

Department for Environment, Food and Rural Affairs

## Updated Outbreak Assessment #3

# Influenza A (H5N1) of avian origin in domestic livestock in the United States of America

10 February 2025

## Disease report

On 25 March 2024, the United States of America (USA) made an immediate notification to the World Organisation for Animal Health (WOAH) of an outbreak of influenza A of avian origin (H5N1) affecting dairy cattle in Texas. The outbreak strain, a high pathogenicity avian influenza (HPAI) virus strain, belonged to clade 2.3.4.4b, genotype B3.13. This genotype has never been detected outside of the Americas. To date there have been 959 confirmed cases of HP H5N1 clade 2.3.4.4b genotype B3.13 in dairy cattle across 16 States in the USA (source: [HPAI Confirmed Cases in Livestock, Animal and Plant Health Inspection Service](#)). Until early 2025, all detections of the virus in dairy cattle in the USA had been this one particular strain. The emergence is thought to be the result of a single spillover from wild birds between October 2023 and January 2024 followed by within and between herd spread through direct contact and movement of infected cattle, and indirect transmission to poultry flocks. The B3.13 genotype has been linked to mild infections in dairy workers, along with some poultry cullers, with conjunctivitis and mild respiratory symptoms being the most common manifestation.

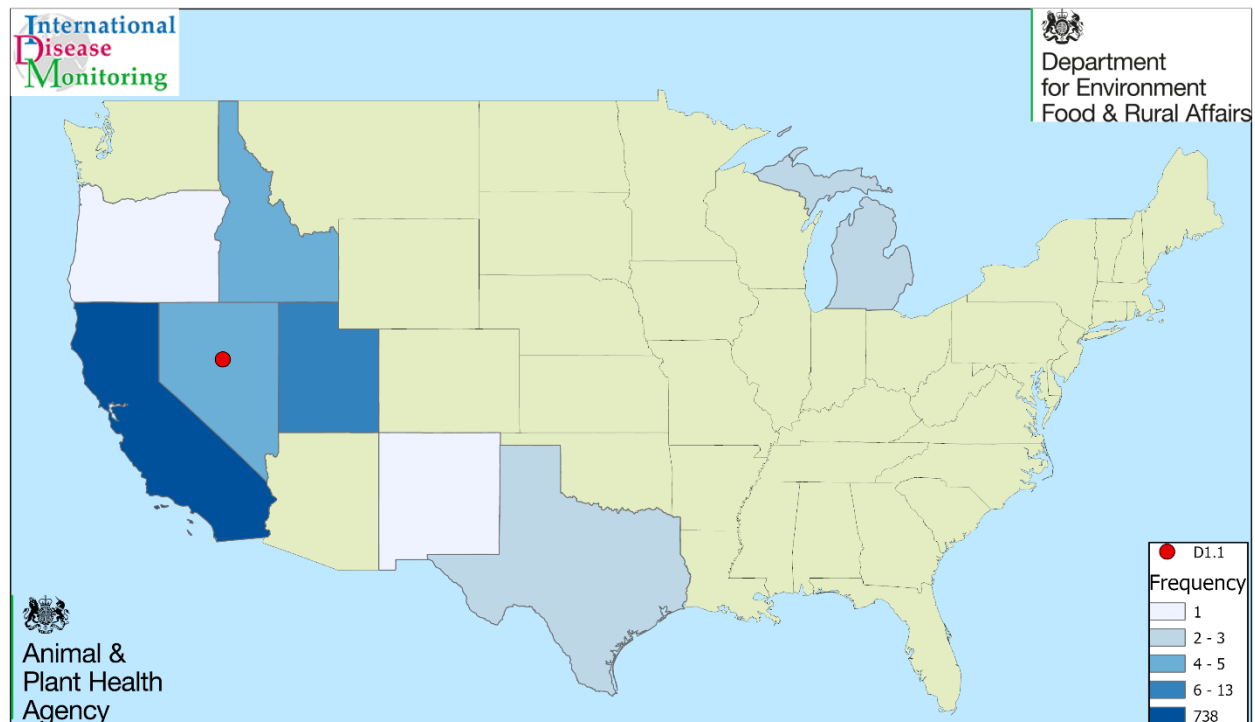
On 5 February 2025, the USDA announced a new spillover of HPAI H5N1 to dairy cattle, which involved the D1.1 genotype currently circulating in wild birds and poultry. Genotype D1.1 represents the predominant genotype of HPAI H5N1 in wild birds in the North American flyways in autumn 2024 and winter 2024 to 2025. It has been identified in wild birds and mammals as well as domestic poultry in the USA and Canada (sources: [confirmations of highly pathogenic avian influenza in commercial and backyard flocks, Animal and Plant Health Inspection Service](#) and [status of ongoing avian influenza response by province - inspection.canada.ca](#)).

This strain was also detected in backyard poultry and a spill-over case into a human in Louisiana, USA, which resulted in the patient's death.

The risk to Great Britain of the D1.1 genotype of H5N1 being introduced to livestock is considered **negligible** currently and **very low**, at most, in the autumn.

## Map 1. US states where livestock infected with HPAI have been detected as of 10 February 2025 since our previous update on 15 August 2024 ([Avian Influenza in cattle in USA](#))

The legend shows the number of confirmed reports of HPAI per state (data from USDA, 2025).



Map Prepared by IDM

Date: 07/02/2025

Absolute Scale: 1:24,000,000

HPAI in Livestock  
13 August 2024 to 07 February 2025  
(USDA Data)

0 205 410 820 1,230 1,640 Kilometers

## Situation assessment

To date there have been 959 confirmed cases of H5N1 B3.13 in dairy cattle in the USA. Of these 738 have been in California. There have been 64 in Colorado, 35 in Idaho, 30 in Michigan, 27 in Texas, 13 in Utah, 13 in Iowa, 9 in New Mexico, 9 in Minnesota, 7 in South Dakota, 5 in Nevada. 4 in Kansas, 2 in Oklahoma, 1 in Wyoming, 1 in Ohio, and 1 in North Carolina. In the last few weeks, the rate of new farms testing positive has reduced and in the last 30 days, there were 30 farms in California and 6 in Nevada reported (USDA 2025). As part of the national control strategy, 36 states are now taking part in an anonymised bulk milk testing scheme.

The HPAI H5N1 D1.1 genotype was detected following confirmation of H5N1 in milk sampling from dairy cows in Nevada under this national milk testing strategy which began in December 2024 (source: [National Milk Testing Strategy, Animal and Plant Health Inspection Service](#)). The D1.1 genotype is widespread in wild birds in the USA, although the exact source of the infection and route of introduction into cattle has not been

elucidated. Nevada was among the first to participate in the National Silo Monitoring Program, which includes testing milk samples from processing plant silos for HPAI. This sampling scheme coincides with the FDA's existing regulatory program, which requires all raw milk Grade A silos to be sampled 4 times within 6 months. In Nevada, 3 of 11 silo samples collected on 6 and 7 January 2025 tested positive for HPAI. As up to 12 dairies in the same geographic region could have contributed to the affected silos, the authorities carried out an investigation into those contributing dairies and found at least 4 cattle herds in Nevada were positive for D1.1, and 2 additional herds in Churchill County have been placed under quarantine, pending results of laboratory testing. These Nevada cases represent the first detection of a genotype other than B3.13 in dairy cattle and the second known spillover from wild birds into lactating dairy cattle.

The dairy cattle on the affected farm in Nevada had begun showing the same types of clinical signs as the dairies where the B3.13 genotype has been detected. These include fever, reduced feed consumption, reduced milk production, and mild respiratory signs such as coughing, sneezing and nasal discharge.

This first detection of the D1.1 genotype in dairy cattle, although this virus has been widespread in wild birds in the USA, is unexpected as spillovers are considered to be rare events. Analysis of the haemagglutinin gene of the Nevada dairy cattle viruses did not identify changes predicted to affect infectivity or adaptation to mammalian hosts. However, a mutation (D701N) in the PB2 gene commonly associated with mammalian adaptation of HPAI viruses (including South American marine mammals) was identified in viruses sequenced from four separate dairy cows. This D701N PB2 gene mutation has not been seen to date in D1.1 viruses found in wild birds or poultry but has been found in B3.13 viruses from dairy cattle. The D701N PB2 gene mutation improves replication efficiency of the virus in mammalian cells and has been observed sporadically in human infections of avian-origin influenza viruses. The PB2 D701N mutation is a well characterised mammalian adaptation seen in many notable avian-origin mammalian-adapted influenza strains including Eurasian avian-like swine H1N1 influenza viruses, avian-origin equine H3N8 viruses and pinniped 2.3.4.4b genotype B3.2 H5N1 viruses from South America (Tomás, G. et al., 2024).

It is not clear how and if the D1.1 strain will spread through cattle across America. The HPAI H5N1 B3.13 genotype has been shown to spread from cattle to cattle, likely through milking activities, with occasional spillover into poultry. There is no evidence of introduction of the B3.13 genotype to migratory wild birds, although peridomestic species on affected farms have tested positive.

It is not known whether dairy cattle previously infected with B3.13 may be at risk of infection from D1.1 nor if the D1.1 virus can escape some of the immunity from previous strains, although there is likely some cross-protection. Maintaining good biosecurity in dairy cattle and tracing movements will be central to containing future spread.

## Implications for regional spread in North America

The D1.1 strain has already been detected in migratory wild birds and poultry in Canada. It was also the strain responsible for a serious clinical human case in British Columbia. Canada has been undertaking bulk milk testing every month since the start of the dairy cattle cases in USA and have not detected any spread to Canadian cattle. As of January 31, 2025, CFIA laboratories have tested 1944 samples of raw milk arriving at processing plants in all provinces across Canada (source: [milk sampling and testing for highly pathogenic avian influenza \(HPAI\) in Canada](#)). All lactating dairy cattle which move from the USA to Canada are tested, and none have been positive, and there are restrictions of movements of certain animal by-products from USA to Canada. A passive surveillance scheme is also in place to allow farmers to report suspect clinical signs.

Although Canada is approved for the export of live cattle (from regions recognised as free of Enzootic Bovine Leukosis) and other bovine products, including raw milk and colostrum, as there are currently no cases in dairy cattle in Canada, this pathway is negligible risk.

The Canadian authorities have also reported that the D1.1 strain has been detected in all migratory wild bird flyways, except the Atlantic flyway, therefore at this time of year, there is also negligible risk for this pathway.

## Implications for Great Britain

The most likely route of entry of American H5N1 virus into Great Britain is through trade in bovine products from affected farms in the USA or through migratory wild birds. There is no trade in live cattle. There is also no evidence that any strain of HPAI H5N1 has been introduced from the USA into Great Britain or Europe by migratory birds based on genomic analysis of outbreaks in Great Britain, despite detections of these viruses in Canada and the USA since 2014 (UKHSA, 2024). However, there are a small number of wild bird species which migrate annually every autumn into north-western Europe from North America, typically from the north-east tundra of Canada, through Greenland, Iceland and the Faroes. These include whole populations of light-bellied brent geese which winter in Ireland, but breed in north-west Greenland where they may interact with other geese species which have wintered in the mid USA, and some populations of northern wheatear, together with a small proportion of pectoral sandpipers and buff-breasted sandpipers, although the latter are rare in Europe. For these birds to bring D1.1 strain of HPAI H5N1 into Great Britain would require birds to migrate this spring (spring 2025) north through Canada along the Atlantic flyway and into north-west Greenland where they mix with those species which winter in Ireland, Great Britain and/or Europe, such that those species would then bring the virus into Great Britain in autumn 2025. Some migratory species of geese including snow goose, black brant, and Ross's goose winter in Nevada which is on the migration route from Mexico (Baldassarre 2013). However, very few snow geese actually winter in Nevada and only a small proportion of snow geese actually breed in west

Greenland with most summering in northern Canada (Baldassarre 2013) and so the risk from this route is considered very low. Even if D1.1 were to spread throughout the USA in cattle as B3.13 has done, entry of the strain into Europe through wild birds is considered unlikely. It is noted, for example, that the American strain of HPAI H5N5 detected in seabirds (northern fulmars) in north-west Greenland in autumn 2024 ([WAHIS](#)) has not as yet been detected in northern Europe, with all HPAI H5N5 in wild birds in Europe being the genotype I, which originated in Russia in 2020 and subsequently spread through Scandinavia.

Annual bird migration from the USA itself east-west across the Atlantic Ocean into northern Europe does not occur, with most migrations in the Americas being between North and South America through Central America and the Caribbean. This is not only because of the huge distances involved in crossing the Atlantic Ocean but also because birds want to move from high northerly latitudes where they breed in the Arctic summer to more southerly latitudes where the day lengths are longer and it is warmer in the winter. Generally, bird species do not enter north-west Europe directly from the USA across the Atlantic. However, during the annual migration of wild birds from North America south through the Caribbean each autumn, a small proportion are regularly blown off course by hurricanes to westerly points of Great Britain, including the Isles of Scilly, the Western Isles and west Wales. However, this is considered rare and unpredictable and considering the low likelihood that individual birds from the USA are infected, the likelihood of their bringing HPAI into north-western Europe directly from the USA in the autumn is very low.

Some seabird species such as great skuas which breed in the Faroes and winter off Newfoundland in Canada could in theory bring the virus into Europe in the spring. However, the return route in the spring from eastern Canada is not such a plausible route of reintroduction of H5N1 from North America to the Faroes in northern Europe because the returning seabirds in spring have been dispersed over the winter, unlike when on their breeding sites in the summer. Those seabirds that breed in Great Britain (including Shetlands and Western Isles) typically winter off the coast of west Africa or the Biscay and not the east coast of Canada or the USA.

The key point is that there is no direct route from the USA to northern Europe across the Atlantic. Therefore, it is considered that the likelihood of introduction of either the B3.13 or the D1.1 genotype from dairy cattle in the USA to Great Britain through wild birds is **negligible** currently but may increase to **very low**, at most, in the autumn.

The USA and Canada are both approved for the export to Great Britain of raw or unpasteurised milk, milk products and colostrum for human consumption, as they are listed in Column A of the Third Country list (Gov.uk, 2024a). The H5N1 B3.13 virus affecting dairy herds in the USA has been shown to be shed in milk in high concentrations, where it may remain infectious unless the milk is pasteurised (EFSA, ECDC and EURL, 2024). We would expect the D1.1 strain to be similarly affected by pasteurisation, and that the majority of imports will have been of pasteurised products.

H5N1 may be transmitted through fomites, such as contaminated equipment, vehicles and clothing (USDA, 2024b). However, assuming that proper biosecurity practices are followed, it is considered highly unlikely that any contaminated equipment, such as milking equipment, is entering and being utilised on farms in Great Britain. Evidence of viral persistence for several hours on milking equipment under experimental conditions suggests it is a viable route for indirect transmission (Le Sage et al., 2024) and again, it is expected this D1.1 strain would persist under similar conditions for a few hours. However, given the travel times between the US or Canada and Great Britain, it is unlikely that any virus would persist on used milking equipment being imported.

The movement of people between dairy farms was highlighted as a potential risk factor in the US outbreaks (USDA, 2024b) and we would also consider this a similar concern if infection were to be present in other countries.

## Conclusion

The D1.1 genotype of high pathogenicity avian influenza (HPAI) virus H5N1 has spilled over from wild birds into dairy cattle in Nevada in the USA with 4 farms affected so far in January 2025. Given the extensive spread of H5N1 B3.13 through dairy cattle across the USA in 2024, it is possible that similar spread of D1.1 will occur, unless strict movement and biosecurity controls are put in place.

Available trade data shows that only a small proportion of consignments of dairy products from the USA could contain viable H5N1 virus. Additionally, the mitigation measures that are currently in place in the USA, along with the mandatory testing and reporting which have been implemented will reduce this likelihood further. Migratory wild birds are unlikely to be a direct route of introduction of H5N1 D1.1 virus into Great Britain and the likelihood of this is considered very low at most in the autumn. The overall likelihood of entry of H5N1 D1.1 virus from dairy livestock in the USA into Great Britain is assessed as **negligible** currently and **very low**, at most, in the autumn. Although the same strain has been detected in poultry and migratory wild birds in Canada, the lack of pathways to Great Britain from Canada applies as well. No dairy herds have been detected in Canada with either of the strains of H5N1 and therefore there is a **negligible risk** for incursion from Canada.

In the USA there have been multiple cases of domestic cats which have been fed raw pet food containing poultry meat or raw dairy products becoming infected and dying of neurological signs. Raw pet food is defined as products which have not undergone a 'kill step' during production, and although they should only contain products of animal origin which are suitable for human consumption, the lack of cooking can mean that other pathogens are present. Several recalls were made of such commercial raw pet food in the USA, and tested positive for H5N1. Pet owners should be aware that shelf-stable pet food does include a 'kill step' and therefore any pathogens would have been destroyed.

There are always concerns around infected products entering Great Britain in passenger luggage and the subsequent waste being discarded in areas where livestock or wildlife could access them. We would like to highlight to all cattle keepers, dairy producers, smallholders and members of the public that it is illegal to feed cattle catering waste, kitchen scraps or dairy products, and to adhere to the swill feeding ban. All dairy keepers should remain vigilant and ensure that any visitors to their premises have not had any recent contact with dairy cattle or cattle premises, poultry or wild birds in the affected regions in USA, or with wild birds and poultry in Canada. People who have been working on farms or with animals returning from any affected areas should avoid any contact with domestic cattle or domestic poultry in commercial holdings and smallholdings. All clothing, footwear or equipment should be cleansed and disinfected before entering dairy cattle or other livestock areas.

Any suspect cases must be reported promptly. Clinical signs may include a decrease in feed consumption, with a decrease in rumination and rumen motility and subsequent acute drop in milk production. Severely affected cattle may have thicker, concentrated, colostrum-like milk or produce no milk at all. Others may include abnormal tacky or loose faeces, lethargy, dehydration, fever, and respiratory signs, such as nasal discharge. Other non-avian species may exhibit respiratory or neurological signs (Caserta et al., 2024, USDA, 2024c). You can read more information about [influenza A \(H5N1\) suspect case definitions for mammals, including pets and wildlife](#).

If you suspect a notifiable disease in your animals, you must report it immediately by calling the Defra Rural Services Helpline on 03000 200 301. In Wales, call 0300 303 8268. In Scotland, contact your local Field Services Office. Failure to do so is an offence.

We will continue to monitor the situation.

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