

Rapid Risk assessment

for highly pathogenic avian influenza H5
(HPAI H5) clade 2.3.4.4b



Update for May based on the period
April (01-30 April) 2024

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Situation in Germany

No outbreaks of HPAIV H5 in domestic poultry or captive birds were detected in Germany between 1 and 30 April 2024.

The number of cases in wild birds decreased further to 9, distributed between Saxony (n=4), Schleswig-Holstein and Hesse (2 cases each) and one case in North Rhine-Westphalia (Fig. 1, Table 1). Geese were predominantly affected. The H5N1 subtype was confirmed in all cases.

A total of 11 HPAI genotypes have been characterised in Germany since November 2023. Two genotypes known since November (DE-23-11-N1.3_euDG in a grey goose from Hesse and DE-23-11-N1.2_euAB in a goose from Saxony) were determined in April.

In Germany, HPAIV H5N1 infections were reported in two foxes in Hamburg on 11 April (Fig. 1; 3).

Table 1: Number of reported HPAIV H5 cases in wild birds, affected bird groups and locations in the period 1 to 30 April 2024 per federal state. Data source: TSN, FLI. Data status: 02/05/2024

Federal state (March/April)	County	Municipality	Wild birds (number of HPAIV notifications)	Period Determination
Hesse (0/2)	Wetterau district	Reichelsheim	Greylag goose (1)	16.04.
		Wölfersheim	Greylag goose (1)	29.04.
North Rhine-Westphalia (2/1)	Viersen	Willich	Wild goose (1)	05.04.
Schleswig-Holstein (10/2)	North Friesland Steinburg	Dagebüll	Red knot (1)	05.04.
		Schenefeld	Eagle owl (1)	
Saxony (4/4)	Leipzig	Markkleeberg	Wild goose (4)	2.+16.04.

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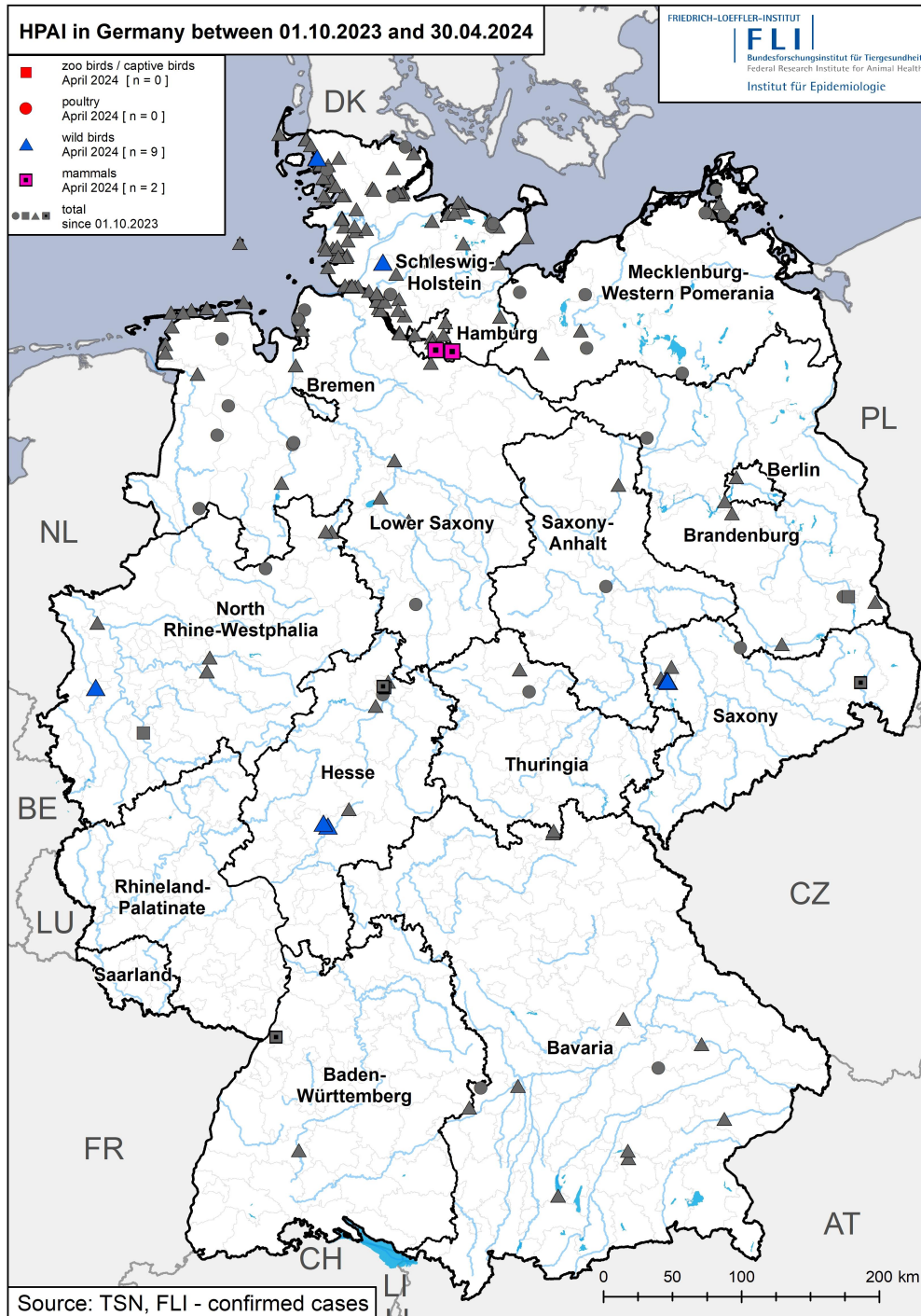


Figure 1: Cases in wild birds (triangles) and mammals (squares with dot) since 01.10.2023. Current cases for the period 01-30.04.2024 in colour. No new cases were reported in domestic poultry in April. Data source: TSN, FLI; data status: 02/05/2024.

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Situation in Europe

HPAIV H5 outbreaks in **domestic poultry** in Europe were reported in April exclusively from Bulgaria (n=4) and Hungary (n=8) (Fig. 2). Various sectors of poultry production were affected; in Bulgaria laying hens, broilers, non-commercial small holdings; in Hungary turkeys, waterfowl with secondary infections mainly from the Békés region.

The number of cases in **wild birds** in Europe also decreased in April with a total of 7 reports (March=54). In addition to Germany (see above), Bulgaria, Denmark, Latvia, Norway, Poland, the United Kingdom and Slovenia each reported one case (Fig. 2). In addition to waterfowl and birds of prey, white storks (Bulgaria, Poland) were also affected.

With the exception of one HPAIV H5N5 detection in a sparrowhawk in England (Llangarron), only the **H5N1 subtype** was identified.

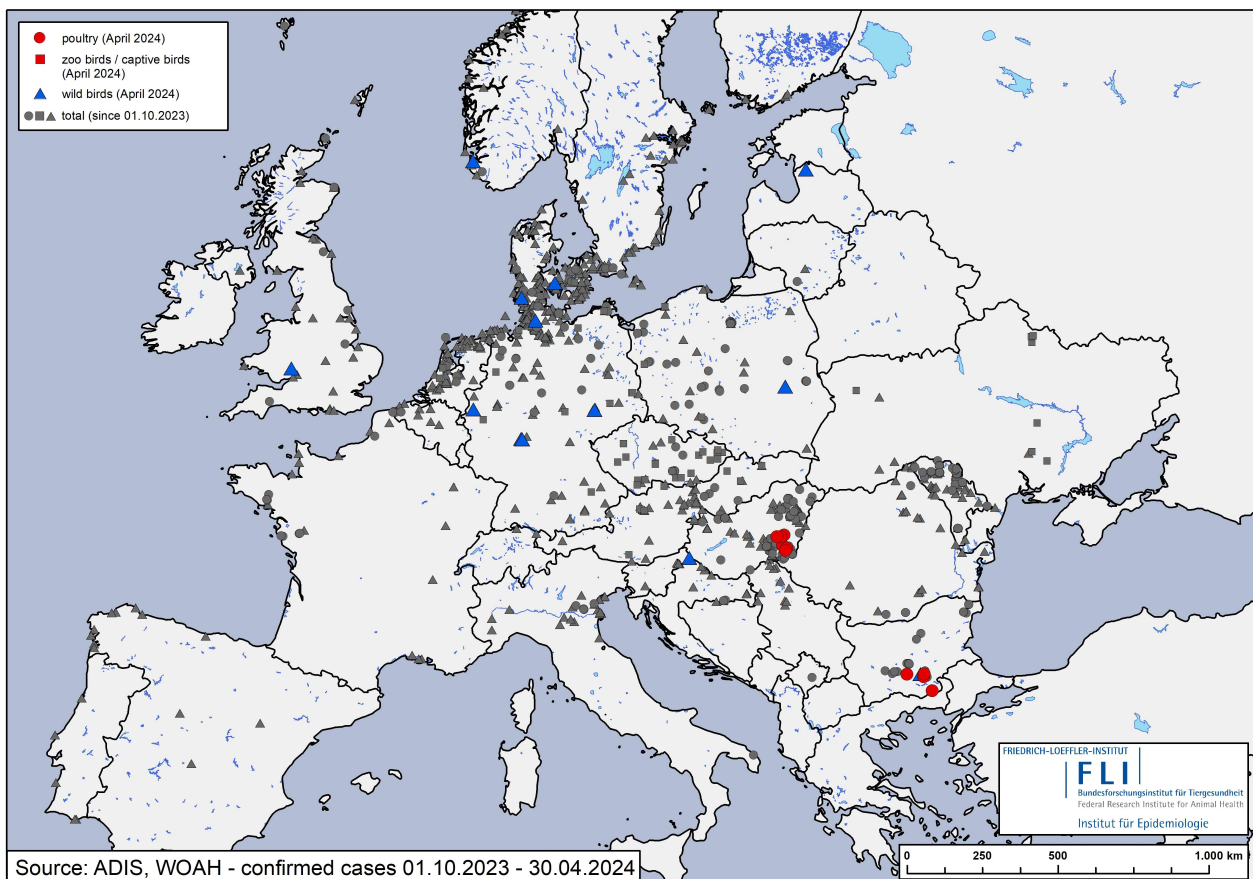


Figure 2: HPAI cases in poultry, captive birds and wild birds reported to ADIS and WOA from 01 October 2023 to 30 April 2024. Cases for April in red and blue; poultry = domestic poultry kept for commercial purposes; zoo/other privately kept birds = other captive birds. Data source: ADIS, WOA; status of data query: 02/05/2024.

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The H5N1 HPAI viruses of clade 2.3.4.4b characterised in Europe since October 2023 have new and different genotypes, which presumably arose through reassortment of circulating HPAI viruses with various local LPAI viruses. There is an increased number of new genotypes with a renewed trend towards more regionality.

Apart from the mammals reported by Germany, no other species were reported in April (Fig. 3).

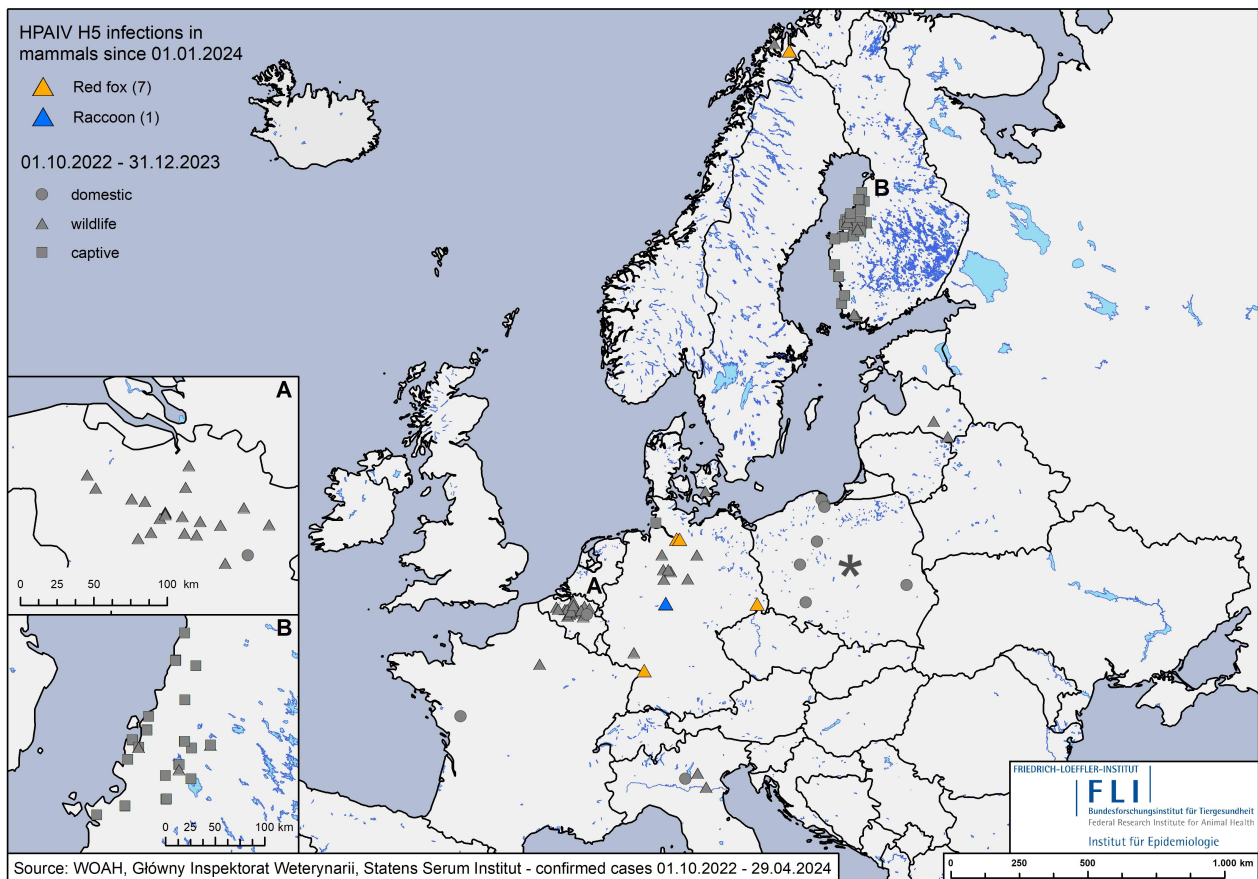


Figure 3: HPAIV H5 infections in mammals in Europe reported to WOA since 01.10.2022. In colour: cases since 01.01.2024. Triangles: wild mammals (wildlife); circles: Domestic mammals; squares: captive mammals (fur animals; captive). *Polish mammal cases involve 33 cats and one caracal and are described on the homepage of the "Main Veterinary Inspectorate" in Poland. Data query: 02/05/2024.

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Situation in the world/Special events

Outbreaks in **domestic poultry** and **wild bird cases** caused by HPAIV H5 clade 2.3.4.4b were detected **worldwide** in Asia and North America in April 2024 and reported to the World Organisation for Animal Health (WOAH). The outbreak in dairy cows in the USA should be emphasised in particular (see below).

- South and Southeast Asia: A few HPAIV H5N1 outbreaks in domestic poultry have been reported in India and Vietnam
- Antarctic region: HPAIV H5 was detected in April in brown skuas on "Lagoon Island", found dead already at the end of February, and reported to the WOAH.
- South America: Brazil reported HPAIV H5N1 cases in terns on the east coast. The situation is currently very calm compared to a year ago.
- North America: In North America (USA), 30 outbreaks in poultry in 3 US states and 32 cases in wild birds were reported for April. These include waterfowl, raptors and crows from 8 states, as well as a number of wading birds found dead on the east coast of North America (Virginia).

In the USA, **infections with HPAIV H5 (clade 2.3.4.4b) in mammals** have reached a new level: The outbreak of HPAIV H5N1 (genotype B3.13) in dairy farms, first reported by the USA at the end of March, has continued to spread. By 2 May, the [US authorities](#) had reported a total of 36 affected farms in 9 states (Texas, Kansas, Idaho, Michigan, New Mexico, North Carolina, Colorado, Ohio and South Dakota). The outbreak appears to have been ongoing for several months. The original introduction of the virus into dairy herds probably occurred as a single event through infected wild birds. The virus was primarily detected in milk samples from infected cattle, some of which had very high viral loads ($> 10^6$ TCID₅₀ per ml). The infected dairy farms appear to be epidemiologically linked through a source in Texas. Transmission, e.g. via contaminated milking equipment, is suspected. On one affected dairy farm in Texas, the virus was also detected in cats that had already been found dead in February and had presumably been infected via the milk. A further four cats died in April as a result of infection (3 cats in New Mexico, 1 cat in Ohio); the virus was also detected in poultry kept on these farms. More precise epidemiological, clinical and virological data on the outbreaks in cattle are still lacking, so that an assessment is currently not possible either in overview (actual spread, spread over time) or in detail (spread in the animal and in the herd). For example, it remains unclear whether and to what extent this virus already has adaptations for replication in cattle. There are indications that the tissue in the bovine udder has [the necessary receptors for influenza A viruses](#) and that other variants and genotypes could therefore also pose a risk if introduced directly into the udder.

HPAIV H5 genome was detected in pasteurised milk from supermarkets in the USA, indicating widespread distribution; however, no infectivity was detected in the PCR-positive treated milk.

In this context, a [human HPAIV H5N1 clade 2.3.4.4b infection](#) has been detected so far. The person from Texas developed conjunctivitis; reports on the exact circumstances of contact and

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whereabouts of the person are not clear. Although no further human infections have been reported, the FAO, WHO and WOAHP have issued a [joint risk assessment](#) assuming the possibility of further sporadic human infections as long as HPAI H5 viruses are detected in milk and dairy cow farms and thus exposure of personnel working on dairy cow farms is likely.

In Germany, there is currently no clinical evidence of a similar infection in dairy cows. Validation studies to establish sensitive virological and serological diagnostics have been initiated at the FLI; plans are also being drawn up to screen dairy herds in Germany on the basis of tank milk tests.

Even though sporadic human infections continue to occur, according to a recent assessment by the European Centre for Disease Prevention and Control (ECDC), the risk of zoonotic influenza transmission to the general population in the EU/EEA countries is considered **low**. However, a low to **moderate** risk is assumed for occupationally exposed groups ([source](#)).

Summary and risk assessment (domestic poultry, wild birds)

Since mid-February 2024, reports of outbreaks in domestic poultry and cases in wild birds have decreased worldwide, although they have not yet come to a complete halt.

No outbreaks in domestic poultry have been reported in Germany since March.

Compared to previous years, the HPAI H5 viruses detected in birds are still widespread in Europe, but the number of detections is significantly lower, which could be due, among other things, to a certain immunity of the previously affected wild bird species, which has a corresponding effect on the prevalence in wild bird populations.

Large waterfowl congregations (e.g. swans and ducks during the winter rest period) have dispersed, but fluctuations in waterfowl movements are still to be expected in Europe over the next few weeks as birds migrate home to their breeding grounds still in May. Colony-breeding birds (terns, gulls, gannets, cormorants) returned from their wintering grounds in Africa and southern Europe to their breeding grounds (on the coast) in the course of April, and densities may continue to increase slightly. Small to medium-scale movements of waterfowl species and gulls to freshwater areas inland or to coastal areas for breeding are taking place. Viruses can spread easily in bird populations and be carried over short distances to other populations. Warmer temperatures and stronger UV radiation can contribute to a reduction in the infectivity of influenza viruses.

The presence of H5 antibodies in adult wild birds after surviving infection in recent years could have a positive impact on the overall situation for affected wild birds, but could leave continued virus circulation unrecognised, as more birds could be at least partially protected from serious illness and death. This means that there may still be a risk of introduction for poultry holdings, even if no conspicuous wild bird deaths have been observed in the region. Cases in carnivorous mammals are also an additional indicator of HPAI H5 presence and should be given special attention.

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The risk of entry, spread and further spread of HPAI H5 viruses in waterfowl populations within Germany is estimated to be **moderate**. This also includes a **moderate** risk of infection for colony-breeding shorebirds returning from their wintering grounds. The "[Bird Flu Radar](#)" (EFSA) shows an increased probability of HPAIV H5 entering the coastal area in mid-May.

The risk of HPAIV H5 being introduced into German domestic poultry holdings and bird populations in zoological facilities through direct and indirect contact with wild birds is classified as **low** for May, as reports of wild bird cases are currently only sporadic, albeit spread throughout Germany.

It is currently assumed that there is a **low** risk of the virus spreading between holdings (secondary outbreaks) within the EU and also within Germany, as the biosecurity measures introduced remain high and outbreaks have fallen sharply across Europe, although they are still occurring in Bulgaria and Hungary.

The risk of introduction through the sale of live poultry in the travelling trade or at poultry exhibitions within Germany and Europe is estimated to be **low**.

The risk of unrecognised circulation of HPAI H5 viruses in waterfowl holdings is classified as **low**.

Separate risk assessment for cattle in Germany

Since mid-March, the first cases of HPAIV H5 infections have been reported worldwide in a number of dairy herds in the USA. Cow-to-cow transmission as well as the spread of the virus through the transport of cattle and indirect transmission through the transport of equipment appear to be responsible for the large-scale spread to 9 US states. The genotype B3.13 (clade 2.3.4.4b) responsible for the infections in cattle has also been detected in 8 domestic poultry flocks in 5 US states.

The most likely routes of introduction of the American H5N1 virus into Germany are trade in cattle and contaminated cattle products from affected farms in the USA.

Raw milk and raw milk products probably pose the greater risk of infection, as the H5N1 virus is excreted in high concentrations in the milk. Contact with untreated milk is therefore an important source of infection and should be given special consideration. Based on the available literature and ongoing studies, the US authorities report that pasteurisation leads to inactivation of the HPAI virus, even if genome parts can still be detected in the milk. However, no studies have yet been published on the effectiveness of pasteurisation of HPAI H5N1 in cow's milk containing the virus or on virus inactivation in dairy products.

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Table 2: Imports of cattle and cattle products from the USA to Germany for the years 2023 and 2024. Data source: TRACES. Data status: 03.05.2024

Year	Type of imported product	Quantity	Number of consignments
2023	Live cattle	0	
	Fresh meat	355 tonnes	In 24 consignments
	Frozen meat	1,142 tonnes	In 231 consignments
	Raw milk	0	
	Colostrum	0	
	Milk and cream	27 tonnes	In 5 consignments
	Dairy products (cheese, quark)	3 tonnes	In 3 consignments
	Fertiliser	0	
	Sperm	598,213 units	In 74 consignments
	Embryos	1,433 units	In 17 consignments
2024	Live cattle	0	
	Fresh meat	105 tonnes	In 9 consignments
	Frozen meat	50 tonnes	In 4 consignments
	Raw milk	0	
	Colostrum	0	
	Milk and cream	0	
	Dairy products (cheese, quark)	0	
	Fertiliser	0	
	Sperm	249,329 units	In 25 consignments
	Embryos	540 units	In 5 consignments

The risk of the US HPAI H5N1 strain (B3.13) introduced into German cattle herds, including dairy cow farms, is estimated to be **very low**.

This assessment is based on the fact that, according to the available trade data, neither raw milk nor live cattle are imported into Germany from the USA (Table 2). Imported dairy products are treated in such a way that any infectious viruses they may contain are unlikely to survive. It is very unlikely that contaminated cattle products (raw milk) will be carried by people who then enter cattle farms to enable close direct contact.

In addition, the possibility of infection of the udder with one of the HPAIV H5 strains of clade 2.3.4.4b occurring in Europe must be evaluated. Although multiplication in the udder is an option for all these HPAIV H5 strains, the route into the udder appears to be a limiting factor. One indication of this is in particular the fact that for 27 years now there has been possible contact of

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cattle with HPAI H5 viruses in many countries (especially in Asia) (e.g. via infected wild birds and their faeces). However, comparable events had not been observed prior to the occurrence of the cases in the USA.

The risk of infection of cattle with HPAI H5 viruses occurring in Europe is therefore estimated to be **very low** for Germany.

Current recommendation

POULTRY

The top priority is to protect poultry from the introduction and possible further spread of HPAIV infections. To this end, the relevant recommended biosecurity measures and monitoring and clarification tests must be reviewed and strictly adhered to. Poultry farmers are **legally** obliged to comply with the basic rules of biosecurity. The reporting of deaths in poultry farming to the veterinary authorities, followed by an official investigation, is considered a measure for the early detection of the fatal disease in chickens and turkeys.

Prevention and [biosecurity measures](#) in poultry farms, animal parks and zoos, especially those with outdoor and free-range systems, should be urgently reviewed and, if necessary, optimised. Livestock farmers can check the biosecurity of their farms anonymously and free of charge using the so-called "AI risk traffic light" (<https://risikoampel.uni-vechta.de/>). In particular, it should be possible to prove that keepers have already taken effective measures to prevent the entry and spread of HPAIV *before* an HPAIV case occurs. The British authorities have published a photo book with examples of biosecurity in poultry flocks ([photo book, in English](#)).

In addition, containment orders remain an effective measure to minimise the exposure of poultry holdings. On the basis of local risk assessments, small-scale and short-phase containment orders can also make a useful contribution. The use of TSIS to view wild bird cases in the districts ([TSIS query](#)) is publicly available.

Poultry or bird exhibitions or the sale of live poultry (travelling trade), including trans-regional trade, should be effectively monitored when they take place. Bringing together (pedigree) poultry of different origins and keeping them at the exhibition venue for several days should be avoided at all costs.

Increased vigilance for the rapid detection of suspected cases in poultry and the immediate initiation of diagnostic clarification with regard to HPAIV would also include the early testing of sick birds in waterfowl holdings and fallen stock for AIV in order to detect the circulation of HPAI at an early stage.

Even though EU Regulation 2023/361 has made it possible to vaccinate poultry against HPAI since February 2023, there is still a lack of suitable commercial vaccines authorised for use throughout Europe. In this respect, [considerations](#) of vaccination as a further preventive protective measure

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in addition to the known biosecurity precautions must remain largely theoretical. Vaccination of poultry would also be linked to considerable monitoring requirements, which are financially costly and would also place a heavy burden on the personnel capacities of veterinary offices and testing facilities.

Persons exposed to potentially infected poultry or captive birds, e.g. during killing or evacuation, or who have come into contact with infected wild birds, must be adequately protected and actively monitored or self-monitored for at least 10 days after exposure for respiratory symptoms or conjunctivitis and immediately inform local health and occupational health services to initiate testing and follow-up. Antiviral pre- or post-exposure prophylaxis should be considered and stocked for exposed individuals in accordance with national recommendations. At the end of February, the European Medicines Agency (EMA) endorsed the authorisation of two adjuvanted protein vaccines for active immunisation of humans against influenza A/H5N1: [Celldemic®](#) and [Incellipan®](#).

WILD BIRDS/WILD ANIMALS

It is virtually impossible to influence the course and spread of HPAIV infections in wild bird populations. The collection of carcasses has proven to be a useful measure against further food chain-related transmission (especially mammals and birds of prey such as sea eagles). However, it can also mean a disturbance for sensitive bird species (especially during the breeding season) and lead to a further spatial spread of the virus if infected animals migrate and spread the virus to other colonies. The protection of colony-breeding rare bird species is a high priority. Nature conservationists, national park rangers, bird wardens, bird ringers etc. should be prepared to deal with sick and dead birds in cooperation with the relevant veterinary authorities, and the possible collection and disposal of dead birds should be planned in advance. The public is called upon to report dead birds and conspicuous cases of illness (neurological symptoms) to the veterinary authorities. Citizens have been able to report dead finds at [ornitho.de for a fortnight](#). The registration of the number of dead birds found and the associated communication between environmental and veterinary authorities should be intensified. Correct species identification of dead birds is required and, in addition to information on the total number of non-investigated dead finds, must be reported via TSN. This is the only way to ensure that the extent of the incident can be realistically assessed and documented. A detailed document with instructions for action and background information can be found on the ["Wadden Sea World Heritage"](#) website.

Vaccination of wild birds is ruled out for practical reasons, but may be considered as an [emergency measure](#) under special conditions.

Ringling activities have the potential to significantly exacerbate the impact of the current HPAI outbreak through two main mechanisms: i) by facilitating transmission from one location to another via clothing and equipment of the ringer interior and ii) by exacerbating symptoms and thus potentially increasing virus shedding due to the stress associated with handling in the ringed

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birds. Scientific bird ringing in colonies with a (high) incidence of deaths (with or without HPAI-positive findings) should be stopped immediately. Ringers who find dead birds in previously unaffected colonies should inform the relevant authorities (nature conservation and veterinary departments) and discuss the next steps. Further visits to other bird populations (including captive birds) should be avoided at all costs in order to prevent the virus from spreading.

Close personal and unprotected contact with dead or sick birds should be avoided; in general, if (even mild) symptoms of illness occur as a result of such contact, a doctor must be consulted immediately to clarify a possible HPAIV human infection.

The same precautions should be taken when finding dead wild carnivores (especially foxes). Carnivores found alive with neurological changes may also be infected with HPAIV H5N1. If foxes or other carnivores are examined at state testing centres as part of rabies screening, tissue samples from the CNS and lungs should always be tested for influenza virus RNA.

In times of high risk or when HPAIV cases or outbreaks are known in an area, consideration should be given to suspending hunting of waterfowl, both to reduce disturbance to wild bird populations and to reduce the possibility of spreading infection from the wild to the domestic environment when infected birds are transported. In addition, there is an increased risk of infection of humans or domestic animals (dogs, cats) when handling raw infected meat.

Abnormal behaviour and deaths of wild birds and mammals in connection with wild bird deaths should be reported immediately to the veterinary authorities for recovery and, if necessary, investigation. A [list of wild bird species for passive surveillance of HPAIV H5 in the EU](#) has just been updated.

The FLI has compiled a [catalogue of recommendations](#) to provide an overview of further options for action.

CATTLE / CATTLE FARMS

Measures must be taken to ensure that contact with potentially contaminated cattle products is avoided. This includes food that has travelled to Germany in passengers' luggage and could be a source of infection for cattle or wild animals if disposed of improperly. The public, livestock farmers, milk producers and small farmers must be informed that it is illegal to feed cattle with food waste, kitchen waste or dairy products.

Dairy farmers are encouraged to ensure that visitors to their farms have not had any recent contact with dairy or cattle farms in the affected regions of the US. Persons working on farms or handling animals returning from affected areas should avoid any contact with domestic cattle or poultry for at least a 3-day quarantine period. Clothing, footwear or equipment worn by this group of people should be disinfected before entering dairy or other livestock areas.

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In the case of unclear and frequent cases of disease or even non-specific symptoms (reduced milk yield, thick, discoloured milk, fever, loss of appetite), testing for HPAIV H5 should be included. Similarly, dogs, cats and pigs kept on farms with poultry with HPAIV outbreaks should be included in the environmental tests (swab and serum samples).

Furthermore, contact with materials that is potentially contaminated with HPAIV H5 viruses (e.g. open drinking troughs in pastures with access to birds; material soiled with bird droppings) should be minimised as far as possible.

Data sources: Animal Disease Notification System (TSN), Animal Disease Information System (ADIS), World Organisation for Animal Health (WOAH), Empres-I, European Food Safety agency (EFSA), [Sub-Antarctic and Antarctic Highly Pathogenic Avian Influenza H5N1 Monitoring Project | SCAR](#); [Canadian Food Inspection Agency](#); [USDA APHIS Livestock USA](#); DEFRA

Abfragezeitraum: 01.-30.04.2024;

Query date: 02/05/2024

Further information

The data situation in the databases is dynamic and changes daily. Therefore, there are shifts in the figures if they are queried at different times.

The European Food Safety Authority (EFSA) provides an updated edition of the scientific assessment of the situation in Europe: [Avian influenza overview December 2023 - March 2024](#).

EFSA has also produced a review article on HPAIV [mammalian](#) infections.

In addition to weekly updated [maps of the outbreaks](#), the FLI also provides information on molecular-virological investigations of the HPAI viruses in Germany ([HPAIV genotypes in Germany](#)) and a catalogue of questions ([FAQ](#)).

The [Radar Bulletin Germany is published](#) at monthly intervals on the FLI website.

The magazine for the poultry industry (DGS) has set up an [avian influenza radar](#) in which avian influenza outbreaks are listed chronologically with details of species, numbers and locations.

The European Reference Laboratory for Avian Influenza has launched a new [HPAI dashboard](#) regarding HPAI detections in the EU.

The EFSA has also set up an [HPAI dashboard](#) in which the figures in Europe can be displayed in real time.

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EFSA has developed a [Bird Flu Radar](#) e together with Euring, Eurobird Portal and Ausvet.

The European Centre for Disease Prevention and Control publishes weekly [overviews](#), including on HPAI in public health. The WHO published a [risk assessment](#) on 21 December 2022.

The British Trust of Ornithology (BTO) has published helpful [tips](#) for bird ringers.

Meanwhile, the FAO's Scientific Task Force on Avian Influenza in Wild Birds and others are calling on authorities to recognise HPAI as a problem for the conservation of biodiversity and to focus their [surveillance and control measures](#) on the protection of wild fauna.

"[Offlu](#)" published in December a overview of HPAI cases in wild birds and mammals in South America and the Antarctic region with an assessment of the risk of entry into Oceania and the Antarctic penguin population . The document also refers to options for action. Furthermore, a [current press release](#) provides information about the research visit to the Antarctic in March.

The One Health High-Level Expert Panel (OHHLEP) is urging a [holistic approach to panzootic highly pathogenic avian influenza](#).