Animal &
Plant Health
Agency

Scientific opinion on the incursion of High Pathogenicity Avian Influenza (HPAI) H5Nx into housed or not housed poultry flocks and captive birds

9 November 2026

Summary

The scientific opinion for the risk of incursion of highly pathogenic avian influenza (HPAI) H5Nx into housed and non-housed birds (domestic poultry and captive birds) in Great Britain from direct and indirect contact with wild birds is updated here to accommodate the wild bird cases and poultry outbreak reports to 9 November 2026. This scientific opinion was previously updated in January 2023 in response to an increase in the number of findings of HPAI H5N1 in poultry and wild birds during the middle of the migratory waterbird season. The epidemic curve for the 2026 to 2027 season remains in the early stages of development. Although poultry outbreaks remain considerably lower than those reported during the equivalent period in 2022 to 2023 and 2025 to 2026 seasons, seven IPs have already been confirmed by 9 November 2026, exceeding the number reported by the same point in the 2023 to 2024 and 2024 to 2025 seasons. It is unknown how migratory waterbirds may influence further introduction of the virus into Great Britain during autumn to winter 2026 to 2027 as they gather at their wintering sites, though they will provide a large susceptible population with unknown immunity with the ability to excrete viable virus into the environment.

It is not possible to directly measure the effect of housing poultry on the reducing the risks of exposure to HPAI from wild birds. It has previously been estimated by expert opinion that housing of poultry gives a **two-fold** reduction in the risk of exposure of poultry to virus from wild birds increasing to a **six-fold** reduction if the unhoused birds previously had access to environmental water bodies in the absence of any biosecurity. Furthermore, by applying routine biosecurity to poultry premises there is a further **four-fold** reduction in risk while high biosecurity leads to a further **44-fold** reduction in risk. This highlights the importance of maintaining high biosecurity at all times to protect poultry. A 2024 study concluded that a housing order was most effective from approximately three weeks after implementation and when combined with other additional biosecurity and disease control measures (Tammes, 2024). Internal APHA analyses suggest that the effectiveness of housing measures is heterogeneous across space and time, with their impact likely influenced by factors such as infection pressure.

Housing orders have been put in place six times since 2016 (see Table 1) as a preventative measure to the estimated increased risk to poultry from wild birds. The European Food Safety Authority (EFSA) in 2017 used expert opinion to assess the effectiveness of various biosecurity measures in preventing outbreaks. Expert opinion was utilised as there was insufficient published evidence to assess the efficacy of housing or biosecurity on the prevention of HPAI. The opinion concluded that housing as a standalone measure (that is in the absence of other biosecurity measures such as foot dips, cleaning equipment, preventing access to wild birds and rodent control) is likely to reduce the number of outbreaks and estimated a two-fold reduction in risk but is not able to completely prevent all outbreaks. It recommended that a suite of biosecurity measures should be implemented, alongside appropriate training. Nevertheless, the paper did highlight that outdoor poultry holdings bear an increased risk of avian influenza incursions

and the applicable biosecurity measures are more limited where birds are not confined to housing.

Here the assessment for the current (9 November 2026) HPAI risk levels in Great Britain is updated, based on current control measures and the infection pressure for different areas of Great Britain from wild bird abundance. The key points relating to the current situation are:

1. The 2025 to 2026 outbreak recorded the greatest number of HPAI H5N1 detections in Great Britain since the unprecedented outbreak in the 2022 to 2023 season. Though there were no detections of HPAI H5 in poultry over the summer
2. In the 2025 to 2026 season (1 October 2025 to 30 September 2026) there were 95 HPAI infected premises (IPs).
3. Since the start of the 2026 to 2027 season (1 October 2026 to 9 November 2026), there have been 7 confirmed IPs of poultry, with 5 in England and 2 in Scotland. Wales have not yet had any confirmed IPs.
4. HPAI H5 wild bird detections started to increase across England and Scotland as we entered the beginning of the 2026 to 2027 season, with 20 detections from 1 October 2026 to 9 November 2026. The majority were found in England (18), followed by Scotland (2) and none so far in Wales.
5. In previous seasons, England has typically reported IPs first in Great Britain as there is HPAI incursion via wild waterfowl from the near continent.
6. Following the rise in the number of HPAI detections in wild birds and IPs in October 2026, along with an increase in the European continent, and more favourable conditions for virus survival, the risk level was increased to **HIGH** for wild birds on 6 November 2026 and the risk levels to poultry were increased to **MEDIUM** (with medium uncertainty) where biosecurity is sub-optimal and increased to **LOW** (with low uncertainty) where biosecurity is stringent (practicing the highest standards of biosecurity) on 6 November 2026.
7. Avian Influenza Prevention Zones (AIPZs) are not currently in place. The AIPZ requires keepers and personnel working with poultry to take additional biosecurity measures. This means that all bird keepers in these areas (whether they have pet birds, commercial flocks or just a few birds in a backyard flock) are required by law to take a range of biosecurity precautions, including housing their birds (except in very specific circumstances).
8. There are a number of risk pathways for the introduction of HPAI from wild birds to domestic birds. Transmission between infected wild birds and kept birds can occur as a result of direct transmission (beak to beak contact) or indirect transmission (wild birds contaminate objects (fomites) and the environment which kept birds then come into contact with).
9. Spread of HPAI between premises when disease control measures and keeper awareness are high is considered to have been rare in the UK. Though they have occurred with spread between units of the same business through shared workers. This rate may increase with increased background infection pressure.

10. Detections to date have been reported prominently in resident wild bird species, including raptors, gulls, pigeons and Canada geese, with only a small number of detections in migratory waterbirds, notably whooper swans.
11. HPAI H5N1 also continues to be reported in wild birds and poultry across Europe. As we are in the autumn months, detections of HPAI in wild birds in Europe are of more relevance to future risks to Great Britain as the over-wintering migratory ducks, geese and swans are beginning to arrive in Great Britain from Europe.

Introduction

Housing orders have been utilised in Great Britain and also in several EU countries during previous outbreaks of HPAI. The effectiveness of housing orders on reducing exposure of poultry to virus is difficult to assess. In the 2016 to 2017, 2021 to 2022, 2022 to 2023, 2024 to 2025 and 2025 to 2026 seasons in Great Britain, it is considered likely that there would have been a higher number of outbreaks had a mandatory housing order not been in place. However, it is difficult to estimate how many flocks would have been exposed to the virus if the housing order had not been in place, and therefore how many were prevented as a result of the housing order.

EFSA carried out a comprehensive review of the outbreaks of HPAI H5N8 in 2016 to 2017 to assess the risk of introduction of virus into poultry from migratory and residential wild birds (EFSA, 2017). The opinion concluded that once virus is introduced to a wild bird population, a critical population size is required before virus amplification and further wild bird-associated geographical spread of the virus can take place. Therefore, there is an increased likelihood of incursion into poultry farms most closely located to large gatherings of wild birds (including but not exclusively waterfowl) during the waterbird migration season. Once the migratory birds leave (from late March onwards) the risk of poultry outbreaks in Europe and Great Britain usually reduces but in cases where non-migratory birds are still testing positive, there will be a continual, albeit lower, risk. The risk is anticipated to be lower because the large gatherings of wintering resident birds will have dispersed to their breeding sites, the migratory waterbirds will have departed, and the warmer temperatures and longer day lengths will reduce virus survival in the environment. Though we have seen disease circulation in seabird populations over the summer months in recent years, this has typically not resulted in an increase in infected poultry premises.

Through the EFSA (2017) expert opinion, the impacts of various sanitary control measures were estimated. The relative risk reduction for entry of the virus from wild birds to poultry was estimated to be **three-fold** by preventing access of poultry to water bodies. It was estimated by expert opinion that housing of poultry gives a further **two-fold** reduction, and by applying routine biosecurity to poultry premises there is a further **four-fold** reduction in risk while high biosecurity leads to a further **44-fold** reduction in risk.

A further supporting document to EFSA opinions on the risk of introduction of HPAI into poultry farms in general (EFSA, 2017a) was a systematic review of previous outbreaks to identify risk factors and concluded that the main risk factor for introduction is contact with wild birds or fomites contaminated with wild bird faeces. Other important risk factors were poultry species (waterfowl and turkeys are higher risk), the production system, where outdoor systems are higher risk than indoor, and the presence of biosecurity flaws.

This scientific opinion aims to assess whether the introduction of a requirement to house poultry is likely to reduce the number of outbreaks in Great Britain over winter 2026 to aid policy decisions.

Risk assessment

Hazard identification

The hazard identified is the high pathogenicity avian influenza (HPAI) virus H5Nx subtype, as both the HPAI H5N1 and HPAI H5N5 subtypes have been isolated from the UK during the current season which started on 1 October 2026. Since 1 October 2026, detections of H5N1, H5N5, and untyped H5 avian influenza viruses have also been reported across Europe.

Risk question:

“What is the risk of incursion of HPAI H5Nx into housed and non-housed birds (domestic poultry and captive birds) in England, Scotland, and Wales in November 2026 from direct and indirect contact with wild birds?”

Terminology related to the assessed level of risk

For the purpose of the risk assessment, the following terminology will apply (WOAH, 2021):

- **Negligible**: event is so rare that it does not merit consideration
- **Very low**: event is very rare but cannot be excluded
- **Low**: event is rare but does occur
- **Medium**: event occurs regularly
- **High**: event occurs very often
- **Very High**: event occurs almost certainly

Assumptions and uncertainties in H5N1 transmission in wild birds in Great Britain over the winter 2026 to 2027

Most, if not all, migratory wild birds that overwinter in Great Britain are expected to arrive over the coming months, with populations typically peaking in December and January. The risk level may increase over the coming weeks. Reducing the uncertainty in this assumption would not alter the risk.

The 2026 to 2027 season differs from that observed during the large-scale outbreaks of 2021 to 2022, 2022 to 2023 and 2025 to 2026. While wild bird detections during October and early November have remained below the levels reported during the equivalent period in 2022 to 2023 and 2025 to 2026, HPAI H5 is being detected across both wild birds and poultry. However, this can change quickly.

The detection of HPAI in raptor species early in the season may indicate the continued presence of HPAI H5 within local wild bird populations. These detections may suggest ongoing virus circulation in resident wild birds (including doves and finches which may serve as prey for raptors) prior to the arrival of migratory waterbirds. However, given the limited number of cases this season, it is not yet possible to determine if this represents sustained local transmission. More cases in waterbirds are expected in Great Britain in the coming weeks as the number of cases in migratory ducks (pintail, wigeon, teal) increase and spread westwards through Europe.

Although poultry outbreaks remain considerably lower than those reported during the equivalent period in 2022 to 2023 and 2025 to 2026 seasons, seven IPs have already been confirmed by 9 November 2026, exceeding the number reported by the same point in the 2023 to 2024 and 2024 to 2025 seasons.

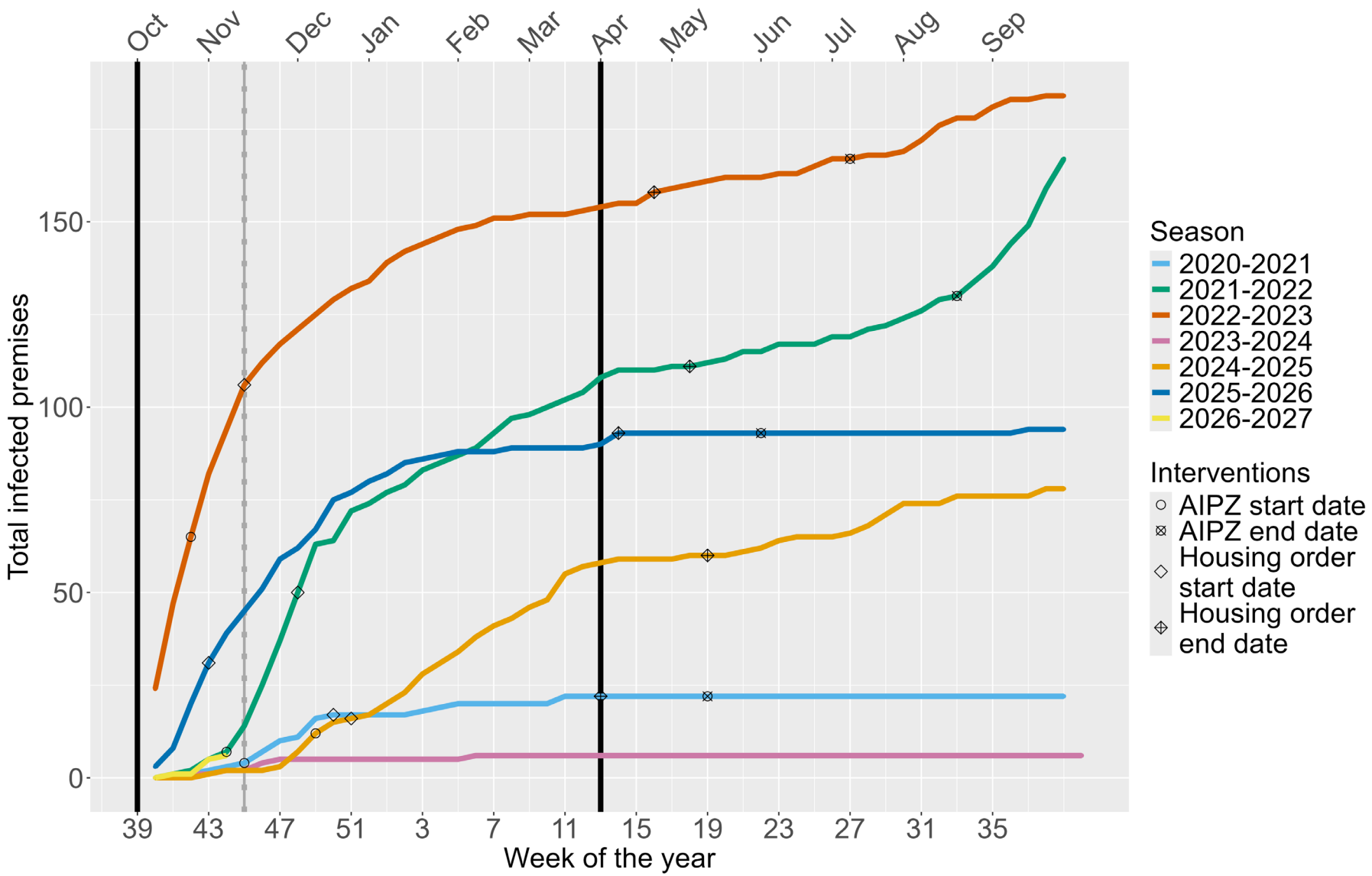
The evidence for the economic benefits and dis-benefits of housing birds is not part of this assessment.

Entry assessment

Probability that HPAI H5 is present in Great Britain currently

The 2026 to 2027 season began officially in Great Britain on 1 October 2026. Figure 1 shows that the number of IPs started to increase in the first few weeks of October. Although the number of outbreaks remains lower than that observed during the equivalent period of the 2022 to 2023 and 2025 to 2026 seasons, seven IPs have been confirmed by the beginning of week 46. Since 1 October 2026 and as of 9 November 2026, there have been seven confirmed Infected Premises (IPs) in Great Britain, with 5 in England and 2 in Scotland (Figure 2). Additionally, since 1 October 26 and as of 9 November, there have been 20 HPAI H5 detections in wild birds (Figure 3) with the majority confirmed as H5N1 (16) and 4 confirmed as H5N5. At the time of writing, there have been no confirmed IPs or HPAI H5 detections in Wales. In previous seasons, England has typically reported IPs first in Great Britain as there is HPAI incursion via wild waterfowl from the near continent.

Figure 1: Line graph showing the cumulative number of infected premises in Great Britain since the 2020 to 2021 season. Each season starts on the 1 October. Housing orders and AIPZ interventions are marked on each line when implemented (plain circle and diamond) and when revoked (circle and diamond with a cross through). Housing order start dates are shown using the earliest implementation date anywhere in Great Britain. Black vertical lines represent the start and the end of the high-risk period (1 October to 31 March) and the grey vertical line represents the current week (46). For a complete list of regional and national housing order commencement and end dates, see Table 1.


Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
150
100
50
0
Total infected premises
39
43
47
51
3
7
11
15
19
23
27
31
35
Week of the year
Season
2020-2021
2021-2022
2022-2023
2023-2024
2024-2025
2025-2026
2026-2027
Interventions
AIPZ start date
AIPZ end date
Housing order start date
Housing order end date

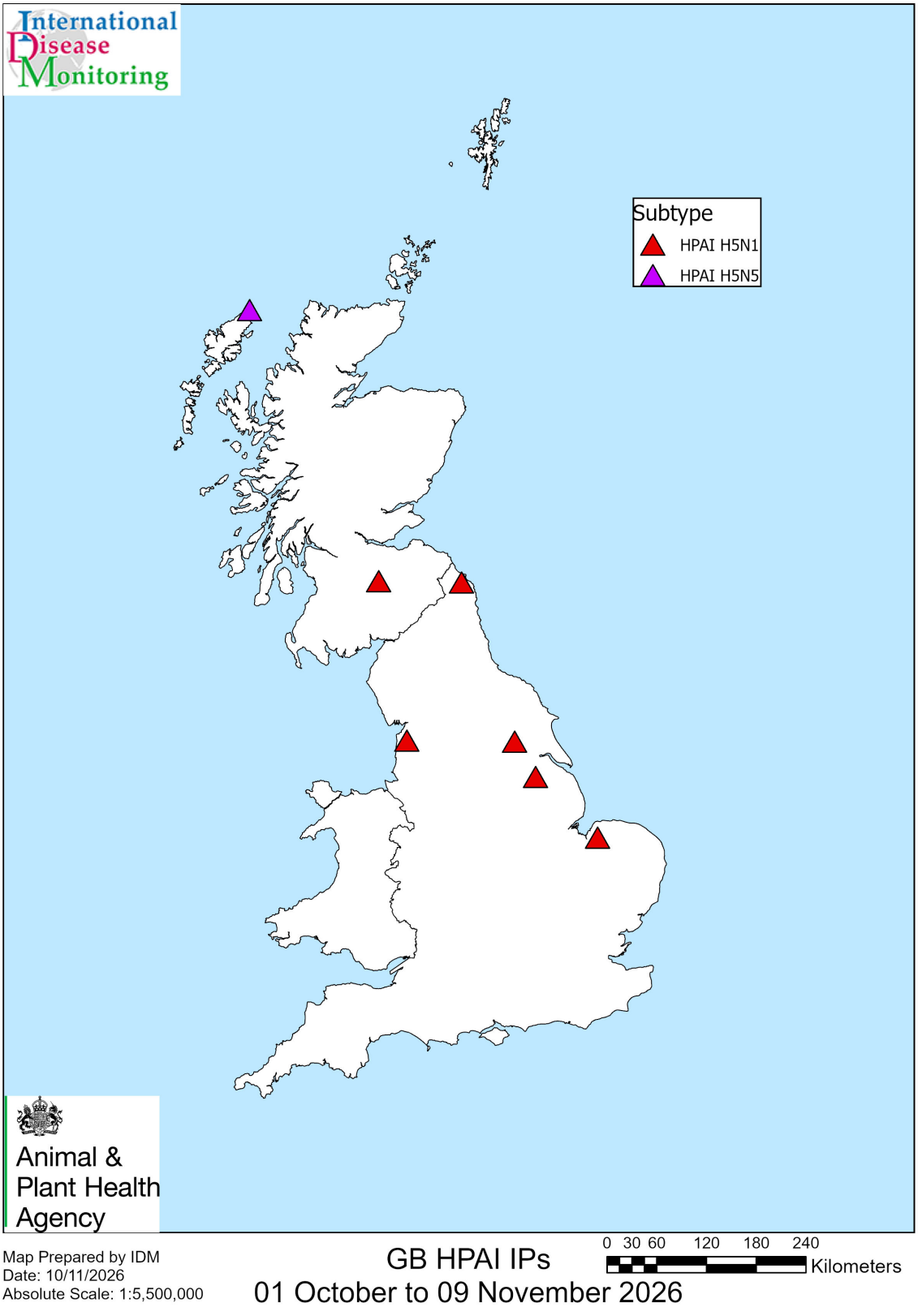
HPAI Season	England outbreaks	Scotland outbreaks	Wales outbreaks	Housing order?	Coverage	Date introduced	Date lifted
2017 to 2018	0	0	0	No	N/A	N/A	N/A
2018 to 2019	0	0	0	No	N/A	N/A	N/A
2019 to 2020	1	0	0	No	N/A	N/A	N/A
2020 to 2021	77	10	8	Yes	National GB	14/12/2020	31/03/2021
2021 to 2022	134	11	7	Yes	National GB	29/11/2021	02/05/2022
2022 to 2023	160	38	8	Yes	Regional (Norfolk, Suffolk and parts of Essex) National (England) National (Wales)	12/10/2022 07/11/2022 02/12/2022	18/04/2023 18/04/2023 18/04/2023
2023 to 2024	4	2	0	No	N/A	N/A	N/A

2024 to 2025	20	1	2	Yes	Regional (East Riding of Yorkshire, City of Kingston Upon Hull, Lincolnshire, Norfolk and Suffolk) York, North Yorkshire and Shropshire Herefordshire, Worcestershire, Cheshire, Merseyside and Lancashire in addition to the East Riding of Yorkshire, City of Kingston Upon Hull, Lincolnshire, Norfolk, Suffolk, Shropshire, York and North Yorkshire. County Durham, Cumbria, Northumberland and Tyne and Wear in addition to Cheshire, City of Kingston Upon Hull, the East Riding of Yorkshire, Herefordshire, Lancashire, Lincolnshire, Merseyside,	23/12/2024 27/01/2025 16/02/2025 07/04/2026	15/05/2025 to 22/05/2025 (7-day welfare transition period)

					Norfolk, Suffolk, Shropshire, Worcestershire, York and North Yorkshire.		
2025 to 2026	79	9	7	Yes	Regional (Cheshire, Cumbria, Derbyshire, Durham, East Riding of Yorkshire, Greater Manchester, Lancashire, Leicestershire, Lincolnshire, Merseyside, Norfolk, North Yorkshire, Northumberland, Nottinghamshire, Rutland, Shropshire, South Yorkshire, Staffordshire, Suffolk, Tyne and Wear, West Yorkshire) National (England)	30/10/2025 06/11/2025	09/04/2026

Table 1: Number of infected premises (IPs) recorded in England, Scotland and Wales, together with regional and national housing order implementation and withdrawal dates by HPAI season.

Figure 2: Outbreaks of HPAI H5 in domestic poultry and captive birds (as of 9 November 2026) in Great Britain from 1 October 2026.



The wild waterfowl population in Great Britain is relatively well understood. Several non-governmental organisations (NGOs) conduct regular surveys for the wild waterfowl at

known wintering sites across Great Britain. In particular, the British Trust for Ornithology (BTO), The Joint Nature Conservation Councils (JNCC), the Royal Society for the Protection of Birds (RSPB) and the Wildfowl and Wetlands Trust (WWT) carry out counts of wild birds. There are 53 sites counted each with at least 20,000 birds wintering year after year across Great Britain, though this represents only a portion of wintering sites used by waterfowl in Great Britain.

Recent expert ornithological opinion is that there have been no major differences in the populations of migratory wild waterbirds, the location of the large assemblages or the timing of arrivals of migratory waterbird populations compared to previous years. In terms of migration, the wild migratory waterfowl started arriving as usual in Great Britain from Northern Europe in late August and September with numbers peaking in December and January. While some species, such as swans, will be site loyal from one year to the next, others will be less so, and there will be some mixing between species including resident Great Britain and migratory waterbirds in the large aggregation sites. Outward migration will start again from late March with nearly all migratory waterbirds expected to be departed by early May.

There is a system for wild bird surveillance in the Great Britain, whereby found dead birds from target species are reported either by wardens at reserves and wetland sites, or by the public and then submitted for testing at the National Reference Laboratory (NRL). It is important to note that this system of passive surveillance does not provide complete knowledge of the population. The immunity status for wild birds is unknown. Not all infected birds will die, and the detection of dead birds will vary depending on the species of bird that die (smaller birds are less likely to be noticed than large birds), the location (detection is less likely in remote areas) and the level of awareness of the people who find the dead birds (trained wardens are more likely to report than members of the general public). Once positive birds have been reported at a site, more findings may not be tested until two weeks have passed. Since 1 October 26 and as of 9 November, there have been 20 HPAI H5 detections in wild birds (Figure 3) with the majority confirmed as H5N1 (16) and 4 confirmed as H5N5. It should be noted that there is a variable lag period between the collection of found-dead wild birds to sampling, testing, and the reporting of results. There is also typically a lag period observed between detections in wild birds and incursions into poultry premises.

Figure 3: Map showing HPAI H5 cases in wild birds (as of 9 November 2026), in Great Britain from 1 October 2026

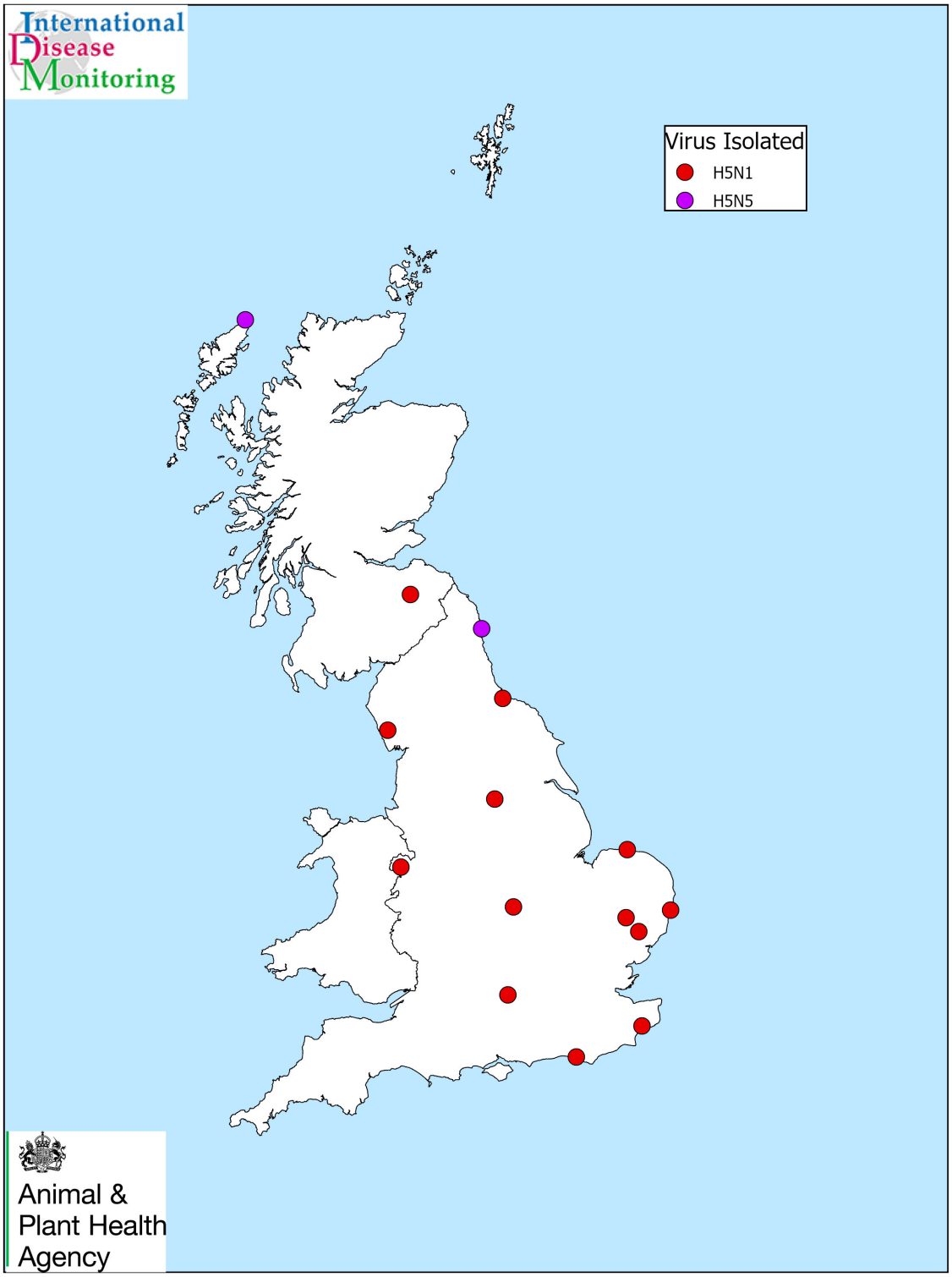
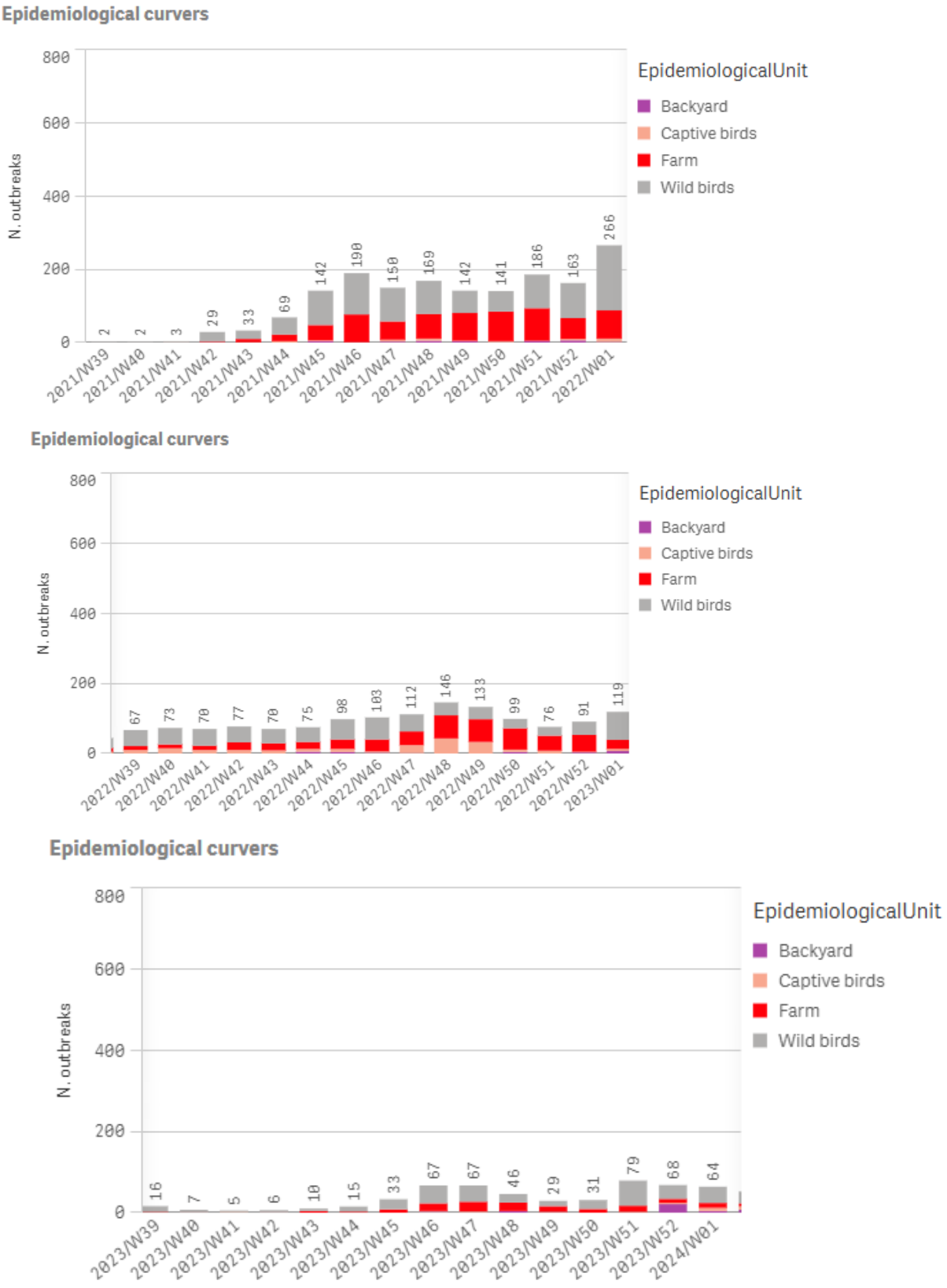
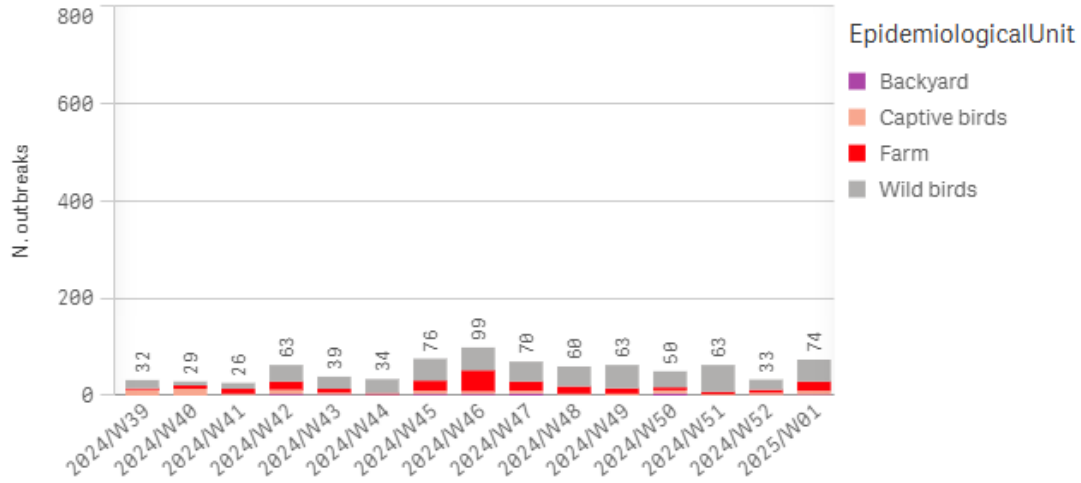


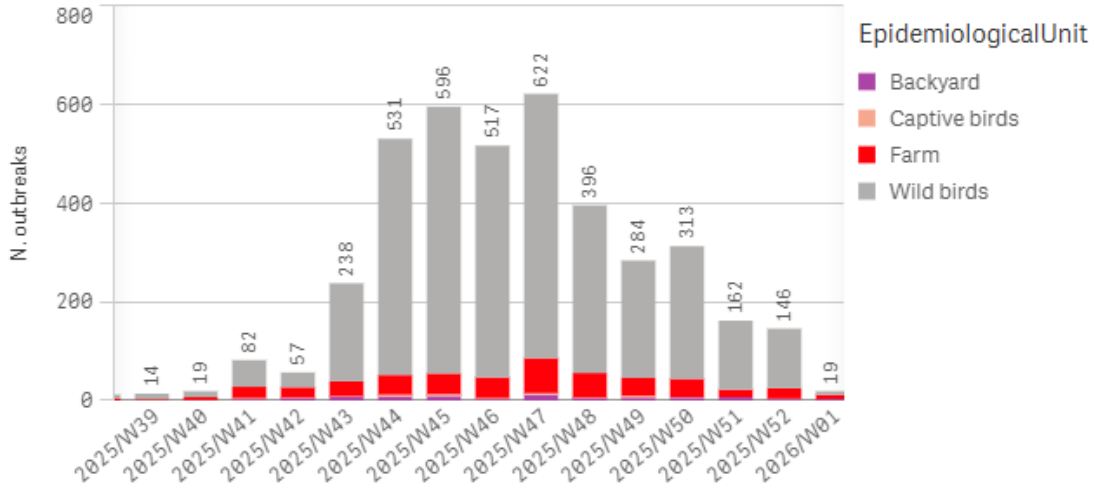
Figure 4: Epidemiological curvers produced by the European Union Reference Laboratory (EURL) based on the number of reports of HPAI on farms, backyard premises, captive birds and wild birds per season since 2021 to 2022. Graphs run from the start of each HPAI season (1 October) to week 1 of the following year apart from the current season, which runs to the beginning of week 46.



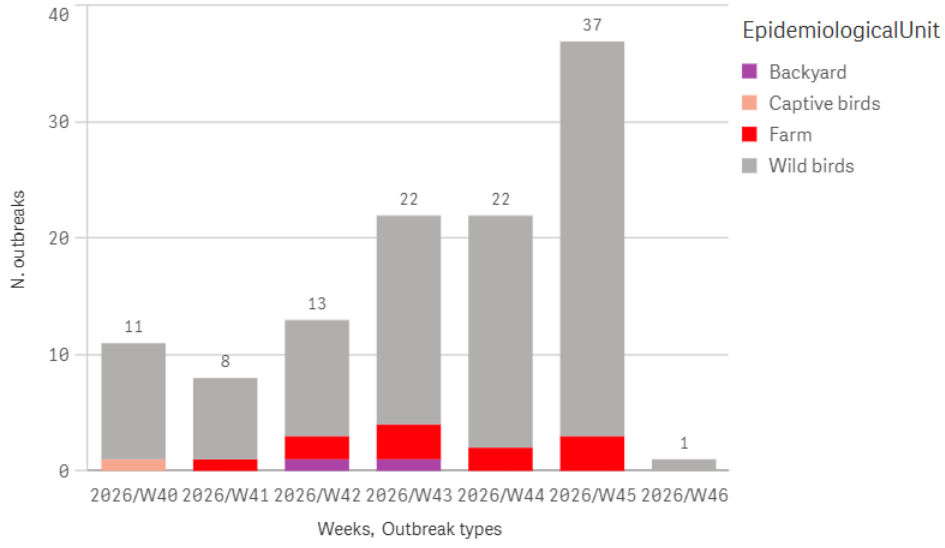
Epidemiological curvers



Epidemiological curvers



Epidemiological curvers



Across Europe since October 2026, HPAI H5 infection has been detected in multiple species of wild bird with 94 cases in total and 12 outbreaks in poultry according to data from the World Organisation for Animal Health. Results submitted to the EURL (Figure 4) show the number of HPAI reports per season since 2021 to 2022. Trends in EURL data generally reflect those observed in Great Britain (Figure 1), however, they are not necessarily predictive of subsequent patterns in Great Britain.

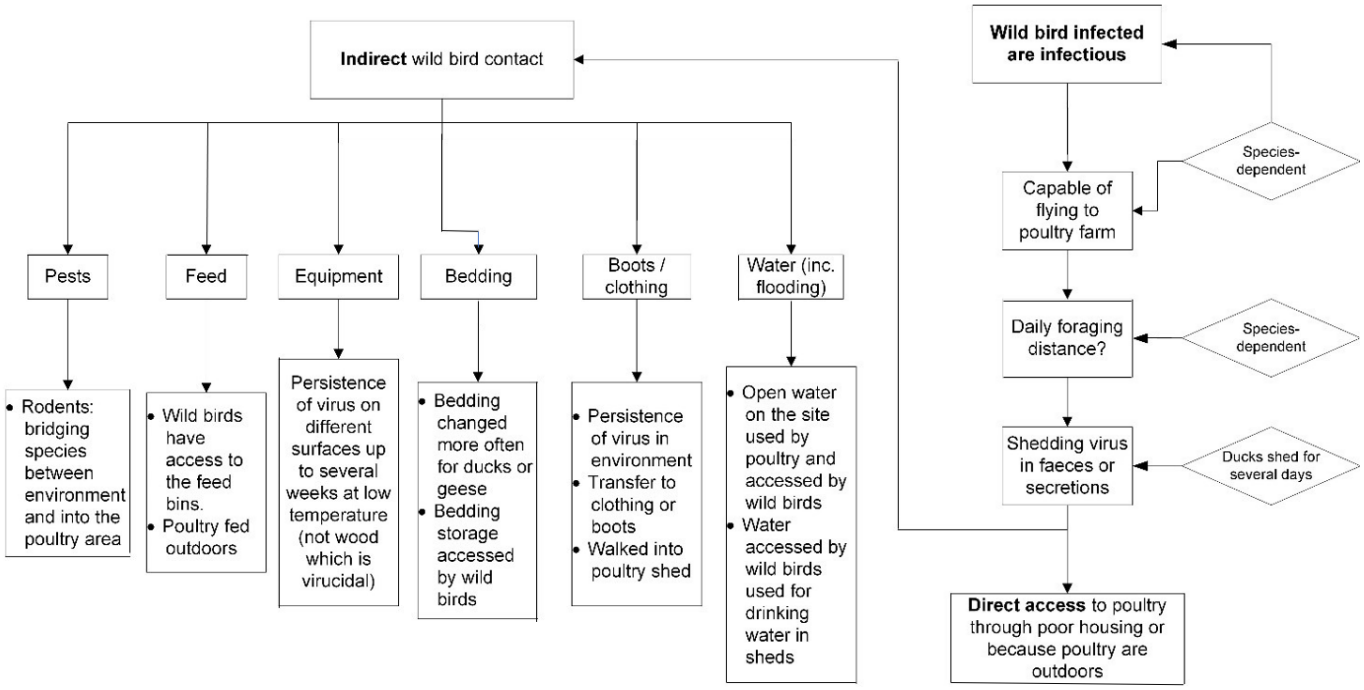
Since all the migratory waterbirds are arriving in Great Britain over the next few weeks and months, the details of cases currently in Europe are of greater relevance to Great Britain compared to the end of winter migration. Now and over the next few weeks is the time that we will see the most impact from these migratory waterbirds. France, Belgium, Denmark, the Netherlands, Germany, Iceland and Norway are of particular relevance to Great Britain due to their geographical proximity and the movement of wild birds between these regions. Several of these countries have reported elevated HPAI risk during autumn 2026. Denmark raised its HPAI incursion level to high and implemented a mandatory housing order following ongoing wild bird migration and an increase in poultry outbreaks. Germany have similarly increased its risk level to high, with housing orders to be considered at the state level. Iceland have reported an increase in HPAI H5N5 detections in wild gulls, reported by WOAH, while the Netherlands introduced a mandatory national housing order following three poultry outbreaks in a short period. Norway also heightened their HPAI risk level as a precautionary measure, ahead of their first outbreak of HPAI H5N1 in poultry in early November.

It is unknown how migratory waterbirds will influence the introduction of the virus into Great Britain during autumn to winter 2026 to 2027, as HPAI H5N1 has already been detected in a small number of resident wild bird species prior to the arrival of most migratory waterbirds. Genetic analysis may be able to determine if there have been any new incursions this season, rather than the increased waterfowl population serving as a mechanism by which virus that was already circulating in Great Britain can amplify. Currently, HPAI H5 has been detected in migratory waterbirds in Great Britain, and they may have gone onto infect other resident birds to some degree which is currently unknown. Some of those migratory waterbirds would have had immunity from previous exposures either last winter in Great Britain or on their breeding grounds over the summer and would thus not have been susceptible, although immunologically naïve “first winter” birds (that is born in summer 2026) could contribute significant viral loadings to the environment if infected.

The anticipated peak in wild bird cases and poultry IPs in Great Britain from the arrival of the migratory waterbirds in autumn 2026 may be at the start of its upward trajectory. The current virus strains are likely to continue to circulate in wild birds in Great Britain over the coming months, with likely increasing numbers in the coming weeks as waterbird populations increase and environmental factors are more favourable for virus survivability. It is therefore considered that the likelihood of there being infected wild bird species present in Great Britain in the next month (December 2026) is **HIGH**, and it is expected that more HPAI H5 cases in wild birds will be detected in the next month (December 2026).

Exposure assessment

Figure 51 Exposure pathways for poultry to HPAI H5N1 via contact with wild birds



There are multiple pathways for the exposure of poultry to influenza viruses causing notifiable avian diseases via direct or indirect contact with infected wild birds

These include contact with:

- infected poultry such as live birds, hatching eggs and day-old chicks of poultry
- live infected wild birds, particularly waterfowl
- poultry products and by-products of infected poultry,
- contaminated feed, water, bedding, equipment, vermin, or clothing and footwear of people in contact with infected birds or contaminated environment.
- contaminated environment, for example contaminated ranges or flood water.

For this risk assessment, the pathways associated with trade in live poultry or poultry products (including domestic moves: first and third points above) will not be considered.

Data generated at APHA Weybridge indicates that this H5N1 virus will retain infectivity in the environment at low temperatures, for up to 55 days at 4°C (Ian Brown, APHA, Pers. Comm.). This means the environment could remain contaminated for several weeks in certain conditions.

It is concluded from sequence data that the UK H5 virus demonstrates no strong correlations for specific increased affinity for humans.

The EFSA opinion from 2017 used a combination of systematic review of all poultry outbreaks in the EU and expert knowledge elicitation from members of the poultry sectors. Experts were asked to consider four levels of biosecurity: preventing access to waterbodies, housing, carrying out “routine” daily biosecurity (boot washing, limiting visitors, rodent control, clean feed, and water) and high biosecurity as used in compartments (all the above, plus shower in and out, no visitors, reverse air pressure, dedicated staff, and equipment etc). The opinion estimated that the relative risk for entry is reduced **three-fold** by preventing access to water bodies, that housing gives a further **two-fold** reduction, and applying routine biosecurity gives a further **four-fold** reduction. The relative risk for entry is estimated to lead to a further **44-fold** decrease by applying high biosecurity measures as observed in compartment premises (Defra compartments, British Poultry Council). However, it is recognised that this level of biosecurity is not implemented to the same standard across all poultry premises and that a range of biosecurity plans are in place across Great Britain, with varying levels of efficacy, which will be impacted by the surrounding infection pressure. Tammes (2024) examined the impact of the national housing order introduced during the winter of the 2022 to 2023 HPAI season across 8 regions in England. The study reported that the housing order was associated with a reduction in poultry infections, particularly in regions with higher poultry densities and in regions most affected by detections in wild birds. Nationally, the average incidence rate of infected poultry declined from 0.46 in the week preceding the introduction of the housing order to 0.11 three weeks after its implementation. The study concluded that the housing order was most effective from approximately three weeks after implementation and when combined with other additional biosecurity and disease control measures. However, as the flock-level incubation period for HPAI can be up to 14 days (WOAH, 2021), infections acquired before the housing order was introduced may continue to be detected for several weeks afterwards. The use of other biosecurity and disease control measures also makes it difficult to determine the specific impact of housing. Internal analysis work, undertaken by APHA in 2023 suggested that a housing order is likely to be associated with a reduction in the number of cases amongst premises with outdoor access. However, the strength of such association seems to be heterogenous in space and or time and likely influenced by other factors such as the force of infection. This variability could explain why the association between the housing order, although using ‘not having outdoor access’ as a proxy, with a reduction in the number of cases of HPAI was strongly statistically significant in East Anglia but not statistically significant in other areas. In a similar fashion, the association existed between premises with outdoor access and a shorter time to becoming an infected premises when only larger flocks were considered, but this association was not statistically significant when considering IPs disclosed in Scotland only, although it is important to note that the sample size was considerably smaller in this case, Further analyses including denominator data and the inclusion of other covariates would allow us to gain further understanding of the effect of a housing order on the incidence of HPAI H5N1 (APHA, pers. comm., 2023).

In the scientific opinion presented here, we class the level of biosecurity maintained by premises in poultry compartments as stringent. Compartmentalisation is a scheme open to poultry breeding companies in Great Britain. Approval as a compartment is based on the management protocols, biosecurity systems and husbandry practises at a given premises.

Depending on acceptance of compartments by importing countries, compartment status may place a company in a stronger position with regard to resumption of exports following an outbreak of Avian Influenza in Great Britain). In premises in the compartment scheme every effort is made to prevent wild bird access, foot baths and clean equipment are used, bedding is stored undercover and rodent control is applied. The compartment scheme covers those premises with the highest standards of biosecurity, which include air and door locks, shower in – shower out facilities and pristine areas in the poultry sheds. All of these are applied to the “Compartment” breeding and rearing facilities.

Direct contact with live infected wild birds

The likelihood of contact between poultry and infected wild birds will be dependent on their abundance in the locale and how attractive the site is to birds for example, an on-farm pond, uncovered bedding, or poorly managed feed bins are three well-known factors which make the direct contact of free-range poultry with wild birds more likely. Therefore, well-constructed and maintained facilities, aimed at reducing contact between poultry and outdoor areas will reduce the direct contact with wild birds, and indirect contact via contamination of outdoor ranges, ponds, feed, waterers, feeders, and roosting areas with wild bird secretions. It will not prevent all indirect pathways through which disease may enter a poultry premises, and additional biosecurity measures will be required to mitigate those risks.

Contact with contaminated feed, water, bedding, equipment, vermin or clothing and footwear of people in contact with infected birds or contaminated environment including flood water

Contamination of feed, bedding, and water by infected wild birds during an outbreak is possible on a poultry farm unless access by wild birds is prevented. For poultry which require frequent bedding changes, moving potentially contaminated bedding into the poultry house is a possible route of transmission. For poultry fed outdoors, feed may be accessed by wild birds (or wildlife acting as mechanical vectors). Contaminated water sources may also introduce virus to the poultry (for example from a local pond or reservoir). When wild bird food is scarce, if poultry are fed outdoors, it is quite likely wild birds will be attracted to the site. The roofs of poultry sheds may also be suitable loafing sites for gulls or corvids which may act as bridging species.

These pathways can be prevented by sourcing such products from safe sources (such as, where contamination from wild birds was not possible) and keeping such items in containers which no wild birds can access. The site can be made less attractive to wild birds by removing or covering any ponds on site, preventing accumulation of standing water, using drinking water from bore holes or mains water and making sure feeding areas are protected. Contact with contaminated equipment, footwear and clothing can be prevented by making sure all personnel in contact with the birds use dedicated clothes and boots and that cleansing, and disinfection are applied appropriately. This will be particularly important where birds are housed, as personnel contact with the birds may be

more frequent, as feed, bedding and water must be brought into the houses and birds must be checked for welfare issues and or eggs collected from inside the houses. Visitors to the farm should be limited, and adequate records of all movements on and off the poultry premises should be kept. Other important biosecurity practices to ensure wild birds are separated from flocks, include feeding birds indoors or under cover, discouraging wild birds from landing, removing wild bird contamination, netting ponds, and draining watercourses, removing feeders and water stations from the range, ensuring good building maintenance and regular inspections for signs of wild bird and rodent access. It is not always possible to prevent flooding at a site, and ingress of flood water has been implicated as a source of virus in past outbreaks, but housing should be wherever possible, built to prevent ingress.

Above all, the EFSA opinion recommended that all personnel are trained in and practice good biosecurity, regardless of whether birds are housed or not, as housing cannot reduce transmission through fomite pathways as a standalone measure.

Domestic poultry

The poultry sector in Great Britain is complex and seasonally variable. There is a requirement for all poultry keepers in England, Scotland, and Wales housing any number of birds to be registered with the British Poultry Register. In terms of the proportion of the sector which is raised outdoors, for the egg sector, there are circa 25-26 million free-range hens, and 1.5 million organic hens accounting for approximately 63.7% of UK production (Egg info). For broilers, the proportion is a lot lower, at 3-5% (BCP). For ducks it is estimated that around 30% are outdoor and for geese, the majority are raised outdoors. Additionally, there is typically an increase in the turkey population in the run up to the Festive period, with many of these premises free-range where access to wild birds (direct and indirect) is possible.

Captive birds (non-poultry)

Captive birds, such as those held in collections, zoos or approved bodies are already semi-housed and should be kept separate from wild birds. For some, it will be difficult to prevent access to their water environment (penguins, pelicans, flamingos etc) but it is unlikely it will be possible to house indoors, so every effort should be made to prevent wild bird access. There have been multiple outbreaks in captive birds in Europe (in zoos) since 2016 and a derogation exists domestic legislation in Great Britain which means birds may not have to be destroyed, unless they are in contact with the infected collection.

Ratites

Ratites, such as ostriches, cannot be housed on a long-term basis for welfare reasons, but the susceptibility of such birds to this virus is not well understood. Ratites are often considered refractory to HPAI infection however there have been cases in Germany and USA of emus showing clinical signs in a zoo and therefore these birds should also be considered susceptible.

Game birds

Once game birds are released for the shooting season, they are considered wild and outside the scope of a prevention order around housing. Game birds cannot be released in areas under a disease control zone or an AIPZ with housing measures. Any remaining birds will be caught-up in late January.

It is illegal to release by hand captive birds for the purpose of being shot immediately after their liberation, under Part 1, Section 8 of the Wildlife and Countryside Act, 1981. Therefore, if gamebirds are released and then test positive when they have been shot, they are unlikely to have been infected at the premises of origin and more likely from contact with wild birds.

Conclusions

The probability of HPAI H5 still being present in wild birds in Great Britain in winter 2026 to 2027 is **HIGH**. At this early stage of the HPAI season, the number of wild bird detections, infected premises and reports from continental Europe, especially in those countries of higher concern due to their proximity to Great Britain, have begun to increase. Combined with increasingly favourable winter conditions for virus persistence and the fact that peak migratory bird movements are not expected for several weeks, these indicators suggest that further increases in detections and outbreaks are likely in the coming weeks.

Effective and well-maintained housing reduces the probability of poultry exposure to wild birds and their excretions, but does not completely prevent indirect contact, particularly where HPAI virus can still be carried into poultry houses on clothing, footwear, feed, and bedding.

Plotting the number of IPs over previous seasons following the introduction of a housing order shows a decrease in the number of IPs after housing is introduced, (Figure 1) though this it is difficult to say with any degree of certainty what proportion of this (if any) is due to housing birds alone rather than other factors such as waterfowl migration patterns and the implementation of mandatory, complimentary biosecurity measures as part of the housing order. It is not possible to assess the impact of housing as a protective measure because it would require epidemiological investigations that are not possible during control of a notifiable disease.

Given the continuing infection pressure from wild birds, favourable environmental conditions for virus survivability, and the increase in numbers of infected poultry premises and backyard flocks over the last month, we consider the likelihood of at least one outbreak being detected in the next month in Great Britain to be **MEDIUM** (occurs regularly) **with medium uncertainty** where biosecurity is suboptimal and there are biosecurity breaches, and **LOW** (event is rare, but does occur) **with low uncertainty** where stringent biosecurity is applied. This takes into consideration the Avian Influenza Protection Zone (AIPZ) and assumes that bird keepers are taking the additional

biosecurity measures required. As estimated in the EFSA opinion (EFSA 2017), a two-fold reduction in the number of IPs is anticipated where birds are housed. This is supported by Tammes (2024), who reported that the national housing order in the 2022 to 2023 HPAI season was associated with a reduction in poultry infections. However, this is not recommended as a standalone measure and should be used in conjunction with other biosecurity measures mentioned earlier in this report alongside appropriate training.

As the most likely contact of poultry with wild birds will be in those areas where there are high concentrations of wild birds, where there are no large aggregations of wild birds, the risk is lower for this particular pathway, but there are still other pathways which could lead to the introduction of any notifiable avian disease. It should be noted that a housing order has a law of diminishing returns towards the end of an outbreak and is most effective when implemented early in the outbreak.

The risk of HPAI H5 incursion into poultry premises depends on the level of biosecurity present. There are multiple pathways which can bring infection into poultry, and these are not necessarily prevented when housing is used as a control measure in the absence of any other biosecurity.

Although the number of IPs reported so far in the 2026 to 2027 season (at the same time period of week 46) remains below what was observed during the 2022 to 2023 and 2025 to 2026 seasons, the occurrence of seven IPs (across England and Scotland) by the start of week 46 demonstrates the circulation of HPAI and exceeds the number of IPs reported by now in the 2023 to 2024 and 2024 to 2025 seasons. Additionally, the peak population of migratory waterfowl is in December and January, with the highest rate of birds arriving now and an increase in reports of HPAI H5 on the near continent. While this risk assessment is at a Great Britain level, we recognise that risk is not homogenous. HPAI H5 has already been reported in several distinct geographical locations in Great Britain in the last couple of weeks, involving multiple bird species, indicating that there are several processes ongoing which may increase the onward risk to poultry. While there have not yet been any reports of disease in Wales, there have been reports in areas close to the border with Wales and there will be a lot of wild bird movement in the coming weeks and months.

Expert opinion suggests that housing leads to a two-fold reduction in risk. While a housing order has not yet been implemented, its introduction could help reduce opportunities for virus transmission between wild birds and poultry and contribute to limiting the number of outbreaks during the remainder of the season. Noting that it can take up to 3 weeks to have the most effect (Tammes 2024). The effect of housing may be underestimated because it also includes removing access of poultry to ponds which may have an additional three-fold effect, giving an overall six-fold reduction in risk. The behavioural impact of announcing a housing order may also send a message to poultry keepers that the risk has increased significantly, increasing the uptake of daily routine biosecurity measures.

Housing birds which are not used to housing can cause welfare issues. Making sure their environment is enriched (for example with toys), that they have plenty of room to move,

access to feed and water, clean bedding and the ability to display natural behaviours such as dustbathing are all welfare priorities. For ducks their bedding must be changed regularly as they will mess it quickly and they need access to water so they can clean their feathers. If the birds become stressed, they may be more prone to infections or other behaviours which impact on welfare. Certain species cannot be housed for welfare reasons or because they are already considered wild such as geese, ratites and gamebirds.

It should be noted that there are studies and expert opinion assessments which confirm that housing is only part of the biosecurity continuum (EFSA, 2017 and Tammes, 2024). Housing, in addition to directly reducing contact with wild birds, also enables the application of more stringent biosecurity measures. For example, a foot bath and change of clothes is likely to be more effective at mitigating indirect transmission when birds are housed, compared to when poultry are let out and wild birds can also access the range, water, feed and roosting areas. If stringent biosecurity is applied, the risk to poultry is substantially reduced and housing of poultry will further reduce that risk.

References

EFSA, 2017: EFSA AHAW Panel (EFSA Panel on Animal Health and Welfare), More S, BicoutD, Bøtner A, Butterworth A, Calistri P, Depner K, Edwards S, Garin-Bastuji B, Good M, GortazarSchmidt C, Michel V, Miranda MA, Nielsen SS, Raj M, Sihvonen L, Spoolder H, Thulke H-H, Velarde A,Willeberg P, Winckler C, Breed A, Brouwer A, Guillemain M, Harder T, Monne I, Roberts H, Baldinelli F,Barrucci F, Fabris C, Martino L, Mosbach-Schulz O, Verdonck F, Morgado J and Stegeman JA (2017).Scientific opinion on avian influenza. EFSA Journal 2017;15(10):4991, 233 at https://doi.org/10.2903/j.efsa.2017.4991

EFSA, Aznar, I., 2021. '2020 Annual surveillance report/HPAI early warning tool (assessing the risk of introduction via migratory wild birds' [Powerpoint presentation]. Available at https://ec.europa.eu/food/system/files/2021-10/reg-com_ahw_20210922_hpai_annual-surveillance_efsa.pdf. Accessed: 10/02/2022.

IZSVe (2022) IZSVe report - Number of highly pathogenic avian influenza positive events notified by country and poultry category (pdf).

Tammes P. Spread of avian influenza among poultry specialists in England during winter 2022/23: National poultry housing order and environmental drivers. Dialogues Health. 2024 Jan 4;4:100165. doi: 10.1016/j.dialog.2024.100165. PMID: 38516217; PMCID: PMC10954017.

WOAH, 2021. Terrestrial Animal Health Code. Available at https://www.oie.int/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/. Accessed: 10/02/2022.