Biosecurity Assessment for Broiler and Layer Flocks

Dr Carla Gomes DVM, MVPH, PhD, Dip.ECVPH, Animal Health Ireland, provides an overview of biosecurity in the poultry industry

The poultry industry faces ongoing challenges as units seek to prevent introduction and spread of infectious diseases and other risks. Biosecurity refers to the set of measures applied to address these risks. Biosecurity can be divided into external and internal components.

External biosecurity focuses on the contact points of the farm with the outside world and aims to prevent diseases entering or leaving the farm. This applies both to exotic diseases (e.g., Avian Influenza), and to endemic diseases (e.g., Campylobacter or Infectious laryngotracheitis). All measures taken to limit or stop the spread of pathogens within a farm are covered by internal biosecurity.

The implementation of biosecurity measures has also been shown to have other positive effects. For example, in several studies with poultry, higher biosecurity scores showed a positive correlation with the production results and the profitability of the farm. Along with this, the use of antibiotics can be greatly reduced, which, consequently, will reduce the development of antibiotic resistance.

INDEPENDENT BIOSECURITY ASSESSMENT

One of the best ways to understand and improve the biosecurity status of units is through regular independent assessment by a trained private veterinary practitioner (PVP). A standardised system of assessment is available across the Irish poultry industry. These assessments are fully funded through the Targeted Advisory Service on Animal Health (TASAH) under the Rural Development Programme. The programme is overseen by Animal Health Ireland, with payment being made directly to the PVP, following completion of the assessment/review. Only PVPs who have been trained in these assessments are funded for their delivery. A list of trained PVPs is available at https://animalhealthireland.ie/training/poultry-training. Herd owners can directly contact one of these trained PVPs to avail of this service. Funded assessments are available on a yearly basis.

The assessments help to highlight the points of greatest risk in each farm. This provides the opportunity for farmer and vet to agree up to three prioritised, achievable measures to improve biosecurity. A report detailing the results of the biosecurity assessment, including the scores in each section and the agreed measures to address identified weaknesses will be generated for PVPs to provide to the farmers. Repeating the assessment each year will allow improvements over time to be demonstrated. While not currently available, there is also the potential to compare performance against national rankings.

The assessments are conducted using Biocheck, a risk-based scoring system developed by the University of Ghent to evaluate the quality of on-farm biosecurity in a scientific and independent way (https://www.biocheck.ugent.be/). External biosecurity and internal biosecurity are divided into several sections (Table 1) for broiler and layer units. These sections systematically assess and score risks related with live animals, animals' products, carcase management, operations (e.g., transport of suppliers, animal transport, waste/water management, facility hygiene, cleaning and disinfection protocols), personnel flows (e.g., visitor policy, farm staff, management of work routines), facilities (e.g., fences and entrances), and immunity management (e.g., vaccination protocols). Each section is scored from 0 per cent (poorest biosecurity) to 100 per cent (the best biosecurity) and weighted according to their importance in terms of risk for introduction and spread of infection in poultry units. The weighting of elements within the poultry assessments is described at https://biocheck.ugent.be/en/weight-factors-poultry.

Table 1. External and Internal biosecurity components of Biocheck UGent tool for broiler and layer farms.

Broilers		Layers	
External	Internal	External	Internal
Purchase of one day old chicks	Disease management	Purchase of one day old chicks	Disease management
Depopulation of broilers	Cleaning and disinfection	Purchase of layers	Cleaning and disinfection
Feed and water supply	Materials and measures between compartments	Depopulation of hens	Materials and measures between compartments
Removal of manure and dead animals		Transport of eggs	Egg management
Entrance of visitors and personnel		Feed and water supply	
Supply of materials		Removal of manure and dead animals	
Infrastructure and biological vectors		Entrance of visitors and personnel	
Location of the farm		Supply of materials	
		Infrastructure and biological vectors	
		Location of the farm	

BROILERS AND LAYERS: BIOSECURITY SCORES

As of the end of July 2021, 213 units had been reviewed in terms of their biosecurity for broilers and 68 units for layers. These correspond to around 66 per cent and 36 per cent of the commercial broiler and layer units in Ireland. Overall, for broilers and layer flocks, internal biosecurity scores better than external

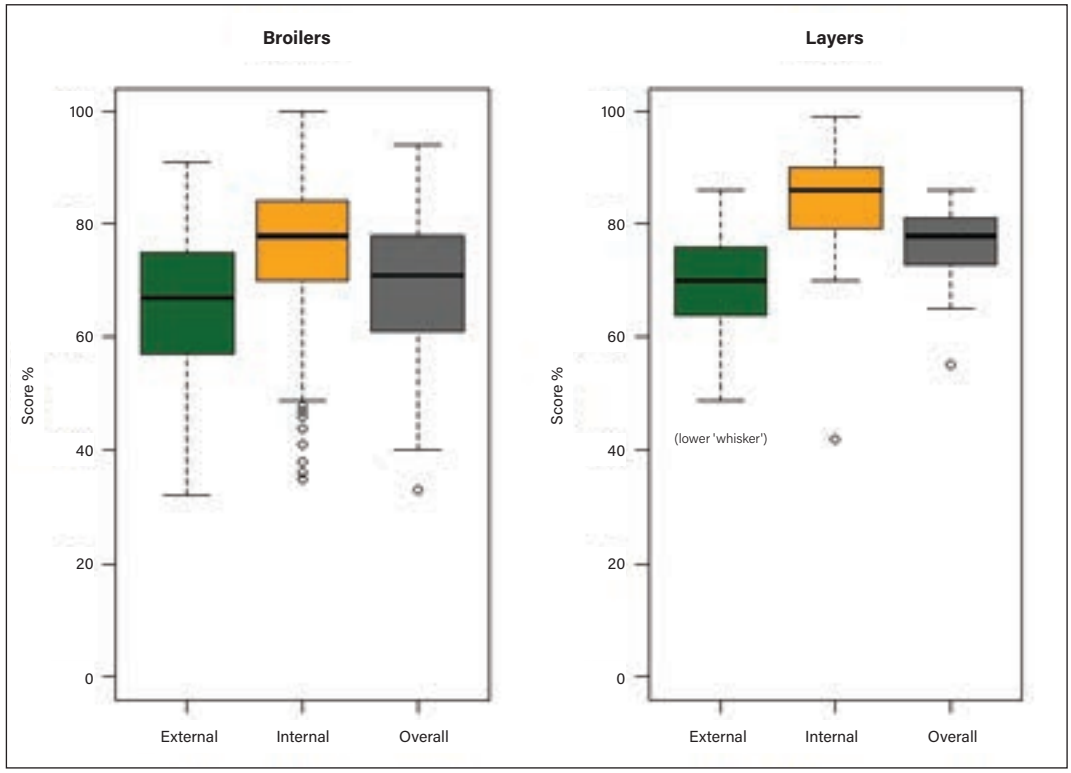

Figure 1: Graph showing the distribution of the scores per farm for the components of external (dark green), internal (orange) and overall (grey) biosecurity for all of the broiler (213) and layer (68) farms assessed until the end of July 2021. The thick line is the median (half of the farms assessed have scores lower than this line, while the other half have scores higher than this line). The lower and upper limits of each box represent the distribution of herds falling within 25 per cent-75 per cent of the distribution, while the lower and upper 'whisker' represent the range of scores for 5 per cent to 95 per cent of flocks (i.e., excluding the top and bottom 5 per cent of scores).

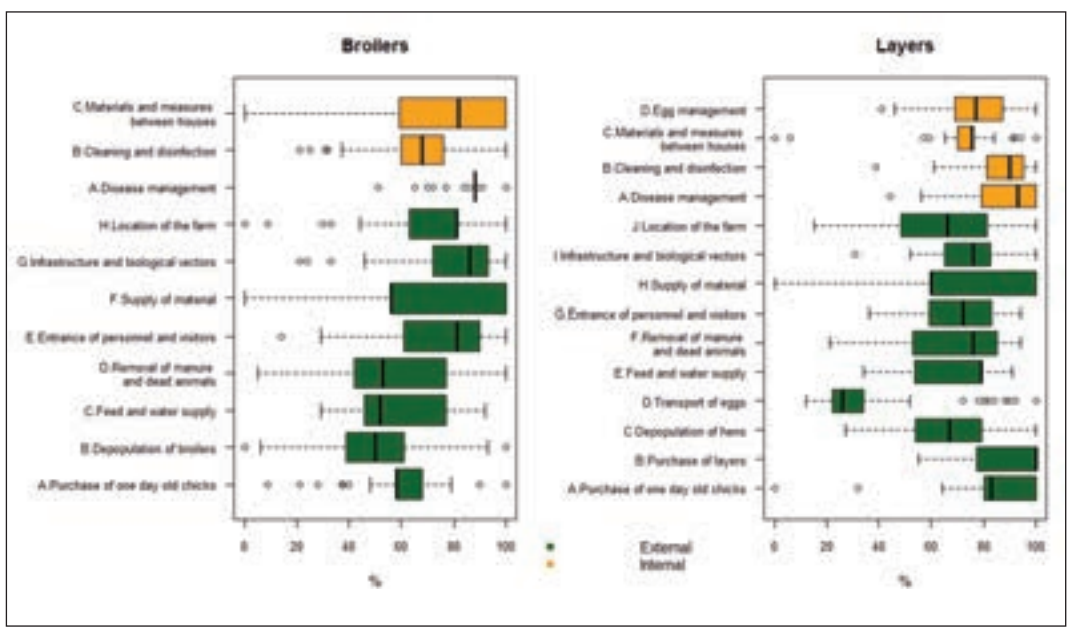

Figure 2: Biosecurity results for each of the several sections that are part of the overall external (dark green) and internal (orange) biosecurity assessments for broiler (left graph) and layer (right graph) flocks.

biosecurity (Figure 1). Direct comparison of the scores between broilers and layers units is hampered by the low coverage of layers units assessed so far. It is quite probable that the layer units assessed so far could be ones with better biosecurity (or at least the ones showing a more proactive attitude towards biosecurity by doing an assessment).

When looking at specific biosecurity sections on broiler units (Figure 2 – left graph), sections such as the entrance of personnel and visitors, infrastructure and biological vectors, location of the farm (all related to external biosecurity) and disease management (related to internal biosecurity) score well for most of the farms. Measures focusing on the sections of depopulation of broilers, feed and water supply, removal of manure and dead animals, and supply of material require

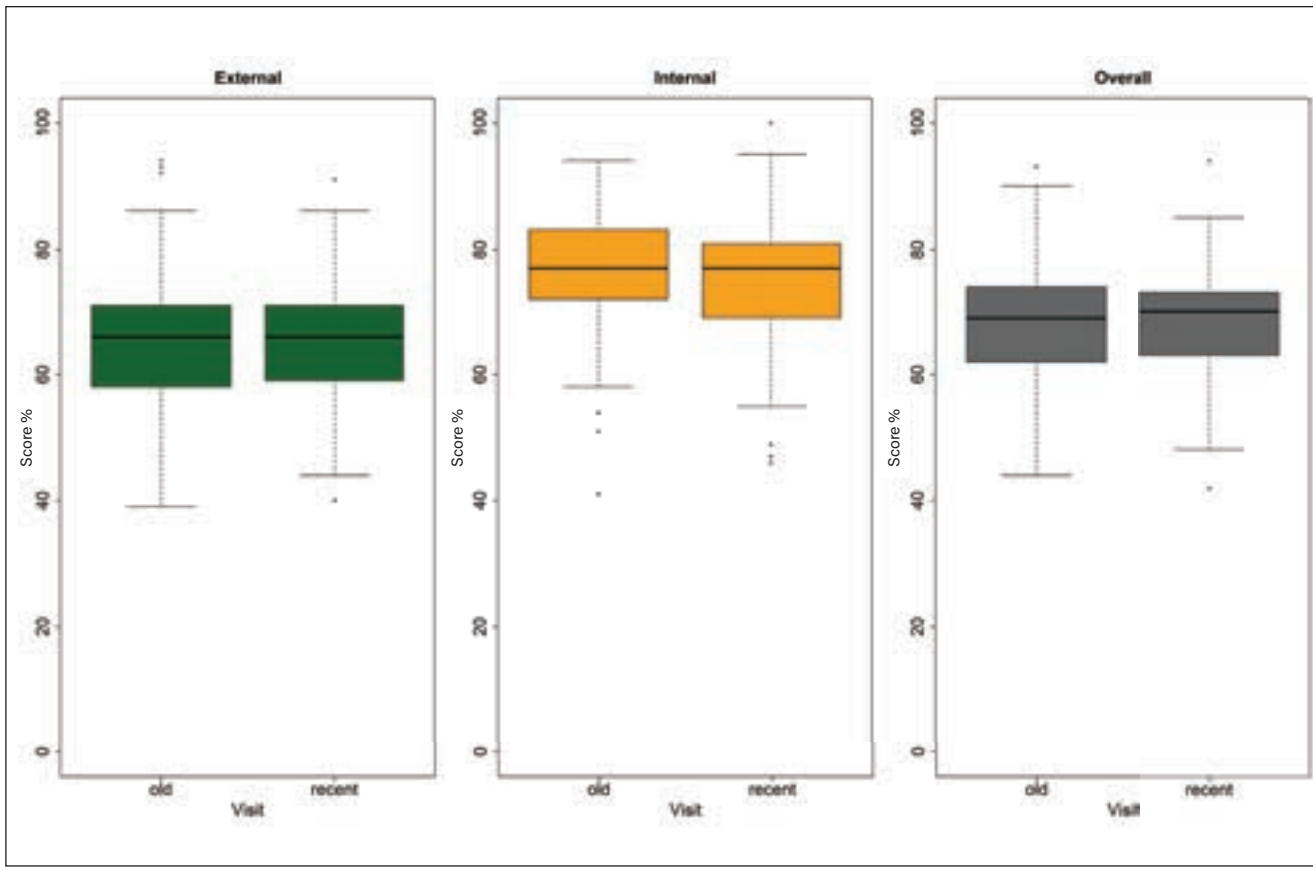

Figure 3: Biosecurity results for each of the several sections that are part of the overall external (dark green) and internal (orange) biosecurity assessments for the 97 broiler units that have been assessed twice (from the old to the most recent visit).

further improvement. Examples of these measures would be: to ensure that transport vehicles taking poultry to the slaughterhouse are always empty on arrival at the farm; not allowing entrance of transport staff into the poultry houses; dividing the farm site into clean and dirty areas; and disinfecting material before entering the farm. The dirty area of a farm is where 'risky' operations occur, such as passage of all inbound and outbound traffic from multiple companies (e.g., feed delivery, manure removal, removal of carcases, external transport of animals), while the clean area should be reserved for internal farm movements and for only fully-cleaned and disinfected lorries. In terms of internal biosecurity, installing a farm hygiene lock and having house-specific boots helps prevent the dissemination of disease within a farm.

In terms of recommendations made so far by PVPs to broilers units, around one-third focus on the removal of dead animals, followed by advice related to the entrance of visitors and personnel, fencing of the farm and cleaning and disinfection.

For layer units (Figure 2 – right graph), sections such as purchase of one day old chicks, purchase of layers, feed and water supply, removal of manure and dead animals, infrastructure and biological vectors (all related to external biosecurity), disease management and cleaning and disinfection (related to internal biosecurity) score well for most of the layer units assessed so far. Measures focusing on the transport of eggs, supply of materials, depopulation of hens and egg management require further improvement. Examples of such measures would include: not allowing the driver of vehicles transporting eggs to have access to the egg facilities on farm; making sure that such vehicles are empty on arrival at the farm; disinfecting material before entering the farm; providing the catching team farm-specific or disposable clothes and boots, making sure that the catching team wash and disinfect their hands before entering the poultry houses; and preventing farmworkers who work in the poultry houses also working in the egg room.

The recommendations provided to improve layer units' biosecurity focus on the entrance of visitors and personnel, installation of hygiene locks, cleaning of feed equipment and removal of dead birds.

Ninety-seven (45.5 per cent) of the 213 broiler units have been assessed more than once. Figure 3 shows the results for these farms for external, internal and overall biosecurity. A slight improvement was observed for external biosecurity, while the same was not observed for internal biosecurity. This indicates that farmers are not consistently implementing the measures suggested by PVPs to improve their biosecurity.

To conclude, external biosecurity in poultry units should be improved to reduce the risk of disease introduction into the farm, especially exotic diseases such as avian influenza. Internal biosecurity is generally high but there is room from improvement in this sector. It would be especially interesting to link this data with Campylobacter results from broilers units to explore the biosecurity practices associated with higher risks for Campylobacter.

AHI will conduct further veterinary training sessions on performing these assessments, subject to interest. To register your interest in this training please enter your details at https://portal.animalhealthireland.ie/traineoi/