Skin and soft tissue swab interpretation guide

NOTE this does not cover ear, throat, genital, or eye swabs.

In line with NICE guidance and GIRFT principles, wound swabs should only be taken when there are clear clinical signs of infection or when a wound is deteriorating or failing to heal, rather than as a routine practice. If further guidance is required on how to assess a wound for signs of infection, then please refer to the Wound infection guideline on the Nottinghamshire APC website.

All swabs need to be interpreted with clinical context, so it is essential to provide clinical details.
Relevant details include significant exposures, such as fresh / salt water or animals (including exotic pets e.g. reptiles), patient risk factors such as immunocompromise or diabetes, and the location swabbed. Providing these will dictate how a sample is processed, and in turn what organisms are isolated.

The presence of bacteria does not always represent infection.

A positive culture result should not always automatically be treated as no site on the skin is sterile and colonisation is common.

In long term wounds colonisation is more common, so swabs are only indicated if there are signs of infection present.

Antibiotics are not required for wound colonisation and may cause more harm than benefit.

Common organisms or results seen on swabs

Staphylococcus aureus	This is a common skin commensal but also represents a frequent pathogen in wound infection. If present in a site that has evidence of infection it will typically require treatment, usually with Flucloxacillin. It is important to check for previous MRSA colonisation (see below). If the patient has recurrent boils / abscess formation, then testing for PVL toxin could be considered. If present this will need decolonisation. Family members will likely need decolonisation at the same time as there is a risk of cross contamination and subsequent re-infection. This is covered in more detail in the Nottinghamshire APC guideline SSTI – Panton-Valentine Leukocidin (PVL). The local IPC team will typically provide input with this process.
Methicillin resistant *Staphylococcus aureus (MRSA)*	As per '*Staphylococcus aureus*' with the addition that if MRSA is present the isolate will not respond to penicillin/flucloxacillin or other oral beta-lactam antibiotics. Alternative sensitivities will be released when MRSA is isolated as sensitivity to alternative agents such as doxycycline or co-trimoxazole is variable. If found on a swab (screening or wound) then decolonisation is required. This is covered in more detail in the Nottinghamshire APC guideline MRSA Infection Control and Empirical Antibiotic Treatment. The local IPC team will typically provide input with this process.
Staphylococcus intermedius/ pseudointermedius	This is a Coagulase positive Staphylococcus like *Staphylococcus aureus* and can cause skin and soft tissue infections in wounds often associated with close animal contact.
Other Staphylococcal species e.g. Coagulase negative Staphylococcus	These would not typically be reported by the laboratory as they are common skin commensals and would normally represent colonisation rather than infection. While Coagulase negative Staphylococcus are often low-virulence colonisers, some species (especially *Staphylococcus lugdunensis)* can behave aggressively and cause infections resembling those due to *Staphylococcus aureus*.

Group A Streptococcus (*Streptococcus pyogenes*)	This is a pathogen that is ALWAYS clinically significant when isolated from a wound. It is typically associated with rapidly spreading cellulitis but can also lead to necrotising soft tissue infections such as necrotising fasciitis. When isolated this should prompt a careful review of the wound, looking for severe pain out of keeping with the presentation or evidence of systemic illness. If these are present, then referral to secondary care should be considered. This isolate will be covered by Amoxicillin, although if the patient has been started on Flucloxacillin this will also work. If the patient is allergic to penicillin, then full sensitivities will be required as resistance to alternative agents such as Clindamycin or Erythromycin is variable. Given this organism is transmissible meticulous hand hygiene as well as keeping the wound clean and covered are important. For patients in nursing/care home guidance can be sought from the local IPC team regarding infection control measures which can include but are not limited to isolation for the patient involved.
Group B Streptococcus (*Streptococcus agalactiae*)	This can be a coloniser of chronic wounds but can also present as a pathogen in elderly patients or those with poorly controlled diabetes or increased body habitus. As such it should only be treated if there is evidence of active infection. If an infection is deemed to be due to Group B Streptococcus, then investigations for diabetes should be considered. This isolate will be covered by Flucloxacillin. If the patient is allergic to penicillin, then full sensitivities will be required as resistance to alternative agents such as Clindamycin or Erythromycin is variable.
Group C/G Streptococcus (*Streptococcus dysgalatiae*)	This will typically represent infection and can cause similar presentations to Group A Streptococcus although Group C/G are typically less virulent than Group A. Infections can range from superficial cellulitis through to life threatening necrotising infections. They are typically worse in the elderly or those with underlying co-morbidities such as diabetes, cardiopulmonary disease or immunosuppression. This isolate will be covered by Flucloxacillin. If the patient is allergic to penicillin, then full sensitivities will be required as resistance to alternative agents such as Clindamycin or Erythromycin is variable.
Mixed colonising bacteria	A mixture of organisms has been grown on culture that would most likely fit with colonisation. Due to the mixture, it is not possible to identify a specific pathogen and provide susceptibility results. If there is clinical evidence of infection, treat empirically as per Nottinghamshire APC antimicrobial guideline – Cellulitis.

	If there is evidence of persistent infection despite empirical treatment, contact the duty microbiologist. This comment will commonly mention other specific organisms such as 'including pseudomonas' or 'including coliforms' – see below for further guidance.
Mixed colonising bacteria including coliforms	The term Coliform is an umbrella term which refers to a large group of Gram-negative bacilli and covers many common bacterial species (including *E. coli*, Klebsiella, Enterobacter and Citrobacter species). The presence of these organisms in wound swabs typically represents colonisation rather than infection and in the absence of clinical signs of infection does not require treatment. The laboratory does not normally differentiate between these organisms and will not routinely perform sensitivity testing.
Mixed colonising bacteria including Pseudomonas species	Pseudomonas sp. Is an environmental organism that thrives in moist environments. It is a very common coloniser of wounds particularly if there is exudate present which is classically green in colour. The mainstay of management if Pseudomonas is present should focus on wound care and moisture control, with consideration of the use of antimicrobial dressings. Primary treatment is covered in more detail in the Nottinghamshire APC Wound infection guideline. Due to the mixture, it is not possible to identify a specific pathogen and provide susceptibility results. If there is clinical evidence of infection, treat empirically as per Nottinghamshire APC guideline – Cellulitis. If there is evidence of persistent infection despite empirical treatment, contact the duty microbiologist. Rarely, in the immunosuppressed, Pseudomonas can cause ecthyma gangrenosum, a rapid progressing rash that begins as red macules before developing into necrotic gangrenous ulcers. This would require input by secondary care as debridement and intravenous antibiotics are typically required.

Candida species	Candida species are normal commensals of skin and mucous membranes and readily colonize open wounds without causing harm. Growth from non-sterile sites like wound swabs often indicates colonization or contamination rather than true infection.
Anaerobes	The clinical significance of anaerobes in a wound swab depends entirely on how the swab was taken. If this is a superficial swab of the surface of a wound (even in the case of a diabetic ulcer) it is of little value as it will represent colonisation rather than any underlying pathogenic organisms. If this is a deeper sample (i.e. a biopsy sample) however this may be pathogenic and should be discussed with the duty microbiologist.

Other atypical organisms

Each of these organisms will likely have an interpretive comment added if present in swabs and all should be discussed with the duty microbiologist.

Pasteurella species	This is a clinically significant isolate and is typically associated with wounds from cat or dog bites and scratches. It often appears as part of a polymicrobial infection, influencing empirical antibiotic choice. It can present with rapidly progressive cellulitis. Patients with co-morbidities such as liver disease, immunocompromised or patients over 65 are at risk of severe invasive infection and may need input from secondary care. The treatment of dog and cat bites is covered in more detail in the Nottinghamshire APC guideline Human and Animal Bites.
Vibrio species	This is a clinically significant isolate that will require prompt management and aggressive treatment. It is associated with exposure of wounds to seawater or brackish water, or through contamination during handling of raw seafood. These marine bacteria can cause rapidly progressive wound infections, necrotising fasciitis and can carry a mortality rate over 50% in vulnerable populations. If present in samples patient should be considered for referral to secondary care as IV therapy may be required.
Aeromonas species	This is a clinically significant isolate that can cause a spectrum of infections from superficial cellulitis through to necrotising infections. It is typically associated with exposure to freshwater or trauma. If present in samples patient should be considered for referral to secondary care as IV therapy may be required.

Further resources

For more information on sending samples, interpreting sensitivity results and implications for antibiotic dosing, see: Microbiology (NUH) , Clinical Microbiology (SFH) and Interpreting Sensitivity Results.

RCGP – Summary of antimicrobial guidance
NICE Guidance – Cellulitis, Leg Ulcers, Insect bites, Scarlet Fever, Impetigo and Animal bites
GOV.UK – PVL-Staphylococcus aureus infections

Accessibility checked