

PANDEMIC (H1N1) 2009 INFLUENZA

**A summary of guidance for
infection control in healthcare settings**



DH INFORMATION READER BOX

Policy	Estates HR/Workforce Management Commissioning IM&T Planning/Performance Finance Clinical Social Care/Partnership Working
Document purpose	For information
Gateway reference	13016
Title	Pandemic (H1N1) 2009 Influenza – A summary of guidance for infection control in healthcare settings
Author	HPIH&SD PIP
Publication date	December 2009
Target audience	Directors of nursing, directors of infection prevention and control, infection control teams
Circulation list	
Description	Summary infection control guidance specific to current pandemic (H1N1)
Cross reference	<i>Guidance for pandemic influenza: Infection control in hospitals and primary care settings</i>
Superseded documents	<i>Pandemic flu: A summary of guidance for infection control in health care settings</i>
Action required	N/A
Timing	N/A
Contact details	Pandemic Flu Team Department of Health 451C Skipton House 80 London Road London SE1 6LH
For recipient's use	

Acknowledgement

The Department of Health and the Health Protection Agency are grateful for the assistance of the Health and Safety Executive in the preparation of this document.

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1 Introduction

This document is an updated version of *Pandemic flu: A summary of guidance for infection control in health care settings* issued in September 2007.¹ It is specific to the current pandemic influenza virus, pandemic (H1N1) 2009, and thus represents current guidance.

This guidance document has been written for the NHS, but the infection control principles apply to other settings delivering healthcare. This guidance should be used for all patients with suspected or confirmed pandemic (H1N1) 2009 influenza. Additional pandemic influenza information and guidance is available on the Department of Health (DH) website (www.dh.gov.uk) and the Health Protection Agency (HPA) website (www.hpa.org.uk).

This guidance includes new or updated information regarding:

- transmission characteristics of pandemic (H1N1) 2009 influenza (section 3.1)
- aerosol-generating procedures (section 4.3)
- occupational health – deployment of staff at high risk of complications from influenza (section 6)
- setting-specific guidance for mortuaries and dental surgeries (sections 7.1 and 7.2).

This document is based on the currently available virological and epidemiological knowledge about pandemic (H1N1) 2009 influenza. Further updates may be made in the future if required as new details and evidence emerge. Please check www.dh.gov.uk for the most up-to-date guidance.

2 Background

2.1 Emergence of the pandemic

Influenza pandemics arise when a new influenza virus, such as pandemic (H1N1) 2009, emerges to which there is little immunity in the population and which is capable of spreading effectively from person to person. In mid-April 2009, a novel strain of influenza A/H1N1 was identified in California, and this was subsequently found to be the cause of severe illness in Mexico. The World Health Organization (WHO) declared the existence of a global influenza pandemic on 11 June. The first cases were reported in the UK on 27 April, and the first wave of infection in the UK occurred during June and July 2009.

WHO has reported that the clinical picture is largely consistent across all countries and that the patterns of illness are not the same as those seen during seasonal influenza epidemics: internationally, higher attack rates have been seen in children and much lower attack rates in older adults.

Revised planning assumptions for pandemic (H1N1) 2009 influenza have been published by the Department of Health.² In October 2009, the worst case scenario for planning purposes was that 12% of the population would become unwell with pandemic influenza between that time and the end of the normal influenza season.² However, children under 16 are significantly more susceptible to the virus, and up to 30% may fall ill during the second wave.²

Updated modelling will be made available on the DH (www.dh.gov.uk) and HPA (www.hpa.org.uk) websites as required.

2.2 Clinical features

Seasonal influenza is a respiratory illness with a wide range of symptoms. It is characterised by the sudden onset of fever and cough, with other common symptoms being chills, headache, sore throat, and aching muscles and joints.

The clinical presentation of pandemic (H1N1) 2009 influenza is broadly similar to seasonal influenza. In the UK, around 20% of people with pandemic influenza also report diarrhoea and vomiting – a higher proportion than with seasonal influenza. Only a small minority of confirmed cases have become severely ill or died.

The incubation period for pandemic (H1N1) 2009 influenza (the time between catching influenza and showing symptoms) can be up to seven days but is most likely to be between two and five days.³

The following clinical diagnostic criteria are used in the UK for pandemic (H1N1) 2009 influenza:

- fever (pyrexia $\geq 38^{\circ}\text{C}$) or a history of fever

AND

- influenza-like illness (two or more of the following symptoms: cough; sore throat; rhinorrhoea; limb or joint pain; headache; vomiting or diarrhoea) OR
- severe and/or life-threatening illness suggestive of an infectious process.

Up-to-date epidemiological details of pandemic (H1N1) 2009 influenza are available at www.hpa.org.uk

3 Transmission characteristics and principles of infection control

3.1 Transmission and survival characteristics of the virus

Infection control advice for pandemic influenza is based on the current knowledge of pandemic (H1N1) 2009 influenza and, where there is no information specific to pandemic (H1N1) 2009, on the assumption that the transmission characteristics of pandemic influenza are similar to those of seasonal influenza.

- Although transmission of pandemic (H1N1) 2009 influenza within healthcare settings and to healthcare workers has been reported,⁴ person-to-person spread of pandemic (H1N1) 2009 influenza in the community is now well established. Healthcare staff are therefore at risk of contracting influenza during normal day-to-day living and from work colleagues as well as from patients.
- The transmission of pandemic (H1N1) 2009 influenza appears to be similar to seasonal influenza, i.e. transmission occurs mainly through the spread of respiratory droplets by coughing, sneezing and contact with contaminated surfaces.
- Evidence of influenza transmission other than via respiratory droplets is limited. All secretions (except perspiration) and excretions, including diarrhoeal stool, should be regarded as potentially infectious.
- Certain aerosol-generating procedures are thought to be associated with an increased risk of transmission of some respiratory pathogens and, although the evidence for this is not influenza specific, it is thought that this type of transmission may also occur with influenza.
- Individuals are usually considered infectious while they have symptoms, especially fever; how infectious they are depends on how severe their symptoms are and the stage of the illness they are at. Influenza virus has been recovered from infected people before they show symptoms, and possible transmission of pandemic (H1N1) 2009 influenza from pre-symptomatic children has been reported.⁵ However, people are considered to be most infectious just after symptoms start.
- Children, immunocompromised individuals and severely ill people shed virus for longer periods and are likely to be infectious for longer periods than other individuals.
- Influenza viruses can survive on environmental surfaces for varying periods, depending on the type of surface. Detectable virus (by culture) can survive on hard surfaces for up to 48 hours and on porous surfaces for up to 12 hours. Measurable quantities of viable virus can be transferred to hands from hard, non-porous surfaces for up to 24 hours after contamination but from paper tissues for only 15 minutes after contamination.⁶

- Influenza viruses are removed from skin by washing with soap and water or inactivated by using alcohol handrub and similarly can be removed from surfaces by cleaning with normal detergents and cleaners.

3.2 Principles of infection control

Limiting transmission of pandemic (H1N1) 2009 influenza in the healthcare setting requires a range of measures which can be considered as a hierarchy of controls.⁷

Administrative controls are implemented at an organisational level to help prevent the introduction of infection and to control and limit the transmission of infection. Next, environmental/engineering controls will, through effective environmental cleaning and adequate ventilation, physically reduce exposure to infection. Finally, the use of personal protective equipment (PPE) will protect staff, patients and visitors. The use of such a hierarchy attempts to put PPE in context, given that its effectiveness depends on actions at an individual level rather than at an exposure or organisational level where measures are likely to be more effective. The principles below are listed according to such a hierarchy. (Note that this list is not exhaustive but includes key principles and illustrates a useful approach to infection control.)

- Administrative controls:
 - timely recognition of influenza cases
 - maintaining separation in space and/or time between influenza and non-influenza patients, including appropriate patient triage
 - occupational health arrangements, including immunisation of frontline healthcare workers*
 - educating staff, patients and visitors about infection control for influenza, including the importance of good respiratory and hand hygiene
 - consistently and correctly implementing standard and droplet infection control precautions to limit transmission
 - restricting access of ill visitors to the building
 - instructing staff members with symptoms to stay at home and not come in to work
 - planning and implementation of strategies for surge capacity.
- Environmental/engineering controls:
 - environmental cleaning
 - adequate ventilation
 - waste disposal.
- Use of PPE and hand hygiene:
 - using PPE appropriately according to the risk of exposure to the virus
 - consistent and correct hand hygiene.

* For details of the swine flu vaccination programme, see www.dh.gov.uk

4 Infection control precautions

Key points

- Standard infection control precautions and droplet precautions must be used for patients with suspected or confirmed pandemic (H1N1) 2009 influenza.
- Good hand hygiene among staff and patients is an important control measure.
- Good respiratory hygiene is essential, ie 'Catch it, bin it, kill it'.
- The use of PPE 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 undertaken.
- FFP3 respirators should be used during potentially infectious aerosol-generating procedures.

4.1 Standard infection control precautions

Standard infection control precautions (also known as standard infection control principles) and droplet precautions must be used for patients with suspected or confirmed pandemic influenza. Standard infection control precautions:

- are a set of broad statements of good practice to minimise exposure to and transmission of a wide variety of micro-organisms
- should be applied by all healthcare practitioners to the care of all patients all of the time
- are published⁸ and detailed in the full guidance document⁹ and include hand hygiene, use of PPE, safe use and disposal of sharps, and environmental hygiene
- protect against contact transmission of influenza as they include the use of hand hygiene, gloves and aprons to protect from respiratory secretions and other bodily secretions and excretions.

4.1.1 Hand hygiene

Good hand hygiene is essential to reduce the transmission of infection in healthcare settings and is a critical element of standard infection control precautions.

- Hands must be cleaned immediately before every episode of direct care of or contact with patients and after any activity or contact that potentially results in hands becoming contaminated, including the removal of protective clothing (including gloves), cleaning of equipment and handling of waste.
- Hands should be cleaned between caring for different patients and between different care activities for the same patient, even if gloves have been worn.
- Hand hygiene includes hand washing with soap and water and thorough drying, and the use of alcohol-based products (eg alcohol handrub) that do not require the use of water.
- If hands are visibly soiled or contaminated, then they should be washed with soap and water and dried; if not visibly soiled, an alcohol handrub can be used.
- Hand washing and use of alcohol handrub to clean hands must be carried out thoroughly and for a time period sufficient to inactivate the virus, ie 40 to 60 seconds for hand washing (including thorough drying); 20 to 30 seconds when using alcohol handrub.¹⁰
- Touching the face with gloved hands or hands that have not been recently cleaned should be avoided.
- All staff, patients and visitors should clean their hands when entering and leaving areas where care is delivered.

4.1.2 Respiratory hygiene – ‘Catch it, bin it, kill it’

Patients, staff and visitors should be encouraged to minimise potential influenza transmission through good respiratory hygiene measures:

- Hands should be kept away from the eyes, mouth and nose.
- Disposable, single-use tissues should be used to cover the nose and mouth when sneezing, coughing or wiping and blowing noses. Used tissues should be disposed of promptly in the nearest waste bin.
- Tissues, waste bins (preferably lined and foot operated) and hand hygiene facilities should be available for patients, visitors and staff.
- Hands should be cleaned (using soap and water if possible, otherwise using alcohol handrub) after coughing, sneezing, using tissues or after any contact with respiratory secretions and contaminated objects.

- Some patients (eg older people and children) may need assistance with containment of respiratory secretions; those who are immobile will need a container (eg a plastic bag) readily at hand for immediate disposal of tissues.

In common waiting areas or during transport, symptomatic patients may wear surgical masks to minimise the dispersal of respiratory secretions and reduce environmental contamination.

4.2 Applying droplet precautions for pandemic influenza

In addition to standard infection control precautions, droplet precautions should be used for a patient known or suspected to be infected with influenza.

- Droplet transmission occurs as a result of droplets being expelled from the respiratory tract of an infected individual (eg during coughing and sneezing) directly onto a mucosal surface or conjunctiva of a susceptible individual.
- Droplets travel only short distances through the air. Traditionally a distance of 3 feet/1 metre has been used for employing droplet precautions; however, this distance should be considered as the minimum rather than an absolute distance.
- Droplet precautions should be continued until the resolution of fever and respiratory symptoms.

4.2.1 Patient placement

- Ideally, patients with suspected or confirmed influenza should be placed in single rooms. When this is not possible, patients should be cohorted (grouped together with other patients who have influenza or the symptoms of influenza and no other infection) in a segregated area.
- A distance of at least one metre should be maintained between patients' beds; in communal areas where there are no beds, patients should be kept at least one metre apart.
- Special environmental controls, such as negative pressure rooms, are **not** necessary to prevent the transmission of influenza either by respiratory droplets or aerosols.

4.2.2 Fluid repellent surgical masks

- Fluid repellent surgical masks must be worn when working in close contact (within approximately one metre) of a patient with symptoms.
- In an area where influenza patients have been cohorted together, it may be more practical for staff to wear a surgical mask at all times, rather than only when in close proximity to or close contact with a patient.

See section 4.4.3 for more information on surgical masks.

4.2.3 Patient transport

- The movement and transport of patients from their rooms or the cohorted area should be limited to essential purposes only.
- Staff at the destination must be informed that the patient has or is suspected to have influenza.
- If transport or movement is necessary, consider offering the patient a surgical mask to be worn during transport until the patient returns to the segregated area, to minimise the dispersal of respiratory droplets. As an alternative, good respiratory hygiene should be encouraged – ‘Catch it, bin it, kill it’ (see section 4.1.2).
- Hand hygiene is important for staff involved in transfers, and hand hygiene facilities should be offered to patients when feasible.

4.3 Aerosol-generating procedures

It has been suggested that aerosols generated by medical procedures are one route for the transmission of the influenza virus. However, the evidence necessary to establish which aerosol-generating procedures are associated with transmission of influenza or other pathogens is poorly established, with studies being of variable quality and rigour. A WHO review of such studies found that it was not possible to draw recommendations from some of the conclusions due to flaws identified within the methodology.¹¹

From the available literature and incorporating UK expert opinion, the following procedures are considered likely to generate aerosols capable of transmitting influenza when undertaken on patients with influenza, ie are considered to be potentially infectious aerosol-generating procedures:

- intubation, extubation and related procedures, eg manual ventilation and open suctioning
- cardiopulmonary resuscitation
- bronchoscopy
- surgery and post-mortem procedures in which high-speed devices are used (see section 7.1)
- dental procedures (see section 7.2)
- non-invasive ventilation (NIV), eg Bilevel Positive Airway Pressure ventilation (BiPAP) and Continuous Positive Airway Pressure ventilation (CPAP)
- high-frequency oscillating ventilation (HFOV)
- induction of sputum.

For patients with suspected or confirmed influenza, any of these potentially infectious aerosol-generating procedures should only be carried out when essential. Where possible, these procedures should be carried out in well-ventilated single rooms with the doors shut. Only those healthcare workers who are needed to undertake the procedure should be present. A gown, gloves, eye protection and an FFP3 respirator should be worn by those undertaking these procedures and by those in the same room. In post-mortem examinations where high-speed devices are used, the use of a powered respirator can be considered as an alternative to a FFP3 respirator (section 7.1).

The rate of clearance of aerosols in an enclosed space is dependent on the extent of any ventilation – the greater the number of air changes per hour (ventilation rate), the sooner any aerosol will be cleared. The time required for clearance of the aerosol, and thus the time after which the room can be entered without a respirator, can be determined following a risk assessment. The risk assessment should take into account the characteristics of the room – such as whether it is a room in a theatre suite or a ward side room – and, if known, the number of air changes per hour as outlined in WHO guidance.¹¹ Where feasible, environmental cleaning should be performed when it is considered appropriate to enter without a respirator.

Visitors to patients ventilated with NIV or HFOV may be exposed to potentially infectious aerosols. The number of such visitors should be limited where possible. Visitors should be made aware of the risks and be offered PPE as recommended for staff.

Certain other procedures/equipment may generate an aerosol from material other than patient secretions but are not considered to represent a significant infectious risk. Procedures in this category include:

- administration of pressurised humidified oxygen
- administration of medication via nebulisation.

During nebulisation, the aerosol derives from a non-patient source (the fluid in the nebuliser chamber) and does not carry patient-derived viral particles. If a particle in the aerosol coalesces with a contaminated mucous membrane, it will cease to be airborne and therefore will not be part of the aerosol.

For such procedures, gloves, an apron and a surgical mask (plus eye protection if there is a risk of splashes to the eyes) are recommended as per standard infection control and droplet precautions.

4.4 Personal protective equipment (PPE)

4.4.1 Overview

PPE is worn to protect staff from contamination with body fluids and to reduce the risk of transmission of influenza between patients and staff and from one patient to another. Appropriate PPE for care of patients with pandemic influenza is summarised in Table 1. Standard infection control precautions apply at all times.

Table 1: Personal protective equipment for care of patients with pandemic influenza

	Entry to cohorted area but no patient contact	Close patient contact (within one metre) ^a	Aerosol-generating procedures ^b
Hand hygiene	✓	✓	✓
Gloves	✗ ^c	✓ ^d	✓
Plastic apron	✗	✓	✗
Gown	✗	✗ ^{e, f}	✓ ^f
Surgical mask	✓ ^g	✓	✗
FFP3 respirator	✗	✗	✓
Eye protection ^h	✗	Risk assessment	✓

- a PPE for close patient contact (within one metre) also applies to the collection of nasal or nasopharyngeal swabs.
- b Wherever possible, aerosol-generating procedures should be performed in side rooms or other closed single-patient areas with only essential staff present.
- c Gloves and an apron should be worn during environmental cleaning procedures (see section 5.1).
- d Gloves should be worn in accordance with standard infection control precautions. If glove supplies become limited or come under pressure, this recommendation may need to be relaxed. Glove use should be prioritised for contact with blood and body fluids, invasive procedures and contact with sterile sites.
- e Consider a gown in place of an apron if extensive soiling of clothing or contact of skin with blood and other body fluids is anticipated (for example, during intubation or caring for babies).
- f If non-fluid repellent gowns are used, a plastic apron should be worn underneath.
- g Surgical masks are recommended for use at all times in cohorted areas for practical purposes. This would include non-clinical staff in healthcare facilities, eg reception staff working in an influenza clinic in primary care. If surgical mask supplies become limited or come under pressure, then their use in cohorted areas should be limited to close contact with a symptomatic patient (within one metre).
- h Eye protection is required to be worn as part of standard infection control precautions when there is a risk of blood, body fluids, excretions or secretions splashing into the eyes. Surgical masks with integrated visors are an option for eye protection.

Regardless of whether staff have had pandemic (H1N1) 2009 influenza or have received the pandemic vaccine they should continue to follow the infection control precautions, including PPE, as outlined in this document.*

PPE should comply with the relevant BS EN standards (European technical standards as adopted in the UK) where these apply.

4.4.2 Eye protection

- As part of standard precautions, eye protection should be used when there is a risk of contamination of the eyes from splashing, eg by secretions (including respiratory secretions), blood, body fluids or excretions.
- An individual risk assessment should be carried out at the time of providing care.
- Disposable, single-use eye protection is recommended.
- Eye protection should always be worn by all those present in the room during potentially infectious aerosol-generating procedures.

4.4.3 Surgical masks

Surgical masks are worn to protect the wearer from the transmission of influenza by respiratory droplets. A recent trial suggests that masks and respirators offer a similar level of protection to each other against infection with influenza to healthcare workers during routine patient care (this does not apply to infectious aerosol-generating procedures).¹²

- Surgical masks should be fluid repellent and should be worn by healthcare workers for any close contact with patients with influenza symptoms (ie within approximately one metre). The mask will provide a physical barrier and minimise contamination of the nose and mouth by droplets.
- When pandemic influenza patients are cohorted in one area and several patients must be visited over a short time or in rapid sequence, it may be more practical for staff to put on a surgical mask on entry to the area and to keep it on for the duration of the activity or until the surgical mask requires replacement (ie when it becomes wet or damaged).

* Employers are under a legal obligation – under control of substances hazardous to health (COSHH) – to adequately control the risk of exposure to the virus where exposure can't be prevented. Employees have an obligation to make full and proper use of any control measures, including PPE, provided by their employer. Vaccination cannot be used as a substitution for such controls as it is not always fully effective in all cases.

- In outpatient settings – general practice, dental surgeries, accident and emergency (A&E) or similar – it may be more practical for staff working in the segregated area for influenza patients to put on a surgical mask on entry to the area and to keep it on for the duration of the activity or until the surgical mask requires replacement.
- Surgical masks should:
 - cover both nose and mouth
 - not be allowed to dangle around the neck after or between each use
 - not be touched once put on
 - be changed when they become moist or damaged
 - be worn once and then discarded as clinical waste – hand hygiene must be performed after disposal.

4.4.4 Respirators

A disposable respirator providing the highest possible protection factor available (ie an EN149:2001 FFP3 disposable respirator) should be worn by healthcare workers when performing procedures that have the potential to generate infectious aerosols (see section 4.3). FFP3 support training materials are available on the DH website (www.dh.gov.uk).

Fitting the respirator correctly is critically important for it to provide proper protection. Every user should be fit tested and trained in the use of the respirator. In addition to the initial fit test carried out by a trained fitter, a fit check should be carried out each time a respirator is worn. Health and Safety Executive guidance on fit testing is available at www.hse.gov.uk/pubns/fittesting.pdf.¹³

A good fit can only be achieved if the area where the respirator seals against the skin is clean shaven. Beards, long moustaches and stubble may cause leaks around the respirator. Other types of respiratory protective equipment (eg powered hoods and helmets) are available and should be considered if a good fit cannot be achieved with disposable respirators. A powered respirator might be the only type suitable for some healthcare workers, for example someone who, perhaps for cultural reasons, prefers not to remove their beard.

Disposable respirators should be replaced after each use and changed if breathing becomes difficult, the respirator is damaged or distorted, the respirator becomes obviously contaminated by respiratory secretions or other body fluids, or if a proper face fit cannot be maintained. Respirators should be disposed of as clinical (also known as infectious) waste.

4.4.5 Putting on and removing personal protective equipment

Putting on PPE

The level of PPE used will vary according to the procedure being carried out, and not all items of PPE will always be required. PPE should be put on before entering a side room or cohorted area. If full PPE is required, for example for a potentially infectious aerosol-generating procedure, all staff in the room or entering within one hour of the procedure should wear the following PPE put on in the following order:

1. Gown (or apron if not a potentially infectious aerosol-generating procedure)
2. FFP3 respirator (or surgical mask if not a potentially infectious aerosol-generating procedure)
3. Eye protection, ie goggles or face shield (for a potentially infectious aerosol-generating procedure and as appropriate after risk assessment)
4. Disposable gloves.

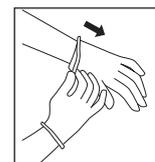
The order given above is practical but the order for putting on is less critical than the order of removal given below.

Removal of PPE

PPE should be removed in an order that minimises the potential for cross-contamination. Before leaving the side room or cohorted area, gloves, gown and eye protection should be removed (in that order, where worn) and disposed of as clinical (also known as infectious) waste. After leaving the area, the respirator (or surgical mask) can be removed and disposed of as clinical waste. Guidance on the order of removal of PPE is as follows:

1. Gloves

- Grasp the outside of the glove with the opposite gloved hand; peel off.
- Hold the removed glove in gloved hand.
- Slide the fingers of the ungloved hand under the remaining glove at the wrist.
- Peel the second glove off over the first glove and discard appropriately.



2. Gown or apron

- Unfasten or break ties.
- Pull gown or apron away from the neck and shoulders, touching the inside of the gown only.
- Turn the gown or apron inside out, fold or roll into a bundle and discard.



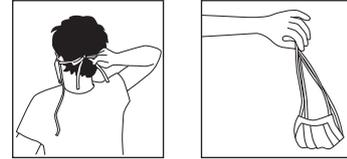
3. Eye protection

- To remove, handle by headband or earpieces and discard appropriately.



4. Respirator or surgical mask

- Untie or break bottom ties, followed by top ties or elastic, and remove by handling ties only and discard appropriately.



To minimise cross-contamination, the order outlined above should be applied even if not all items of PPE have been used.

Clean hands thoroughly immediately after removing all PPE.

4.5 Segregation and cohorting

4.5.1 Hospital settings

- When it is no longer feasible to isolate patients in single rooms, influenza patients should be cohorted in segregated areas of the hospital to help contain influenza infection within one part of the hospital and reduce the risk to other patients.
- A designated self-contained area or wing of the hospital should be used for the treatment and care of patients with pandemic influenza whenever possible. This area should:
 - include a reception area that is separate from the rest of the hospital and should, if feasible, have a separate entrance/exit from the rest of the hospital
 - not be used as a thoroughfare by other patients, visitors or staff, including patients being transferred, staff going for meal breaks, and staff and visitors entering and exiting the building
 - be separated from non-segregated areas by closed doors.
- To control entry, signage should be displayed warning of the segregated influenza area.
- The provision of surgical masks to patients with suspected or confirmed pandemic influenza to be worn from the point of assessment or triage in any healthcare setting (except when in a dedicated influenza area) should be considered. As an alternative to a mask, good respiratory hygiene should be encouraged – ‘Catch it, bin it, kill it’ (see section 4.1.2).

4.5.2 Primary care, walk-in centres, assessment centres, A&E, dental surgeries

- In primary care and similar outpatient settings, influenza (and suspected influenza) patients should be segregated in place or time from non-influenza patients.
- Primary care trusts may make arrangements for distinct influenza and non-influenza GP and dental practices. If a healthcare facility is seeing both influenza and non-influenza patients, a separate area within the facility should be used for influenza patients, including separate waiting and reception areas if possible.
- Alternatively, influenza patients should be seen at a different time from non-influenza patients, with cleaning of shared areas taking place between influenza and non-influenza clinics.
- The influenza area should be separated from non-segregated areas by closed doors. To control entry, signage should be displayed warning of the segregated influenza area.
- The provision of surgical masks to patients with suspected or confirmed pandemic influenza to be worn from the point of assessment or triage in any healthcare setting (except when in a dedicated influenza area) should be considered. As an alternative to a mask, good respiratory hygiene should be encouraged – ‘Catch it, bin it, kill it’ (see section 4.1.2).

4.6 Visitors

- Visitors to all areas of the hospital or healthcare facility should be kept to a minimum.
- Visitors with influenza symptoms should not enter the healthcare facility and should be encouraged to return home.
- It is particularly important that every effort is made to ensure that people with influenza symptoms do not enter wards or units – such as haematology and transplant units – where there are immunocompromised patients.
- All visitors entering a cohorted area must be instructed on hand hygiene practice and the use and removal of appropriate PPE, ie a surgical mask, when in a cohorted area, and a surgical mask, gloves and apron for close patient contact (see section 4.3 concerning visitors of patients undergoing prolonged aerosol-generating procedures, ie NIV and HFOV).

5 Environmental infection control

5.1 Environmental cleaning

- Freshly prepared detergent and warm water should be used for cleaning in hospitals and other healthcare environments. Influenza viruses are removed by detergent, so it is not necessary to enhance cleaning with chlorine-based disinfectants.
- Areas used for cohorted patients should be cleaned at least daily.
- Clinical rooms should be cleaned at least daily and after clinical sessions for patients with influenza.
- Frequently touched surfaces such as medical equipment and door handles 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 specific areas and not moved between influenza and non-influenza areas.
- Domestic staff should be trained in which PPE to use and the correct methods of wearing and removing PPE. In addition to gloves and an apron, a surgical mask should be worn for cleaning in cohorted areas.

5.2 Clinical and non-clinical waste

- No special procedures beyond those required to conform with standard infection control precautions are recommended for handling clinical waste (also known as infectious waste) and non-clinical waste that may be contaminated with influenza virus.
- DH has published guidance on the safe disposal of healthcare waste: *Health Technical Memorandum 07-01: Safe Management of Healthcare Waste*.¹⁴

5.3 Linen and laundry

- No special procedures beyond those required to conform with standard infection control precautions are recommended for handling linen. Linen should be categorised as 'used' or 'infected' as per the NHS Executive's *Health Service Guideline (95)18: Hospital Laundry Arrangements for Used and Infected Linen*.¹⁵
- Both 'used' and 'infected' linen must be handled, transported and processed in a manner that prevents exposures to skin and mucous membranes of staff, contamination of their clothing and the environment, and infection of other patients. Gloves and an apron should be worn when handling used linen. Hands should be cleaned after removing PPE.

5.4 Staff uniforms

- The appropriate use of PPE will protect uniforms from contamination in most circumstances. No additional precautions regarding uniforms and workwear are required during the influenza pandemic. DH has issued *Uniforms and Workwear: An evidence base for developing local policy*.¹⁶

5.5 Crockery and utensils

- The combination of hot water and detergent used in dishwashers is sufficient to decontaminate dishes and eating utensils used by patients with influenza. Washing up by hand using household detergent and hand-hot water is also sufficient. There is no need to use disposable plates and cutlery.

5.6 Furnishings

- All non-essential furniture and other non-essential items, such as toys, books and magazines, should be removed from reception and waiting areas, consulting and treatment rooms, A&E departments and day rooms and lounges.

6 Occupational health and staff deployment

- Prompt recognition of cases of influenza among healthcare workers is essential to limit the spread of the pandemic.
- Healthcare workers with influenza should not come to work.
- As a general principle, healthcare workers who provide care in areas for pandemic influenza patients should not care for other patients, although exceptions may be necessary.
- A risk assessment is required for health and social care workers at high risk of complications from influenza, including pregnant staff. Employers should discuss with employees who are at risk or are pregnant the need to be deployed away from areas used for the care of those who have, or are clinically suspected of having, pandemic influenza; or, in the primary care setting, from clinics set up to manage people with influenza-like symptoms. More information for staff who are pregnant or in other at-risk groups is available at www.dh.gov.uk/en/publichealth/flu/swineflu/dh_107655.¹⁷ As part of their employer's duty of care, occupational health departments or providers should ensure that advice is available to all healthcare staff, including specific advice to those at risk from complications.
- Bank, agency and locum staff should follow the same deployment advice as permanent staff.
- In the event of a breach in infection control procedures, eg an incorrectly worn FFP3 respirator during a potentially infectious aerosol-generating procedure, staff should be reviewed by occupational health departments or providers, and post-exposure prophylaxis may be considered.
- Occupational health departments or providers should lead on the implementation of systems to monitor for illness and absence.
- Occupational health departments or providers should facilitate access of staff to antiviral treatment where necessary and implement a vaccination programme for the healthcare workforce.

- As part of their employer's duty of care, occupational health departments or providers have a role to play in ensuring that fit testing programmes are in place for those who may need to wear FFP3 respirators.
- Where possible, staff who have had confirmed pandemic influenza or who have been vaccinated should work in the cohorted areas and care for influenza patients. Such staff should continue to follow the infection control precautions, including PPE, as outlined in this document.

7 Specific settings

7.1 Mortuaries

Where clinically indicated, post-mortem examinations may yield vital clinico-pathological information that may be of importance in refining recommendations related to prevention and treatment of infection.

- The post-mortem examination should be conducted in a suitably equipped mortuary, and the standard precautions for autopsy work (scrub suit, complete cover gown, apron, gloves with cut-resistant undergloves and visor eye protection) should be used.
- For aerosol-generating procedures, eg when using high-powered cutting tools, appropriate respiratory protection should also be worn. The required protection can be achieved by using a properly fitting FFP3 respirator, a properly fitting half mask (these are re-usable respirators) and P3 filter, or a powered respirator hood/visor. A powered respirator may be preferable for long duration work or where problems arise with mask fit or compatibility with other PPE items.

7.2 Dental surgeries

- Only urgent dental work should be carried out on patients with symptoms of influenza.
- Patients with influenza symptoms should be identified rapidly and triaged to determine whether urgent treatment (ie treatment prior to resolution of symptoms) is required.
- Patients with influenza symptoms should be segregated from other patients in time or space. This is likely to involve seeing such patients at the end of surgery with appropriate cleaning afterwards.
- PPE as appropriate for infectious aerosol-generating procedures should be worn for dental treatment of patients with symptoms of influenza, ie gloves, a gown and an FFP3 respirator (see section 4.4.4).
- Further guidance is given in the BDA advice sheet *Infection Control in Dentistry*¹⁸ and in *Pandemic influenza: Guidance for dental practices*.¹⁹

7.3 Antiviral collection points

Antiviral collection/distribution points may be in a variety of settings, eg health centres, pharmacies. Although instructions will have been given for a well 'flu friend' to collect antivirals on behalf of an individual with infection, it is possible that someone with symptoms of influenza may present themselves. In these circumstances, staff at the collection point should:

- offer the individual a surgical mask to wear or encourage good respiratory hygiene – 'Catch it, bin it, kill it' (see section 4.1.2)
- keep contact with the individual to a minimum
- clean their hands after being close to the individual with suspected influenza
- clean surfaces that are likely to have been contaminated.

8 References

1. Department of Health and Health Protection Agency. *Pandemic flu: A summary of guidance for infection control in healthcare settings*. DH, 2007. Available at www.dh.gov.uk/en/Publichealth/Flu/PandemicFlu/DH_078752
2. Department of Health and Cabinet Office. *Swine Flu: Guidance for planners*. DH, 22 Oct 2009. Available at www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_107413
3. Department of Health. Chapter 23a: 'Pandemic influenza A(H1N1)v 2009 (swine flu)'. In *Immunisation against infectious disease – 'The Green Book'*. DH, 2009. Available at www.dh.gov.uk/en/Publichealth/Healthprotection/Immunisation/Greenbook/DH_4097254
4. US Centers for Disease Control and Prevention. Novel influenza A (H1N1) virus infections among health-care personnel – United States, April–May 2009, *MMWR* 2009;58(23); 641–5. Available at www.cdc.gov/mmwr/preview/mmwrhtml/mm5823a2.htm?s_cid=mm5823a2_e
5. Smith A, Coles S, Johnson S, Saldana L, Ihekweazu C, O'Moore E. An outbreak of influenza A(H1N1)v in a boarding school in South East England, May–June 2009. *Euro Surveill* 2009;14(27):pii=19263. Available at www.eurosurveillance.org/Images/dynamic/EE/V14N27/art19263.pdf
6. Bean B, Moore BM, Sterner B, Petersen LR, Gerding DN, Balfour HH Jr. Survival of influenza viruses on environmental surfaces. *J Infect Dis* 1982;146:47–51.
7. World Health Organization. *Infection prevention and control in health care for confirmed or suspected cases of pandemic (H1N1) 2009 and influenza-like illnesses: Interim guidance 25 June 2009*. WHO 2009. Available at www.who.int/csr/resources/publications/swineflu/swineinfinfcont/en/index.html
8. Pratt RJ, Pellowe C, Wilson JA et al. epic2: National Evidence-Based Guidelines for preventing healthcare-associated infections in NHS hospitals in England, *J Hosp Infect* 2007;65(suppl):S1–64. Available at www.epic.tvu.ac.uk/PDF%20Files/epic2/epic2-final.pdf
9. Department of Health and Health Protection Agency. *Pandemic Influenza: Guidance for infection control in hospitals and primary care settings*. DH, 2007. Available at www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080771

10. World Health Organization and World Alliance for Patient Safety. *WHO Guidelines on Hand Hygiene in Health Care*. WHO, 2009. Available at http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf
11. World Health Organization. *Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care*. WHO, 2007. Available at www.who.int/csr/resources/publications/WHO_CDS_EPR_2007_6c.pdf
12. Loeb M, Dafoe N, Mahony J et al. Surgical mask vs N95 respirator for preventing influenza among health care workers: a randomized trial. *JAMA* 2009;302(17):1865–71 (doi:10.1001/jama.2009.1466). Available at <http://jama.ama-assn.org/cgi/content/full/302/17/1865>
13. Health and Safety Executive. *Operational Circular 282/28: Fit Testing of Respiratory Protective Equipment Facepieces*. HSE, 2003. Available at www.hse.gov.uk/pubns/fittesting.pdf
14. Department of Health. *Health Technical Memorandum 07-01: Safe Management of Healthcare Waste*. DH, 2006. Available at www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_063274
15. National Health Services Executive. *Health Service Guideline (95)18: Hospital Laundry Arrangements for Used and Infected Linen*. NHSE, 1995. Available at www.dh.gov.uk/en/Publicationsandstatistics/Lettersandcirculars/Healthserviceguidelines/DH_4017865
16. Department of Health. *Uniforms and workwear: An evidence base for developing local policy*. DH, 2007. Available at www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_078433
17. Department of Health. *Health and Social Care Workers and Pandemic Influenza: Information for staff who are pregnant or in other at-risk groups*. DH, 2009. Available at www.dh.gov.uk/en/publichealth/flu/swineflu/DH_107655
18. Department of Health and British Dental Association. *BDA Advice Sheet A12: Infection control in dentistry*. BDA, 2003. Available at www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4120904
19. Department of Health. *Pandemic influenza: Guidance for dental practices*. DH, 2008. Available at www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_087736



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299967 1p Dec 09

Produced by COI for the Department of Health