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BIRD FLU:

ONLY MAJOR FARM REFORMS CAN END IT

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EXECUTIVE SUMMARY

Avian influenza – also known as bird flu or avian flu – is getting worse. Outbreaks are longer lasting and are no longer purely seasonal; they spread quickly – killing wild and farmed birds.

The latest strain of the avian influenza (also known as bird flu or avian flu) virus has claimed the lives of over half a billion farmed birds globally, since its emergence in 2021. Many were confined to the industrial farming system – factory farms – where they were being intensively reared for their meat or eggs. In these inhumane systems, sheds containing tens of thousands of birds crammed closely together and reared for their meat are commonplace. And, globally, many egg-laying hens live out their lives in cages – each hen with the space of around an A4 sheet of paper.

Respected scientific bodies, including the European Food Safety Authority (EFSA), continue to raise concerns about avian flu's potential spread to people and possible links with future pandemics.

WHO'S TO BLAME?

Governments and the poultry sector usually blame wild birds for bird flu, detracting from factory farming's role in the development of this highly infectious disease. However, the international Scientific Task Force on Avian Influenza – set up to provide recommendations and guidance for governments of countries affected or at risk – reiterated in its July 2023 report that HPAI originated in the poultry sector, not in wild birds. In reality, wild birds are caught up in a cyclical situation where the disease, fuelled by the factory farming system, is spiralling out of control. Although reported deaths amongst wild birds are in the tens of thousands, the actual numbers are thought to be in the millions.

Until recently, the bird flu that circulated naturally in wild birds generally caused little harm to the animals. But when it enters the poultry sheds of factory farms, often carried into premises on contaminated shoes, clothes, machines, animal feed and bedding, it can evolve into dangerous Highly Pathogenic Avian Influenza (HPAI). This is because poultry production in factory farms creates ideal conditions for the spread of disease. These cramped and stressful systems give viruses a constant supply of new hosts. They enable infection to spread very quickly among the birds, perhaps evolving into new strains as it does so.

In such environments, highly harmful strains can rapidly emerge. And these strains can then be carried back outside factory farms, spread to wild birds and back to farms again through, for example, contaminated clothing and equipment. Indeed, the international Scientific Task Force on Avian Influenza states that since the mid-2000s, the spillover of HPAI from poultry to wild birds has occurred "on multiple occasions".

Following 20 years of evolution in farmed poultry, the latest, and most deadly, strain of the virus has adapted to wild birds, meaning that it is circulating independently in wild populations, with some outbreaks occurring in remote areas with no poultry.

LAYING PANDEMIC FOUNDATIONS

But birds are not the only animals affected by avian flu. The disease has spread to mammals – infecting otters, foxes, dolphins, sea lions, and domestic dogs and cats, amongst others. In October 2022, mink at a big farm in Galicia, a region in northwestern Spain, became infected. Most worryingly, the virus developed the ability to spread from one mink to another – something it previously had not been capable of in mammals; this makes it far more contagious. If it develops the same ability to spread between humans, it could become a real pandemic risk.

While the health risk to humans from avian influenza is low, it cannot be ruled out altogether, as at least 875 people have been infected worldwide since 2003. The swine flu epidemic of 2009 and the 1918 Spanish flu outbreak, caused by a flu virus with genes of an avian origin, powerfully highlight the capabilities of zoonotic disease.

Bird flu has been described by Professor Devi Sridhar, chair of global public health at the University of Edinburgh, as a ticking timebomb. "The more chances the virus has to jump into a human and mutate, the more likely it is a dangerous strain will emerge that could

set off the next pandemic" she said. A joint statement from the UN's Food and Agriculture Organization (FAO), World Organisation for Animal Health (WOAH) and the World Health Organization (WHO) in July 2023 stated: "Avian influenza viruses normally spread among birds, but the increasing number of H5N1 avian influenza detections among mammals – which are biologically closer to humans than birds are – raises concern that the virus might adapt to infect humans more easily."

STOPPING THE SPREAD

A wide range of studies show that the stressful, crowded conditions of industrial animal farming contribute to the emergence, spread and severity of bacterial and viral infections. Biosecurity measures, such as restricting farm access and disinfecting areas, are currently relied on by governments and industry to tackle bird flu. But while biosecurity is important, EFSA reports show that it is not enough to stop this disease in its tracks. Biosecurity does not tackle the root of the problem.

A fundamental change in approach, supported by a clear strategy agreed by governments and industry, is needed to tackle bird flu. Otherwise, we could face repeated, devastating outbreaks for years to come, making an eventual highly destructive spread to humans more likely. Consequently, governments should consider offering financial support to farms that are willing to adapt, close down or relocate to areas with few poultry farms.

IMPLEMENTING A THREE-POINT ACTION PLAN

Without urgent action, millions more birds and other mammals are likely to suffer and die and the health of millions of people may be in serious jeopardy. To tackle this devastating disease, we need an integrated action plan which includes the following measures:

1. MASS VACCINATION OF FLOCKS to slow down the spread of the disease. There have been concerns regarding vaccination, partly because trade restrictions are placed on countries that vaccinate animals including poultry. Other concerns centre on the difficulty of distinguishing infected birds from vaccinated ones. But a vaccine against H7N9 bird flu has been developed that can differentiate infected birds from vaccinated birds. And countries including China, Mexico, Egypt and El Salvador are already allowing vaccination.

2. RADICAL RESTRUCTURING OF THE POULTRY INDUSTRY. The Scientific Task Force on Avian Influenza highlights the need to reform the poultry sector, stressing that "reassessment of the nature and sustainability of poultry production systems is required". It states that "HPAI risks are high where (poultry) production occurs in high-density settings" and emphasises the need to reduce the density of poultry farms. It is critical that the poultry sector adopts smaller flocks, lower stocking densities and more robust breeds with higher levels of natural immunity. This will reduce the risk of highly pathogenic bird flu strains emerging and spreading. Virus-contaminated dust particles can be spread via the wind to and from farms located near one another. The practice of locating poultry farms near each other and concentrated in a particular region must therefore end to reduce the spread of disease.

3. CHANGING THE WAYS PIGS ARE FARMED. More than 1.4 billion pigs are reared globally for their meat each year. Most are confined to factory farms – known breeding grounds for disease. There is clear evidence that pigs can be infected by swine, human and bird flus. They can also act as 'mixing vessels' to create new pig, bird and human viruses. This problem is recognised by the US Centers for Disease Control and Prevention which states: "The resulting new virus might then be able to infect humans and spread easily from person to person". And a recent study across 17 European countries found "a high incidence of influenza A virus in European swine populations" and concluded that they "host building blocks of pre-pandemic influenza viruses". Consequently, stocking densities on pig farms should be lowered, the size of groups in which pigs are kept should be reduced and more robust breeds should be farmed. It is also vital that pig farms are not clustered closely together.

We urge national agriculture ministries and the poultry sector to work with the World Organisation for Animal Health and the United Nations Food and Agriculture Organization to introduce these reforms which are an essential component of tackling bird flu.

Image: © Victoria de Martigny / We Animals Media

COUNTRY: Canada
PROVINCE/STATE: Quebec
DATE: April 2022

“A little further down the road, we saw dumpsters covered in feathers and I knew it would be bad. Then we got closer and saw a severed leg on the lid. When we opened the lid, it was a horror show: hundreds of mutilated ducks, discarded as waste.

Photographer/Filmmaker | Victoria de Martigny

The latest strain of the avian influenza (also known as bird flu or avian flu) virus has claimed the lives of over half a billion farmed birds since its emergence in 2021.[1] Some birds have died from the virus; in other cases, whole flocks have been culled to prevent the disease from spreading. Against this devastating backdrop, the debate continues as to whether highly pathogenic avian influenza (HPAI) primarily stems from wild birds or farmed poultry.

Governments and the poultry sector tend to blame wild birds for bird flu, as this detracts from intensive poultry production's role in the development of this disease. However, the international Scientific Task Force on Avian Influenza, which includes the UK's Royal Veterinary College, the World Organisation for Animal Health and the UN Food and Agriculture Organization, stresses that HPAI is typically associated with poultry farming. Highly pathogenic avian influenza from farmed poultry is spread to wild birds who are victims of the disease.[2] While reported deaths amongst wild birds are in the tens of thousands, the actual numbers are thought to be in the millions.[3]

A 2023 report by the Scientific Task Force reiterated that HPAI originated in the poultry sector, not in wild birds. The report pointed out that "before 2005 when HPAI viruses spilled significantly from poultry into wild birds, HPAI in free-ranging wildlife was highly unusual".[4] Moreover, Klaassen and Wille (2023) stated: "This panzootic did not emerge from nowhere, but rather is the result of 20 years of viral evolution in the ever-expanding global poultry population".[5] These authors added: "The global poultry population currently comprises 70% of the world's avian biomass and plays a central role in the perpetuation of HPAIs".

And *Horizon*, a European Commission journal, states: "The variant that kickstarted the current wave of outbreaks – A(H5N1) – emerged in 1996 in China as a result of the rapid expansion of the commercial duck and poultry sectors. It then spilled over to wild birds".[6]

The argument that wild birds are the key drivers of bird flu is also undermined by the findings of a 2022 European Food Safety Authority (EFSA) report. It documents that between 16 March and 10 June 2022, 86% of the poultry outbreaks in Europe "were secondary due to between-farm spread of HPAI Virus".[7] The EFSA noted that this was particularly the case in the most affected countries – France, Hungary and Italy.

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Klaassen and Wille, 2023, in *Nature Ecology & Evolution*

ANSES (the French National Agency for Food, Environmental and Occupational Health and Safety) stated: "The large-scale HPAI (H5) episodes that have occurred so far in France have each time originated in inter-farm transmission that developed after viral introduction into a waterfowl (ducks/geese) fattening farm".[8]

Professor Thomas Mettenleiter, president of the FLI Federal Research Institute for Animal Health in Germany, states: "It's frequently human activity and not direct infection from wild birds that causes new incursions of the virus. People carry the virus into premises on contaminated shoes, clothes, machines, animal feed and bedding".[9]

Until recently, the bird flu viruses that circulated naturally in wild birds were usually of 'low pathogenicity'. Viruses of low pathogenicity generally cause little harm. However, when low pathogenic avian influenza gets into industrial poultry sheds, it can evolve into dangerous, highly pathogenic avian influenza.

SUPPLYING NEW HOSTS

Industrial poultry production, which packs thousands of birds into sheds, gives a virus a constant supply of new hosts. These conditions allow it to move very quickly among the birds. It may change genetically as it does so, creating a situation where highly virulent strains are more likely to emerge.[10] These harmful strains can then be spread to other farms and wild birds. The Scientific Task Force states that since the mid-2000s the spillover of highly pathogenic bird flu from poultry to wild birds has occurred "on multiple occasions".

So typically, the situation appears to be as follows: low pathogenic bird flu spreads from wild birds to poultry. There it can mutate into highly pathogenic bird flu. This is then spread to other farms and can also spill over to wild birds and back again to poultry, continuing a vicious and ever-increasing circle. The Scientific Task Force confirms this saying that "wild birds are both victims and vectors of a virus originating from within a poultry setting".[11]

Following 20 years of evolution in farmed poultry, the latest, and most deadly, strain of the virus has adapted to wild birds, meaning that it is circulating independently in wild populations, with some outbreaks occurring in remote areas with no poultry. The effect has been devastating. Since this latest strain's emergence in 2021, it has killed millions of wild birds from 320 different species.[12] Most governments appear to have no convincing strategy for ending these regular bird flu outbreaks other than hope that they will eventually die down. But there is no sign of this happening. Indeed, the outbreaks are getting worse.

Without a comprehensive action plan to fully tackle the key root causes of the disease, the world could face repeated, devastating outbreaks of bird flu for years to come.

FREEING FARMS FROM BIRD FLU

First, serious consideration must be given to vaccination. It involves difficulties but could slow down the spread of the disease.

Second, to reduce the risk of highly pathogenic avian influenza strains emerging and spreading, the poultry industry needs a radical re-think and restructuring. This will involve farming breeds with stronger immunity, smaller flocks and lower stocking densities so giving the birds more space.

While the health risk to humans from avian influenza is low, it cannot be ruled out altogether. Bird flu has spread to mammals including seals, red foxes and wild boar and, in rare cases, it has already infected humans.[13] Research indicates that just a few mutations could lead to bird flu becoming transmissible to – and between – people. The 1918 'Spanish flu' pandemic in humans was caused by an influenza virus with genes of avian origin.

Intensive poultry farming systems are clear health hazards. They involve large numbers of genetically similar, stressed birds, with weakened immune systems, closely packed together, thus creating the perfect environment for the emergence of more virulent disease strains. Without reform, bird flu outbreaks will continue to be the cause of death for millions of birds and possibly put human lives at risk.

Image: © iStockphoto/VV Shots

Sign during bird flu outbreak in London November 2022

BIOSECURITY IS NOT ENOUGH

In addition to blaming wild birds, governments and the poultry sector place considerable emphasis on biosecurity to prevent the spread of avian flu. They argue that poultry should be kept indoors where strict biosecurity is more feasible. However, the argument that poultry are not vulnerable to bird flu when kept indoors in bio secure facilities is not borne out by practical experience.

According to the EFSA's 2021 report on bird flu: "The frequent occurrence of HPAI A(H5) virus incursions in commercial farms where birds are kept indoors,

including poultry production types considered at low avian influenza risk (e.g. broilers and breeders), raises concern about the capacity of applied biosecurity measures to prevent virus introduction".[14]

And in 2022 the EFSA said: "Outbreaks often occurred in establishments without outdoor access, and poultry production systems (e.g. breeders) with high biosecurity standards were also affected".

They also stated: "The biosecurity measures implemented along the poultry production chain do not seem effective in preventing all introductions of the HPAI A(H5N1) virus into poultry establishments. In the coming months, the sustained and increasing infection pressure on poultry establishments will further challenge the effectiveness of the applied biosecurity measures".[15]

BREEDING DISEASE

The stressful, crowded conditions of industrial animal farming greatly contribute to the emergence and spread of bacterial and viral diseases. Some are zoonotic – capable of spreading to people. Such concerns are noted in a Joint Scientific Opinion from the European Medicines Agency and EFSA. They stated: "The stress associated with intensive, indoor, large-scale production may lead to an increased risk of livestock contracting disease".[16]

It is important to remember that the last global pandemic before COVID-19 originated in farm animals.[17] Swine flu killed between 151,700 and 575,400 people worldwide in 2009.[18] This pandemic started in central Mexico; its emergence is believed to be associated with the long-distance trade in and industrial farming of pigs.[19]

The Nipah virus in Malaysia led to the death of more than 100 people in 1999. The outbreak was associated with the increased size and density of commercial pig farms and their encroachment into forested areas.[20] The virus appears to have been transmitted from fruit bats to pigs, and from pigs to people.[21] Outbreaks of the Nipah virus still occur and World Organisation for Animal Health (WOAH) describes it as having "devastating zoonotic potential"[22] The World Health Organization (WHO) says "the case fatality rate is estimated at 40% to 75%".[23]

INFECTING MAMMALS

It's clear that, like industrial poultry farming, the factory farming of pigs creates ideal breeding conditions for disease. The evidence above is supported by a recent study which collected samples from nearly 2,500 European pig holdings. Many of the samples were from "regions of very intense pork production in Europe".[24] The research found a year-round presence of up to four major strains of swine influenza A virus on more than 50% of the farms studied. The authors concluded that "European swine populations represent reservoirs for emerging IAV (influenza A virus) strains with zoonotic and, possibly, pre-pandemic potential". The paper asserts: "European swine populations host building blocks of pre-pandemic influenza viruses".

Worryingly, bird flu has now spread from birds to mammals. It has recently been detected in otters, foxes, seals, dolphins and porpoises in Britain.[25] It has also been detected in domestic cats in Poland, and dogs and cats in Italy.[26,27] The virus has also been found in brown and black bears in North America[28] while veterinary authorities in Peru have reported bird flu in sea lions.[29,30] In March 2023, the country's national parks service, Sernanp, recorded the deaths of 3,487 sea lions: 3.29% of the population of the country.[31]

A report in the scientific journal, *Nature*, cites a 2022 avian influenza outbreak on a Spanish mink farm as providing the "strongest evidence so far" of the highly pathogenic strain spreading not just to, but between, mammals.[32] This outbreak involved a new variant of the disease, including genetic material from a strain found in gulls. *Nature* report states that this new variant's genetic makeup also suggests an increased ability to reproduce in mammals. It asserts: "Researchers have warned that, unless careful precautions are taken, the disease might eventually spread among people".

Similarly, a study examining the death from avian influenza of sea lions in Peru suggests that the current bird flu virus has "serious pandemic potential for humans".[33] Bird flu is currently not easily transmitted between people, but scientists have suggested that just a few mutations would allow it to become as infectious as seasonal flu.[34] A *New Scientist* editorial described the risk of a pandemic as "fact, not fiction".[35]

RISKING PEOPLE'S LIVES

More recently, bird flu was described by Professor Devi Sridhar, chair of global public health at the University of Edinburgh, as a ticking timebomb. "The more chances the virus has to jump into a human and mutate, the more likely it is a dangerous strain will emerge that could set off the next pandemic" she said.[36]

Francesca Bandinelli, scientific director of EFSA, says: "The risk (for humans) exists, from low to medium, but with a great uncertainty due to the fact that different viral strains are circulating, and that it is an RNA virus, which, as we have all learned from the Coronavirus, can mutate when it runs, and mutations may emerge that facilitate their adaptation and replication in humans".[37]

WHO reports that, in the past 20 years, there have been at least 875 cases of human infection with the avian influenza H5N1 virus logged by 21 countries.[38,39] Of these, 458 people died, a mortality rate of more than 50%.

Humans can typically only be directly infected with bird flu viruses in two ways. These are either from close contact with infected birds, or from environments contaminated with the virus – places where the mucous, saliva or faeces of infected birds are present.[40]

However, humans could be infected indirectly through an intermediate animal host.

DISEASE MIXING VESSELS

Pigs can be infected by avian influenza and human influenza viruses as well as swine influenza viruses. Pigs can act as mixing vessels in which these viruses can reassort (i.e. swap genes) and new viruses that are a mix of pig, bird and human viruses can emerge.[41] In 2009, an H1N1 virus with genes from North American pigs, Eurasian pigs, humans and birds emerged to infect people and quickly spread, causing the 2009 swine flu pandemic.[42]

The US Centers for Disease Control and Prevention (CDC) explains that virus reassortment could occur if a pig were simultaneously infected with a human influenza A virus and an avian influenza A virus. This combination could produce a new influenza A virus with some genes from the human virus and some from the avian. "The resulting new virus might then be able to infect humans and spread easily from person to person."[43] Most people will have little or no immunity against the new virus.[44]

Similarly, the European Commission's *Horizon* magazine states: "A bird flu pandemic is unlikely to arise unless the virus first becomes established in an intermediary mammal – most likely a pig. Pig cells have qualities that make it possible for viruses from both birds and humans to take hold and replicate".[45] Professor Mettenleiter, who coordinated the EU-funded DELTA FLU[46] project says: "The worry is that one day a pig will act as a mixing vessel, co-hosting flu viruses from both birds and humans. This could result in a novel reassortment – a hybrid virus with genetic material from both viruses".[47]

The World Organisation for Animal Health (WOAH) also identifies mink as possible mixing vessels: "Some mammals, such as mink, may act as mixing vessels for different influenza viruses, leading to the emergence of new strains and subtypes that could be more harmful to animals and/or humans. Recently reported infections in farmed mink are a concern because infections of large numbers of mammals kept in close proximity to each other exacerbate this risk".[48] WOAH adds: "The current situation highlights the risk that H5N1 avian influenza may become better adapted to mammals, and spill over to humans and other animals".[49]

Bird flu could only infect a large number of people if it were able to spread readily between them. The spread of bird flu from one person to another is very rare.[50] However, there is a danger that current bird flu viruses could evolve and gain the ability to spread easily between people.[51] What makes the outbreak in a Spanish mink farm so troubling is that the virus spread from infected mink to other mink in the farm. The ability for the virus to spread between a mammalian species has sparked concerns about the possible spread of bird flu between people.[52]

A July 2023 joint statement from the FAO, WOAH and WHO stated: "Avian influenza viruses normally spread among birds, but the increasing number of H5N1 avian influenza detections among mammals - which are biologically closer to humans than

Image: © Lukas Vincour / Zvířata Nejíme / We Animals Media

COUNTRY: Czechia
PROVINCE/STATE: Tachov District
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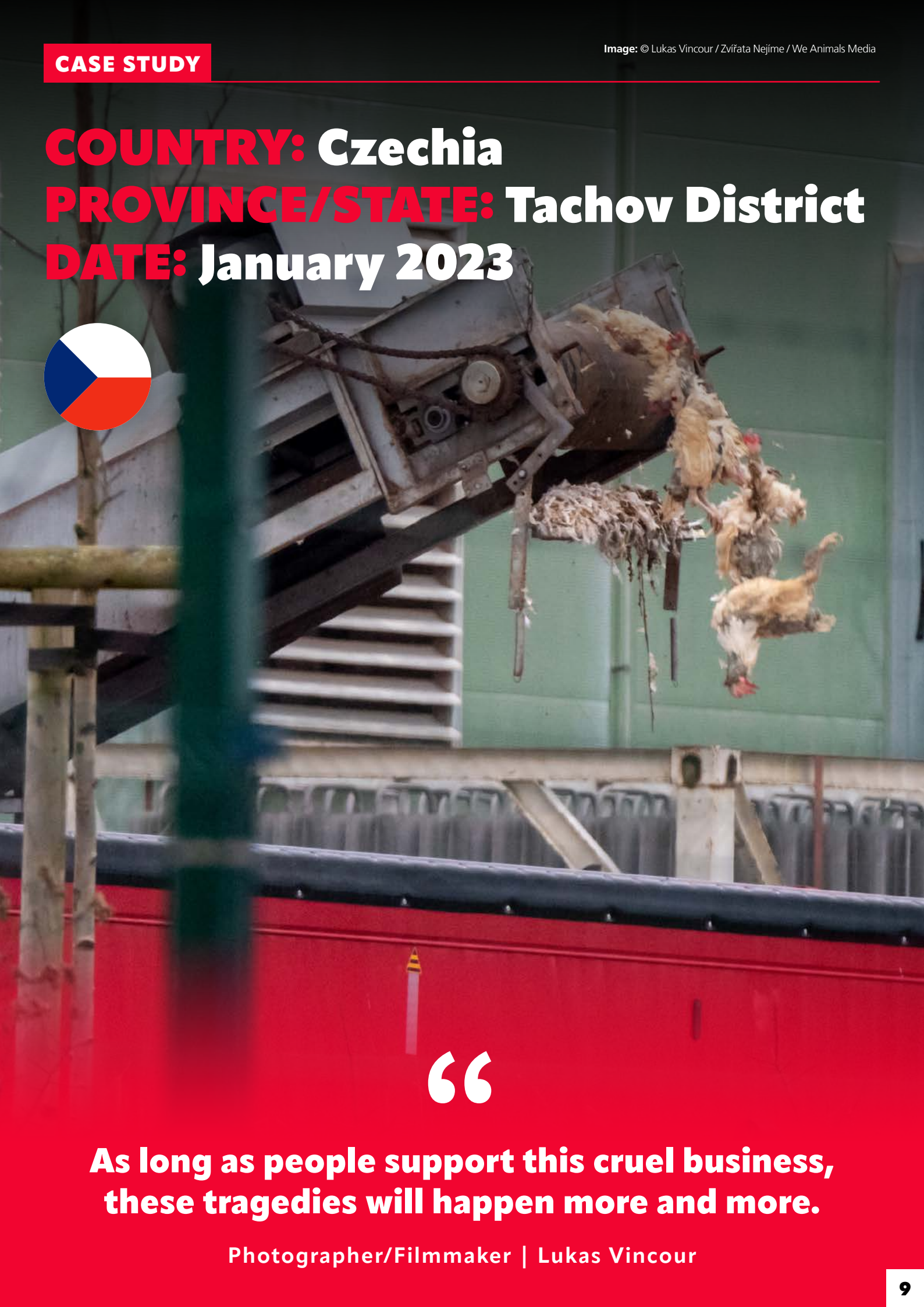

“As long as people support this cruel business, these tragedies will happen more and more.

Photographer/Filmmaker | Lukas Vincour

birds are - raises concern that the virus might adapt to infect humans more easily. In addition, some mammals may act as mixing vessels for influenza viruses, leading to the emergence of new viruses that could be more harmful to animals and humans".[53]

HOW TO END THE SPREAD OF AVIAN FLU

Three steps are vital in tackling bird flu. These are: vaccination, radically restructuring the poultry industry and changing the way pigs are farmed.

VACCINATION

Traditionally, governments and livestock sectors have opposed vaccination as a tool for helping to control disease. This is partly because trade restrictions may be placed on countries that vaccinate animals. Consequently, 'stamping out' is the preferred option, involving killing whole flocks once disease is detected to try and stem its spread.

However, stamping out is clearly not ending the current avian flu outbreaks. They are getting worse; over the last year or so they have become longer lasting and more birds are dying or being culled. The disease has also spread to several countries in Central and South America which have detected the presence of highly pathogenic bird flu for the first time.

Previously bird flu was seasonal with periods of low risk in summer. However, the European Commission's *Horizon* magazine states: "Infection has now changed from rare, sporadic outbreaks to a situation of continuous risk".[54] Without a clear plan, we could face repeated, devastating outbreaks of bird flu for years to come.

Vaccination is not a perfect solution, but it could restrict the spread and severity of the disease and reduce the amount of virus that can be passed on. One challenge is that influenza viruses can mutate rapidly, which means that a particular vaccine may be less effective when dealing with a new strain.

Moreover, there are concerns due to the difficulty of distinguishing infected birds from vaccinated birds. This is a key reason why some countries are reluctant to import poultry from countries that vaccinate against bird flu. However, a vaccine against H7N9 bird flu has been developed that can differentiate infected birds from vaccinated birds.[55]

Virologist Professor Arjan Stegeman points out: "Even if we don't have a perfect vaccine, it can still be valuable. Over the years, various animal diseases have been controlled by imperfect vaccines. Newcastle disease, foot and mouth disease, and Aujeszky's disease are all good examples of that".[56]

Although vaccination will not end the bird flu crisis on its own, it is an important part of the strategy for tackling this disease.

Encouragingly, several countries already vaccinate poultry against bird flu and others are seriously thinking of doing so. Those who already vaccinate include China, Egypt, Mexico and Ecuador.

In July 2023, France announced a vaccination programme for its duck industry.[57] Vaccination will be compulsory throughout the year for all rearing duck farms in mainland France. For breeding duck farms (those producing day-old birds or hatching eggs) that supply to the French market only, vaccination is voluntary, however, if breeding farms are producing for export, vaccination is prohibited in order not to restrict trade. The Government will pay for 85% of the total cost of vaccination.

Importantly, French agriculture minister, Marc Fesneau, stated, "vaccination alone will not prevent a new epizootic. It constitutes an additional prevention tool, in addition to the measures already implemented: compliance with biosecurity measures at all links in the sector; health surveillance guaranteeing early detection of the disease; a reduction in densities of farms to limit the spread of the virus".

New EU rules effective from 12 March 2023 permit the trading of vaccinated captive birds, vaccinated poultry sent for immediate slaughter, other poultry products and day-old chicks from vaccinated birds within the territory. AVEC, which represents Europe's poultry meat sector, welcomes this saying that it will be "more and more difficult to control HPAI without vaccination".[58]

Traditionally the USA has been opposed to vaccinating poultry against bird flu. However, the *New York Times* reports that the Biden Administration is now giving serious consideration to a vaccination programme.[59] However, the UK Government states that "Further evidence is needed on vaccine effectiveness… given the risk of vaccinated birds without clinical signs, spreading the virus undetected".[60]

During the 90th General Assembly of the World Organisation for Animal Health (WOAH) 21-25 of May 2023, the World Assembly of Delegates adopted a resolution that recommends: "Members, in consultation with the poultry sector, may consider the implementation of vaccination as a complementary disease control tool that is based on sound surveillance and takes into account local factors, such as circulating virus strains, risk assessment and vaccination implementation conditions".[61]

RADICALLY RESTRUCTURING THE POULTRY INDUSTRY

While vaccination and good biosecurity can play an important part in tackling bird flu, they are insufficient on their own. Further measures are needed. The Scientific Task Force highlights the need to reform the poultry sector, stressing that "reassessment of the nature and sustainability of poultry production systems is required".[62] It states that "HPAI risks are high where (poultry) production occurs in high-density settings" and emphasises the need to reduce the density of poultry farms.

To reduce the risk of highly pathogenic avian influenza emerging, a poultry sector featuring smaller flocks and more space for the birds is urgently needed. The birds farmed should be breeds with a greater natural immunity. It's also critical to stop locating poultry farms so close together. This view is supported by the EFSA which states that prevention measures should include: "Reduction of the density of commercial poultry farms. This is primarily important in densely populated poultry areas".[63] ANSES (the French National Agency for Food, Environmental and Occupational Health and Safety) has highlighted the need to lower stocking densities in poultry farms and to reduce the density of farms in a particular geographic location.[64]

Following this, in July 2023, France introduced a scheme of 'de-densification' which involves reducing the number of duck farms in the most vulnerable regions until they can be re-filled with vaccinated birds. Farmers will receive compensation for lost production.[65]

FARMING CHICKENS REARED FOR MEAT – BROILERS

STOCKING DENSITY

In the EU, broilers are commonly stocked at 39kg/m² (this is equivalent to around 17 chickens/m²). However, if certain conditions are met, broilers may be stocked at 42kg/m² (equivalent to around 19 chickens/m²). The risks presented by such high stocking densities are compounded by the high number of chickens kept in each shed. Broiler sheds often contain 30,000 or more birds. And there may be four, six or even ten sheds located next to each other on one farm.

In the UK, broilers are commonly stocked at 38kg/m² (this is equivalent to around 17 chickens/m²). In its 2023 Scientific Opinion on the welfare of broilers, the EFSA recommended that "a maximum stocking density of 11kg/m² should be applied to allow the broilers to express natural behaviour, to rest properly and to support health".[66] A stocking density of 11kg/m² equates to around five chickens/m².

FLOCK SIZE

Scientific studies on maximum flock size are limited, and in its recent Scientific Opinion, the EFSA stated that more research is needed on this. However, it cites one study which showed an increased prevalence of painful skin problems among broilers kept in group sizes of 6,000 birds or more, such as dermatitis on the soles of their feet and burns on their legs and breasts from prolonged sitting in their own waste. The increased prevalence was compared to groups of 3,000.[67]

Guidance on what may be a sensible flock size can be found in the European Commission Regulation on marketing standards for poultry meat.[68] This provides that in the case of chicken labelled as 'traditional free range' the maximum permitted group size in a poultry house (i.e. in the birds' indoor housing) is 4,800 chickens. A key additional stipulation is that

Image: © Essere Animali / We Animals Media

COUNTRY: Italy
PROVINCE/STATE: Veneto region
DATE: January 2022

“I thought those chickens had suffered a double injustice. Firstly, they contracted the virus because they were locked up in an intensive farm. And secondly, they were killed in an atrocious way and crushed one on top of the other after a long agony.

Photographer/Filmmaker | Francesco Ceccarelli

the birds are of a slow growing breed. Moreover, the Regulation outlines that the total usable area of poultry houses at any single production site must not exceed 1,600m². As the maximum permitted stocking density is 12 chickens/m², this means that the maximum permitted number of chickens at any one farm is 19,200. The UK's leading organic certification scheme – the Soil Association – requires that no more than 1,000 broilers may be kept in a poultry house.[69]

The importance of avoiding large flock size is highlighted by a research project carried out by the FAO, the UK's Royal Veterinary College, and the University of California. The paper examined rates of highly pathogenic avian influenza in Cambodia, Thailand and Vietnam.[70] It concluded: "Evidence from Thailand, Vietnam and Cambodia strongly suggests that larger-scale poultry flocks (>1,000 birds) are at higher risk of HPAI (highly pathogenic avian influenza) than many of their small-scale, backyard counterparts". This paper considered both broilers and egg-laying flocks.

Similarly, a study of HPAI-infected farms in Iowa, USA, found that "for turkey, layer and pullet farms, the probability of airborne infection was higher for larger flocks within the same type of poultry".[71]

GENETICS

It is well known that today's broilers and laying hens suffer severe health problems because of extreme breeding for high yield. For example, fast-growing broilers have an increased risk of leg deformities, lameness, lethargy, skin sores, heart failure and sudden death, as their skeletons and organs struggle to support the excessive muscle growth at such a young age.[72,73,74,75,76] Unsurprisingly, fast-growing broilers are also less able to display their natural behaviours.[77,78] But breeding poultry for increased growth can also impair their immune system.[79] In the Netherlands, supermarkets require slower-growing broilers, meaning the poultry industry has greatly increased the proportion of these healthier, higher welfare birds in recent years. Their most recent data show that fast-growing chickens are using nearly nine times more antibiotics than slower-growing birds.[80] Given the increasing issue of antimicrobial resistance and the problems caused by infectious disease in poultry, it is essential that industry breeds birds with greater natural immunity.

FARMING CHICKENS REARED FOR EGGS – LAYING HENS

In the EU and UK, hens kept in enriched cages must be provided with at least 750cm² of cage area per hen. This means that they can be stocked at 13 hens/m². Hens kept in cage-free systems must not be stocked at more than nine hens/m².

In its 2023 Scientific Opinion on the welfare of laying hens, the EFSA recommended a maximum stocking density of four laying hens/m².[81] This equates to 2,500cm²/bird. The Soil Association organic standards require that no more than 3,000 laying hens can be kept in a poultry house.[82]

AVOIDING HIGH DENSITY OF POULTRY FARMS IN A PARTICULAR REGION

EFSA has stressed the vulnerability to bird flu of densely populated poultry areas.[83,84] It pointed out that "in 2021 (in Italy), more than half (167 out of 316) of the poultry outbreaks were identified in northern Italy in commercial poultry establishments in areas with high poultry densities in the Veneto region".[85] The EFSA's prevention strategy includes reduction of the density of commercial poultry farms. This is primarily important in densely populated poultry areas and areas close to wetlands.[86]

The links between bird flu and poultry farms located close together is supported by EFSA's finding (referred to on page 11). Between 16 March and 10 June 2022, 86% of the poultry outbreaks in Europe - up to 93% in France and Hungary – "were secondary due to between-farm spread of HPAI Virus".[87]

The European Centre for Disease Prevention and Control points out that virus-contaminated dust particles can be spread via the wind to and from farms located near one another.[88] And studies examining bird flu outbreaks in the USA and France indicate that airborne transmission, aided by the large external exhaust fans in intensive poultry sheds, may be contributing to the spread of highly pathogenic bird flu between nearby farms.[89,90]

SUGGESTED APPROACH FOR RESTRUCTURING THE POULTRY INDUSTRY

Whilst no clear figures have been established regarding the scale of the reductions required to substantially decrease the risk of bird flu, we would suggest the following as starting points for discussion.

REDUCING STOCKING DENSITY

EFSA's 2023 recommendations should be followed i.e. that the maximum stocking density for:

- **Meat chickens should be 11kg/m² which equates to around five chickens/m²,[91]**
- **Laying hens should be four laying hens/ m². This equates to 2,500cm²/bird.[92]**

REDUCING FLOCK SIZE

A helpful starting point for considering flock size may be the UK's Soil Association standards which set a maximum flock size of 3,000 and 1,000 birds for laying hens and broilers respectively. These are substantially smaller flocks than in the conventional poultry sector but are commercially viable.

An alternative approach for thinking about flock size is provided by the European Commission Regulation on marketing standards for poultry meat.[93] For chicken labelled as 'traditional free range' the maximum permitted group size in a poultry house (i.e. in the birds' indoor housing) is 4,800 chickens.

REDUCING POULTRY OPERATIONS CLUSTERS

Although EFSA has highlighted the vulnerability to bird flu of densely populated poultry areas, it has not suggested the maximum number of farms per square kilometre.

Given the escalation of bird flu, the best approach is for relevant authorities to stop the establishment of new farms, and existing farm expansion, in densely populated poultry areas. The dangers posed by these densely populated areas are great. Consequently, governments should consider offering financial support to farms that are willing to adapt, close down or relocate to areas with few poultry farms.

MAKING THE LINKS WITH PIG PRODUCTION

There is clear evidence that pigs can be infected by avian influenza and human influenza viruses as well as swine influenza viruses. Pigs can also act as 'mixing vessels' in which these viruses can reassort (swap genes); new viruses that are a mix of pig, bird and human viruses can emerge. The Centers for Disease Control and Prevention (CDC) states that "the resulting new virus might then be able to infect humans and spread easily from person to person".[94]

A recent study concluded: "European swine populations host building blocks of pre-pandemic influenza viruses".[95] Many of the samples in this study were from "regions of very intense pork production in Europe". Considering pigs act as mixing vessels for human, avian and swine influenza viruses, the pig sector also needs restructuring to make it less vulnerable to the spread of influenza viruses. The restructuring would involve reduced stocking densities, smaller group sizes and not clustering large numbers of farms in a particular area.

In a 2022 report, the EFSA summarises space allowances which are needed to enable certain behaviours in growing pigs.[96] These are presented in Table 1 on page 16.

The first column shows the space allowances which pigs need to be able to lie separated from other pigs in a lateral position (on their side) – a particularly important behaviour for temperature regulation.

Image: © Compassion in World Farming

COUNTRY: United Kingdom
PROVINCE/STATE: Norfolk
DATE: November 2022

“Watching them load the dead birds into the waste trucks I saw clouds of feathers drifting off in the wind and bird after bird falling onto the ground. Eventually one worker kicked the fallen dead birds into a tractor bucket. This was no way to prevent a highly infectious disease from spreading.

Photographer/Filmmaker | Ed Shephard

EFSA recommends that at temperatures above 25˚C and for pigs weighing above 110kg (even when the temperature is below 25˚C) the space allowances set out in the first column of the below Table should be provided as these will enable lateral lying i.e., lying on their sides with legs extended. The second column shows the space allowances below which, due to lack of space, pigs kept on solid floors will reduce the amount of time they spend lying down. The EFSA also points out that reduced space allowances impair growth rate and increase tail biting.

The EFSA recommended these minimum space allowances from the viewpoint of improving animal welfare and growth rate. Nonetheless, they may provide a helpful starting point for considering the space thresholds for stress in pigs and the impact on vulnerability to disease.

TABLE 1.
Space allowances required for pigs to be able to lie down.
Calculated from data in the EFSA 2022 report.

Weight of pigs in kg	Space required to lie in a separated lateral position (on their side) (m^2/pig)	Space below which pigs, kept on a solid floor, will reduce the amount of time spent lying down due to insufficient space(m^2/pig)
10	0.22	0.33
20	0.35	0.53
30	0.45	0.70
40	0.55	0.84
50	0.64	0.98
60	0.72	1.10
70	0.80	1.22
80	0.87	1.34
90	0.94	1.45
100	1.01	1.55
110	1.08	1.65

FOOD SYSTEM TRANSFORMATION

Food systems contribute to pandemic risk in multiple ways. A report from the UN Environment Programme and the International Livestock Research Institute, preventing the next pandemic, identifies unsustainable agricultural intensification and increasing demand for animal protein as major drivers of zoonotic disease emergence.[97] The report also highlights that factory farming can contribute to the emergence of new viruses due to industrial animal agriculture's dependence on huge amounts of soy and cereals to feed the animals. This leads to the expansion of farmland into forests and other wildlife habitats. Ecosystem disruption and loss of biodiversity increases the risk of pathogen spillover.[98] These factors, combined with closer contact between humans and wildlife, can lead to viruses being transmitted from wild animals to people.[99]

This is supported by a report by the Intergovernmental Platform on Biodiversity and Ecosystem Services, which states: "The underlying causes of pandemics include… land-use change, agricultural expansion and intensification".[100]

A 2022 study led by a researcher at Harvard University found that: "Large pig and poultry farms are where the genetic reassortment needed to source pandemic influenza strains may most likely occur".[101]

Another 2022 study, by a researcher at the Department of Environmental Studies, New York University, discusses the "infectious disease trap of animal agriculture".[102] The report highlights that frequently used 'prevention' strategies of monitoring transmission and spread of diseases with pandemic potential, including 'spillover' events to other species and stopping outbreaks by culling, are not enough. They do not address the root causes, including the high and increasing demand for animal-sourced foods.

Furthermore the 2022 report from the International Union for Conservation of Nature (IUCN) highlights that the: "Global trend in large-scale industrial production of pigs, poultry and farmed-wildlife species is coincident with pandemic emergence of highly pathogenic human or zoonotic influenzas, and coronaviruses".[103] It adds: "A certain way to reduce risk of zoonosis and emerging infectious diseases globally… is to reduce dependence on intensive animal-based food production systems".

Ultimately, this supports the need for a holistic solution. Transforming the food system for a sustainable future means reconnecting animal welfare with that of humans, and the planet on which we live.[104] It means replacing intensive – factory - farming with regenerative, agroecological farming combined with more balanced, healthier diets. Put simply: we must reduce the amount of animal-sourced food that we eat and farm fewer animals but in better conditions.

HOW ARE POULTRY AFFECTED BY BIRD FLU KILLED?

Several different killing methods are used in the mass culling of poultry affected by bird flu. The least worrying from an animal welfare viewpoint and the most practical methods currently available are containerised gassing units or high-expansion nitrogen filled foam.

WHOLE HOUSE GASSING

Whole house gassing is an option but is only possible in newer sheds where a suitable 'seal' can be created to ensure that the pumped in CO2 can reach appropriate levels to kill the birds. Exposure to CO2 is associated with two welfare concerns, pain and breathing difficulties, both of which have been demonstrated as causing suffering in chickens, and can be assumed to cause suffering in other poultry.

Research has shown the suffering threshold of CO2 is around 45-50%, and in the context of slaughter for food, UK and EU legislation do not permit conscious birds to be exposed to more than 40% CO2 to avoid the risk of reaching this threshold.[105] The welfare challenge around whole house gassing is the need to ensure that all the birds throughout the shed are exposed to the gas in a consistent and gradual manner, so that birds lose consciousness before they are exposed to the aversive levels of CO2 that will kill them. In reality, this means that ideally multiple gas inlets are needed.

There are also issues around temperature, as the pumping in of liquid CO2 (if this option is used) immediately vaporises in the shed, results in dramatic drops in temperature, and can have welfare impacts. This method is very noisy – which can startle the birds and results in them showing signs of panic. Whole house gassing has several advantages, primarily that no handling of birds is required, which can cause them distress; and it is fast and effective.

The use of inert gases such as argon or nitrogen in whole house gassing would have welfare advantages as they are much less likely to cause distress and pain, but this is near impossible to achieve in practice.

Using inert gases means oxygen levels must be reduced to <2-4% to kill birds, which even in newer sheds, is difficult as no shed can be fully sealed to create the required environment.

CONTAINERISED GASSING UNITS

When containerised gassing units (CGUs) are used, the birds can either be placed in a container in which the gas is already present, or the birds are placed in crates or transport modules. They are put in a sealed container into which the gas mixture is then introduced. CGUs (as opposed to whole house gassing) have the advantage that they can be sealed and provide more flexibility as to which gas mixtures can be used, including those that are much less likely to cause distress and pain. However, birds have to be caught and handled and killed in batches.

HIGH EXPANSION NITROGEN-FILLED FOAM

High expansion nitrogen-filled foam is a quicker and less distressing option. The foam acts as a delivery mechanism for the gas, and as the foam envelopes the animal, oxygen will be effectively eliminated/displaced, and it will die through a lack of oxygen. Because the foam submerges the bird it is not necessary to seal a building, as the bird is completely surrounded by nitrogen (>98%) and rapidly succumbs. The critical point for successful application is that the animals need to be submerged in foam completely with at least a one metre buffer of foam above their heads. This will ensure that as they die and movements such as wing flapping starts, the birds remain submerged and are not re-exposed to air, which could result in recovery.

Image: © Andrew Skowron / We Animals Media

COUNTRY: Poland
PROVINCE/STATE: Mazowieckie and Greater Poland Voivodships
DATE: April 2021

“Mountains of dead birds piled up in front of the poultry houses.

Photographer/Filmmaker | Andrew Skowron

FIRE-FIGHTING FOAM

High expansion nitrogen-filled foam should not be confused with low expansion foam (fire-fighting foam), which kills birds by drowning, and is used in the USA. This method is not approved for use in the UK or EU.

VENTILATION SHUTDOWN

This inhumane method is widely used in the USA. It involves switching off the automated ventilation system. The intended consequence is that, without ventilation, the body heat from the animals raises the temperature in the house until the animals die from overheating. With ventilation shutdown + heat (VSD+Heat), as well as the ventilation being switched off, heat is introduced into poultry houses to achieve a lethal rise in temperature.

Information on slaughtered birds reared for commercial purposes due to avian flu between February 2022 until the end of February 2023 in the USA, shows that:

- **12,527,400 birds were killed in mass slaughters that used VSD+Heat as the sole method**
- **32,421,700 birds were killed in mass slaughters in which VSD+Heat was used as one of multiple methods (for example: whole house gassing used in one barn, VSD+Heat in another; or VSD+Heat used as the primary method with neck breaking – or cervical dislocation – used for all the survivors)**
- **8,238,571 birds were killed in mass slaughters in which VSD+Heat was NOT used.[106,107]**

For 5,262,110 birds, the method of killing has not yet been ascertained.

Ventilation shutdown and VSD+Heat are inhumane killing methods and should not be used.

CONCLUSION

Without a comprehensive action plan to fully tackle the root causes of the disease, the world could face repeated, devastating outbreaks of bird flu for years to come. Millions more birds and other mammals are likely to suffer and die and the health of millions of people may be in serious jeopardy. Industrial poultry production is a key factor behind the regular outbreaks of bird flu witnessed in recent years. Industrial production, in which large numbers of birds are packed into a shed, gives a virus a constant supply of new hosts; it can move very quickly among the birds, perhaps mutating as it does so. In this situation highly virulent strains are likely to rapidly emerge.

A far-reaching transformation of the intensive poultry sector is required. We need lower stocking densities, smaller flocks, birds whose health has not been undermined by genetic selection for fast growth and high yields. We must also end the clustering of large numbers of poultry farms close together in a particular geographic region.

There is clear evidence that pigs can act as 'mixing vessels' in which different viruses can reassort and new viruses that are a mix of pig, bird and human viruses can emerge. The pig sector should be restructured to make it less vulnerable to the transmission and amplification of influenza viruses. This would involve reduced stocking densities, smaller group sizes and avoiding clustering large numbers of farms in a particular area.

We urge national agriculture ministries and the poultry sector to work with the World Organisation for Animal Health and the United Nations Food and Agriculture Organization to introduce these reforms which are an essential component of tackling bird flu.

Image: © Direct Action Everywhere / We Animals Media

COUNTRY: USA
PROVINCE/STATE: Iowa
DATE: March 2022

“The tragedy at this farm is emblematic of the inherent violence in factory farming and of the government backing that further entrenches us in this outdated food system, with our taxpayer dollars funding nightmare scenarios like this one.

Photographer/Filmmaker | Direct Action Everywhere (DxE)

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