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Guidance

Wuhan novel coronavirus (WN-CoV) infection prevention and control guidance

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1. Scope

This guidance outlines infection prevention and control advice for healthcare providers assessing possible cases of WN-CoV. It should be used in conjunction with local policies.

This guidance will remain under review as further scientific information is published about WN-CoV.

2. Introduction

Coronaviruses are mainly transmitted by large respiratory droplets and direct or indirect contact with infected secretions. They have also been detected in blood, faeces and urine and, under certain circumstances, airborne transmission is thought to have occurred from aerosolised respiratory secretions and faecal material.

As coronaviruses have a lipid envelope, a wide range of disinfectants are effective. Personal protective equipment (PPE) and good infection prevention and control precautions are effective at minimising risk but can never eliminate it.

As WN-CoV has only been recently identified, there is currently limited information about the precise routes of transmission. Therefore, this guidance is based on knowledge gained from experience in responding to coronaviruses with significant epidemic potential such as Middle East Respiratory Syndrome Coronavirus (MERS-CoV) and Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV).

WN-CoV infection is classified as an airborne high consequence infectious disease (https://web.archive.org/web/20200122124632/https://www.gov.uk/guidance/high-consequence-infectious-diseases-hcid) (HCID) in the UK.

It is known that both SARS-CoV and MERS-CoV can transmit person to person; although this is not yet confirmed for WN-CoV, it is reasonable to assume that human-to-human transmission is possible.

Emerging information from these experiences has highlighted factors that could increase the risk of nosocomial transmission, such as delayed implementation of appropriate infection prevention and control measures combined persistence of coronavirus in the clinical setting (eg positive PCR detection of MERS-CoV RNA for up to five days after patients' last positive respiratory specimen).

In the absence of effective drugs or a vaccine, control of this disease relies on the prompt identification, appropriate risk assessment, management and isolation of possible cases, and the investigation and follow up of close contacts to minimise potential onward transmission.

Effective infection prevention and control measures, including transmission-based precautions (airborne, droplet and contact precautions) with the recommended personal protective equipment (PPE) are essential to minimise these risks. Appropriate cleaning and decontamination of the environment is also essential in preventing the spread of this virus.

3. Preparedness measures

In preparation, healthcare professionals or facilities that may be involved in the investigation or management and care of possible cases should:

- review their local policies and ensure that operational procedures are described, and staff are familiar with them; for example, where PPE is stored and how it should be used

- review procedures for rapidly decontaminating parts of the healthcare environment where a possible case has been located
- ensure there is a process that would ensure possible cases are identified at presentation leading to the triggering of relevant case management and infection control policies.
- ensure that staff are aware of where a possible case will be isolated and the need for a negative pressure room, if it is available.
- ensure that staff who are assessing or caring for suspected WN-CoV cases are familiar with an FFP3 respirator conforming to EN149, and that fit testing has been undertaken before using this equipment. If an individual cannot use an FFP3 respirator due to inadequate fit, then an alternative with equivalent protection (eg powered hood respirator) must be identified prospectively
- ensure that staff caring for patients with suspected WN-CoV are trained in the safe donning and removal of PPE
- ensure staff know who to contact within their organisation to discuss possible cases
- ensure there is a clear internal procedure for co-ordinating infection control, liaising with the local health protection team (https://web.archive.org/web/20200122124632/https://www.gov.uk/health-protection-team) and arranging testing with PHE for possible cases to exclude WN-CoV

Ensure that adequate supplies/equipment are available (with appropriate training provided), including:

- FFP3 respirators
- gloves with long tight-fitting cuffs
- gowns - disposable fluid-resistant full-sleeve gowns and single-use
- eye protection, for example single use goggles or face visor
- clinical waste bags
- hand hygiene supplies
- general-purpose detergent and chlorine based disinfectant solutions.

4. Key principles

WN-CoV specific infection control measures for inpatients should include the following:

4.1 Standard infection control precautions (in addition to enhanced precautions)

- standard precautions to include careful attention to hand hygiene
- standard precautions when handling any clinical waste, which must be placed in leak-proof clinical waste bags or bins and disposed of safely
- used laundry should be classified as infectious

4.2 Respiratory and cough hygiene

Respiratory and cough hygiene will minimise the risk of cross-transmission of respiratory illness:

- the patient should be encouraged to cover their nose and mouth with a disposable tissue when sneezing, coughing, wiping and blowing the nose
- all used tissues should be disposed of promptly into a waste bin
- give the patient the opportunity to clean their hands after coughing, sneezing, using tissues, or after contact with respiratory secretions or objects contaminated by these secretions

4.3 Combined airborne, contact and droplet precautions

- either an isolation room with negative-pressure relative to the surrounding area or a neutral pressure single room. Both should have en-suite bathroom and toilet facilities, and preferably anterooms
- use of FFP3 respirators conforming to EN 149 for persons entering the room. Staff must be fit tested prior to using this equipment. These should be single use (disposable) and fluid repellent
- use of long-sleeved fluid-repellent gown
- disposable gloves with long tight-fitting cuffs for contact with the patient or their environment
- eye protection to be worn for all patient contacts
- refrain from touching mouth, eyes or nose with potentially contaminated gloves
- specimens should be double bagged and delivered by hand to the laboratory

This advice covers the period from initial identification of a patient with an epidemiological risk factor for WN-CoV, through initial isolation, assessment, and the period of time until the test result is available. PHE will advise on further management for any confirmed cases.

5. Isolation (patient placement)

- a possible case should be managed in negative pressure single room if available. If this is not possible then a single room with en-suite facilities should be used. Room doors should be kept closed
- positive-pressure, single rooms must not be used
- the nature of the area adjoining the side room should be taken in to account to minimise the risk of inadvertent exposure (such as high footfall areas, confused patients, vulnerable patient groups)
- if on a critical care unit, the patient should be nursed in a negative-pressure single/side room where available, or, if not available, a neutral-pressure side room with the door closed
- if there is no en-suite toilet, a dedicated commode (which should be cleaned as per local cleaning schedule) should be used with arrangements in place for the safe removal of the bedpan to an appropriate disposal point
- avoid storing any extraneous equipment in the patient's room

5.1 Anterooms and putting on and removing PPE

Anterooms (otherwise known as a 'lobbies') also have the potential to become contaminated and should be regularly decontaminated as described in environmental decontamination.

It is strongly advised that staff progress through 'dirty' to 'clean' areas within the anteroom as they remove their PPE and wash hands after they leave the patient room. To this effect, movements within the anteroom should be carefully monitored and any unnecessary equipment should not be kept in this space.

A buddy system to observe for inadvertent contamination is recommended, especially during high risk procedures and PPE removal.

In the event that no anteroom/lobby exists for the single room used for WN-CoV patients, then local infection prevention and control teams (IPCT) will need to consider alternative ways of accommodating these recommendations to suit local circumstances.

Recommendations regarding ventilatory support are provided in the critical care section.

5.2 Notices about infection risks

Written information must be placed on the isolation room door indicating the need for isolation, including the infection prevention and control precautions which must be adhered to prior to entering the room. Patient confidentiality must be maintained.

5.3 Entry records

Only essential staff should enter the isolation room.

A record should be kept of all staff in contact with a possible case, and this record should be accessible to occupational health should the need arise.

6. Staff considerations

The use of bank or agency staff should be avoided.

Staff involved in care of possible cases should be given emergency contact details if they develop WN-CoV compatible symptoms while away from the hospital. Further details of this and other requirements for managing healthcare contacts by the employer will be provided by PHE.

7. Visitors

Visitors should be restricted to essential visitors only, such as parents of paediatric patients or an affected patient's main carer. This should be subject to a local risk assessment having been performed.

PPE must be made available to visitors, including instruction and supervision of correct usage and donning and doffing.

The hospital should be mindful of its responsibilities to persons who are not employees, under The Control of Substances Hazardous to Health Regulations 2002 and The Management of Health and Safety at Work Regulations 1999.

8. Personal Protective Equipment (PPE)

The following PPE is to be worn by all persons entering the room where a patient is being isolated (either before definitive assessment, or once assessed as a possible case):

- long sleeved, fluid-repellent disposable gown – wearing scrubs underneath obviates problems with laundering of uniforms and other clothing
- gloves with long tight-fitting cuffs
- FFP3 respirator conforming to EN149 must be worn by all personnel in the room. Fit testing must be undertaken before using this equipment and a respirator should be fit-checked every time it is used
- eye protection, such as single use googles or full-face visors, must be worn (note prescription glasses do not provide adequate protection)

The PPE described above must be worn at all times when in the patient's room (see putting on and removing personal protective equipment)

9. Hand hygiene

This is essential before and after all patient contact, removal of protective clothing and decontamination of the environment.

Use soap and water to wash hands or an alcohol hand rub if hands are visibly clean.

Rings (other than a plain smooth band), wrist watches and wrist jewellery must not be worn by staff.

10. Aerosol generating procedures

Procedures that produce aerosols of respiratory secretions, for example bronchoscopy, induced sputum, positive-pressure ventilation via a face mask, intubation and extubation, and airway suctioning carry an increased risk of transmission. Where these procedures are medically necessary, they should be undertaken in a negative-pressure room, if available, or in a single room with the door closed.

Only the minimum number of required staff should be present, and they must all wear PPE as described above. Entry and exit from the room should be minimised during the procedure.

If aerosol generating procedures are undertaken in the patient's own room, the room should be decontaminated 20 minutes after the procedure has ended.

If a different room is used for a procedure it should be left for 20 minutes, then cleaned and disinfected before being put back into use.

Clearance of any aerosols is dependent on the ventilation of the room. In hospitals, rooms commonly have 12-15 air changes per hour, and so after about 20 minutes there would be less than 1 per cent of the starting level (assuming cessation of aerosol generation).

If it is known locally that the design or construction of a room may not be typical for a clinical space, or that there are fewer air changes per hour, then the local IPCT would advise on how long to leave a room before decontamination.

11. Equipment

- re-useable equipment should be avoided if possible; if used, it should be decontaminated according to the manufacturer's instructions before removal from the room
- use dedicated equipment in the isolation room. Avoid storing any extraneous equipment in the patient's room
- dispose of single use equipment as per clinical waste policy inside room
- ventilators should be protected with a high efficiency filter, such as BS EN 13328-1
- closed system suction should be used
- disposable crockery and cutlery may be used in the patient's room as far as possible to minimise the numbers of items which need to be decontaminated

12. Environmental decontamination

There is evidence for other coronaviruses of the potential for widespread contamination of patient rooms/environments, so effective cleaning and decontamination is vital.

Cleaning and decontamination should only be performed by staff trained in the use of the appropriate PPE; in some instances, this may need to be trained clinical staff rather than domestic staff.

After cleaning with neutral detergent, a chlorine-based disinfectant should be used, in the form of a solution at a minimum strength of 1,000ppm available chlorine.

The main patient isolation room should be cleaned at least once a day, and following aerosol generating procedures or other potential contamination.

There should be more frequent cleaning of commonly used hand-touched surfaces and of anteroom/lobby areas (at least twice per day).

To ensure appropriate use of PPE and that an adequate level of cleaning is undertaken which is consistent with the recommendations in this document, it is strongly recommended that cleaning of the isolation area is undertaken separate to the cleaning of other clinical areas.

Dedicated or disposable equipment must be used for environmental decontamination. Reusable equipment must be decontaminated after use with a chlorine-based disinfectant as described above.

13. Linen

Bag linen inside patient isolation room in accordance with procedures for infectious linen. Unbagged linens should not be carried through the ward or other clinical area.

14. Waste

Large volumes of waste may be generated by frequent use of PPE; advice from the local waste management team should be sought prospectively on how to manage this.

Dispose of all waste as clinical waste.

Waste should be quarantined until testing results are known. If the patient is confirmed to have WN-CoV, PHE will advise on waste disposal and transportation.

Waste from a confirmed case must be disposed of as Category A waste. The transport of Category A waste is described in Health Technical Memorandum 07-01: Safe management of healthcare waste (https://web.archive.org/web/20200122124632/https://www.gov.uk/government/publications/guidance-on-the-safe-management-of-healthcare-waste).

If ambulant, the patient can use the ensuite WC. If bedpans are used, the excreta should solidified using superabsorbent polymer gel granules and then disposed of as clinical waste. The use of these granules must be strictly controlled as described in this NHS National Patient Safety Alert (https://web.archive.org/web/20200122124632/https://improvement.nhs.uk/news-alerts/superabsorbent-polymer-gel-granules-2019/). Communal facilities must not be used.

15. Specimens

All specimens and request forms should be marked with a biohazard label.

The specimen should be double-bagged in the isolation room by a staff member wearing recommended PPE.

Specimens should be hand delivered to the laboratory by someone who understands the nature of the specimens. Pneumatic tube systems must not be used to transport specimens.

Transport of samples between laboratories should be in accordance with Category B transportation regulations. PHE follows the guidance on regulations for the transport of infectious substances 2019–2020 (https://web.archive.org/web/20200122124632/http://www.who.int/ihr/publications/who_hse_ihr_2012.12/en/).

16. Mobile healthcare equipment

The following advice applies to devices that cannot be left in the isolation room, such as portable X-ray machines:

- use of mobile healthcare equipment should be restricted to essential functions as far as possible to minimise the range of equipment taken into and later removed from the room
- the operator of the device, if not routinely looking after the patient, must be trained and supervised in infection prevention and control procedures, including the use of PPE
- the operator should wear PPE as described above when in the isolation room
- any equipment taken in to the room and which must be subsequently removed, must be disinfected prior to leaving the anteroom
- any additional items such as a digital detector or a cassette will also need to be disinfected, regardless of whether there has been direct contact with the patient or not. This is due to the risk of environmental contamination of the equipment within the isolation room

17. Critical care

- all respiratory equipment must be protected with a high efficiency filter (eg BS EN 13328-1). This filter must be disposed of after use
- disposable respiratory equipment should be used wherever possible. Re-usable equipment must, as a minimum, be decontaminated in accordance with the manufacturer's instructions
- a closed suctioning system must be used
- ventilator circuits should not be broken unless necessary
- ventilators must be placed on standby when carrying out bagging
- PPE must be worn
- water humidification should be avoided, and a heat and moisture exchanger should be used

18. Transfers to other departments

Where possible, all procedures and investigations should be carried out in the single room with a minimal number of staff present. Only if clinical need dictates, and in consultation with the infection control team, should patients be transferred to other departments. The following procedures then apply:

- the trolley used to transport the patient from the isolation room, should be disinfected as far as possible (see environmental decontamination immediately before leaving the room by an individual wearing protective clothing and PPE as described previously
- the department must be informed in advance of the patient's arrival
- any extraneous equipment to be removed safely from the investigation/treatment room
- the patient must be taken straight to and from the investigation/treatment room and must not wait in a communal area

- the patient should wear a 'surgical ' mask if this can be tolerated - this will prevent large respiratory droplets being expelled into the environment by the wearer
- the treatment/procedure room, trolley/chair and all equipment should be decontaminated after use, as per the cleaning instructions above
- to enable appropriate decontamination after any procedure, patients should be scheduled at the end of a list, as far as possible. After the procedure, access to such spaces should be restricted and environmental decontamination implemented
- during patient transfers a process to ensure that no individuals not wearing PPE come within 2 metres of the patient should be followed. Anyone in the vicinity of the patient (for example carrying out procedures, transferring the patient or standing within 2m of the patient) must wear the PPE previously described

19. Transfers to other hospitals

- transfer of cases to another hospital should be avoided unless it is necessary for medical care
- if transfer is essential, the IPCT at the receiving hospital and the ambulance staff must be advised in advance of the special circumstances of the transfer, so that appropriate infection control measures can be taken

20. Handling dead bodies

- the act of moving a recently deceased patient onto a hospital trolley for transportation to the mortuary might be sufficient to expel small amounts of air from the lungs and thereby present a minor risk
- a body bag should be used for transferring the body and those handling the body at this point should use full PPE
- the outer surface of the body bag should be decontaminated (see environmental decontamination) immediately before the body bag leaves the anteroom area. This may require at least two individuals wearing such protective clothing, in order to manage this process
- the trolley carrying the body must be disinfected prior to leaving the anteroom, including the wheels
- prior to leaving the anteroom, the staff members must remove their protective clothing
- once in the hospital mortuary, full PPE should be used if the body bag is opened
- washing or preparing the body is acceptable if those carrying out the task wear PPE. Mortuary staff and funeral directors must be advised of the biohazard risk. Embalming is not recommended
- if a post mortem is required safe working techniques (eg manual rather than power tools) should be used and full PPE worn, in the event that power tools are used. High security post mortem suites are available if needed and can be discussed with the PHE incident team
- after use, empty body bags should be disposed of as category A waste

21. Putting on and removing personal protective equipment

21.1 Putting on PPE

Before donning, healthcare workers should put on scrubs, ensure hair is tied back securely and off the neck and collar, remove jewellery/pens, ensure they are hydrated, and perform hand hygiene.

Staff should wear the following PPE, put on in the following order:

1. gown
2. FFP3 respirator and fit check
3. eye protection (goggles or face shield)

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. During donning each item must be adjusted as required to ensure it fits correctly and interfaces well with other PPE items.

21.2 Removal of PPE

PPE should be removed in an order that minimises the potential for cross-contamination. Before leaving the side room gloves, gown and eye protection should be removed (in that order, where worn) and disposed of as clinical waste. After leaving the area, the respirator can be removed and disposed of as clinical waste.

The order of removal of PPE is suggested as follows, consistent with WHO guidance:

1. peel off gloves and dispose in clinical waste
2. perform hand hygiene
3. remove gown by using a peeling motion, fold gown in on itself and place in clinical waste bin
4. remove goggles/visor only by the headband or sides and dispose in clinical waste
5. remove respirator from behind and dispose in clinical waste
6. perform hand hygiene