

**Technical Report | Version June 1<sup>st</sup> 2006**  
ECDC Scientific Advice – Public Health Risk from HPAI



Phase 5 of a pandemic at which point there would probably only be a single opportunity to contain the pandemic through early containment.<sup>58</sup>

## **5. The Potential for generation of a pandemic strain from H5N1.**

A/H5N1 viruses have been circulating with occasional human exposures for nearly a decade. While the infection can infect and cause disease no change in behaviour of the virus in humans have been detected (in stark contrast to all the changes in birds) and no pandemic strain has appeared.<sup>23</sup> There must be some restriction on widespread transmission in humans of the H5N1 virus since the AI virus strains that infect humans seems to be limited to a restricted genotype and there have been few infections, even though millions of exposures and very close contact is required to infect other humans. Hence most evidence indicates a difficult adaptation process for A/H5N1 viruses among humans.

An enduring concern is that a "normal" seasonal flu virus will infect an H5N1-infected human, the two viruses will recombine and a new efficient H5N1 strain will emerge.<sup>2,59</sup> Equally there might be recombination with another animal influenza or the H5N1 could simply mutate to form a pandemic strain.<sup>2</sup> Previously it was thought that due to the low number of H5N1 infected humans, this would be statistically unlikely though the risk might increase as the epizootic continues. Given that normal human influenza has been circulating world wide, including in Asia, the extension of A/H5N1 to birds in Europe, Africa and South Asia must have increased the numbers of people potentially exposed to H5N1 and human influenzas. At the same time it is unknown whether poultry immunization in the Far East will decrease or increase human exposure.

The reduced amounts of contacts between infected birds and humans in European countries compared to elsewhere makes it unlikely that Europe will be the starting point for an H5N1 pandemic though there are countries on the edge of the European Union to the East and South where those conditions exist and where WHO's Early Containment Strategy might be needed.<sup>58</sup>

The extension of range does not mean that there has been any change in the pandemic potential of H5N1 itself.<sup>30</sup> However the increased exposure of humans to H5N1 means that if this virus does have pandemic potential that potential must be more likely to be expressed in the near future than it was previously. Conversely if H5N1 shows no ability to adapt better to humans despite such exposure confidence is likely to increase that its genetic pandemic potential is low. One implication for those determining policy is that if they are convinced that preparation should be made for a pandemic

**Technical Report | Version June 1<sup>st</sup> 2006**  
ECDC Scientific Advice – Public Health Risk from HPAI



based on an H5N1 virus there are now good reasons for speeding up those preparations.

It does not follow from any of the above that the next pandemic will necessarily be due to H5N1 or another HPAI. Equally since it is not fully understood how pandemics arise it does not follow that the risk of a pandemic is actually any higher now than it was say a decade ago. Though there is more H5N1 in circulation it does not follow that there has been an overall increase worldwide of the influenza viruses (of all H types) whose genetic material has pandemic potential.

However certainly there is absolutely no room for complacency. The first pandemic of the 20<sup>th</sup> century is thought to have emerged at least in part from an avian influenza either in Europe or North America.<sup>60</sup> It has been suggested that other mammals may act as the 'vessel' for dual infection and recombination.<sup>2</sup>

There are reasons for recommending extending seasonal influenza vaccination to wider groups. It has been suggested to include those involved in control measures when seasonal influenza is circulating. This is already a standard recommendation by one of WHO's Regions.<sup>53</sup> The case for immunisation of the wider number of people in Europe who live with domestic poultry either in commercial farms or with just a few chickens in the backyard is a much more difficult decision and requires a measured scientific public health view. A major consideration will be the difficulty of identifying those at risk. It probably will be preferable to further expand the use of seasonal vaccinations in the general population at least in the risk groups as recommended by WHO's Executive Board.<sup>61</sup> Given the need to expand European capacity for production of influenza vaccine there are other reasons why this will be desirable.

There are two crucial caveats to end this section. Firstly the ability of influenza viruses to adapt, change and surprise is well established. Just because the A/H5N1 viruses have been behaving in one way in Asia up to now that does not mean they cannot and will not and so become a greater threat to human health. Secondly it is important in this section to acknowledge that in focusing so much on HPAI in general and A/H5N1 in particular the next pandemic infection may actually arise from a low pathogenic strain, or the already human adapted A/H2N2 virus that caused a

**Technical Report | Version June 1<sup>st</sup> 2006**  
ECDC Scientific Advice – Public Health Risk from HPAI



previous pandemic because almost no community immunity exists against this virus anymore.

## **6. Final Considerations**

### **6.1 The Need for Close Co-operation of Veterinary and Human Health Services**

Much of the reduction of risk to humans from A/H5N1 will depend on the outcomes of veterinary control programs and how safely they are conducted.<sup>29,40</sup> While it would be difficult to justify large-scale public health expenditures in preventing a few sporadic human cases, it is justifiable to support expenditures to solve the problem in animals with such potentially significant public health implications as development of a pandemic. Increasing cooperation between the veterinary and human health agencies within Europe will be a crucial component to control avian influenza. Unified national and local planning is an imperative and is already part of the assessment exercises that ECDC, the European Commission and WHO Europe is assisting national authorities in making. Especially important will be unified approaches to any outbreaks of human H5N1 in the EU including vulnerable accession and candidate countries notably Romania.

### **6.2 The Importance of Risk Communication**

Though strictly outside the remit of this paper it is impossible to ignore the evident confusion in the minds of the public between avian, seasonal and pandemic influenza. The perception of risk can be massive while as demonstrated above the actual risk to the individual from Avian Influenza is extremely low, even if they are exposed to infected poultry. Partially this confusion is understandable since avian influenza can lead onto pandemic influenza and the two issues are commonly tackled together in publications. However this is leading to disproportionate anxiety and needs to be addressed. Otherwise when the pandemic of 'bird flu' fails to materialize the case for preparing for the next pandemic will be undermined. Equally there will be unwarranted and disproportionate anxiety in the minds of the public and fear of harmless birds, both wild and domestic.

### **6.3 Adapting to H5N1**

Though there is no sign that H5N1 is adapting to humans Europe needs to adapt to H5N1. The detection of H5N1 in wild birds in many European Union Countries and the seeming stability of the virus suggest that countries may

**Technical Report | Version June 1<sup>st</sup> 2006**  
ECDC Scientific Advice – Public Health Risk from HPAI



need to adjust to this being added to the current list of zoonoses present in animals that occasionally infect humans.

## Technical Report | Version June 1<sup>st</sup> 2006

### ECDC Scientific Advice – Public Health Risk from HPAI

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## Technical Report | Version June 1<sup>st</sup> 2006

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## Technical Report | Version June 1<sup>st</sup> 2006

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## **Annex 1. Table: Who is at risk of getting "Bird Flu" - Highly pathogenic H5N1 avian influenza?**

**Broadly speaking there are two types of Risk Groups:-**

### **Group 1 - Low but Real Risk**

The risk of infection is almost entirely confined to the small numbers of **people who have close and intense contact with sick H5N1 infected domestic poultry (chickens, ducks etc) or their droppings or sometimes wild birds. For example through having sick and H5N1 infected poultry in the house.** Human cases have almost entirely been in this category.

In these circumstances **children** may be at higher risk than adults. This probably represents behavioral rather than constitutional susceptibility. In these setting children being more play with or look after poultry and are less likely to practice good persona hygiene than adults.

**People traveling to countries where H5N1 is prevalent can sometimes enter this category if they are staying with families with domestic poultry.**

The people who are **at highest risk of acquiring H5N1** are the very small number of **people living in the same household as cases of H5N1 in humans.** It is thought that this is through shared exposure. Though person to person transmission also occasionally happens. This is why early identification of human cases and early treatment of them and their household contacts is crucial.

### **Group 2 Theoretical Risk – Precautions Required**

There are also those at theoretical risk who may be exposed to the virus and should take appropriate precautions. This includes the following where H5N1 may be present:

- Health care workers caring for those with H5N1 infection though there have been no cases in this group for nearly a decade the risk is there and preventive measures should be taken. A related group are those working in laboratories with H5N1 viruses
- Veterinarian and people involved in controlling outbreaks in birds (culling)
- People who work on industrial poultry farms,
- People who may have close contact with infected wild birds e.g. some ornithologists and hunters,
- People who deal with sewage which is contaminated with H5N1

**For the majority of people who have no contacts with domestic or wild birds or their droppings, the risk of acquiring H5N1 is almost non existent.**