2. Disinfect skin and top of blood culture bottle with chlorhexidine & alcohol swab for at least 15 seconds and allow to dry for 15 seconds
3. Collect blood from the neonate using syringe and drawing up needle.
4. Use aseptic non touch with gloves on. The aim is to avoid contaminants and obtain an accurate result.
5. Remove sharp needle from the collection syringe taking care not to touch the syringe hub and replace with Vacuette blood transfer Unit.
6. Transfer sample into the Peds Plus culture vial. Please note suction will pull all blood from the syringe.
7. Mix gently
8. Label with patient ID, date, time and remove barcode from bottle, place onto signed request form.
9. Send to pathology laboratory immediately.
10. Incubation will take up to 48 hours
Supplementary Digital Content 2: PDSA 2

**CHANGE OF PRACTICE: PREPARATION OF NEONATES SKIN FOR IV INSERTION**

| Current Practice: prior to 17/6/19 |
|-----------------------------------|
| • Varied practice regarding cleaning of neonates' skin in preparation for IV insertion or blood sample collection |

| Change of Practice: 17/06/19 |
|-----------------------------|
| 1. **Clean skin at insertion site using 1% Chlorhexidine & 70% Alcohol swab** |
| • After selecting the most appropriate vein for cannulation, the overlying skin should be cleaned continuously using a back and forth motion for at least 15 seconds |
| 15 second equates to the time taken to say/sing: |
| “Twinkle, twinkle little star, how I wonder what you are. Up above the world so high, like a diamond in the sky. Twinkle, twinkle little star, how I wonder what you are.” |
| OR |
| Happy birthday song X 2 |
| • The cleaned site should then be allowed to dry for at least 15 seconds prior to breaching skin surface with IV cannula or needle. |

| 2. **Avoid contaminating the cleaned insertion site** |
|-----------------------------------------------|
| • Insertion site should not be re-palpated once it has been swabbed. If this occurs, then the site needs to be cleaned again for a further 15 seconds. |
| • Avoid re-using chlorhexidine/alcohol swabs |

| Rationale : |
|-------------|
| • An audit of the neonatal unit’s blood cultures has revealed a spike in the rate of blood culture contamination toward the end of 2018. During this process it was noticed that the practice around cleaning the skin prior to IV cannula insertion was variable. Inadequate swabbing of skin poses a significant risk for contaminating blood cultures and introducing bacteria that can cause infection. |

Written by Neonatal Fellow in consultation with infection control, ID department consultant, nurse educators and department heads.
Optimal Blood Culture Collection

Preparing skin for IV insertion + blood collection

1. Locate most appropriate vein
2. Perform hand hygiene
3. Put on gloves (clinician preference for either non-sterile or sterile gloves)
4. Open 1% Chlorhexidine + 70% Alcohol swab
5. Clean skin overlying chosen vein continuously in a back and forth motion for at least 15 seconds
6. Allow skin to air dry for at least 15 seconds prior to inserting cannula

Be sure to avoid:

- Re-palpating insertion site after cleaning with swab
- Re-using 1% chlorhexidine + 70% alcohol swabs
Aseptic Technique

What is aseptic technique?

Aseptic technique is the range of infection prevention and control practices which are used to minimise the presence of pathogenic microorganisms during clinical procedures.

**TERMINOLOGY**

Previously, the terms ‘sterile technique,’ ‘clean technique’ and ‘aseptic technique’ have been used interchangeably. The correct terminology and practice is ‘aseptic technique’.

**Sterile**

The term ‘sterile technique’ should not be used in place of the term aseptic technique. It is nearly impossible to achieve sterile technique during all clinical procedures due to the large numbers of microorganisms present on the human body and in the health care environment. Only controlled environments such as specially equipped operating theatres can achieve near-sterile techniques.

**Asepsis**

‘Aseptic technique’ aims to prevent pathogenic microorganisms, from being introduced to the patient via hands, surfaces and equipment during invasive clinical procedures.

**Clean**

Cleaning surfaces and equipment is an important part of preventing and controlling the spread of infection. It is part of the process to ensure asepsis and sterility.

**Non-touch technique**

‘Non-touch technique’ is where the clinician’s hands do not touch and thereby contaminate key parts and key sites. This is critical for maintaining asepsis.

**Key sites & key parts**

Key sites are any insertion or access sites or wound that could be a point of entry for microorganisms to colonise the patient. E.g IV insertion site, urinary devices, open wounds.

Key parts are the most critical parts of the procedural equipment. They are the sterile components. E.g bungs, needle hubs, syringe tips.

During all procedures, key parts and key sites need to be identified and protected. Aseptic key parts must only come into contact with:

- other aseptic key parts
- key sites

Core infection control components

The aim of every procedure should be to maintain asepsis at all times by protecting the key parts and key sites from contact contamination by microorganisms. There are five key principles of asepsis:

1. Hand hygiene
2. Non-touch technique
3. Aseptic field management
4. Environmental control
5. Appropriate use of personal protective equipment

**Environmental control**

Prior to performing an aseptic procedure, clinicians need to ensure that there are no environmental risks to the procedure. Risks may include:

- nearby cot space cleaning
- bedside curtains
- staff/parent/visitor
- nearby air conditioners

**Gloves**

Sterile gloves should be worn if a key part or key site needs to be touched, or if it is likely that they may accidently be touched, during the procedure.

Otherwise, non sterile gloves may be used.

**ASEPTIC FIELDS**

An aseptic field is a designated work space that contains and protects procedural equipment from becoming contaminated.

There are three types of aseptic fields. They are used in different situations and require different management.

**Critical aseptic fields:**

A critical aseptic field ensures asepsis during procedures. It is used when key parts or key sites cannot be easily protected from contamination during a procedure. This may be because the key parts or key sites:

- are large
- are numerous
- can’t be protected by caps and covers
- can’t be handled with non touch technique at all times
Critical aseptic fields should be managed as a key part themselves which means that only sterile equipment can come into contact with it. They should be handled with a non touch technique where possible. Sterile gloves, sterile gown, mask and hat should be worn and sterile drapes should be used. Procedures which may require a critical aseptic field include:

- Insertion of PCVGs,
- Insertion of UAC/UVC
- Insertion of chest drains
- Lumbar puncture

Figure 1: In critical aseptic fields, the entire working space can only come into contact with other aseptic equipment i.e. the work space is managed as a key part.

Micro critical aseptic fields:

The micro critical aseptic field is a smaller version of the critical aseptic field and is used to protect a single key part. A micro critical aseptic field is usually the sterile packaging, cover, cap or sheath of a key part.

General aseptic fields:

A general aseptic field promotes asepsis during more simple procedures. It is used when key parts and key sites can easily be protected from contamination using micro critical aseptic fields and a non touch technique.

Figure 2: In this picture, the blue tray represents the general aseptic field, whilst the sterile caps and covers are micro critical aseptic fields.

The choice of aseptic field should be made to ensure protection of key parts and sites.

Standard aseptic technique

Standard aseptic technique can be used when procedures:

- Involve a small number of key parts and key sites
- Involve small key parts and key sites
- Are technically simple
- Are short in duration (e.g. less than 20 minutes)

Standard aseptic technique requires the clinician to:

- Identify key parts and key sites
- Protect those key parts and key sites from contamination during the procedure
- Perform hand hygiene
- Wear gloves (can be non-sterile)
- Use a non touch technique
- Control environmental risks

Examples of procedures that may use standard aseptic technique include:

- Insertion of an IV cannula
- Taking venous blood samples
- Preparation and administration of IV fluids or medications
- Accessing any invasive device

These procedures involve general aseptic fields and micro critical aseptic fields.

Surgical aseptic technique

Surgical aseptic technique is required when procedures:

- Involve a large number of key parts or key sites
- Involve large sized key parts or key sites
- Are technically complex
- Are long in duration (e.g. more than 20 minutes)

Surgical aseptic technique requires the clinician to:

- Identify key parts and key sites
- Protect those key parts and key sites from contamination during the procedure
- Maintain aseptic fields
- Perform hand hygiene
- Wear sterile gloves + other appropriate PPE
- Use a non touch technique whenever possible
- Control environmental risks

Examples of procedures that may use surgical aseptic technique include:

- PCV insertion
- UAC/UVC insertion
- Chest drain insertion

Due to the high risk of contamination of key parts or key sites, a critical aseptic field, sterile gloves and PPE are required.

Surgical aseptic technique should still use micro critical aseptic fields and a non touch technique where possible.
Supplementary Digital Content 2: PDSA 3

Aseptic technique questions

1. What are the 5 principles of aseptic technique?
   a) Hand hygiene, PPE, non-touch technique, sterile gloves, aseptic field management
   b) Environmental control, hand hygiene, non-touch technique, PPE, aseptic field management
   c) Environmental control, hand hygiene, sterile gloves, non-touch technique, infection control
   d) Infection control, hand hygiene, aseptic field management, PPE, non-touch technique

2. What is a non-touch technique?

3. What is an aseptic field?

4. Can you name the three different types of aseptic field? Please give an example of each/when you might use them?
   1) 
   2) 
   3) 

5. What is a key part? Please give an example

6. What is a key site? Please give an example

7. When should non-sterile and sterile gloves be used?

8. Why is aseptic technique important in the nursery?

9. When should non-touch technique be used in the nursery?
Supplementary Digital Content 2: PDSA 4

CHANGE OF PRACTICE: BLOOD VOLUME COLLECTED FOR BLOOD CULTURE

Current Practice: prior to 31/7/19
- Varied practice with regards to volume of blood collected for blood culture from the neonatal population
- No method for recording volume of blood collected and sent to lab for culture

Change of Practice: 1/8/19

Ideally 1ml of blood should be collected from ALL neonates as the 1st sample taken in a dedicated syringe and transferred to blood culture bottle.

For neonates <1000g
- Aim for 1ml however a minimum of 0.5ml of blood should be collected for blood culture

For neonates ≥ 1000g
- Collect 1ml of blood for blood culture

For all blood cultures taken please do the following:
1) fill out a blood culture stickers and stick it in the patients case notes
2) Fill out the neonatal blood culture collection book.

See sticker below

Rationale:
An audit of the neonatal unit’s blood cultures has revealed a spike in the rate of blood culture contamination toward the end of 2018. During this audit process it was noticed that the practice around the volume of blood being collected and sent for blood culture was highly variable. Studies have shown that collecting <1ml for blood cultures lowers the sensitivity of the results dramatically and makes it more challenging to whether a culture has been contaminated.
Optimal Blood Culture collection

Volume of blood required for neonatal blood cultures

Ideally 1ml of blood should be collected from ALL neonates.

This should be the 1st sample taken from a newly inserted IV cannula in a dedicated syringe.

For neonates <1000g
- Aim for 1ml however a minimum of 0.5ml of blood should be collected for a blood culture

For neonates ≥ 1000g
- Collect 1ml of blood for a blood culture

For all blood cultures taken please do the following:

1) Fill out a blood culture sticker and put it in the patient’s case notes
2) Fill out the neonatal blood culture collection record book