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| **Title of the abstract** | Modelling the risk of contamination to private water supplies in Scotland |
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Private water supplies have been identified as a risk factor for gastrointestinal illness in Scotland. The vast majority of private water supplies are small scale supplies, which number approximately 20,000. The responsibility for managing these supplies resides solely with their owners and users. As a consequence, the quality of water from these supplies can often go untested for years. The types of private water supplies can vary greatly but are generally grouped into either surface water fed or groundwater sourced, which influences how vulnerable the supply is to contamination.

Diffuse pollution by organisms such as *Cryptosporidium*, *Escherichia coli*, *Salmonella* and *Campylobacter* is a major threat to the quality of these supplies with potential public health consequences for waterborne related illness. Some component of this contamination is dependent on sporadic environmental conditions such as adverse weather events and temporal land use. The impact on the vulnerability of the supply from these events is dependent on associated factors, such as the density of livestock within close proximity. In addition, the faecal output and the prevalence of pathogens varies between types of animal.

Building on evidence related to the various risk factors contributing to the microbiological contamination of private water supplies, we develop a mathematical model that explores the transmission of pathogenic organisms from the sources to the supplies. This analysis is applied within our three study areas with high private water supply use. This model will assist in the prioritisation of testing of small scale supplies and will highlight potential hotspots for risk to microbiological contamination.