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A Monte-Carlo simulation model to evaluate surveillance options for future analysis and detection of genetically modified (GM) feed related effects.

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Purpose: To inform policy decisions on the longer term strategy for monitoring of possible animal health effects from GM feed in production animals. Consideration was given to both plausible outcomes and novel conditions.
Methods:A comprehensive review of current animal health monitoring was undertaken and surveillance components were established for evaluation; these include passive, abattoir, post mortem, production records and active components. At risk populations were determined by production type for analysis and include diary, pigs, poultry and aquaculture. Models describing each surveillance component were generated for each production group. Expert elicitation was performed to parameterise the models. A Monte-carlo simulation in @risk version 6.3 was used to establish 'normal' detection probabilities for each disease syndrome assuming baseline GM exposure. Simulation sensitivity analysis was performed by varying the relative risk associated with trans-genic feed to access for a detectable change in disease syndromes with respect to the risk.
Results: The sensitivity of each surveillance component was evaluated for the syndromes and population groups of interest. The most sensitive component for unknown severe diseases was consistently the post-mortem system. The most sensitive method for analysis of less severe conditions with a lower relative risk is the use of industry available production data across population groups.
Conclusions: Strengthening of currently established surveillance systems and improving capacity for detection of emerging conditions could be extended to include monitoring of GM feed adverse effects. Identification of unforeseen adverse effects and plausible risk effects should be approached through different methods of animal health surveillance.
Relevance:GM feed consumption has increased dramatically in livestock and humans and is predicted to continue both in feed concentration and number of strains. Future surveillance methods for detection of both known and unknown, risk syndromes can now be tailored more specifically to the most sensitive components of the existing surveillance network.