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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

Refocusing and Reshaping of Highly Pathogenic Avian Influenza Preventive Strategies in Rural Settings

Sigfrido Burgos¹ and Sergio A. Burgos²

¹Animal Production and Health Division, Livestock Information, Sector Analysis and Policy Branch, Pro-Poor Livestock Policy Initiative (PPLPI) Unit, Food and Agriculture Organization of the United Nations (FAO-AGAL), Viale delle Terme di Caracalla, 00100 Rome, Italy

²Department of Animal and Poultry Science, University of Guelph, Guelph, ON, N1G 2W1, Canada

Abstract: Highly Pathogenic Avian Influenza Type A H5N1 subtype is a viral zoonotic disease that has infected and killed birds and humans in SE Asia, Africa and Europe since late 2003. Incendiary media reports, mob hype, dire forecasts and misinformation have unintentionally portrayed this animal and human health issue as an inevitable global disaster. Infected and at-risk countries can implement preventive and corrective disease mitigation measures. This disease can be successfully managed at its source by channelling efforts into two areas: communication and education. If contact conditions between virus and healthy birds can be prevented or minimized; most other emergency corrective measures become provisional. Extensive public awareness about prevention needs to be raised, particularly amongst veterinary services and bird owners, keepers and caregivers.

Key words: Highly Pathogenic Avian Influenza, HPAI, bird flu, strategies, H5N1

Introduction

Influenza, or flu, is an acute, highly contagious viral disease caused by orthomyxoviruses and it is divided into three types: *Influenzavirus* A, B and C. Type A affects avian species, particularly poultry and it is most commonly known as Avian Influenza (AI) or bird flu. AI can be divided into highly pathogenic (HPAI) and lowly pathogenic (LPAI) depending on its ability to cause disease symptoms and fatality. Type A Influenza viruses are further divided into subtypes on the basis of antigenic relationships of two viral capsid surface proteins: haemagglutinin (H) and neuraminidase (N). There are 16 H types and 9 N types and these can occur in H_xN_y combinations. The combination causing global animal and human health concerns is H5N1. Currently, only H5 and H7 virus subtypes have been shown to cause HPAI in susceptible avian species, but not all H5 and H7 are virulent. In poultry, this transmissible disease is characterized by sudden onset (after incubation period of 2-4 days), loss of appetite, fever, prostration, lethargy, swollen hocks, nasal discharge, oedema of the neck and head, progressive inflammation of the respiratory mucous membrane and most likely, death. HPAI has a high mortality rate in chickens, often reaching 90-100% within 48 hours.

Background Information: H5N1 is the technical term for a lethal sub-type of avian influenza. This strain has infected numerous species of birds in Asia, Europe and Africa since late 2003. It has not been found in birds in North or South America, including the Caribbean (FAO,

2007). In 2006, a total of 47 countries reported HPAI outbreaks: 24 in Europe, 15 in Asia and 8 in Africa (Petrini, 2007). From November 2003 to June 29, 2007 there have been a total of 317 confirmed cases with 191 deaths, resulting in a 60.25% mortality rate (WHO, 2007). Nowadays, countries like Indonesia, Egypt and Nigeria are considered HPAI entrenched; whereas Bangladesh, Kuwait, Saudi Arabia, Ghana and Togo are the new countries with AI reports in 2007 (Domenech *et al.*, 2007).

Local governments and international organizations (i.e., FAO, OIE and WHO) common goal is to diminish the virus load in the environment and consequently reduce the risk of a pandemic by eradication of the virus at animal source.

Current approaches to disease mitigation: Current steps suggested to eradicate this disease at its source are: early detection, rapid confirmation of suspects, rapid response and complete, transparent notification (OIE, 2007). Others suggest more comprehensive measures through collaborative partnerships (Anaeto and Chioma, 2007). However, before early detection by bird owners and caregivers is possible, there needs to be systematic knowledge of what symptoms to look for in bird flocks as to ascertain with some degree of accuracy if AI has been contracted. Furthermore, not only is it necessary to raise public awareness about this zoonotic disease (transmissible from animals to humans under natural conditions), but it is imperative to inform all parties (population at large) about its mode of dispersion amongst avian species, so that individuals and

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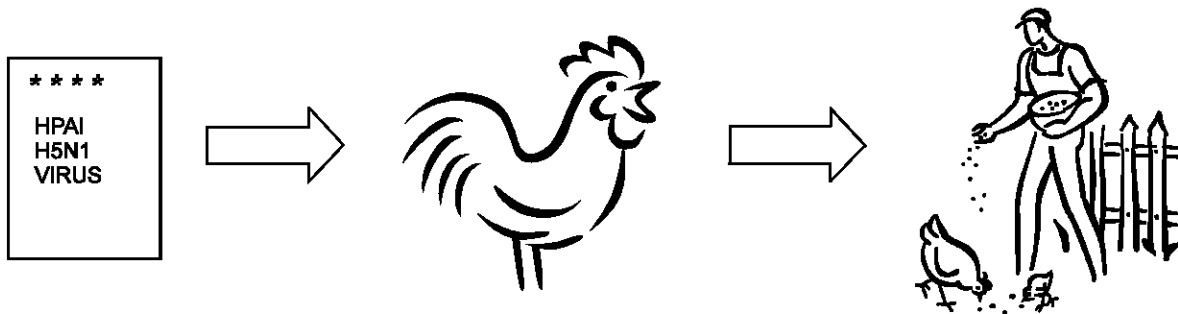


Illustration No. 1: Schematic of AI disease progression and participants

communities initiate behavioural modifications with respect to animal-human relationships and animal husbandry in order to halt its dissemination.

Moreover, the immediate corrective measures taken by authorities upon knowledge of AI infection are to implement movement control within a 10-km radius around the outbreak, animal quarantine and a stamping out strategy to control disease dispersion. It is important to acknowledge that HPAI viruses H5N1 subtypes will not be eradicated globally in the short or medium terms (Sims, 2007a,b).

Refocusing and reshaping: Empirical evidence demonstrates that AI, regardless of pathogenicity, infects various bird species under many rearing systems and natural environments. There is no particular way of knowing precisely which birds are susceptible to disease or not, thus posing a limitation to disease mitigation. Since birds can't willingly avoid AI, what is now evident is that this issue deals with human variables (i.e., behaviours) that manage, care and keep birds. Focus should be aimed at this level.

Refocusing: As seen above, the initial step to ensue a sequential disease progression is primary inoculation between viruses alone or viral carrier and an uninfected bird; if this crucial step can be prevented or diminished, the natural path of dissemination could be halted, with little or no animal/human threat remaining. Therefore, considering anecdotal evidence and four years of moderately successful disease-dealing experience, it is only appropriate to ponder upon a serious reconsideration of preventive strategies that focuses strongly on disease communication to all parties involved and extensive education/training programs of rural veterinary services, which are the information agents in close contact with individuals in communities where there exists a high infection risk.

Reshaping: In general, the risk of introduction of the virus increases with a) low biosecurity levels and b) increased movement of poultry into live bird markets. At this point,

the first step to act on is thorough disease communication to poultry-related participants about HPAI, because it is through knowledge of the risks: potential economic losses and potentially detrimental effect on livelihoods, that there can be concretization of issue magnitude and seriousness of consequences. The second step to act on is the emphasis given to education/training programs of rural veterinary services. Here, logically, there needs to be delivered a positive, optimistic and realistic message to work under a framework of 'achievable solutions' in order to encompass harmonised efforts towards a successful mitigation campaign. These capacity-building programs must be very simple, very graphic and easy to understand. Additionally, they need to stress prevention, prevention and prevention as the cheapest, most sound alternative. A one-page, easy-to-follow, step-by-step prevention guideline sheet should follow training; coupled with all available contact information (i.e., telephones, faxes and emails) and resources in case an outbreak needs to be reported to local, regional or national authorities.

Institutional problems are foreseen, such as low wages, reduced allowances, inadequate staffing, long distance travels and devolution of authority to district level; however, these can be dealt on the way, on a case-by-case basis. Budgetary issues will certainly arise, thus to soften the financial burden of national educational campaigns on HPAI prevention measures, complimentary assistance on capacity-building events can be solicited to international organizations or some of it can be funded by World Bank or International Monetary Fund programmes. Wages and salaries of national veterinary services under the Ministry of Agriculture and Animal Welfare Departments can be considered a fixed cost, while guideline distribution, traveling expenses and logistical expenditures can be accounted as variable costs.

Important husbandry measures to transmit during education/training are:

- 1) Uninfected poultry must be kept, if possible, indoors;

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- 2) If this is not possible, then suggest fencing poultry premises;
 - 3) Contact with wild birds should be avoided;
 - 4) Lower branches in neighbouring trees should be pruned;
 - 5) Attempt to keep poultry species separated and isolated from each other;
 - 6) Implement an "all in-all out" rearing system;
 - 7) Limit water reservoir sites (i.e., pond and lakes) to avoid wild bird intrusion;
 - 8) Feeders and drinkers should be exclusive for poultry and not wild birds;
 - 9) Poultry workers should not have contact with other birds;
 - 10) Poultry workers should not visit non-assigned poultry houses;
 - 11) Limit visitor and foreign traffic into poultry premises;
 - 12) Insist on cloth and boot changes before entering poultry premises;
 - 13) Provide shoe/boot disinfection pads at poultry premise entrances;
 - 14) Separate poultry flock from birds that returned from live markets;
 - 15) Have routine checks of wild bird-poultry contacts and correct them;
 - 16) Implement any creative, practical measure to mitigate disease risk;
- 6) Display logotype at conspicuously visible location (i.e., markets, streets, roads, hospitals, rural buses, grocery stores and all provincial schools);
 - 7) Implement performance-based remuneration to veterinary agents;
 - 8) Establish community-based surveillance teams with rotation schedules;

From a psycho-socio-economic standpoint, every action engaged has an implicit motivational component behind it. Oftentimes, this motivation is influenced by economic and financial reasoning; be it in the form of opportunity cost or an actual monetary expenditure, therefore, it is only reasonable to expect that farming-dependent, low-income families will only implement actions that are in accordance to their current financial status or those that have a tangible promise to enhance remuneration beyond what they would normally receive.

Unless players at the beginning of supply chains have sincere motivation and commitment to implement changes, these will be hard to materialize; especially in decentralized, unregulated developing nations. Ultimately, control of HPAI H5N1 within individual countries rests on governments operating through effective national veterinary services.

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Adoption of preventive measures by subsistence, small and large scale poultry farmers is critically important and these are based on cost-effectiveness, incentive-compatibility and ease of implementation (McLeod and Hancock, 2007).

Considerations: The goal of this paper is to delineate what HPAI is, what has been done to mitigate AI infections in animals-and consequently in humans-and to suggest a strategic change of direction from corrective to preventive strategies. Some locations have to live with this disease on a daily basis to which they are forced to implement culling, stamping out, quarantines and vaccinations; nevertheless, prevention of further outbreaks will remain the only measure to manage disease in the long term.

Practical recommendations to enhance communication and education are:

- 1) Disease communication by media outlets through public-private partnerships;
- 2) Corporate tax-deductible mass television and radio "info-shorts";
- 3) Government-sponsored informational banners at rural town centres;
- 4) Front page and middle page advertisements in wide-circulation newspapers;
- 5) Design a "HPAI prevention message logo" (i.e., Buckle up! and got milk?);

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