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Bird flu and pandemic flu

What's the message for GPs and hospital doctors?

News p 981

The extensive media coverage of avian influenza (bird flu) over recent weeks has caused confusion and increasing concern that bird flu will imminently cause a human pandemic. This has been fuelled by the report of a parrot infected by the H5N1 strain of avian influenza in the United Kingdom this week. Is such a pandemic a flight of fantasy or a dead cert?

The influenza pandemic contingency plan presented by the chief medical officer[1] is clear and comprehensive, but at nearly 450 pages, 11 downloadable documents, and many web links, it may not be ready reading for busy health professionals.

Everyone is familiar with seasonal human flu, which typically affects 10-15% of the UK population each winter and leads to around 12 000 excess deaths. Although minor antigenic drift in the human influenza virus A occurs continuously, a major shift in its surface protein antigens H or N can trigger a worldwide influenza pandemic because of absence of population immunity. Fortunately, this happens only rarely—"Spanish" flu in 1918-9 (H1N1 virus) with an estimated 250 000 excess deaths in the UK, "Asian" flu in 1957-8 (H2N2) with 33 000 deaths, and "Hong Kong" flu in 1968-9 (H3N2) with 30 000 deaths. Many scientists believe that another pandemic is overdue.

Influenza A viruses also infect birds and animals, mostly pigs and horses. Avian influenza viruses do not usually infect humans, hence the grave concern when 18 human cases of influenza caused by bird-to-human transmission of AH5N1 avian influenza occurred in Hong Kong in May 1997 with six deaths.[2] Given the large number of infected chickens then in the Hong Kong markets, bird-to-human clinical infection was clearly rare. Public concern waned when culling of more than 1.5 million chickens halted the epidemic.

Since 2003, however, this highly pathogenic AH5N1 virus has spread rapidly to poultry in 17 countries in Asia and Eastern Europe and is now endemic in some.[3] Most of the resulting 118 human cases have been healthy young children or adults in close contact with infected flocks, with a mortality of over 50% (mostly from viral pneumonia and multiorgan failure).[4 5]

The lack of sustained human-to-human transmission suggests that this AH5N1 avian virus does not currently have the capacity to cause a human pandemic. But, given the known potential for antigenic shift—either from a gradual process of adaptive genetic mutation within the virus or by a snap gene reassortment with a human influenza A virus[6]—the virus could acquire the mechanism for rapid human transmission and cause explosive global spread, facilitated by current air travel. Pigs and humans seem to be the "mixing vessels" for genetic exchange when coinfected by both animal and human flu viruses. Close domestic proximity of fowl, pigs, and people facilitates this, a situation common in Asia.

The optimistic alternative to this apocalyptic viewpoint is that the appearance of a modified avian virus capable of triggering a human pandemic is unlikely: there have been more than 3300 flu outbreaks in birds with 150 million killed and only 118 human cases,[3 5] and the disease in birds is proving containable with good surveillance and prompt action. Early mass use of neuraminidase antiviral drugs has also been recommended as a containment strategy for any local nascent human pandemic in Asia.[7] So a pandemic may occur some time in the future, but not necessarily linked to bird flu.

How would doctors and nurses manage during a pandemic? Conservative modelling suggests that a quarter of the UK population (over 14 million people) would become ill, with 50 000 excess deaths, during successive pandemic waves. Until a pandemic strain vaccine has been developed, clinical guidelines produced by the British Thoracic Society, British Infection Society, and Health Protection Agency for the Department of Health for consultation with professional bodies, propose targeted treatment with neuraminidase antiviral drugs for patients seen within 48 hours of developing fever and influenza-like illness.[8] The aim is to shorten symptom duration, reduce infectivity, and prevent complications. Oseltamivir has been chosen by the Department of Health as the treatment to stockpile and use during a pandemic in the UK (probably because it is taken as a tablet whereas the other neuraminidase inhibitor, zanamivir, can only be inhaled, and because recent human AH5N1 isolates seem to be resistant to the M2 inhibitors amantadine and rimantadine[9]). The guidelines also recommend early treatment with prophylactic antibiotics for high risk patients with influenza-like illness to prevent or ameliorate secondary bacterial lung infection.

Delivering health care would be a considerable challenge, not least because illness among NHS and other essential staff would diminish the workforce. During a 15 week pandemic in the UK there would be an estimated additional 1.5 million consultations in primary care, 0.75 million visits to accident and emergency departments, and more than 82 000 admissions to hospital.[10]

BMJ 2005;331:975–6

Infection control would be challenging too because, unlike SARS, flu is highly infectious before patients develop definite symptoms. The public would be told that "coughs and sneezes spread diseases" and advised on hand washing, using paper tissues rather than handkerchiefs, and social distancing.[10]

The epidemic of bird flu has stimulated countries to develop plans for a future human pandemic. The spectrum of clinical illness from pandemic flu cannot be predicted accurately, and guidelines for the public and health services will probably change with experience. Doctors should visit the Department of Health website now and at least read the advice relevant to them. They may not have time when a pandemic starts.

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Competing interests: Both authors are members of the committee that produced "Clinical guidelines for patients with an influenza-like illness during an influenza pandemic,"[8] but their comments are their own and not those of the committee. JTM received a lecture fee from AstraZeneca in 2002 and in 2004 and attended one advisory board meeting about pneumococcal vaccine for GlaxoSmithKline in 2003.

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Improving surveillance of MRSA bacteraemia

Should focus more on patients bringing strains to hospital on readmission

Papers p 992 and *Education and debate* p 1013

Two papers in this week's *BMJ* consider from different perspectives the limitations of England's mandatory surveillance system for methicillin resistant *Staphylococcus aureus* (MRSA) bacteraemia.[1 2] This surveillance became compulsory in April 2001 in response to the rise in MRSA bacteraemias from less than 2% of all *S aureus* bacteraemias in 1990 to 42% in 2000.[3] The Department of Health publishes the results for each English NHS acute trust every six months.[4] In 2004 the secretary of state for health announced that these infections would be halved by 2008 and monitored by the Healthcare Commission.[5]

The paper by Wyllie and colleagues focuses on the high proportion of MRSA bacteraemias among patients on admission to hospital.[1] These bacteraemias were not necessarily acquired in the community, however, since nearly all these patients had previously stayed in hospital, where they could have been exposed to MRSA and some were known to have had MRSA on a previous admission. Indeed, in England most MRSA infections among patients entering hospital are caused by strains that have been exported from hospitals and have created a reservoir in community settings such as residential care homes.[6–8] These are distinct from the true community acquired MRSA strains, which have caused serious infections.[9]

Successful control of the spread of infection depends on having, on average, less than one secondary case arising from each case of MRSA infection. As asymptomatic MRSA carriage may be prolonged, reintroduction from the community is an important factor as secondary cases may span several hospital admissions. We need better understanding of MRSA dynamics inside and outside hospitals to inform future guidance, particularly on whether control of MRSA should span the hospital and its catchment area.[6] The high proportion of MRSA bacteraemias that are detectable on entry to hospital has implications for admitting doctors, who need to raise their index of suspicion and treat infected patients accordingly. This situation complicates decisions on empiric treatment: automatically selecting treatment that covers more resistant infections will benefit some patients but will increase the chances of engendering yet more resistant organisms.

Interventions to control MRSA on entry to hospital are also up for debate, such as systematic screening on admission and the use of rapid diagnostic tests as tools in maintaining MRSA-free zones.[10] Such tools are unlikely to succeed in the long run if hospitals have insufficient capacity for isolating infected patients and nobody pays enough attention to reservoirs of infection in the community.[11] Moreover, competing pressures on the NHS will have to be balanced, so that targets to reduce waiting lists do not adversely affect infection control.

This week's article by Spiegelhalter discusses the use and interpretation of the English surveillance data.[2] The author highlights many of the pitfalls of using routine surveillance data to monitor whether a target has been met. Generally, the purpose of public health surveillance is to detect and describe problems, initiate investigation, and suggest hypotheses. The quantity of data, even when obtained through enhanced

BMJ 2005;331:976–7