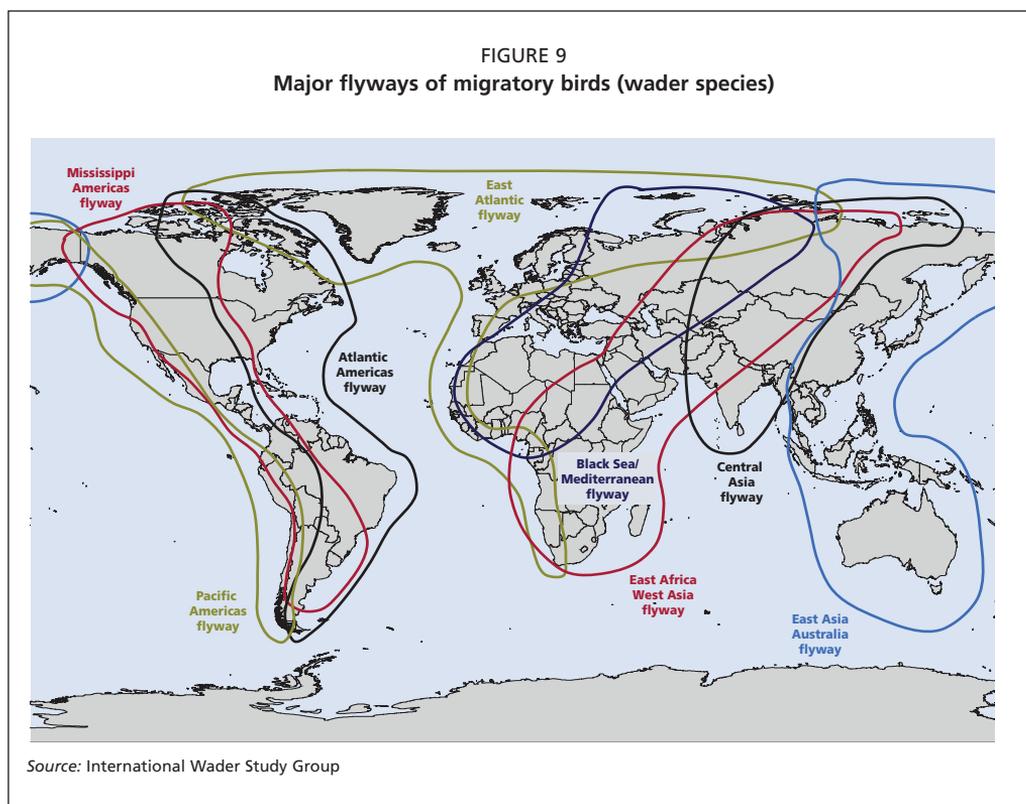


## 3. The risk of introduction and dissemination of avian influenza

### 3.1 RISK OF INTRODUCTION BY MIGRATING BIRDS

The migration of water birds presents a serious risk of carrying AI viruses over long distances, with a complex network of different overlapping flyways providing the opportunity for widespread dissemination of viruses. However, extensive field studies have not been able to determine whether wild birds are spreading the H5N1 HPAI virus over long distances during their annual migrations. Current information suggests that infected birds may move short distances carrying H5N1, but long migratory movements with this strain of virus have not been confirmed.

Wild birds infected with AI viruses can generally shed virus for up to one month. However, studies conducted on several waterfowl species and H5N1 suggest that virus shedding occurs for only 3–4 days. During breeding season, during moult and at overwintering sites,



wild birds from different regions concentrate in wetlands or other habitats and transmission of viruses can occur. The outcome is that, over the course of a year, birds from different locations and from different flyways can potentially exchange viruses and other pathogens, resulting in the rapid spread of infectious agents across continents. In the course of the current epidemic, a large number of wild bird species have died from the H5N1 HPAI virus, but the role wild birds play in the spread of this disease remains undetermined because no reservoir species have been identified.

One would expect that if infection occurs in domestic poultry, and if breaks in biosecurity exist at the farm, it is likely that wild birds that visit the farm or are adjacent to it would test positive, or even succumb to H5N1 exposure. But the limited information that currently exists suggests that, in general, dead wild birds are not frequently found on farms or nearby locations, and testing conducted on “bridge species” (those that move between farms and wetlands or other natural habitats) has been negative for H5N1. Currently, this interface between the agriculture and wildlife sectors is nevertheless recognized as important, and further studies have been initiated.

Regardless, good biosecurity requires that physical barriers be erected between poultry and wild birds, used feed and manure waste, and that clean or treated water be provided to poultry.

***An important component of preparedness in the context of the current avian influenza epidemic is to identify wild bird migratory patterns, timing and destination sites, and to assess the risk that close contact with domestic poultry may provide an entry point for establishment of avian influenza viruses.***

### **3.2. RISK OF IMPORTATION**

Many countries currently impose bans on the importation of poultry and poultry products from infected countries with notifiable AI. Given the potential for transboundary spread of the disease, it would be wise to take great care with all poultry products, especially those that can carry the virus. Live birds represent by far the greatest risk, but dressed carcasses of infected birds, eggs from infected hens, poultry waste and fomites contaminated with faeces can all be a source of infection. A detailed risk assessment for each poultry product has been carried out by the European Food Safety Authority (EFSA) and is available on its Web site (<http://www.efsa.europa.eu>).

Birds, such as fighting cocks, that are used for recreational purposes move from location to location and across borders, and they therefore represent a risk that should be closely monitored through regulation and inspection rather than bans, which would be likely to lead to clandestine movements of such birds. Likewise, the illegal movement of live birds represents a risk that will not be mitigated by imposing bans on legal importation.

### **3.3 RISK OF SPREAD FROM INFECTED POULTRY**

To prevent further spread of H5N1, surveillance in poultry as well as in wild birds should be strengthened in countries at immediate risk. Resources should be focused on the reduction of close contacts between humans, poultry and wildlife through better management practices and improved biosecurity practices in poultry production enterprises, especially small and “open-air” facilities where poultry and waterfowl mingle with wild birds or local

resident bridge species. The influenza viruses are easily spread by fomites and generally survive well in water, especially in cold climates. Furthermore, certain species of ducks are able to carry influenza viruses without exhibiting any clinical signs of disease. Juvenile ducks have the highest rates of infection and shedding. High titres of virus occur in late summer, when birds leave their northern breeding areas, although these titres decrease as birds continue southward.

Once HPAI has been recognized in the marketing environment in a country, all persons working with poultry should greatly increase the level of hygienic practices to avoid bringing the virus into an operation (bioexclusion) and to prevent the virus exiting (biocontainment) if it has already entered a flock, village or region. The main ways in which the virus passes from one region to another area are: sale of infected birds to markets, departure of wild waterfowl that have commingled with infected backyard poultry units, the wearing of contaminated footwear or clothing by people working or selling poultry and the transfer of contaminated cages and egg crates to markets or poultry farms. Poultry keepers and communities must therefore take practical measures to avoid introducing the virus and to reduce the risk of spread when disease has been detected.

### 3.4 VIRUS SURVIVAL IN THE ENVIRONMENT

The survival of influenza viruses is prolonged by low relative humidity and low temperature in aerosols, whereas low temperature and high moisture levels prolong survival in faeces. Most studies on viral environmental persistence have been carried out in cool northern climates, with the following findings:

- The AI virus can survive in faeces for at least 35 days at 4 °C; it can survive within the poultry house environment for up to 5 weeks (Webster *et al.* 1978).
- The virus may remain infective in lake water for up to 4 days at 22 °C and over 30 days at 0 °C (Webster *et al.* 1978). H5N1 has been shown to survive in water between 14 and 26 days at 17 °C and between 3 and 5 days at 28 °C (Brown *et al.* 2006).
- As an enveloped virus, the influenza virus is susceptible to several disinfectants, including detergents.
- The virus is stable over a pH range of 5.5–8.
- The AI virus can be isolated from lake water where waterfowl are present (Hinshaw *et al.* 1979). Acidification of potentially contaminated drinking water to pH 2.5 or chlorination should minimize spread of infection.