



Credit: FAO/IFP, Pagani

BIOSECURITY FOR HPAI

Promoting and Supporting Actions for Risk Reduction



**BIOSECURITY MEASURES
MUST BE EASY TO COMPLY
WITH AND DIFFICULT TO
AVOID**

Disease in poultry and humans caused by H5N1 highly pathogenic avian influenza (HPAI) has now been present for over a decade. It has involved commercial flocks of all sizes and species as well as backyard or scavenging poultry.

During this time, our understanding of how H5N1 HPAI spreads has increased. It is clear from epidemiological analysis and molecular biology studies that while wild birds play a role in the spread of disease, this role is minimal with only relatively small proportion of the overall volume of disease transmission worldwide linked to wild birds, although in Europe the majority of infections have been detected in dead wild birds. The majority of cases are the result of spread between domestic poultry after initial introduction. This is particularly true in endemically-infected countries.

Most secondary spread is largely human-mediated. Direct spread is initiated by people by moving live birds (domestic and captive species) and indirectly through contaminated materials (fomites), and in some cases through hunting activities. In some countries, live-bird markets have been one of the important elements in maintaining and spreading the virus, and have in some cases been the source of infection in humans.

A disease that is known to spread primarily through human activities, can be controlled through increased awareness, education and the application of biosecurity measures along the production and marketing chain. It is this that makes biosecurity so critically important in the prevention, control and eradication of H5N1 HPAI, with the focus on changing the habits and behaviors of people in such a way that the risk of disease transmission is decreased.

The key is to persuade people of the need for and advantages of, adopting biosecurity measures and to develop with them sets of safe poultry production practices that are seen by them as possible, practical and sustainable.

In no country is poultry keeping or production and management systems homogenous. The poultry production sector is made up of many different types of domestic and non-domestic captive birds. Besides domestic poultry, people keep other types of birds, including fighting cocks, breeding and show birds, birds of prey and related species, decoy birds for hunting and captive exotic wild birds. Many people other than large- and small-scale commercial producers, form part of the domestic and captive bird sector; these include traders, live-bird market and hatchery workers, animal health workers, feed sellers, transporters and other intermediaries and service providers. In 2004, FAO defined four poultry production systems (originally referred to as 'sectors') based on the characteristics

of the production methods, including biosecurity measures implemented, and the extent of involvement in the market chain:

Sector 1 - industrial integrated production with birds or products marketed commercially.

Sector 2 - commercial poultry production with birds or products sold through slaughter-houses or live poultry markets.

Sector 3 - smallholder commercial poultry production, including water fowl, with birds or products usually sold through live-bird markets.

Sector 4 - village or backyard production with birds or products consumed locally.



Credit: FAO/H. Wagner

However, there is no direct relationship between size of a production unit and biosecurity: even some very large commercial poultry enterprises may demonstrate strikingly inadequate biosecurity, no better than in many small-scale commercial production units. The more complex the production and marketing systems (i.e. the more steps and people involved), the harder it is to control and eradicate H5N1 HPAI. When devising and recommending biosecurity measures, all stages in the chain must therefore be taken into account.

There is a very clear reservoir of the virus in domestic poultry, particularly ducks, and possibly other captive wild birds, but the role of wild birds as a reservoir of infection (maintaining the virus) is unclear.



Credit: FAO/P. Pagani

THE HPAI VIRUS PERSISTENCE AND SPREAD

Wild birds have been known to introduce infection but this is, with the exception of Europe, uncommon compared with spread between domestic poultry.

Infected domestic birds are the most dangerous source of virus, followed by inanimate objects (fomites) contaminated with secretions (in particular faeces from infected birds). Airborne spread is not considered to be significant.

Prevention and control of disease involves “finding it fast”, “killing it rapidly”, and “stopping its spread. All three of these objectives must be achieved rapidly and simultaneously for disease to be effectively controlled.

Continuous and vigilant surveillance helps to detect disease early once it has occurred. Culling is a very effective response if implemented early and consistently along with local incentives, including fair compensation.

Vaccination is an excellent tool for controlling the disease as long as it is used according to strict recommendations on selection and application of vaccine, monitoring of vaccinated populations, as well as a well defined exit strategy. There are however technical, logistical and economic reasons that can make it difficult to implement it effectively.

PREVENTION AND CONTROL OF HPAI - STOPPING THE SPREAD

At local (or farm) level, the emphasis in biosecurity for poultry flocks should be on *bioexclusion*, that is keeping the virus out of uninfected farms and villages. Once an outbreak has occurred and has been detected, then preventing the virus from spreading out from the infected site (*biocontainment*) becomes the most important activity. However, because containment is more difficult, prevention is the most efficient form of control.

Absolute biosecurity that prevents all spread of HPAI is almost impossible to achieve, but reaching a level of biosecurity that helps reduce spread to below a certain threshold, is possible. In practical terms, *if on average an infected site infects less than one uninfected site*, the disease will eventually die out.

Biosecurity is critical for preventing the initial incursion, as well as stopping further spread of the virus, alongside surveillance, targeted culling, disposal and vaccination.



Segregate, Clean, Disinfect

Biosecurity has three technical components: segregation, cleaning and disinfection.

Segregation involves keeping potentially infected animals and materials away from uninfected animals. It is not about keeping species apart. If virus does not enter a poultry holding, no infection can take place. In short, no animals or materials should enter or leave a poultry holding unless they have to. This means creating barriers and controlling what passes through them.

Cleaning removes most of any contaminating virus from materials that must pass through these barriers (in either direction). It has been demonstrated that most virus contamination on physical objects is contained in faecal material or in respiratory secretions that adhere to the surface of such objects.

Disinfection is important when performed consistently and correctly, but should be regarded as a final “polishing” step in biosecurity, used only after effective cleaning. It is often incorrectly done and under field conditions can be less than effective, because disinfectants may not penetrate into dirt in sufficiently high concentrations.

There are many known biosecurity systems, but these have been developed mostly for large-scale commercial production systems in developed countries. This raises three major considerations:

- Large-scale commercial farms in developing countries should be encouraged to adopt the measures.
- Some of the commonly-recommended measures may not be easily implementable and are sometimes inappropriate for small-scale commercial and scavenging poultry systems in resource-poor settings.
- Appropriate biosecurity measures need to be developed for intermediaries, non-domestic poultry, hunters, etc.

Appropriate biosecurity measures must be designed and implemented contextually; and where they already exist, they must be more effective and/or more widely implemented.

Moreover, biosecurity measures must be practical and proportionate to the risk for which they are developed, with their design grounded firmly in three key considerations:

- Biosecurity recommendations should be developed for all component parts of the domestic poultry and captive bird sector, including intermediaries.
- In most locations, the emphasis should be on preventive biosecurity to decrease the risk of infection (bioexclusion), although biocontainment remains important.
- Those who will implement biosecurity measures should also be involved in their design to ensure that they are feasible and sustainable.

EFFECTIVE BIOSECURITY MEASURES

ENGAGING STAKEHOLDERS

Biosecurity must be practical and sustainable for all – for producers, for traders, for intermediaries and for all those pursuing activities that could pose a risk of disease introduction. At the same time, biosecurity can only succeed if those who will have to implement the necessary measures accept the need for it, and see the benefits in doing so.

Incorporating socio-economic analysis into biosecurity planning helps in identifying the social and cultural acceptability of proposed measures, the level of cost compared to what people can afford to pay, the regulations, incentives, and penalties that may be appropriate to induce behaviour change. Stakeholder dialogue is critical to understand:

- Who keeps poultry and how important is it to their livelihoods?
- What might people be willing to do to improve biosecurity?
- How much can people afford to spend on biosecurity, and who should pay for what?
- What balance of incentives and penalties may be needed?

The answers will be different for each actor in the value chain, depending on their commercial motivation and the size of their operation. Economic assessment of biosecurity measures may be based on cost-effectiveness or cost-benefit analysis. Livelihoods analysis is useful for understanding the importance of poultry and motivations of people.

COMMUNICATING BIOSECURITY

Promoting biosecurity involves identifying how people perceive their own situation and the environment in which they operate. Communication plays a vital role in enhancing the concept and to design ways of involving the people in biosecurity planning and implementation.

Communication must take into account the complex interplay between risk perception, behavioural intent, the response, and message design. Effective behaviour change communication must come to terms with and overcome the widespread perception among many communities that poultry sickness and death are natural, a perception that often leads to lack of reporting sick and dead birds, lack of hygiene when handling poultry, and the consumption of sick and dead poultry.

At the same time, awareness of *why* the behaviour being promoted *makes sense* to the receiver of the message is key to behaviour change and must form part of any communication strategy. To make sense to a farmer, communication messages

must also address personal and community values, rather than providing the technical rationale alone.

Furthermore, communication has a major role to play in the "enabling environment" that must be created to enhance biosecurity. It is an instrument of advocacy, stimulating policy-makers and media to rally round the importance of biosecurity, helping to create the supportive institutional framework within which individuals and communities can play their role.



Credit: FAO/S. Sarkar

Ambiguous messaging at a border post, Africa

Highly pathogenic avian influenza is a disease that can be controlled through the application of effective biosecurity measures because it is highly dependent on the actions of people for its spread.

Biosecurity can have a proactive preventive impact and will enable producers to protect their flocks themselves. The attributes of different biosecurity measures must be analysed to try and understand which may be most appropriate and have the greatest impact for which production system, with practical and sustainable solutions from the point of view of the producers, traders and intermediaries. To ensure successful uptake and implementation:

- Biosecurity measures must be easy to comply with and difficult to avoid.
- Biosecurity measures must be designed with the involvement of all stakeholders who are directly or indirectly involved in, or are in contact with poultry production – from producers and the communities within which they operate down to traders, live bird market sellers and service providers.
- Public funds should contribute to introducing or improving biosecurity measures for scavenging poultry and upgrading live bird markets as safe poultry production may be considered a public good, as it is a powerful tool to reduce the risk of animal disease and the threat of a human pandemic.
- Governments should strengthen incentives for all producers to adopt biosecurity measures, with an emphasis on regulatory measures for the commercial sector. A database of commercial producers should also be developed and maintained.
- Awareness messages must be designed for all stakeholders and must aim for a balance between creating understanding of risk and explaining the value of improved biosecurity in the common (public) interest.

In October 2008, FAO, OIE and the World Bank jointly published a report entitled 'Biosecurity for HPAI: Issues and Options', which provides an analysis of the situation and ways to improve biosecurity in developing countries. The report is available at the following link:

<ftp://ftp.fao.org/docrep/fao/011/i0359e/i0359e00.pdf>

