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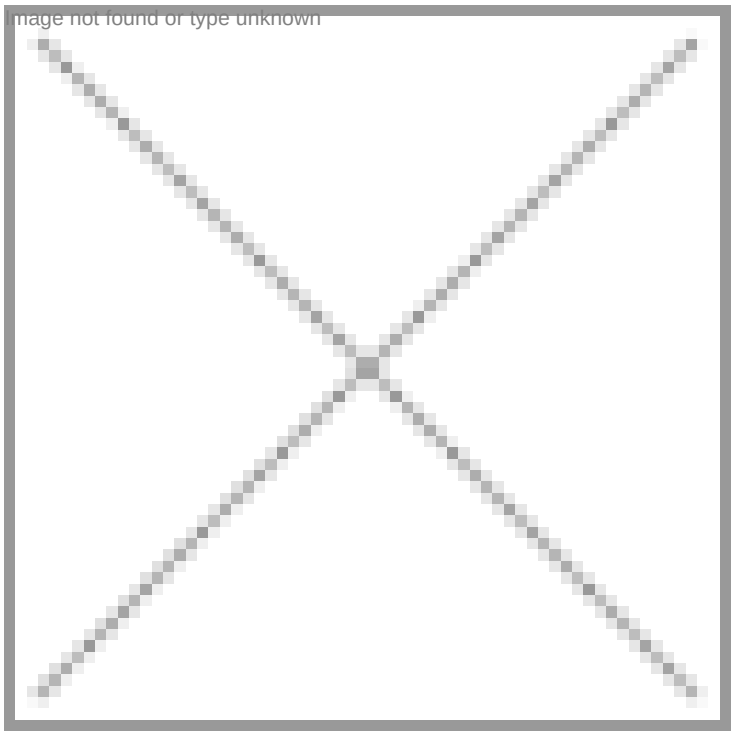

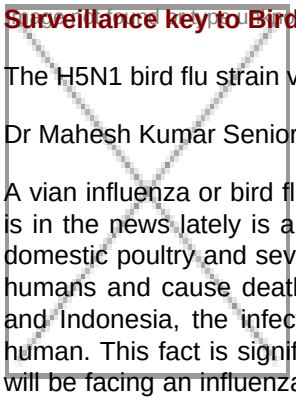

Surveillance key to Bird Flu control

The H5N1 bird flu strain virus causes the disease and it has turned alarmingly contagious in Asia.

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A vian influenza or bird flu as its commonly called has taken on increas- ing significance in the past few years. The virus that is in the news lately is a high pathogenic avian influenza of the H5N1 subtype. This virus has caused severe mortalities in domestic poultry and several other bird species. It has taken on special significance, of course, because of its ability to infect humans and cause death. While there have been deaths associated with the H5N1 virus in Thailand, Vietnam, Cambodia and Indonesia, the infections are believed to be a result of exposure to infected bird rather than spread from human to human. This fact is significant. The moment the virus is able to spread readily from human to human, the human population will be facing an influenza virus that we have had no immunity against. The current vaccines do not contain the H5 strain and will be ineffective in preventing the disease.

Flu pandemic

Pandemics (world-wide epidemics) are common to influenza and appear on the planet every so many years. A pandemic occurs when a new subtype emerges that has not been previously circulating in the human population. The first known flu pandemic was in 1918 commonly called the Spanish flu was caused by an H1N1 strain of avian influenza. It was considered the most severe influenza outbreak causing an estimated mortality of over 50 million worldwide. The mortality rate was very

high in India with approx 50 deaths/1000 people. Other pandemics were milder, the Asian Flu of 1957 was caused by an H2N2 virus causing 2 million deaths worldwide followed by the Hong Kong Flu pandemic (H3N2) of 1968 causing 1 million deaths. Influenza viruses are commonly described on the basis of the 2 proteins, the Haemagglutinin (H) and the Neuraminidase (N). There are 16 haemagluttinins and 9 neuraminidases for a possible 144 potential subtypes. While the viruses keep to their host species, occasionally, they can jump to another host species. This is usually because of the mixing of genes that occur during concomitant infections of strains from 2 species. While this was the case in the 1957 and 1968 pandemics, it has now been reported that the 1918 virus jumped directly from bird to human. The 1918 virus has now been completely studied and genetic changes that may have allowed the adaptation of this virus from bird to human have been identified. More importantly, the current bird flu strain (H5N1) shares some of these same mutations, which may be the reason why the current virus is able to infect humans. Current influenza vaccines for humans are comprised of the H1, H2 and H3 subtypes and do not offer protection against the H5N1 strain currently circulating in Asia.

Avian influenza

Avian influenza refers to a large group of different influenza viruses that primarily affect birds. It has traditionally been controlled by eradication or stamping out policies. If an outbreak were to occur, that area is quarantined and the birds are de-populated. Recently, some countries have used vaccines to aid in the control of avian influenza, namely Mexico, and Italy. Other countries have used vaccines sporadically and in well-defined situations in the control of the disease. While eradication makes sense in certain situations, it may not be possible in the case of avian influenza as the true reservoir for the virus are wild birds like ducks and geese that are not symptomatic (don't exhibit overt signs of disease or die). Complicating this is the migratory bird population that can transmit the virus over "national" and "international" boundaries. While vaccines are available to control the disease in birds, they can be applied effectively only to captive species not wild birds. Herein lies the problem.

Current Situation

Birds: The H5N1 strain is clearly spreading west in the bird populations. There are reports daily of new deaths in birds in European countries like Greece and very recently in a parrot in Great Britain (the bird was in quarantine). As the migratory seasons begin, there is likely to be many more cases of infected birds in Asia and in other Western countries. India is no exception and will likely find the bird flu virus in migratory birds and perhaps in domestic poultry in the near future. Control of the problem should be a combination of eradication, and vaccination. Vaccinating in a ring around the affected areas and containing the problem. Vaccines are currently available that are effective against the H5N1 bird flu. An effective vaccine should contain the relevant antigen that is properly standardized and of high quality. Fort Dodge Animal Health has several vaccines for avian influenza (for birds) that have demonstrated efficacy against the highly pathogenic H5N1 virus. The vaccines should allow differentiation of vaccinated from infected animals; this is usually accomplished by using a vaccine containing the same H5 antigen but different N type than the circulating virus. For example, an H5N9 or H5N3 vaccine will be effective against the H5N1 circulating virus but the N9 or N3 will allow the vaccinated bird to be distinguished from a naturally infected bird. This is because the H protein/antigen is mainly responsible for protection. Proper bio-security, cleaning and disinfection are also extremely important in the control of the disease and cannot be overlooked.

Humans: The virus as yet is unable to move from human to human, but if science and history hold true, it is just a matter of time. The virus is clearly very pathogenic in the few who have been infected. Mortality is greater than 50 percent in infected individuals, with over 70 known deaths to date. More tragic is the mortality rates in children. In Thailand, the fatality rate was greater than 89 percent in children younger than 15 years of age. Many scenarios have been presented in the last few months on potential spread of the virus. Some estimate the pandemic can circle the globe within 15 months and cause over 150 million deaths. However, due to mitigating factors such as medicines and perhaps vaccines along with properly executed emergency plans, the number of fatalities will be far less. One thing is certain, if the virus behaves as the Spanish flu virus did it will cause many deaths and clearly travel today is different from the last century and will speed the spread of the virus. There are effective anti-viral medications that one can take to contain the virus, however not all are effective against this virus. Amantadine is totally ineffective; all virus isolates of H5N1 from the recent epidemic contain the mutation, which makes them resistant to this drug. However oseltamivir (trade name, Tamiflu) and zanamivir (trade name Relenza) are still effective against the virus. While antiviral medications are effective, one must recognize the symptoms and start the treatment quickly for it to be effective. Concerns exist over the supply of the drug and whether the drugs would be made available to all in need. While medicines can be used after an infection, the better option is of course vaccination. Effective vaccination will prevent many deaths in what is clearly to become a pandemic. However, there are no vaccines for people that are available today. Many companies are in the process of developing the vaccine with several government agencies helping to fund the progress. Hopefully, by mid 2006 vaccines will become available. In the meantime, proper surveillance and control will buy us much needed time until vaccines and anti-viral medications become readily available.