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# A retrospective epidemiological analysis of risk factors for a primary necropsy diagnosis of bovine respiratory disease

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ABSTRACT

Bovine respiratory disease (BRD) is a multifactorial disease and the primary cause of both bovine morbidity and mortality in Ireland. The risk factors associated with a primary necropsy diagnosis of BRD among cattle in the traditional (non-feedlot) husbandry systems prevalent in Ireland have not been investigated previously. The aim of this case-control study was to investigate those risk factors among cattle of all ages over an 8 year period. A total of 3,090 BRD cases and 5,236 controls were matched by submitting veterinary practitioner. Univariable and multivariable analyses were performed to examine the association of selected animallevel, herd-level and environmental risk factors with case or control status using a conditional logistical regression model. Male cattle aged more than 31 days were significantly more likely to record a primary necropsy diagnosis of BRD than female cattle. Older cattle of both sexes were at increased odds of a BRD necropsy diagnosis than younger calves with the exception of female cattle aged greater than 165 days. The risk of a primary necropsy diagnosis of BRD increased with increasing herd size and decreased with increasing time in days since the last animal movement into the submitting herd. There were significantly reduced odds of a primary necropsy diagnosis of BRD in the summer (June to August) when compared with the autumn (September to November). These findings identify significant risk factors for a necropsy diagnosis of BRD under non-feedlot-type husbandry conditions.



## 1. Introduction

Bovine respiratory disease (BRD) is the primary cause of both bovine morbidity and mortality in both traditional non-feedlot (Anon, 2013) and large feedlot (Edwards, 2010) husbandry systems. The multifactorial aetiology of BRD coupled with the complex interaction of animals, pathogens and their environment in its pathogenesis pose significant challenges in effecting control of this disease. In the Republic of Ireland, BRD (16–17%) is consistently recorded as the most common cause of bovine mortality on necropsy (Anon, 2013).

The Regional Veterinary Laboratories (RVLs) (Fig. 1) are a network of government-funded, strategically located, veterinary diagnostic pathology laboratories engaged in veterinary scanning surveillance. Voluntary necropsy carcase submissions to the RVLs are made by veterinary practitioners on behalf of their farmer clients. Each RVL has a catchment area, typically covering five surrounding counties, from which submissions are received, however, the vast majority of necropsy submissions to the RVLs come from herds located within 65 km of the laboratory (Anon, 2007).

Many risk factors for BRD morbidity have been identified e.g. disposition (Fell et al., 1999), genetics (Snowder et al., 2006) and age (Townsend et al., 1989), however, there are few epidemiological studies focussing specifically on the risk factors associated with BRD mortality, rather than morbidity. While an association between BRD morbidity and BRD mortality appears intuitive, and has support (Curtis et al., 1988; Loneragan et al., 2001; Cusack et al., 2007), the inference that the association of a given risk factor with morbidity implies it is also associated with a primary necropsy diagnosis of BRD may not be justified. Previous studies have also

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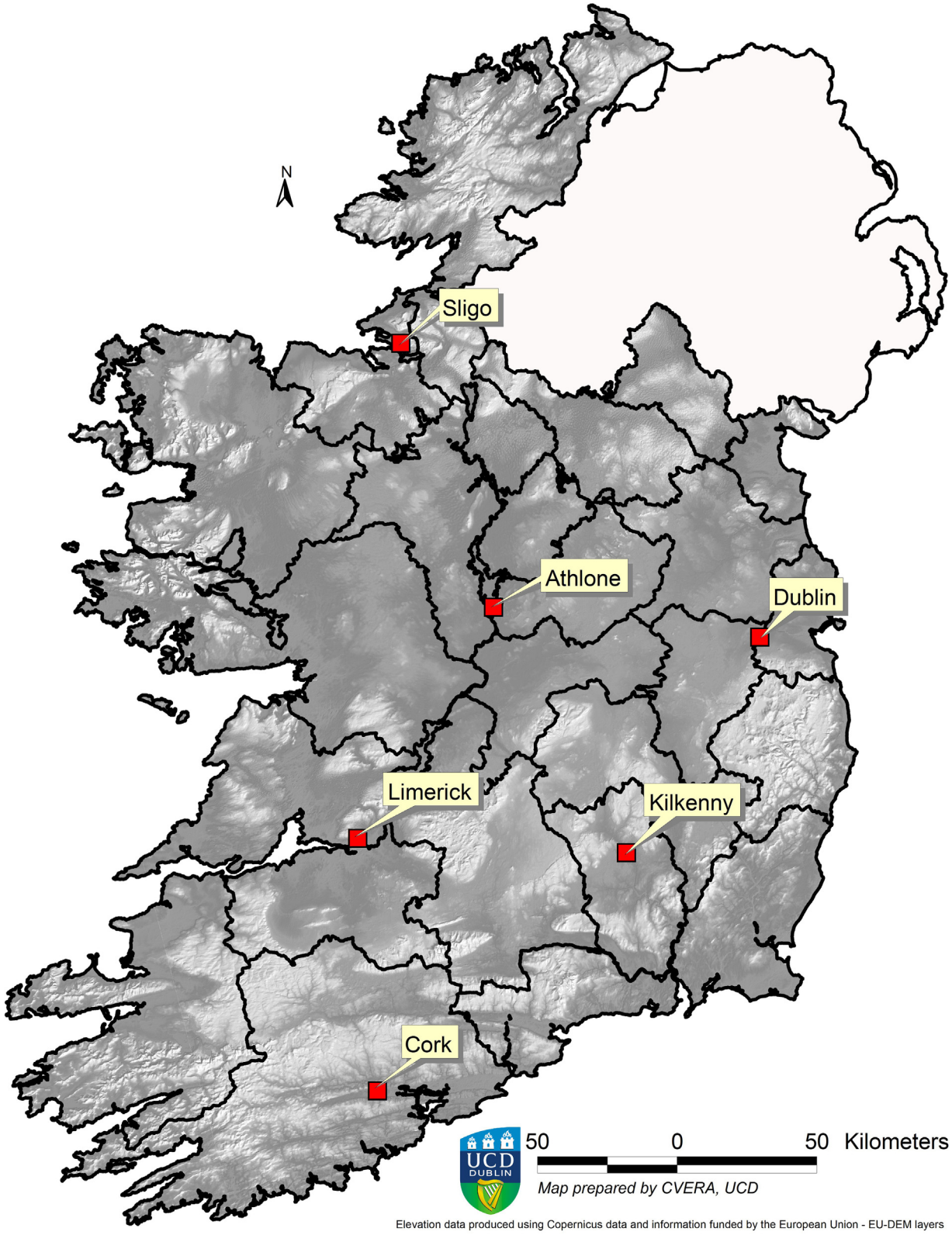


**Fig. 1.** A map of Ireland with the location of the six Department of Agriculture, Food and Marine (DAFM) regional veterinary laboratories (RVLs).

typically addressed the situation pertaining on the very large feedlot systems common in North America (Ribble et al., 1995) and Australia (Cusack et al., 2007). The husbandry systems prevalent in cattle enterprises in Ireland differ considerably from these; average herd size (58 animals (Anon, 2014)) is small, animals are raised primarily on pasture in a temperate climate and are normally only housed during the winter months. The relative importance of the risk factors for a primary necropsy diagnosis of BRD under such husbandry systems have not been researched and may differ considerably.