

PAEDIATRIC NURSING PRACTICE MANUAL
SECTION 5

SPECIMEN COLLECTION

5.1 BLOOD

5.1.3 COLLECTION OF BLOOD CULTURES

Aim

To collect a blood sample for the culture of micro organisms without contaminating the specimen

Key points

1. Peripheral blood cultures are performed by medical officers or phlebotomists.
2. It is preferable to collect blood cultures before the commencement of antibiotics but this should not delay the commencement of treatment.
3. A single blood culture is not adequate to exclude infection in most circumstances. Up to three blood cultures substantially increases the likelihood of isolation of the invading micro organism^{1, 2} especially where a diagnosis of infective endocarditis is being considered. Ideally, these blood cultures should be collected over a period of time with separate samplings.² However, if the clinical condition warrants urgent antibiotic therapy after blood culturing, multiple blood cultures may be collected at the same time.^{1, 3}
4. The following options are preferable when collecting blood for cultures
 - From a vein (or artery)
 - From a vein and central line (ie. 2 sets of blood culture)
 - From a central line only, if this is the only option
5. Blood cultures should not be taken from a peripheral intravascular catheter (IVC) unless it is upon the initial insertion of that peripheral IVC.
6. If collecting blood from a central line (refer to [PNPM 5.1.4](#) Collection of Blood from a Central Venous Access Device) the first sample of blood is used for the culture and where there is more than one lumen, each lumen should be cultured independently.²
7. If blood has been collected for other tests it should be added to the appropriate tubes after addition to the culture bottles otherwise microbial cross contamination of the blood cultures from unsterile tubes may occur. (for Order of Draw refer to the Pathology Manual, General Guidelines Section 2.6 p.12-13).

Equipment for peripheral blood cultures

Swab 70% isopropyl alcohol (for blood culture bottle)

Swab 70% alcohol/2% chlorhexidine (for skin)³

Blood culture bottles

- If > 5mL can be obtained, use the Routine Blood Culture Pack (containing two bottles; one aerobic and one anaerobic) – ideally 8-10mL for each bottle of the set, but at least 3mL per bottle.¹
- If ≤ 5mL can be obtained, use the small volume Peds Plus Blood Culture Set (one bottle) - up to 5mL in a single bottle. NOTE: Peds Plus bottle label states 1-3 mL but up to 5mL may be inoculated.¹
- For culturing of Mycoplasma, Ureaplasma or Mycobacterial species by blood culture, contact the Department of Microbiology.¹

Equipment for peripheral blood cultures (cont.)

5mL, 10mL or 20ml syringe (dependent upon volume of blood required for blood culture. Additional syringes may be required for other blood sampling).

IV cannula, butterfly needle or needle for venepuncture as required by operator

Tourniquet

Sharps container

Clean gloves

Tape and cotton wool (for dressing venepuncture site)

Blood Transfer Device (BTD)

Additional equipment for taking blood cultures from a central line

Refer to [PNPM 5.1.4](#)

PROCEDURE	ADDITIONAL INFORMATION
Assemble the equipment.	If more than one set of blood cultures are to be performed, the number of sets required are to be determined by medical staff.
Clean the skin (or the CVC lumen) with the 70% alcohol/2% chlorhexidine swab. Allow to dry for at least two minutes.	Skin decontamination is crucial in reducing the risks of blood culture contamination. ^{3,4} Adequate drying time is essential for maximum bacterial kill.
Flip the top off both bottles. Swab the exposed rubber septum with the 70% isopropyl alcohol wipe.	Whilst there is a small removable plastic disc covering the septum, environmental bacterial contamination can still occur underneath.
Volumes of blood to be collected: Adolescents 16-20mL (8-10mL per bottle per set) Children 6-10mL (3-5mL per bottle per set) Infants 4-6mL (2-3mL per bottle per set) Neonates 1-3 mL (1-3mL in Peds Plus bottle). ^{1,5}	A lesser volume of blood is required for culture in paediatrics because the magnitude of bacteraemia is greater in infants and neonates. ^{2,6}
Remove needle and connect the syringe to the Blood Transfer Device (BTD). Without touching the exposed rubber septum of the bottle, inject equal volumes (1 to 10 mL as required) of blood into the appropriate bottles. ²	The use of the BTD as a safety device is recommended where available (refer Infection Control Manual Policy 2.1) Standard Infection Control Precautions. If =>5mL of blood is expected to be obtained, use the Routine Blood Culture Pack (two bottles). If < 5mL of blood can only be obtained, use the Small Volume (Peds Plus) Blood Culture Pack (containing the pink BD Bactec Peds Plus/F bottle).

PROCEDURE	ADDITIONAL INFORMATION
It is preferable to inject the blood sample into the aerobic bottle first (silver BD Bactec Plus Aerobic/F, before injecting the remaining blood into the anaerobic bottle (purple BD Bactec Lytic/10 Anaerobic).	This minimised the chance of any air being injected into the anaerobic bottle. ¹ Also aerobic bacteraemia is more common than anaerobic.
Label the blood culture bottles with the patient's name, the date and time and the specimen collection site or lumen.	DO NOT PLACE PATIENT LABEL OVER BAR CODE ON BOTTLE.
Send blood cultures with the appropriately completed request form to Microbiology.	

References:

1. Keil T. Collection of blood cultures [Expert opinion]. In: Head, Department of Microbiology. Perth: Princess Margaret Hospital; 2010.
2. Mylotte JM & Tayara A. Blood cultures: Clinical aspects and controversies (Literature Review). Eur J Clin Microbiol Infect Dis.19(3):157-163; 2000.
3. Mimos O, Karim A, Mercat A, Cosserson M, Falissard B Parker, F et al. Chohexidine compared with povidone-iodine as skin preparation before blood culture. A randomized, controlled trial [Level II]. Ann Intern Med.131(11):834-837; 1999.
4. Isaacman DJ & Karasic RB. Lack of effect of changing needles on contamination of blood cultures [Level II]. Pediatr Infect Dis J.9(4):274-278; 1990.
5. Osborne Park Hospital. Collection of Specimens - Blood Cultures [Expert opinion]. Osborne Park: Osborne Park Hospital; 2008.
6. Li J, Plorde JJ & Carloson LG. Effects of volume and periodicity on blood cultures [Level III-3]. Journal of Clinical Microbiology.32(11):2829-2831; 1994.