New Delhi on 21 August 2009, Nepal does not have Influenza center lab (ICL) capable of virus isolation, PCR. WHO has guided the nation to report confirmed cases as per three confirmatory tests result; PCR, viral culture and serology test, 4 fold rise in pandemic (H1N1) 2009 virus virus-specific neutralizing antibodies. WHO has guided countries without a designated National Influenza Center (NIC), with no ongoing influenza surveillance activities or with no laboratory capacity to diagnose the pandemic H1N1 2009 influenza virus to collect representative samples from clinically compatible cases from newly affected areas and among severe cases per week and send to neighboring countries or regional influenza laboratories with laboratory capacity for virus characterization.

The laboratory confirmation report of H1N1 cases from NPHL requires transparency, so as to assure the public regarding the improvement on the diagnostic capabilities of NPHL and the type of test being implemented or collaboration with certain national private or international organization for confirmation. The government of Nepal, in order to assure improved health care system requires having some degree of transparency to gain public confidence.

*Immunization program:* The government of Nepal has not initiated any vaccination program as it is still awaiting vaccine deployment from WHO. By now the country should have been ready for the next pandemic wave with effective immunization program and stockpiling in hand of antiviral and appropriate personal protection equipment, however claims to be ready for pandemic wave.

*Total H1N1 cases identified:* According to WHO/SEARO, Nepal has reported cumulative cases of 172 with 2 deaths as of 2 February 2010. No cases of H1N1 have been reported since that date when WHO is reporting increasing incidence of H1N1 in Southeast Asia. The cases cannot be taken as the actual cases when the surveillance measures and diagnostic tools applied are in question for the effectiveness.

*Efficacy of the mitigation measures applied apart from AI incidence place:* With the pandemic preparedness on hand from AICP and existing plans and programs implemented to deal with the January and February 2009 AI pandemic in Jhapa and Morang district, the government of Nepal initiated the mitigation measures. The national action preparedness plan and the mitigation measures applied seems to correlate with each other as per the activities been addressed by the MoHP. However, the efficacy of the measures applied remains in question regarding other areas of Nepal where no sign of AI have been observed.

### **Conclusion**

Nepal with capacity constraint, low financial resources, low manpower and limited technology, political instability has undergone challenges to implement a plan. Issues such as an under-developed health care system, the topography of the country, economic remoteness, difficulties in enhancing literacy among the female and rural populations, conservative social custom and traditions and centralized planning and administration has contributed to the implementation problems. The Avian Influenza Control Project (AICP) has made an endeavor to improve and implement mitigation measures to deal with the H1N1. However due to existing challenges; country's associated constraints and uncertainty in the development of the health care system, the capability enhancement and effectiveness of the diagnostic laboratory, National Public Health Laboratory and the surveillance measures implemented, issues following the mitigation measures applied remains. Transparency to gain public confidence and assure the citizens of their safety and capability enhancement in the health sector is necessary.

Until the NPHL capacity is enhanced or collaboration with national private or international organization for diagnosis question about Nepal has a high health profile or is immunized to the subtype will continue. Transparency and open communication regarding the capabilities of the government needs to occur. Furthermore, the method of surveillance will



be impeded. Screening of swine operation should be implemented. Table top or field exercise of pandemic planning should occur. No immunization campaign has been implemented and the country is still awaiting vaccine deployment from WHO which indicates management and leadership issues, contributing to a lack of effective mitigation measures. With WHO continuing to report additional cases in Southeast Asia, continue vigilance and reporting in Nepal should occur. The government of Nepal however needs to be better prepared for the unpredictable pandemic threat and its consequences.