

Chapter 1

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ASEPTIC NON-TOUCH TECHNIQUE AND INFECTION PREVENTION

Clinical Skills for Nurses, Second Edition. Claire Boyd.

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LEARNING OUTCOMES

By the end of this chapter you will have an understanding of the aseptic non-touch technique (ANTT) and be able to define it. You will also be able to describe the ANTT framework, list the ANTT principles and be able to apply ANTT to your practice.

Performing any clinical skills we must first consider infection control principles to reduce incidences of healthcare acquired infections (HCAIs) and community acquired infections. We first need to refresh our understanding of some of these micro-organisms. Table 1.1 shows just four of the micro-organism culprits.



Healthcare acquired infection (HCAI)

Also known as healthcare associated infections. These are infections that people get while they are receiving healthcare for another condition. HCAIs are a significant cause of illness and death and they can have serious emotional, financial and medical consequences.

Table 1.1 Four types of micro-organisms.

Micro-organism	Examples
Bacteria: Gram positive	<i>Clostridium difficile</i> , staphylococcus
Bacteria: Gram negative	Salmonella, gonorrhoeae
Mycobacteria	Tuberculosis, leprosy
Virus	Herpes zoster: chicken pox, shingles, norovirus, coronavirus
Fungi (superficial)	Thrush, ringworm
Protozoa	Plasmodium (cause of malaria) Cryptosporidium (can cause gastroenteritis)

MICRO-ORGANISMS

Bacteria, viruses, fungi or other less common pathogens can cause HCAs. The most well-known include those caused by methicillin-resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* (C-diff).

Table 1.1 only shows the 'bad' micro-organisms, known as **pathogenic** microbes. But not all bacteria are bad – the 'good' micro-organisms, known as **commensal** microbes, actually live in or on the human body and help the body: vitamin K, which is necessary to regulate our blood clotting processes, is produced by some of these good bacteria.

DID YOU KNOW?

It has been estimated that 1 kg of an adult's total body weight is composed of bacteria, known as microflora, which are beneficial to the human body.

Just one of those good-guy bacteria is known as *Lactobacillus acidophilus*. This bacterium helps us by:

- supporting digestive function
- supporting the health of the immune system
- supporting the health of the urinary tract
- improving vaginal microflora in women
- enhancing absorption of nutrients
- relieving abdominal cramps, gases, and diarrhoea.

Micro-organisms already present in the body only cause problems when the body's defences are weakened (due to ill health) or breached by surgery or other medical procedures. Within the healthcare environment we are generally more concerned about pathogenic micro-organisms.

MIASMA

Since 100 BCE, our ancestors were aware that disease could be spread by ‘imperceptible particles’ entering the body; In short that the air around us is not pure, and if you were unlucky, this bad air or ‘miasma’ could cause disease or death if breathed in. Later on, surgeons would have sulphur burnt where they would operate, to purify the air, creating a lovely aroma of rotten eggs! This rudimentary understanding of microbes had not yet equated good health with good hand hygiene.

DID YOU KNOW?

The airborne germs we breathe in includes bacteria, fungi, moulds, viruses, and volatile organic compounds, which are chemicals that easily dissolve in water or vaporise into air.

How Are Micro-organisms Spread?

Micro-organisms are not solely spread through the air; The six potential routes are:

- Direct contact, for example kissing or sexual contact
- Indirect contact, for example contaminated hands touching surfaces or other people
- Airborne, for example sneezing or coughing or through disturbance of dust when cleaning
- Faecal–oral, for example not washing hands after going to the toilet and then preparing food and ingesting it
- Animal vector, for example mosquito bite inserting micro-organisms into the body causing malaria
- Bloodborne, for example sharing dirty needles, used equipment or by infected blood products.

Five Moments of Hand Hygiene

As our knowledge about micro-organisms increased, we also became much more aware of the importance in healthcare of correct hand washing. The World Health Organization (2009) developed the five moments of hand hygiene, suggesting when we should wash our hands:

- before patient contact
- before an aseptic task
- after body fluid exposure risk
- after patient contact
- after contact with patient surroundings.

It is all well and good knowing when to wash your hands, but it must be performed correctly.

Correct Hand Washing

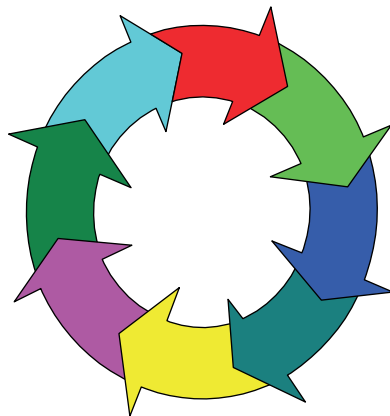
A simple but effective means of protecting patients from nosocomial infection is hand washing, which is considered to be the most basic but vital infection control measure. Healthcare practitioners are taught the six-point hand washing technique:

- 1 Palm to palm.
- 2 Right palm over left dorsum and left palm over right dorsum.
- 3 Palm to palm fingers interlocked.
- 4 Back of fingers to opposing palms with fingers interlocked.
- 5 Rotational rubbing of right thumb clasped in left palm and vice versa.
- 6 Rotational rubbing backwards and forwards with clasped fingers at right hand in left palm and vice versa.

The gold standard is to use liquid soap on wet hands and to dry the hands thoroughly.

The Chain of Infection

We now know how micro-organisms are spread and how effective correct hand washing is, but we also need to be aware of the chain of infection. The chain of infection has six links; break one of the links and the spread of infection is prevented. The six links are:



- 1** An infectious agent, such as MRSA or norovirus.
- 2** A reservoir, such as people, food, water.
- 3** A way out of the body, such as, faeces, urine, sneezing.
- 4** A method of spread, such as contact by hand or equipment, droplets, airborne.
- 5** A way into the body, such as breaks in the skin, mucous membrane, inhalation.
- 6** A susceptible host such as elderly individuals or those with poor immune systems (cancer patients, newborn).

Today, healthcare workers are trained in infection control principles and our knowledge has somewhat increased since the miasma theory days! However, we still have much to learn as numbers of patients contracting infections in either the hospital or community setting are far too high. HCAs pose a serious risk to patients, staff and visitors, and

substantial costs to the NHS and care providers, and significant morbidity to those infected. Individuals have the right to expect that they are being safely cared for, with staff trained in infection control principles to minimise their chances of catching an infection.

POOR PRACTICE

As our knowledge in infection control principles have increased, our execution of this knowledge still needs to be addressed.

At the start of my nursing career as a student on placement, I once saw a registered midwife putting on sterile gloves to empty a new mother's urinary catheter bag. Clearly, this healthcare professional had not quite understood the basic principles of infection control, as non-sterile gloves and apron would have sufficed. I have more recently seen a male patient having a urinary catheter inserted with the nurse wearing two pairs of sterile gloves (known as the 'double gloving' technique). We know today that the bottom pair of sterile gloves is *not* sterile because of the pores in the gloves. This practice should no longer be seen when conducting aseptic techniques.

Years ago, it was all very confusing, not least because we would use the term 'sterile technique' and 'aseptic technique' interchangeably. Sterile and aseptic are not the same thing.

DID YOU KNOW?

Double gloving is acceptable practice in surgery/operating theatres as it does provide an additional level of protection against penetration of the gloves by surgical instruments.

What Does It All Mean?

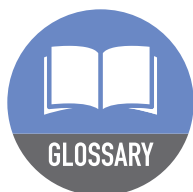
In the healthcare sector, we have known for many years the devastation that the harmful germs can inflict but the terminology we use to describe the technique we are using to reduce contamination has been less clear, if not downright confusing. For example, when performing any dressing change in the ward area, we would wait some time for the dust to settle after bed making and then refer to this dressing change as ‘a sterile technique’. In reality, this is totally incorrect, as microbes would still be floating around in the air – just because we can’t see them, does not mean that they aren’t there!

Note: It is still good practice to wait for some time after bed-making before changing dressings in clinical areas.

It is not possible to achieve a true sterile technique outside the controlled environment of a specially designed operating theatre or sterile cabinet. Table 1.2 shows the definitions of aseptic technique, ANTT, clean and sterile techniques.

A full risk assessment must be conducted to establish which technique is to be employed prior to undertaking the clinical skill.

Note: sterilised equipment can only be considered sterile inside unopened packaging. Once the pack has been opened, it is instantly exposed to airborne organisms and is therefore considered aseptic. The sterile technique employs sterile fields, sterile gowns, masks, sterile gloves, sterile supplies and surgical hand rub.



Pathogenic

The ability to cause or produce disease.

Key parts Any part of a piece of equipment used during aseptic technique that will increase the risk of infection if contaminated by infectious material.

Table 1.2 Definitions of aseptic, aseptic non-touch, clean and sterile technique.

Technique	Definition
Aseptic	'Without organisms'. The principle aim of an aseptic technique is to protect the patient from contamination by pathogenic organisms during medical and nursing procedures.
Aseptic technique	Minimising the sterility of a product during handling or preparation. Using this technique is about maintaining the sterility of already sterile objects.
Aseptic non-touch technique	Practice of avoiding contamination by not touching key elements, known as 'key parts', such as the tip of a needle or the surface of a sterile dressing where it will be in contact with the wound.
Clean technique	A modified aseptic technique that aims to avoid introducing micro-organisms to a susceptible site. The use of sterile equipment is not crucial.
Sterile technique	Aims to achieve total freedom from <i>all</i> micro-organisms. It is not possible to achieve a true sterile technique outside the controlled environment of a specially designed operating theatre.

STANDARD AND SURGICAL ASEPTIC NON-TOUCH TECHNIQUE

As we have seen in Table 1.2, a widely used method of aseptic technique is known as ANTT. Performing clinical skills using the ANTT approach is achievable both in the clinical and non-clinical settings such as hospital wards and patients' homes.

There are two types of ANTT, one of which is used in more acute procedures. The two ANTT can be seen in Table 1.3.



Aseptic field

An aseptic field is a controlled working space that contains and protects procedure equipment from contamination. An aseptic field must be prepared immediately prior to use and not left unattended.

Table 1.3 Standard and surgical aseptic non-touch technique.

	Standard	Surgical
Technique	Technically simple, using non-sterile gloves Employs general aseptic field used for carrying out procedure Short duration	Technically complex, performed using sterile gloves and in operating theatres, usually involving extended time frame
Use	Procedures such as inserting peripheral cannulas, venepuncture, taking blood cultures, intravenous therapy, respiratory suctioning	Procedures involving large open sites Only sterilised equipment can be placed on a critical aseptic field

PRINCIPLES OF ASEPTIC NON-TOUCH TECHNIQUE

The non-touch principle requires not touching the key parts and key sites. Key parts are the parts of equipment that if contaminated by infectious material, increase the risk of infection to the patient. Table 1.4 shows eight key parts.

The 13 principles of ANTT are:

- 1 Correct hand hygiene:** infection control principles start with correct hand washing.
- 2 Correct use of personal protection equipment (PPE):** PPE includes gowns, gloves, aprons, goggles and visors.
- 3 Correct preparation of the environment:** worktops and surfaces should be cleaned using the 'S' technique, which means wiping from side to side so as not to recontaminate areas.
- 4 Correct preparation of aseptic field:** clean trolleys and trays may act as your aseptic field.
- 5 Correct preparation of equipment:** packaging should be removed and disposed of outside your aseptic field.
- 6 Protect key parts (i):** key parts should not be contaminated. Contamination is avoided by using the 'non-touch' technique.

Table 1.4 Key parts of equipment.

Key part	Information
Syringe tip	Should be protected at all times, as it is the key part. If this key site is contaminated, it may result in a healthcare acquired infection (HCAI).
Hub of needles	Should be protected, as it will come into contact with the syringe tip (another key part).
Rubber bungs of drug ampoules	A key part that needs to be cleaned with an approved agent, as it is not sterile. Once cleaned, only the key part of the needle shaft should come into contact with the rubber bung.
Venepuncture needles	A key part that should not be touched or contaminated as it is puncturing the patient's vein.
Intravenous (IV) administration sets – spike	A key part that should not be contaminated as it is penetrating the infusate being administered to the patient. If contaminated, it could also contaminate the infusate, putting the patient at risk of an HCAI.
IV administration sets – connector	A key part, being attached to a needle-free device. It should not be touched or contaminated and should only come into contact with other key parts/sites.
Peripheral venous cannula	A key part that should not be touched or contaminated as it is puncturing the patient's vein.
Dressings	A key part that should not be touched or contaminated before or during applying the dressing to a wound, as contamination can cause an HCAI.

- 7 **Correct disposal of PPE:** gloves, aprons etc. should be disposed of in the correct waste disposal.
- 8 **Rewash or gel hands:** prior to the procedure.
- 9 **Reapply PPE:** gloves, aprons etc.
- 10 **Prepare patient:** this includes correct identification of the patient, checking allergies and gaining consent.
- 11 **Protect key parts (ii):** key parts should not be contaminated. Contamination is avoided by using the 'non-touch' technique.
- 12 **Dispose of PPE:** used PPE should be disposed of in the correct waste disposal.
- 13 **Clean and store equipment:** all equipment should be stored away after being cleaned.

To help our understanding, have a go at Activity 1.1. Decide whether you would wear sterile or non-sterile gloves and put a tick in the correct column, and whether the skill is an aseptic, aseptic non-touch or clean technique.



Activity 1.1

Clinical activity	Sterile gloves	Non-sterile gloves	Aseptic, ANTT or clean technique?
Providing mouth care to the unconscious patient			
Inserting a urinary catheter			
Preparing intravenous medications			
Emptying a urinary catheter			
Emptying a urinal full of urine			
Emptying a commode full of faeces			
Inserting a cannula into a patient's hand			
Taking blood via venepuncture			
Changing a tracheostomy stoma dressing			
Changing a surgical wound site			



How to remember the ANTT principles using an acronym

- A** Always wash hands
- N** Non-touch technique to protect key parts
- T** Touch non-key parts with confidence
- T** Take appropriate infection prevention precautions

CORRECT USE OF PPE

Principle 2 of ANTT is the correct use of PPE. PPE covers the use of disposable gowns, aprons, masks, goggles/visors and gloves, and is covered by the Health & Safety at Work Act 1974 etc. PPE should be easily accessible for all staff in their working environment.



Activity 1.2

Would you wear a non-sterile apron to perform these clinical tasks?

- Bed-bathing a patient
- Emptying a bed pan/urinal
- Making a bed
- Washing a bed
- Changing a stoma bag
- Cleaning a trolley
- Cleaning a drip stand
- Inserting a peripheral cannula

Removing Peripheral Cannulas

Putting into practice what we know about ANTT, the next section shows us how to remove a peripheral cannula using a clean technique avoiding touching key parts while wearing non-sterile gloves and disposable apron.

Equipment:

- Clean surface – dressing trolley or tray
- Disposable plastic apron
- Non-sterile gloves
- Sterile gauze

- Sterile plaster (or other covering if patient is allergic to plaster)
- Yellow sharps bin
- Clinical waste bag
- Alcohol hand rub

Steps:

- 1 Explain the procedure to the patient and obtain consent.
- 2 Clean hands correctly with soap and water or alcohol hand rub.
- 3 Apply non-sterile gloves and apron.
- 4 Clean tray with chlorhexidine and alcohol wipe.
- 5 Open sterile gauze packaging and leave gauze in packaging.
- 6 Take equipment to patient's bedside.
- 7 Remove gloves/apron and dispose of.
- 8 Clean hands with soap and water or alcohol hand rub.
- 9 Apply non-sterile gloves and apron.
- 10 Loosen existing cannula dressing gently.
- 11 Remove gauze from packet touching one side only and place over cannula site – do not apply pressure or push down on gauze.
- 12 Slowly remove the cannula and dressing (checking whole unit integrity) and dispose of in sharps bin.
- 13 Once cannula is removed, apply pressure to gauze until haemostasis is achieved. Check cannula site.
- 14 Apply plaster (or other covering) until puncture site is closed.
- 15 Remove gloves and apron.
- 16 Clean hands with soap and water or alcohol hand rub.
- 17 Document that the cannula has been removed.

Now be honest, how many of us have seen healthcare staff taking peripheral cannulas out with no PPE on and not even taking a sharps bin for the safe disposal of sharps. This brings me back to the start of this chapter: as our knowledge in infection control principles have increased, our execution of this knowledge still needs to be addressed.

TEST YOUR KNOWLEDGE

- 1 What is the definition of asepsis?
- 2 True or false – an aseptic field can be left unattended for up to two hours?
- 3 Can you touch key parts and key sites if you are wearing gloves?
- 4 Can you touch key parts and key sites if you are not wearing gloves?
- 5 When preparing intravenous medications, what type of technique is used and what type of gloves should be worn?
- 6 When emptying a commode full of faeces, what type of technique is used and what type of gloves should be worn?
- 7 What is the second principle of ANTT?
- 8 True or false – the rubber bung of a drug ampoule is a key part.
- 9 True or false – standard ANTT is generally used for procedures involving large open sites.
- 10 The chain of infection has how many links?

KEY POINTS

- Micro-organisms
- Hand hygiene
- The chain of infection
- ANTT

USEFUL WEB RESOURCES

ANTT: www.antt.org

World Health Organization infection control guidelines: www.infectioncontrolresults.com/the-whos-infection-control-guidelines

Health and Safety at Work Act 1974: <https://www.hse.gov.uk/legislation/hswa.htm>

NHS healthcare associated infections: <https://www.england.nhs.uk/patient-safety/healthcare-associated-infections>

National Institute for Health and Care Excellence guidance on healthcare associated infections: <https://www.nice.org.uk/guidance/qs113>

Royal College of Nursing *Understanding Aseptic Technique:* <https://www.rcn.org.uk/professional-development/publications/pub-007928>

Government guidance on healthcare associated infections: <https://www.gov.uk/government/collections/healthcare-associated-infections-hcai-guidance-data-and-analysis>

REFERENCE

World Health Organization (2009). *Your 5 Moments for Hand Hygiene*. Geneva: WHO Available at https://www.who.int/gpsc/5may/Your_5_Moments_For_Hand_Hygiene_Poster.pdf (accessed 13 January 2022).