

SARS Infection Control Training

Educational Video / CD Rom Text



Department of
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An Roinn

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Introduction and General Infection Control Issues

This is an educational film designed primarily to show you what personal protective equipment you must wear when attending to a patient suspected of having Severe Acute Respiratory Syndrome or SARS. This applies to all HCWs in both acute and community settings. We will also refer to other relevant infection control issues though the infection control guidance in this film is not intended to be comprehensive.

Nevertheless, the global SARS outbreak reminds us all of the importance of infection control in day-to-day healthcare. While infection control is important in preventing the spread of infection to other patients, good infection control also protects healthcare workers – not just from serious diseases such as SARS, but also from common infections such as viral gastroenteritis, scabies, tuberculosis and winter respiratory infections.

The use of personal protective equipment or PPE specifically for SARS is covered in detail, but you should consider protective equipment as part of every patient encounter. For example, Standard Precautions using gloves and plastic aprons should always be worn when coming into direct contact with blood and other body fluids. In addition, masks and eye protection are appropriate for all procedures where there is a risk of blood, body fluids, secretions and excretions coming into contact with mucous membranes through splashing.

Hand hygiene is the single most important infection control measure but compliance is notoriously low. The introduction of the new alcohol hand solutions has made hand hygiene much more convenient and is used when hands are not visibly soiled. The correct hand hygiene technique will be demonstrated later. Hand hygiene should be undertaken:-

- Before and after patient contact and between dirty and clean tasks on the same patient;
- After contact with a source of micro-organisms, such as body fluids and substances, mucous membranes, broken skin or inanimate objects such as patient bedding or toilet surfaces, which are likely to be contaminated;
- After removing gloves or any other type of PPE.

SARS has also reminded us of the importance of the **early institution of infection control measures** when patients first present. In the Accident and Emergency department, to reduce the spread of respiratory winter infections, patients with respiratory symptoms such as coughs or sneezes, should be asked to cover their nose and mouth when coughing or sneezing or be provided with a mask. If a patient is unable to comply, then the HCW may consider the use of a mask to protect themselves.

Finally, before moving onto infection control specifically for SARS, remember that you can protect yourself this year and every year by taking up the 'flu vaccine' which is available free of charge to all healthcare workers in their place of work.

SARS Epidemiology and Infectivity

SARS is a newly recognised respiratory illness which is believed to have originated in the Guangdong Province of China in November 2002. By the end of June 2003 there had been around 8000 cases in more than 30 countries with 774 deaths. The highest death rate was in the over 65's. Most cases were either clinical healthcare workers or close contacts of affected patients. In Canada and Singapore the percentage of healthcare workers was approximately 40% of total cases but globally this number was closer to 20%. Where transmission to health-care workers has occurred it appears to have been after close contact with symptomatic individuals (that is, persons with fever or respiratory symptoms) before recommended infection control precautions for SARS were implemented - in other words, unprotected exposures.

On average the number of secondary cases of infection generated by a single typical SARS patient is about 3. This is consistent with a disease spread by direct contact or large respiratory droplets that travel only a few metres. On the other hand, if a disease is spread by aerosols, a single person can infect an entire room by coughing, as can happen with measles and influenza. SARS is therefore considered to be much less infectious than influenza. Also unlike 'flu' SARS is more infectious in the second week of illness and patients who are severely ill appear to be more infectious than those with mild illness. Few secondary cases have occurred where symptomatic cases have been isolated within 5 days of the onset of illness. The World Health Organisation estimated that there were approximately 3.9 million deaths due to respiratory tract infection in 2002 and clearly SARS is responsible for only a very small proportion of these. It is however important that Healthcare workers know how to protect themselves in the event of SARS re-emergence.

The causative agent has been identified as a corona virus with an incubation period ranging from 2 – 10 days, usually around 5 days. The virus has been found in respiratory secretions, saliva, blood, urine and faeces in patients with SARS. The main routes of spread are by droplets, aerosolised respiratory secretions (as a result of a medical intervention) and direct contact with patient's secretions, other body fluids and from the environment surrounding the patient where droplets may have fallen. It is known that the virus can live in secretions and excretions for 2-4 days.

Aerosol generating procedures are believed to increase the risk of SARS transmission and should not be undertaken unless deemed medically necessary.

Examples of aerosol generating procedures:

- Use of nebulisers
- Bronchoscopy
- Induced sputum
- Positive pressure ventilation via a face mask
- Intubation and extubation
- Open airway suctioning.
- High flow oxygen therapy

To protect you from acquiring SARS it is imperative that you wear the correct protective equipment in the correct way. In this film we will show you how to put on and take off Personal Protective Equipment safely.

This film deals with the basic PPE requirements, but there may be some situations which will warrant a higher level of protection, such as when intubating a patient, nursing a ventilated patient or when suctioning is required. In these or similar circumstances staff should seek advice from their local Infection Control Team.

The experience of other hospitals where cases of SARS were cared for shows that this kind of PPE combined with the other infection control measures we will tell you about is effective in protecting HCWs. Nevertheless all healthcare workers should be vigilant for any signs of SARS until 10 days after their last encounter with a SARS patient. A record of all staff in contact with a SARS patient should be maintained by the manager in each area. This will be co-ordinated through your local occupational health department.

Putting on Personal Protective Equipment

It is important to ensure that you have everything you need before entering the isolation room. You may find it useful to have another member of staff outside the room in case assistance is required.

Staff caring for very ill SARS patients who require a lot of suctioning and where there is a lot of droplet contamination, should have facilities to shower and change all clothing including footwear before going home. For all staff this will be made easier by wearing scrub suits.

It is important to remove all jewellery to ensure that you can decontaminate your hands effectively and reduce the risk of contaminating your skin inadvertently when adjusting earrings or necklaces.

Artificial nails must not be worn and natural nails should be short and clean. Hair must also be tied up and secured to ensure adjustments are not required.

Healthcare workers who are allergic to latex need to ensure that the PPE they use is latex free.

- First put on a surgical theatre cap. Make sure all hair is covered.
- This step is not considered necessary for SARS patients well enough to be cared for in Primary Care as it is the most severely ill patients who are considered to be most infectious.
- Next you will require a FFP3 respirator mask.
- A respirator mask is recommended by the Health and Safety Executive as it helps to reduce the wearer's exposure to airborne particles. Ordinary theatre style masks prevent particles being expired into the air by the wearer, but are not designed to efficiently filter air being breathed in by the wearer. They also do not seal tightly to the face. Therefore, they are only advised for patient use, to lessen exposure to other people from the patient's secretions. It is important to know the difference and ensure you are using the correct protection.
- HCWs who require to be in the room for a long period of time may find the valved FFP3 more comfortable to wear. This type of mask must not be put on a patient.
- Open the respirator mask out. Then holding the body of the respirator mask in one hand and the straps in the other, scoop the respirator mask over your chin and place one strap at the crown of your head and one at the base of your head under your ears.
- Ensure that there is a tight seal under your chin and then mould the nosepiece with the fingertips of both hands, moving your fingertips down both sides of the nosepiece. Pinching the nosepiece with one hand may result in less effective mask performance.
- A good fit can only be achieved where the respirator mask seals against clean-shaven skin.

To ensure the mask is fitted properly there are two checks you should make:-

1. **Exhale sharply.** A positive pressure should be felt inside the respirator mask. If any leakage is detected, adjust the position of the respirator mask and/or the straps. Retest the seal and if need be repeat the steps until the mask is sealed properly.
2. **Inhale deeply.** If there is no leakage, the negative pressure will make the mask cling to your face or if the mask is rigid you should not feel any air entering from the sides.

****A fit check should be carried out each time a respirator is worn.**

- The respirator mask must be changed if you touch it or if it becomes grossly contaminated, wet or damaged. You should also change your respirator mask if breathing becomes difficult or a proper fit cannot be maintained. The mask should only be removed when the wearer is in a safe place for example outside the patient's room.

- Next put on disposable eye protection to protect your eyes against droplet contamination. This can be in the form of goggles or visors. Using a visor will discourage you from touching your respirator mask, face and eyes.
- HCWs who wear glasses must realise that these on their own do not provide sufficient protection and a visor still needs to be worn.
- A long sleeved, disposable, water repellent gown is the next piece of protective clothing to be put on. Unfold the gown and put it on with the opening to the back. Ensure that the gown fully encloses and protects your back. Then carefully tie the strings in a bow so that the ends can be easily untied later when the gown is being removed.
- Put on a pair of well-fitting gloves and ensure the sleeves are tucked securely into the gloves. Extra gloves must also be available in the room to ensure that you can change these appropriately for patient care.
- Enter the room closing the door immediately behind you.
 - **Remember while you are working in this area you must avoid touching your face or respirator mask!**

Taking off PPE, including hand hygiene technique

- When you are ready to leave the room your personal protective clothing can be removed and hand decontamination carried out as follows:-
- If you are attending a patient in a room without a lobby you will only remove your gown and gloves in the room. Otherwise all PPE is removed in the lobby.
 1. First untie your gown at the neck and waist carefully pulling on the end of the string taking care not to touch your inner clothing.
 2. Place hands on the outside of your gown at shoulder level and pull downwards to remove both gown and gloves in one movement ensuring that you only touch the inside of the gown with your bare hands.
 3. Continue to carefully roll the gown into a ball and then place the waste into a foot operated clinical waste bin.
 4. You then must wash your hands using the following prescribed method:-
 - Turn on taps and adjust temperature;
 - Wet your hands and apply one measure of antiseptic liquid soap;
 - Briskly rub hands together palm to palm;
 - Rub right hand over back of left hand interlacing fingers and then rub left hand over back of your right hand interlacing fingers as before;
 - Rub palm to palm with fingers interlaced;

- Rub backs of fingers to opposing palms with fingers grasped;
 - Rotationally rub each thumb;
 - Rub palm of hands with opposing finger tips in a circular movement;
 - Rub around the wrist and up forearms if arms have been exposed;
 - Rinse well and then using disposable paper towels dry hands well.
 - Rinsing soap off and drying hands well will ensure your skin does not become dry or allow the detergent to build up on your hands. This will also reduce the likelihood of an allergy to the soap. Damp hands encourages micro organisms to proliferate on your hands.
 - Dispose of towels into a pedal operated bin so that you do not recontaminate your hands by touching the lid of the bin.
5. Leave the room ensuring you close the door directly behind you.
 6. Next remove your visor and place in the clinical waste bin.
 7. Then remove your respirator mask by breaking the ties at one side of the mask and then carefully dispose of into the bin. If the mask does not have ties that are easily broken at the side, the mask must be removed with great care using the straps to ensure minimal disturbance. **Great care must always be taken to ensure you do not touch the body of the respirator mask.**
 8. Finally remove your head covering from the front to the back and dispose of it.
 9. Again decontaminate hands with an alcohol preparation.

Specimen taking

- Ensure full PPE is worn when taking specimens or handling blood or body fluids.
- Every effort must be made to prevent spillages and contamination of the outside of the specimen container. The specimen should be placed into a specimen bag and the outside of the bag wiped down with an alcohol wipe before taking it away from the patient.
- To prevent contamination of the form, this should be kept outside of the room and should be filled in when the specimen has been placed in the biohazard bag.
- Remember that all spills of blood and body fluids must be cleaned up immediately using 10 000 ppm of a chlorine-releasing agent.
- Wipe the specimen tray with an alcohol wipe before setting it down on the trolley.

- Decontaminate your hands with an alcohol hand preparation ensuring all areas of the hands have been treated. Use the same technique as for handwashing.
- The specimens are placed into the zip section of a biohazard bag and the form placed in the outer pouch.
- All specimens for suspected cases of SARS must be treated as high-risk specimens.
- The specimen and the request form must be properly labelled with a 'Danger of infection' or 'Category 3' label and the form must contain the patient's clinical information and that they are a 'suspected SARS' case.
- There is a specified form to be used for SARS specimens.
- Specimens must be transported to the laboratory in a robust, leak-proof container.
- Pneumatic tube transporter systems or public transport must not be used to transfer these specimens.
- The biomedical scientist in the lab must be informed before sending the specimen.
- When the specimen arrives in the laboratory it will be taken directly to a Category 3 room.

Next we will deal with other SARS infection control issues including decontamination of the environment, waste disposal and handling of linen.

Waste and linen management

Although this film is designed primarily for healthcare workers it is important that infection control advice is also given to SARS patients both in the hospital and the home environment.

For example the importance of hand hygiene and respiratory hygiene should be emphasised to patients in either area. Respiratory hygiene means covering nose and mouth with a tissue when coughing or sneezing and disposing of the tissue safely into a clinical waste bin in the isolation room or into the toilet/or a plastic bag tied off at the top, prior to placing it in a bin at home. This should be followed by hand hygiene. Patients may be advised to keep a towel for their own use or use disposable paper towels.. Carers at home should also be advised about the importance of hand hygiene. Patients should be advised to wear a surgical mask when in the company of other household members.

Whether in the hospital or at home, when using the toilet patients should be asked to lower the toilet lid before flushing to prevent contaminated water from splashing out.

If the patient uses a bedpan, the nurse inside the isolation room should hand this to a nurse outside the room for immediate transfer to a bedpan washer. The bedpan should be covered and the assistant wear appropriate PPE. All wards should ensure that their bedpan washers are maintained regularly and that they reach thermal disinfection temperatures. If a bedpan macerator is used the holder should be retained in the patient's room for their use only. The holder should be cleaned after use. The contents of the disposable "former" can be solidified with a product such as "Vernagel".

Clinical waste can be disposed of by the usual method using the appropriate bags and containers. A supply of clinical waste bags should be kept within the room. To ensure safety during transportation to the collection point, the clinical waste bag can be put into another clinical waste bag either in the lobby or just outside the room. The bag must be carefully closed using a swan neck technique and tagged and labelled before being left for collection. A sharps container should be also kept in the patient's room for easy disposal of sharps. You should ensure that this container is properly assembled before use. It should be decontaminated before removal from the room either using an alcohol wipe or by using a chlorine releasing disinfecting agent.

Linen can potentially be a vector for the transfer of microorganisms if it is not handled correctly. Linen must always be handled carefully to ensure minimal airborne dispersal of skin cells. This is a standard infection control precaution. Always remove linen from the bed by folding it carefully, from top to middle then from the bottom to the middle and then carefully rolling it up for disposal into an alginate bag and then into the appropriate colour coded outer bag for collection. Keep the outer bag outside the room preferably in the lobby so that it does not become contaminated. If the outer bag is not waterproof, you must ensure that the bag is stored in a dry, clean secure area prior to collection. Always ensure you are wearing PPE when handling waste or contaminated linen.

Laundry in the home should be laundered at the highest temperature recommended for the fabric and ideally in a separate wash from other household laundry.

Cleaning and Decontamination

Cleaning and decontamination of environmental surfaces are important components of routine infection control. Although environmental surfaces such as floors are generally not involved in the transmission of micro organisms, some surfaces, especially those that are touched frequently e.g. bedrails, door knobs, and toilet surfaces may serve as important reservoirs.

It will make it easier to clean and decontaminate surfaces within the room if the room does not contain unnecessary items. This advice applies equally to patients cared for in the community. All equipment used for the patient must be dedicated to that patient only and as far as possible be disposable or easy to decontaminate. Cutlery and dishes do not need to be disposable, but must be washed as soon as possible after use in hot soapy water or in a dishwasher.

During the course of the patient's illness it is important to ensure that contamination of the environment is minimised. All surfaces such as beds, chairs, lockers, bedside tables, toilets and medical equipment etc. must be cleaned and disinfected at least once and preferably twice a day. In the home environment where patients are less acutely unwell, once a day would be sufficient. You must always remember to wear PPE when cleaning and disinfecting surfaces and equipment. Disposable gloves should be worn by non-infected family/household members carrying out this task where the patient is being cared for at home.

Surfaces must be cleaned with detergent and water before then being disinfected with a chlorine releasing agent of 1,000ppm i.e. Milton, household bleach, Haz-tabs, Actichlor tablets. If using Milton dilute 1 part Milton to 9 parts water. This makes a 1 in 10 dilution. For the chlorine releasing tablets, you must check the label for the number of tablets to use as this varies between manufacturers. If using household bleach follow the instructions on the label and handle with care. After using a chlorine releasing solution you will need to rinse the surface with ordinary fresh, clean water and dry well with disposable paper towels. The solution or tablets must be added to cold water and should be used in a well ventilated room. Care needs to be taken when handling these solutions as bleach can stain clothing.

Terminal disinfection of the room using the same three-way clean should be carried out according to your local policy. Curtains must be changed and bagged for laundering. All disposable equipment must be carefully bagged and sealed. Sinks and toilets require to be cleaned thoroughly.

This cleaning regime can also be used for ambulances, cubicles in A&E and any other areas a SARS patient has received care.

Further information can be found in the SARS contingency plan that is held in each Trust. Your Infection Control Nurse will be able to provide you with the relevant documents. You will also find further information on the CD-ROM version of this production. If in doubt about any infection control aspect of caring for SARS patients please ask a member of your local Infection Control Team or Consultant in Communicable Disease Control.