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## Cover paper for the Animal Health, Food Safety and Public Health risk assessments for Chronic Wasting Disease and TSEs in cervids.

1. In March 2017, the Government Office for Science commissioned a joint risk assessment from APHA, PHE and FSA to look at the risk to public health from TSEs in cervids. A series of questions were posed to the Agencies, following meetings with the Government Chief Scientist and the Chief Veterinary Officer.
2. The risk assessment processes for the different agencies follow different international standards and cannot easily be combined therefore three separate documents have been produced and this paper aims to give an overall conclusion.
3. The hazards were identified as the Chronic Wasting Disease (CWD) prion in Norwegian reindeer (*Rangifer tarandus*) which was first detected in 2016 and which is similar to the CWD found in North American cervids, and the atypical CWD prion detected in Norway in Eurasian moose (*Alces alces*) and red deer (*Cervus cervus*). Evidence available suggests these are two different TSE diseases, with different tissue distribution in affected animals. Indeed CWD in North America is represented by several strains which may have different infectivity and pathogenicity.
4. A recent study carried out in Canada has shown that CWD from North American cervids can infect *Cynomolgus* macaques (a model for human infection studies) both through intracranial infection and through consumption and there was spread to close contact macaques. However this is only one experiment and further research is needed to show if it is a reproducible effect. Other recent experiments using different techniques and possibly a different strain of CWD showed transfection into macaques did not occur.
5. From an animal health perspective, the risk assessment considered the different pathways for introduction of disease into the UK deer population and subsequent exposure to and spread within UK cervids and other livestock. This was a review of the previous assessments and updates with new evidence and considers the non-cervid livestock population. The conclusion was that for CWD, there is a very low to low risk of the disease being introduced to the UK (depending on the pathway), a high risk of spread to other cervids and a very low risk of spread to other livestock species. For the



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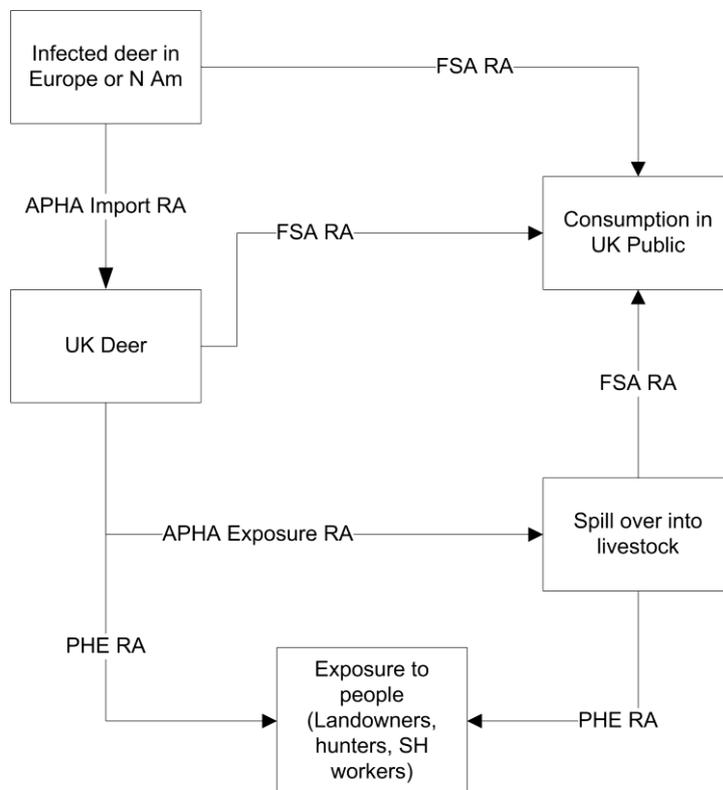
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atypical CWD in moose and red deer, the risk of incursion into the UK cervid population would be considerably lower because of the different tissue distribution and the possible atypical presentation of the prion disease but there is high uncertainty. It is also useful to note there are only two managed populations of moose in the UK and some zoo collections. The fallen stock surveillance in the UK gives good reassurance that there is no CWD circulating in non-cervid ruminants.

6. From a food safety perspective, consumption of venison in the UK mainly consists of UK origin cervid meat. Therefore the risk assessment considers the risk if disease were present in the UK already. There are many areas of uncertainty in the different steps of the assessment, which will be addressed by studies currently running in the USA and Canada following cohorts of people known to have consumed infected meat. However the incubation period and the infective dose are not known so negative results from these studies may not be definitive. There are differences in the way that cervid carcasses are handled and meat is produced, in comparison to other ruminants (not removing spinal cords or “specified risk material”). Nevertheless the overall risk assessment considered there was a very low risk to public health considering consumption patterns and slaughter house requirements.
7. From a public health (occupational exposure or non-food exposure) perspective, the risk assessment also assumes disease is already present in the UK and considers the various levels of contact with infected cervids, through different pathways. The populations at risk are those in direct contact with infected cervids (game keepers, hunters, vets, knackermen, renderers and butchers etc), people taking dietary supplements, such as antler velvet, people in contact with pet animals which have consumed infected meat and environmental exposure. The overall risk was considered very low with a medium level of confidence. The precautions already in place for handling BSE infected carcasses would also prevent exposure to CWD.
8. Therefore the overall risk level is very low if not negligible, given the unlikely scenario of disease already present in the UK cervid population, the presumed species barrier for transmission to other livestock and human infection through aerosol contamination and low consumption patterns.
9. Nevertheless there are substantial levels of uncertainty in terms of the level of infection in the UK, if present, the incubation period and infectious dose. Therefore these risk assessments will remain living documents and will be reviewed as new evidence becomes available.

10. The Norwegian Authorities have confirmed that as of 24<sup>th</sup> June 2018, 41,891 cervids have been tested, with 2,117 free ranging reindeer in Nordfjella of which 19 tested positive for CWD giving a prevalence of 1%. More than 10,000 moose have been tested, with three testing positive for the atypical cervid TSE (atypical CWD). Nearly 7,000 red deer have been tested, of which one was positive for atypical CWD.

Figure 1: Conceptual pathway for the risk assessments (RA) for the three science agencies.



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*Date 26/06/2018*