SHORT REPORT

H5N1 influenza questionnaire: are Scottish emergency departments ready to isolate and treat a possible index case?

J Vardy, N Mukherjee, N Dignon

H5N1 has emerged as a highly pathogenic strain of avian flu. Cases of bird-to-human transmission have occurred and raised concerns that human-to-human transmission may be possible. Therefore, it is vitally important to isolate any index case arising from bird-to-human transmission. Questionnaires were sent out to emergency departments throughout Scotland seeking information on the availability of facilities and supplies necessary to treat and prevent onward infection from a suspected index case of human H5N1 infection. They were specifically asked about side rooms for isolation and supplies of FFP3 masks, lysis buffer and oseltamivir (Tamiflu).

Pandemic flu results from the emergence of a new influenza A subtype markedly different from its currently circulating predecessors. It can cause disease in humans, can spread from person to person, and has the potential to spread widely, as a high proportion of the population has no immunity for this disease. "Spanish" flu, H1N1, is one example of this disease that emerged in 1918–9 and killed an estimated 20–40 million people worldwide. There is currently a massive and unprecedented outbreak of highly pathogenic influenza A/H5N1 affecting poultry and wild birds. It started in SouthEast Asia in 2003 and continues to spread. This has so far caused a small number of human cases with a high proportion of deaths. Concerns have been raised that this could provide a setting for the emergence of a subtype of influenza with a greater affinity for humans and the potential to cause a pandemic.¹

We are currently at the World Health Organisation classification phase 3 of the pandemic alert period indicating that human infection has occurred with a new subtype of influenza (H5N1) and that rare cases of human-to-human spread through close contact have occurred.²

In March 2006, a dead whooper swan infected with H5N1 was found in Fife, Scotland.³ This led us to wonder how well prepared emergency departments in Scotland are to cope with and prevent onward transmission from a suspected index case of H5N1 in a patient presenting from the community either returning from a visit to an infected country or after contact with sick birds within the UK.

Health Protection Scotland has issued comprehensive guidelines on dealing with a suspected case of H5N1, available at their website <http://www.hps.scot.nhs.uk/>.

They advise that a possible case of influenza H5N1 should be considered in a patient if he/she fulfils the following three criteria:

1. Has a fever of $>38^{\circ}\text{C}$, or a history of fever and respiratory illness or other severe life-threatening illness;
2. Has travelled to a part of the world affected by H5N1 in birds (which becomes redundant if H5N1 emerges in birds in the UK);
3. Has had contact with sick, dead or dying poultry, or close contact with humans with unexplained severe respiratory illness, or has had laboratory exposure to virus.⁴

Emerg Med J 2007;24:283–285. doi: 10.1136/emj.2006.041178

If influenza A/H5N1 is suspected in a patient unwell enough to require admission to hospital, the patient should be immediately isolated in a side room and put on a surgical mask. Nasopharyngeal aspirate or combined nose/throat swabs should be sent in a virus transport medium of lysis buffer that serves to inactivate the virus rendering the sample safe. The patient should start oseltamivir (Tamiflu) as soon as possible.⁴

Staff should adhere to strict respiratory isolation measures, wear a mask, gown, gloves and eye protection. FFP3 masks have 98% filtering efficiency and are recommended for use by healthcare workers isolating a suspected index case of H5N1.⁵ Healthcare workers in contact with an index case, and the patient's household contacts, should be treated with Tamiflu as soon as possible.⁶

We undertook this survey to examine how well prepared emergency departments in Scotland are to isolate and treat a possible index case of influenza A/H5N1. Specifically, we asked about the availability of side rooms with and without bathroom facilities, availability of FFP3 masks, lysis buffer and oseltamivir (Tamiflu).

METHODS

In April 2006, we sent questionnaires to the clinical nurse managers of all 40 emergency departments identified through the National Health Service website. Questionnaires were also sent to consultants of the 22 departments identified as consultant-led. In June 2006, the questionnaires were sent again to departments that had not responded.

Using the Health Protection Scotland guidelines, we identified areas that could possibly produce difficulties in an emergency department dealing with a suspected index case of influenza A/H5N1. These relate to the availability of isolation facilities, FFP3 masks, lysis buffer and oseltamivir (Tamiflu) listed in the box. We also asked respondents to estimate their annual new patient attendance rates in order to compare the availability of facilities with department size. Respondents could answer "Yes", "No" or "Don't Know".

The statistical package Minitab 13 was used to perform a two-sample t test to demonstrate a difference in sample means.

RESULTS

Initially, representatives from 33 emergency departments returned completed questionnaires. The other seven departments responded at the second time of contact, giving a 100% department response rate.

Fifty-one replies were received in total. In all, 17 consultants and 16 clinical nurse managers replied from the 22 consultant-led departments, and 18 clinical nurse managers from the non-consultant led departments. Where two replies were received from one department the reply with the least "don't know" answers was used.

Attendance per annum

The mean annual new patient attendance was 33 921 (median 36 000, range 2500–83 000). The mean annual new patient

Box 1 Questionnaire distributed to emergency departments in Scotland

- How many new patients per annum are seen in your emergency department?
- With regard to isolating a first or index case of suspected, probable or confirmed influenza A/H5N1 in a patient attending the emergency department:
Does your emergency department have a side room?
Does the single room have its own bathroom facilities?
Do you have a negative pressure room for respiratory isolation?
- With regard to additional equipment:
Do you have FFP3 respirator masks readily available for first cases of suspected influenza A/H5N1 in humans?
Do you have available appropriate lysis buffer for NPA or throat/nose swabs for PCR?
- In regards to post exposure prophylaxis:
Do you have oseltamivir (Tamiflu) available for treating healthcare workers caring for a confirmed index case of Influenza A/H5N1?

attendances for consultant-and non-consultant led departments were 49 814 (18 000–83 000) and 13 252 (2500–44 000), respectively. Annual new patient attendances and percentage of consultant-led departments are given in table 1.

Departments with side rooms with or without an attached bathroom had significantly higher new patient attendances per annum than those without ($p = 0.029$ and 0.002).

Side rooms, bathrooms and negative pressure

A breakdown of the emergency departments having access to side rooms, side rooms with a bathroom and negative pressure isolation is given in table 2.

FFP3 masks, lysis buffer and oseltamivir (Tamiflu)

A breakdown of the emergency departments that indicated having FFP3 masks, lysis buffer and oseltamivir (Tamiflu) available is given in table 3.

Table 1 Consultant-led department number and percentage

New patient attendances per annum	Number of departments	Consultant-led
<10 000	12	0 (0%)
10–40 000	10	6 (60%)
40–60 000	12	10 (83%)
>60 000	6	6 (100%)

Table 2 Side room facilities available in the emergency department

Attendances	<10 000	10–40 000	40–60 000	>60 000	Total
Side room	5 (42%)	8 (80%)	9 (75%)	6 (100%)	28 (70%)
Bathroom	0	2 (20%)	2 (17%)	4 (67%)	8 (20%)
Negative pressure	0	2 (20%)	1 (8%)	0	3 (8%)

There was no significant difference between the number of new patient attendances per annum and those who said they had access to FFP3 masks, lysis buffer or Tamiflu ($p = 0.23$, 0.46 and 0.75).

DISCUSSION

In all, 70% of departments had a side room, and as this includes the majority of the larger departments this suggests that a side room that could be used for isolation is available to the majority of the population. The lack of side room in smaller departments is of concern however, as an index case presenting after contact with a wild bird could plausibly occur in a rural area served by a hospital with a smaller department. Side rooms with bathroom facilities were found in 20% of departments, mostly larger departments, indicating that this facility would be available to a greater proportion of the population than this. Such a facility is ideal, as it makes a prolonged period of isolation logistically easier and tends to decrease staff-to-patient contact. Very few departments had a negative pressure isolation room. While structural alteration of departments is impractical, it is possible for hospitals without a side room for isolation to formulate a contingency plan and identify a suitable adaptable area that could be used if the need to isolate such a patient arises.

FFP3 mask, lysis buffer and oseltamivir (Tamiflu) are all important adjuncts in the diagnosis and treatment of suspected influenza A/H5N1 and vital to the prevention of onward transmission of H5N1 from a suspected index case to healthcare workers and other contacts. FFP3 masks are required to prevent staff inhaling infective aerosol; lysis buffer inactivates viral replication, rendering specimens safe for handling and transport and Tamiflu is necessary for prophylactic treatment of medical staff and household contacts of an index case. A proportion of respondents to our questionnaire indicated that they did not know whether lysis buffer or oseltamivir (Tamiflu) was available, in which case it is unlikely that staff, would have immediate access to supplies should an index case present. The majority (68%) of departments indicated that they had FFP3 masks available to staff whereas 25% had access to lysis buffer for viral transport and 30% had access to supplies of oseltamivir (Tamiflu). There was no relationship between the availability of these supplies and department size, suggesting that an index case would have similar odds to this of presenting to a department where such facilities were available.

If a suspected index case of influenza A/H5N1 is identified, then it is vitally important to limit opportunities for human-to-human spread as, if viral affinity for humans should increase, widespread transmission could occur. These relatively straightforward measures have been proposed in an attempt to limit spread from an index case in the hospital environment. A number of emergency departments indicated that they already have access to supplies of FFP3 masks, lysis buffer and oseltamivir (Tamiflu) which will assist in their efforts to protect hospital staff, other patients and ultimately the community from the risk of onward infection from a suspected index case presenting to the department.

In conclusion, Health Protection Scotland has provided extensive guidance as to optimal management of an index case of influenza A/H5N1 presenting to an emergency department. We are currently in WHO phase 3 of pandemic flu planning and will move to the higher level of phase 4 if clusters of human-to-human transmission occur. This is especially relevant to Scotland in the wake of proven infection in a swan in Fife and it is important to be in an advanced state of readiness in time for the coming flu season. Our questionnaire demonstrates that while a proportion of emergency departments in Scotland already have in place the facilities and

Table 3 Availability of FFP3 masks, lysis buffer and oseltamivir (Tamiflu) in the emergency department

Attendances	<10 000	10–40 000	40–60 000	>60 000	Total
FFP3 masks available					
Yes	8 (67%)	9 (90%)	8 (67%)	3 (50%)	27 (68%)
No	4	1	4	3	13 (32%)
Lysis buffer available					
Yes	2 (17%)	4 (40%)	1 (8%)	3 (50%)	10 (25%)
Don't know	2	2	5	2	10 (25%)
No	8	4	6	1	20 (50%)
Oseltamivir (Tamiflu) Available					
Yes	3 (25%)	4 (40%)	3 (25%)	2 (33%)	12 (30%)
Don't know	2	3	2	1	8 (20%)
No	7	3	7	3	20 (50%)

supplies necessary to follow the Health Protection Scotland guidelines and to safely treat and isolate a suspected index case of influenza A/H5N1, not all are yet fully equipped.

Authors' affiliations

J Vardy, N Mukherjee, N Dignon, Emergency Department, Glasgow Royal Infirmary, Glasgow, Scotland, UK

Competing interests: None.

Correspondence to: Jennifer Vardy, Emergency Department, Glasgow Royal Infirmary, 84 Castle Street, Glasgow G4 0SF, Scotland, UK; jenvardy@doctors.org.uk

Accepted 12 December 2006

REFERENCES

- 1 **Health Protection Agency**. Influenza pandemic contingency plan. http://www.hpa.org.uk/infections/topics_az/influenza/pandemic/fluplan.htm
- 2 UK Health Department Influenza pandemic contingency plan (October 2005 edition). <http://www.dh.gov.uk/assetRoot/04/12/17/44/04121744.pdf> (accessed 2 Feb 2007).
- 3 **BBC News website**. Timeline: birdflu in the UK. http://news.bbc.co.uk/2/hi/uk_news/4882824.stm (accessed 2 Feb 2007).
- 4 **Health Protection Scotland**. Algorithm for the management of returning travellers from countries affected by avian influenza A (H5N1) presenting with febrile respiratory illness: recognition, investigation and initial management. <http://www.documents.hps.scot.nhs.uk/respiratory/avian-influenza/aialgorithms/a3p3.pdf>.
- 5 **Health Protection Scotland**. Respiratory Protection for Influenza – What are the options? <http://www.documents.hps.scot.nhs.uk/hai/infection-control/faqs/ffp3-faqs.pdf>.
- 6 **Health Protection Scotland**. Post-exposure prophylaxis (PEP) for contacts of confirmed human cases of avian influenza (H5N1) in the UK. <http://www.documents.hps.scot.nhs.uk/respiratory/avian-influenza/aialgorithms/b3p3.pdf>.