



Will avian influenza lead to a human pandemic?

by Robert Kahn

The United Kingdom Government recently publicised its National Risk Register. The “gravest threat to UK security” was not terrorism or a natural disaster but an influenza pandemic, where one-third to one half of the population might become sick and possibly 750,000 people would die [1]. Although a human influenza pandemic would probably begin in Southeast Asia, such a pandemic would be likely to spread the fastest in the United Kingdom and the Netherlands, because of their high population density and international airports [2].

This article offers an assessment of the possibility of avian influenza leading to a human pandemic, with easily accessed websites that provide further information. As medical writers, many of us are already aware of the scientific complexities inherent in trying to evaluate the possible threat of a pandemic. Clearly, the available evidence is subject to different interpretations. We face the twin dangers of ignorance and panic: to do nothing is to succumb to ignorance, to become alarmist is to encourage panic. As medical writers we have the medical knowledge and the ability to write that places us in a privileged position, but with privilege comes responsibility.

What is risk assessment?

To evaluate the possibility of a human influenza pandemic, it is helpful to begin with a risk assessment that considers both the likelihood of a pandemic and its possible consequences. The risk assessment matrix in the box below sets out two scales—the likelihood of an event from being ‘Almost certain’ to being ‘Rare’, along with its consequences from ‘Catastrophic’ to ‘Insignificant’.

Because there have been three influenza pandemics in each of the 18th, 19th and 20th centuries, the consensus among risk consultants is that the likelihood of an influenza pandemic is either ‘Almost certain’ or ‘Likely’. Furthermore, the consequences of such a pandemic are a degree of risk that is likely to be either ‘Major’ or ‘Catastrophic’. However, as considered below, it may be possible to develop an effective vaccine that changes both the likelihood and the degree of risk of a pandemic.

A risk assessment matrix [3]

Consequences: Degree of risk					
Likelihood	↓				
↓	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	High	High	Extreme	Extreme	Extreme
Likely	Moderate	High	High	Extreme	Extreme
Moderately likely	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Rare	Low	Low	Moderate	High	High

Integrating human and veterinary medicine

There is increasing awareness that human and animal health is inextricably linked, as postulated by the ‘One Health’ initiative [4]. Since 1997 avian influenza has killed or led to the slaughter of some 500 million chickens and turkeys throughout the world [5]. From 1940 to 2004, some 60 per cent of the emerging disease outbreaks world-wide among humans have begun in animals [6]. HIV/AIDS, Ebola Virus, West Nile Virus and SARS (Severe Acute Respiratory Syndrome), as well as H5N1 influenza, are a few significant examples [7]. New evidence suggests that the spread of the H5N1 avian influenza virus in domestic and commercial poultry throughout Southeast Asia is being spread by free-grazing domestic ducks in highly populated areas that grow a large amount of rice [8]. The greater the density of ducks, people and rice, the greater the risk. Poor hygiene in commercial poultry farming and the sale of live poultry in local markets are also contributory factors to the spread of avian influenza [9].

According to regularly updated information from the World Health Organization (WHO), 245 people have died from the H5N1 influenza virus since 2003 [10]. Over 90 per cent of the deaths have been in five countries—Indonesia, Viet Nam, Egypt, China and Thailand. This data supports the prediction of the Lowy Institute in Sydney, Australia that if an influenza pandemic does occur, 95 per cent of the deaths would be in developing countries [11]. Almost all of these deaths have been among people who have been intensively exposed to diseased poultry, although there have been a few family clusters in which one member of a family was infected by poultry and then passed on the disease to other members of the family. However, the number of human deaths has been limited, because the H5N1 virus needs to attach itself to the lower respiratory tract in humans, which is difficult for the present virus to reach [12].

Can an influenza pandemic be stopped?

Viruses are constantly changing. The H5N1 virus could mutate into a form that readily passes from human to human in a pattern of sustained transmission. This might happen in a direct transmission from an animal to a human, or through an intermediary such as a pig that served as a mixing vessel for both human and avian viruses [13]. If a human being (or a pig) that already had an influenza virus came in contact with the H5N1 avian influenza virus, the

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possibility of creating a new strain of virus would increase dramatically. Therefore, it is important for those at risk of influenza, those who have sustained contact with poultry, lab workers, and veterinarians to have the annual 'flu shot' for seasonal influenza. Also, the one-off shot against pneumonia is very helpful, because during a pandemic the major cause of death is secondary bacterial pneumonia, as happened during the pandemic of 1918-1920 [14]. However, as there can be harmful side effects for a few people with either pneumonia shot, careful medical advice is necessary.

These personal precautions, as well as careful hygiene (especially regular hand washing), are important [15]. However, whether a pandemic can be stopped depends to a considerable extent on early detection and identification of the new virus, as well as immediate isolation of any small clusters of initial human cases. Given the ubiquity of airplane travel, bird smuggling and general global mobility, a new virus would be more likely to spread by air travel than by wild birds. It could be only a few weeks before a new virus formed (probably somewhere in Southeast Asia) and then arrived in a new location (via an international airport). The virus would then spread community by community in waves throughout a country, probably in two to three waves over a period of one to two years. Whether such global spread could be prevented by immediate containment in the country of origin is not clear at this time, and depends to a considerable extent on effective surveillance, immediate lab analysis of virus samples, further scientific research and pharmaceutical initiatives. As the years pass, there is more and more chance of stopping a pandemic, because understanding of the nature of avian viruses is improving.

Antivirals, vaccines and new research

Many governments and international organisations are stockpiling antivirals, such as oseltamivir (Tamiflu) and zanamivir (inhaled as Relenza). However, there is increasing evidence of resistance developing against Tamiflu [16]. Furthermore, to be effective these antivirals must be taken as soon as possible after the onset of illness [17]. Although antivirals might be important in mitigating the impact of a serious pandemic, the real effort to stop a pandemic rightly centres on producing new vaccines.

WHO has estimated that it would take six months to one year to develop and manufacture a vaccine that protects against the H5N1 virus, because it would be necessary to identify the precise strain of the virus that began the pandemic before developing the vaccine [18]. However, there is now a possibility of moving away from the sixty-year-old technique of egg-based vaccine technology toward a whole-virus vaccine developed from cell culture—a process that would lead to faster manufacturing of a vaccine [19]. Furthermore, a pre-pandemic vaccine (Prepandrix) has been clinically tested and granted marketing authorisation in Europe [20]. If these and other research initiatives prove successful, a vaccine would soon

be available before the pandemic strikes, rather than months after the particular strain of an influenza A virus had been identified.

Business continuity planning for an influenza pandemic

The earlier focus in this article on risk assessment needs to be followed by sustained business continuity planning, once there is some understanding of the possible risks of an influenza pandemic. Medical communications agencies and pharmaceutical firms, like other businesses, must plan for the possibility of emergencies, disruptions and staff absences [21]. With pandemic influenza, approximately one-third to one-half of the staff is likely to be absent over an 18-month period, so considerable cross training will be necessary to empower people to cover for those who are absent. In working out risk management plans and exercises, it is worth considering that those who assess the risks should not have sole responsibility for managing those risks, because if someone knows they are going to have to deal with risk management, they may have a tendency to assume that the likelihood and consequences of a particular risk are low.

Some business analysts are hopeful that any pandemic will be mild [22]. Others believe that a pandemic is inevitable, its effects will be disruptive, but businesses can mitigate the impact [23]. Comprehensive information and advice is available from the University of Minnesota's Center for Infectious Disease Research and Policy at their website, www.cidrap.umn.edu. A further source of advice on both risk assessment and risk management is Dr Peter Sandman at: www.psandman.com.

Will there be a pandemic? The jury is out

Many scientists believe that "it is not a question of if, but of when an influenza pandemic will begin" [24]. However, the Health Editor of *The Observer*, Jo Revill has pointed out: "Never before have we had so much early warning about the spread of an influenza virus—and never before have we had so much opportunity to prepare for it, using all our resources and our common sense" [25]. For a balanced, sensible approach, see the website maintained by the US Government's Department of Health & Human Services [26].

During the last great influenza pandemic in 1918-1920, different cities prepared in different ways; and those communities that encouraged social distancing (i.e. staying at home and away from mass gatherings) experienced much lower rates of illness and death [27]. Based on that experience, there are a number of books available on the practicalities of facing an influenza pandemic [28]. Thinking through how and where families and friends will be gathered together should take place before a pandemic begins, because calm, rational decision-making in the midst of a crisis is extremely difficult [29]. Whatever our different therapy areas, employers, free-lance commitments and

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home nations, we need to understand the scientific complexities of avian influenza. On the question of whether avian influenza will lead to pandemic influenza, the jury is out. Even if the present avian influenza virus does change into a virus that will transmit effectively from human to human, medical research might lead to an effective vaccine that will stop the virus. Time is on our side.

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References:

Pandemic influenza is a complex, interdisciplinary topic that requires consideration of a number of issues. This article together with its reference list can be accessed in the journal section of www.emwa.org. The web-based references listed in the online reference list offer an on-line learning course about five aspects of pandemic influenza:

- (1) **Risk assessment and risk management** is considered in references 1, 2, 3, 21, 22 and 23.
- (2) **Links between human and animal health** are in references 4, 5, 6, 7 and 8.
- (3) **Personal preparation** is in references 9, 14, 15, 17, 25, 26, 27, 28 and 29.
- (4) **Possible consequences of a pandemic** are in references 10 and 11.
- (5) **Various viruses, anti-virals and vaccines** are in references 12, 13, 16, 18, 19 and 20.

Meet the EMWA Executive Committee candidates... 2009

EMWA's Executive Committee will be elected based on voting by members present at the Annual General Meeting in Ljubljana on 27 May 2009. If you will not be present you may also vote by proxy in advance by sending your vote to EMWA's Head Office (onfo@emwa.org) before 21 May 2009 or appoint another EMWA member as your proxy and provide that member with your voting form to take to the AGM.

For the position of Public Relations Officer:**Andrea Palluch**

Although I'm a relatively fresh EMWA member, having joined in 2005, I believe I fit the motto EMWA most like to promote: "an organisation run for and by its members". With this in mind, and having been a clinical research associate for 6 years, I thought it would be great if EMWA was to join forces with the Institute of Clinical Research (ICR). EMWA received the idea very well and we translated it into the first ICR-EMWA joint symposium held in London in 2008. It was such a successful event that it is now in its second year and counting! I volunteered to run a workshop (pharmacogenomics) which will be offered for the first time in the spring conference 2009. I would also like to bring to life EMWA's initiative of having mentors/buddies for newcomers at our conferences. I'm very outgoing, proactive, and like interacting with people and learning from them. EMWA is growing fast and I want to help in promoting this highly professional organisation. My secret master plan is to promote EMWA in my native country, Brazil (and perhaps other countries in South America), so that they too can benefit from the wealth of opportunities, knowledge and networking offered by EMWA.



and I was involved in a number of committees for the conference dedicated to translation in Barcelona (2008).

My academic qualifications include an MSc in Bioengineering and an MA in Linguistics. With over 12 years experience in the Erasmus programmes and devising self learning materials and programmes for medic and scientific students, I also have a strong background in education and international project management. I specialised in self learning, e-communication and life long learning. I have been involved in translation of medical documentation for 8 years and I created CINETIQUE Translations in 2003 to better answer the need of the pharmaceutical and medical industry in terms of multilingual communication. I work full time developing my company's activities as well as a medical translator and editor. I love challenges and I am keen to see all projects I am involved in expand; I am eager to apply my knowledge and experience to contribute to EMWA's present and future development.

Although I am a 'non-traditional' medical writer, I can represent EMWA's members as I have a lot in common with them: I have worked both as a freelancer and in Universities, I deal with all types of medical documentation on a daily basis and moreover, being a French native and having lived in the UK for over 15 years, I understand the issues faced by non-native English speakers.

I am outgoing with excellent communication skills. "Hard working whilst keeping a smile" is what my colleagues and clients say about me. I enjoy integrating people's opinions and requirements and taking them into account in the projects I manage.

On the whole, I feel I have the knowledge, experience, confidence and energy to take on this new challenge and I ask you for your vote of confidence at the upcoming election in Ljubljana.

For the position of Vice President:**Laurence Auffret**

I am pleased to apply to the position of Vice-President for EMWA. EMWA's impressive history of excellence, along with its commitment to training medical writers and ongoing developments, appeals to my own set of values.

I am an active EMWA member, I am a workshop leader

