

THE NEW ZEALAND MICROBIOLOGY NETWORK



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NZMN Position Statement on Microbiological Specimen Sterility

Principle

Invasive bacterial infections occur when a given bacterial pathogen causes infection in a normally sterile site within the body. A normally sterile site is an anatomical location in which bacteria are not normally present in a healthy person, whilst a normally non-sterile site is an anatomical location that harbours either resident or transient microbial flora (commensal bacteria).

Invasive infections represent dissemination of infection to 'deep' internal body sites. Invasive infections generally arise through haematogenous spread to internal organs, fluid compartments, deep tissues and other internal body sites. Rarely, invasive infections may arise as a result of direct extension from superficially infected sites into deep body sites.

Non-invasive infections represent 'superficial' infections, involving either the body's surface only (skin, conjunctiva and mucosal membranes) or involving contiguous spread from the body's surface to adjacent subsurface sites. Non-invasive infections generally arise on the body's surface, or through a breach in the physical barriers of the skin, conjunctiva and mucosal membranes, leading to infection of the adjacent subcutaneous/submucosal soft tissues.

As a general rule, the skin/mucosa and subcutaneous/submucosal tissues are considered non-sterile sites and infections of these sites are termed 'superficial' infections. The fascia, muscle layers and structures interior to these are considered sterile sites, and infections of these sites are termed 'deep' infections.

Microbiological specimen sterility

The tables below show specimen types and corresponding anatomical sites that are considered to represent sterile sites and non-sterile sites, and can thus inform classification of a given bacterial infection as invasive or non-invasive for the purposes of surveillance of invasive bacterial infections. The algorithm below can aid assignment of sterility for a given microbiological specimen. These recommendations are not intended to inform the clinical management of patients. The enclosed list of specimen types and sites is not exhaustive but should permit interpretation of sterility for the vast majority of microbiological specimens.

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Summary table

Specimen type	Sterility
<ul style="list-style-type: none"> Blood 	Sterile sites
<ul style="list-style-type: none"> Internal body fluids (CSF, pleural, pericardial, peritoneal, joint, vitreous, amniotic) 	
<ul style="list-style-type: none"> Tissue (incl. bone) Swab of body interior (e.g. surgical/theatre swab) Pus aspirate 	Variably sterile sites – consult detailed tables and algorithm below
<ul style="list-style-type: none"> Swab of body surface (skin/wound, throat, genital, ear, eye, purulent discharge/exudates) 	Non-sterile sites
<ul style="list-style-type: none"> Respiratory specimens (sputum, tracheal aspirate, BAL/BW) 	
<ul style="list-style-type: none"> Urine and other excreta 	

Detailed table – sterile sites

Specimen category	Specimen type	Specimen site
Sterile sites	<ul style="list-style-type: none"> Blood 	N/A
	<ul style="list-style-type: none"> Internal body fluid aspirate 	Internal body fluids <ul style="list-style-type: none"> Cerebrospinal fluid (CSF) Pleural fluid (pleural effusion/pleural empyema) Pericardial fluid Peritoneal fluid (ascitic fluid/abdominal fluid/CAPD fluid) Joint (synovial) fluid Vitreous fluid Amniotic fluid
	<ul style="list-style-type: none"> Tissue (incl. bone) Swab of body interior (e.g. surgical/theatre swab) Pus aspirate 	Internal organs <ul style="list-style-type: none"> Brain Heart/valvular tissue Pleura Liver Spleen Kidney Pancreas Ovary/uterus/endometrium
		Internal body tissues <ul style="list-style-type: none"> Muscle/fascia Lymph node Joint/synovial Vascular
		Bone/bone marrow from closed osteomyelitis (i.e. intact overlying skin and soft tissue) <ul style="list-style-type: none"> Skull/mandible Spine Ribs/sternum Pelvis (see bone from open osteomyelitis below) Long bones/scapulae/clavicles
	Internal body abscess/pus collection <ul style="list-style-type: none"> Internal organs (as above) Internal body sites <ul style="list-style-type: none"> Lymph node (suppurative lymphadenitis) Muscle abscess (pyomyositis) Retropharyngeal abscess Internal body cavities <ul style="list-style-type: none"> Intra-thoracic/lung abscess Intra-abdominal/pelvic abscess 	

Note: Interpretation of the clinical significance of bacterial pathogens in post-mortem specimens from normally sterile sites should be undertaken with caution, preferably in conjunction with a Clinical Microbiologist.

Detailed table – non-sterile sites

Specimen category	Specimen type	Specimen site
Non-sterile sites	<ul style="list-style-type: none"> Tissue (incl. bone) Swab of body interior (e.g. surgical/theatre swab) Pus aspirate 	Internal organs <ul style="list-style-type: none"> Lung Gastrointestinal tract/gall bladder Urinary bladder Placenta/products of conception
		Bone from open osteomyelitis (i.e. where infected bone may be in continuity with non-intact/infected overlying skin and soft tissue) <ul style="list-style-type: none"> Foot bones (i.e. in the context of a diabetic foot infection) Hand/wrist bones Pelvis/sacrum (i.e. in the context of an infected pressure ulcer)
		Skin and soft tissue (excluding muscle and fascia) <ul style="list-style-type: none"> Skin tissue Subcutaneous tissue
		Skin and soft tissue abscess/pus collection <ul style="list-style-type: none"> Cutaneous/subcutaneous abscess Peritonsillar abscess (quinsy)/parapharyngeal abscess Parotid abscess (suppurative parotitis)
		Specimen site unspecified/unclear
	<ul style="list-style-type: none"> Swab of body surface (non-surgical swab) 	Skin <ul style="list-style-type: none"> Intact skin Non-intact skin (wound/ulcer/lesion) Skin biopsy
		Mucosa/mucosal surfaces <ul style="list-style-type: none"> Oropharynx/tonsils (throat) Nasopharynx/nasal/sinuses Genital (urethra/vagina/cervix/ endocervix) Rectal
		Ear <ul style="list-style-type: none"> Internal/external ear canal
		Eye <ul style="list-style-type: none"> Conjunctival swab Corneal scrapings
		Pus/exudates <ul style="list-style-type: none"> Purulent discharge
		Specimen site unspecified/unclear
		<ul style="list-style-type: none"> Respiratory
	<ul style="list-style-type: none"> Urine and other excreta 	<ul style="list-style-type: none"> Urine/faeces/bile Saliva/tears Other secretions

Sterility classification algorithm

