

Risk assessment

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



Update based on the period
November (01-30 November) 2023

Situation in Germany

Between 1 November and 1 December 2023, eight HPAIV H5 outbreaks were detected in domestic poultry in Germany (Tab. 1, Fig. 1).

The number of cases in wild birds rose again in November. A total of 26 cases of HPAIV H5 in gulls (n=8), ducks (n=6), geese (n=4), cranes (n=4), a bird of prey, and a swan were reported to the Animal Disease Notification System (TSN) (Tab. 2, Fig. 1). The H5N1 subtype was detected in 24 cases. One great black-backed gull from the Wadden Sea was HPAIV H5N5-positive (Tab. 2).

No HPAIV infections in mammals were reported from Germany for the month of November.

Four new HPAI genotypes have been detected in Germany so far in November. One genotype, which also circulates in the Netherlands and Denmark, was detected in wild birds and in a poultry farm in Lower Saxony and Schleswig-Holstein. Another genotype with a similar distribution pattern was identified in a barnacle goose in Schleswig-Holstein. A third genotype, possibly attributable to these viruses, has so far only been detected in poultry in a private farm in Schleswig-Holstein and a turkey farm in Mecklenburg-Western Pomerania. The fourth new genotype was detected in a breeding flock in Thuringia and a crane in Hamburg.

Table 1: Confirmed HPAIV H5 outbreaks in poultry, including captive birds, for the period from November 1 to December 1, 2023 in Germany Data source: TSN, FLI. Data status: 04.12.2023

Federal state	County	Poultry species concerned	Type of use	Number of birds kept	Date of Detection
Brandenburg	East Prignitz-Ruppin	Turkey	Fattening	>11,000	30/11
Mecklenburg-Western Pomerania	Ludwigslust-Parchim	Turkey	Fattening	>25,000	21/11
Lower Saxony	Cloppenburg	Turkey	Fattening	>23,000	28/11
	Cuxhaven	Chicken/duck	Mixed/private		18/11
		Turkey	Fattening	>14,000	30/11
	Emsland	Turkey	Fattening	>16,500	01/12
Schleswig-Holstein	Schleswig-Flensburg	Chicken	Egg production	4,100	25/11
Thuringia	Kyffhäuserkreis	Duck	Breeding/private		22/11

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Table 2: Number of reported HPAIV H5 cases in wild birds, affected bird groups and locations in the period 1-30 November 2023 per federal state. Data source: TSN, FLI. Data status: 04/12/2023

Federal state (October/November)	County	Location	Wild birds (number of HPAIV notifications)	Date of Confirmation
Bavaria (0/3)	Ebersberg	Poing	Crane (1)	17/11
	Landsberg a. Lech	Ammersee south shore	Crane (2)	01/12
Hamburg (0/4)	Hamburg City	Norderelbe	Crane (1)	20/11
		City	Bird of prey (1), Swan (1)	29/11
		City	Peregrine falcon (1)	01/12
Mecklenburg-Western Pomerania (0/2)	Western Pomerania-Rügen	Rambin	Duck (2)	03&06/11
Lower Saxony (3/5)	Aurich	Greetsiel	Herring gull (1)	17/11
		Norderney	Seagull (1)	08/11
	Wittmund	Langeoog	Wild goose (1)	24/11
	Diepholz	Diepholz	Wild goose (1)	01/12
	Empty	Moormerland	Owl (1)	01/12
Schleswig-Holstein (0/12)	North Friesland	Friedrich-Wilhelm-Lübke-Koog	Wigeon (3), great black-backed gull (H5N5,1), gull (1)	14-17/11
		Hamburg Hallig	Black-headed Gull (1) & Herring Gull (1) Goose (1)	17/11 14/11
		Reußenköge	Black-headed Gull (1)	17/11
	Dithmarschen	Schlüttsiel	Barnacle goose (1)	27/11
		Meldorf harbor	Wigeon (1)	27/11
		Schleswig-Flensburg	Barnacle goose (1)	28/11

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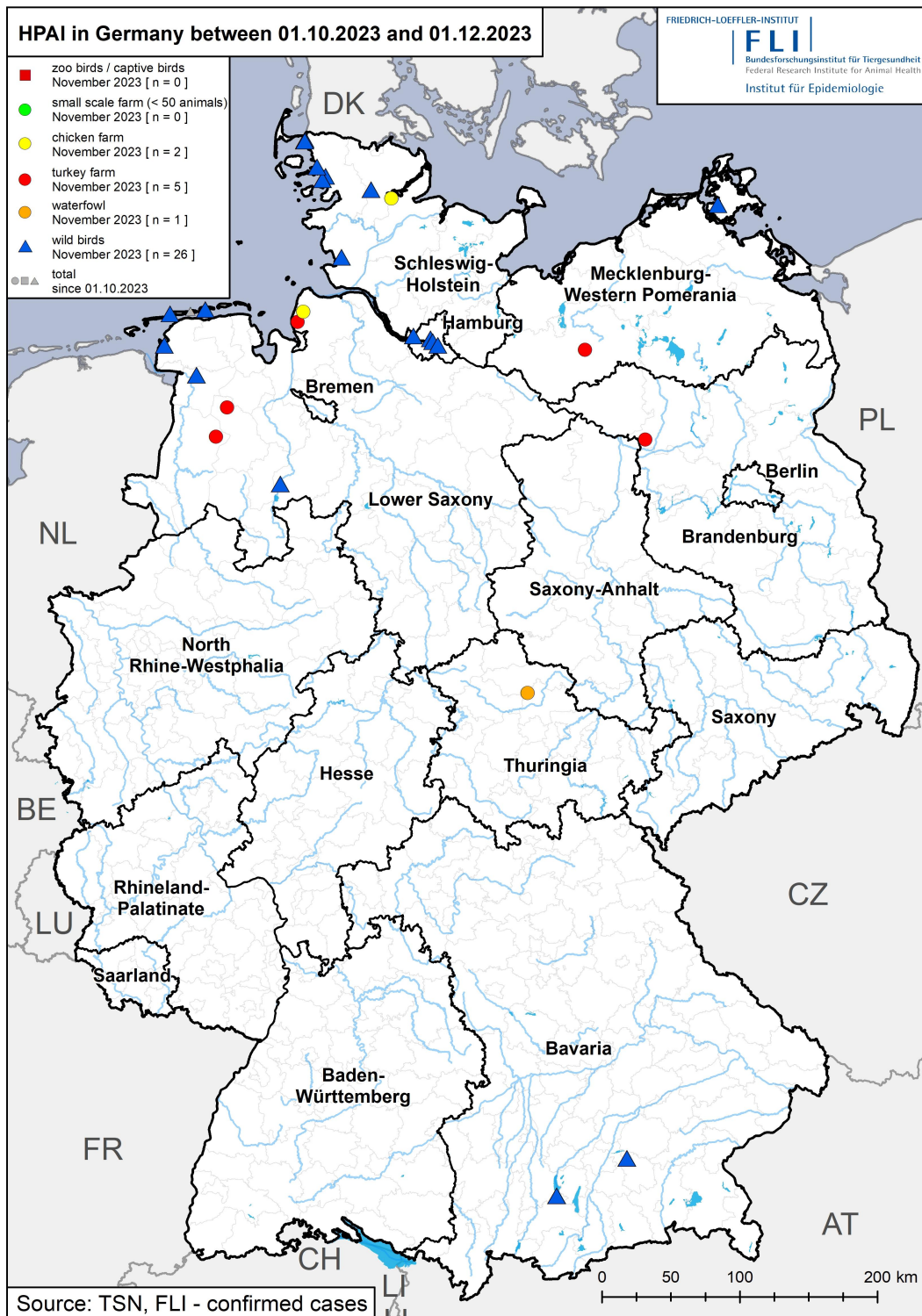


Figure 1: Outbreaks of HPAIV H5N1 in Germany in poultry (dots), other kept birds (zoo/wildlife sanctuary; squares) and cases in wild birds (triangles) since 01/10/2023. In color outbreaks and cases for the period 01/11-01/12/2023. Different colors: see legend. Data source: TSN, FLI; data status: 04/12/2023.

Situation in Europe

The number of HPAIV H5 outbreaks in **poultry** in Europe rose sharply in November, with Hungary reporting the most outbreaks with numerous secondary outbreaks (mainly waterfowl) (Fig. 2, 4). In total, more than 1.6 million birds (turkeys, chickens, waterfowl) were affected by the outbreaks across Europe in November alone.

In **captive birds**, the Netherlands reported 2 outbreaks in pheasant holdings (Fig. 4).

The number of cases in **wild birds** in Europe also jumped to over 100 in November. Almost half of these cases concern gray cranes (Fig. 3).

The **H5N1 subtype** was identified in the majority of cases. Iceland and Norway reported deviating evidence of HPAIV **H5N5** in a white-tailed eagle (Norway) and a raven and a kittiwake (Iceland).

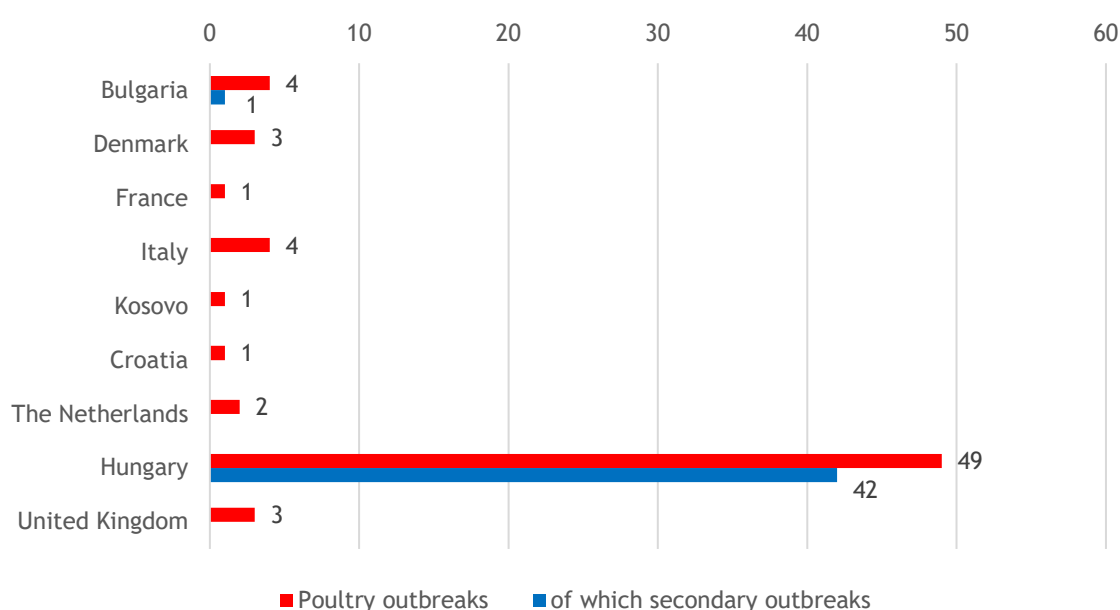


Figure 2: Notifications of HPAIV H5 outbreaks in poultry for November 2023 in Europe (Germany not included). Data source: ADIS, WOA; data status: 04/12/2023.

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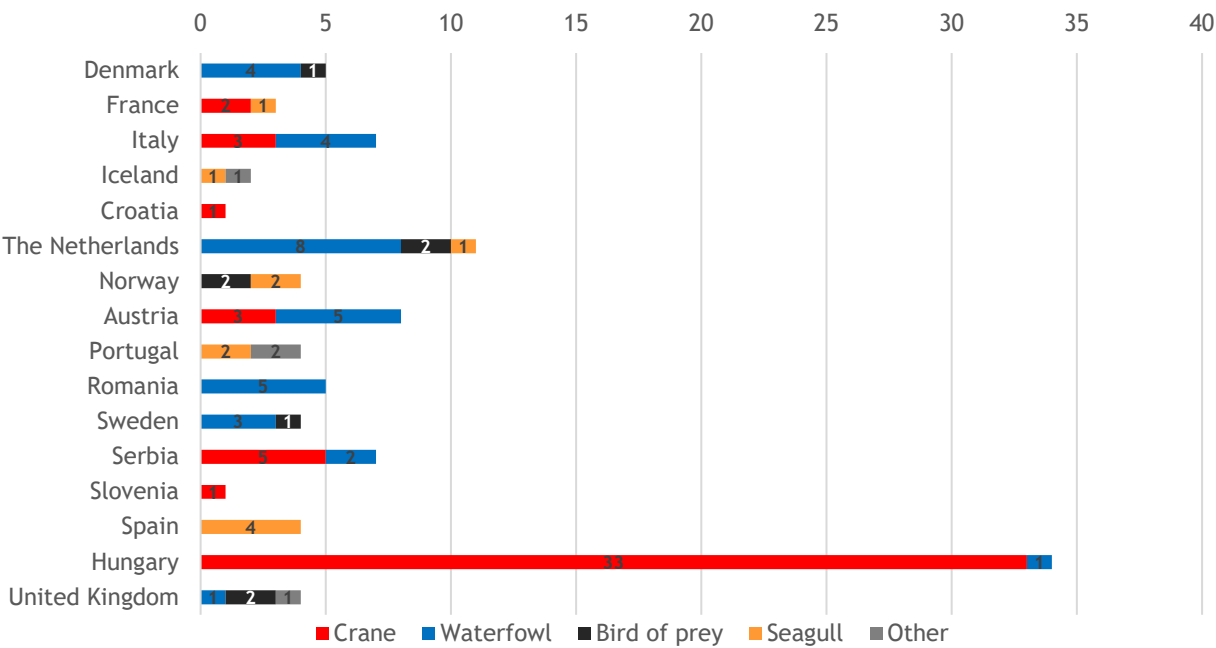


Figure 3: Notifications of confirmed HPAIV H5 cases in wild birds for November 2023 in Europe (Germany not included). The wild bird numbers are only the number of individual reports to ADIS, which often conceal a much higher number of affected birds. Data source: ADIS, WOA; data status: 04/12/2023.

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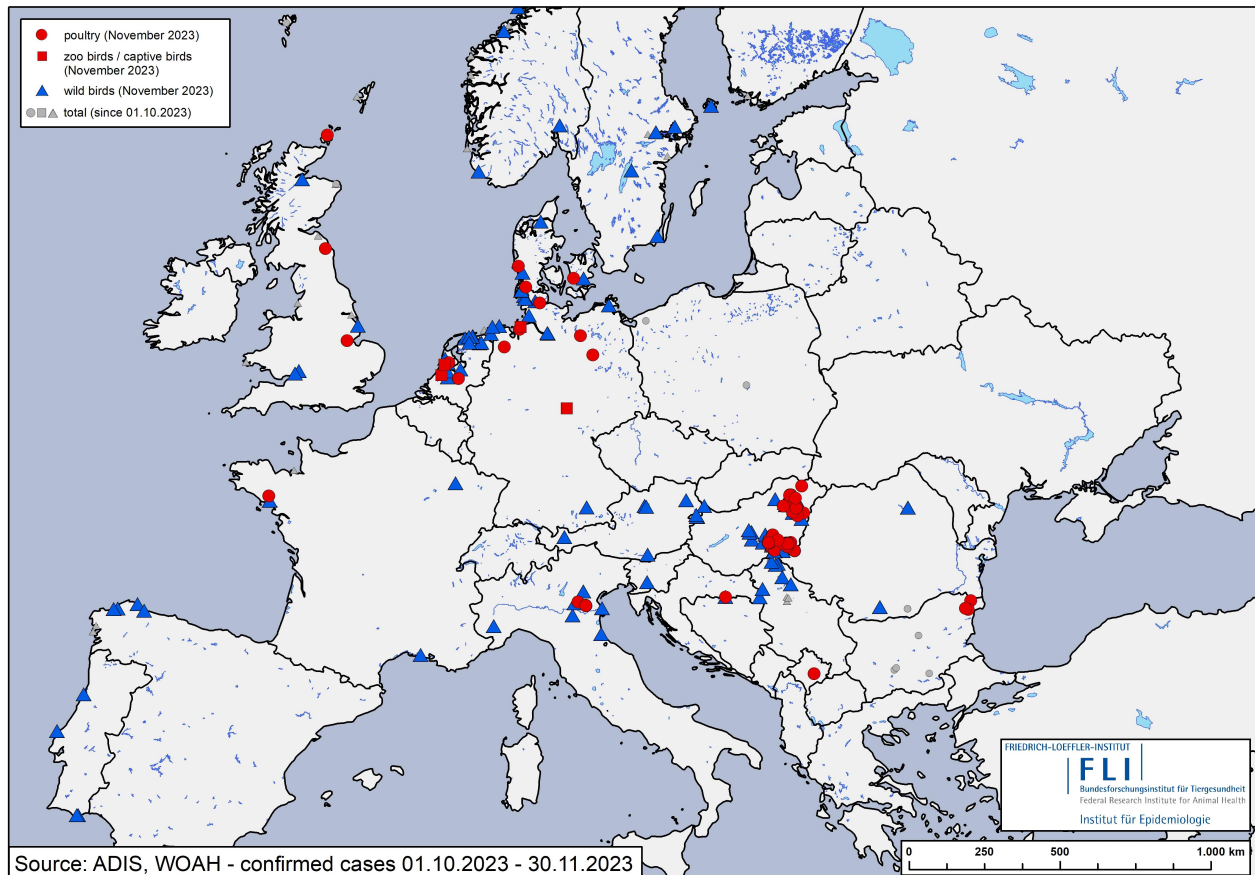


Figure 4: HPAI cases in poultry, captive birds and wild birds reported to ADIS and WOA from October 1 to November 30, 2023. Cases for November in red and blue; poultry = commercial (domestic) poultry; zoo/other privately kept birds = other captive birds. Data source: ADIS, WOA; status of data query: 04.12.2023.

The HPAI H5N1 viruses investigated in Europe until October belonged almost exclusively to the genotype "gull-like BB" of clade 2.3.4.4b HPAIV H5, which emerged (presumably in France) from a reassortment event of H5N1 and an AIV of subtype H13 adapted to gulls and was spread across Europe from June 2022. This genotype dominated events in Germany and Europe in 2023 and was also responsible for many of the mammalian fatalities in Europe. Since October, no more sequences of viruses of this genotype have been reported.

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

In September and October, individual H5N5 viruses were characterized in Norway, England and Iceland. The genotype underlying these viruses was already characterized in 2021, but has not been found since the first quarter of 2022.

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In November, the WOA¹ was notified of 42 detections of HPAIV H5 in mammals exclusively from Finnish fur farms (Arctic fox, red fox, American mink, raccoon dog, sable, Fig. 5).

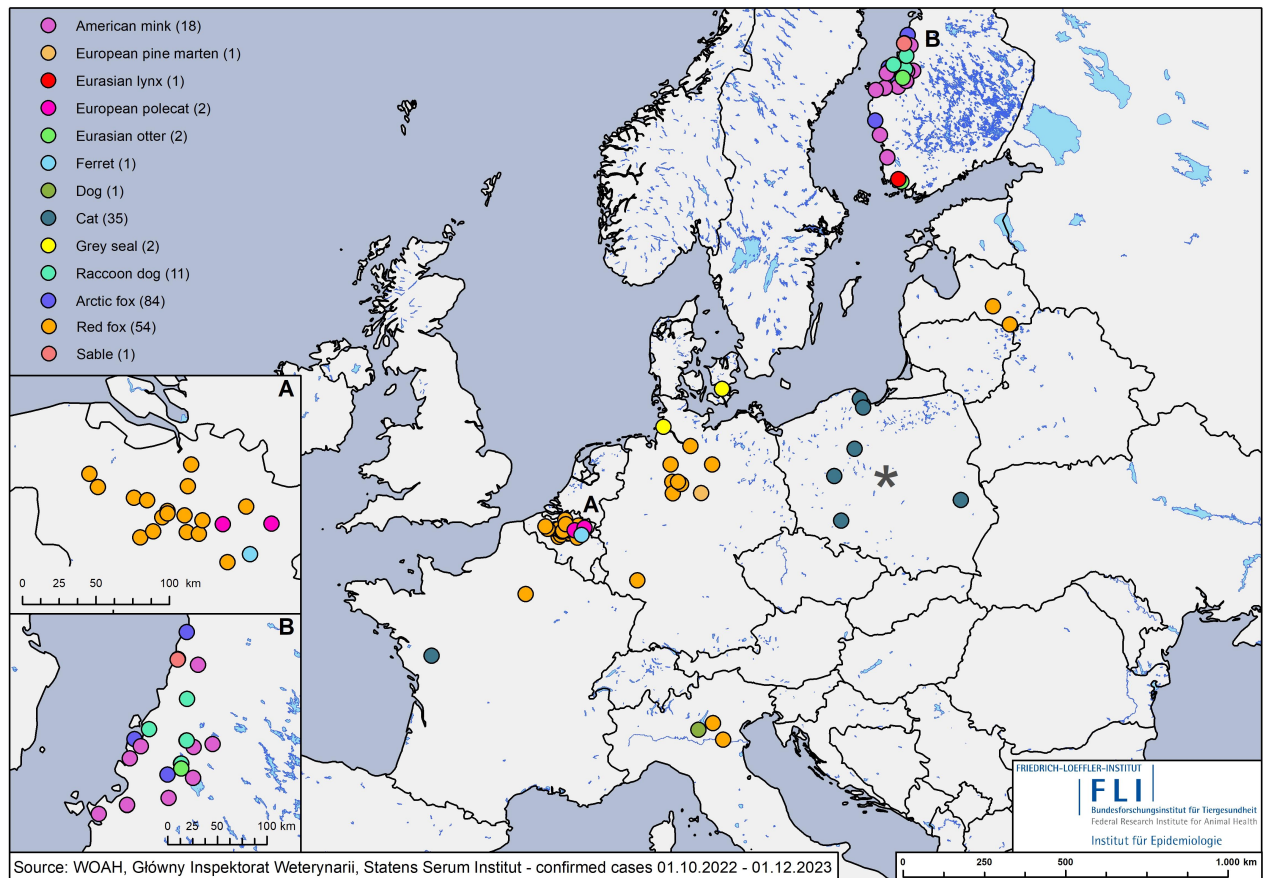


Figure 5: HPAIV H5 infections in mammals in Europe reported to WOA since 01/10/2022. *Polish mammal cases concern 33 cats and 1 caracal and are described on the homepage of the "Main Veterinary Inspectorate" in Poland. Data query: 01/12/2023.

Situation in the world/Special events

Worldwide, outbreaks in domestic poultry and wild bird cases caused by HPAIV H5 of clade 2.3.4.4b are again being reported to the WOA, particularly in the Americas.

- Antarctic region: The cases of HPAIV that first appeared in October in a number of wild bird species on South Georgia, a group of islands in the South Atlantic of the Antarctic region, have spread further. At the end of November, the virus was detected in albatrosses in addition to skuas, petrels and terns. In addition, wild bird infections (southern petrels) have been reported from another archipelago, the Falklands/Malvinas.
- In South America, outbreaks in poultry and cases in wild birds continued to be reported in November:
 - Colombia reported 4 outbreaks in poultry
 - Argentina reported HPAIV H5N1 in James flamingos, a very rare bird species of the high Andes, with 220 deaths.
 - According to official information from the Ecuadorian Ministry of the Environment, HPAIV H5N1 has been detected in samples of frigate birds in the "El Morro" colony (Guayas). Around 6,000 dead birds were registered. The colony comprises 35,000 frigate birds and is the largest in the American Pacific region.
- North America: Outbreaks in poultry and cases in wild birds have been reported across the entire North American continent from Canada to Mexico:
 - Canada: 63 outbreaks in poultry, British Columbia particularly affected
 - USA, 23 states: 55 outbreaks in poultry, 43 private holdings; a total of over 8 million animal losses in November. Over 600 wild birds tested positive in November alone, including a large proportion of clinically healthy hunted ducklings.
- Asia:
 - For the first time in three years, Cambodia reported outbreaks of HPAIV H5N1 in small holdings in the south-east of the country, near the border with Vietnam;
 - Japan reported 14 outbreaks in Saga and Ibaraki prefectures at the end of November.

Fatal infections with HPAIV H5 in mammals were reported in November in sea lions and seals in Uruguay and in elephant seals in the Antarctic.

Despite the high number of outbreaks in poultry worldwide and an assumed multiple contact between humans and infected birds, **infections with HPAIV H5 clade 2.3.4.4b in humans** still appear to be very rare events that are closely monitored and documented. Since 2020, fewer than 10 human infections with mild or asymptomatic courses have occurred in Europe and North America, although severe courses have been reported in two people from Ecuador and Chile after infection with HPAIV H5. In November, infections of a 21-year-old woman (deceased) and a 4-year-old girl with HPAIV H5N1 were reported from Cambodia, which were temporally linked to an outbreak of HPAIV H5N1 in ducks. Genetic analyses showed that it was a different clade, 2.3.2.1c, which is not circulating in Europe.

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According to an assessment by the European Center for Disease Prevention and Control (ECDC), the risk of zoonotic transmission of HPAIV H5N1 clade 2.3.4.4b and the associated impact on public health is classified as **low**. However, a **moderate** risk is assumed for occupationally exposed groups who have close contact with infected poultry or who have been exposed to infected and diseased cats (e.g. in Poland) ([source](#)).

Summary and risk assessment

After a sharp decline in HPAIV outbreaks and cases across Europe in August and September, there has now been a sharp increase.

Since November, a considerable number of outbreaks in poultry (n=76) have been reported in Europe, with an independent outbreak with secondary outbreaks developing, particularly in regions with a high density of poultry (Hungary). In November alone, the number of poultry losses across Europe amounted to over 1.6 million.

The range of wild bird species affected now includes an increasing number of waterfowl again (in spring and summer it was gulls). What is new is a Europe-wide increase in the occurrence of cranes at their resting places; there is no evidence of possible increased mortality.

The H5N1 HPAI viruses of clade 2.3.4.4.b characterized in Europe since October 2023 show new and different genotypes, which presumably arose through reassortment of circulating HPAI viruses with different LPAI viruses. Another subtype (H5N5) is circulating in northern Europe and has been detected in a great black-backed gull in northern Germany in addition to Norway and Iceland.

In many parts of Germany there are suitable resting and wintering areas for a large number of waterfowl. In winter, weather conditions lead to increased movement dynamics (even over long distances) and in some places to high numbers of resting populations. At the same time, small to medium-scale movements of resting waterfowl species favor the spread of the virus to other populations, even over short distances.

Cold temperatures and weaker UV radiation provide favorable conditions for the persistence of HPAI viruses. The possibility of further reassortment events is likely in the coming weeks when waterfowl, which are often infected with low pathogenic influenza viruses at this time, meet at resting places. 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 leave circulation undetected.

The risk of entry and spread of HPAI H5 viruses in waterfowl populations in connection with high waterfowl densities at staging areas within Germany is classified as **high**. The "Bird Flu Radar" (EFSA) indicates a high probability of HPAIV H5 being introduced into northern and south-western Germany in early December.

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The risk of HPAIV H5 introduction into German poultry farms and captive bird populations in zoological facilities through direct and indirect contact with wild birds is classified as **high**, as reports of wild bird cases have been increasing again since the end of October. An increasing number of outbreaks in poultry and captive birds in Europe indicates a current risk potential.

It is currently assumed that there is a **high** risk of the virus spreading between holdings (secondary outbreaks) within the EU and also within Germany. The intra-Community movement of poultry from countries with a pronounced outbreak represents a particular risk factor. Turkey and waterfowl flocks in particular are currently affected throughout Europe.

The risk of introduction through the sale of live poultry in the travel trade or at poultry exhibitions within Germany and Europe is also considered to be **high**.

The risk of undetected circulation of HPAI H5 viruses in waterfowl farms in Germany is also classified as **high**.

Current recommendation

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 checked 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 optimized if necessary. 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 farmers had already taken effective measures to prevent the entry and spread of HPAIV *before* an HPAIV case occurred. The British authorities have published a photo book with examples of biosecurity in poultry flocks ([photo book](#)).

Direct or indirect contact between poultry and wild waterfowl or natural bodies of water should be completely avoided in order to prevent the introduction of the disease. A risk-based restriction of the free-range keeping of poultry (stabling) is recommended in the vicinity of frequent cases of HPAIV-infected wild birds. Every citizen can use TSIS to view wild bird cases in the districts ([TSIS query](#)).

Increased vigilance for rapid detection of suspected cases in poultry and immediate initiation of diagnostic clarification with regard to HPAIV would also include 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.

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To avoid secondary outbreaks, at least the following precautions should be taken:

- No shared use of equipment, carcass garbage cans and vehicles by several poultry farms.
- Restriction of vehicle and passenger traffic on poultry farms to an absolute minimum.
- Staff looking after poultry should only work on a single farm.
- Veterinarians and other persons visiting poultry flocks on a professional basis should stop their tour and observe a 48-hour waiting period if they have entered a flock where clinical signs, including increased mortality, indicate HPAI.

Poultry or bird exhibitions or the sale of live poultry (in the travel trade), including supra-regional trade, should be prevented or effectively monitored. Bringing together (pedigree) poultry of different origins and keeping them at the exhibition venue for several days should be avoided at all costs.

Increased attention must also be paid to compliance with biosecurity measures for intra-Community movements of poultry, particularly to or from EU countries with a current outbreak. Careful cleaning and disinfection must be ensured for poultry transport vehicles returning from affected countries.

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 approved for use throughout Europe. In this respect, [considerations](#) of vaccination as a further preventive protective measure in addition to the known biosecurity precautions must remain largely theoretical. France, which has started vaccinating commercial duck farms under a national derogation, was immediately banned from trading poultry with the USA and Japan. This also has consequences for the entire European trading area. 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 been in 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.

Surveillance of wild mammals for HPAIV H5 infection (see below), but also mammals kept in captivity (fur animals) should be intensified. Similarly, dogs, cats and pigs kept on farms with poultry with HPAIV outbreaks should be included in environmental testing (swab and serum samples).

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

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and to reduce the possibility of spreading infection from the wild to the domestic environment when infected birds are transported.

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 white-tailed eagles). 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 finds and conspicuous cases of illness (neurological symptoms) to the veterinary authorities. The registration of the number of dead finds and the associated communication between environmental and veterinary authorities should be intensified. A detailed document with instructions and background information can be found [here](#).

Close personal and unprotected contact with dead or sick birds should be avoided; in general, if your own (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 facilities as part of rabies screening, tissue samples from the CNS and lungs should always also be tested for influenza virus RNA.

Abnormal behavior 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.

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 estimated and documented.

For an overview of further options for action, a catalog of recommendations can be [found here](#).

Data sources: Animal Disease Notification System (TSN), Animal Disease Information System (ADIS), World Organization for Animal Health (WOAH), Empres-I, European Food Safety agency (EFSA), [Scientific Committee on Antarctic Research](#); [Canadian Food Inspection Agency](#); [USDA APHIS](#)

Query period cards: 01/11-01/12/2023;

Query date: 04/12/2023

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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 what is happening in Europe: [Avian influenza overview June - September 2023 | EFSA \(europa.eu\)](#).

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

The [Radar](#) Bulletin Germany is published monthly 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.

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

The WHO published a [risk assessment](#) on 21/12/2022.

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 recognize HPAI as a problem for the conservation of biodiversity and to [Monitoring and control measures](#) should also be geared towards the protection of wild fauna.