

The global swine flu pandemic 2: infection control measures and preparedness strategies

Exploring the infection prevention and control measures that nurses need to know about to effectively deal with the swine flu pandemic

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This second in a two-part unit on swine flu looks at infection control measures for nurses.

During late spring and early summer, increasing numbers of people became infected with novel swine origin influenza type A virus (influenza A (H1N1)v 2009) and a global pandemic started.

Part 1 of this unit explored the biology of influenza viruses and the origins and characteristics of flu pandemics. This part reviews viral transmission, infection prevention and control and pandemic preparedness.

INTRODUCTION

As a global flu pandemic caused by A(H1N1)v 2009 virus has been declared by the World Health Organization (2009a), governments are implementing their pandemic preparedness strategies.

The UK government has a national framework for responding to a flu pandemic (Cabinet Office and Department of Health, 2007) and all NHS organisations and health protection agencies have action plans. These aim to ensure the resources, staff and well rehearsed plans are in place.

Staff need to be familiar with workplace pandemic preparedness plans and understand their role in containing and reducing the impact of swine flu. Everyone needs to be confident they can play their part in ensuring effective care, while protecting other patients and themselves from infection.

BACKGROUND

The WHO is responsible for international surveillance of flu outbreaks and establishing the potential for a global pandemic. Criteria are used to categorise the evolution of outbreaks into 'pandemic alert phases' (Fig 1).

LEARNING OBJECTIVES

- Be familiar with the elements of national and local pandemic preparedness strategies.
- Understand appropriate flu prevention and control approaches.

From February 2009, the WHO incrementally increased these phases until phase 6 was declared in June. That meant there was definitive evidence of increased and sustained person to person transmission of A(H1N1)v 2009 in different countries. This indicates this much anticipated global flu pandemic is under way, and no one knows the full impact it will have (WHO, 2009b).

Minimising risk

Measures to limit transmission are described in detail in the UK flu preparedness plan (Cabinet Office and DH, 2007) and in evidence based guidance from national and international health agencies (Box 1).

The core elements of flu preparedness plans designed to contain or mitigate the impact of pandemic flu include:

- Pandemic virus-specific vaccination (if available);
- Early identification of infected people and treatment with antiviral drugs;
- Respiratory hygiene (cough etiquette);
- The use of infection prevention and control measures during episodes of healthcare (especially hand hygiene).

VIRAL TRANSMISSION

Influenza viruses spread easily from person to person via the respiratory route and also from hand-to-face contact if hands are contaminated. Droplet and contact transmission are the most likely routes.

Droplet transmission

The main method of viral transmission is via large respiratory droplets generated by a person who is infected during coughing, sneezing or talking. Viral transmission requires close personal contact because these droplets are too large to remain suspended in the air and can usually only travel short distances through the air (not more than 1m).

BOX 1. PANDEMIC FLU WEBSITES FOR HEALTHCARE PROVIDERS

- World Health Organization – *Global Alert and Response – Pandemic (H1N1) 2009*
tinyurl.com/global-alert
- UK government
www.direct.gov.uk/en/swineflu
- Department of Health (England) – pandemic flu web resource
tinyurl.com/DH-pandemic-flu
- Health Protection Agency (England) – *Pandemic Influenza*
tinyurl.com/HPA-pandemic-influenza
- Health Protection Scotland
Pandemic Flu – Guidance for Infection Control in Hospitals and Primary Care Settings
tinyurl.com/pandemic-flu-guidance
- Cabinet Office and Department of Health – *Pandemic Flu – A National Framework for Responding to an Influenza Pandemic*
tinyurl.com/influenza-framework
- NHS (England)
National Pandemic Flu Service
www.pandemicflu.direct.gov.uk/
- Department of Health and Health Protection Agency – *Pandemic Influenza: Guidance for Infection Control in Hospitals and Primary Care Settings*
tinyurl.com/dhguidance-infection
- *Pandemic Influenza: Guidance for Infection Control in Critical Care*
tinyurl.com/dhinfection-critical-care
- Centers for Disease Control and Prevention (US)
www.pandemicflu.gov
- Health and Human Services (US) – *HHS Pandemic Influenza Plan, Supplement 4 Infection Control*
tinyurl.com/supplement-infection

Contact transmission

Contact transmission is an important means by which influenza viruses are transmitted, especially via contaminated hands which touch the face and transfer virus to the conjunctiva or to mucous membranes of the nose or mouth.

Direct or indirect contact transmission can easily occur, for instance, when shaking hands with an infected person whose hands are contaminated (as a result of using them to cover their mouth and nose when coughing). Hands can also become contaminated by touching contaminated objects, such as stainless steel counters, table tops and plastic washing up bowls, where the virus can survive for up to 24 hours (Weber and Stilianakis, 2008).

Research has suggested that influenza viruses can survive for several days on bank notes. Investigators said that “considering that hundreds of billions of banknotes are probably exchanged every day worldwide, infection from hands contaminated with virus picked up from virus-contaminated banknotes cannot be totally ignored” (Thomas et al, 2008).

Airborne transmission

Although aerosol-generating procedures, such as endotracheal intubation, suctioning, nebuliser treatment or bronchoscopy could increase the risk of droplet nuclei (1–10µm in diameter) transmission, there is no reliable evidence that in other circumstances small particle aerosols are significantly involved in influenza virus transmission (Brankston et al, 2007; Lemieux et al, 2007).

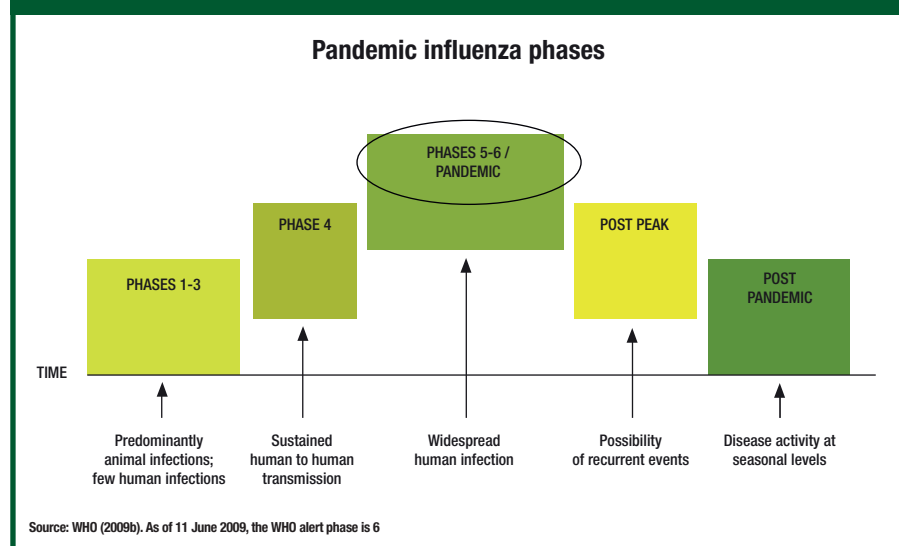
However, some scientific opinion cautions against dismissing completely the significance of airborne transmission of influenza viruses (Atkinson and Wein, 2008). New and evolving research can challenge many of the truisms currently accepted in this fast moving field.

Influenza virus survival and inactivation

Influenza viruses are susceptible to a wide range of detergents and disinfectant chemicals (especially chlorine solutions). They are therefore easier to kill in the environment than many other types of viruses and other micro-organisms.

Influenza A virus can survive for at least five minutes when transferred to the hands. As guidance from Health Protection Scotland (Box 1) points out, this is long enough for self inoculation of the conjunctiva or mucous membranes, and for

FIG 1. WHO CURRENT PANDEMIC ALERT PHASE



the virus to be transferred by touch from contaminated hands to other surfaces.

It is reassuring, then, that research has shown that the influenza A virus is destroyed within 30 seconds by alcohol hand disinfectant (Schurmann and Eggert, 1983).

INFECTION CONTROL AND PERSONAL HYGIENE

The general public can take basic infection control measures to minimise the risk of infection to themselves and to others. These include (Cabinet Office and DH, 2007):

- Staying at home when ill;
- Covering the nose and mouth with a tissue when coughing or sneezing;
- Disposing of dirty tissues promptly and carefully – bagging and binning them;
- Washing hands frequently with soap and water, or using alcoholic hand disinfectants to reduce spread of the virus from hands to the face, or to other people, particularly after blowing the nose or disposing of tissues;
- Cleaning frequently touched hard surfaces, such as kitchen worktops, light switches and door handles, and regularly using normal cleaning products;
- Avoiding crowded gatherings where possible, especially in enclosed spaces;
- If suffering with flu symptoms, wearing a disposable face mask to protect others should it become essential to go out, for example, to go to hospital;
- Making sure children follow this advice.

The guidance states that “adopting such measures can help mitigate the overall health and wider impact of a pandemic by lowering

the clinical attack rate and slowing its development, thereby spreading peak demand on services and enabling them to respond more effectively” (Cabinet Office and DH, 2007).

This document also provides guidance to the public on: using face masks and respirators; restrictions on travel within the UK; restrictions on public gatherings; school closures; and pre-pandemic vaccination.

Key points from guidance are:

- The general wearing of face masks in public places by those who do not have flu symptoms is not recommended (and face masks will not be supplied by government);
- Restrictions on travel within the UK would have little positive impact on the total number affected by flu over the entire course of a pandemic and would exacerbate the economic impact, increasing social disruption and adding to business/service continuity. Consequently, the government is unlikely to impose restrictions on internal travel, unless it becomes necessary for public health reasons as the pandemic develops;
- The government is unlikely to issue a blanket ban on public gatherings, but it may do so if circumstances indicate it would be prudent to do so to protect the public;
- The government would take decisions on advising school closures on the basis of an assessment of the emerging characteristics and impact as the pandemic develops;
- Although a population-wide vaccination campaign is unlikely to be possible before or during the first pandemic wave, vaccination may help to reduce the impact of subsequent

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waves. A pandemic strain-specific vaccine is scheduled to become available in the UK by mid-October at the earliest. The government intends to offer this first to high risk groups and eventually the entire population.

Further information for the public, including an online/telephone diagnosis and authorisation for accessing antiviral medication, is available from the National Pandemic Flu Service (Box 1, p16).

HOSPITAL INFECTION CONTROL

As large numbers of seriously ill people with flu will require hospital admission, consistently applying clinically effective infection prevention and control measures is essential in protecting all patients from nosocomial transmission of flu viruses.

Effective infection prevention and control measures are comprehensively described in the two pandemic influenza guidance for infection control in hospitals and primary care settings documents and in *Pandemic Influenza: Guidance for Infection Control in Critical Care* (Box 1, p16). All acute care providers need to be familiar with this guidance and to consistently incorporate its recommendations into routine practice.

The DH and HPA (2007) outline key points for infection prevention and control practice. These include:

- Standard infection control principles (Pratt et al, 2007) and droplet precautions (see below) must be used where patients have or are suspected of having flu;
- Good hand hygiene among staff and patients is vital to protect both groups;
- Good respiratory hygiene is essential;
- The use of personal protective equipment should be proportionate to the risk of contact with respiratory secretions and other body fluids and should depend on the type of work or procedure being done. This guidance also clarifies the appropriate use of different types of face masks and respirators.

Applying droplet precautions

The DH and HPA (2007) describe means for applying droplet infection control precautions, which include the following recommendations:

Placing patients in the facility:

- Ideally patients with flu should be placed in single rooms or cohorted (grouped with other patients who have flu and no other infections) in a segregated area;
- Where patients are cohorted on the basis of epidemiological and clinical information rather than on laboratory-confirmed

diagnosis, beds should be at least 1m apart;

- Since flu viruses are mainly transmitted by large respiratory droplets and by contact with hands and surfaces contaminated by these droplets, special ventilation is not necessary; the doors of segregated areas can remain open (unless a patient is isolated in a single room for an additional reason that requires the doors to be shut).

Personal respiratory protection:

- Fluid repellent surgical masks should be worn by healthcare workers for any close contact with patients, that is, within 1m. These masks provide a physical barrier and minimise contamination of the nose and mouth by respiratory droplets from patients. Disposable respirators that provide the highest possible protection factor – FFP3 respirators – should be worn while carrying out procedures that could generate aerosols. If an FFP3 respirator is not available, the next highest category should be worn, that is, an FFP2 respirator (DH and HPA, 2007).

Environmental cleaning and disinfection in hospitals: this guidance recommends the following measures:

- Freshly prepared neutral detergent and warm water should be used for cleaning the hospital or other healthcare environments;
- As a minimum, areas used for cohorted patients should be cleaned daily;
- Clinical rooms should be cleaned at least daily and also between clinical sessions for patients with flu and those for patients not infected with flu, if the same room is used;
- Frequently touched surfaces should be cleaned at least twice daily and when known to be contaminated with secretions, excretions or body fluids;
- Domestic staff should be allocated to

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- Pratt, R.J. et al (2007) epic2: national evidence-based guidelines for preventing healthcare-associated infections

specific areas and not moved between flu and non-flu areas;

- Domestic staff must be trained in using personal protective equipment (PPE) and in precautions to take when cleaning cohorted areas. They should wear gloves and aprons; and, when cleaning in the immediate patient environment in cohorted areas, they should also wear a surgical mask;
- Dedicated or single-use equipment should be used when possible. Non-disposable equipment should be decontaminated or laundered after use in line with local policy;
- Any spillage or contamination of the environment with secretions, excretions or body fluids should be treated in line with local spillage policy.

CONCLUSION

All nurses, doctors, midwives, HCAs and support staff need to quickly become expert in the prevention, control and containment of this critical event. ●

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