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**PROTOCOL FOR THE CARE OF THE CENTRAL VENOUS
CATHETER (CVC)**

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Contents

Section	Title	Page
1.	CARE OF THE CENTRAL VENOUS CATHETER (CVC)	4
2.	ASEPTIC NON-TOUCH TECHNIQUE FOR BLOOD SAMPLING AND FLUSHING OF CVC LINES	6
3.	ASEPTIC NON-TOUCH TECHNIQUE FOR INSERTION SITE DRESSING CHANGE FOR CVC LINES	13
4.	ASEPTIC NON-TOUCH TECHNIQUE FOR CHANGING THE NEEDLE-FREE VALVE - SMARTSITE FOR CVC LINES	17
5.	ASEPTIC NON-TOUCH TECHNIQUE FOR REMOVAL OF A CVC LINE	20
6.	SUPPORTING REFERENCES	25

CARE OF THE CENTRAL VENOUS CATHETER (CVC)

GENERAL POINTS

- ┆ The patient requires a CXR to verify line tip position once inserted, even if ultrasound has been used for insertion.
- ┆ CVCs have more than one port and all ports should only be flushed using the described method.
- ┆ All ports will have a 3-way tap in situ and SmartSites. The only exemption to this will be if the patient is receiving TPN feeding.
- ┆ Smartsites must be visibly clean and blood-free at all times.
- ┆ A 10ml Luer lock syringe or larger should be used for accessing a CVC line. Smaller syringes are not to be used.
- ┆ 0.9% Sodium Chloride should be used when flushing the port. The SmartSite needle free valve and dressing should be changed weekly if line remains in situ longer than 7 days.
- ┆ All lumens not in use should be clamped and 3-way tap turned off at all times. Failure to do this can result in air embolus and patient death.

MAINTENANCE / FLUSHING

- ┆ Follow procedure for the Aseptic Non Touch Technique (ANTT) when accessing and flushing CVC lines.
- ┆ Flush ports that are not in use regularly with 10mls 0.9% Sodium Chloride.
- ┆ All lines should be bled to check patency and flushed when changing the SmartSite.
- ┆ If a lumen is blocked it should be clearly labeled as such and not used. Consider removing the whole line as infection risk is high.
- ┆ Blood sampling should only be via CVC if peripheral venepuncture extremely difficult/impossible as significantly increases infection risk.

EXIT SITE CARE

- ┆ Inspection of the insertion site should be carried out daily whilst in hospital for signs of infection and CVC bundle completed.
- ┆ DRESSINGS – Follow procedure for ANTT dressing of CVC lines and should be carried out:
 - A weekly dressing change is required unless the dressing is no longer intact or moisture has collected under the dressing.
- SHOWERING/ BATHING/ SWIMMING
Patient should be encouraged to shower; line should not be submerged.

INFECTION

- INSERTION SITE: If there are signs and symptoms of localised infection i.e. erythema, discharge, pain or oedema, obtain insertion site swab. Refer to medical staff for same day review and consideration of oral antibiotics.
- SYSTEMIC INFECTION: If there are signs of systemic infection (i.e. pyrexia/hypothermia, chills/rigors, raised or low WCC, raised CRP) obtain central and peripheral blood cultures. Central blood cultures without paired peripheral cultures are likely to be meaningless. Refer **URGENTLY** to medical team. Recommendation if suspicion of infection is line removal.

THROMBOSIS / OCCLUSION

- If there is any sign of swelling of site, infusion fluid leakage, stop the Infusion and alert medical staff immediately.
- If the port has become blocked, clamp off the line: turn the 3 way tap to the off position and mark the port "Do not use"
- If the whole line is blocked removal should be discussed with the consultant or appropriate doctor.

REMOVAL

- ┆ CVC lines may be removed by nursing staff that are trained to do so.
- ┆ CVC line removal should be discussed with the consultant or appropriate doctor.

Observe for any complications post removal – bleeding, haematoma formation, air embolus, thrombosis, cardiac dysrhythmia and vascular damage.

This protocol should be read in conjunction with:

- The National Infection Prevention and Control Manual
- Zero Tolerance Hand Hygiene Policy
- The Consent to Treatment Policy
- NHS Borders code of Practice for the Control of Medicines
- NMC guidelines on record keeping
- NHS Borders Intravenous Flush Policy 2019

All the above policies are available on the NHS microsite.

ASEPTIC NON-TOUCH TECHNIQUE FOR BLOOD SAMPLING AND FLUSHING OF CVC LINES

Equipment required for accessing, taking bloods and flushing a CVC line

- Plastic apron x 2
- Appropriate face covering
- 2 x Non-sterile gloves
- 1 dressing trolley
- Sterile pack (containing sterile towel)
- Hard surface disinfection wipes
- 3 x chlorhexidine 2% and alcohol 70% wipes (per lumen)
- 2 x 10ml luer lock syringes (per lumen)
- 1 x vygon red cap
- 1 x 10ml vial of 0.9% Sodium Chloride (per lumen)
- 1 x safety needle for drawing-up solution
- 1 Multi adaptor for blood collection
- Blood tubes
- Sharps Bin

Additional equipment required if taking blood cultures

- Culture bottles 1 red (anaerobic) and 1 blue (aerobic) for adults or 1 yellow for children
- Sterile gloves
- 2 sterile wrapped plain Monovette tubes
- 2 Monovette needles
- 2 x chlorhexidine 2% and alcohol 70% wipes for disinfection of culture bottles
- 'Record of blood culture' sticker. (**DO NOT** remove bar code labels from blood culture bottles)

	ACTIVITY	RATIONALE
1	Confirm patient identity by asking full name and date of birth.	To ensure correct patient and positive patient identification.
2	Explain and discuss the procedure with the patient.	To ensure understanding of the procedure and allow time for the patient to ask questions.
3	Obtain verbal consent.	To gain patient consent.

4	Ensure patient is comfortable (In a supine position) if possible and in a private area.	To maintain privacy and dignity.
5	Check that all jewellery is removed except for a plain wedding band.	As per National Infection and prevention Control manual.
6	Utilising the Six Step hand washing technique in the National Infection Prevention and Control Manual, wash hands and pat dry thoroughly with paper towels.	To ensure that no health care associated micro-organisms are transferred via the hands.
7	Put on plastic apron. Put on appropriate face Covering.	To ensure health care worker is wearing PPE as per trust policy.
8	Put on appropriately sized non-sterile gloves.	To reduce the risk of transfer of micro-organisms.
9	Clean suitable dressing trolley with hard surface disinfection wipes.	To reduce the risk of transfer of micro-organisms.
10	Collect all required equipment and put on bottom of trolley.	To reduce the risk of transfer of micro-organisms.
11	Attach a yellow clinical waste bag to the side of trolley below level of top shelf.	To reduce the risk of transfer of micro-organisms.
12	Take dressing trolley with assembled equipment to patient.	To reduce the risk of transfer of micro-organisms.
13	Open sterile dressing pack onto top of trolley.	To maintain aseptic conditions.

14	Remove gloves and apron and use the Six step hand rub technique in the National Infection Prevention and Control Manual.	To ensure that no health care associated micro-organisms are transferred via the hands.
15	Put on appropriately sized non-sterile gloves and apron.	To reduce the risk of transfer of micro-organisms.
16	Clean 3 chlorhexidine 2% and alcohol 70% wipes with hard surface disinfection wipes, open top and place on sterile sheet.	To reduce the risk of transfer of micro-organisms.
17	Open 10ml luer lock syringe. Open red vygon cap and attach to syringe ensuring the 'key parts' are not contaminated and place on sterile sheet.	To reduce the risk of transfer of micro-organisms.
18	Open 10ml luer lock syringe and connect drawing up needle and place onto sterile field without contaminating key parts. Wipe 0.9% saline ampoule with hard surface disinfection wipes and place on sterile field.	To maintain aseptic conditions. To ensure Key parts are not contaminated.
19	If bloods required, open 10ml luer lock syringe and multi adaptor onto sterile sheet without contaminating key parts. Clean blood tubes with hard surface disinfection wipes and place on sterile sheet, Attach first blood tube to the multi adaptor and place on sterile sheet, ensuring the tip of the multi adaptor does not become contaminated.	To maintain aseptic conditions.
	Procedure	
20	Expose the catheter lumen end.	To reduce the risk of transfer of micro-organisms.

21	Remove apron and gloves and use the Six step hand rub technique in the National Infection Prevention and Control Manual.	To reduce the risk of transfer of micro-organisms.
22	Re-apply apron and put on sterile gloves.	To reduce the risk of transfer of micro-organisms.
23	Wipe the neck of the 0.9% saline ampoule with a chlorhexidine 2% and alcohol 70% wipe and allow to dry.	To maintain aseptic conditions.
24	Using the syringe and needle draw up the saline ensuring key parts are not contaminated sheath the needle and place on sterile field	To maintain aseptic conditions.
25	Open chlorhexidine 2% and alcohol 70% wipe and remove from packet.	To maintain aseptic conditions.
26	Clean SmartSite thoroughly with a chlorhexidine 2% and alcohol 70% wipe applying friction, rubbing the cap in a clockwise and anticlockwise manner at least five times with each wipe and wait a minimum of 60 seconds to air dry.	To maintain aseptic conditions.
27	A sterile sheet should be used to ensure lumen does not become re- contaminated (e.g. allowing to drop back on to patient or contaminating with hands).	To maintain aseptic conditions.

28	<p>If blood cultures are required, these must be taken first and not discarded. Sterile gloves must be used to obtain blood cultures.</p> <ul style="list-style-type: none"> • Flip off the plastic lids covering the blood culture bottle tops. • Clean top of bottles with chlorhexidine 2% and alcohol 70% wipes, one for each bottle. • Open SARSTEDT Safety-Needle and place needle into each bottle. • Open sterile gloves and put them on using the packaging as a sterile field. • Attach multi-adapter for blood collection to the 1st Monovette tube for blood cultures. • Attach the Multi-adaptor to the SmartSite, unclamp the line and turn the 3 way tap to the open position. • Aspirate required amount of blood. DO NOT LOCK PISTON INTO BASE 	To maintain aseptic Conditions.
	<ul style="list-style-type: none"> • Clamp line and turn the 3 way tap to the off position. Remove blood tube leaving Multi-adaptor in place. Repeat process with 2nd Monovette tube. • Connect Monovette tubes to blood culture bottles and let the blood flow into the bottles until the last 0.5mls and remove. • Repeat process with other blood tubes until all blood samples have been obtained. Re-clamp and turn the 3 way tap to the closed position prior to disconnecting the Multi-adaptor. <p>Document the procedure in the patients notes using the 'Record of blood culture stickers' provided.</p>	To maintain accurate patient Records.

29	If only routine blood samples to be obtained, open and attach the empty 10ml luer lock syringe to the SmartSite. Unclamp the line and turn the 3 way tap to the open position and withdraw 10mls of blood and discard. Re-clamp the line and turn the 3 way tap to the closed position prior to disconnecting the syringe. Attach multi adaptor with attached blood tube and proceed to take samples as described above.	To ensure patency and check the line is in the correct position and prevent air embolism.
30	If wishing to check patency of a lumen remove Vygon red cap and attach an empty 10ml luer lock syringe, unclamp the line and turn the 3 way tap to the open position. Withdraw 5 mls of blood. Re-clamp the line and turn the 3 way tap to the closed position before disconnecting the syringe.	To ensure patency and check the line is in the correct position and prevent air embolism.
31	After any lumen is accessed, it must be flushed. Remove sheathed needle and attach luer lock syringe with 10mls 0.9% Sodium Chloride, unclamp the line, turn the 3 way tap to the open position and flush using a rapid pulsating action. Re-clamp the line and turn the 3 way tap to the closed position prior to disconnecting the syringe.	To ensure patency. To create turbulence within the device lumen removing debris from the internal device wall.
32	Clean the SmartSite with a chlorhexidine 2% and alcohol 70% wipe applying friction, rubbing the cap in a clockwise and anticlockwise manner at least five times with each wipe, ensuring any residual blood is removed and wait a minimum of 60 seconds to air dry.	To maintain aseptic conditions.
33	Label the blood tubes at patient bedside.	To ensure correct patient and positive patient identification.

34	Dispose of all equipment as per NHS Borders policy and remove PPE. Clean trolley using hard surface alcohol detergent wipes.	To comply with NHS Borders clinical waste policy.
35	Utilising the Six Step hand washing technique in the National Infection Prevention and Control Manual, wash hands and pat dry thoroughly with paper towels.	To prevent contamination of items used following the procedure.
36	Document procedure in patient's nursing notes and complete (CVC) bundle.	To maintain accurate patient Records.

ASEPTIC NON-TOUCH TECHNIQUE FOR INSERTION SITE DRESSING CHANGE FOR CVC LINES

Equipment required for insertion site dressing change for CVC lines

- Plastic aprons x 2
- Appropriate face covering
- 3 x Non-sterile gloves
- 1 x Dressing trolley
- 1 x sterile dressing pack (containing sterile towel)
- BD Chloraprep 3ml skin prep for exit site dressing
- 1 x Semi-permeable transparent dressing

	ACTIVITY	RATIONALE
1	Confirm patient identity by asking full name and date of birth.	To ensure correct patient and positive patient identification.
2	Explain and discuss the procedure with the patient.	To ensure understanding of the procedure and allow time for the patient to ask questions.
3	Obtain verbal consent.	To gain patient consent.
4	Ensure patient is comfortable and in a private area.	To maintain privacy and dignity.
5	Check that all jewellery is removed except from plain wedding band.	As per NHS Borders Infection Control Policy.
6	Utilising the Six Step hand washing technique in the National Infection Prevention and Control Manual, wash hands and pat dry thoroughly with paper towels.	To maintain aseptic conditions.

7	Put on plastic apron. Put on appropriate face covering.	To ensure health care worker is wearing PPE as per trust policy.
8	Put on appropriately sized non sterile gloves.	To maintain aseptic conditions.
9	Clean suitable dressing trolley with hard surface disinfection wipes.	To reduce the risk of transfer of micro-organisms.
10	Place all equipment required on bottom of trolley	To reduce the risk of transfer of micro-organisms.
11	Attach a yellow clinical waste bag to the side of trolley below level of top shelf.	To reduce the risk of transfer of micro-organisms.
12	Take dressing trolley with assembled equipment to patient.	To reduce the risk of transfer of micro-organisms.
13	Open and drop sterile dressing pack onto top of trolley. Open Semi-permeable transparent dressing onto sterile sheet.	To maintain aseptic conditions.
14	Open BD Chloraprep 3 ml onto sterile field.	To maintain aseptic conditions.
15	Remove gloves and apron. Use the six step hand rub technique in the National Infection Prevention and Control Manual.	To ensure that no health care associated micro-organisms are transferred via the hands.

16	Put on appropriately sized non sterile gloves and apron.	To maintain aseptic conditions.
17	Loosen the old dressing gently, remove and discard in yellow waste bag. Remove any securing tapes or securing device if loose or contaminated or due to be changed and discard in yellow waste bag.	To reduce the risk of transfer of micro-organisms.
18	If the site is red or discharging, take a swab for bacterial investigation.	To ensure the insertion site is no infection.
19	Remove gloves and re-clean hands using the Six step hand rub technique in the National Infection Prevention and Control Manual.	To ensure that no health care associated micro-organisms are transferred via the hands.
20	Apply sterile gloves.	To ensure that no health care associated micro-organisms are transferred via the hands.
Procedure		
21	Clean 4cm of skin around the exit site with BD. Chloraprep 3ml using a back and forward motion using the cross hatch method and wait a minimum of 60 seconds to air dry.	To maintain aseptic conditions.
22	Reapply the tapes or securing device if necessary, this may require skin preparation prior to application of securing device.	To prepare the skin to receive the dressing and ensure the CVC is secure.
23	Apply transparent semi permeable transparent dressing to secure and ensure insertion site is covered.	To cover exit site and minimize infective risk.

24	Dispose of all equipment as per NHS Borders policy and remove PPE. Clean trolley using hard surface alcohol detergent wipes.	To comply with NHS Borders clinical waste policy.
25	Utilising the Six Step hand washing technique in the National Infection Prevention and Control Manual, wash hands and pat dry thoroughly with paper towels.	To prevent contamination of items used following the procedure.
26	Document date and time of procedure in patients nursing notes and CVC bundle.	To maintain accurate patient records.

ASEPTIC NON-TOUCH TECHNIQUE FOR CHANGING THE NEEDLE-FREE VALVE - SMARTSITE FOR CVC LINES

Equipment required for changing the needle-free valve - SmartSite for CVC lines

- 2 x Plastic aprons
- 1 x appropriate face covering
- 1 x Non-sterile gloves
- 1 x Dressing trolley
- 1 x Sterile dressing pack (containing sterile towel)
- 4 x chlorhexidine 2% and alcohol 70% Wipe
- 3 x 10ml luer lock syringe/s (per lumen)
- 1 x Vygon red cap
- 2 x 10ml vial of 0.9% Sodium Chloride (per lumen)
- 1 x SmartSite – Needle-Free valve (CareFusion)

	ACTIVITY	RATIONALE
1	The SmartSite can be changed during the Aseptic Non Touch Technique (ANTT) procedure of accessing and flushing the line.	To maintain aseptic conditions.
2	Follow steps 1-18 in the ASEPTIC NON-TOUCH TECHNIQUE FOR BLOOD SAMPLING AND FLUSHING OF CVC LINES , repeating step 18.	Follow Protocol.
3	Expose the catheter lumen end.	To reduce the risk of transfer of micro-organisms.

4	Remove apron and gloves and use the Six step hand rub technique in the National Infection Prevention and Control Manual.	To reduce the risk of transfer of micro-organisms.
5	Re-apply apron and put on sterile gloves.	To reduce the risk of transfer of micro-organisms.
6	Wipe the neck of the 0.9% saline ampoule with a chlorhexidine 2% and alcohol 70% wipe and allow to dry. Repeat this step.	To maintain aseptic conditions.
7	Using the syringe and needle draw up the saline ensuring key parts are not contaminated sheath the needle and place on sterile field. Repeat this step.	To maintain aseptic conditions.
8	Open the SmartSite ensuring that key parts are not contaminated. Remove sheathed needle from one of the luer lock syringes filled with 0.9% Normal Saline and attach to the Smartsite and push the fluid through until it comes out the end of the SmartSite, return to sterile cover and place on sterile field.	To maintain aseptic conditions.
9	To check patency of the line remove the Vygon red cap and attach the empty 10 ml luer lock syringe, unclamp the line and turn the 3 way tap to the open position and withdraw 5 mls of blood. Re-clamp the line and turn the 3 way tap to the closed position before disconnecting the syringe.	To ensure patency and check the line is in the correct position and prevent air embolism.
10	Remove the sheathed needle and attach luer lock syringe with 10mls 0.9% Sodium Chloride, unclamp the line and turn the 3 way tap to the open position and flush using a rapid pulsating action. Re-clamp the line and turn the 3 way tap to the closed position prior to disconnecting the syringe.	To ensure patency. To create turbulence within the device lumen removing debris from the internal device wall.

11	Remove the Smartsite from the line and discard. Clean the end of the line with chlorhexidine 2% and alcohol 70% wipe and allow to dry for 60 seconds. Ensure any traces of blood are removed.	To maintain aseptic conditions.
12	Connect and secure the primed Smartsite with 10 mls 0.9% Normal Saline attached. Unclamp the line and turn the 3 way tap to the open position and flush using a rapid pulsating action. Reclamp the line and turn the 3 way tap to the closed position prior to disconnecting the syringe.	To ensure patency To create turbulence within the device lumen removing debris from the internal device wall.
13	Clean the SmartSite with a chlorhexidine 2% wipe followed by a alcohol 70% wipe applying friction, rubbing the cap in a clockwise and anticlockwise manner at least five times with each wipe, ensuring any residual blood is removed and wait a minimum of 60 seconds to air dry.	To maintain aseptic conditions.
14	Dispose of all equipment as per NHS Borders policy and remove PPE. Clean trolley using hard surface alcohol detergent wipes.	To comply with NHS Borders clinical waste policy.
15	Utilising the Six Step hand washing technique in the National Infection Prevention and Control Manual, wash hands and pat dry thoroughly with paper towels.	To prevent contamination of items used following the procedure.
16	Document procedure in patient's nursing notes and in CVC Bundle.	To maintain accurate patient Records.

ASEPTIC NON-TOUCH TECHNIQUE FOR CENTRAL VENOUS CATHETER REMOVAL

Equipment required for removal of CVC lines

- 2 x Plastic aprons
- 1 x appropriate face covering
- 2 x Non-sterile gloves
- 1 x Dressing trolley
- 1 x Sterile dressing pack (containing sterile towel and low-linting gauze)
- 1 x BD Chloraprep 3 ml onto sterile field.
- 1 x Hypoallergenic tape
- 1 x Sterile scissors
- 1 x Small sterile specimen container (if required for microbiology)
- 1 x Stitch cutter
- 1 x Additional low-linting gauze swab
- 1 x occlusive dressing

	ACTIVITY	RATIONALE
1	Confirm patient identity by asking full name and date of birth.	To ensure correct patient and positive patient identification.
2	Explain and discuss the procedure with the patient.	To ensure understanding of the procedure and allow time for the patient to ask questions.
3	Obtain verbal consent.	To gain patient consent.
4	Ensure patient is comfortable (In a supine position) if possible and in a private area.	To maintain privacy and dignity.
5	Check that all jewellery is removed except for plain wedding band.	As per NHS Borders Infection Control Policy.

6	Utilising Six Step Technique, wash hands and pat dry thoroughly with paper towels.	To ensure that no health care associated micro-organisms are transferred via the hands.
7	Put on plastic apron. Put on appropriate face covering	To ensure health care worker is wearing PPE as per trust policy.
8	Put on appropriately sized non sterile gloves.	To maintain aseptic Conditions.
9	Collect all required equipment and put on bottom of trolley.	To reduce the risk of transfer of micro-organisms.
10	Attach a yellow clinical waste bag to the side of trolley below level of top shelf.	To reduce the risk of transfer of micro-organisms.
11	Take dressing trolley with assembled equipment to patient.	To reduce the risk of transfer of micro-organisms.
12	Open sterile dressing pack onto top of trolley.	To maintain aseptic conditions.
13	Open stitch cutter and place on sterile field.	To maintain aseptic conditions.
14	Open sterile scissors and place on sterile field.	To maintain aseptic conditions.

15	Open BD Chloraprep 3 ml onto sterile field.	To maintain aseptic conditions.
16	Remove gloves and apron. Use the six step hand rub technique in the National Infection Prevention and Control Manual.	To ensure that no health care associated micro-organisms are transferred via the hands
17	Put on appropriately sized non-sterile gloves and apron.	To reduce the risk of transfer of micro-organisms.
	Procedure	
18	Discontinue any infusions, if in progress, and disconnect the infusion system from the catheter. Clamp the catheter lumen(s) and turn all 3 way taps to the closed position.	To reduce the risk of air getting into the catheter.
19	Assist the patient into the Trendelenburg position, that is, head slightly lower than feet.	For patient comfort and to reduce the risk of bleeding.
20	Expose the catheter lumen end.	To reduce the risk of transfer of micro-organisms.
21	Loosen and gently remove the old dressing and discard it. Remove tapes or securing device. Advise patient to stay still while line is unsecured.	To reduce the risk of transfer of micro-organisms.
22	Remove gloves and apron. Use the six step hand rub technique in the National Infection Prevention and Control Manual.	To reduce the risk of transfer of micro-organisms.

23	Put on sterile gloves and apron.	To reduce the risk of transfer of micro-organisms.
24	Clean 4cm of skin around the exit site with BD Chloraprep 3ml using a back and forward motion using the cross hatch method and wait a minimum of 60 seconds to air dry.	To maintain aseptic conditions.
25	Carefully cut and remove any skin suture securing the catheter with the stitch cutter.	To prevent trauma.
26	Cover the site with low-linting gauze.	To capture any blood splatters and maintain asepsis.
27	Ask the patient to perform the Valsalva manoeuvre. (Valsalva – forced breath out against a closed glottis).	To aid removal and prevent air embolus.
28	Hold the catheter with one hand near the point of insertion and pull firmly and gently. As the catheter begins to move, press firmly down on the site with the swabs. Maintain pressure on the swabs for about 5 minutes after the catheter has been removed.	To prevent bleeding.
29	If line tip culture required (rare), cut the catheter with sterile scissors about an inch from the tip and place in sterile container.	To check for infection.
30	When bleeding has stopped (approximately 5 minutes), cover site with a small dressing and make the patient comfortable.	To maintain asepsis and prevent bleeding.

31	Dispose of all equipment as per NHS Borders policy and remove PPE. Clean trolley using hard surface alcohol detergent wipes.	To comply with NHS Borders clinical waste policy.
32	Utilising the Six Step hand washing technique in the National Infection Prevention and Control Manual, wash hands and pat dry thoroughly with paper towels.	To prevent contamination of items used following the procedure.
33	Document procedure in patient's nursing Notes and complete form for microbiology and send to labs.	To maintain accurate patient records.

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