

# Current Irish dairy herd biosecurity practices and economics



The recent launch of the National Farmed Animal Biosecurity Strategy (2021) is an opportune time to assess biosecurity practices in Irish dairy herds. In this article, Dr John Mee, PhD, MVM, MVB, DipECBHM, FRCVS, Teagasc; Dr Osayanmon W. Osawe, PhD, ESRI; Dr Marie-Claire McCarthy, PhD, MVB, DAFM; Dr Conor McAloon, PhD, MVB, DipECBHM, MRCVS, UCD; Dr Luke O’Grady, PhD, MVB, DipECBHM, MRCVS, UCD; and Dr Doris L  pple, PhD, BSc, NUI Galway, present the latest results from two national biosecurity studies on Irish dairy farms

Biosecurity has become a very topical subject globally with the SARS-CoV-2 pandemic. While to date, there has been limited information on the adoption of biosecurity practices on Irish cattle farms, international studies would suggest limited uptake of such measures. Some of this reluctance to implement best biosecurity practice (for example as recommended by the Animal Health Ireland Biosecurity TWG) may be linked to a lack of evidence showing an economic benefit to the farmer.

### TWO RECENT BIOSECURITY STUDIES

In order to bridge these knowledge gaps, two new research studies were recently completed by Teagasc in conjunction with UCD and NUI Galway. Both projects examined current biosecurity practices on Irish dairy farms and one also evaluated whether such practices were associated with economic benefits. These studies were conducted against the backdrop of EU milk quota abolition in 2015 and consequent significant national dairy herd expansion. We define

Bioexclusion practice	Dairy farms (%)
Don't exhibit cattle at agricultural shows	98
Slurry spread from home farm only	98
Foot dip on farm	92
Mains or well only water sources	90
No possible nose-to-nose neighbour cattle contact	86
Own trailer used for cattle transport	50
Slurry spread by contractor only	22
Disinfect cattle trailer	6

Table 1. General bioexclusion practices adopted on larger Irish dairy farms.

bioexclusion as practices for the prevention of introduction of infection to a farm and biocontainment as practices for the prevention of transmission of infection within a farm, while the term ‘biosecurity’ is the umbrella term for both.

## MOOREPARK/UCD STUDY

Data from a control group of 50 herds in a recent national study comparing biosecurity practices of farmers who sent their heifers out to contract-rearing (n=70) or reared their heifers at home (n=50) are summarised here (McCarthy et al., 2021). These (control) farmers had larger than national average (~90 cows) herd sizes (median 121 cows; 60-501). The majority (>50 per cent) of these farmers adopted most general bioexclusion practices (Table 1) but fewer adopted purchase animal bioexclusion practices (Table 2). While adoption of general biocontainment practices was highly variable (Table 3), the vast majority of farmers vaccinated their cows and breeding bulls (Table 4), most commonly against salmonellosis, leptospirosis and IBR (Table 5).

## NATIONAL FARM SURVEY STUDY

In addition to the above study, supplementary survey data from the National Farm Survey (NFS-2019) on biosecurity practices of 267 dairy farmers are summarised here (Osawe et al, 2022). The average herd size on these farms (91 cows) was similar to the national average herd size. The vast majority of these farmers vaccinated their herds, generally against two or more diseases (Table 6), most commonly leptospirosis, IBR and salmonellosis (Figure 1). Interestingly, both the proportion of farmers vaccinating and the proportion vaccinating against each disease was lower in this study with average herd sizes, than in the previous study with larger herd sizes. While the majority of farmers also conducted BTM testing, a majority also fed pooled colostrum to calves.

## ECONOMICS OF BIOSECURITY


In addition to collecting data on biosecurity practices, data on farm financial performance was collected from the dairy farms in the NFS. Higher gross margin (GM)/cow was associated with an increasing number of vaccinations (Table 7). Larger herd sizes, better management ability and extent of dairy specialisation were

Purchase animal bioexclusion practice	Dairy farms (%)
Quarantine facility >3m from other cattle	93
Quarantine purchased cattle	79
Test purchased cattle (excl. bTB)	28
Quarantine for > 4 weeks	15

**Table 2. Purchase animal bioexclusion practices adopted on larger Irish dairy farms.**

related to the use of vaccination (and more so, vaccination against more diseases). Using two or more vaccinations was associated with economic gain that increased with the number of vaccinations.

Specifically, using two or three vaccinations was associated with an economic gain of €67GM/cow while using more than three vaccinations was associated with an economic gain of



11/08/2022

Direct animal healthcare professional communication (DaHPC)

**HIPRABOVIS IBR MARKER LIVE (Infectious bovine rhinotracheitis vaccine (live)) - Increase in the incidence of anaphylactic-type reactions in cattle**

Dear Veterinarian,

Laboratorios HIPRA, S.A. in agreement with the European Medicines Agency and the Health Products Regulatory Authority (HPRA), would like to inform you of the following:

**Summary**

- Since early 2022, an increase in the incidence of anaphylactic-type reactions in cattle has been observed after the use of the vaccine HIPRABOVIS IBR MARKER LIVE.
- Within the period from 1 March 2022 to 31 May 2022, a total of 27 cases involving 175 animals that had an anaphylactic-type reaction, and 8 animals that have died, have been reported. In at least 5 of the animals that have died, the animals had anaphylactic-type reactions with a fatal outcome.
- Most of the cases have been reported in specific geographic regions of Spain (19/27) and Italy (7/27). Within this period, more than 641,075 doses have been administered in 14 EU countries. This situation has not been observed in Ireland or in other EU countries where the vaccine is currently used.
- In most cases several other vaccines had previously and/or concomitantly been administered to the animals.
- A clear root cause has not been identified yet and investigations are ongoing. The product information will be updated on the frequency and severity of hypersensitivity / anaphylactic-type reactions.
- Veterinarians are recommended to promptly report any adverse events observed to the HPRA and HIPRA at the earliest opportunity. It is recommended to provide the complete vaccination history and overview of the products used in the reacting animals, where possible. This information will enable further evaluation of the issue.

**Background on the issue/concern**

HIPRABOVIS IBR MARKER LIVE was first authorised in January 2011. It consists of a live attenuated vaccine which includes a live gene-deleted Infectious Rhinotracheitis Virus, strain CEDDEL as the active ingredient. The CEDDEL strain used in the vaccine is a double deletion mutant, which reduces the virulence of the vaccine strain and allows the differentiation of animals with antibodies to gE (infected) and those without (vaccinated). The vaccine is intended for the active immunisation of calves from 3 months of age and adult cows, to reduce clinical signs of infectious bovine rhinotracheitis (IBR) and field virus excretion.

Vaccination is the main approach for the management of Infectious Bovine Rhinotracheitis. The presence of eradication programs in some European (EU) countries makes the use of vaccines an important tool for protecting national herds. Marker vaccines allow monitoring of the herds in these countries.

Hypersensitivity reactions are adverse events already described in the product information of HIPRABOVIS IBR MARKER LIVE with a frequency of 'very rare'. The purpose of this letter is to inform you of an increase in the number of cases related to anaphylactic-type reactions, which has been observed in specific geographic areas of Spain and Italy. Within the period from 1 March 2022 to 31 May 2022, a total of 27 cases involving 175 animals that had an anaphylactic-type reaction, and 8 animals that have died, have been reported. Within this period, more than 641,075 doses have been administered in 14 EU countries. This situation has not been observed in other EU countries where the vaccine is currently used. In most cases several other vaccines had previously and/or concomitantly been administered to the animals.


A clear root cause has not been identified yet and investigations are currently ongoing. The product information will be updated on the frequency of hypersensitivity reactions from 'very rare' to 'rare' and on their severity with the addition of anaphylaxis (sometimes fatal). In case an anaphylactic-type reaction occurs, an appropriate symptomatic treatment should be administered.

**Call for reporting**

Reporting adverse events is important. It allows continuous safety monitoring of a veterinary medicinal product. Veterinarians are recommended to report any suspected adverse events via the national reporting system: see the HPRA website: Adverse Reaction Reporting ([hpra.ie](http://hpra.ie)) or email [vetsafety@hpra.ie](mailto:vetsafety@hpra.ie). The complete vaccination history and overview of other veterinary medicinal products used previously in the reacting animals, whenever possible, including the product name(s) and batch details, should be also provided in the reports, if available. A questionnaire is available from Laboratorios HIPRA, S.A. to assist veterinarians upon request.

**Company contact point:**

Should you have any questions or require additional information, please contact us:  
 Laboratorios HIPRA, S.A.  
 Avda. la Selva, 135, 17170 Amer (Girona),  
 SPAIN  
 (+34) 972 430660  
[www.hpra.com](http://www.hpra.com)



**Laboratorios Hipra S.A.**  
 Avda. la Selva, 135, 17170 Amer (Girona), Spain  
 Tel.: (34) 972 43 06 60 · [hpra@hpra.com](mailto:hpra@hpra.com) · [www.hpra.com](http://www.hpra.com)

N.I.F. A-26063675 - Registro Mercantil de Girona, tomo 138, folio 35, hoja GI-2480, inscripción 177, del libro de sociedades.

Biocontainment practice	Dairy farms (%)
Operate a rodent control policy	98
Don't graze animals of different age groups together	96
Apply antiseptic to all calves' navels	90
Disinfect calf houses between seasons	80
Calves don't share airspace with older animals	66
Wash equipment between management groups	64
Wash hands between management groups	50
Calves kept in groups of 10 or less	46
Dip boots in disinfectant footbath between groups	44
Change gloves between management groups	41
Calves housed exclusively individually up to weaning	34
Waste milk not fed to calves	20
Don't move older calves back to pens with younger calves	16

Table 3. General biocontainment practices adopted on larger Irish dairy farms.

€78GM/cow, when compared to using one or not vaccinating at all. Thus, the more diseases farmers vaccinated against, the higher the economic gains on those farms. Similarly, farmers who tested BTM for diseases also had higher GM/cow than farmers who did not, an economic gain of €103GM/cow. In contrast, there was no difference in GM/cow between farmers that pooled colostrum or not. Farmers with larger herd sizes were more likely to test BTM for diseases, while the opposite was true for not pooling colostrum.

Vaccination practice	Dairy farms (%)
Cows vaccinated for at least one infectious disease	94
Breeding bulls vaccinated against at least one infectious disease	83

Table 4. Vaccination practices adopted on larger Irish dairy farms.

These findings indicate that vaccination and testing BTM for diseases was associated with higher GM/cow, while evidence of economic benefits of not pooling colostrum was not found. But, importantly, not pooling colostrum was not associated with reduced economic outcomes. However, as this study utilised a cross-sectional dataset, uncontrolled biases and confounding factors may have

Disease	Dairy farms (%)
Salmonellosis	78
Leptospirosis	76
IBR	70
Clostridia	68
BVD	44

Table 5. Diseases vaccinated against on larger Irish dairy farms.

Biosecurity practices	Dairy farms (%)
Vaccinate cattle (against at least 1 disease)	86
Vaccinate against more than 3 diseases	39
Vaccinate against 2 or 3 diseases	33
Vaccinate against 0 or 1 disease	28
Test bulk tank milk (BTM) for diseases (other than SCC)	65
Use pooled colostrum (from more than one animal)	55

Table 6. Biosecurity practices adopted on average size Irish dairy farms.

affected the outcomes. This study design limitation should be borne in mind when interpreting/extrapolating findings. An alternative approach would be to compare farmers' economic outcomes before and after they adopted biosecurity measures. Towards this end, Teagasc, in collaboration with AHI, DAFM, ICBF, NUIG, SRUC, UCD and UG, has funded a

Biosecurity practice	POM (0 or 1)	ATT 2 or 3	ATT > 3
Vaccination	1,113*** (31)	67* (40)	78** (40)
	POM	ATT	
Testing bulk tank milk	1,128*** (46)	103** (50)	
Not pooling colostrum	1,198*** (29)	-45 (36)	

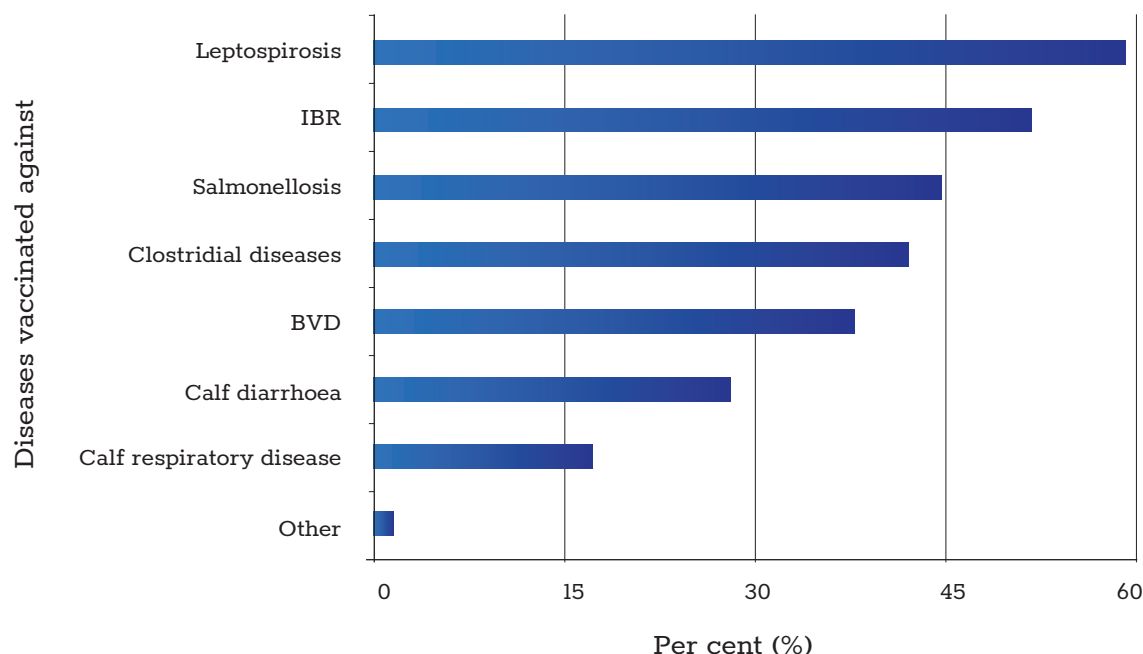
Significance level: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10; ATT = Average Treatment Effect on the Treated, POM = Potential Outcome Mean

Table 7. Economic impact (gross margin €/cow) for selected biosecurity practices in average size dairy herds.

new five-year (2022-2027) research project (MKAB-1763) on the production, health and economic impacts of biosecurity audit and intervention in Irish dairy herds.



Bulk tank milk sampling.



**Figure 1. Diseases vaccinated against by farmers with average size dairy herds.**

#### ACKNOWLEDGEMENTS

Teagasc funded the study by McCarthy et al, (2021) through the Walsh Scholar project MKAB-0146. The Department of Agriculture, Food and the Marine funded the study by Osawe et al, (2022) through the Surveillance Welfare and Biosecurity of Farmed Animals (SWAB) project 17/s/230.

#### REFERENCES

- McCarthy, M. C., O'Grady, L., McAloon C. G. and Mee, J.F. (2021) A survey of biosecurity and health management practices on Irish dairy farms engaged in contract-rearing. *Journal of Dairy Science*, 104, 12859-12870, <https://doi.org/10.3168/jds.2021-20500>
- Osawe, O.W, Läßle, D. and Mee, J.F. (2022) Economic analysis of biosecurity adoption in dairy farming: Evidence from Ireland. *Journal of Animal Science*, 2022-6318, <https://doi.org/10.1093/jas/skac218>

## Reader Questions and Answers

### 1. DEFINE BIOCONTAINMENT

- A. Prevent introduction of infection into farm.
- B. Prevent transmission of infection within farm.
- C. Contain infection within farm.
- D. Provision of biocontainers for infectious material.

### 2. DEFINE BIOEXCLUSION

- A. Prevent introduction of infection into farm.
- B. Prevent transmission of infection within farm.
- C. Exclusion of purchased animal from the farm.
- D. Exclusion of visitors from the farm.

### 3. WHAT ARE THE MOST COMMON DISEASES FARMERS WITH AVERAGE SIZE DAIRY FARMS VACCINATE AGAINST?

- A. Lungworm, Coccidiosis, Johne's disease.
- B. BVD, IBR, Leptospirosis.
- C. Leptospirosis, IBR, Salmonellosis.
- D. BVD, IBR, Salmonellosis.

### 4. WHAT WAS THE ECONOMIC GAIN (€GM/COW) OF USING 2 OR 3 VACCINES COMPARED TO 0 OR 1?

- A. €76.
- B. €79.
- C. €67.
- D. €69.

### 5. WHAT WAS THE ECONOMIC GAIN (€GM/COW) OF TESTING BTM FOR ANTIBODIES TO INFECTIOUS DISEASES?

- A. €3.
- B. €33.
- C. €10.
- D. €103.

ANSWERS: 1B; 2A; 3C; 4C; 5D.