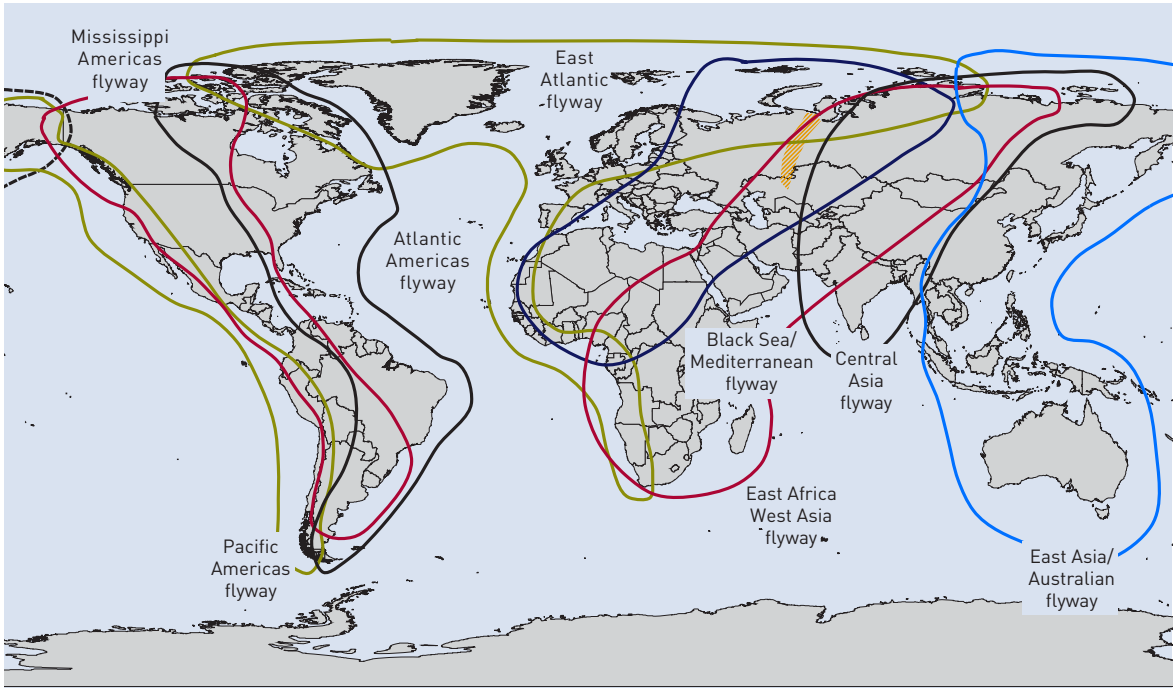
3. The risk of introduction and dissemination of avian influenza

3.1 RISK OF INTRODUCTION BY MIGRATING BIRDS

Migration of water birds represents the main risk of carrying AI viruses over long distances and provides a complex network because different bird flyways overlap geographically.

Birds infected with AI virus can shed virus for up to one month. Birds from different regions intermingle with each other in areas where large water bodies attract them and transmission of viruses can occur between them. The outcome is that potentially viruses can be transmitted from infected countries in Southeast and East Asia to Central Asia, Eastern Europe, the Middle East and Africa, North and South America. In the course of the current epidemic, a large number of wild bird species have been found dead, with AI virus type

FIGURE 1
Major flyways of migratory birds (wader species)



H5N1 being isolated. Recent findings show that the virus can be isolated from other bird species without signs of disease. However, it is not yet fully determined which species are implicated in the long distance introduction of the virus and its transmission to poultry.

If infection occurs in domestic poultry, it is likely to be in areas where wild waterfowl congregate and where poultry are not in bird-proof sheds. Transmission of virus can occur from contaminated water as well as from direct contact of wild birds with poultry. Good biosecurity therefore requires physical barriers erected between poultry and wild birds and also the provision of clean or treated water before being 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 of close contact with domestic poultry providing an entry point for establishment of avian influenza.

3.2 RISK OF IMPORTATION

Many countries currently impose bans on the importation of poultry and 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 Agency (EFSA) and is available on their web site (see Annex 1).

It should be recognised that illegal movement of live birds also 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, especially where birds come to rest along their migrating routes. 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 those that are small and 'open-air'- where poultry and waterfowl mingle with wild birds. The influenza viruses are easily spread by fomites and generally survive well in water. 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 southwards.

Once a highly pathogenic virus (HPAI) has been recognised in the marketing environment or country, all persons working with poultry should greatly increase the level of hygienic practices to avoid bringing virus into an operation (bio-exclusion) and to prevent virus exiting (bio-containment) 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 which have visited infected backyard poultry units, the wearing of contaminated footware or closing people working or selling poultry, or 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

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 following findings:

- AI virus can survive in faeces for at least 35 days at 4°C. AI virus can survive within the poultry house environment for up to 5 weeks (Webster *et al.* 1978).
- 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).
- As an enveloped virus, influenza virus is susceptible to several disinfectants, including detergents.
- The virus is stable over a pH range of 5.5-8.
- 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 minimise spread of infection.