



RISK ASSESSMENT

New Orthobunyavirus isolated from infected cattle and small livestock – potential implications for human health

22 December 2011

Main conclusions and recommendations

In early November 2011, a new orthobunyavirus, provisionally named the Schmallenberg virus, was detected by metagenomic analysis and virus isolation from infected cattle in Germany. Similar findings have been reported from the Netherlands, where lambs have also been infected with the same virus in utero, resulting in congenital malformations.

Based on current evidence, it is not possible to confirm or exclude a causal relationship between detection of the new orthobunyavirus and the observed clinical symptoms in cattle and small livestock. Epidemiological, immunological and microbiological investigations are ongoing in Germany and the Netherlands.

According to health authorities in Germany and the Netherlands, further cases in cattle and small livestock can be expected.

Diagnostic capacity is currently limited to a real-time RT-PCR, which has to be further validated. Improved diagnostic methods, including serology, will facilitate identification of newly-affected holdings and geographic areas.

Previously, genetically similar orthobunyaviruses have not caused disease in humans. It is therefore unlikely that this virus will cause disease in humans, but it cannot be excluded at this stage.

Close collaboration between animal and human health services is necessary to ensure rapid detection of any change in the epidemiology of animals and humans. In particular, the health of farmers and veterinarians in close contact with potentially infected animals should be carefully monitored.

Public health issue

Potential implications for human health of the newly isolated orthobunyavirus from infected cattle in Germany and the Netherlands and infected lambs in the Netherlands.

The objectives of this rapid risk assessment are:

- To review the information currently available on the new orthobunyavirus in animals;
- To evaluate the potential public health impact of the detection of this virus.

For more information, please refer to the risk profile prepared by the Dutch National Institute for Public Health and the Environment (RIVM) available at:

<http://www.rivm.nl/dsresource?objectid=rivmp:60483&type=org&disposition=inline>

and the provisional risk group classification by the Friedrich-Loeffler-Institut available at:

http://www.fli.bund.de/no_cache/de/startseite/aktuelles/tierseuchengeschehen/schmallenberg-virus.html

Source of assessment request and experts consulted

Internal ECDC decision taken at daily round table on 19 December 2011.

- National Institute for Public Health and the Environment (RIVM), the Netherlands: Marion Koopmans, Chantal Reusken;
- Friedrich-Loeffler-Institut (FLI), Germany: Martin Beer.

Disease background information

In early November 2011, a new orthobunyavirus was detected in infected cattle kept at a holding in Schmallenberg in the Hochsauerlandkreis district of Germany and provisionally named the Schmallenberg virus. The new virus belongs to the *Bunyaviridae* family, genus *Orthobunyavirus*, Simbu serogroup (preliminary information, based solely on genetic information). The virus was also isolated in a cell culture at the Friedrich-Loeffler-Institut and has been further characterised. Genetic characterisation has shown that the new virus is closest to the following Simbu serogroup viruses: Shamonda-, Aino- and Akabane-viruses, which do not cause disease in humans.

However, at least 30 orthobunyaviruses are zoonotic and may cause disease in humans, with symptoms ranging from mild to severe – e.g. La Crosse encephalitis virus, California Encephalitis virus, Cache Valley virus, Batai virus, Tahyna virus, Inkoo virus, Snowshoe Hare virus, Iquitos virus and Oropouche virus (the latter two viruses belong to the Simbu serogroup).

Transmission of orthobunyaviruses in animals is mainly reported through biting midges (*Culicoides spp.*) but may also be transmitted through mosquitoes and vertically across placenta. Several midge species are present in Europe but the competent species for the new orthobunyavirus has not yet been identified.

For further information, please see the risk profile prepared by the Dutch National Institute for Public Health and the Environment (RIVM) available at:

<http://www.rivm.nl/dsresource?objectid=rivmp:60483&type=org&disposition=inline>

Event background information

Germany

During summer 2011, an unusually high incidence of the following symptoms was observed in dairy cows in North Rhine-Westphalia: fever (>40°C), impaired general condition, anorexia and reduced milk yield by up to 50%. The symptoms disappeared after a few days.

Laboratory investigations performed at the Friedrich-Loeffler-Institut, the German Federal Research Institute for Animal Health (FLI) enabled other relevant infections to be excluded (blue tongue virus, foot and mouth disease virus, enzootic hemorrhagic disease virus, bovine viral diarrhoea virus and other pestiviruses, bovine herpes virus-1 and other herpes viruses, Rift Valley fever and bovine ephemeral fever). On 18 November 2011, the FLI reported identification of a new virus in serum samples from infected cattle through next generation sequencing and metagenome data analysis. This new virus was dubbed the 'Schmallenberg virus'.

Fourteen holdings of cattle have been tested and over 100 samples taken between August and October 2011. Nine PCR-positive samples of 'Schmallenberg virus' were identified in four holdings. Moreover, 150 samples from holdings in unaffected regions (southern part of Germany, Mecklenburg-Western Pomerania) taken as controls were negative.

So far cases have only been reported in the region of North Rhine-Westphalia.

To date, no human cases have been reported among exposed individuals such as farmers or veterinarians.

The Netherlands

During August and September 2011, an unusually high incidence of diarrhoea, fever and decrease in milk yield was reported in cattle. About 80 herds have been affected. Fifty serum samples were obtained from twenty affected herds and eighteen samples were PCR-positive for the new 'Schmallenberg virus'.

In addition, since the beginning of December, the Dutch animal health services observed a high number of congenital malformations such as scoliosis, hydranencephaly and arthrogryposis in newborn lambs. Autopsy and virological investigations of brain tissue from these lambs revealed the presence of the 'Schmallenberg virus'.

In the Netherlands, there is no indication of geographical clustering as cases are dispersed across the country.

To date, no unusual human illnesses have been reported in the affected areas. In addition, no human cases have been reported among exposed individuals such as farmers or veterinarians. Veterinary health services in the Netherlands have requested farmers to report potential symptoms of illness.

ECDC threat assessment for the EU

Causal relationship between symptoms in animals and infection with the 'Schmallenberg virus' cannot be confirmed or excluded at this point. Epidemiological, immunological and microbiological investigations are ongoing in Germany and the Netherlands to identify a possible association.

According to the health authorities in Germany and the Netherlands, further cases in cattle and small livestock can be expected. Since transmission of the virus is most likely to be via midges, the number of new infections should decrease during winter and could increase again during the next vector season.

With new epidemiological and diagnostic tools, careful monitoring of the disease and the virus will be possible should new cases arise in cattle and small livestock during the next season.

While some orthobunyavirus cause human disease, including some in the Simbu serogroup, the genetically most related viruses (Shamonda-, Aino-, and Akabane-viruses) do not cause disease in humans. Therefore, it is unlikely that the new 'Schmallenberg virus' will cause disease in humans but it cannot be excluded at this stage. Further epidemiological and seroepidemiological studies should provide more evidence.

Since intrauterine infections in sheep have increased complicated pregnancies and parturitions, veterinarians are more likely to be called to facilitate parturition. There is currently no information about the presence of a viable virus in amniotic fluid, but in such a case veterinarians and farmers may be at risk of exposure.

Diagnostic capacity is currently limited to a real-time RT-PCR, which has to be further validated. Improved diagnostic methods, including serology, would facilitate identification of affected holdings and geographic areas.

Further information from ongoing surveillance and investigations may necessitate a revision of this rapid risk assessment.

Conclusions

A new orthobunyavirus has been detected in infected cattle by means of metagenomic analysis and subsequent virus isolation. The new virus has also been identified in brain tissue from newborn lambs with congenital malformations.

The new virus belongs to the *Bunyaviridae* family, genus *Orthobunyavirus*. Further genetic characterisation has shown that the new virus is most closely related to the Shamonda-, Aino-, and Akabane-viruses of the Simbu serogroup. While some orthobunyaviruses cause disease in humans, including some in the Simbu serogroup, the three genetically most related viruses mentioned above do not cause disease in humans. It is unlikely that this new orthobunyavirus can cause disease in humans but it cannot be excluded at this stage. Further epidemiological monitoring of disease and seroepidemiological studies in domestic animals and humans are needed and should provide further evidence.

Close collaboration between animal and human health services is necessary to ensure rapid detection of any change in the epidemiology of animals and humans. In particular, the health of professionals such as farmers and veterinarians in close contact with potentially infected animals should be carefully monitored.

Further studies of the new virus and its epidemiology are necessary for a more evidence-based assessment of the risk of disease occurring in humans during the coming vector season.

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References

- [1] Friedrich-Loeffler-Institut. New Orthobunyavirus detected in cattle in Germany, November 2011. Available at: http://www.fli.bund.de/fileadmin/dam_uploads/press/Schmallenberg-Virus_20111129-en.pdf National
- [2] Institute for Public Health and the Environment (RIVM). Risk profile for human of Schmallenberg virus, 19 December 2011. Available at: <http://www.rivm.nl/dsresource?objectid=rivmp:60483&type=org&disposition=inline>
- [3] German Federal Ministry of Food, Agriculture and Consumer Protection. Oral presentation at the Standing Committee on Food Chain and Animal Health (SCoFCAH): New Orthobunyavirus detected in cattle in Germany. Brussels, 6 December 2011. Available at: http://ec.europa.eu/food/committees/regulatory/scfcah/animal_health/presentations/06122011_new_orthobunyavirus_in_cattle_germany.pdf
- [4] Dutch media, 17 December 2011:
<http://www.rtvoost.nl/nieuws/default.aspx?nid=135820>
<http://www.omroepbrabant.nl/?news/166590962/Nieuw%20virus%20opgedoken%20onder%20Nederlandse%20lammeren%20en%20koeien.aspx>
- [5] Rijksoverheid, Ministry of Economic Affairs, Agriculture and Innovation. New virus in sheep and cows in the Netherlands. 16 December 2011. Available at: <http://www.rijksoverheid.nl/nieuws/2011/12/16/nieuw-virus-onder-schapen-en-koeien-in-nederland.html>
- [6] The Center for Food Security and Public Health, Iowa State University. Akabane Disease. September 2009. Available at: <http://www.cfsph.iastate.edu/Factsheets/pdfs/akabane.pdf>