

Highly Pathogenic Avian Influenza

Four Epidemiological Situations



Countries that are not currently infected with H5N1 and are located in regions of the world where H5N1 is not present

Governments in these countries should begin to prepare for the eventual introduction of H5N1. If neighboring countries are not yet affected, and the disease is detected early, the chances of eliminating the virus are very good. Early detection can greatly reduce the total cost of an eventual outbreak and reduce the chances of human cases. Vaccination will probably not be needed and would limit exports. Vaccination should be considered if the outbreak becomes so widespread that killing all infected birds is not an option.



Prior to an outbreak, resources should be invested to ensure:

- Education of producers and veterinarians on H5N1 avian influenza
- Passive and active surveillance programs for early detection
- Timely and reliable diagnostic laboratory capability
- Laws for quarantine, stop movement, and depopulation are in place
- Response teams are trained for depopulation, disinfection, and disposal
- Supplies for personal protection, depopulation, cleaning, disinfection, and disposal are stockpiled
- A transparent and fair compensation program is in place and has been clearly communicated to the producers
- Vaccines for use in high value or rare birds are stockpiled
- A food safety education program is in place to assure the public that it is safe to eat properly cooked healthy poultry and eggs from vaccinated birds

Countries that are not infected with H5N1, but are in regions where H5N1 is present and not under control

Governments in these countries should also begin to prepare for the eventual introduction of H5N1. All of the preparedness activities already discussed for countries that are in H5N1 free regions of the world should be undertaken if resources are available.

If infection occurs in a country in this situation, the disease can be stamped out if there is a well equipped and prepared veterinary service. However, the disease is more likely to be reintroduced if neighboring countries continue to have outbreaks. Increasing biosecurity is the best way to control this disease, however, if re-introductions occur, preventive vaccination could be considered for some production sectors. In this case, the sectors to vaccinate depend on a risk assessment and the structure of the poultry industry. In addition to vaccines, the necessary supplies for safely administering the vaccines should be stockpiled.



The following factors should be considered before initiating a vaccination program

- Live bird markets are at high risk for introduction and spread of H5N1. Consideration should be given to closing live bird markets and/or changing biosecurity practices.
- It can be very difficult to effectively vaccinate backyard or village poultry and ducks and to ensure that new birds are continuously vaccinated.
- It is essential to detect vaccinated flocks which become infected and to depopulate those flocks in order to prevent H5N1 from becoming endemic in a country. This can be accomplished by using either unvaccinated sentinel birds in each flock, or a vaccine and companion diagnostic test that allow detection of vaccinated flocks that become infected.
- Vaccinated flocks which become infected should be depopulated to prevent spread of infection.
- Some countries may refuse to import poultry and poultry products from countries that vaccinate for H5N1. Zoning or compartmentalization (according to OIE guidelines) can be used to establish subsets of the poultry sector that are not vaccinated and may be exported.

Countries that are infected with H5N1 that have a well-developed veterinary infrastructure

In this example, both backyard poultry and the export market for poultry and poultry products are often very important. These countries have options for stopping H5N1 without the use of vaccination.

If the H5N1 virus becomes difficult to control by killing all infected birds or if it becomes too expensive, vaccination of high risk areas or sectors can be considered.



Countries in this situation that plan to control the disease by destroying all infected birds should consider the following factors:

- Reintroduction of H5N1 may occur because of continuing presence of virus in an endemic region.
- Extensive resources will be needed for surveillance and stamping out activities.
- Zoning or compartmentalization (according to OIE guidelines) can be used to establish subsets of the poultry sector that are free of infection, have very good biosecurity, are not vaccinated and may be exported.
- A transparent and fair compensation program should be in place and clearly communicated to the poultry producers.

For vaccination, factors to consider include:

- It is very difficult to effectively vaccinate backyard and village poultry and ducks and to keep this population vaccinated.
- Vaccination crews should be trained in how to avoid spreading infection and in use of personal protective equipment to avoid becoming infected.
- High quality vaccines which meet the criteria in the OIE Manual of Standards should be used.
- It is also important to remember that two doses of killed vaccines are required to induce effective immunity and the immunity takes several days to develop after the second dose.
- The efficacy of the vaccine should be monitored because the H5N1 virus may antigenically drift so that the vaccine eventually becomes ineffective. A new vaccine will need to be produced for each newly emergent strain of H5N1.
- Surveillance for infection in vaccinated flocks should be implemented using unvaccinated sentinels or a combination of a marker vaccine and companion diagnostic test. Vaccinated flocks which become infected should be depopulated to prevent spread of infection.

Countries that are infected with H5N1 that have limited veterinary infrastructure for control of the disease

These countries often have a large backyard poultry population which is an important source of food and livelihood. There are limited resources for controlling H5N1 through surveillance, detection and destroying infected birds. Resources are not available to effectively implement a vaccination strategy which includes routine surveillance for detection of vaccinated flocks that become infected.



The following factors should be considered in deciding how to control H5N1 in this situation

- Mass vaccination can be effective in reducing disease in poultry and in limiting human disease.
- However, mass vaccination is very costly to implement and maintain
- Mass vaccination will result in loss of export markets
- It is not possible to eradicate H5N1 through mass vaccination alone
- It is very difficult to effectively vaccinate backyard and village poultry and ducks and to keep this population vaccinated
- Re-emergence of infection and disease can be expected if vaccination is stopped or vaccination rates fall too low.
- High quality vaccines which meet the criteria in the OIE Manual of Standards should be used.
- Vaccination crews should be trained in how to avoid spreading infection and in use of personal protective equipment to avoid becoming infected.
- It is also important to remember that two doses of killed vaccines are required to induce effective immunity and the immunity takes several days to develop after the second dose.
- The efficacy of the vaccine should be monitored because the H5N1 virus may antigenically drift so that the vaccine eventually becomes ineffective. A new vaccine will need to be produced from the newly emergent strain of H5N1.
- After the incidence of H5N1 infection is greatly reduced, it may be possible to design an eradication program based on the use of sentinel birds or a combination of a marker vaccine and companion diagnostic test to detect infected flocks that are vaccinated.
- Without effective surveillance all poultry and ducks should be considered potentially infected.
- People should be informed to avoid high risk behaviors, such as close contact with poultry and eating improperly cooked poultry and eggs. Closing of live bird markets or implementation of biosecurity in live bird markets should be considered.