EQUINE GRASS SICKNESS IN SCOTLAND: A CASE–CONTROL STUDY OF ENVIRONMENTAL GEOCHEMICAL RISK FACTORS

†*Wylie, C.E., †Shaw, D.J., ‡Fordyce, F.M., §Lilly, A. and †McGorum, B.C.
†Royal (Dick) School of Veterinary Studies and The Roslin Institute, Easter Bush Veterinary Centre, The University of Edinburgh, Roslin, EH25 9RG, UK; ‡British Geological Survey,West Mains Road, Edinburgh, EH9 3LA, UK; §James Hutton Institute, Craigiebuckler, Aberdeen, AB15 8QH, UK.
**Current address; Rossdales Equine Hospital, Cotton End Road, Exning, Newmarket, Suffolk, CB8 7NN, UK.*
Email: Claire.wylie@rossdales.com

Reasons for performing study: Epidemiological investigations suggest that soil macro- and micro-nutrients may be a trigger for the occurrence of equine grass sickness (EGS). However, there is limited information regarding relationships between exposure to geochemical elements and the occurrence of EGS.

Objectives: To determine whether the geographical distribution of EGS cases referred to the Royal (Dick) School of Veterinary Studies was associated with the presence or absence of particular geochemical elements in the environment.

Study design: A retrospective time-matched case–control study.

Methods: 455 EGS geo-referenced cases were identified between 1 January 1990 and 1 June 2006. Each case had 2 time-matched geo-referenced controls (n = 910). For study purposes, cases or controls originating outwith Scotland were excluded. Environmental concentrations of a range of elements, most with known biological function, were collated from 2 geochemical point datasets and spatially extrapolated giving continuous cover across Scotland: the British Geological Survey (BGS) Geochemical Baseline Survey of the Environment (G-BASE) stream sediment dataset and the James Hutton Institute (JHI), National Soil Inventory of Scotland (NSIS). Data were analysed using multivariable conditional logistic regression.

Results: Statistically significant associations were obtained between the distribution of EGS cases and (i) higher environmental levels of Ca, K, Mo, Na, Se and Ti, and (ii) lower environmental levels of Al, Cd, Co, Cr, Cu, Ni and Pb. This study identified no association between EGS cases and the environmental concentrations of Ba, Ga, Fe, Mg, Mn, P or Sr.

Conclusions: A number of statistically significant associations were identified between EGS cases and element concentrations in the spatially extrapolated stream sediment and soil data. This information will assist future studies on the aetiology of EGS, with further research suggested to focus on those identified significant associations with greatest biological plausibility such as reduced levels of Cu and Zn, and higher levels of K and Se.

Ethical animal research: Informed client consent was obtained for the use of clinical records. **Sources of funding:** Part-funded by The BGS University Funding Initiative. A.L. is funded by the Scottish Government's Rural and Environment Science and Analytical Services Division. C.E.W. is supported by The Margaret Giffen Trust. F.F. is funded by the Natural Environment Research Council (NERC). **Competing interests:** None.