

NATIONAL STANDARD METHOD

INVESTIGATION OF SKIN, SUPERFICIAL AND NON- SURGICAL WOUND SWABS

BSOP 11

Issued by Standards Unit, Department for Evaluations, Standards and Training
Centre for Infections



Association of Medical Microbiologists
Association of Medical Microbiologists



INVESTIGATION OF SKIN, SUPERFICIAL AND NON-SURGICAL WOUND SWABS

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AMENDMENT PROCEDURE

Controlled document reference	BSOP 11
Controlled document title	Investigation of skin, superficial and non-surgical wound swabs

Each National Standard Method has an individual record of amendments. The current amendments are listed on this page. The amendment history is available from standards@hpa.org.uk.

On issue of revised or new pages each controlled document should be updated by the copyholder in the laboratory.

Amendment Number/ Date	Issue no. Discarded	Insert Issue no.	Page	Section(s) involved	Amendment
6/ 09.11.09	4.1	5	5	Scope of document	Section expanded
			5	Introduction	Restructured to give conditions before pathogens
			5	Introduction	Rare skin infections relabelled as other skin infections
			10	Technical Information / Limitations	The term "CE marked leak proof container" replaces "sterile leak proof container";
			11	1.2 Specimen transport and storage	endnote ^a added to clarify the change and referenced to IVD Directive 98/79/EC ²
			17	Appendix	Flow chart inserted
			19	References	Reviewed and updated

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Types of specimens: Skin swab
Swab from superficial wound
Swab from non-surgical wound

SCOPE OF DOCUMENT

This document describes the processing and bacteriological investigation of skin, superficial and non-surgical wound swabs. However, it should be noted that many conditions are best diagnosed by submission of a skin biopsy for culture and histopathological examination. Viruses, such as Herpes simplex and Varicella-zoster, as well as non-microbial agents, may also cause skin lesions but are outside the scope of this National Standard Method.

INTRODUCTION

Infections of the skin and subcutaneous tissues are caused by a wide range of organisms³⁻⁵. Organisms isolated from a clinically infected wound may be clinically significant but this decision needs to be made in conjunction with clinical details. Examination of biopsies might be more effective for diagnosis than swabs. Commonly isolated organisms include:

- *Staphylococcus aureus*
- Lancefield groups A, B, C and G streptococci
- *Bacteroides* species
- *Clostridium* species
- Anaerobic cocci
- Coagulase-negative staphylococci
- *Corynebacterium* species
- Enterobacteriaceae
- Pseudomonads

Organisms isolated from a clinically infected wound may be clinically significant although they must be carefully assessed for their true clinical significance. Particular organisms are often typically associated with specific clinical conditions, as described below.

Cellulitis is a diffuse spreading infection involving the loose connective tissue of the deeper layers of the skin and subcutaneous tissues. Blood culture is the investigation of choice (see [BSOP 37 - Investigation of blood cultures for organisms other than *Mycobacterium* species](#)) and superficial swabs in the absence of a skin break are unrewarding. Recurrent cellulitis can occur following damage to local venous^{6,7} or lymphatic drainage systems.

Cellulitis is characterised by local pain, tenderness, erythema and oedema. The margins of the infected areas are ill defined, being neither elevated nor sharply demarcated. The most common causative organisms are β -haemolytic streptococci and *Staphylococcus aureus*^{8,9}.

Haemophilus influenzae cellulitis, particularly of the orbit, occurs in children up to three years of age¹⁰. Invasive *H. influenzae* infections have become rare following the introduction of *H. influenzae* type B vaccine.

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Facial cellulitis due to *Streptococcus pneumoniae* has also been described and occurs mainly in children. Cellulitis due to *S. pneumoniae* may also occur in patients with underlying conditions such as alcoholism, diabetes mellitus, intravenous drug abuse or systemic lupus erythematosus.

Cellulitis around wound infections is commonly caused by:

- β -haemolytic streptococci
- *S. aureus*
- *Bacteroides* species
- Anaerobic cocci

Bite wounds in human and animal can become contaminated by oral flora. Organisms most commonly isolated include^{11,12}:

- *Pasteurella multocida*
- *S. aureus*
- α -haemolytic streptococci
- Anaerobes
- DF-2 (*Capnocytophaga canimorsus*)
- *Eikenella corrodens*
- *Haemophilus* species
- Coagulase-negative staphylococci
- *Streptobacillus moniliformis*
- *S. intermedius*

Capnocytophaga canimorsus is associated with dog bites and causes septicaemia, particularly in patients who are splenectomised. This organism is usually isolated only from blood cultures.

Streptobacillus moniliformis is associated with rat bites and diagnosis is confirmed by culturing the organism from blood or joint fluid.

Other unusual organisms may be isolated including *Weeksella zoohelcum*, *Actinobacillus* species and *Neisseria canis*.

Insect bites are often associated with secondary Lancefield Group A streptococcus and *S. aureus* infection.

Burns sepsis is an important cause of death in patients suffering from burns. Organisms encountered include^{13,14}:

- *Staphylococcus aureus*
- β -haemolytic streptococci
- Pseudomonads, especially *Pseudomonas aeruginosa*
- *Acinetobacter* species
- *Bacillus* species
- Enterobacteriaceae
- Filamentous fungi, eg: *Fusarium* species

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- *Candida albicans* and other yeasts
- Coagulase-negative staphylococci

Ecthyma gangrenosum is a focal skin lesion characterised by haemorrhage, necrosis and surrounding erythema. It is usually caused by *P. aeruginosa*¹⁵, or occasionally by *Stenotrophomonas maltophilia*¹⁶ or by haematogenous dissemination of fungal infection (eg *Candida* species and mucoraceous fungi).

Similar lesions found in patients who are neutropenic may be due to infection with *Aspergillus* species or *Fusarium* species¹⁷.

Erysipelas is a superficial infection of the skin. It primarily involves the dermis and the most superficial parts of the subcutaneous tissues, with prominent involvement of the superficial lymphatics. It presents as a painful, fiery red, oedematous area of skin, occasionally with small vesicles on the surface. The margins have sharply demarcated, raised borders. The causative organism is usually the Lancefield Group A streptococcus but it can also be caused by Lancefield Group G streptococci and *S. aureus*¹⁸.

Erysipeloid is an uncommon nonsuppurative cellulitis due to *Erysipelothrix rhusiopathiae*³. It is an occupational disease of fishermen, fish handlers, butchers and abattoir workers. It affects the hands and fingers causing lesions which present as painful purplish areas of inflammation with erythematous advancing edges.

Erythrasma is a chronic, superficial skin infection of the stratum corneum caused by *Corynebacterium minutissimum*. It presents with fine, scaly, reddish-brown plaques usually in the axillae. Diagnosis is most often made on clinical grounds rather than by culture.

Folliculitis is the infection and inflammation of a hair follicle^{3,19}. Dome-shaped papules or pustules form. These are each pierced by a hair and surrounded by a rim of erythema. The condition is usually caused by *S. aureus*. Outbreaks due to *P. aeruginosa* have been associated with the use of swimming pools and whirlpools²⁰⁻²² and individual cases of *P. aeruginosa* folliculitis have followed the use of synthetic sponges²³. *Candida* species, especially in patients receiving prolonged antibiotic or corticosteroid treatment, and *Malassezia furfur*, in patients with diabetes or granulocytopenia or receiving corticosteroid treatment, can also cause folliculitis²⁴.

Impetigo is a superficial, intra-epidermal infection producing erythematous lesions that may be bullous or nonbullous. Bullous impetigo is caused by *S. aureus*²⁵. Nonbullous impetigo is most frequently caused by Lancefield Group A streptococci²⁶ or *S. aureus* or a combination of both. Lesions of bullous impetigo begin as vesicles and evolve into groups of superficial flaccid bullae with little or no surrounding erythema. They rupture easily. Lesions of nonbullous impetigo begin as small erythematous papules which form vesicles that develop into pustules and then rupture. Nonbullous impetigo has occasionally been caused by streptococci of Lancefield Groups C and G²⁷.

Scalded skin syndrome (Lyell's syndrome in older children; Ritter's syndrome in infants) is caused by *S. aureus*, particularly phage group II, phage type 71²⁸.

Paronychia is a superficial infection of the nail fold occurring as either an acute or chronic condition. Common isolates include²⁹.

- *S. aureus*
- Lancefield Group A streptococci
- Yeasts
- Anaerobic bacteria
- *H. influenzae*

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Superficial mycoses are cutaneous fungal infections that involve the hair or nails or the keratinized layer of the stratum corneum (see [BSOP 39 - Investigation of dermatological specimens for superficial mycosis](#)). Skin scrapings, hair or nail clippings are recommended for the diagnosis of fungal infection. Causative organisms are dermatophytes, *Candida* species or lipophilic yeasts³⁰. Rare fungi such as *Scytalidium dimidiatum* and *Scytalidium hyalinum* may also be isolated.

- Dermatophytic skin infection due to *Epidermophyton*, *Trichophyton* or *Microsporum* species produce pruritic, scaly, erythematous lesions with a characteristic "ringworm" appearance (see [BSOP 39 - Investigation of dermatological specimens for superficial mycosis](#)).
- Lipophilic yeasts cause pityriasis or tinea versicolor, infections of the stratum corneum with the yeast *Malassezia furfur*³¹
- *C. albicans* may colonise or infect the skin, especially in patients who are immunosuppressed and diabetic. Candidosis of large skin folds (candida intertrigo) occurs under breasts, between overhanging abdominal folds, in the groin and perineal areas, and in the axillae.

Cutaneous *Cryptococcus neoformans* infections are becoming increasingly frequent in HIV-infected patients. They present as widespread skin-coloured, dome-shaped, translucent papules. Skin scrapings are the specimens of choice.

Systemic mycoses such as those caused by *Mucor*, *Aspergillus*, *Cryptococcus*, *Fusarium* or *Candida* species may produce skin manifestations including ecthyma gangrenosum. These are best investigated by culture of biopsies (see [BSOP 17 - Investigation of tissues and biopsies](#)).

Ulcers of the skin are most often due to vascular insufficiency from venous or arterial disease, pressure (decubitus ulcers or bedsores), neuropathic changes or some combination of these. Ulcerated skin lesions may also result from the various collagen-vascular diseases, eg rheumatoid arthritis, and may complicate other disorders such as inflammatory bowel disease. In clinical practice the most common encountered type are chronic leg ulcers relating to venous insufficiency.

Precise diagnosis of the aetiology of any ulcer is important^{32,33} but may not be rigorously practised by attending health care workers³². This may affect interpretation of the biomedical literature and of microbiological results, and may adversely affect management and outcome for the individual.

All breaches of the integument will regularly become colonised (or infected) with bacteria. Bacteria may be detected by culture, or by nucleic acid amplification techniques. However, the clinical significance of such findings depends heavily on the precise nature of the lesions, the clinical situation prevailing at the time of sampling (stability, chronicity, presence of local and systemic signs and symptoms of infection), and sampling methodology.

Swab cultures from stable, chronic venous leg ulcers, without signs or symptoms of infection, are of questionable clinical value^{32,34} as opposed to biopsies of material from the depth of the ulcer, or aspirates of the leading edge of any cellulitic reaction³⁵. In clinical practice superficial swabs are most likely to be received.

When infections are complicated by the involvement of soft tissue and bone, isolates from superficial swabs taken from ulcers may correlate poorly with cultures of specimens taken by other more invasive means. Such specimens are biopsies and excised tissues, surgically obtained curettage, and aspirates from abscesses (see [BSOP 14 - Investigation of abscesses and post-operative wound and deep-seated infections](#), and [BSOP 17 - Investigation of tissues and biopsies](#)). Sampling by irrigation aspiration rather than biopsy has been recommended, and results correlate well with responses to clinical measures³⁶.

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In common with other situations, it is likely that the role of anaerobic bacteria (especially anaerobic cocci and Gram - negative rods) and of synergically pathogenic bacterial populations (featuring aerobic and anaerobic bacteria)³⁷ may have been under-appreciated as causes of clinically-evident infection arising from ulcerated skin lesions. Anaerobic infection may be associated with foul smelling odour or discharge and evidence of tissue necrosis.

Tropical ulcers and chronic non-healing lesions may occur on previously healthy skin, often after trauma. Causative organisms include anaerobes.

Genital ulcers may result from trauma or from sexually transmitted disease. Traumatic ulcers usually heal rapidly and are associated with genital tract commensal organisms or with *S. aureus* or β -haemolytic streptococci. Ulcers caused by sexually transmitted organisms tend to persist and may be caused by herpes simplex virus (usually type II) or by a variety of bacterial agents, notably *Treponema pallidum* in the UK (see [BSOP 28 - Investigation of genital tract and associated specimens](#)).

Ulcerative skin lesions may be caused by parapoxviruses such as orf virus. These are acquired through skin abrasions after contact with infected domesticated animals, including sheep, goats and cattle.

Diabetic ulcers - foot infection in patients who are diabetic is both a common and potentially disastrous complication that can progress rapidly to irreversible septic gangrene necessitating amputation of the foot. *Corynebacterium* species, streptococci, meticillin susceptible and resistant staphylococci, pseudomonads, *Enterobacter aerogenes*, *Bacteroides fragilis*, *Fusobacterium* species and *Prevotella bivia* are among organisms that have been isolated from limb threatening diabetic foot ulcers^{38,39}.

Other skin infections

Aeromonas and non-cholera *Vibrio* species are predominantly isolated from traumatic water-related wounds or lacerations received whilst swimming in fresh or salt water⁴⁰, from other environmentally contaminated wounds or from fishing or shellfish inflicted injuries⁴¹. Rarely they can cause muscle necrosis similar to that caused by *C. perfringens*. *Aeromonas* was initially reported as a pathogen in patients who are immunosuppressed. It is now known also to cause severe disease in patients who are immunocompetent⁴². *Aeromonas* infection may also follow the therapeutic use of leeches^{43,44}. Water-related injuries can be polymicrobial involving environmental Gram-negative organisms such as *Edwardsiella tarda*⁴⁵ and pseudomonads.

Bacillus anthracis is the causative agent of anthrax which appears clinically in one of two forms, cutaneous (skin) anthrax or inhalation anthrax. Following the deliberate release of *B. anthracis* in the USA in 2001, there is an increased awareness of the release of this and other organisms which may pose a biological threat⁴⁶. Cutaneous anthrax occurs through inoculation of spores to the skin or by contamination of abrasions. Skin lesions called malignant pustules develop, which are characteristic ulcers with a black centre⁴⁷. They are rarely painful, but if untreated the infection can spread to cause septicaemia. If untreated, the disease can be fatal in 5% of cases, but with antibiotic treatment recovery is usual. Cutaneous infection with *B. anthracis* can occur in industrial workers who use materials of animal origin eg wool, leather, bristles and fur, or in the agricultural workplace eg farmers, husbandmen, butchers and vets. In rare cases *B. anthracis* has been transmitted via insect bites⁴⁸.

Bacillus cereus can cause serious infection. This is related to toxin production and can occur following operative procedures, in traumatic wounds and in burns. *B. cereus* may also be present as a contaminant of traumatised areas⁴⁹.

Corynebacterium diphtheriae and *Corynebacterium ulcerans* can cause cutaneous diphtheria^{50,51}. They colonise sites of trauma or insect bites and therefore may be isolated from non-healing skin ulcers.

Leishmania species cause oriental sores and chronic skin granulomas or ulcerating lesions⁵². Cutaneous leishmaniasis is most commonly seen in South America, the Far East and Ethiopia. Diagnosis is made by demonstrating the parasite in stained impression smears and tissue sections.

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Detection by nucleic acid amplification techniques and by culture is also available in reference centres. *Leishmania* speciation is a guide to appropriate therapy and to prognosis.

Like methicillin-sensitive *Staphylococcus aureus* (MSSA), MRSA may colonise and or infect wounds and soft tissue. Newly emerging community (mecIV) MRSA with virulence factors such as Panton-Valentine leukocidin (PVL) or Scalded Skin toxin (SST) are causing highly contagious infections (eg folliculitis) in healthy children and young adults⁵³. Infections are often spread through poor hygiene⁵⁴. More serious infections such as necrotising fasciitis and pneumonia are increasingly described.

Mycobacterium species can cause cutaneous infections. These may signify a disseminated systemic infection or may represent a local infection by a non-tuberculous *Mycobacterium* (see [BSOP 40 - Investigation of specimens for Mycobacterium species](#)). Examples are⁵⁵:

- *Mycobacterium tuberculosis* which causes lupus vulgaris lesions around the mouth
- *Mycobacterium marinum* which causes granulomas and lymphangitis acquired through water-related injuries
- *Mycobacterium ulcerans* which causes cutaneous lesions called Buruli ulcers
- *Mycobacterium haemophilum* which causes widespread cutaneous lesions in patients who are immunocompromised
- *Mycobacterium leprae* which causes leprosy (Hansen's disease) a chronic disease of the skin, mucous membranes and nerve tissues

Sporothrix schenckii causes sporotrichosis⁵⁶. Cutaneous sporotrichosis is acquired by contamination with soil, sphagnum moss or other vegetable matter and develops at the site of inoculation to form a primary lesion with lymphatic spread (see [BSOP 39 - Investigation of dermatological specimens for superficial mycosis](#)). It is more common in warmer climates.

Cutaneous salmonellosis and listeriosis may also occur in veterinarians and farmers, typically on the arms, following assisted delivery of farm animals, usually cattle^{57,58} infected *in utero*. Cutaneous listeriosis in a patient with AIDS has also been reported⁵⁹.

Yersinia enterocolitica can cause cutaneous infections⁶⁰.

TECHNICAL INFORMATION/LIMITATIONS

The recommended incubation time for anaerobic plates is 48 hours. However some anaerobic bacteria such as certain species of *Actinomyces* require longer incubation (7 days) and will not be detected if plates are examined sooner.

In National Standard Methods, the term "CE marked leak proof container" is used to describe containers bearing the CE marking and which are used for the collection and transport of clinical specimens. The requirements of the EU *in vitro* Diagnostic Medical Devices Directive (98/79/EC Annex 1 B 2.1)⁶¹ state that such devices must "reduce as far as possible contamination of, and leakage from, the device during use and, in the case of specimen receptacles, the risk of contamination of the specimen. The manufacturing processes must be appropriate for these purposes".

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1 SAFETY CONSIDERATIONS⁶²⁻⁷²

1.1 SPECIMEN COLLECTION

N/A

1.2 SPECIMEN TRANSPORT AND STORAGE

Use sealed plastic bags for transport and storage of specimens.

1.3 SPECIMEN PROCESSING

Process all specimens in a Containment Level 2 facility. If infection with a Hazard Group 3 organism is suspected, work should be performed in a microbiological safety cabinet in a Containment Level 3 room.

Laboratory procedures that give rise to infectious aerosols must be conducted in a microbiological safety cabinet.

Refer to current guidance on the safe handling of all organisms documented in the NSM.

The above guidance should be supplemented with local COSHH and risk assessments.

Compliance with postal and transport regulations is essential.

2 SPECIMEN COLLECTION

2.1 OPTIMAL TIME OF SPECIMEN COLLECTION

Collect specimens before the start of antimicrobial therapy, where possible.

2.2 CORRECT SPECIMEN TYPE AND METHOD OF COLLECTION

Samples of pus/exudate, if present, are preferred to swabs (see [BSOP 14 - Investigation of abscesses and post-operative wound and deep-seated infections](#)). If only a minute amount of pus or exudate is available it is preferable to send a pus/exudate swab in transport medium to minimise the risk of desiccation during transport.

Sample a representative part of the lesion. Swabbing dry crusted areas is unlikely to yield the causative pathogen.

If specimens are taken from ulcers, the debris on the ulcer should be removed and the ulcer should be cleaned with saline. A biopsy or, preferably, a needle aspiration of the edge of the wound should then be taken⁷³.

A less invasive irrigation-aspiration method may be preferred. Place the tip of a small needleless syringe under the ulcer margin and irrigate gently with at least 1 mL sterile 0.85% NaCl without preservative. After massaging the ulcer margin, repeat the irrigation with a further 1 mL sterile saline. Massage the ulcer margin again, aspirate approximately 0.25 mL of the fluid⁷⁴ and place in a CE marked leak proof container^a.

Fungal specimens for dermatophytes: See [BSOP 39 - Investigation of dermatological specimens for superficial mycosis](#).

2.3 ADEQUATE QUANTITY AND APPROPRIATE NUMBER OF SPECIMENS

N/A

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3 SPECIMEN TRANSPORT AND STORAGE

3.1 TIME BETWEEN SPECIMEN COLLECTION AND PROCESSING

Specimens should be transported and processed as soon as possible.

3.2 SPECIAL CONSIDERATIONS TO MINIMISE DETERIORATION

Swabs should be transported in Amies transport medium with charcoal⁷⁶.

Biopsies should be placed in a CE marked leak proof container^a in a sealed plastic bag with a small amount of sterile normal saline to prevent desiccation.

If processing is delayed, refrigeration is preferable to storage at ambient temperature. Delays of over 48 h are undesirable.

4 SPECIMEN PROCESSING

4.1 TEST SELECTION

N/A

4.2 APPEARANCE

N/A

4.3 MICROSCOPY

4.3.1 STANDARD

Grams staining is not normally required.

4.3.2 SUPPLEMENTARY INVESTIGATIONS

See [BSOP 40 - Investigation of specimens for *Mycobacterium* species](#), and [BSOP TP 39 - Staining procedures](#).

4.4 CULTURE AND INVESTIGATION

4.4.1 PRE-TREATMENT

N/A

4.4.2 SPECIMEN PROCESSING

See [QSOP 52 - Inoculation of culture media](#).

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4.4.3 CULTURE MEDIA, CONDITIONS AND ORGANISMS FOR ALL SPECIMENS:

Clinical details/ conditions	Standard media	Incubation			Cultures read	Target organism(s)
		Temp °C	Atmos	Time		
All swabs	Blood agar	35-37	5-10% CO ₂	40-48 h	daily	Lancefield Groups A, C and G streptococci <i>Pasteurella</i> species <i>S.aureus</i> <i>Vibrio</i> species
For these situations, add the following:						
Clinical details/ conditions	Supplementary media	Incubation			Cultures read	Target organism(s)
		Temp °C	Atmos	Time		
All wound swabs e.g chronic ulcers, traumatic wounds	Neomycin fastidious anaerobe agar with metronidazole 5 µg disc	35-37	anaerobic	40-48h	≥40 h	Anaerobes
Cellulitis in children Human bites	Chocolate agar - †	35-37	5-10% CO ₂	40-48 h	daily	<i>Haemophilus</i> species
Burns Swabs from dirty sites Patients who are immunocompromised Diabetic patient Intertrigo Paronychia	Sabouraud agar	35-37	air	40-48 h*	≥40 h	Fungi
Cutaneous diphtheria Foreign travel	Hoyle's tellurite agar	35-37	air	40-48 h	daily	<i>C. diphtheriae</i> <i>C. ulcerans</i>
Optional media		Incubation			Cultures read	Target organism(s)
		Temp °C	Atmos	Time		
Diabetic wounds	MacConkey/CLED	35-37	air	16-24 h	≥16 h	Enterobacteriaceae Pseudomonads
Swabs from dirty sites	Staph/strep selective agar	35-37	air	40-48 h	daily	<i>S.aureus</i> Lancefield Groups A, C and G streptococci
<p>Other organisms for consideration: Dermatophytes (BSOP 39 - Investigation of dermatological specimens for superficial mycosis) and <i>Mycobacterium</i> species (BSOP 40 - Investigation of specimens for <i>Mycobacterium</i> species)</p> <p>* Incubation may be extended to 5 d if clinically indicated; in such cases plates should be read at ≥40h and then left in the incubator/cabinet until day 5</p> <p>† Either bacitracin 10 unit disc or bacitracin - containing agar may be used</p>						

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4.4.4 SUPPLEMENTARY INVESTIGATIONS

Toxigenicity testing of *C. diphtheriae*

See [BSOP 40 - Investigation of specimens for *Mycobacterium* species](#)

4.5 IDENTIFICATION

4.5.1 MINIMUM LEVEL OF IDENTIFICATION IN THE LABORATORY

Anaerobes	"anaerobes" level
Bacillus species	species level exclude anthrax
β-haemolytic streptococci	Lancefield Group level
Coagulase-negative staphylococci	"coagulase-negative" level
C. diphtheriae	species level and urgent (same-day) toxigenicity test
C. minutissimum	species level
C. ulcerans	species level
<i>E. corrodens</i>	species level
Enterobacteriaceae	"coliforms" level
<i>E. rhusiopathiae</i>	species level
Haemophilus	species level
<i>Pasteurella</i>	species level
Pseudomonads	"pseudomonads" level
S. aureus	species level
S. pneumoniae	species level
Yeasts	"yeasts" level
Vibrio	species level
<i>Aeromonas</i>	species level
Dermatophytes	BSOP 39 - Investigation of dermatological specimens for superficial mycosis
Mycobacterium	BSOP 40 - Investigation of specimens for <i>Mycobacterium</i> species

Organisms may be further identified if clinically or epidemiologically indicated.

Note: All work on suspected isolates of *C. diphtheriae* which is likely to generate aerosols must be performed in a safety cabinet⁷⁷.

A medical microbiologist must be informed of all suspected isolates of *C. diphtheriae* as soon as possible (same-day toxigenicity testing is available from the reference laboratory).

4.5.2 REFERRAL TO REFERENCE LABORATORIES

For information on the tests offered, turn around times, transport procedure and the other requirements of the reference laboratory [click here for user manuals and request forms](#).

Organisms with unusual or unexpected resistance, and whenever there is a laboratory or clinical problem or anomaly that requires elucidation, should be sent to the appropriate reference laboratory.

4.6 ANTIMICROBIAL SUSCEPTIBILITY TESTING

Refer to [BSOP 45 - Susceptibility testing](#).

5 REPORTING PROCEDURE

5.1 MICROSCOPY

Urgent microscopy results should be telephoned or sent electronically.

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Written report should be issued after 16 – 72 h.

5.2 CULTURE

Following results should be reported:

Presence or absence of specifically named organisms eg *S. aureus*

Culture reporting time

Clinically urgent culture results should be telephoned or sent electronically.

Written reports should be issued after 16 – 72 h stating, if appropriate, that a further report will be issued.

5.2.1 ANTIMICROBIAL SUSCEPTIBILITY TESTING

Report susceptibility results as clinically indicated.

6 REPORTING TO THE HPA (LOCAL AND REGIONAL SERVICES AND CENTRE FOR INFECTIONS)⁷⁸

Refer to the following:

Individual NSMs on organism identification

Health Protection Agency publications:

"Reporting to the HPA: A guide for diagnostic Laboratories"

"Hospital infection control: Guidance on the control of infection in hospitals"

Local guidelines

Isolation of possible *C. diphtheriae* should be reported urgently to the CCDC.

All isolates of *Mycobacterium* species should be reported.

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7 ACKNOWLEDGEMENTS AND CONTACTS

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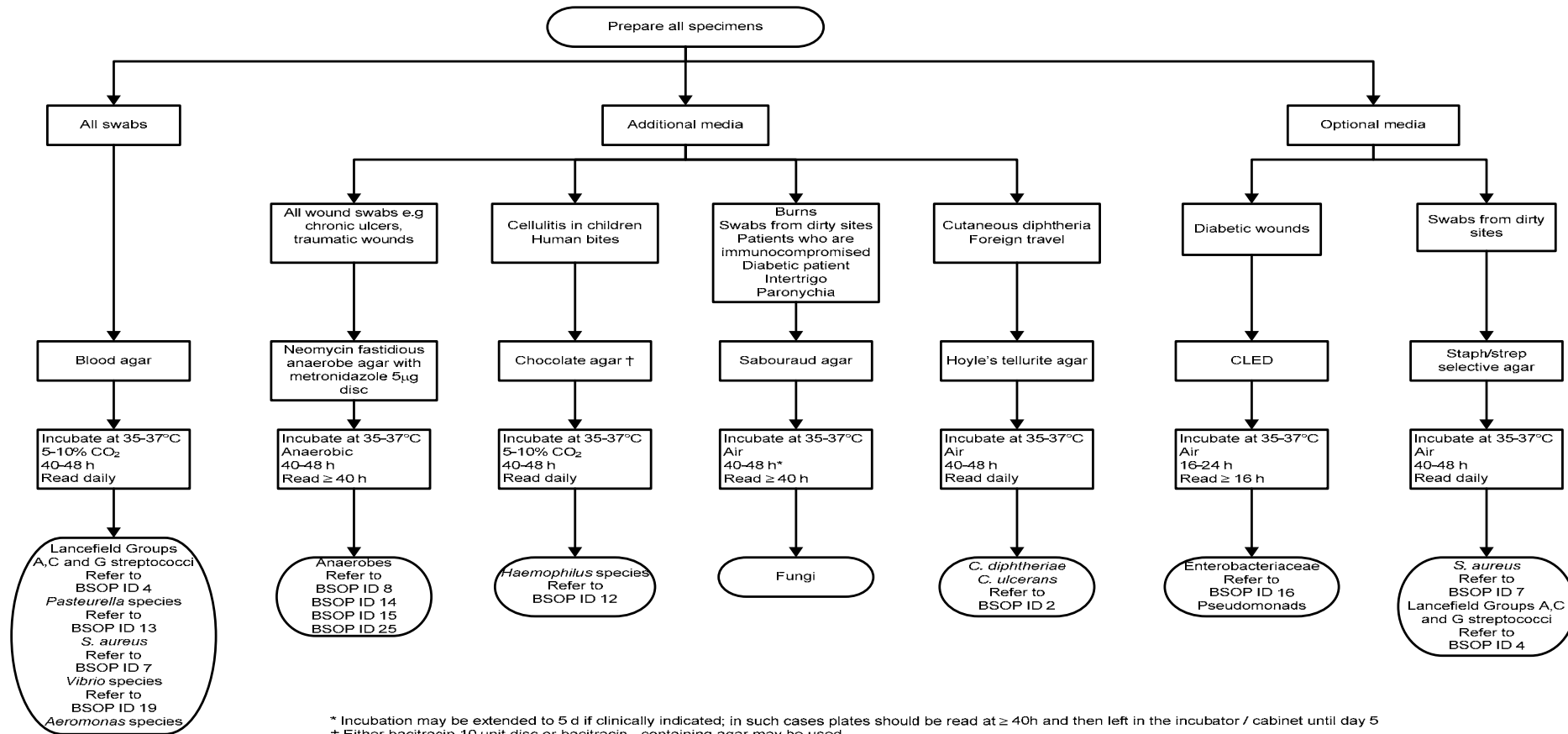
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^a *The requirements of the EU in vitro Diagnostic Medical Devices Directive⁷⁵ (98/79/EC Annex 1 B 2.1) state that such devices must “reduce as far as possible contamination of, and leakage from, the device during use and, in the case of specimen receptacles, the risk of contamination of the specimen. The manufacturing processes must be appropriate for these purposes”.*

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