

High pathogenicity avian influenza outbreak in Western Cape poultry

On 18 April 2023, an increase in mortalities was seen on a large layer chicken farm in the Paardeberg area between Paarl and Malmesbury. Samples were taken and the presence of H5 avian influenza virus was detected on 21 April. In the week that followed, four more layer farms in the Paardeberg area became infected (Fig. 1). By 4 May, the virus from one of the farms had been typed as a high pathogenicity H5N1 avian influenza virus. All farms worked to cull the affected sites as quickly as possible and the chicken carcasses were disposed of by burial or composting (Fig. 2). The outbreaks and culling operations resulted in the loss of approximately 1.5 million layers, representing about 25% of the population of layer chickens in the Western Cape.



Figure 2: Chicken carcasses being prepared for composting on one of the affected farms

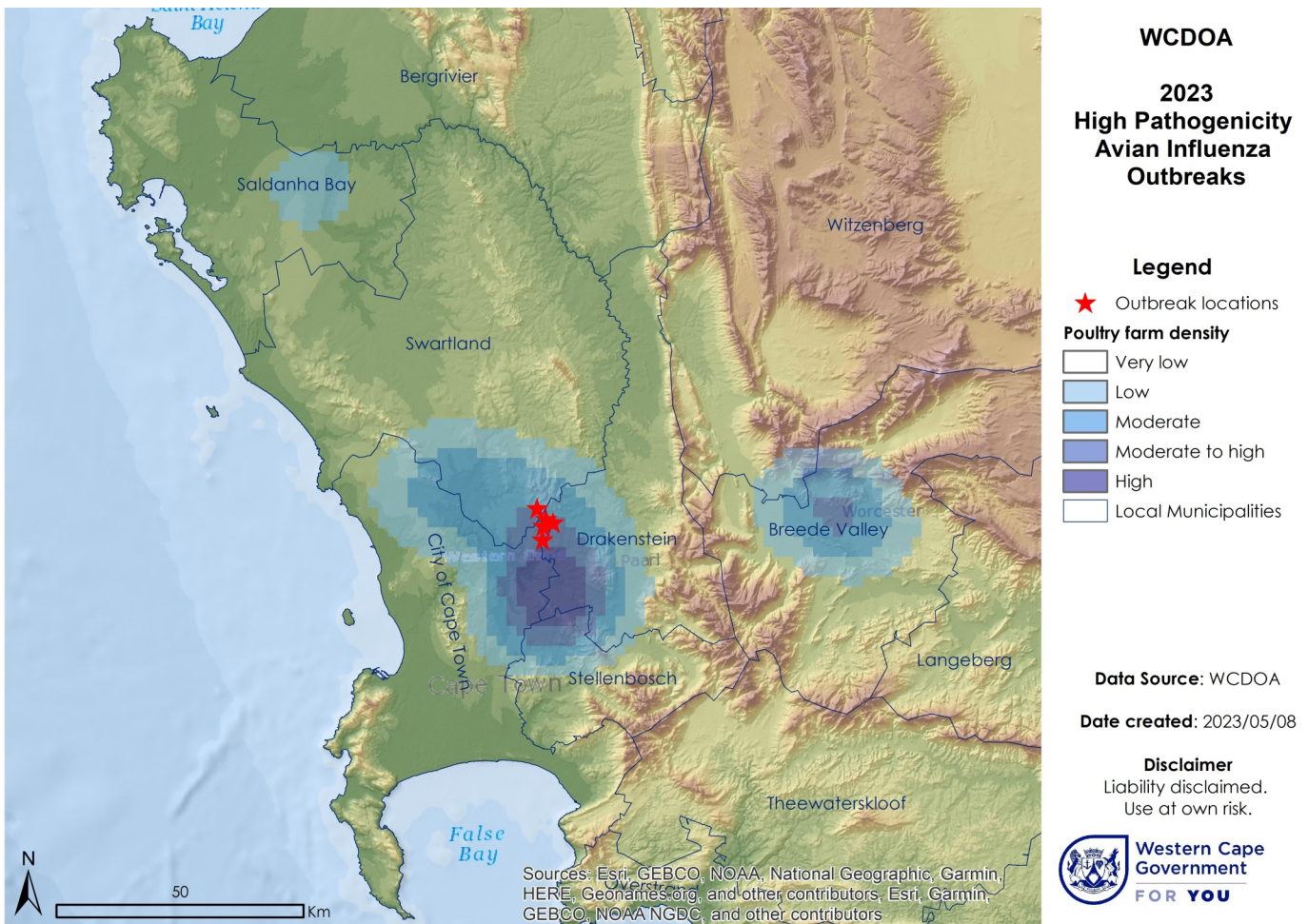


Figure 1: Locations of farms affected by high pathogenicity avian influenza in the Paardeberg area in April 2023

Zoonotic potential of clade 2.3.4.4b H5N1 avian influenza

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High pathogenicity avian influenza (HPAI), subtype H5N1, clade 2.3.4.4b originated in Europe in 2020. Since 2021, it has been causing outbreaks and mass mortalities in domestic poultry and wild birds all over the world, with the exception of Australasia and Antarctica (Fig. 3). As a result of the disease, over 200 million bird deaths have been reported to the World Organisation for Animal Health since 2021. In South Africa there have been outbreaks in 2021, 2022 and 2023.

What makes this HPAI different from previous viruses is the unprecedented number of reports of infection in mammals. As of 28 April 2023, 30 species of marine and terrestrial mammals have been reported infected in North and South America, Europe and Asia. Many of the species were diagnosed after showing clinical signs of disease or being found dead. The majority of affected species are carnivores that could have been exposed to infected birds by hunting or scavenging. A full list of the affected mammal species is available in the European Food Safety Authority's latest [Avian influenza overview](#).

Of concern is that several of the reports of mammal mortalities suggest the possibility that the virus is able to be transmitted between mammals.

In June 2022, the first mass mortality event of mammals was reported in harbour seals and grey seals in Maine, USA. The mortalities coincided with an HPAI outbreak in wild birds in the area. Most seals were found dead, but the few that were found alive showed respiratory and neurological signs. Investigators considered it unlikely

that the seals were infected by consumption of infected birds, as this is not a normal part of the diet of the affected species. They concluded that infection could have occurred from environmental exposure or that seal-to-seal transmission could have occurred.

More convincing evidence of mammal-to-mammal transmission came in October 2022, when an outbreak of HPAI occurred on a mink farm in Spain. An increased mortality rate was seen on the farm, where 52 000 American minks were kept for fur production. Affected minks showed mainly neurological signs before death. The minks were fed a diet containing raw poultry by-products, but these were sourced from areas in which there had not been reported outbreaks of HPAI. Wild bird deaths from HPAI were, however, reported from the coast nearby to the mink farm. As the minks were kept in partially open housing, the initial introduction of the virus likely occurred from contact with wild birds. The disease was observed to spread from hot spots in barns on one side of the farm to the neighbouring barns and across the farm, resulting in a 4.3% mortality rate by week three. At this point, culling operations began and the farm was depopulated over the next month.

Since February 2023, mass mortalities of wild sea lions have been reported from Peru and Chile. Some sea lions were seen with neurological and respiratory signs, but the majority were found dead, either floating at sea or stranded along the coast (Fig. 4). Observed deaths have coincided with HPAI outbreaks in seabirds in the same areas. Approximately 7000 sea lions have been reported

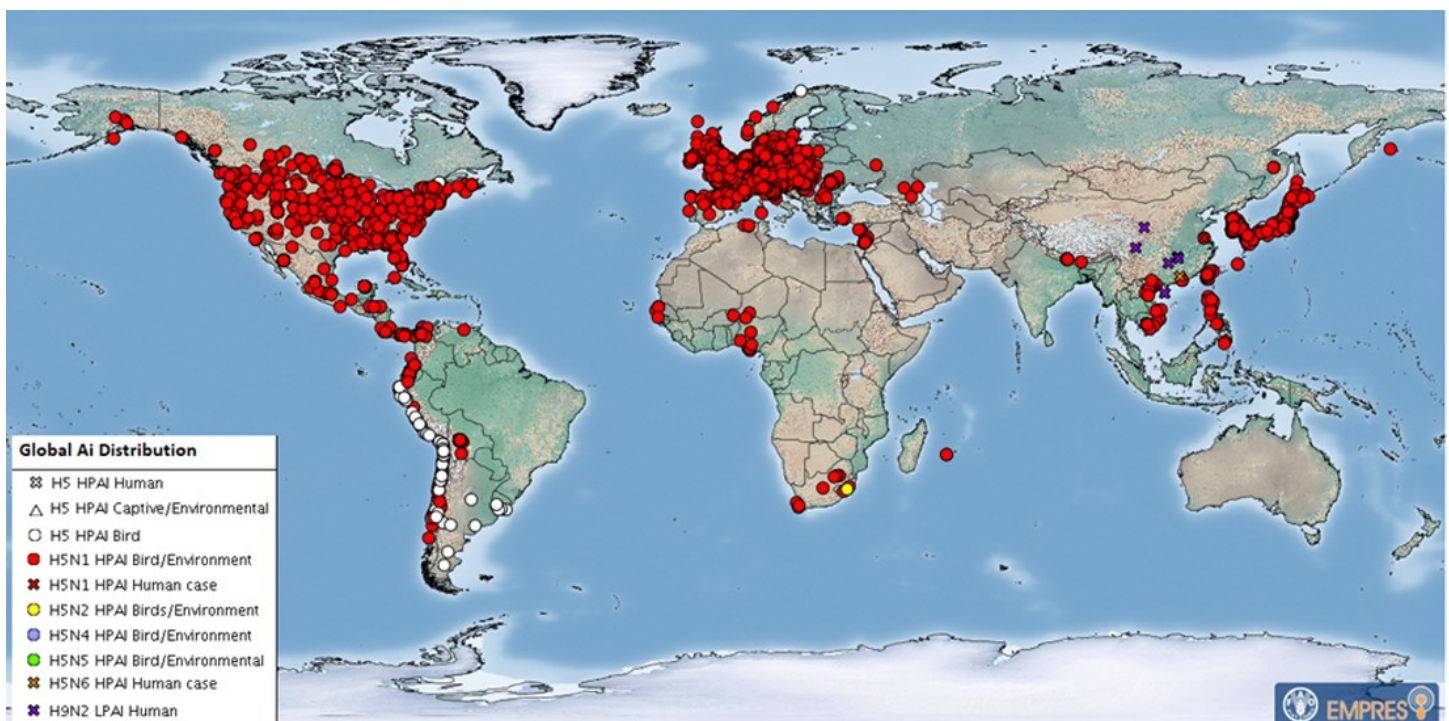


Figure 3: Global avian influenza events from October 2022 until 27 April 2023 (FAO)

dead in Peru and Chile combined. Given the number of affected sea lions, it seems more likely that transmission occurred between them than that each one was infected through individual exposure to infected birds. This cannot be ruled out, however, as hunting and scavenging of seabirds by sea lions is common.

Since January 2022, eight cases of H5N1 HPAI, clade 2.3.4.4b have been reported in people in several countries, including China, the UK, Spain, the USA, Ecuador and Chile. These cases have occurred mostly in people who had occupational or domestic exposure to infected birds. However, some of the cases had no direct exposure to birds, raising the possibility that the virus could have been transmitted in the environment.



Figure 4: A dead sea lion in Chile is examined by the National Fisheries and Aquaculture Service (Photo: SERNAPESCA)

In March 2023, a viral specimen taken from a hospitalised Chilean patient showed two mutations in the polymerase basic protein 2 (PB2) gene which allow the virus to replicate more efficiently in mammalian cells. Similar mutations have been found in about half of the viruses collected from other mammals infected with this virus. These mutations are rarely seen in viral samples from birds, indicating that the mutations have likely occurred upon transmission to mammals.

Two additional classes of mutations would be necessary to allow the virus to maintain transmission from person to person. PB2 mutations have been seen in previous versions of H5N1 that did not evolve further to be able to be transmitted between people. However, the widespread outbreaks currently occurring provide numerous opportunities for viral spillover between birds and mammals, increasing the risk of viral adaptation. Vigilance and caution is therefore necessary.

The risk of HPAI to the general public is low and consumption of poultry products carries a negligible risk. For those with occupational or other close contact with potentially infected birds, the risk is low to moderate, according to the World Health Organisation. To decrease the risk, the use of personal protective equipment when handling or being otherwise exposed to potentially infected birds is recommended. According to [guidelines](#) from the Centers for Disease Control and Prevention, this should include:

- Snugly fitting safety goggles (unvented or indirectly vented)
- Disposable gloves
- Waterproof boots that can be disinfected or boot covers
- An N95 respirator. If this is not available, a well-fitting facemask such as a surgical mask
- Disposable, waterproof overalls
- A disposable head cover or hair cover

Those that have been exposed to birds with HPAI should monitor their own health and, if signs of respiratory illness develop, should visit their nearest health care facility and report exposure to HPAI.

Pets are also at risk of HPAI infection. Severe neurological signs and deaths have been reported in domestic dogs and cats that had contact with infected wild birds. It is therefore important to prevent pets from roaming and make sure that they are supervised when outside the home.

In the Western Cape, sampling and testing for HPAI has taken place in some wildlife species, including fur seals with unexplained mortalities. However, HPAI has not been detected in South African mammals to date.

References and further reading:

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Centers for Disease Control and Prevention, 2023, Technical Report: Highly Pathogenic Avian Influenza A (H5N1) Viruses, <https://www.cdc.gov/flu/avianflu/spotlights/2022-2023/h5n1-technical-report.htm>

Food and Agricultural Organisation, Global Avian Influenza Viruses with Zoonotic Potential situation update, 27 April 2023: <https://www.fao.org/animal-health/situation-updates/global-aiv-with-zoonotic-potential/en>

Outbreak events

Outbreaks of **high pathogenicity avian influenza (H5N1)** occurred on five commercial layer **chicken** farms in the **Paardeberg** area. Details are provided on page 1 of this report.

Avian influenza virus was detected on an **ostrich** farm in the **Kannaland** Local Municipality. There has been an increase in rainfall in the area in the last two months, with lots of water in the surrounding dams available for wild birds and a large number of Egyptian geese noted in the area. Despite virus being detected in a high proportion of samples, no high pathogenicity virus has been identified.

Low pathogenicity avian influenza (H5) was detected in **wild bird** faeces collected in **Worcester** town.

Avian influenza virus was detected in **wild bird** faeces collected near **Stanford**.

An **aardwolf** on a farm near **Murraysburg** appeared tame and approached people. The aardwolf was killed and subsequently tested positive for **rabies**. No human or animal contacts occurred.

Small scale farmers in Kwanonqaba, **Mossel Bay** experienced deaths amongst their **pigs** as a result of **African swine fever** (ASF). A previous outbreak of ASF occurred in this area in January 2022, but was resolved by March 2022.

Three sheep kept by a small-scale farmer in **Atlantis** showed advanced skin lesions from **sheep scab** infestation. The sheep were treated twice under official supervision.

Skin lesions characteristic of **erysipelas of swine** were seen after slaughter on pig carcasses originating from farms near **Bonnievale** and **Paarl** (Fig. 5).

Fever, nasal discharge, oral lesions, salivation and lameness were seen in **sheep** from three farms in the **Vanrhynsdorp** area. Clinical diagnoses of **bluetongue** were made.

Salmonella Enteritidis was cultured from routine samples taken from seven commercial **chicken** establishments in the **Cape Town, Malmesbury** and **Worcester** areas.

Orf lesions were seen in **ewes** on a farm near **Riviersonderend**. An outbreak of orf occurred on this farm previously in March, but in the ram group in a different camp.

Two **rams** on a farm in the **Bitterfontein** area showed signs of severe penile swelling with bleeding as a result of **pizzle rot** (peestersiekte). The rams were treated with antibiotics and topical antiseptic.

A **horse** near **George** with a fever tested positive for **West Nile virus**.

Red lice were seen on **sheep** in auction pens near **Gouda**.



Figure 5: Erysipelas lesions on a pig carcass
(Photo: M. Hendricks)

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