A(H5N1), avian influenza – still with us, ready to pounce?

LONDON, UK----6th January 2012----ExpertREACT. A recent WHO call for heightened vigilance on influenza virus variants and suppression of scientific evidence indicating H5N1 can be made more transmissible confirms our great fear of the influenza virus. EU concerns with cost savings on the dealing with next pandemic rather pre-emptive strategies e.g. priming are misplaced.

Since the abatement of the H1N1 "swine flu" epidemic, which first surfaced in Mexico (March 2009) worldwide focus on pandemic influenza, at least in the lay press, has seemingly quietened. Fortunately, H1N1 was relatively mild compared to previous pandemics e.g. *Spanish flu* or *Hong Kong flu* killing an estimated <20,000 people compared to the 20-50 million which died in 1918.

As we enter a new year the World Health Organisation (WHO) has released statistics suggesting that in terms of deaths, 2011 was the highest year since 2007 for H5N1, the highly pathogenic avian influenza or "bird flu" (first identified in 1997) which also has pandemic potential **(1).** A few recent pointers in the academic press also suggest that we should not become complacent about the influenza virus.

In 2011, 61 cases of H5N1 infection were reported with 34 deaths indicating a high case fatality rate (CFR) of 55%; far exceeding the Case Fatality Ratio (CFR) for *Spanish flu* which has been estimated at 2-3%. Cumulative cases (laboratory confirmed) between 2003 and 2012 are numbered at 578 with 340 deaths. The latest human case in 2011 (10th November) was reported in Egypt in a 31 year-old female registering as the 153rd case so far in the country **(2)**. In December 2011, various outbreaks had been reported in poultry in Egypt, Indonesia and China.

Humans become infected with H5N1 when exposed to infected birds in contaminated environments. This then results in further sporadic human cases in clusters among close contacts in crowded living conditions. Thankfully there is no compelling evidence to suggest H5N1 can spread at the community level which could have dramatic downstream consequences. The lack of sustained human-to-human transmission observed with H5N1 can in part be explained at the molecular level because the virus binds ineffectively to the type of sialic acid on human epithelial cells in the nose, throat and lungs so limiting its ability to infect.

Given the unpredictability of the influenza virus, specifically changes within viral proteins such as the hemagluttinin (HA) or neuraminidase (NA) molecules, which play an essential role during the infection process, it is plausible, at that the H5N1 could evolve and become more transmissible in the human population. Indeed, this same process was responsible for the emergence of the H1N1 pandemic. For this reason, the WHO in December 2011, has stressed the importance of global monitoring of variant influenza viruses **(3)**; reminding countries that it is an obligation under the International Health Regulations (IHR) to report all human cases of influenza virus infection which do not correspond with predominant circulating types. In fact, influenza (caused by a new subtype), is within a list a critical diseases, such as smallpox, poliomyelitis (wild) type and severe acute respiratory syndrome (SARS) which may have serious public health impact and must be reported to the WHO in all circumstances **(4)**

The significance of potential influenza virus variants and their high potential to impact upon human health was also exemplified by reports in late December 2011 that scientists were able to increase the transmissibility of H5N1 in ferrets **(5).** Two seperate groups, one from Erasmus Medical Center in Rotterdam and the other from University of Wisconsin, Madison sent manuscripts to the prestigious academic journals, Science and Nature respectively but were then requested not to publish details by a US Government advisory panel due to reasons to national security **(6).**

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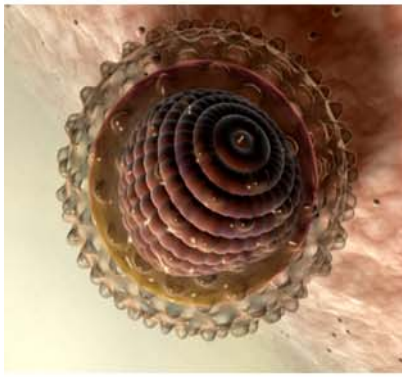

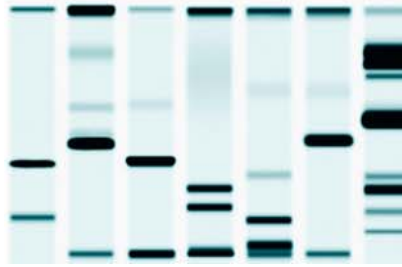

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Such unprecedented action, counter to the free-flow of ideas and information that is usual in academic science again stresses the inherent fear of the influenza virus.

Whether a new dangerous influenza virus emerges naturally or as part of a terrorist exercise in biological weaponry, the key question remains – how well are we prepared? The global response to the 2009 H1N1 pandemic could be viewed as a test run to a future scenario, especially in terms of vaccine production and distribution. However, as stated our previous article in March 2009 **(7)**, a pandemic-specific vaccine produced 6 months post pandemic declaration can only partly alleviate the potential excess morbidity and mortality associated with a influenza pandemic.

The global community needs to think more carefully about influenza vaccine stockpiling and/or population priming with pre-pandemic vaccines most likely to give protection against H5N1 variants. Stockpiling H5N1 vaccines began in some EU countries to a marginal degree prior to the emergence of H1N1 but then most pre-agreed advance supply agreements (ASA) were activated to then produce monovalent pandemic specific vaccine, in most cases too much.

In the European Union (EU), it appears that as part of latest pandemic initiatives, such as the EU Joint Procurement of Pandemic Influenza vaccines **(8)**, member states are now (post H1N1) more concerned with the economics and potential cost savings of dealing with the next pandemic once it occurs. This logic is flawed and assumes the next pandemic will be "mild" and similar to H1N1. What if it isn't?

References and Notes:

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