14

Minimizing the vulnerability of poultry production chains for avian influenza

C.W. Beard[#]

Even a casual observer of the global avian influenza (AI) situation will likely be quick to arrive at the conclusion that should bring concern to the world's poultry industries. That is, avian influenza is not going to 'go away'. Because it has migratory waterfowl, sea birds, shore birds and perhaps some other wild avian species as its natural hosts, avian influenza is here to stay with its 'built-in' dissemination mechanism: the free-flying birds. The presence of the viruses in the guts of the usually asymptomatic free-flying natural hosts and the shedding of the viruses in their faeces facilitates the widespread perpetuation of AI viruses along with the ever-present threat they present to domestic poultry.

Recent AI experiences in widely different locations such as Hong Kong and New York support the conclusion that live-bird markets (LBMs) can effectively serve as the direct or indirect 'link' for AI between the natural hosts and domestic poultry. The LBMs are usually a collection of birds from many sources and may include many species including waterfowl and some especially susceptible species such as quail. The LBMs are perfect 'links' because they also include commercial poultry, which can facilitate the transfer of virus from the LBMs back to the commercial producers via contaminated transport coops, vehicles and personnel.

The backyard flocks can also include a variety of avian species including domestic waterfowl on open ponds exposed to direct contact with migratory waterfowl, game fowl (fighting cocks) and free-ranging guinea fowl, geese and an untold number of other avian species. They can also participate in the poultry adaptation and transfer of AI to commercial poultry flocks through the LBM system.

There is apparently an increased interest by some of the more recent residents in the United States in both buying their poultry meat at an LBM and having backyard flocks which in some areas of the country are likely to include the frequently transported fighting cocks. Although illegal in all but a single state, the interest in rearing game fowl (fighting cocks) is apparently increasing as a hobby/business in some cultural circles in certain geographic areas of the country. There are no indications that either the LBM system of collecting and marketing dressed poultry or the practice of having backyard flocks (even in dense urban areas) is going to wane. In fact, they appear to be on the increase, which adds to the ever present threat of AI gaining access to commercial poultry flocks.

Whereas there are some poultry diseases for which we might be able to discuss their complete eradication with the reasonable likelihood of being successful, I do not believe avian influenza is one of those. For the reasons mentioned above, AI viruses with their global distribution are here to stay.

[#] Vice President - Research & Technology, U.S. Poultry & Egg Association, 1530 Cooledge Road, Tucker, Georgia 30084 USA. E-mail: cbeard@poultryegg.org

It is usually when the AI viruses apparently 'spill over' from their natural hosts and become adapted to domestic poultry species that they become the cause for concern. The highly pathogenic members of the AI viruses can result in very serious economic losses to commercial poultry. The recent evidence that some of the H5 and H7 AI viruses can be directly transmitted from poultry to humans, causing infection, disease and even death adds more urgency to devising reliable schemes to protect domestic poultry from the ubiquitous avian influenza viruses. If AI was ever to become generally perceived to be a dangerous zoonotic disease, it could have a very negative effect on the consumption of poultry meat and eggs.

Once we can agree that the AI viruses are not likely to 'go away' and are likely to persist in the world for the foreseeable future, we can be much more realistic as we try to devise a plan or plans of action to lessen their negative impact. We know that vaccines certainly offer a means to provide variable levels of protection against AI. Once the identification of the particular haemagglutinin of the AI virus of concern is known, vaccines (inactivated, subunit or vectored) can be of great benefit if properly managed. The use of naturally occurring avirulent AI viruses to protect against virulent members of the same HA subtype has generally been discouraged for two reasons: they can participate in the development of new viruses with unpredictable consequences through reassortment between the virulent and the avirulent viruses, and the live 'vaccine' virus may also experience mutations to become highly pathogenic as well.

Even though there are therapeutic drugs licensed for use in humans against type-A influenza, they do not appear, at least for now, to have practical use in domestic poultry. A published laboratory trial using one of the first of these drugs (amantadine HCl) demonstrated that AI-virus populations exhibiting drug resistance could rapidly emerge with the virus replicating and causing mortality in chickens being medicated with the drug. The rapidly acquired drug resistance was confirmed by in-vitro laboratory studies of the viruses recovered from the affected chickens.

There is another very obvious option to the prevention and control of losses from AI, and that is simply to produce poultry in a way to prevent their exposure to the AI virus. It is easy to make such a statement that could appear naïve to some in that the success of such a simplistic approach depends upon so many variables including: the density and make-up of the poultry population in the area, the proximity of poultry premises to each other, the proximity to concentrations of the free-flying natural hosts (flyways or preserves), the extent and multiplicity of types of domestic poultry in the area and, probably most important of all, the level of knowledge of poultry biosecurity practices and the commitment of the poultry-company management as well as the on-farm personnel to the protection of their flocks from exposure to AI.

The possibility of the intentional introduction of disease agents such as highly pathogenic AI and Newcastle viruses into commercial flocks by those wishing to inflict serious economic and food-supply harm has received considerable attention in the last two years. Some of us do not believe that it would be possible to prevent all if any initial attacks but believe it would be feasible to develop and implement a system of biosecurity that would confine the diseases to the flocks where the diseases were initially introduced, not allowing them to spread throughout the poultry-company complex.

The vertical integration of the broiler industry in the United States has resulted in complexes comprised of hatcheries, feed mills, processing plants, breeder flocks and broiler flocks. The flocks of one company may be interspersed in the same geographic area with flocks owned by other broiler companies. Because of the day-to-day

movement of company personnel between their flocks, sometimes at great distances, I believe the existing practice of establishing disease quarantine zones simply on distance from infected flocks during control programmes should be re-examined. I do not believe distances have as much relevance as they once did, because in the modern industry a company service person can visit an infected flock and travel 70-80 km to another company flock within the period of one hour. Such a scenario tells me that the validity of setting up 10-km 'zones' around infected flocks may be of limited value in today's commercial industry. Flock-contact sequences by company and other personnel appear to be a more important consideration than distance in that there is some evidence that airborne transmission between flocks occurs only when houses are in very close proximity. It is only possible to lessen the chances of such disease spread by human movement through a sound and closely adhered to system of biosecurity.

Because we at the U.S. Poultry & Egg Association believe that keeping AI out of flocks through 'biosecurity' is a valid, albeit difficult, option for preventing AI losses, we funded the development and production of an interactive compact disc (CD) training and reference programme entitled "Poultry Disease Risk Management: Practical Biosecurity Resources CD".

The individual primarily responsible for the content of the CD was Dr. J. P. Vaillancourt , a poultry veterinarian at North Carolina State University. He solicited and received input from poultry-industry veterinarians throughout the CD development process utilizing the rapid-response capability and convenience of email. He applied the term 'Dream Team' to that group and used them for rapid editorial and content reviews of biosecurity issues and practices all during the CD development process.

The actual production of the interactive CD was accomplished by Gene Lambert of Paradigm Media in California. He remains the technical resource person for those who may have difficulty operating all the many features of the CD. Users must have a computer with a sound card and CD-reading drive capability. It is not difficult to use, even by a computer neophyte. It can also be used by professionals in group-training sessions.

The CD is being offered to the poultry industry at no cost. It can be obtained by placing an order on the U.S. Poultry & Egg website at www.poultryegg.org. We are attempting to keep records on who receives the CD so future revisions/updates can be sent to them. Approximately 500 CDs have already been mailed out to requestors.

We have concluded that for any programme of biosecurity to be effective, the bird caretakers or growers themselves must be absolutely convinced of its need, informed of the technical basics involved and supportive of the effort. All the biosecurity rules and regulations sent down to the farm from 'those in charge' will be for naught without the complete 'buy in' by the grower/caretakers of the flocks. For example, no poultry-company administrator or government regulator will be observing the poultry house when the caretaker has to get out of bed at midnight to check the brooder operation and house ventilation. That caretaker must believe in the need for and the effectiveness of biosecurity or he/she might be inclined to take no biosecurity precautions before entering the poultry house in the dark of the night. Caretaker education and training must be a basic building block of creating a system of biosecurity that can keep AI out of commercial poultry. It is the hope of the U.S. Poultry & Egg Association that the Biosecurity CD will, through the coming years, help accomplish that difficult goal.

Because the implementation of an effective biosecurity programme in the commercial poultry industry will likely require both operational and facility changes at some level of increased cost, upper management of the poultry company must also be well informed of the need and be supportive of the effort. Large integrated poultry companies are often led by talented administrators with backgrounds either in poultry science or business administration. As with the flock caretakers, they may not fully understand the basic principles of infection, disease and contagion. Because disease transmission is generally due to the direct or indirect contact of susceptible flocks with infected and virus-shedding poultry or even more likely due to the movement of contaminated personnel and/or equipment, there is a great need to educate all poultry-industry personnel on diseases and their causative agents. Once they have that basic understanding, individuals will be able to appreciate the need for biosecurity practices and therefore will be more likely to be supportive of the biosecurity effort.

There are many operations that are the responsibility of the poultry-company management and not the farm caretakers where there is a great need for attention to biosecurity. From the placement of chicks, flock supervision, feed delivery to catching/hauling, the integrator management has a long list of operations where the neglect of sound biosecurity can be very costly. Any operations that include farm visits can be particularly risky without biosecurity. The collection of semen and the artificial insemination of turkey hens is a good example as is the placement of new pullets and removal of spent fowl in a very large multi-age table-egg operation. To implement a really effective programme of biosecurity will first require a significant education/training effort at all levels in a company; this can only be successfully accomplished with a prolonged and continuing training programme. Employee turnover and retraining of employees and caretakers will require that biosecurity training become a routine part of company training and indoctrination programmes.

The Biosecurity CD that we have produced will hopefully be proven to be a convenient, interactive and easily updated training aid. During the workshop I have presented a PowerPoint ‘look’ at the CD and its capabilities prepared for promoting the use of the CD by Dr. Vaillancourt, and I have shown a few minutes of the Biosecurity CD.

I am not trying here to convince you that we in the United States are claiming that we have made the startling new ‘discovery’ that biosecurity is the way to prevent commercial poultry losses from AI and other infectious poultry diseases. We are aware that the realization has been obvious to all of us for many years. However, with the expanding LBM system, the increased interest by more of our residents in having backyard flocks, and the continuing growth of a diverse and, in some locations, a crowded poultry industry, it was our belief that the level of biosecurity practiced in our industry needed to be drastically improved. It is our hope that this Biosecurity CD, with the advantages of its inherent technological features, will help achieve that goal.

It is our goal that the broad disease-prevention benefits of an expanded and improved level of biosecurity can, if properly implemented and maintained, be so significant over time to offset, partially or completely, any additional costs associated with it. After all, biosecurity is mostly a ‘people’ thing: their understanding of diseases and their transmission, their dedication to complying with biosecurity practices, and the extent to which regulators can be successful in controlling the inherent risks to commercial poultry that accompany the LBM systems and backyard (game fowl) poultry operations.

There are some parts of the commercial industry that should be put on the 'top of the list' for improved biosecurity. The primary breeders are already convinced of the importance of biosecurity and have made great strides to implement it in their companies. There is an obvious need for biosecurity to be improved at the multiplier or parent flock level within companies. These are very valuable birds and the capital investment alone would be ample justification alone for a company to invest in biosecurity as 'insurance' against disease losses. The very large million- and multimillion-hen table-egg complexes also represent a huge bird investment and are other examples where improved biosecurity could represent a economically defensible form of insurance against disease losses. In fact, there may not be any other reasonable alternatives to protecting such large numbers of caged layers against the ravages of AI.

I believe the concept of biosecurity practices reducing the likelihood of AI losses is a sound approach. The remaining question is whether or not those involved will have the interest and the will to pursue that route. After all, if they don't join in with conviction and enthusiasm, it is not likely to be successful. I appreciate the opportunity to have been a part of this AI workshop and welcome future input on how we might improve the Biosecurity CD.