

9

INFECTION CONTROL

Key points:

1. Good personal and household hygiene prevents infections.
2. Hand washing and personal hygiene are essential to good health.
3. Infection control prevents the spread of TB in our homes.
4. Infection control is especially important for homes where sick people are being cared for.
5. Hospitals and health care facilities need to have high infection control standards.

We can prevent many diseases by not coming into contact with the germs (bacteria, viruses, fungi, protozoa or parasites) that cause them. This is infection control. There is a lot we can do in our every day lives to reduce our chances of coming into contact with germs and infections. Good hygiene helps prevent many infectious diseases and promotes better health and well-being. Personal and household hygiene is an essential part of infection control and forms the basis of public health programmes around the world. Controlling infections has become a huge problem in South African healthcare. People are being infected with serious illnesses in hospitals. In this chapter we will learn how the risks of infection being passed on in hospitals, at home and in the community can be reduced.

Infection control is especially important for people living with HIV, because of the risk of opportunistic infections. But everyone, regardless of their HIV status, benefits from following the basic principles of infection control, such as hand hygiene. Apart from germs that are spread by touch, we are also at risk of airborne infections, such as TB. As we already know, HIV positive people are especially vulnerable when it comes to TB infection. To ensure good public health it is very important that we practice infection control in our homes and public spaces.





ABOUT THIS CHAPTER

The aim of this chapter is to understand the importance of infection control and the basics of personal and household hygiene.

This chapter covers:

- What is infection control?
- What causes infections?
- How infections are spread
- Household and personal hygiene
- Households caring for sick people
- TB control
- Infection control in hospitals
- Cultural interpretations of disease



Welcome to Chapter 9. In this chapter we are going to talk about infection control. Personal and household hygiene help prevent us from getting infected by germs. By the end of this chapter, you will know practical steps that you can take to improve the hygiene in your home and ways to keep you and your family healthy.

What is infection control?

Infection control aims to prevent the spread of infections in health care settings and other places, like the home and public spaces. Infection control is part of public health practice. Hand hygiene, cleaning, disinfection, sterilisation, vaccination and management of infection outbreaks are all part of infection prevention and control.

In this chapter, we will focus on infection control in the home. We will also talk about infection control in hospitals and clinics so that we can be better informed about health standards and if needs be advocate for improved services. The aim of this chapter is to provide accurate information, along with practical advice to make sure that we limit our exposure to germs in our daily lives.

What causes infections?

Episode 8, Chapter 1



People can get sick for all kinds of reasons, but most common illnesses are caused by germs. Another word for germ is 'pathogen'. A pathogen is something that causes infection in the body that makes you sick. As you may already know, pathogens are micro organisms which cannot be seen without a microscope, because they are so small. As we have already discussed in Chapter 3 there are different kinds of germs.

Pathogens can be divided into 4 different groups:

- Bacteria
- Viruses
- Fungi
- Protozoa

We can also be infected by bigger parasites, such as tapeworms. Parasites are not micro organisms. Each germ causes a specific illness. For example, the bacteria that causes TB only causes TB. It is useful to know about the different kinds of germs because this can help us prevent being infected by them.

BACTERIA

Bacteria are found all around us and also inside us. Not all bacteria are harmful. In fact some bacteria are even good for our bodies, such as the bacteria that live in our digestive system and help break down the food that we eat. But there are also bacteria that cause illnesses such as syphilis, TB, sinusitis, pneumonia, diarrhoea and bronchitis. We usually treat these bacterial infections with antibiotic medication. It is very important that we always complete our antibiotics because otherwise we could develop drug resistance which means the antibiotic no longer works. An example of a drug resistant bacterial infection is DR (drug resistant) TB.

VIRUSES

Viruses are much smaller than bacteria and cannot grow or reproduce outside the cells of other creatures. Besides HIV, examples of viruses include colds, flu and herpes. The main difference between bacteria and viruses is that viruses cannot be treated as easily because viruses change (mutate). Viruses cannot be treated with antibiotics, but there are anti-viral medicines. For example, we have learnt how ARVs slow down the multiplication of HIV in our bodies, but ARVs cannot completely get rid of the virus in our body.

FUNGI

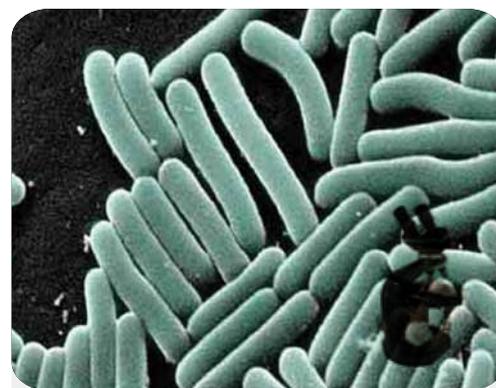
Fungi come in many different forms, such as mould or mushrooms. Fungi can also infect our bodies. We call this a fungal infection. Examples of fungal infections are athlete's foot, dandruff, thrush and PCP pneumonia. We treat fungal infections with anti-fungal medication, such as Fluconazole. Good oral hygiene, such as flossing and brushing teeth in the morning and evening after eating food, is an important part of infection control. Fungal infections feed off sugar so limiting the amount of sugar and sweets and junk food you eat reduces the chances of getting infections in your mouth.

PROTOZOA

Protozoa are germs (pathogens) that infect the human body. Not all protozoa infect the human body. The most common kind of protozoan infection is malaria, which is carried by mosquitoes. You can take medication to try and protect yourself from malaria. This is called prophylactic treatment, but most people who live in malaria areas don't take this medicine all the time and rather treat themselves when they get sick. The best form of infection control for malaria is to sleep under mosquito nets and to make sure that you wear clothes that cover most of your body in the mornings and evenings when mosquitoes are active. Another way of reducing malaria in an area is making sure that there is not a lot of still water lying around where mosquitoes can breed.



Here is a photo of a microscope.



This is a photo of bacteria taken through a microscope.

Different types of germs cause different diseases

How infections are spread

We have talked about the different kinds of germs (bacteria, viruses, fungi and protozoa). Many of us may already know some of the ways that germs are spread, such as TB travelling through the air. Let's now look at other ways that germs are spread. Knowing how germs are spread is an important part of infection control because then we can take steps to prevent being exposed to the germs.

Here are some of the ways germs spread in the world around us and between people:

- Water
- Food
- Air
- Animals and insects
- Personal contact

Water

People often get infected by drinking unclean water or washing cooking utensils or themselves in water that is not safe. When water is 'unclean' or 'not safe' it means that there are germs in the water that can make us sick. We cannot tell just by looking at water if it is germ-free. For example, some water in rivers might not be perfectly clear, but it may be fine to drink, while other water that looks clear may carry germs that can make us sick. The most common illnesses that people get from unclean water are diarrhoea, dysentery and other stomach ailments. Most of the time, these illnesses are caused by bacterial infections.

Clean water is often linked to sanitation. Areas without proper sanitation and disposal of rubbish and sewage often have bad water quality because rubbish and excrement is flushed into rivers and enters the same water system that people use for collecting drinking water. Diarrhoea is responsible for 12% of deaths of children under 5 years old every year in the developing world. These 1.3 million deaths could easily be avoided if clean water and proper sanitation was available (WHO, 2003). Making sure that people have access to sanitation and safe drinking water is one of the biggest challenges for the developing world. Floods often result in widespread contamination of water sources because wastewater and sewerage is mixed with sources of clean water.

If you live in an area without safe water, there are things you can do to make the water safe. Depending on whether you plan to drink the water, or use it for cooking and washing food and utensils, you will decide on what method to use to sterilise your water. Sterilising kills the germs in the water. Some sterilisation methods, like adding bleach to water, are best suited for making water safe to wash up in. Other methods, like adding iodine or chlorine, or using direct sunlight, are better for drinking water.

People often forget that it is also important to wash cooking and eating utensils in clean water and to dry them with clean cloths. Bleach can be added to washing up water to make sure that it does not have any germs in it. It is also important to wash fruit and vegetables with clean water before eating them. Or else you can peel the fruit or vegetable before eating it. This is especially important in areas where animal manure is used to fertilise crops or where crops are watered with unclean water. Washing your hands with clean water is also very important. We will talk later in detail about how hand washing prevents infections.

Episode 8, Chapter 2



Many people in South Africa do not have access to clean water.

Useful tips for sterilising water:

- Boil water for about 5 minutes and leave to cool. Not all bacteria are killed by boiling water, so to be extra safe you can add 2 drops of chlorine or bleach to a litre of cooled water. If you use bleach, do not use scented bleach.
- Steritabs (chlorine tablets) kill bacteria and protozoa in water.
- Ultraviolet radiation kills most common pathogens and is found in sunlight. Let water stand for a while so dirt can settle on the bottom of the container. Pour off clear water into clear plastic bottles. Place bottles on a dark background in full sunlight for at least 8 hours.
- Add 3 drops of iodine (2% tincture) for each litre of water you want sterilised.



If you don't have access to safe water you can treat your water to kill germs.



DISCUSSION POINTS

In a group talk about the following questions and see if you can answer them.

1. What does it mean when water is not safe to drink?

It means that there are germs (pathogens) in the water that cause infections.

2. Name some common illnesses caused by germs carried in water.

Diarrhoea, dysentery and other stomach pains and cramps are often caused by bacteria in water.

3. What can you do to kill the germs in water to make it safe?

You can add a few drops of chlorine, iodine or bleach to a litre of water to make it safe. You can also boil water, but boiling water does not kill all germs so you will still need to add chlorine, iodine or bleach. You can also use sunlight to kill germs by placing water in clear plastic bottles on a dark background for 8 hours in direct sunlight.



WORKBOOK NOTES

Food

Many germs (pathogens) are spread during preparing and eating food. An important part of infection control is preventing food from being infected with bacteria, viruses or parasites. Illnesses caused by eating contaminated food usually have symptoms like diarrhoea, fever, vomiting, stomach cramps and dehydration. This is often called 'food poisoning'. Food is most commonly infected with bacteria that cause illness. Raw meat or poultry may become contaminated during slaughter and incorrect storage. Fruit and vegetables may also be contaminated and that is why it is important to wash all fruit and vegetables in clean water.

Even after food has been cooked it still can become infected. When food is cooked and left out for more than 2 hours at room temperature, bacteria will quickly start to multiply. Because bacteria are micro organisms they cannot be seen without a microscope and so we cannot see when food is infected by bacteria.

Only after food is left for a few days can we then smell if it is 'off' or we can see mould starting to grow on it or it might start to rot. Poultry, pork and seafood are especially easily contaminated with bacteria and you should always make sure that these foods are fresh, kept refrigerated before eating and are cooked well.

Children and infants are easily infected by germs carried in food and drinks because their immune systems are not as strong as adults. The effect of dehydration is also more serious in children and infants and they are more likely to die as a result. Because children play close to the ground and also often eat with their hands, it is very important to wash their hands and faces before feeding them.



Bread mould is caused by fungi.

Animals and insects

RATS AND MICE

Rats and mice often carry diseases and so it is a good idea to make sure that you don't attract mice and rats into your home or living area. Diseases carried by mice and rats are passed on through their droppings, urine or saliva. Rats and mice also often have fleas. Fleas also carry diseases that affect humans, such as bubonic plague. Bubonic plague, or 'Black Death' as it was also known, was responsible for the death of a quarter to a half of Europe's population in the mid-1300s. Fleas can also transmit typhus and tapeworm. Flea bites are also a potential health hazard because people scratch the bite and create a small wound that other bacterial infections can enter.

CATS AND DOGS

Cats and dogs can also carry fleas and can bring other dirt into the home. It is better to keep pets out of the home, and especially off beds or soft furnishing. Dogs often roll in rotten rubbish or faeces and you do not want this to enter your home. Dogs also may carry worms and this is why you should not let dogs lick your face or mouth. If you have small children, be aware that they are often the same height as pet animals and so may be licked.



Rats and mice carry germs and can spread disease and fleas.

Tips to prevent diseases spread by rats

- Don't leave food waste lying in the open or in a bin with no lid. Food waste attracts rats and mice.
- Bury vegetable waste or store it in a container with a lid if you plan to compost it or feed it to pigs or other animals.
- Make sure that food is stored in cupboards, a refrigerator or containers that mice and rats cannot get into.
- If you have rats or mice in your living environment make sure that all rat or mice droppings are swept up and thrown away every day.

Tips to prevent infections carried by pets

- Make sure pets do not have fleas on them. There are many flea treatments on the market and also flea collars.
- You should not let pets lick your face or eat off the same plates as you.
- Make sure to wash children's hands after they have been touching pet animals.
- It is also important to regularly 'de-worm' your pets and also your children. 'De-worming' medication is cheap and is found at clinics and pharmacies.

FLIES AND COCKROACHES

House flies are one of the greatest carriers of disease. House flies easily contaminate food because they land on many different surfaces and the hairs on their bodies and legs pick up dirt and bacteria which then move from one place to another. Flies also often vomit or defecate while feeding which means that they contaminate the food that they land on. This is why it is so important to keep flies off food and to cover or refrigerate food. Cockroaches contaminate food in the same way as flies. If you leave food uncovered or do not dispose of food waste, you will attract cockroaches into your home.

MOSQUITOES

We have already discussed malaria which is a protozoan infection that is carried by mosquitoes. Not all mosquitoes carry malaria. People get malaria by being bitten by an infected female Anopheles mosquito. For this reason, some areas are known as 'malaria areas' because this kind of mosquito is commonly found there.



DISCUSSION POINTS

In a group talk about the following questions and see if you can answer them.

1. Why should you make sure there are no rats and mice in your home?

Rats and mice carry germs that can infect household members.

2. Why should you not let a pet dog lick your face?

Dogs eat rotten things and so if their saliva touches your face, you can easily become infected with worms and other germs.

3. What are some of the common ways to prevent malaria?

You can sleep under mosquito nets, wear long loose clothing that covers most of your body and use insect repellent to help prevent being bitten by mosquitoes and getting infected with malaria.



WORKBOOK NOTES

Tips to prevent infections spread by flies and cockroaches

- Keep flies off food - cover or refrigerate food.
- Make sure cockroaches cannot get into food - store all food in closed containers or in the fridge.
- You can also stand the legs of a table in tins of water to prevent cockroaches and ants from crawling up and reaching the table surface where you store or prepare food.



Here is a photo of the Anopheles mosquito that spreads Malaria.

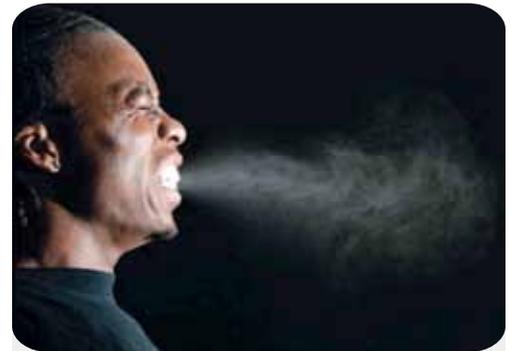
Tips for preventing malaria:

- Sleep under mosquito nets.
- If possible, have mosquito screens on windows and doors.
- Use insect repellent to keep mosquitoes away.
- Cover up exposed skin, especially in the evenings when mosquitoes are active.
- Try and make sure there are no still pools of water near where you live, because mosquitoes breed in still water.

Air (droplet infection)

Many germs are spread in the air. This is also called 'airborne' or 'droplet infection' because the germs are carried in the droplets that come from your mouth and nose when you sneeze and cough. When you have a cold and you cough and sneeze you release large numbers of cold or flu germs into the air. These germs can then be breathed in by someone in your environment and they could easily be infected. Apart from the common cold and 'flu, another common airborne illness is TB. HIV positive people are at increased risk of being infected with TB because their immune systems are compromised. We will talk in a lot more detail about TB later in this chapter.

Flus and colds commonly infect people in winter. If you live in a damp or wet environment your immune system may struggle to fight off infections. It is also easier for people who live in crowded homes or work in big offices or who travel on public transport everyday to get infected with airborne diseases because they come into contact with a lot of people. Airborne pathogens can stay in the air for a long time and can travel long distances. Many South Africans travel on public transport every day which can put them at risk of being exposed to airborne illnesses, because often taxis, train carriages and buses are over crowded. If you are travelling in a taxi, train or bus with someone who has 'flu or TB and is coughing and sneezing without covering their mouth and nose, the germs will be in the air and you can breathe them in. The other problem is that often windows are kept closed which means the germs stay inside. The longer the distance travelled and the more time you spend in the area where the germs are in the air, the higher your risk of breathing in the germs and being infected.



Here we can see how a sneeze can spread germ through the air. This is why it is important to cover your mouth and nose when you sneeze or cough.

Tips for preventing airborne illnesses:

- Cover your mouth and nose when coughing and sneezing, especially if you are sick.
- If you travel on crowded public transport, try and sit next to a window or cover your mouth and nose with a scarf and item of clothing.
- Keep offices and homes well ventilated. If an infected person is in a room and all windows and doors are closed, their germs will remain in the room and be passed on to other people.
- See the photograph below for the right way to cover your mouth and nose when sneezing or coughing. It is better to sneeze into your elbow and not onto your hands which you will then go on to touch other things and people with.
- Many clinics give masks to people who are attending the clinic to help prevent the spread of TB, as well as other airborne infections such as swine 'flu.



DISCUSSION POINTS

In a group talk about the following questions and see if you can answer them.

1. Explain how germs are spread through the air.

If someone who is sick sneezes or coughs without covering their nose and mouth, their germs spray into the air and can then travel through the air and are then breathed in by someone else.

2. What can we do to prevent being infected with airborne germs?

We can make sure our homes are well ventilated, especially if someone in the home is sick. We can also cover our mouths and noses with a scarf, handkerchief or tissue when in crowded areas. If you are sick, then cover your nose and mouth with a tissue or cough and sneeze into your elbow.



WORKBOOK NOTES



The correct way to sneeze or cough. (Photos: John Freeman and MSF Khayelitsha)

General household hygiene



Bacteria and other pathogens can live in house dust. The bacteria that are put into the air when someone coughs or sneezes may land in household dust. Certain bacteria like TB can use this dust to breed and survive in (incubate). Dust also supports fleas and other bugs. Household dust is the perfect environment for germs and many people are also allergic to household dust which makes them sneeze. Dust mites are microscopic, spider-like creatures that can only be seen under a microscope. They are found in household dust and cause allergies, such as asthma. This is why it is important to clean your home regularly and to make sure that your house has as little dust as possible.

CLEANING THE HOME

Clean the home thoroughly at least once a week. Sweep the floors and if there are mats or carpets take them outside and shake them to get rid of dust. You can also wash the floors with soapy water. It is also a good idea to have a mat at the door so that people can brush off the dirt from their shoes before entering the home.

Kitchen areas or the places where food is prepared and eaten should also be kept clean. It is best to wash cooking utensils and cutlery and plates and bowls in hot water. Soap and hot water clean better than cold water because it removes grease. Boiling water also kills many bacteria. You can also add a teaspoon of bleach to your washing up sink to make sure all bacteria are killed. It is also a good idea to wipe all surfaces where food is prepared and eaten with a hot damp cloth that has been soaked in a hot water with a teaspoon of bleach. Other cleaning products are also good at making sure that bacteria are removed from the home.

RUBBISH REMOVAL

Make sure that all rubbish is thrown in a bin outside the house, or else in a closed bin inside the house that is emptied frequently and then thrown away properly. If you do not live in an area where there are rubbish collection services you will need to either burn or bury your rubbish. If rubbish is not burnt or buried, it will attract rats and other animals that can spread disease. Rubbish also smells bad and many germs live in rotting material. A vital part of infection control is making sure that all rubbish is removed and destroyed or composted.

BEDS OFF FLOOR

If possible beds should be off the floor so that you are not in contact with the floor. The floor is often full of dust and dirt because people walk on the floor and bring dirt and germs inside the home on the bottom of their shoes or feet. Blankets and covers should be hung outside regularly in sunshine to kill bacteria. Bedding, such as sheets and pillow cases, should be washed once a week and hung to dry in direct sunlight if possible.

VENTILATION IS VITAL TO PREVENT AIRBORNE INFECTIONS



Sweeping the floor keeps the house dust free and helps prevent the spread of germs.



Wiping surfaces with a cloth helps prevent the spread of germs.



We should wash up after meals using soap and hot water.



Most personal hygiene tips are common sense but it is good to remind ourselves why personal hygiene is so important for our health and well being. Personal hygiene is important for everyone, but it is especially important for people living with HIV because it can help prevent opportunistic infections. It is also important to teach children how to care for their bodies and to help them wash and brush their teeth every day.

HAND WASHING

The most important way to prevent the spread of infections is to wash your hands. Most infections, especially the common cold or 'flu and gastroenteritis (upset stomach), are passed on when germs on our hands come into contact with our mouths. According to the WHO 90% of annual deaths from diarrhoea are among children in the developing world (Water for Health: Taking Charge. WHO, 2001). Many of these deaths could have been avoided through hand washing because diarrhoea is mostly caused by bacteria that are spread from the hands to the mouth.

Here we can see the steps for washing your hands. You can dry your hands with clean, dry towels instead of paper towels (WHO, Save lives clean your hands, 2009).

We also come in contact with germs when we interact with other people. It is important to wash your hands thoroughly with soap and hot water and to dry them with a clean dry towel or paper towel.

You should always wash your hands:

- After going to the toilet
- After touching rubbish or waste bins
- Before and after preparing or eating food
- After touching an animal
- Before and after caring for someone who is sick
- After changing a baby's nappy
- Before changing contact lens



1. Hands after handling raw chicken

2. Hands after handling a dirty dishcloth

3. Hands after using the toilet

Source: FDF/PHILS, UK

WASHING THE BODY

A daily shower or bath cleans our skin of sweat and bacteria that we have picked up during the day. Apart from removing body odour, daily washing helps keep our skin healthy. If you are active and do hard physical work or play sport, it is good to wash afterwards with soap and rinse well. After washing you should dry yourself thoroughly with a clean, dry towel. If possible it is better not to share towels because infections can be passed on this way.

HAIR CARE

Hair care is another important part of personal hygiene. If you have Asian (Eastern) or Caucasian (white) hair you should wash your hair every 2 to 3 days depending on your hair and how much exercise you do. African hair is different from Asian or Caucasian hair and so it needs different ways of caring for it. If you have African hair, don't shampoo your hair every day, but rather use shampoo every 3 to 7 days. If you have braids or hair extensions you still need to wash your hair. If you do a lot of sport or exercise and feel the need to wash your hair, you can rinse it in warm water rather than use shampoo everyday. Shampoo will strip your hair of its natural oils and make it dry and brittle. Use a mild, moisturising shampoo. Depending on what you like, you might choose to use a leave-in conditioner or another hair product oil to keep your hair and scalp from drying out. Looking after your hair and scalp helps prevent infections. Some kinds of dandruff are caused by fungal infections. If you have dandruff, use an anti-dandruff shampoo. If it still doesn't go away speak to your doctor or pharmacist.



Keeping our hair clean is good for our health.

Washing daily helps keep our skin healthy

DENTAL HYGIENE

You should brush your teeth twice a day after meals, preferably in the morning and in the evening before you go to sleep. You should also floss your teeth or clean them with a toothpick to make sure that any food stuck between your teeth is removed. If food stays in your mouth, it attracts germs which can cause your teeth to start rotting and other gum infections. Flossing also removes plaque which is an important part of oral hygiene because plaque build up can cause gum and teeth problems.

Avoid sharing toothbrushes because infections can be spread in this way, especially if a person has open wounds or ulcers in their mouth. Make sure you do not push your gums back by brushing with a stiff toothbrush or brushing too hard. Use a soft brush and gently brush your teeth taking care to brush down over the gums in circular motions. If you push your gums back and expose the roots of your teeth you make it easier for infections to take hold.

NAIL CARE

Keep nails short and use a nail brush to clean under them regularly. If you like to have long nails make sure that you use a nail brush to clean them regularly. Germs and dirt can collect under your nails and in this way infections can spread from your hands to your mouth.



We should brush our teeth twice a day.



DISCUSSION POINTS

In a group talk about the following questions and see if you can answer them.

1. Why is hand washing so important?

When we wash our hands we prevent germs from spreading from our hands to our mouths.

2. Why should we wash/shower every day?

Washing every day cleans our skin of dirt, sweat and germs.

3. What can we do to prevent infections in our mouths?

Flossing every day and brushing teeth twice a day helps keep your mouth clean and healthy.



WORKBOOK NOTES

Households caring for sick people

Episode 8, Chapter 5



If you live in a home where you are caring for a sick person it is important to know about infection control. When caring for someone who is sick, there is the danger that they can infect other members of the household. But there is also the danger that people in the home can infect the sick person with other, new infections.

We will discuss in detail how to care for people in the home in Chapter 18 on home-based care. Home-based care is provided to people in their homes and usually involves trained home-based carers who support a primary care giver who lives in the home with the sick person. Home-based care most often refers to people who are seriously ill or sick for a long time before getting better. For example, people who may need home-based care are those who have had a stroke, people living with HIV and AIDS, elderly people, mentally handicapped people and people who are dying of a terminal illness, such as cancer.

In this chapter we are focusing on infection control and so it is also important to talk about what to do in the home when caring for someone who is sick. As we have already discussed, germs can be spread through air, water, food and personal contact. The most important thing to do when caring for someone in the home is to limit the ways that germs are spread. Not all illnesses are contagious (infectious). For example, you cannot be infected with cancer or mental illness and someone who has had a stroke cannot make you sick. But other illnesses, like TB, 'flu and pneumonia, are infectious and can be passed on to other people in the home. Here are some basic tips in infection control when caring for someone who has an infectious illness at home:

- If possible keep the sick person in a separate room and keep the door closed to prevent air moving from the sick person's room into the rest of the house. If this is not possible, then make sure that the whole house is well ventilated. Keep at least 1 window open all the time and at least once a day make sure that all windows and doors are opened to move all stale air out of the home and get fresh air in.
- Wash all bed linen at least once a week. Dry linen in direct sunlight to help kill bacteria.
- Hang blankets and bed covers in sunlight to help kill bacteria.
- Separate stained or soiled linen and clothes from other laundry and wash separately. After rinsing thoroughly with running water, soak in water with diluted bleach and then wash with soap.
- Wipe all surfaces in the home with a cloth which has been soaked in a litre of boiling water and teaspoon of bleach. In this way, you remove germs resting on surfaces which can be touched by other people in the household who are not sick.
- Any toilet paper or cotton wool used to clean wounds, wipe the person or blow their nose should be put into a plastic bag and tied closed before being put into the bin. You can also burn cotton or toilet paper waste.
- Wash your hands before and after caring for the person (i.e. changing the bed, feeding, washing).
- Avoid having a pregnant woman care for the sick person because pregnant women can have a weakened immune system.
- A sick person can eat off the same plates and bowls as the rest of the household, but make sure that the plates, bowls and spoons, knives and forks are washed in hot, soapy water before and after the sick person touches them. Make sure you don't eat from the same plate, or drink from the same cup, at the same time as someone who is sick.
- Avoid having a sick person look after children. Children easily catch infections because their immune systems are not as strong as an adult's.
- Other members of the household should wash their hands frequently, especially after being in the room with the sick person or touching them.

Apart from these steps to preventing infection in homes caring for sick people, everyone should continue to follow the guidelines for household and personal hygiene.



DISCUSSION POINTS

In a group talk about the following questions and see if you can answer them.

1. Why should we make sure the home is well ventilated when we are caring for a sick person in the home?

If you are caring for a sick person and they have an infection that is airborne, you need to make sure that the germs don't stay in the house where other people can breathe them in and get infected.

2. Can a sick person use the same knives and forks and plates and cups as the rest of the family?

Yes, they can use the same things to eat with, but you cannot eat off the same plate at the same time as someone who is sick. You should also make sure that everything is washed in hot, soapy water to kill bacteria and prevent them being spread to other members of the family.



WORKBOOK NOTES



TB control

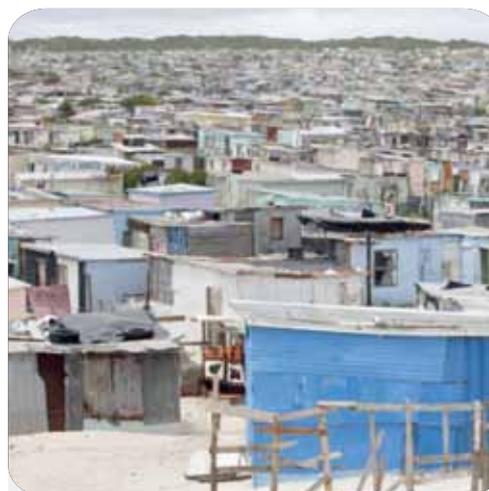
Episode 8, Chapter 6



TB is caused by a bacterium called *Mycobacterium Tuberculosis*. As we have already learnt in Chapter 8, TB is the leading cause of death for people living with HIV in South Africa. In this chapter we will focus on TB infection control. If you want to learn more about TB and TB treatment, please read Chapter 8. TB prevalence in South Africa is very high and affects many South Africans regardless of their HIV status.

One of the main challenges for controlling the spread of TB in South Africa is that many South Africans live in poor socio-economic conditions. Informal settlements often have the perfect conditions for the spread of TB because of the crowded living conditions and the poor quality of housing where homes are often damp and cold. Many homes in informal settlements also have poor ventilation which means that there is an increased chance of being exposed to the TB germ if you live in one of those homes.

A growing concern among health care professionals is the spread of drug resistant (DR) TB, which means that TB treatment no longer works. Drug resistant TB is sometimes called MDR (multidrug resistant) or XDR (extensively drug resistant). People can be infected with a strain (kind) of TB that is drug resistant, or they can develop drug resistant TB if they do not complete their TB medication. Some organisations, such as Médecins Sans Frontières (MSF), prefer to use the term DR TB, which stands for drug resistant TB, instead of XDR TB and MDR TB. They believe this helps to reduce the stigma for people who are infected with DR TB. Regardless of whether a person is infected with TB or DR TB, they are infected by the same bacterial infection, but they need different medication to treat it.



Informal settlements are hotspots for the spread of TB because many homes are crowded and do not have good ventilation. (Photo: John Freeman)

Between the years 2004-2008, over 24 000 cases of DR TB were diagnosed in South Africa (National Institute for Communicable Disease, South Africa, 2008). 7% of these cases were found to be infected with XDR TB. Although this is very high, this is only a small percentage of the estimated number of DR TB cases in South Africa. The major concern with DR TB is that it spreads easily and it is very difficult to treat effectively. Only 15% of people with MDR TB can be cured. Patients also need to take treatment for a very long time.

There are some important steps that can be taken to prevent the spread of TB and DR TB.

PREVENT TB BY COVERING MOUTH AND NOSE

Because TB is an airborne infection, the most effective ways to prevent the spread of TB is to encourage people to cover their mouths and noses when they sneeze and make sure that homes and other public spaces are well ventilated. We have already spoken about this in some detail in this chapter.

PREVENT THE SPREAD OF TB IN HOSPITAL

To begin with, the most common way to treat DR TB patients was to hospitalise them so that they could not infect other people in their community. The advantage of hospitalising patients is that the medical staff can closely observe the patients and make sure that they take their medication correctly and treat any side-effects. But people feel very isolated in hospital and some patients even break out of hospital.

The other concern is that people will not be diagnosed because they will stay away from health care facilities because they don't want to be isolated from their families and lose their disability grants. For all these reasons, there are moves to rather treat DR TB patients in the home. But of course we need to take extra care when treating DR TB patients in the home so that they do not infect other family members.

Another major reason for not wanting to hospitalise people with DR TB and ordinary TB is that when patients with DR TB are mixed with ordinary TB patients the ordinary TB patients can become infected with DR TB. This can happen either because the hospital has not picked up (diagnosed) the DR TB infection or because of a shortage of beds. Hospitalised TB patients can also increase the risk of other patients (who are in hospital for different illnesses) being infected with TB.

PREVENT THE SPREAD OF TB DURING HOME CARE

All the recommendations for treating sick people in the home that have already been discussed in this chapter also apply for TB patients. But there are some additional tips that should be followed as well.

- **Send young children away**

If a DR TB patient is living at home, children and pregnant women should rather stay with other family members until the person's TB has been cured. Children and pregnant women have weaker immune systems and are at increased risk of getting TB. The DR TB patient is encouraged to wear a facial mask or use a tissue every time they sneeze or cough to stop the spread of the TB germ in the home environment. People who are caring for the person with DR TB can also use a facial mask when in close contact with them.

- **Cross ventilation**

One of the most important ways to limit TB infection at home and in hospitals is to improve ventilation. Fresh air must come into the room and stale air must go out. Research has found that the air in a room needs to change 12 times an hour. This will greatly limit infection with TB.

WHO recommends that all buildings should have cross ventilation which means that air can flow through the home at all times of the day. Airbricks allow air to move from open windows or doors out the airbricks which means that germs do not get trapped inside the home. Many homes in South Africa are not built using airbricks because they are built using building materials like corrugated iron and wood.

In homes where there are no airbricks it is even more important to make sure that windows and doors are opened so that the air inside the home can be replaced with fresh air. Of course there are limitations to this due to security concerns and during the winter months when it rains a lot. A fan can also help to move air out of a room if it is placed in the right area. Airing of bedding and soft furnishing like pillows and curtains in sunlight can help kill any TB bacteria in the home environment.

**Cross ventilation
is an important way to
reduce TB infection**



The TAC campaign for community-based treatment for people with DR TB. (Photo: John Freeman and MSF Khayelitsha)



It is recommended that people cover their mouths and noses with a face mask or a paper tissue. (Photo: John Freeman)



Airbricks have holes which allow for cross ventilation.

Infection control in hospitals

Episode 8, Chapter 7



Infection control in hospitals is a challenge faced by all healthcare facilities around the world. Hospitals and hospital staff and patients are all at risk of being exposed to infections in a hospital or clinic. Patients not only bring germs into the hospital/clinic when they come to receive care, but they also exposed to many different germs while they are there. For this reason it is very important that hospitals control the spread of germs with the thorough cleaning of all surfaces and bedding and soft furnishing (pillows, curtains). Staff should be correctly trained so that they know how to clean general wards, passage ways and waiting areas, as well as specialist areas like operating theatres that require complete sterilisation.

In any hospital or clinic setting the following infection control steps should be followed:

- Hand hygiene is one of the most effective ways of preventing the spread of germs. Healthcare workers should wash their hands thoroughly using soap and water and dry their hands using a paper towel. A paper towel is much better than a hand dryer or a fabric towel. In addition to hand washing, rubbing the hands with an alcohol-based solution is also an important part of hand hygiene. Hands should be washed or rubbed before and after each patient is seen to.

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

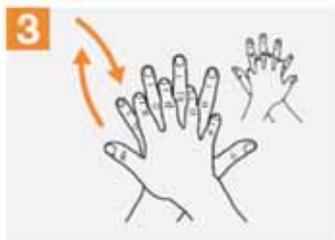
Duration of the entire procedure: 20-30 seconds



1a Apply a palmful of the product in a cupped hand, covering all surfaces;



2 Rub hands palm to palm;



3 Right palm over left dorsum with interlaced fingers and vice versa;



4 Palm to palm with fingers interlaced;



5 Backs of fingers to opposing palms with fingers interlocked;



6 Rotational rubbing of left thumb clasped in right palm and vice versa;



7 Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



8 Once dry, your hands are safe.

Here we can see WHO instructions on hand rubbing with an alcohol-based hygiene product.

- Personal protective equipment such as face masks, gloves and aprons should be used if necessary. Face masks are used to protect people against airborne diseases (i.e. TB). Gloves are used to protect against germs that are blood borne or that can be passed on in bodily fluids (i.e. HIV or hepatitis). Change gloves between tasks on the same patient if you come into contact with a potentially infectious material. For example, if you touch the floor while picking something up. Remove and throw away gloves and wash hands before going onto the next patient. A health care worker may need facial protection if there is the risk of splashes or sprays of bodily fluids. A gown protects the skin and helps prevent soiling clothes.
- Staff and patients should make sure they follow cough/sneeze etiquette and cover their mouths and noses when they sneeze or cough. It is better to sneeze or cough into a tissue or into your elbow than onto your hands, because then the germs are on your hands and you need to wash them. Make sure that all tissues are disposed correctly. Wash your hands after blowing your nose or touching tissues.
- When handling used linen make sure that your skin does not come into contact with it and that other patients are not at a risk of the spread of germs.
- All health care workers should make sure that waste disposal is done correctly. Items that have come into contact with blood and bodily fluids are usually incinerated (burnt at a very high temperature). Needles and other medical supplies are usually sterilised or destroyed at health care facilities.

Infection control and making sure hospitals are safe and germ-free environments are important in order to prevent infections that take place in the hospital or clinic (also known as nosocomial infections). Common hospital-acquired infections are urinary tract infections, pneumonia and surgery related infections. DR TB can also be spread in hospitals and so special care needs to be taken that other patients do not come into contact with DR TB patients. This is why DR TB patients are quarantined or separated from other patients, including other TB patients.

The development of 'superbugs', which are mostly bacteria that become resistant to multiple antibiotics, are a major concern for health care facilities. These superbugs, like MRSA (methicillin-resistant *Staphylococcus aureus*), are a problem all over the world in both public and private hospitals and clinics. Every year, about 1.7 million patients in America get hospital infections. Most people who are infected with MRSA get infected while in hospital and usually after an operation where they become exposed to the superbug. The challenge with treating superbugs is that they are very difficult to kill and so treatment is very expensive and has to be taken for a long time.

It is very important that our public health care system does everything it can to prevent the spread of superbugs like MRSA. The spread of superbugs can be controlled in a similar way to other bacteria, such as proper cleaning using disinfectants, hand hygiene, disposing of waste, ventilation and isolation of people who are infectious. Hospitals cleaning staff need to be trained properly and make sure that even the tops of doors are cleaned and other out-of-the-way places. Healthcare professionals also need to prescribe antibiotics less often. Strict prevention measures need to be enforced to stop superbug infection in hospitals during surgery and time spent in hospital. New research also needs to be done on prevention and the development of new antibiotics.



Hospitals should be as free from germs as possible.

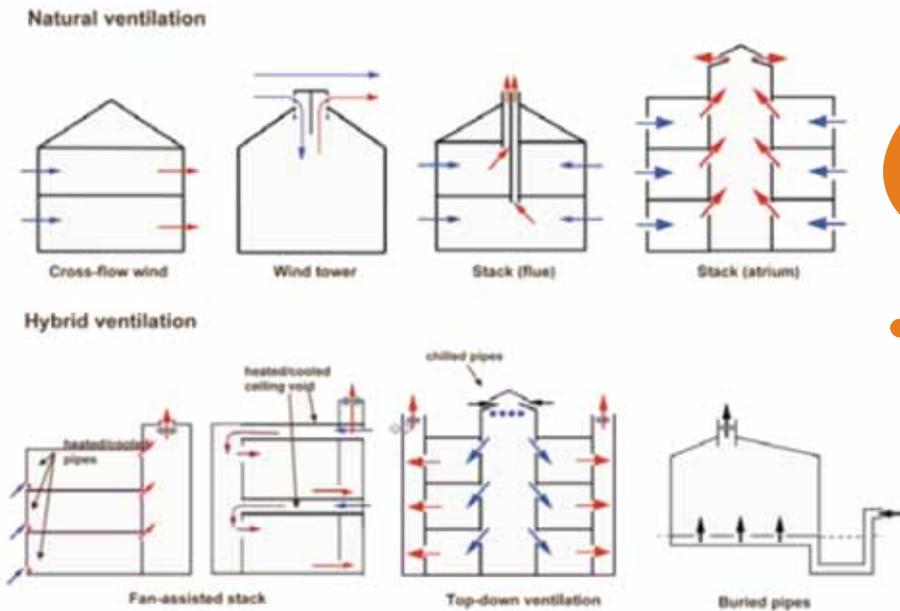


Hospitals sterilise medical equipment using extremely high temperatures or steam.



*Mask wearing in clinic waiting areas.
(photo John Freeman)*

Ventilation of hospitals and clinics is very important. We have talked about how to make sure that air moves in and out the home if you are caring for someone in the home. In hospitals it is even more important to ensure that there is plenty of movement of air. WHO has recommendations on how to make sure that new hospitals are built in a way that makes use of both natural (i.e. wind direction) ventilation, as well as other mechanical ways of ventilation (i.e. fans, extractor fans etc).



Cross ventilation is especially important to reduce infections in hospitals and clinics

Some examples of different hospital building designs that make sure there is ventilation.

Source: Courtesy of Professor Martin Liddament, VEETECH, Coventry, UK.

DISCUSSION POINTS

In a group talk about the following questions and see if you can answer them.

1. Why must hospitals be so strict about infection control?

Hospitals need to be strict about infection control because many people who come to hospital are infectious and their germs can spread to staff and other patients. It is very important to make hospitals and healthcare facilities as germ-free as possible.

2. What are superbugs?

Superbugs are bacteria that are resistant to multiple different antibiotics and are very difficult to treat. People can become infected with superbugs in hospitals when they have surgery.

WORKBOOK NOTES

Cultural interpretations of disease

Around the world different cultures have had their own ways of understanding what causes disease and also different ways of treating illnesses. Many ancient customs are built on the principles of infection control. For example, some historians believe that the religious ban on eating pork among Jewish and Muslim people is based on the understanding that in hot climates pork very easily gets contaminated with germs and so it is better to avoid eating pork. Here we can see how a culture has created a law that protects the health of its people.

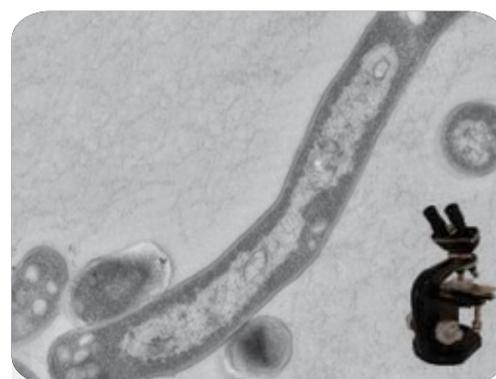
Even before the invention of the microscope, some scholars suggested that disease was caused by things that were invisible to the eye. The first micro organisms were seen using a microscope in 1675, but it was only in 1876 that a man called Robert Koch proved that micro organisms cause disease. He did experiments on cows where he took blood from a cow infected with anthrax (a bacterial infection) and then injected a healthy cow, which then became sick.

Robert Koch also identified the bacterium *Mycobacterium tuberculosis* as the cause of TB in humans in 1882. Before this time there were many misunderstandings about TB. For example, in the 17th century it was believed that people who had TB were vampires because they would drain the life from other family members. Many of the symptoms of TB, such as red, swollen eyes, pale skin, low body temperature and coughing blood were believed to be proof that they were vampires. People believed that because they coughed up blood, they would need to drink the blood of other people. Another belief in the early twentieth century was that TB was caused by masturbation. So we can see that before the science of TB disease was understood, people made up other ways to try and explain it.

The same thing can be said about many other illnesses. In Chapter 1 of this manual we talked about some of the myths about HIV. Many of these myths are the result of people not understanding how disease is caused. We can see that many of these myths are very harmful, because they stigmatise people living with HIV and in some cases put people's lives in danger. It is important to understand the science of illnesses so that we can know how to prevent and treat them best.

Some of the recommendations made in this chapter, such as making sure that there is plenty of fresh air in your home, may sound strange to you because that is not how you currently do things. Talk about what you have learnt in this chapter with your family and the people you live with and see if you can decide on new ways of doing things that prevent infections in the home. We have spoken about how living in poor economic conditions puts people at risk of infection and poor health. But regardless of where you live there are still things you can do (such as hand washing) to make sure that you protect yourself from common infections.

Traditional medicine often gives the patient a different way of understanding their illness and also how best to treat it. Many people believe that ill health is the result of something they have done, such as a jealous neighbour bringing them bad luck or some other reason. If you have different beliefs about what causes disease, think about this chapter carefully and talk to other people you know to see what they think. If you go to a traditional healer it is important that you tell your medical doctor or clinic, because some traditional remedies cannot be taken at the same time as medicines. At the end of the day, it is your life and you can make your own decisions about your health. We are sharing this information so that people can learn more about health and illness and make more informed decisions.



Here we can see a photograph of TB under a microscope.



Here is a photo of a microscope.



DISCUSSION POINTS

In a group talk about the following questions and see if you can answer them.

1. Can you give an example of a cultural/religious law that protects people's health?

The Jewish and Muslim ban on eating pork is believed to be based on the understanding that pork is very easily infected with germs in hot climates.

2. What myths were there about TB before it was proved that it was a bacterial infection?

It was believed that people who had TB were vampires and that TB was caused by masturbating.



WORKBOOK NOTES

Congratulations on completing this chapter.

We have talked about ways of preventing infections through our everyday actions. Infection control is about preventing the spread of germs in our homes and protecting ourselves from germs when we are in public spaces. All these tips help you and your family to live a healthy life together.



BEFORE WE END OFF

Make sure all questions have been answered. It is important that you understand the following key points:

1. Good hygiene prevents infections.
2. Hand washing and personal hygiene are essential to good health.
3. Infection control prevents the spread of TB in our homes.
4. Infection control is especially important for homes where sick people are being cared for.
5. Hospitals and health care facilities need to have high infection control standards.



MULTIPLE CHOICE QUESTIONS

Name :

Circle the correct answer for each question. You can only choose 1 answer for each question.

1. Which of the following statements is true?

- a) Infection control is only for HIV positive people.
- b) Infection control is only found in South Africa.
- c) Infection control prevents the spread of germs.
- d) Infection control is only for sick people.

2. Illnesses are caused by:

- a) Bad luck
- b) Sin
- c) Germs
- d) Anger

3. Which of the following does not prevent the spread of germs?

- a) Washing your hands
- b) Cleaning the house
- c) Painting the house
- d) Refrigerating your food

4. Which of the following does not make water good to drink:

- a) Adding 2 drops of chlorine to a litre of water.
- b) Adding 3 drops of iodine to a litre of water.
- c) Adding 2 cups of chlorine to a litre of water.
- d) Leaving water in a clear plastic bottle for 8 hours in the sun.

5. Most of the time diarrhoea is caused by:

- a) Bacteria
- b) Viruses
- c) Protozoa
- d) Fungi

6. Which of the following statements does not offer good health advice?

- a) You should brush your teeth twice a day after meals.
- b) You should wash once a week.
- c) You should wash your hands before and after touching food.
- d) You should use a nail brush to clean under your nails.

7. Which of the following illnesses is infectious?

- a) Heart attacks
- b) Dementia
- c) TB
- d) Cancer

8. If an illness is infectious it means:

- a) No one can get it.
- b) Only people related to the sick person can get it.
- c) Anyone can get it.
- d) Only old people can get it.

9. If you have DR TB it means:

- a) Standard TB treatment no longer works for you.
- b) You have to be HIV positive.
- c) There is no treatment that will work for you.
- d) Standard TB treatment will work for you.

10. A 'superbug' is a germ:

- a) That was made by the government.
- b) That is drug resistant.
- c) That is found only in South Africa.
- d) That is injected into people to make them sick.



WORKBOOK NOTES

A series of horizontal dashed orange lines providing a space for writing notes.