

## Editorial

### Avian Flu and the Environment

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Since 1997 when H5N1 spread from a bird to a human in Hong Kong, significant events have centered around this emerging international problem. These events include human deaths, culling infected birds, surveillance and control, emergency public health preparations, possible future pandemic, research, conferences and extensive news coverage. The avian (bird) influenza (flu) H5N1 infecting birds and a limited number of humans in some countries has again raised awareness about the link between the environment and human health. The avian (bird) flu viruses can be present in the intestinal tract of some wild birds. This evolutionary relationship usually does not cause a significant concern for the overall health of these wild bird populations. The concern heightened when domesticated chickens, ducks and turkeys became ill and died with this contagious disease among birds. The destruction of domesticated birds used for human food has occurred in some countries to aid in preventing the spread of this disease. This has not been entirely successful. It is a challenge to cull 100% of the diseased domestic birds and implement quarantines in all necessary areas, especially if the disease is not immediately reported and infrastructure is not in place to deal with the problem and the extent of the problem is unknown.

Moreover, humans have died of this disease in numerous countries. Infected birds shed the virus particles in their fecal matter, saliva and nasal secretions. These virus particles contaminate the immediate environment and surfaces where other birds and humans can come into contact with the infectious virus particles. Especially humans working in poultry facilities on a daily basis or raising poultry in open environment conditions with humans in the same locations. Mortality is about 50% in humans. The spread of avian flu viruses [or mutated strain(s)] from human to human is a worldwide concern. If not controlled, the outcome could be one or more local outbreaks becoming a pandemic, with no vaccine available on a national and worldwide basis.

The avian flu is an example of the complex relationships between viruses (requiring a host for replication) living organisms and contamination of our environment (our common biosphere) and the relationship between a pathogen and the one or more hosts it can infect. It is also an excellent example of the ability of infectious agents to spread throughout the environment or biosphere with the potential to mutate and become new strains. The recent events surrounding H5N1 also demonstrate the need for local, national and international surveillance, control procedures, vaccine development and testing, vaccine manufacturing facilities and distribution, anti-viral drugs, diagnostic methods for viruses and other infectious microorganisms, laboratory infrastructure, occupational and public health training,

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risk assessment and communication personal protection (e.g., hygiene, gloves, gowns, eye protection, respirators, high efficiency particulate air filtration, standard operating procedures, recognizing symptoms of illness, appropriate medical attention), biological research and international cooperation. These avian flu events also demonstrate that engineering infrastructure is required to properly disinfect animal wastes for

disposal as well as the facilities the poultry is raised in.

The linkages between wild birds, their migration routes, domesticated poultry, the environment or our common biosphere and humans illustrates the need to research local, national and international pollution, especially with infectious microorganisms that are spread within and between species.