



A survey of biosecurity-related practices, opinions and communications across dairy farm veterinarians and advisors



R.G. Sayers^{a,*}, M. Good^b, G.P. Sayers^c

^a Animal and Grassland Research and Innovation Centre (AGRIC), Teagasc, Moorepark, Fermoy, County Cork, Ireland

^b Department of Agriculture, Food and the Marine, Agriculture House, Kildare Street, Dublin 2, Ireland

^c Epsilon Ltd, Dun Baoi, Derryquay, Tralee, County Kerry, Ireland

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ABSTRACT

Biosecurity at farm-level can often be poorly implemented, and lack of information has been cited by many studies as a potential explanation. Veterinary practitioners (VPs) and dairy advisors (DAs) play a central role in the provision of animal health and management services to dairy farmers. The objective of this study was to document and compare biosecurity-related practices and opinions across VPs and DAs in Ireland. A selection of veterinary experts (VEs) from outside of Ireland was also surveyed.

Questionnaires were completed and response rates of 47% (VPs), 97% (DAs), and 65% (VEs) were achieved. Significant differences were identified in the promotion and implementation of biosecurity between VPs and DAs, with a higher proportion of VPs regularly receiving requests from ($P = 0.004$), and dispensing advice to ($P < 0.0001$), their farm clients. Communication between DAs and VPs was sub-optimal with over 60% of each group not in regular communication with each other. With regard to the main farmer motivation for biosecurity implementation, the majority of VPs (62%) prioritised external factors such as 'economic benefit' and 'mandatory obligation', while the majority of DAs prioritised health/animal-related factors (69%), which were similar to those of farmers (83.1%), although they remained significantly less likely ($OR = 1.8$) than farmers to choose such motivators ($P = 0.005$). Inconsistencies in the implementation of, and in opinions relating to, farm biosecurity were highlighted across all the groups surveyed emphasising the need for standardised information and improved communication.

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Introduction

It is becoming increasingly evident that there is a need to re-orientate dairy farmers towards preventative rather than curative medicine (LeBlanc et al., 2006; EC, 2007; More, 2007; Conrath et al., 2011). Biosecurity, a merging of the concepts of bioexclusion and biocontainment (Mee et al., 2012), is a fundamental component of the practice of preventative veterinary medicine and is an important concept to promote within the farming industry. Studies have highlighted how the implementation of biosecurity at farm-level is often sub-optimal, and poor or inappropriate knowledge-transfer is often cited as a potential cause (Sanderson et al., 2000; Gunn et al., 2008; Heffernan et al., 2008; Moore et al., 2008; Schemann et al., 2011; Brennan and Christley, 2012; Derks et al., 2012; Sayers et al., 2013).

Veterinary practitioners (VPs) play an important role in the provision of animal health services to dairy farmers (England,

2002; LeBlanc et al., 2006; Mee, 2007). Dairy advisors (DAs) offer advice to support farmers in the implementation of 'best-practice' farm management (Chase et al., 2006; Teagasc, 2013). The practical implementation of biosecurity at farm level requires knowledge of the pathogens that constitute a threat to the farming enterprise and also of the livestock production system in operation (Graham et al., 2008; Larson, 2008). Thus, the combined expertise and experience of VPs and DAs provides a useful, industry-recognised means of communicating biosecurity advice to dairy farmers (Jordan and Fourdraine, 1993; Vergot et al., 2005; Gunn et al., 2008; Jensen et al., 2009; Hernández-Jover et al., 2012; Schemann et al., 2012; Brennan and Christley, 2013; Sayers et al., 2013).

Poor communication amongst stakeholders (Vaillancourt and Carver, 1998; Gunn et al., 2008; Benjamin et al., 2010; Kleen et al., 2011) and the provision of conflicting information from multiple sources result in confusion and apathy amongst farmers with regard to the implementation of biosecurity (Moore et al., 2008). Kristensen and Enevoldsen (2008) reported that while Danish farmers viewed VPs as the 'overseers' of clinical care, they considered this group much less qualified to advise on herd health management. In order to actively support dairy farming, and be

* Corresponding author. Tel.: +353 25 42215.

E-mail address: riona.sayers@teagasc.ie (R.G. Sayers).

perceived as valuable to their clients, service providers require an interest in, and ability to communicate clearly, knowledge of disease prevention measures.

Assessment of the knowledge base and opinions of VPs and DAs regarding biosecurity facilitate a better understanding of the communication requirements between clients and professionals (Cattaneo et al., 2009). In this context, it is useful to examine the practices, interactions, and opinions of VPs and DAs with regard to biosecurity. The objective of this study was to document and compare the various practices, opinions, and communication of biosecurity procedures across VPs and DAs working in the Republic of Ireland. Furthermore, as expert opinion is a useful additional adjunct in the decision-making process as regards animal disease management (Cross et al., 2012), a panel of international veterinary experts (VEs) was also canvassed as part of the study. A secondary objective was to create an 'importance ranking' of on-farm biosecurity measures based on the opinions of VPs and VEs.

Materials and methods

Questionnaire design and survey procedure

Three biosecurity questionnaires were designed and circulated to VPs, DAs, and VEs (see Appendix S1–S3 in the online version at doi:10.1016/j.tvjl.2014.02.010, supplementary material). In order to standardise responses across the study population, biosecurity was defined as 'the protection of a herd from the introduction and spread of infectious diseases'. The VP and VE questionnaires were pre-tested on veterinary researchers based at the Teagasc Research Institute (Irish Food and Agriculture Development Authority), and the DA questionnaire on recently retired Teagasc advisors. As a result of this pilot survey, minor modifications to the questions were carried out.

Participation in the survey was voluntary and was not incentivised. The VPs were selected following their nomination by farm clients partaking in a parallel study (Sayers et al., 2013) and 236 VPs were nominated. The study population of DAs consisted of 82 Teagasc dairy advisors.¹ The geographical distribution of surveyed VPs and DAs is outlined in Fig. 1. A total of 34 VEs were selected for inclusion based on their publication record in international, peer-reviewed journals and/or recognised experience in biosecurity and herd health. The survey of VPs was administered by post, whereas the DA survey was carried out during an in-service training session unrelated to biosecurity or herd health. The VE questionnaire was administered 'online'.² A single reminder was forwarded to 'non-responders' 4 weeks following initial delivery of the questionnaire, and responses were recorded on a web-based survey tool (see footnote 2), with electronic entries being manually checked against hardcopy versions, where applicable.

Data analysis

Coded responses to each question were downloaded from SurveyMonkey (see footnote 2). The Excel programme (MS Office version, 2007) was used to collate the data and generate graphs. Chi-squared, Student's *t* test, logistic regression, and Pearson correlation analyses were completed using Stata (Version 12). Prevalence ratios and associated chi-squared (Pearson and Fischer exact) analyses were calculated using a web-based statistical tool.³ Rating scales were automatically generated in SurveyMonkey for ranking survey questions.

Dependent variables (survey questions) were categorised as either 'biosecurity knowledge-transfer' (Table 1) or 'biosecurity opinion' (Table 2). Supplementary comments collected in 'semi-closed' and 'open' questions were categorised under broad headings and tabulated (Table 3). Responses to questions that appeared on both VP and DA questionnaires were compared using prevalence ratios (PRs) following dichotomisation of responses (Tables 1 and 2). Associated *P* values were estimated across responses with values of *P* < 0.05 considered significant. The opinions of VPs, DAs, and VEs with regard to the main motivating reason that a dairy farmer might implement biosecurity were compared with actual farmer data (Sayers et al., 2013). Responses were categorised into 'external' (economic benefit and mandatory obligation) or 'health-related' (prevention of disease introduction and improved animal health and welfare) for the purposes of PR calculation.

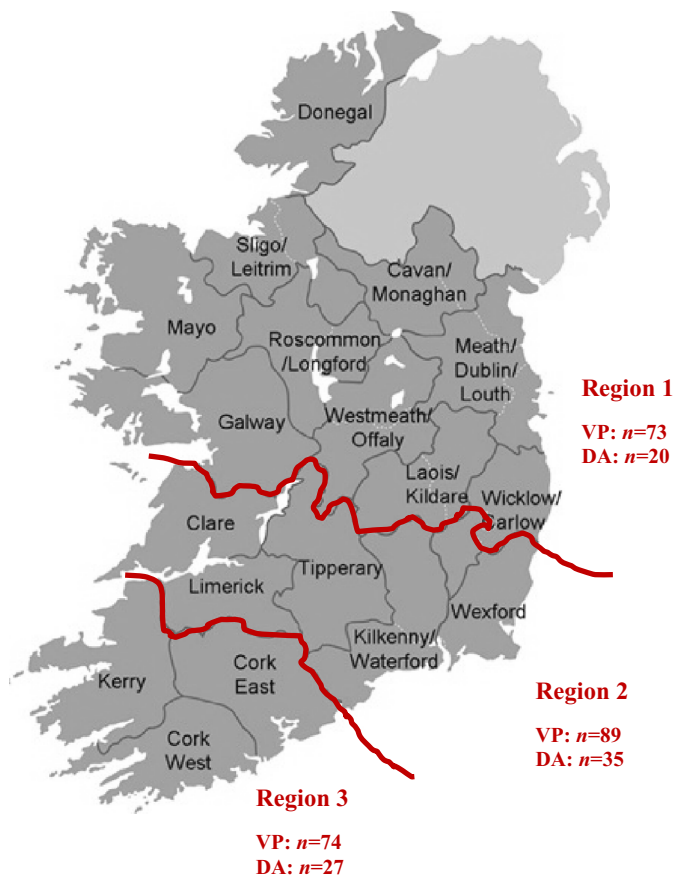


Fig. 1. Geographical distribution of surveyed veterinary practitioners (VPs) and dairy advisors (DAs): regions 1, 2 and 3 used for logistic regression analysis also outlined.

Logistic regression

Non-binary dependent variables (Tables 1 and 2) were dichotomised for the purposes of logistic regression. The effect of two independent variables (region [1, 2, or 3] and decade of qualification [1960s, 1970s, 1980s, 1990s, and 2000s]) was assessed. In the case of DAs, the independent variable decade of qualification was dichotomised in order to ensure sufficient responses for analysis (1960s, 1970s, and 1980s vs. 1990s, and 2000s). Logistic regression analysis was not carried out for the VEs due to the limited sample size. As a first-step analysis, associations between independent and dependent variables were identified by chi-squared procedures. Where an association with *P* ≤ 0.15 was identified, a second step regression analysis including a backwards elimination with a forward step was used to describe the association. Results of regression analysis were regarded as significant at the 5% level. Pearson correlation tests were used to assess for multicollinearity.

Results

Descriptive analysis

Response rates of 47%, 97% and 65% were achieved for the VP, DA, and VE surveys, respectively, and the distribution of VP and DA respondents is outlined in Table 4. No significant difference in geographical location between VP (*P* = 0.96) and DA (*P* = 0.98) responders and non-responders was recorded. The nationality and affiliation of VE respondents are outlined in Figs. 2 and 3. The decade of qualification of each surveyed group is outlined in Fig. 4. Over 95% of the VPs and DAs surveyed had completed their undergraduate training in Ireland. Approximately 75% of VPs worked in 'mixed' practice, while the remainder worked in more specialist large animal practices. A VP priority-ranking of diseases for which

¹ See: <http://www.teagasc.ie>.

² See: <http://www.surveymonkey.com>.

³ See: <http://www.quantitativeskills.com/sisa/statistics/twoby2.htm>.

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