Disease Risk and Institutions Involved in Controlling HPAI

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Previous research

- Avian Influenza National Baseline Survey (2007)
- H5N1 surveillance in wild-birds in wetland areas in Northern Nigeria
- H5N1 virus surveillance Nationwide and in selected Live-Bird Markets (LBMs) in Nigeria
- National active disease surveillance (FAO)
- Isolation and molecular characterization of H5N1 viruses from poultry in Nigeria (Muller, Owoade et al 2006).
- Genetic characterization of a selection of H5N1 viruses in eight Nigerian states in early 2007 (Joannis, NVRI, Monne/Capua, Padova, Italy, Obi Ibadan)

H5N1 surveillance in wild-birds in wetland areas in Northern Nigeria

- Nigeria lies in the East Africa/West Asia fly ways and the North Atlantic flyway of migratory birds.
- Three species *Garganey Anas querquedula*, Northern Pintail *Anas acuta* and Northern Shoveler *Anas clypeata* considered higher risk of carrying HPAI
- Early stages outbreaks in Nigeria wetlands International experts suggested origin of the disease unlikely traceable to migratory birds based on timing of outbreaks.

H5N1 virus surveillance Nationwide and in selected Live-Bird Markets

- Poor sanitation and biosecurity
- H5N1 virus was isolated in 5 out of the 54 LBMs from chickens in three states, from a sick duck in one state and Avian Influenza genetic materials were detected from a chicken in another state

National active disease surveillance (FAO)

- Prevalence of the disease in free range rural poultry may have been about 0.06%

Isolation and molecular characterization of H5N1 viruses

- Mueller et al (2007) showed that H5N1 virus was introduced into Nigeria by at least three independent routes and most coincident with routes of migration of wild birds.
- They suggested that introduction through trade of poultry and poultry products could not be ruled out.

Genetic characterization of a selection of H5N1 viruses in eight Nigerian states

- Joannis et al (2007) studied genetic characteristics of a selection of H5N1 viruses in eight Nigerian states
- Found all the Nigerian H5N1 isolates were closely related to the viruses that were circulating in bird throughout Europe, Russia, Africa, and the Middle-East since 2005.
- Ten 10 out of the 12 strains obtained over a 39 day period were reassortant viruses
- Determined that the viruses circulating in 2007 were different from the original sublineage prototypes that were introduced into Nigeria in 2006.

Genetic characterization of a selection of H5N1 viruses (cont.)

- Showed that the emergence of at least two reassortant viruses in Nigeria were due to co-infection with viruses of different sublineages that had occurred in the country.
- Suggesting that the phenomenon might have been a result of poor bio-security particularly at the live-bird markets as well as ineffective poultry movement controls.

Disease Risk and Institutional Involvement in control of HPAI

- Role of migratory birds
- Role of live bird markets
- Role of non-migratory wild birds
- Role of movement of hunters and pastoralists in and out of wetlands
- Role of illegal trade (long and porous borders)
- Risks associated with structure and management of the industry
- Institutional mechanisms to respond
- Role of improper disposal facilities and the sale and consumption of sick and dead birds.

Migratory birds

- There is ‘a strong relationship between migratory birds, floodplain agriculture, land use pattern, domestic ducks and the spread and persistence of H5N1 virus in northern Nigeria’ (Ilemobade et al 2008)
- The East Africa/West Asia fly ways and the North Atlantic flyway of the migratory birds
- Mixing of migratory birds with domestic poultry in crop fields

Live bird markets

- Results so far obtained from the Live-bird markets surveillance showed clearly that the H5N1 virus circulates in some markets in Nigeria without any signs of overt disease in market poultry, the exact role of LBMs in the spread and sustenance of HPAI in Nigeria needs further attention
- Many poor rely on the LBMs as a mechanisms for selling birds and sourcing replacement stock

Non-migratory wild birds

- No data on the evidence of H5N1 virus in non-migratory wild birds in Nigeria.
- In addition the susceptibility of these wild-birds to the virus is unknown.
- It is quite common to find cattle egrets in poultry farms searching for maggots in poultry dropping dumping sites.
- Guinea fowls are also known to mix with village scavenging poultry.
- The susceptibility and the role of indigenous resident wild-birds and local breeds of poultry in the epidemiology of HPAI in Nigeria need attention.

Movement of hunters and pastoralists in and out of wetlands

- Illegal hunting of wild-birds such as white-stork, white-faced tree ducks, fulvous ducks, Abdim's stork and the Spur-winged birds and geese.

- Movement of pastoralists out of wetlands with their their possessions including domestic ducks.

Illegal trade (long and porous borders)

Risks associated with structure and management of the industry

- The rearing of flocks of different species of poultry and different ages together,
- Uncontrolled livestock and poultry movement within the country because of lack of enforcement of animal disease control laws and regulations
- Lack of an organised poultry marketing system, existence of open live poultry markets characterized by interspecies mixing and poor sanitary conditions

Institutional mechanisms to respond

- Ministries /public institutions responsible for poultry sector and HPAI management
- Country-level organizational structure for HPAI management
- Overall the veterinary facilities: poultry farm ratio is poor and that 65% of the rural poultry has little or no access to veterinary services

Disposal of dead birds/consumption of sick birds

- Unclear disposal practices associated with dead animals
- Evidence that some people consumed culled birds from HPAI infected farms

Ministries /public institutions responsible for poultry sector and HPAI management

- Ministries responsible for the poultry sector in Nigeria are the Federal and State Ministries of Agriculture and Water Resources The FDL&PCS has offices state capitals each SVS supposed to have offices at the LGA
- By law the SDVS are in-charge of animal disease control, but emergencies from major TADs such as HPAI come under the overall command of the DFDL&PCS.
- The NVRI, national mandate for diagnosis, investigations into animal/poultry diseases, animal/poultry disease vaccines, research into various aspects of animal/poultry diseases epidemiology and control.

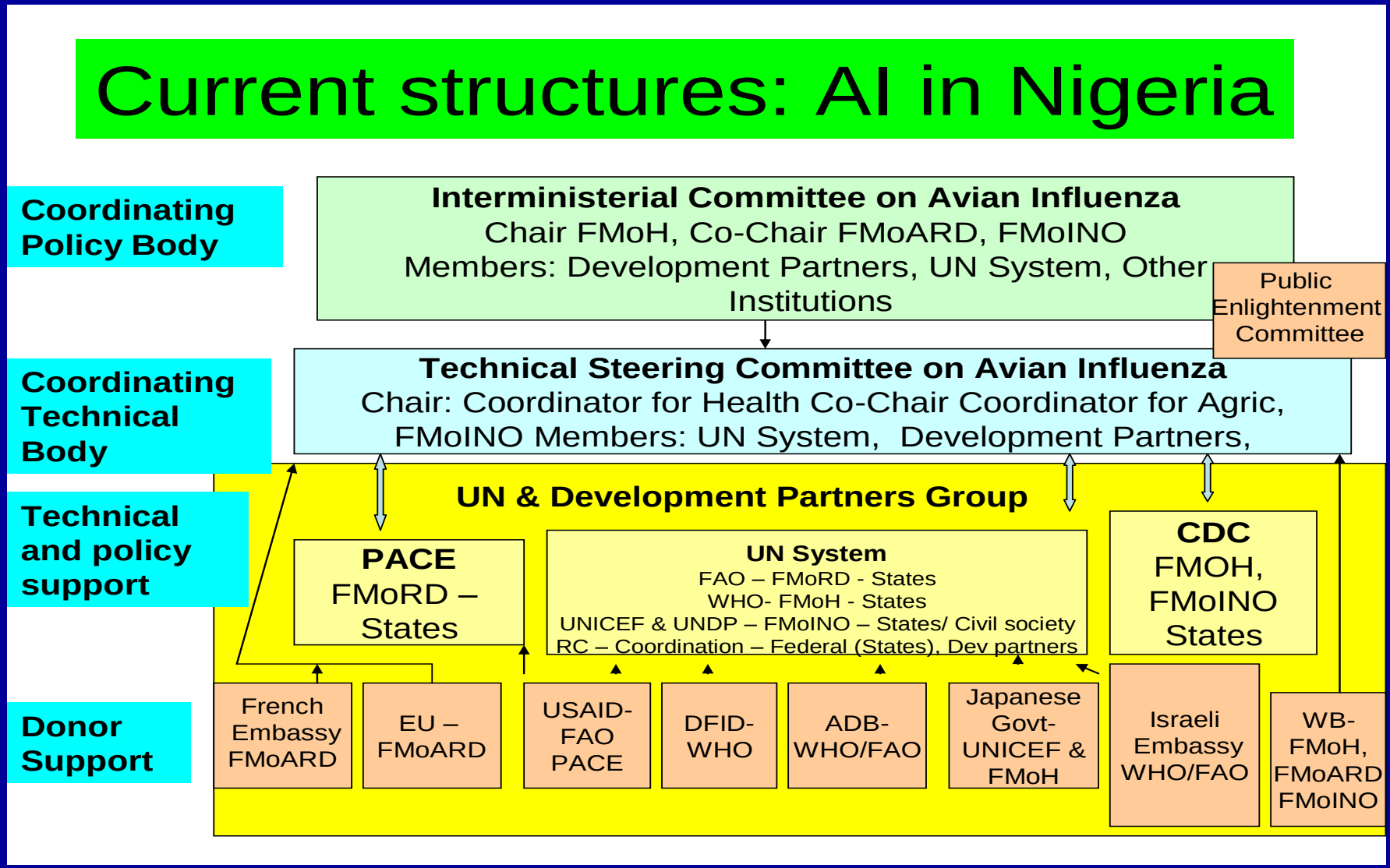
Ministries /public institutions responsible for poultry sector and HPAI management (cont.)

- NAPRI responsible issues relating to utilization of modern and improved techniques, technologies for more efficient animal /poultry production
- Expert and technical support Institutions such as Animal Science/Production Departments of various Federal, State and Private Universities and the Faculties of Veterinary Medicine in the Universities in Ibadan, Zaria, Nsukka, Maiduguri, Sokoto, Makurdi, Umudike and Abeokuta.
- The Poultry Association of Nigeria (PAN) with members drawn from poultry farmers and input suppliers.

Country-level organizational structure for HPAI management

- Soon after confirmation of HPAI February 8 2006, Avian Influenza Crisis Management Centre (AICMC) was set up
- To coordinate activities and disseminate information on the prevention and control of Avian Influenza.
- Three committees, Steering Committee jointly chaired by the Honourable Ministers of Health (FMOH) and Agriculture and Rural Development (FMOARD), Technical Committee jointly chaired by the Honourable Ministers of State for FMOARD, FMOH as well as the Communication Committee were set up in the AICMC.

Country-level organizational structure for HPAI management



Research gaps

- Lack of understanding of:
  - the epidemiology of the virus
  - the role of non-professional animal health service providers or patronize ethno-veterinary medicine in the spread of HPAI in rural households
  - how community-based animal health services can be developed and used to improve surveillance in rural areas
  - molecular characteristics of the H5N1 viruses in Nigeria and how it compares with other isolates from poultry and humans infected in other countries.

- The role of:
  - indigenous poultry breeds and resident wild birds such as local domestic ducks, guinea fowls, cattle egrets and vultures in the spread and sustenance of HPAI in Nigeria.
  - Live Bird Markets (LBMs) in the spread and maintenance of HPAI in Nigeria.
    - ways for disease free restocking by the rural farmers sourcing from LBM’s
  - continued active disease surveillance in various poultry production and marketing systems in Nigeriain improving response efficiency

Way forward – disease risk

- Disease risk maps
- Pathway analysis of potential spread mechanisms
- Summary of prevalence data to feed into qualitative and quantitative risk assessments
- Simulation of potential spread scenarios given pathway analysis

Way forward – institutional mechanisms

- Institutional analysis of the public and private response capacity (surveillance, communication, and response);
  - Behavioral changes associated with public and private sector ability to respond effectively
- Focus group surveys on costs and incentives associated with success and failures to date
- Analysis of how this might be better in the future for rapid and effective response;