

Biosecurity in times of bird flu

H&N TECHNICAL TIPS

Bird flu or avian influenza is undoubtedly one of the most problematic bird diseases for the egg production sector today. Given this context, biosecurity programmes are proving to play a fundamental role in preventing the disease from entering different countries as well as the appearance of secondary outbreaks. This article briefly explains the general characteristics of biosecurity programmes and how bird flu spreads, then gives a list of biosecurity steps of special importance in periods when there is a risk of bird flu cases appearing.

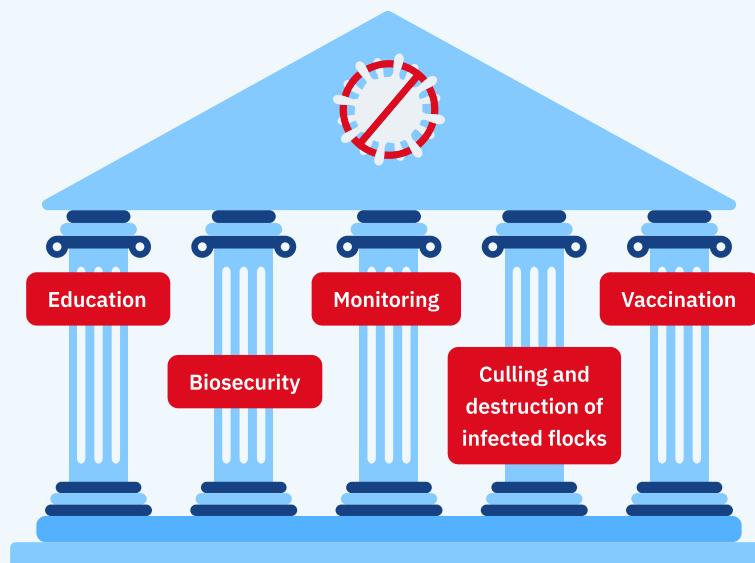
Bird flu: an increasingly complicated epidemiological situation worldwide

The increasing appearance of outbreaks of highly pathogenic avian influenza (HPAI) in poultry farms in various countries has led to enormous difficulties for the egg production sector in recent years. **In fact, the epidemiological situation of the disease seems to be growing increasingly complicated worldwide year after year.** Indeed, even countries that did not use to have cases regularly are finding infected birds for the first time in years.



The avian influenza virus (AIV) is highly infectious and decimates poultry populations. Thanks to its great ability to mutate and recombine its genetic material, it can evolve in terms of its virulence as well as in terms of the species it affects or the composition of its antigens. All of this means that bird flu control programmes can only be successful if they are applied in a coordinated, relentless way.

In general, there are usually five pillars for these programmes:



All of these pillars have one common aim: to **reduce the circulation of the virus** so as to help control or eradicate it from poultry in a certain territory. In many countries, there is some controversy about the feasibility of implementing some of these pillars (particularly concerning vaccination and the culling of infected flocks). In any case, biosecurity is always considered to be an essential tool to control the disease.

Biosecurity programmes in poultry farms

Biosecurity plays a crucial role in controlling bird flu (and practically any avian disease). In disease-free areas, it is the main tool to prevent the disease from entering farms in the territory. **However, the other pillars of the programme are also essential, since they complement the biosecurity and work in synergy with it. For biosecurity programmes to have a real impact on the birds’ health, they must have a series of characteristics:**



They must be part of the companies’ organisational culture. **Biosecurity is not simply about taking isolated measures on some farms, but rather about the company itself working in a way that minimises the risk of diseases entering and spreading.** This implies numerous changes in terms of facilities, procedures, logistics, staff training, etc.



They have to be introduced and work in the long term. It is very difficult to raise real biosecurity levels in the short term if there is no background work behind it, and the farms’ facilities, the staff and the company as a whole will not be prepared for a moment of great pressure such as a bird flu outbreak.



Biosecurity programmes must be all-encompassing. In other words, they must cover all the risks of diseases entering or spreading on farms. **Biosecurity can be divided into three categories: location, facilities and operations.** We can then identify different programmes to control specific risks of diseases entering (visits, pest control, water and feed, replacement of birds, removal of by-products, staff training, L&D protocol, etc.). **They all work together, but the programme is only as strong as its weakest link.**

Of course, for certain diseases, there will be specific parts of the biosecurity programme that may be more important than others. This will depend mainly on each particular disease’s mode of transmission.

Understanding how bird flu is transmitted

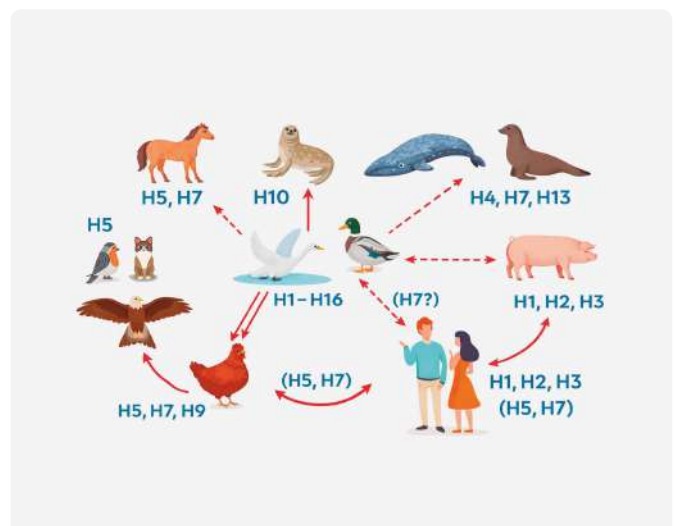
The avian influenza virus (AIV) or bird flu is highly diffusible and infectious.



It can infect most known families of birds, which includes Anseriformes (ducks, geese and swans), Caradriformes (gulls), Ciconiformes (herons), Columbiformes (pigeons), Falconiformes (birds of prey) and Galliformes (partridges and pheasants) and more.

However, different strains show varying degrees of adaptation to different host species. Transmission between different bird species also can occur, especially between closely related ones. Furthermore, direct transmission to mammals, though less common, has also been documented.

Graph 1. Adapted from Wahlgren 2011



Viral Replication & Shedding

Replication of the virus occurs mainly in the respiratory, intestinal, renal, and/or reproductive systems. Via this means, infected birds can begin to excrete the virus three days after infection, mainly through their respiratory tracts, conjunctiva and cloaca.

AIV Skin Contamination

In the case of highly pathogenic avian influenza, the AIV can also be detected on their skin, including the feathers. Infected bird carcasses also have very high viral loads and are highly infectious.

Egg Contamination

The virus can also be isolated from the egg's interior and the shell of eggs laid by infected birds. However, taking into account that birds usually stop laying after infection and that the virus has a high embryo lethality, vertical transmission (chicken to egg/offspring) does not appear to play a significant role in transmission.

Transmission Routes

The virus is transmitted by direct contact between infected and susceptible birds, or else by indirect contact through aerosols or exposure to virus-contaminated fomites. It is important to note that the bird flu virus has a lipid envelope. This means it has low resistance to the environment, especially at high temperatures. Therefore, fomites play a key role in transmitting it, since they give it greater stability. These include bird faeces, water and feathers, which play a fundamental role in transmitting AIV, not forgetting other materials such as cotton or wood.

The infective doses are very low, so even extremely small amounts of such fomites can set off an outbreak on a farm. The virus can also be transmitted by other species of animals that act as a mechanical vector, or which can become infected and excrete the virus. Lastly, it cannot be ruled out that in the event of an outbreak on a farm, the disease could be transmitted to you through feathers and dust carried on the wind from other farms in the area.

Graph 2. Routes of AIV Entry



During this stage prior to an outbreak, the main risk factors involve contact with migratory birds, their faeces and other vectors in contact with them. It should be noted that this risk fluctuates throughout the year due to the times when birds migrate, and between years due to the viral load and the type of virus that recirculates among migratory birds.



We must bear in mind that in a real situation, primary and secondary infections may be occurring at the same time, and that we have limited knowledge of the role of non-migratory wild birds in spreading the disease among farms in the same territory.



If the virus manages to enter farms or sites with poultry in the territory, the source of contagion may also originate from infected poultry. Hence, other risk factors must be added that are related to direct contact (by proximity) or indirect contact (lorries with feed or eggs, removal of chicken manure or litter, visits, etc.) that can take the virus from one farm to another. At this point, early sampling, culling, isolation and destruction of birds and infected matter plays a fundamental role in how the outbreak progresses.

Adapting biosecurity in periods of high bird flu risk:

Biosecurity programmes must be set up to prevent the risk of the disease entering before periods of high bird flu risk begin. In any case, during such periods there are some especially critical measures that must be reinforced:

Risks of AIV being introduced due to migratory birds

Avoid contact with wild birds; any direct contact with such birds and poultry must be avoided. To do so, buildings must be made “wild bird proof”. This means:

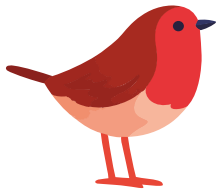
- The farm’s walls and roofs must be completely closed and not allow any type of wild bird to enter.
- Windows and air inlets must be protected with bird mesh or an equivalent system. Such protection must be fitted well and not leave gaps allowing wild birds to enter.
- The access door must remain closed when not in use, and in any case it must not give direct access to the birds’ area. Doors that are not for daily use must be bolted.
- In the case of birds in systems with access to outdoor zones, authorisation must be requested from the official veterinary services to be exempted from the obligation to use such zones where contact with wild birds is impossible to control.

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**WILD
BIRD
PROOF**

02



Avoid attracting wild birds to the farm: farms must be “unfriendly” territories for wild birds. To do so:

- Prevent areas of stagnant water from appearing. The land in the surrounding areas must be levelled to prevent stagnant water from building up. The possibility of using drains and guttering to drain off water from the buildings’ perimeter should be considered.
- Prevent birds from nesting in farm buildings or nearby structures. It is not advisable to have trees or brushy areas of vegetation in the surrounding area.
- Ensure the silos are sealed tight so that birds cannot access the feed. Likewise, spillages of feed that may attract birds must not be allowed.
- Prevent chicken manure from building up in the areas surrounding the buildings, since it always contains undigested cereal grains, which attract various types of birds.
- In a free range bird system, avoid having drinkers or feeders in uncovered zones in outdoor corrals.
- Remove unnecessary ledges or horizontal surfaces that may be used by wild birds to perch on. Systems such as laser cannons or other devices can also be used to scare away birds.
- Farms should not be built in the immediate vicinity of marshes, lakes or other areas where wild birds often make their migratory stops.

Avoid contact with infected wild bird droppings. Avoid introducing infected faecal matter into the buildings. To do so:

- Establish a single point of entry to the buildings with a washbasin and a separation between the dirty area and the clean area, changing to indoor shoes/footwear there. Workers (or visitors) should never step inside the clean area with the shoes they have used outside.
- Establish a perimeter area with defined routes between the farm’s different buildings and facilities. Workers should go only along these marked routes in their daily activity. Lime can also be spread on these routes to sanitise them.
- Control the rodent population, since they can also act as mechanical vectors of infectious matter.
- Completely prevent any other type of domestic or non-domestic animals such as dogs, cats, etc. from entering the birds’ area.

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Prevent water contaminated with AIV from entering. An AIV-free water supply must be ensured. To do so:

- Give priority to deep catchment sources over surface water catchment sources.
- Treat all the water used on the farm with a sanitising agent.
- Prevent rainwater from entering the building through the roof or under doors.

“Effective biosecurity depends on controlling every possible route of virus entry.”

Prevent AIV from entering via temporary or permanent farm workers. The entire workforce must understand the risk and adapt their way of working as well as their personal activities to the situation that has appeared. To do so:

- Have clothing exclusively for use on the farm ready for the workers. Ideally, it should be cleaned at the facility itself and should not be hung outside to dry. The possibility of showering before entering the birds’ area is strongly recommended.
- Workers should avoid having birds of any kind in their homes, especially back garden (outside) birds of any kind.
- They should avoid any type of activity related to birds, such as falconry, hunting, bird watching, cock-fighting or other similar activities.
- It is not advisable for workers to combine livestock farm work with agricultural field activities, especially if they do so in places where they may be in contact with migratory birds or their droppings.
- In the event that workers find dead birds, they should not touch them under any circumstances. They simply have to notify the appropriate person, depending on whether they find them on the farm or during their free time.

05



Risks of AIV entering due to “infected farms”

Prevent AIV from entering due to people visiting. Any type of visit or tour that is not strictly necessary to run the farm must be avoided.

Unavoidable ones must follow certain steps to minimise their risk:

- Visits to the farm by anybody who has been in areas where there have been outbreaks of bird flu (and of course in infected farms) must be strictly forbidden.
- Visitors must be requested not to have visited any poultry farm in the last 72 hours, which must be verified. This is especially critical for visits by groups transporting birds, vaccinators, veterinarians, technical services for poultry apparatus and other professionals who provide services on farms. This can be a big challenge, since the poultry industry must respond to breakdowns, emergencies and schedules. It is therefore necessary for everybody involved in the sector to use common sense and professionalism in order to apply this measure rationally.
- Farms must only be entered wearing clothing and footwear exclusive to the farm. If this is not possible, disposable overalls and leggings should at least be provided for visitors, and the visitor’s clothing and shoes should have been washed before their visit and after their last visit to the farm. The use of showers is highly recommended.

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Prevent AIV entering via farm equipment or materials.

Livestock farm materials may be contaminated with faeces or other fomites that enable the virus to survive and therefore act as a vector for the disease. To prevent this risk, the following steps must be taken:

- Most of the tools and equipment necessary for the farm to run properly must be in the farm itself, so that it is not necessary to share them with other farms.
- Any material coming from areas where cases of bird flu have been reported must be strictly forbidden from entering the farm.
- Any new material or tools entering must be for first-hand use and not come from another farm. If this is absolutely impossible and the tools or materials have been used before, they must arrive cleaned and disinfected from the source. If not, they must not be accepted. Before bringing them into the farm, they must also follow a cleaning and disinfection process. In any case, it should be noted that there are materials (such as egg cartons) that are very difficult to disinfect which should therefore never be recirculated between farms.



Prevent AIV from entering via airborne dust or feather particles. Wind can carry feathers or dust particles with infective loads of AIV from one farm to another. For this reason, priority should be given to building new farms in areas that are as isolated as possible.

“Effective control of farm access is a critical measure in protecting farms from bird flu.”



Prevent AIV from entering via replacement birds. Obviously, legislation on the movement of poultry must be followed. The following steps should also be considered:

- Birds should not be moved from areas or farms with outbreaks of bird flu, even if their transfer has been previously authorised and their transport is already arranged. At this point, the principle of precaution must be followed, working with the greatest possible determination.
- Special attention must be paid to cleaning and disinfecting lorries and cages that transport birds. Likewise, their routes should be planned to avoid areas where there are infected farms.
- No poultry or any other type of bird can be brought into the farm under any circumstances or pretext, apart from official controls and checks.
- In addition, the presence of more than one poultry species on the farm should be considered a risk factor.

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Prevent AIV from entering through vehicles. Vehicles, and particularly their tyres, can carry fomite particles that transmit AIV. Given that transporting materials to and from the farms is part of their activity, it is necessary to take the following steps:

- No vehicle that has travelled through areas where there have been cases of bird flu (and certainly not any that have entered infected farms) should make trips to the farm. This may mean that vehicles have to take alternative routes to the usual ones to avoid such areas.
- Restrict vehicle access to the farm to strictly necessary trips only. Also try to reduce the number of trips to the farm by optimising deliveries and collections. However, routes that visit different farms should be avoided. Carcass removal trucks must not enter the farm under any circumstances.
- Carcasses must be removed at an external point as far as possible from the farm. Under no circumstances can there be any kind of direct contact between the farm staff and the carcass removal lorry drivers.
- All vehicles that do not need to enter the farm must be parked in an external car park, which should restrict entry to only allow feed, egg collection and animal transport lorries.
- Set up pre-established circuits with signage for the lorries. Ideally, these circuits should not enter the farm's perimeter, encouraging unloading or collection from outside the farm.
- If a vehicle must necessarily enter the farm, it must be cleaned and disinfected before arriving at the farm and after its last visit to any other farm. Furthermore, upon arrival, the tyres must be cleaned and disinfected with special care. It is essential to renew the sanitising solution periodically to ensure its effectiveness. It should also be noted that disinfection arches are of great help for this work, but it must be individually verified that each lorry is disinfected properly.
- Special attention must be paid to the cleaning and disinfection of lorries that transport chicken manure.
- Lorry drivers should try to have minimal contact with the farm's staff. Also, they must wear at least overalls and leggings while unloading, and under no circumstances may they enter the birds' area.

09





“Effective biosecurity is only possible through a sustained, sector-wide commitment.”

In summary

It is clear that this list of measures is long, complicated and expensive to implement, involving most parties in the sector, and yet it is probably incomplete.

As a result, biosecurity on farms can only be made real and effective if there is a relentless commitment from the sector as a whole to implement it. It should not be forgotten that, due to the capacity of AIV to mutate and the fact that its entry into the territory depends mainly on being recirculated among migratory birds, it is very difficult to predict how much of a challenge must be faced in the coming years.

For this reason, it is essential to implement a comprehensive biosecurity programme that is well adapted to each farm’s real situation in order to ensure some peace of mind in our work.



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