Guidelines for working with albatrosses and petrels during the high pathogenicity avian influenza (HPAI) H5N1 panzootic

ACAP

ACAP Intersessional Group on High Pathogenicity Avian Influenza H5N1

November 2023

Relevant information on high pathogenicity avian influenza (HPAI) H5N1

1. The current panzootic wave of high pathogenicity avian influenza (HPAI) subtype H5N1 started in 2021 and has killed millions of seabirds worldwide.
2. HPAI H5N1 viruses spread to South America in late 2022 and have since caused mass mortality of seabirds and marine mammals.
3. HPAI H5N1 viruses have arrived in sub-Antarctic islands in October 2023, but not yet in mainland Antarctica. The situation may change rapidly.
4. Oceania, including Australia and New Zealand, is the only remaining region of the world free of this virus, but this situation may also change rapidly.
5. By the end of October 2023 no mass mortality events of procellariiform birds have been attributed to HPAI H5N1; however, these species are susceptible to infection and could be vulnerable to future outbreaks.
6. Birds infected by HPAI H5N1 viruses typically show one or more of the following disease signs: atypical behaviour, neurological signs, conjunctivitis, and respiratory distress.
7. The virus is transmissible to humans, but risk is currently considered low.

The term "panzootic" refers to a large-scale spread of a pathogen in animals across continents or even worldwide (in other words, the animal equivalent to "pandemic" in humans). The ongoing panzootic wave of high pathogenicity avian influenza (HPAI) subtype H5N1 started in 2021, and has since caused the death of millions of birds, having spread to five continents (as of 5 November 2023, only Oceania and mainland Antarctica remain free of the disease). While HPAI H5N1 has been recognized as a threat to the poultry industry since its emergence in 1996, a genetic shift occurred in 2021, resulting in an explosion of cases in wild birds, especially seabirds. In particular, there has been a dramatic expansion in the range of known host species, which now comprises birds and mammals of 356 species across 21 orders (Klaassen & Wille 2023). Associated with this, there have been numerous, major mass mortality events, resulting in the death of hundreds of thousands of boobies, pelicans, terns, cormorants, cranes, geese, gannets, skuas and penguins in Africa, Eurasia, and the Americas (EFSA 2023; Breed et al. 2023). In addition to the enormous impact on wild birds, HPAI H5N1 has affected a wide diversity of wild mammals, including several marine mammals such as pinnipeds and cetaceans (EFSA 2023).

To date, there have been relatively few detections of HPAI H5N1 in Procellariiformes (**Table 1**). The clustered detection of HPAI H5N1 in small numbers of Sooty Shearwaters (*Ardenna grisea*) and Waved Albatross (*Phoebastria irrorata*) in Peru and Short-tailed Shearwaters (*Ardenna tenuirostris*) in Alaska suggests that localized outbreaks might have occurred; however, to date there are no reports of large-scale mortalities of Procellariiformes attributed to HPAI H5N1. This is likely because most HPAI H5N1 detections in Procellariiformes have occurred at wintering/foraging areas, in small numbers and in multi-species outbreaks, and most breeding colonies of procellariiform species are remote and thus located far from the epicentre of activity (**Figure 1**). Nevertheless, these sporadic detections of HPAI H5N1 in Procellariiformes confirm that these species are susceptible to the infection and could therefore be vulnerable if the virus were to spread to their breeding habitat.

In this context, the arrival and spread of HPAI H5N1 within seabird and marine mammal populations in South America since November 2022 is acutely concerning (Breed et al. 2023). The virus is approaching important breeding sites for ACAP-listed species and priority populations, and these species could be severely impacted if outbreaks were to occur at breeding colonies. For example, the first detection of HPAI H5N1 in seabirds at the Galapagos Islands in September 2023 is of concern for the conservation of the Waved Albatross, an ACAP-listed and critically endangered species that is endemic to that archipelago. Additionally, the detection of HPAI H5N1 in an Antarctic Prion (*Pachyptila desolata*) in Brazil in September 2023 is also worrying as it highlights the possibility that Procellariiformes might be exposed to the virus during their migration and could transport the virus when returning to their breeding colonies in the Southern Ocean. The high number of marine mammals affected by HPAI H5N1 in southern South America has also increased the alertness for the region, especially considering the proximity of cases in Patagonia to the Antarctic Peninsula. Scavengers such as giant petrels, gulls, skuas and sheathbills, among others, have been seen consuming the carcasses of infected marine mammals and pose an increased risk for further virus spread to the sub-Antarctic and Antarctic regions (Breed et al. 2023, Dewar et al. 2023). Indeed, the confirmation of HPAI H5N1 in Brown Skua populations on Bird Island (South Georgia/Islas Georgias del Sur*) and in a Southern Fulmar (*Fulmarus glacialoides*) found dead near Stanley (Falkland Islands/Islas Malvinas*) in October 2023, the first known cases in the sub-Antarctic region, raises extreme concern for the ACAP species breeding on these sites; Wandering Albatross (*Diomedea exulans*), Black-browed Albatross (*Thalassarche melanophris*), Grey-headed Albatross (*Thalassarche chrysostoma*) and Light-mantled Sooty Albatross (*Phoebetria palpebrata*), as well as Northern Giant Petrel (*Macronectes halli*) and Southern Giant Petrel (*Macronectes giganteus*).

The 2023/2024 austral summer may present the greatest potential for HPAI outbreaks among seabird populations in the Southern Hemisphere, when most of these birds will congregate to breed. Therefore, all sites where ACAP species congregate or breed may be at risk of exposure via migratory birds and authorities should thus be in a state of alertness. Although the primary introduction route of the virus in seabird colonies has been through natural pathways, accidental introduction by human activities (tourism, fisheries, science, etc.) must be also considered as a potential risk. For detailed information on breeding sites of ACAP species, please refer to https://www.acap.aq/acap-species.

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* A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Islas Malvinas), South Georgia and the South Sandwich Islands (Islas Georgias del Sur y Islas Sandwich del Sur) and the surrounding maritime areas.

Table 1. Summary of HPAI detections in Procellariiformes (updated 5 November 2023).

Species	Site	Date	Latitude	Longitude
Northern Giant Petrel[1] *Macronectes halli*	St Helena Bay, South Africa	16/09/2021	-32.74	17.99
Great-winged Petrel *Pterodroma macroptera*	Silverstroomstrand, South Africa	12/11/2021	-33.59	18.36
Great-winged Petrel *Pterodroma macroptera*	Cape Town, South Africa	15/10/2021	-33.87	18.49
Great Shearwater *Ardenna gravis*	St. John's, Canada	11/05/2022	47.59	-52.70
Manx Shearwater *Puffinus puffinus*	Isle of Rum, UK	07/04/2022	57.00	-6.33
Northern Fulmar *Fulmarus glacialis*	Opinan, UK	19/09/2022	57.68	-5.78
Northern Fulmar *Fulmarus glacialis*	Dornoch, UK	21/09/2022	57.87	-4.01
Northern Fulmar *Fulmarus glacialis*	Opinan, UK	31/10/2022	57.68	-5.78
Northern Fulmar *Fulmarus glacialis*	San Luis Obispo, USA	13/12/2022	35.29	-120.66
Manx Shearwater *Puffinus puffinus*	Itanhaém, Brazil	09/03/2023	-24.25	-46.89
Sooty Shearwater *Ardenna grisea*	At sea near Putu, Chile	25/03/2023	-35.16	-72.61
Sooty Shearwater *Ardenna grisea*	Playa Chica Cartagena, Chile	01/04/2023	-33.55	-71.61
Black-browed Albatross[1] *Thalassarche melanophris*	Colaco, Chile	20/04/2023	-41.78	-73.52
Southern Giant Petrel[1] *Macronectes giganteus*	Playa Guanaqueros, Chile	27/04/2023	-30.20	-71.43
Waved Albatross[1] *Phoebastria irrorata*	Playa Las Gaviotas, Peru	22/05/2023	-8.49	-78.86
Sooty Shearwater[2] *Ardenna grisea*	Puerto Santa, Peru	22/06/2023	-9.00	-78.65
Northern Fulmar *Fulmarus glacialis*	Whitehaven, UK	13/07/2023	54.56	-3.56
Northern Fulmar *Fulmarus glacialis*	Longyearbyen, Svalbard (Norway)	09/08/2023	78.23	15.72
Short-tailed Shearwater[2] *Ardenna tenuirostris*	North Slope Borough, Alaska (USA)	25/08/2023	71.29	-156.78
Northern Fulmar *Fulmarus glacialis*	Suðuroyarbanki, Faroe Islands (Denmark)	05/09/2023	61.56	-6.06
Northern Fulmar *Fulmarus glacialis*	Nólsoy, Faroe Islands (Denmark)	13/09/2023	62.01	-6.67
Manx Shearwater *Puffinus puffinus*	Bertioga, Brazil	13/09/2023	-23.78	-45.95
Antarctic Prion *Pachyptila desolata*	Itanhaém, Brazil	16/09/2023	-24.20	-46.81
Waved Albatross[1,2] *Phoebastria irrorata*	Moche, Peru	25/09/2023	-8.17	-79.03
Southern Fulmar *Fulmarus glacialoides*	Stanley, Falkland Islands (Islas Malvinas)[3]	30/10/2023	-51.69	-57.86

[1] ACAP-listed species.

[2] Detection in two or more individuals collected at the same site and date.

[3] A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Islas Malvinas), South Georgia and the South Sandwich Islands (Islas Georgias del Sur y Islas Sandwich del Sur) and the surrounding maritime areas.

Table to be updated monthly online at https://acap.aq/resources/disease-threats/avian-flu. The numbers of individuals in this table represent those tested and shown to be positive for HPAI H5Nx; they do not necessarily show the total number of birds likely to have died from HPAI at any location either on the date of the listed sample collection or thereafter. Sampling protocols may differ between countries.

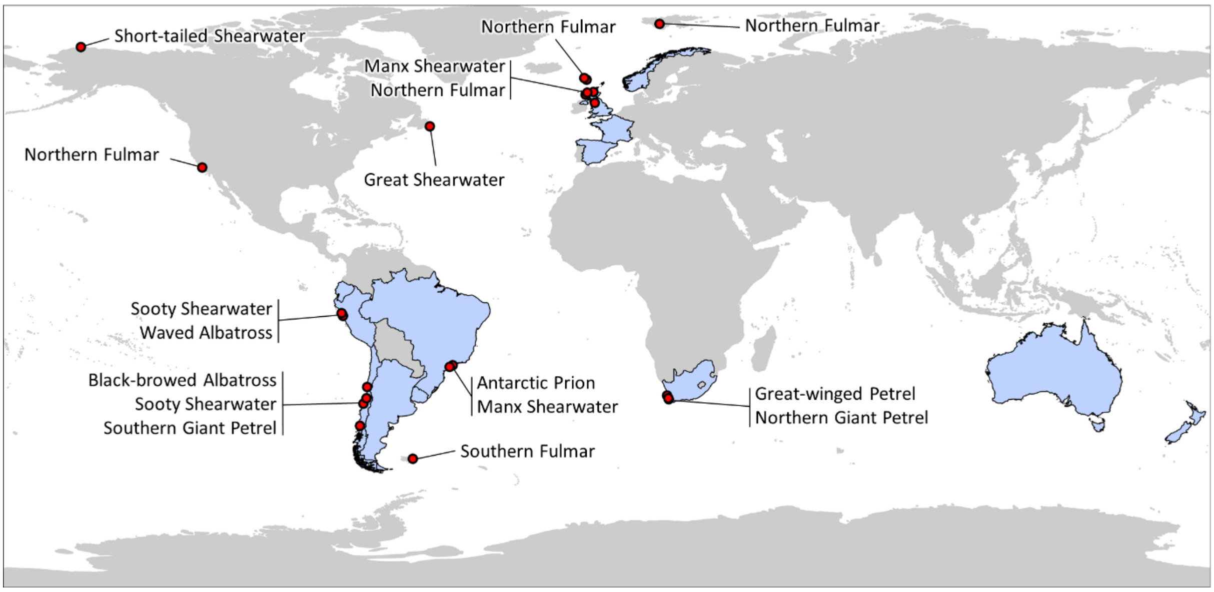

Figure 1. Notifications of HPAI outbreaks to the World Organisation for Animal Health (WOAH) in Procellariiformes (updated 5 November 2023). Parties of the Agreement for the Conservation of Albatrosses and Petrels (ACAP) are marked in blue.

The first indication of HPAI may be unexplained deaths leading to a higher than usual mortality rate, especially of multiple species and clustered in space and time.

Clinical manifestations of HPAI H5N1 differ among species, and virtually nothing is known about how the disease manifests in Procellariiformes, however it is likely to be consistent with other seabirds. The most common and recognized clinical signs in seabirds include:

- Atypical behaviour such as unusual docility, landing at atypical places, lethargy and depression, unresponsiveness, lying down, drooping wings, and dragging legs.
- Neurological signs such as loss of coordination and balance, trembling or twitching of the head and body, twisting of the neck, repetitive movements, walking or swimming in circles, and seizures.
- Conjunctivitis, with closed or excessively watery eyes, possibly with slightly milky to opaque cornea. Darkening of the iris has also been reported in some species.
- Respiratory distress, with gaping (mouth breathing), nasal snicking (coughing sound), sneezing, gurgling, or rattling.

It is important to consider that numerous diseases may cause similar signs (for example: paralytic shellfish poisoning, Newcastle disease, mycoplasmosis, Marek's disease, botulism, etc.), which highlights the importance of collecting and testing samples from affected birds in order to confirm the diagnosis.

HPAI H5N1 also has the ability to infect humans. However, while previous strains of this virus showed high lethality to humans (case fatality rate as high as 50-60%), the strains that have recently spread globally (referred to as "clade 2.3.4.4b") have infrequently infected humans despite the tens of thousands of poultry outbreaks and likely human exposures to the virus. For this reason, the World Health Organization considers that the risk is "low" for humans (WHO 2022) and the European Centre for Disease Prevention and Control considers the risk is "low" for the general public (ECDC 2023). The risk has been assessed as "low to moderate" for occupationally-exposed or groups otherwise exposed to avian influenza-infected birds or mammals (ECDC 2023), and therefore caution is warranted, including appropriate use of personal protective equipment, when working in outbreak settings.

Recommendations for ACAP Parties representatives, government authorities and managers

Recommendations before an HPAI outbreak occurs

1. In preparation for potential HPAI outbreaks, scientists, wildlife managers and animal health agencies should work jointly with national governments on increasing surveillance efforts, minimizing disturbance (especially when/where populations are more stressed, e.g., breeding sites), increasing awareness and enabling a streamlined reporting and response mechanism.

2. Ensure that the following are clearly communicated to the local community, tourism agencies and guides, managers and scientists: (a) the risks posed by HPAI to human and animal health, (b) how to prevent human exposure and avoid human-mediated spread of HPAI viruses, and (c) how to recognize and report suspected HPAI cases in wild and domestic animals, and humans.

3. Where feasible, enhance surveillance and sampling efforts for the early detection of HPAI infection in symptomatic and dead wild birds and mammals, especially at breeding sites of ACAP species and other vulnerable seabirds.

4. Prepare and keep an updated emergency response plan that enables quick investigation of potential HPAI cases and outbreaks and minimizes risk of spread. Coordination with scientists or government authorities in neighbouring countries and particularly those that share migratory bird flyways is highly encouraged. Coordination with national reference laboratories is also recommended to ensure that laboratory testing capacity is in place to detect HPAI quickly and accurately in samples from wildlife, including ACAP species.

5. Establish a plan for visits and fieldwork at sites where ACAP species breed or congregate. This plan should include protocols or guidelines on (a) an initial assessment upon approaching/arriving at the site, (b) procedures if there are sick or dead animals that could be due to HPAI, and (c) biosecurity measures to be adopted when there is no evidence of sick or dead animals that could be due to HPAI.

   - The initial assessment should be conducted upon approaching/arrival, before entering the colony area or handling birds. This could include a survey using binoculars or drones to check for clinical signs and atypical mortality. If the site accommodates multiple species, and particularly if it includes birds and mammals, the survey should include as many of the species and areas of overlap as possible. At vulnerable locations with frequent tourist visitation such as Antarctica, the initial assessment should be performed by a staff member experienced in avian biology and behaviour before tourist landing.

   - If there is evidence of sick or dead animals, visitors should not be allowed to land/visit the site. Non-essential activities, especially those that involve the close approach of birds and mammals, should also be suspended. A clear procedure for the notification of government authorities should be established in advance. Whenever possible, additional information obtained during the initial assessment (number, species, ages and clinical signs of the animals, including photographs and videos) should also be reported to authorities.

   - Even if HPAI has not been recorded in the area and no abnormalities are detected by the initial assessment at the site, it is still recommended that strict biosecurity measures should be implemented during the 2023/2024 austral summer as a precaution. It is particularly important that personnel going to apparently unaffected sites ensure they do not accidentally introduce HPAI viruses by using field gear or equipment that was not adequately disinfected after having been used at affected sites.

Recommendations during and after an HPAI outbreak

6. Control of HPAI viruses in wild birds should not be attempted through culling or habitat destruction. There is no evidence that this approach is effective, and it is actually thought to be counterproductive. There is general consensus on this recommendation, as expressed by the World Organisation for Animal Health (WOAH), the Food and Agriculture Organization of the United Nations (FAO), and the Convention on Migratory Species (CMS), among others (e.g. CMS FAO Co-convened Scientific Task Force on Avian Influenza and Wild Birds, 2023).

7. It is important to involve local animal health and environmental authorities in the decision-making process for authorizing fieldwork at sites where ACAP species breed or congregate. If HPAI infection is suspected in wild birds or mammals, local animal health and wildlife conservation authorities (or National Antarctic Programs) should be notified immediately to ensure that an appropriate investigation is conducted. Reporting confirmed cases of HPAI to WOAH is mandatory and is essential to communicate the effects of the disease at an international level.

8. The general public should be provided with a way to report sick or dead birds and marine mammals to local authorities. Preferably, reporting should be possible even at remote locations and outside of business hours (for example: hotline, website, mobile application, etc.).

9. Teams that will conduct sampling of wild birds and mammals to confirm the presence of HPAI viruses must be provided with adequate training, proper personal protective equipment (PPE), and equipment for sample collection and disposal of carcasses after sampling. It is important to ensure strict biosecurity during sample collection, storage, transportation, and testing. Coordination with national reference laboratories is recommended to ensure that high-quality samples are collected, adequately stored, and transported, ensuring the reliability of diagnostic results.

- Full personal protective equipment (PPE) requirements and re-evaluation of research necessities should be considered. Recommended PPE includes: properly-fitted unvented or indirectly vented safety goggles, disposable gloves (latex, nitrile, etc.), boots or boot covers, masks or approved respirator (N95, KN95, PFF-2, etc.), disposable fluid-resistant coveralls, and disposable head cover or hair cover.
- The use of lysis buffers or RNA preservation solutions (e.g. RNA Shield, RNAlater, etc.) is recommended for the detection of HPAI in ACAP species and other seabirds and marine mammals. In addition to inactivating of the virus, which reduces the risk of human exposure during handling and shipping of samples, these buffers ensure that samples remain viable for molecular testing over extended periods, including in situations where maintaining a cold-chain is not feasible.
- When possible, full genome sequencing should be performed and the results should be shared via international platforms, such as GenBank. This information is critical to improving understanding of how these viruses spread and change and whether they may threaten new species, including humans.

10. Considering areas within the reach of outbreaks, if personnel working in fishing or on other vessels have accidental Procellariiformes onboard, it may not be possible to determine if the bird has HPAI or not. A precautionary approach should be adopted. If birds are still alive, it is recommended that appropriately trained staff, wearing the highest level of PPE available, immediately release the bird over the side of the vessel. If birds are already dead, where fishers are required to retain bycaught carcasses by local government legislation, to guarantee compliance guidance should be sought from the relevant authority on storage and disposal of possibly infected carcasses. For other vessels, carcasses should be disposed of overboard by staff wearing PPE. Personnel touching birds should wash hands with abundant soap and water, even if gloves were used. Flush areas of the boat where bird guano may have splashed with abundant seawater. Bycatch mitigation procedures and compliance should be prioritized to minimize albatross and petrel mortality in fisheries and avoid contact with birds that might be infected with HPAI.

11. Research and monitoring of the demographic and ecological impacts of HPAI in or near affected colonies, or in areas where birds of affected species aggregate, should be encouraged. If possible, these data should be obtained using methods that cause minimal disturbance and that do not involve entering breeding colonies or handling birds (for example, observation from remote vantage points, deployable cameras, drones, etc.). Passive surveillance (count/check for ill or dead animals) should be undertaken where there is an ongoing outbreak. If affected animals are found, samples should be collected as local risk assessments and permits allow.

12. National Regulatory Authorities should consider limiting access or closing adjacent sites during an ongoing outbreak and tiered decision workflows should be planned for local authorities to control the risk of indirect spread or contamination.

13. Following an outbreak, HPAI viruses could remain viable and contagious in the environment for several days, possibly even weeks (particularly in humid and cold environments, and in freshwater). A waiting period of at least 14 days (after the last field visit where no sick animals or atypical mortality were recorded) should be respected before field activities can be resumed at a previously affected site. Basic PPE should still be worn in these areas and good hand hygiene applied.

14. Carcass removal and disposal may be considered in an attempt to mitigate the spread of HPAI to susceptible predators and scavengers, including ACAP species such as giant petrels. However, while this approach may be feasible on beaches with easy access and in urban areas, it is unlikely to be feasible at remote sites, breeding colonies of surface-nesting seabirds or pinniped haul-out sites which could be vulnerable to the disturbance associated with carcass removal. Hence, it should only be adopted following an assessment by trained personnel and considering disposal sites/options. Among the factors that should be considered are the number of carcasses, colony susceptibility to disturbance, options for safe carcass disposal, availability of PPE and trained personnel, and the feasibility of decontaminating equipment and vehicles used to transport and dispose of carcasses.

15. Vaccination may be an option to be considered for the future mitigation of HPAI outbreaks in wildlife; however, this is currently unavailable. Although United States Department of Agriculture (USDA) approved the emergency use of a vaccine against HPAI to be employed among the critically endangered California condors (*Gymnogyps californianus*), it is still a pilot study. Moreover, it has limitations and may prove to be ineffective or impractical for most seabird populations, including ACAP species. Few, if

any, HPAI vaccines prevent infection with the virus and almost none stop virus shedding, transmission and spread. At best they prevent disease and deaths and reduce the rate of spread. Additionally, vaccination programs can create additional evolutionary pressure and accelerate genetic mutations and changes in the transmissibility and pathogenicity of the virus. Surveillance is therefore important to ensure the vaccine strain remains matched to the dominant virus, but surveillance becomes more difficult when there are fewer clinical signs. Besides limitations of available vaccines, vaccination of wild birds would be a significant logistical challenge and has the potential to cause huge disturbance to colonies and possibly even spread the virus mechanically. All currently commercially-available vaccines were developed for poultry and are not validated for wild birds (i.e. it is unknown what level and duration of protection they provide in non-domestic species). They must also be injected into each individual bird and, depending on the vaccine's effectiveness, a large proportion of each population would probably need to be vaccinated with at least one dose and possibly more. If vaccination is deemed vital to the survival of a population, these challenges would need to be overcome with sufficient planning and preparation. However, current vaccines and their application requirements may prove limiting at this time.

Final remarks

The potential impact of HPAI H5N1 on ACAP species is a significant concern for albatross and petrel conservation and has been integrated into the ACAP Work Programme, particularly under the Population and Conservation Status Working Group (PaCSWG). These guidelines were initially launched by ACAP in July 2022 and the need for constant updating and advice to Parties regarding best practices for dealing with the disease motivated the creation of an intersessional group of experts on epidemiology, disease risk assessment and management, which could advise ACAP on issues related to the ongoing high pathogenicity H5N1 avian influenza outbreak. This group has been extensively engaged, since July 2023, to set up this updated version to guide an appropriate and competent response by ACAP member countries and identify appropriate mitigation measures to minimize the potential threat of spreading AI among ACAP species populations. This guide is general and aimed especially at managers and the general public, it does not exempt the need for more specific guidelines for fieldworkers who deal directly in HPAI H5N1 foci and also does not exempt countries from developing their own recommendations and guidelines, covering more details and involving its intrinsic particularities.

Notice regarding Southern Ocean concomitant initiatives: The Scientific Committee on Antarctic Research (SCAR), by its Antarctic Wildlife Health Network (AWHN), has been working in collaboration with COMNAP, the CEP, IAATO and the wider Antarctic community to develop detailed recommendations and guidelines in preparation for an outbreak of HPAI. The AWHN has published a Risk Assessment explaining the heightened risk, with guidelines focused on the protection of human life, prevention of inadvertent spread of the disease through human activity, and surveillance and monitoring. A central reporting database is also being set up for the Southern Ocean by the AWHN. The ACAP HPAI H5N1 Guidelines were developed with researchers involved in this forum to ensure alignment between SCAR and ACAP recommendations. Nevertheless, besides the taxonomic specificities for ACAP guidelines, there is a consensus that the ACAP recommendations go beyond the Southern Ocean, since although the majority of species listed in ACAP occur in the Antarctic and sub-Antarctic regions, they are valid for other areas that harbor species listed in ACAP (e.g., Waved Albatross in Galápagos, Balearic Shearwater in Spain, Pink-footed Shearwater in Chile and many other colonies outside the sub-Antarctic region, as well as places where non-reproductive populations of ACAP species aggregate).

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Key Further Resources

Convention on the Conservation of Migratory Species of Wild Animals (CMS). Scientific Task Force on Avian Influenza and Wild Birds

World Organisation for Animal Health & IUCN Wildlife Health Specialist Group - Avian Influenza and Wildlife: Risk management for people working with wild birds

Food and Agriculture Organisation of the United Nations (FAO): Global AIV with Zoonotic Potential situation update (includes full list of wild bird species)

FAO: Managing large-scale high pathogenicity avian influenza (HPAI) outbreaks in wild birds

WHO Global Influenza Programme Monthly Risk assessment summaries of influenza at the human-animal interface

Scientific Committee on Antarctic Research (SCAR): Biological Risk Assessment of Highly Pathogenic Avian Influenza in the Southern Ocean

Centers for Disease Control and Prevention: Recommendations for Worker Protection and Use of Personal Protective Equipment (PPE) to Reduce Exposure to Novel Influenza A Viruses Associated with Severe Disease in Humans

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