Department
for Environment
Food & Rural Affairs

Risk assessment on the likelihood of spread of highly pathogenic avian influenza H5Nx associated with bird fairs, shows, markets, sales and other gatherings

Qualitative Risk Assessment

Drafted August 2025

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Summary

The hazard is high pathogenicity avian influenza (HPAI) virus H5Nx. Here, a rapid risk assessment (RRA) is undertaken to reassess the risk of HPAI H5Nx introduction from poultry and captive birds taken to bird fairs, shows, markets, sales and other gatherings (henceforth referred to as “gatherings”). The risk of other birds subsequently becoming infected at a gathering should an infected bird be introduced into that gathering and then spreading through dispersing to different establishments has been assessed in previous versions of this RRA as medium and this risk assessment uses the same methodology as previous iterations. Critical to this RRA therefore is the likelihood that captive birds are infected prior to their transport to a gathering, together with the likelihood that any infected birds are not detected (and hence removed) before reaching the gathering.

The main route of exposure of captive birds prior to transport is through contact with wild birds (either direct or indirect contact). At the present time (end of August 2025) the wild bird risk for HPAI H5Nx remains at **high** in Great Britain. However, the wild bird situation is very different now from that when our previous RRA was conducted in July 2025 for gatherings. While all of the 29 wild bird cases of HPAI H5N1 in July (to 21 July) were either in gull or seabird species and located around the coast, there has been a shift since then not only into inland sites but also into resident waterbird species including mute swans, Canada geese and mallard ducks, together with some inland scavenger raptor species such as a red kite in Berkshire. The consequence for poultry in Great Britain is that the risk to poultry from infection pressure in wild birds appears to have started to recouple with a marked increase in the number of Infected Premises (IPs) including two in the Breckland area of Norfolk where in the autumn of 2022 there had been a large number of cases continuing into early 2023. Furthermore, some of these IPs included pheasant farms and there were also a number of cases in wild pheasants following release. At the time of our previous RRA (21 July 2025) there had not been any IPs reported in Great Britain since 22 June 2025. It was considered that the risk to poultry in Great Britain had decoupled from that in wild birds and the risk level for poultry in Great Britain was assessed as low with high uncertainty where biosecurity was suboptimal and with low uncertainty where biosecurity was stringent. Since then, there have been nine IPs indicating the increasing wild bird infection pressure in Great Britain. This together with the increase in inland wild bird cases and the increase in cases in resident waterbirds warranted increasing the risk level for poultry with suboptimal biosecurity from low to **medium** with low uncertainty (11 August 2025: High pathogenicity avian influenza (HPAI) in Great Britain and Europe).

In terms of the bird species considered in this RRA, those poultry and bird species that are most likely to be taken to gatherings include seven bird orders, namely Psittaciformes (parrots), Columbiformes (doves and fancy pigeons excluding racing pigeons), birds of prey (Accipitriformes and Falconiformes), Passeriformes (finches), Galliformes (poultry and game birds), Anseriformes (ducks and geese) and Ratites (ostriches, emus and rheas). The baseline risk of those birds being infected prior to the gathering for this RRA is based on

that of poultry with sub-optimal biosecurity. As with the previous gatherings RRA, that risk for each of the seven bird orders is then refined based on specific differences in access to the environment where residual infectivity from wild birds may be present. Captive ducks and geese kept outside or in un-netted ponds are likely to have contact with wild duck, geese and swan species both at inland and coastal captive bird premises. From our previous RRA on 21 July 2025 (21 July 2025: risk assessment on the likelihood of bird flu spread at bird gatherings), the risk of infection of captive Anseriformes at coastal sites prior to attending the gathering or show is maintained at **high** (with high uncertainty) due to the ongoing detections in gulls and seabirds which could visit coastal water bodies utilised by or frequented by captive Anseriformes. However, in the light of the cases in resident waterbirds at inland sites (including the Canada goose in north Hampshire, for example) the **high** risk of infection is extended to captive Anseriformes at inland sites prior to attending the gathering. The risk of infection for captive Galliformes across Great Britain prior to attending the gathering is increased to **medium** (with high uncertainty) in line with the risk for poultry with suboptimal biosecurity.

The results of the risk assessment are set out in the table below.

Summary table: Qualitative risk assessment for entry and subsequent spread of HPAI H5Nx at bird gatherings according to bird group (for August 2025)

Captive bird group taken to gathering	Risk of entry and subsequent spread	Uncertainty
Psittaciformes	Low	Medium
Columbiformes	Low	Low
Birds of Prey	Low	Medium
Passerines	Low	Medium
Galliformes	Medium	High
Anseriformes	High	High
Ratites	Low	Low

For most captive bird groups, the risk of entry and subsequent spread of HPAI H5 at a gathering is low. However, the risk from Anseriformes not only at coastal sites but also at inland premises is now assessed to be high due to the likely exposure to gulls and resident water birds at water bodies where the captive birds may be kept. This in effect reflects the direct exposure of captive Anseriformes across Great Britain to potentially infected resident waterbirds and gulls. In keeping with the increased risk for poultry with suboptimal biosecurity, the risk of entry and subsequent spread of HPAI H5 at a gathering through Galliformes is now assessed to be medium. The uncertainty is high reflecting the fact that the captive Galliformes' risk level could be the same as that currently for wild birds, namely high, if they are allowed to mix with wild birds on ranges.

Given this range of risks, there are options around the licensing of gatherings which include:-

- to ban for the period of the AI prevention zone

- to allow but only for certain species of birds
- to allow but with improved requirements for biosecurity or
- Captive birds could be housed for seven days prior to moving to the gathering.

If the available biosecurity measures are considered to be insufficient to mitigate the risks identified, or if there is insufficient assurance that they will be complied with, then a ban on some or all categories of gathering would be justified.

Background

Here, a rapid risk assessment (RRA) is undertaken to reassess the risk of high pathogenicity avian influenza (HPAI) H5N1 introduction and spread from poultry and captive birds taken to bird fairs, shows, markets, sales and other gatherings (henceforth referred to as "gatherings"). Gatherings of birds involve the coming together and subsequent dissemination of live kept birds (as well as people, vehicles and equipment) and for this reason can facilitate the introduction and spread of avian notifiable disease including HPAI to different locations across Great Britain. The magnitude of this risk is influenced by the number of different groups of birds brought together and the likelihood of their being already infected at their point of origin. Movements out of an SZ or PZ around a confirmed infected premises are not permitted but other than this, traceability of poultry is lightly regulated so most moves outside a restriction zone are of uncertain origin and status.

Previous Defra risk assessments (Defra, 2016) were used as a basis for the general licence allowing bird gatherings to take place while minimising the risk of introduction of avian notifiable diseases to these events and mitigating the likelihood and impact of any subsequent spread. Here the risk assessment is updated to accommodate the risk levels for HPAI H5N1 in wild birds and poultry in May 2025.

Trends and risk levels in the current epizootic

Over the summer of 2025, the wild bird risk has remained at high. Despite many wild bird cases of HPAI H5/H5N1 over the summer the number of poultry Infected Premises fell with just 6 between 12 May 2025 and 21 July 2025 (21 July 2025: High pathogenicity avian influenza (HPAI) in Great Britain and Europe). On 21st July 2025 (High pathogenicity avian influenza (HPAI) in Great Britain and Europe: 21 July 2025), the risk to poultry with suboptimal biosecurity was reduced from **medium** (with medium uncertainty) to low (with high uncertainty). The risk level for poultry with stringent biosecurity is maintained at **low** (with low uncertainty). This marked an apparent decoupling of the poultry risk from the wild bird risk, with most wild bird cases in gulls and seabirds around the coast of Great Britain. However, in August there were more cases of HPAI H5N1 in resident wild waterbirds such as Canada geese, mute swans and mallards, with cases being detected inland together with cases in wild pheasants after release. In three weeks between 21 July and 11 August there were 9 IPs (11 August 2025: High pathogenicity avian influenza (HPAI) in Great

Britain and Europe) and the risk level for poultry with suboptimal biosecurity was increased from low (high uncertainty) to medium (low uncertainty). The risk level for poultry with stringent biosecurity remained at low but the uncertainty was increased from low to medium to reflect the increase in the wild bird infection pressure and the possible recoupling of the poultry risk to the wild bird risk.

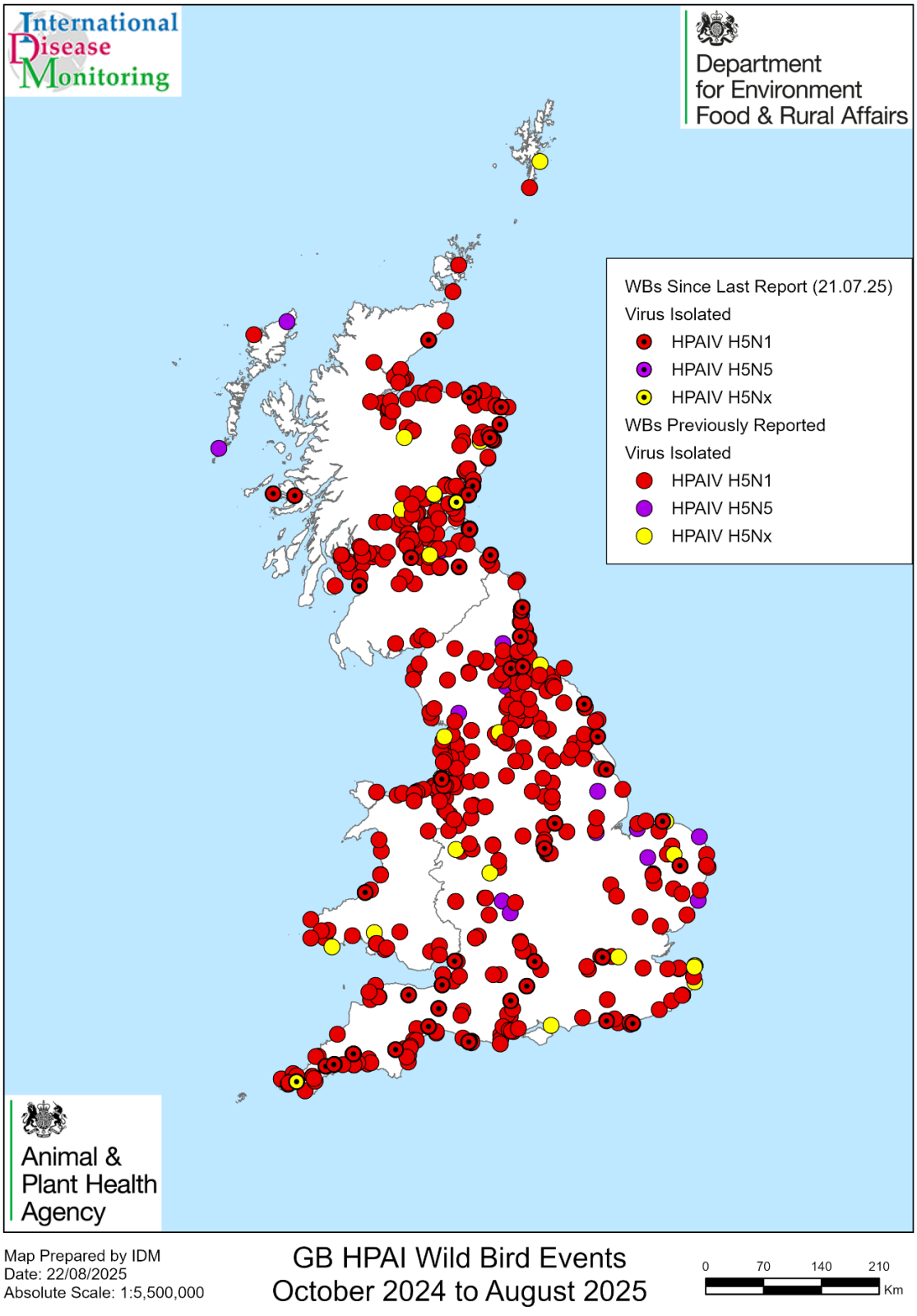


Figure 1 Map HPAI H5Nx positive wild birds in Great Britain from October 2024 to 22 August 2025. The map shows a high density of points across much of England, central and eastern

Scotland and north and south Wales, with points since the previous update being mainly coastal around England, Wales and eastern Scotland.

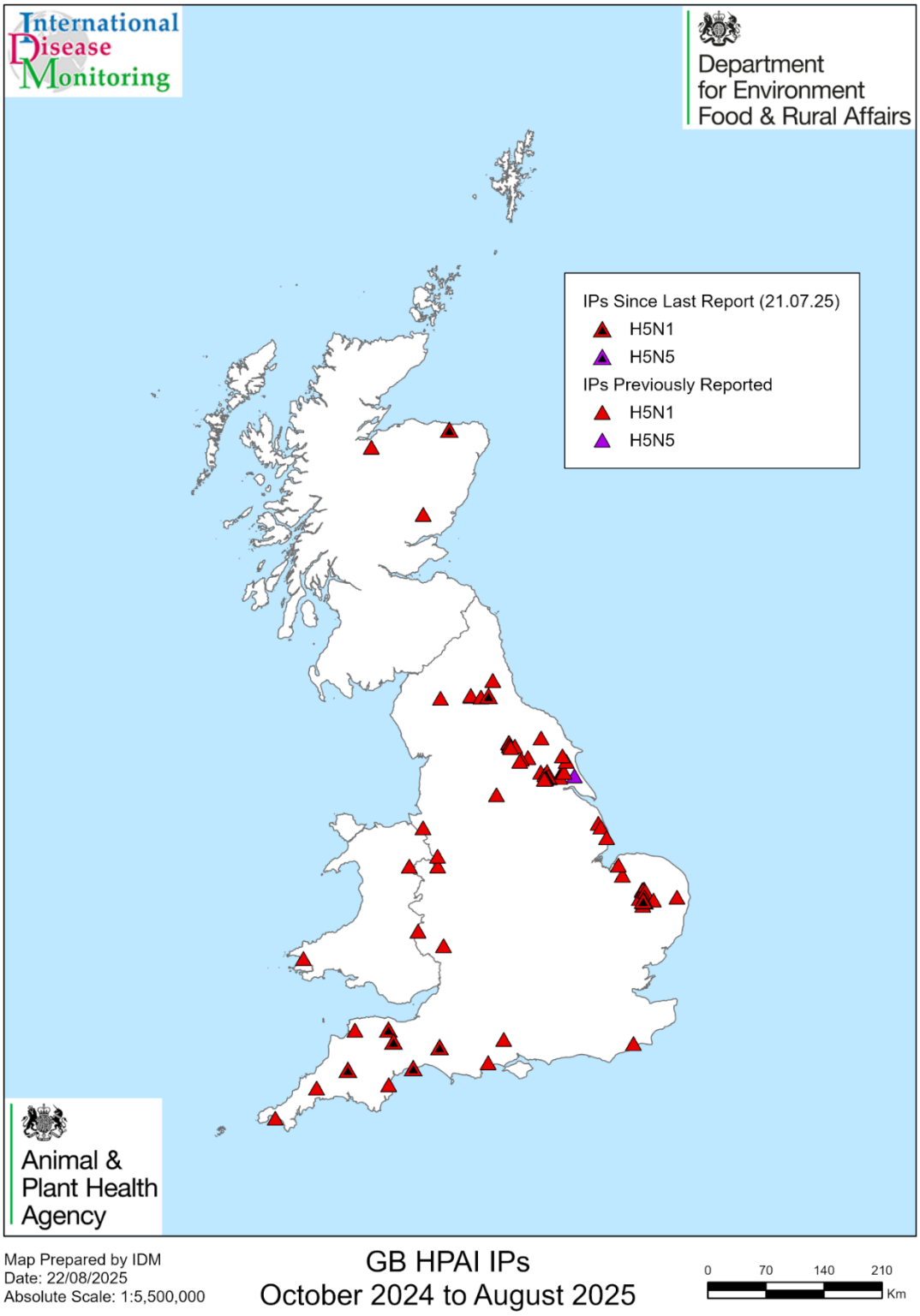


Figure 2 Map of IPs in Great Britain from October 2024 to 22 August 2025. The map shows of points across of England, central and eastern Scotland and north and south Wales.

Captive bird orders glossary

The bird orders of captive birds considered are set out in Table 1.

Table 1 Glossary of captive bird orders considered here with examples.

Order	Examples
Psittaciformes	Parrots
Columbiformes	Pigeons and doves
Birds of Prey (Accipitriformes and Falconiformes)	Hawks and falcons
Passeriformes	Perching birds (Finches and canaries)
Galliformes	Turkeys, pheasants, chickens, guineafowl.
Anseriformes	Ducks and geese
Ratites	Ostriches, emus and rheas.

Hazard identification

The hazard identified is highly pathogenic avian influenza virus, (HPAI) H5Nx.

Risk Question

1) *What is the risk of the introduction of highly pathogenic avian influenza H5Nx onto bird fairs, shows, markets, sales and other gatherings?*

2) *What, if any, management options are available to reduce the likelihood and the impact of introduction and subsequent spread of avian notifiable disease through the abovementioned gatherings?*

Scope

This qualitative risk assessment covers the risk of introduction and subsequent spread of avian notifiable disease to and from bird gatherings organised in Great Britain that were legally moved to the event from within the UK.

This risk assessment does not assess the risk related to illegal movements, negligence to report clinical disease, false certification, breaches in biosecurity etc. Any risks potentially presented by (or to) wild birds are also not assessed here.

Terminology related to the assessed level of risk

For the purpose of the risk assessment, the following terminology will apply (OIE, 2004):

- **Negligible**: So rare that it does not merit to be considered
- **Very low**: Very rare but cannot be excluded
- **Low**: Rare but does occur
- **Medium**: Occurs regularly
- **High**: Occurs very often
- **Very high**: Event occurs almost certainly

It should be noted, however, that the risk terminologies here do not represent how often an event will occur but more indicate the probability of the event occurring.

Entry assessment

The Defra (2016) assessments concluded that the overall risk of the introduction of avian notifiable diseases including HPAI to a bird gathering is related to the ongoing disease situation in Great Britain, both in domestic poultry and in wild birds.

As adopted in previous RRAs for gatherings, the risk of those birds which may attend gatherings being infected with HPAIV H5Nx is based on the official risk of poultry with suboptimal biosecurity in Great Britain being infected through background environmental contamination from infected wild birds (see Table 3). **This risk is currently medium (with low uncertainty)** where biosecurity is sub-optimal and **low (with medium uncertainty)** where biosecurity is stringent**.** The Avian Influenza Prevention Zone (AIPZ) is still in place (end of August 2025). The housing order, however, was lifted from 00.01 on 15 May 2025.

It is assumed that keepers of any birds participating at a gathering are doing so in full compliance with the legal requirements for movements of live birds, and that birds are not coming from areas under disease control restrictions.

Likelihood of captive bird being infected prior to being taken to gathering.

Captive birds, such as those held in collections, zoos or approved bodies are already semi-housed and should be kept separate from wild waterfowl. For some, it will be difficult to prevent access to their water environment (penguins, pelicans, flamingos etc) and it is unlikely that it will be possible to house indoors, so every effort should be made to prevent wild waterfowl access.

Due to the varying level of biosecurity (and considered lower than stringent), those birds being taken to gatherings and shows will be of more uncertain infection status than commercial poultry with stringent biosecurity. Also monitoring and data for commercial production mean that commercial birds can be tracked more easily than for those birds at gatherings and shows. Birds from non-commercial settings carry greater uncertainty. The baseline risk of infection assumed for those birds that could be taken to gatherings is based on the current (22 August 2025) risk to poultry with sub-optimal biosecurity, that is **medium with low uncertainty**. The risks for the seven bird orders considered here (Table 1) are refined in Table 3 based on specific differences in access to the environment where residual infectivity from wild birds may be present. It has already been noted above that the risk levels exist as bands, though those at the higher end are much narrower than the lower risk levels.

Psittaciformes and Passeriformes

Psittaciformes and passerines are kept in aviaries. Given the fact that HPAI H5Nx is still circulating in wild birds and there are still occasional reports in poultry, the risk to birds even with stringent biosecurity being exposed to HPAIV H5Nx is considered to be low and cannot be reduced to very low because even with being kept in indoors or in aviaries, exposure could occur given residual contamination in the environment, though there is less likelihood of direct wild bird contact. Thus, for Psittaciformes and passerines the risk of infection prior to being taken to the gathering is still considered **low**. To end of May 2025, there was one case reported in Psittaciformes in Great Britain, in December 2024, in Norfolk. Globally (excluding Peru where they are wild) there have been very few reports of cases in captive parrots. From 2005 to end of May 2025 on WOAH, there was one case in France (H5N1), 4 in Germany (H5N8), 5 in Russia (H5/H5N1), and 1 in the USA (H5N1) supporting the low risk level. The uncertainty is medium due to the variation in how these birds are kept, i.e ranging from a single bird kept indoors to outdoor aviaries with large collections.

Columbiformes

For the purpose of this document, racing pigeons are not included as they are considered a distinct husbandry system and are the subject of an independent risk assessment. Nevertheless, related Columbiformes may be taken to bird gatherings for other species or breeds. There have been relatively few reports of cases in wild Columbiformes on WOAH over the last few years of the epizootic. In Great Britain since 1 October 2022 there have

been 11 rock doves, 5 wood pigeons and 2 unidentified doves, with 12 Columbiformes reported by WOAH in Great Britain through 2005 to May 2025. Experimental research has provided further evidence for the low level of susceptibility of these birds to H5N1 (Di Genova et al. 2025). Overall considering the abundance of Columbiformes both in Great Britain and globally, there have been relatively few HPAI H5N1 cases in pigeons and doves reported. Although Columbiformes may be kept outside, direct contact with waterbirds is likely to be low. The likelihood of Columbiformes being infected prior to being taken to the gathering is therefore assumed to be **low** with low uncertainty.

Birds of prey (Accipitriformes and Falconiformes)

There are many reports of wild raptors being infected both in Great Britain and globally with HPAI H5N1 and more recently with HPAI H5N5, perhaps because they are exposed to very high viral doses when scavenging infected birds. Most captive birds of prey will be fed on commercial feed considered to be low risk for infection (such as day-old chicks, reared small rodents) but some are fed shot game, including wild duck, which increases risk of infection through feeding. HPAI virus was detected in 4.8% of shot wild duck at sites in eastern England in autumn 2019 to spring 2020 (Wade et al. 2023) and in 18% of shot Anseriformes at sites in northern England between October 2022 and January 2023 (Shemmings-Payne et al. 2025). After several deaths of captive raptors infected with H5N8 in England in 2021 through being fed frozen shot wild duck, falconers are now aware of the risk of HPAI transmission to their birds through this route, especially the continued risk in frozen feed. Further, feeding of infectious material to captive species was also suspected, although could not be conclusively proven, in another case of influenza infection in Great Britain (Falchieri et al. 2024). Current advice is to continue to fly birds for exercise and to keep them clean but feed them on commercial feed only. However, in a recent IP (AIV 2025 54) a captive falcon (in a collection of 10 falcons) used for bird scaring was infected with HPAI H5N1 which was considered likely to have occurred from eating a wild gull it had captured. The overall risk of captive birds of prey having disease prior to being taken to a gathering is therefore elevated from low to **medium** (medium uncertainty) because other captive falcons may also be exposed to gulls if used for wild bird scaring.. The risk would be lower to falcons not contacting wild birds including waterfowl and gulls in particular.

Ratites

Excluding the United Kingdom, a total of 17 outbreaks of HPAI H5 in ratites have been reported on WOAH in Europe since 2005 (Table 2). These include cases in zoos. A small number of outbreaks in Great Britain in 2024 and 2025 also involved ratites including one in captive rheas in East Ridings of Yorkshire on 20th December 2024. Other potential cases involving ratites, for example a case in Canada (B.C ostrich farm 'devastated' after federal judge rules cull of nearly 400 birds can proceed | CBC News), may not have been reported to WOAH. Furthermore, numerous outbreaks of HPAI H5N8 were reported in ostrich farms in South Africa in 2016 to 2017 confirming that ratites are susceptible to some strains of HPAI H5 at least. Although there were large numbers of outbreaks of H5N8 is ostrich farms in South Africa, there are not the same large number of ratite farms

in Great Britain. Therefore, given the small number of ratites (compared to other poultry species) in Great Britain, it is considered here that the likelihood of an infected bird being taken to a gathering is **low** (with high uncertainty). The high uncertainty allows for the fact most ratites will be kept outside where they could be exposed to wild birds and that there were multiple outbreaks of H5N8 in ostrich farms is South Africa suggesting the HPAI could spread through ratites in Great Britain.

Table 2: Reports of HPAI in ratites on WOAH from 2005 to 21 July 2025. H5N8 outbreaks in ostriches do not appear and may have been categorised under "Birds" as poultry on WOAH.

Species	HPAI	Country
Ostrich (Struthio camelus)	H5N1	Cuba
	H5N1	Poland
	H5N1	Mexico
Ostriches (Struthionidae)	H5N1	France
	H5N8	Germany
Emus (Dromaiidae)	H5N8	Germany
Emu (Dromaius novaehollandiae)	H5N1	Chile
	H5N1	Brazil
	H5N1	Poland
	H5	Russia
	H5N1	USA
Rhea americana	H5N8	Germany
	H5N1	USA
	H5N1	Poland
Rheidae	H5N1	Germany
	H5N1	England (Dec 2024)
	H5N8	Germany

Galliformes

There have been 9 poultry IPs in Great Britain since our previous RRA on 21st July 2025 (21 July 2025: risk assessment on the likelihood of bird flu spread at bird gatherings). The likelihood of captive Galliformes being infected prior to being taken to the gathering is assumed to be the same as that current for poultry with suboptimal biosecurity namely **medium**. However, while the uncertainty in this medium risk level for poultry with suboptimal biosecurity is low, the uncertainty here for captive Galliformes is increased to high. The high uncertainty reflects the fact that the captive Galliformes' risk level could be the same as that currently for wild birds, namely high, if they are allowed to mix with wild birds on ranges.

Anseriformes

In our previous RRA on 21 July 2025 (21 July 2025: risk assessment on the likelihood of bird flu spread at bird gatherings), HPAI H5N1 was mainly being reported in found dead wild birds around the coast of Great Britain with few inland bird cases. However, it has since been detected not only in inland wild birds but also in more resident Anseriformes including mute swans, Canada geese and mallard ducks, many of which are inland. Captive ducks and geese kept outside or in un-netted ponds are likely to have contact with wild duck, geese and swan species both at inland and coastal captive bird premises. The risk level for captive Anseriformes (ducks and geese) prior to being taken to gatherings is therefore assessed to be **high** with high uncertainty across Great Britain (Table 3). In effect the risk level to captive Anseriformes across Great Britain is the same as that for wild birds, though they may be lower in the 'high' risk level band if there is some form of biosecurity at the captive bird premises. The high uncertainty relates to our lack of knowledge on the degree of coupling of the wild bird risk to captive Anseriformes.

It is important to note that these surveillance figures for Great Britain are based on passive surveillance of found dead birds reported to Defra by the general public and as such, may be affected by several factors including frequency of visitors accessing areas with bird populations, the potential for immunity in the wild bird population (which may result in fewer birds developing clinical disease and or dying with HPAI), variable surveillance system sensitivity, as well as the size, location and accessibility of carcasses. Thus this wild bird surveillance does not necessarily capture all of the cases that occur. This further contributes to the high uncertainty in the medium risk level for prior infection of captive Galliformes in particular.

Table 3 Likelihood of HPAI H5Nx infection in each group of captive birds prior to attending the gathering

Order	Examples	Likelihood of being infected currently (22 August 2025) prior to going to gathering	Uncertainty
Psittaciformes	Parrots	Low – kept in aviaries or indoors.	Medium
Columbiformes	Pigeons and doves	Low – generally kept outside. Although susceptibility to H5N8 is low compared to other species (Kwon et al, 2017) infection does occur.	Low – based on few cases in wild birds given high abundance and exposure in the environment
Birds of Prey	Hawks and falcons	Medium – kept in aviaries and no longer fed infected frozen shot wild duck meat. However, risk is higher if allowed to catch wild birds, particularly ducks and gulls, with outbreak in captive falcons in Wiltshire linked to an infected gull.	Medium
Passerines	Finches and canaries	Low - kept in aviaries or indoors	Medium
Galliformes	Turkeys, pheasants, chickens, guineafowl.	[a]Medium - based on current risk to poultry with poor biosecurity. Captive Galliformes likely to be outdoors with greater opportunity of exposure to wild birds	[b]High

Order	Examples	Likelihood of being infected currently (22 August 2025) prior to going to gathering	Uncertainty
		hence suboptimal biosecurity.	
Anseriformes	Ducks and geese	High – same as that for wild birds assuming that captive ducks and geese have greater contact than other captive bird groups with wild birds including resident ducks, geese, swans and gulls. Captive ducks and geese likely to be outdoors with access to ponds where HPAI H5N1 could be introduced if present in local gulls and in wild resident ducks, geese and swans.	[b]High
Ratities	Ostriches, emus and rheas.	Low – although kept outdoors with access to wild birds, the small number of ratites in Great Britain greatly reduce the probability that an infected one is taken to a gathering. This is borne out by the fact that only one outbreak has ever	High – there were multiple outbreaks of H5N8 in ostrich farms is South Africa suggesting the HPAI could spread through ratite farms in Great Britain.

Order	Examples	Likelihood of being infected currently (22 August 2025) prior to going to gathering	Uncertainty
		been reported in Great Britain (Table 2).	Also cases in Great Britain.

[a]Based on the current risk level (22 August 2025) to poultry with suboptimal biosecurity.

[b]In the case of some captive Galliformes and many Anseriformes the risk level could be the same as that currently for wild birds, namely high, if they are allowed to mix with wild birds on ranges and ponds respectively. It is not known to what degree the risk to captive Anseriformes and Galliformes is decoupled from the infection pressure in gulls and resident waterbirds across Great Britain over the summer 2025

Likelihood of HPAIV H5Nx not being detected prior to gathering

The level of awareness of avian notifiable diseases in Great Britain is thought to be generally high and suspicions of clinical disease in poultry and other captive birds would be reported reasonably quickly, generally within a few days, particularly with the current awareness in the sector of HPAI H5N1 in wild birds. Movement restrictions for disease control purposes would be uniformly implemented based on domestic and retained EU Community legislation. The length of the virus incubation period as well as the possibility of virus shedding during this time is an important factor to be considered while assessing these risks. However, no official incubation period for avian influenzas is established for bird species other than poultry and the actual length of the incubation period is affected by numerous factors including the disease, the virus load, the actual virus strain, the species, immune status etc.

Psittaciformes

Cases of HPAI H5N1 infection in wild parrots have been reported on WOAH mainly in South America in recent seasons. A range of species have been reported, including blue-and-yellow macaw, budgerigar, burrowing parrot, Mealy parrot, red-and-green macaw, scarlet macaw, slender-billed parakeet, white-winged parakeet, and yellow-headed Amazon parrot. There has been a case where budgerigars were infected at a premises in Norfolk in mid-December 2024. The likelihood of HPAI infection being undetected for Psittaciformes is unknown, but given the multiple detections in wild parrots in South America and the cases in zoos, including the captive bird establishment in Great Britain, is assumed to be low with medium uncertainty.

Columbiformes

A study in which 18 pigeons were inoculated intranasally HPAI H5N8 (clade 2.3.4.4 subgroup B) from South Africa reported viral shedding in medium and high-dose pigeons for up to eight days. Infected pigeons successfully transmitted virus to contact pigeons. There were no clinical signs observed in any of the birds involved and seroconversion was observed in two of the high-dose group chickens (Abolnik et al, 2018). Another study of domestic pigeons, inoculated oculo-nasally with HPAI H5N8 (Clade 2.3.4.4 sub-group icA3) of Korean origin, showed no clinical signs or mortality even though, relatively high levels of shedding were observed in half of the pigeons. The study concluded that, though they have lower susceptibility than some other species, pigeons can be infected with HPAI H5N8 when exposed to high doses and could excrete the virus in sufficiently high doses to infect other species of birds (Kwon et al, 2017). Pigeons could also be fomite transmitters of the virus. Pigeons do not show clinical signs when infected with H5N8 (Abolnik et al, 2018, Kwon et al, 2017) and it is assumed here that there is a high likelihood (medium uncertainty) of not detecting Columbiformes infected with HPAI H5.

Birds of prey

The likelihood of disease not being detected prior to the gathering is low for birds of prey. This is because birds of prey seem particularly susceptible to morbidity and mortality from HPAI H5Nx with many affected in the wild in both Great Britain and globally. It is known that birds of prey show overt clinical signs if infected with the H5N8 HPAI virus, and HPAI H5N1 positive found-dead birds of prey have been a feature in Great Britain in recent weeks and previous seasons (along with captive birds of prey in previous seasons). The infected birds of prey would show clinical signs within 2-3 days of feeding and are likely to be detected prior to taking to a gathering, hence the low risk. However, this may not be the case of all birds of prey, for example white-tailed eagle and the uncertainty is medium.

Passerines

Passerines, including canaries and finches, are known to be susceptible to low pathogenicity avian influenza (LPAI) H5 and that they can shed large amounts of viral RNA through the respiratory route (Marché et al 2018). While they do not show clinical signs or mortality with LPAI, if infected with HPAI H5 then a proportion would be expected to show mortality and there have been reports of mortality of wild passerines both globally and in Great Britain from HPAI H5N1 strains Since 01 October 2022, HPAI H5N1 cases include chaffinch, tree sparrow, goldfinch, house sparrow and several corvids in Europe with cases in zebra finch in the Americas. However, for the 2023 to 2024 and 2024 to 2025 season, there have been no detections of HPAI H5Nx in found dead wild passerines, in comparison to the 2022 to 2023 season in Great Britain there were four cases in passerines, namely a reed warbler and three carrion crows. Though this could be due to any of the issues with passive surveillance issues and unknown immunity status as discussed elsewhere. While there have been reports in previous years, there have been no reports in kept passerines in the 2024 to 2025. The likelihood of infected passerines not being detected is therefore assumed to be medium with medium uncertainty.

Galliformes

Galliformes show high mortality in the poultry outbreaks. Similarly, pheasants are susceptible to H5 HPAI infection and rapidly show clinical signs although those birds infected recently would still be in the incubation period. Therefore, the likelihood of infected pheasants or chickens not being detected prior to taking to a gathering would be low. However, partridges may not show clinical signs and could be missed (Seekings et al. 2024). Furthermore, although Galliformes show high mortality it is considered that detection or reporting could be low in backyard poultry. Therefore, for the purpose of this risk assessment it is assumed the likelihood of disease not being detected or reported in Galliformes on backyard premises which could be taken to gatherings is medium with medium uncertainty.

Anseriformes

While there have been many dead Anseriformes-positive wild bird cases reported both in Great Britain and globally, many wild ducks and geese have survived, and given the level of exposure and virus circulation in recent years there is a possibility of immunity though this is unknown. There is information on seroprevalence in seabirds in Scotland (Greco et al. 2025) with antibody prevalence to avian influenza subtypes ranging from 1.1% of European shags to 78.7% in black-legged kittiwakes. High mortality was also reported in Northern gannets (Lane et al 2023). Furthermore, some ducks may not show clinical signs suggesting that the likelihood of infected ducks and geese not being detected prior to the gathering event is high. The uncertainty is medium.

Ratites

Elsayed et al. (2022) reported mortality rates of 90% in ostrich flocks in South Africa infected with HPAI H5N8. The birds suffered loss of appetite, dropped production, and oculonasal discharges with bleeding from natural orifices. The uncertainty of not being detected is therefore low, with medium uncertainty.

Exposure assessment

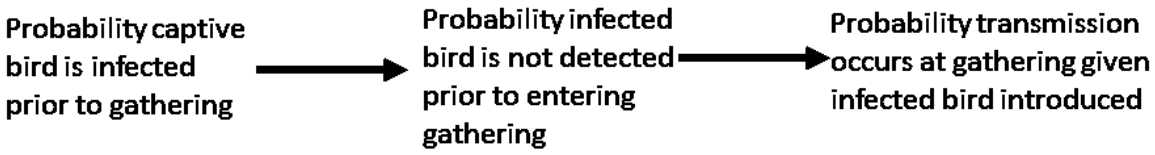
This section deals with the risk that an infected bird entering a gathering will spread disease to other birds at that gathering. If infection were to be introduced to a bird gathering, the likelihood of its spread depends on a number of factors such as the pathogenicity and transmissibility of the virus, the amount of virus being shed by the infected bird, the nature and layout of the gathering such as the housing and proximity of the participating birds, whether the birds are mixing, access to common water sources and whether they are in direct contact with visitors.

Spread of disease within the gathering

Spread through a gathering is based on the aggregated risk from multiple contacts between the infected bird introduced to the gathering and the other birds from different origins and hence going to different destinations after mixing at the gathering. From an epidemiological point of view, the probability of one or more birds actually being exposed to infection at the gathering is defined as “$1-(1-p)^n$”, where p is the probability that an infected bird introduced to the gathering infects another bird given a contact, and n is the number of such contacts. There are no data on p and n at gatherings. However, even if p were low then just ten contacts with the infected bird at the gathering would be sufficient to give an aggregated probability of medium that at least one exposed bird at the gathering would be infected. If p were medium, then just one contact would be sufficient to give a medium aggregated probability that at least one bird would be exposed. Therefore, the risk of disease spread, if introduced to a gathering would be at least medium. This is increased to high in the case of Anseriformes and Galliformes because more individual birds of these two groups may be taken to gatherings.

Qualitative risk assessment

For the purpose of this RRA a simplified risk pathway is used as set out below.



The three qualitative risks in the pathway for each bird order are combined using the matrix of Gale et al. (2009) to the give the overall risk of spread of HPAIV H5Nx from bird gatherings in Great Britain currently.

Incursions at gatherings from wild birds and in particular gatherings at coastal sites are not considered here.

The risk assessment for the current situation (22 August 2025) is set out in Table 4.

Table 4 Qualitative risk assessment for entry and subsequent spread of HPAI H5Nx at bird gathering according to bird group based on risk levels for 22 August 2025. Uncertainty in parentheses.

	Psittaciformes	Columbiformes	Birds of Prey	Passerines	Galliformes	Anseriformes	Ratites
Risk of infection prior to gathering (22 August 2025) see Table 3	Low (Medium)	Low (Low)	Medium (Medium)	Low (Medium)	Medium (High)	High (High)	Low (High)
Likelihood of infected bird not being detected prior to gathering	Medium (Medium)	High (Medium)	Low (Medium)	Medium (Medium)	Medium (Medium)	High (Medium)	Low (Medium)
Risk of spread of disease at gathering	Medium	Medium	Medium	Medium	High	High	Medium
[a]Overall risk	Low (Medium)	Low (low)	Low (Medium)	Low (Medium)	Medium ([d]High)	High ([d]High)	[b]Low ([c]Low)

[a]Overall risk of spread of HPAIV H5Nx at bird gathering calculated as lowest probability in the column according to matrix of Gale et al. (2010).

	Psittaciformes	Columbiformes	Birds of Prey	Passerines	Galliformes	Anseriformes	Ratites

[b]Mathematically “low” x “low” equals “very low” according to Gale et al. (2014). However, given the medium/high uncertainties in the component steps, the overall risk is left at “low”.

[c]Although the uncertainties of the component steps for ratites are high/medium, the two “low” risk levels add certainty that the overall risk is low.

[d]The high uncertainty reflects the high uncertainty in the risk of infection prior to the gathering.

Consequence assessment

Spread of disease from the gathering

If undisclosed avian notifiable disease were to be introduced to a bird gathering by live birds, there is a possibility that unless disease is confirmed during the event, it would remain undisclosed until after the gathering – and therefore there is a potential for further spread. The likelihood of this depends on the length of the event as with longer events the possibility that birds show signs of disease becomes greater, although it may also increase the number of potential contacts between birds at the gathering.

The extent of onward geographical spread depends on the extent of contact and spread between birds at the gathering itself and also where the birds are transported to following the event. The most effective way of preventing such spread would be to detect suspicion of disease at the time of the gathering, while the birds are still together. However, if the source of infection is a (group of) birds with subclinical infection, this increases the risk of onward spread. The size of the gathering, levels of biosecurity and length of the gathering would directly affect the number of potential contacts between infected and susceptible birds.

The consequence of avian influenza being detected in birds either at or having attended a gathering during the risk period is a serious matter for not only industry but also for the competent authorities. This could lead to a multi-focal outbreak in birds which have moved to different parts of the country, which are difficult to trace.

Any outbreak of notifiable avian disease has a significant impact on the UK poultry industry, through the trade and economic impacts on the producer. This is the same for any notifiable avian influenza virus. Average costs to government may be between £2 million and £4 million per outbreak, depending on the number of birds involved and complexity of the investigation.

If disease is detected at a gathering before it concludes and before the birds are dispersed, Government would face a complex challenge relating to disease control at the gathering, including dealing with a large number of owners who may be resistant to the need to cull their birds.

Whilst spread from a gathering may not lead to widespread disease into the commercial sector and may be restricted to small producers, the case in 2007 in the UK involving a market showed that there is a potential scenario for this occurrence. While for the majority of shows and gatherings involve birds classified as not destined for the food chain (as breeders or producers) it is important to note that even one outbreak in backyard premises would still lead to implementing disease control measures, as specified in the current regulations.

The risk assessment presented here addresses the risk of transmission at gatherings and does not consider how many other establishments could be infected, which would depend on the size of the gathering and individual bird keepers who attend them. In the 2020 to 2021 epizootic of HPAIV H5Nx in Europe, there was evidence that many captive bird/poultry outbreaks could be traced to a single dealer in southern Germany emphasizing the potential consequence that gatherings could have.

A reasonable worst-case outcome for multiple outbreaks to occur would be for an infected but apparently healthy bird to be taken to a gathering where it infects some, but not all, of the other birds present, but disease is not detected. The birds at the gathering are then taken to widely distributed premises. One or more of the infected birds is then detected through passive surveillance leading to at least one outbreak being confirmed with consequent disease control zones, impacts on industry and a costly tracing exercise. There has been one comparable case in recent years but this involved LPAI so the consequences were limited and again, for certain species of birds this is less likely.

Mitigation measures

Measures to mitigate the risk of disease entering a gathering and the potential impact include disease vigilance and prompt reporting of any suspicion, high levels of biosecurity and accurate record keeping to assist in any possible tracing exercise following the event. A table has been provided in previous versions of the document (ANNEX1). The risk of further (cross) contamination and onward spread occurring at and beyond the gathering could be mitigated by maintaining high levels of biosecurity, including reducing the number of potential contacts between infected and susceptible birds and informing livestock keepers about the need for vigilance for clinical signs of avian notifiable disease. A quarantine or standstill period on holdings prior to attendance at gatherings and also after return of birds from gatherings could also be considered, although may be impractical, particularly for backyard premises.

Conclusions

Currently (22 August 2025) the risk from gatherings is predicted to be **low** for captive bird groups including Psittaciformes, Columbiformes, passerines, birds of prey, and ratites. The risk is **high** for captive Anseriformes (ducks and geese). The risk has increased to **medium** for captive Galliformes across Great Britain.

The risk for captive Anseriformes is **high** because kept ducks and geese, if they have access to the outdoors, would have greater contact with water bodies, which at coastal sites could attract infected gulls and which at inland sites could attract infected resident waterbirds such as Canada geese, mute swans and mallards. The **medium** risk from captive Galliformes is in line with the current risk level for poultry with suboptimal biosecurity which is medium (low uncertainty).

The uncertainty in the low risk levels for Psittaciformes, Columbiformes, passerines is low as many are kept indoors or aviaries.

The uncertainty in the low risk for birds of prey has increased from low to medium reflecting the recent case of HPAI H5N1 in a captive falcon used for bird control in Wiltshire. It is hypothesised that the falcon was infected from catching an infected gull. The low likelihood that infected birds of prey are not detected prior to the gathering is a key barrier in reducing the likelihood that captive birds of prey introduce and spread HPAI at a gathering.

It should be noted that the “low” risk band covers a wide range of risk and so for bird orders such as Psittaciformes and passerines which tend to be kept in aviaries and therefore with less likelihood of contact with wild birds (e.g. likely to be secure against direct contact with wild gulls and Anserifomes), there may be variation in where the orders sit within that band. Ratites, although being kept outside are well within the low risk level because of the small numbers involved and the low likelihood of not being detected if infected.

The uncertainty in the high risk level for captive Anseriformes is high, reflecting the high uncertainty in the high risk level that captive Anseriformes are infected prior to attending the gathering. Similarly, the uncertainty for the medium risk level for Galliformes is high, reflecting the fact that the captive Galliformes’ risk level could be the same as that currently for wild birds, namely high, if they are allowed to mix with wild birds on ranges .

Therefore in response to the risk questions:

1) What is the risk of the introduction of HPAI H5Nx into bird fairs, shows, markets, sales and other gatherings? **The risk currently (at 22 August 2025) is low for kept birds of prey, Columbiformes, passerines, ratites and Psittaciformes, medium for Galliformes but high for Anseriformes (ducks and geese).**

2) What, if any, management options are available to reduce the likelihood and the impact of introduction and subsequent spread of avian notifiable disease through the above mentioned gatherings? **Options are to ban, allow only certain species, where the risk is considered to be lower, or allow everything with stricter controls and this is in order of increasing risk. Regionalisation could also be considered, and there is an option for housing Galliformes from locations prior to attending a gathering.**

Uncertainties

The main sources of uncertainty in this work relate to the wild bird risk, which is currently (to 22 August 2025) at **high**. In particular it is not clear as to the degree to which it is spreading inland and the extent to which it is going to spread into resident ducks, geese and swans. In July there were 5 cases in mute swans, and 1 case in mallards with a case in a Canada goose in August. In addition there were 3 cases in pheasants in July as documented in our most recent outbreak assessment (11 August 2025: High pathogenicity avian influenza (HPAI) in Great Britain and Europe). The detection of 9 IPs since our previous RRA strongly suggests that the risk to poultry is recoupling to the wild bird risk, although the extent of this across Great Britain and also across the different captive bird groups considered here is not known, thus adding a source of uncertainty. Poultry with suboptimal biosecurity are a good indicator of risk levels to captive Anseriformes and Galliformes. It is also not clear how the risk level in resident wild waterbirds will change in the autumn and whether cases will continue around the coast or decrease as the gulls and seabird disperse, or when inward migration of waterfowl from the continent begins (from the end of September).

References

Abolnik, C., Stutchbury, S. and Hartman, M. J. (2018) Experimental infection of racing pigeons (Columba livia domestica) with highly pathogenic Clade 2.3.4.4 sub-group B H5N8 avian influenza virus. Veterinary Microbiology 227:127-132.

Defra (2016) Risk assessment on the likelihood of spread of avian notifiable disease associated with bird fairs, shows, markets, sales and other gatherings (publishing.service.gov.uk).

Di Genova et al. (2025) Pigeons exhibit low susceptibility and poor transmission capacity for H5N1 clade 2.3.4.4b high pathogenicity avian influenza virus | bioRxiv

Falchieri M, Reid SM, Dastderji A, Cracknell J, Warren CJ, Mollett BC, Peers-Dent J, Schlachter AD, Mcginn N, Hepple R, Thomas S, Ridout S, Quayle J, Pizzi R, Núñez A, Byrne AMP, James J, Banyard AC. Rapid mortality in captive bush dogs (*Speothos venaticus*) caused by influenza A of avian origin (H5N1) at a wildlife collection in the United Kingdom. Emerg Microbes Infect. 2024 Dec;13(1):2361792. doi: 10.1080/22221751.2024.2361792. Rapid mortality in captive bush dogs (Speothos venaticus) caused by influenza A of avian origin (H5N1) at a wildlife collection in the United Kingdom - PMC

Greco, F. et al. (2025) Asymptomatic infection and antibody prevalence to co-occurring avian influenza viruses vary substantially between sympatric seabird species following H5N1 outbreaks. Sci Rep. 2025 Jan 9;15(1):1435. doi: 10.1038/s41598-025-85152-6 (Asymptomatic infection and antibody prevalence to co-occurring avian influenza viruses vary substantially between sympatric seabird species following H5N1 outbreaks - PubMed).

Hemat S. Elsayed, Amany Adel, Dalal S. Alshaya, Fatmah A. Safhi, Areej S. jalal, Dalia M.A. Elmasry, Karim Selim, Ahmed A. Erfan, Samah Eid, Samy Selim, Mohamed T. El-Saadony, Momtaz Shahein (2022), First isolation of influenza a subtype H5N8 in ostrich: pathological and genetic characterization. Poultry Science, Volume 101, Issue 12 (First isolation of influenza a subtype H5N8 in ostrich: pathological and genetic characterization - ScienceDirect).

Gale, P., Brouwer, A., Ramnial, V., Kelly, L., Kosmider, R., Fooks, A.R. and Snary, E.L. (2009) Assessing the impact of climate change on vector-borne viruses in the EU through the elicitation of expert opinion. *Epidemiology and Infection* 138, 214-225.

Gale, P., Goddard, A., Breed, A.C., Irvine, R.M., Kelly, L. and Snary, E.L. (2014) Entry of highly pathogenic avian influenza virus into Europe through migratory wild birds: a qualitative release assessment at the species level. Journal of Applied Microbiology, 116, 1405-1417.

Kwon, J.-H., Noh, Y.K., Lee, D.-H., Yuk, S.-S., Erdene-Ochir, T.-O., Noh, J.-Y., Hong, W.-T., Jeong, J.-H., Jeong, S., Gwon, G.-B., Song, C.-S., Nahm, S.-S. (2017). Experimental infection with highly pathogenic H5N8 avian influenza viruses in the Mandarin duck (Aix galericulata) and domestic pigeon (Columba livia domestica). Veterinary Microbiology 203: 95-102.

Lane, J.V. et al. (2024), High pathogenicity avian influenza (H5N1) in Northern Gannets (*Morus bassanus*): Global spread, clinical signs and demographic consequences. Ibis, 166: 633-650 (High pathogenicity avian influenza (H5N1) in Northern Gannets (Morus bassanus): Global spread, clinical signs and demographic consequences - Lane - 2024 - Ibis - Wiley Online Library).

Seekings AH, Liang Y, Warren CJ, Hjulsager CK, Thomas SS, Lean FZX, Nunez A, Skinner P, Selden D, Falchieri M, Simmons H, Brown IH, Larsen LE, Banyard AC, Slomka MJ. Transmission dynamics and pathogenesis differ between pheasants and partridges infected with clade 2.3.4.4b H5N8 and H5N1 high-pathogenicity avian influenza viruses. J Gen Virol. 2024 Jan;105(1). doi: 10.1099/jgv.0.001946 (jgv001946.pdf).

Shemmings-Payne, W., De Silva, D., Warren, C. J. et al. (7 more authors) (2024) Repeatability and reproducibility of hunter-harvest sampling for avian influenza virus surveillance in Great Britain. Research in Veterinary Science, 173. 105279. ISSN 0034- 5288 (Repeatability and

reproducibility of hunter-harvest sampling for avian influenza virus surveillance in Great Britain).

Wade, D., Ashton-Butt, A., Scott, G., Reaid, S.M., Coward, V., Hansen, R.D.E., Banyard, A.C. and Ward, A.I. (2023) High pathogenicity avian influenza: targeted active surveillance of wild birds to enable early detection of emerging disease threats - PubMed (nih.gov).

Annex 1

Table 3. Comparison of measures available to regulate poultry gatherings and those applied in the current General Licence

Measure	In force
General licence permitting gatherings	Yes
Specific licences	No
Withdraw licence (ie ban)	No
Notify APHA >7 days in advance including: Date the gathering will take place. b) Location of the gathering. c) Details of the licensee (including full name, contact address and telephone number). d) Anticipated numbers and type(s) of birds.	Yes
No sales allowed unless additional conditions are met (see below)	No
The licensee must make a record of all people who bring poultry or other captive birds to a gathering or take such birds from a gathering and keep the record for at least 3 months following the end of the gathering. The record must include at least the following information: a) Full name. b) Home address. c) Telephone number. d) Number and type(s) of birds exhibited, raced, bought or sold.	Yes
The licensee must not allow any cage, crate, basket or other container onto a gathering which is contaminated with bird droppings, bedding or other material of bird origin other than that from, or provided for, the birds brought to the gathering and must make this requirement known to all those bringing birds to the gathering in advertising, on entry forms or by any other means	Yes
The licensee must ensure that any cages, crates, baskets or other containers not removed from the premises by those attending the gathering are cleansed	Yes

and disinfected as soon as reasonably practicable after the end of the gathering and in any case before they are used again.	
i) ensure that any feed to which poultry or other captive birds had access, and all bedding, droppings, other material of bird origin and other contaminants derived from birds at the gathering and which are left on the premises when the gathering has ended are - a) destroyed; b) treated so as to remove the risk of transmission of disease; c) disposed of so that birds do not have access to them; or d) disposed of as Category 2 products under the Animal By-Products Regulations 2005. ii) where practicable, cleanse and disinfect those parts of the premises contaminated by such materials.	Yes
14 days notice to APHA	No
A named veterinary surgeon must be available on site during the whole time of the event for advice in case of suspect disease or a welfare problem. The veterinary surgeon should be responsible to ensuring that only clinically healthy birds in clean cages are entering the event.	No
Biosecurity advice must be distributed at the event.	No
Written contingencies, held by the nominated responsible person, must be available in the event of a disease incident at the event or nearby the event.	No
All cages used in the show must be cleansed and disinfected prior to and after the show.	Implicitly yes
• For sales: A record of all sales taking place at the event should be kept for at least 3 months, this should include: the name, address and telephone number of both the vendor and buyer and any identifying features or individual identification of the purchased bird(s).	No
• For sales: Buyers must isolate the purchased bird(s) from any other birds (except those purchased at the same event) for at least 1 week. • Any signs of ill health observed in the purchased bird(s) during this period must be reported to a veterinary surgeon and such birds must not be mixed with any other birds until the presence of an avian notifiable disease has been ruled out	No
• Restrict to birds of certain species – columbiformes, passerines and psittaciformes	No
• Restrict to regions only	No