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# INFECTION SIMPLIFIED



This simplified leaflet is intended  
to aid your clinical decisions and  
practice around infection

# INFECTION IN WOUND CARE – SIMPLIFIED

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**Wound infection is often associated with delayed wound healing and increase in morbidity. These infections are difficult to treat, and can also add to complications and cause distress to the patient. Early detection/recognition along with appropriate and effective intervention is necessary to reduce the consequences both health wise and financially.**

## INFECTION

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It can be defined as the invasion and multiplication of microorganisms (e.g. bacteria, viruses, and parasites) that are not normally present within the body. An infection may cause no symptoms and be subclinical, or it may cause symptoms and be clinically apparent. An infection may remain localized, or it may spread through the blood or lymphatic vessels to become systemic (MedicineNet 2017).

Wound infection is the invasion of a wound by proliferating microorganisms to a level that invokes a local and/or systemic response in the host. The presence of microorganisms within the wound causes local tissue damage and impedes wound healing (International Consensus 2016).

## STAGES IN THE WOUND INFECTION CONTINUUM

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### Contamination

Wound contamination is the presence of non-proliferating microbes within a wound at a level that does not evoke a host response. Virtually from the time of the wound occurring, all open wounds are contaminated with microbes.

Chronic wounds become contaminated from endogenous secretions (i.e. natural flora) and exogenous microbial sources, including poor hand hygiene practised by healthcare clinicians and environmental exposure. Unless compromised, the host defences respond swiftly to destroy the bacteria.



## Colonisation

Colonisation refers to the presence within the wound of microbial organisms that undergo limited proliferation without evoking a host reaction. Microbial growth occurs at a non-critical level and wound healing is not impeded or delayed. Sources for microorganisms may be natural flora, exogenous sources or as a result of environmental exposure.

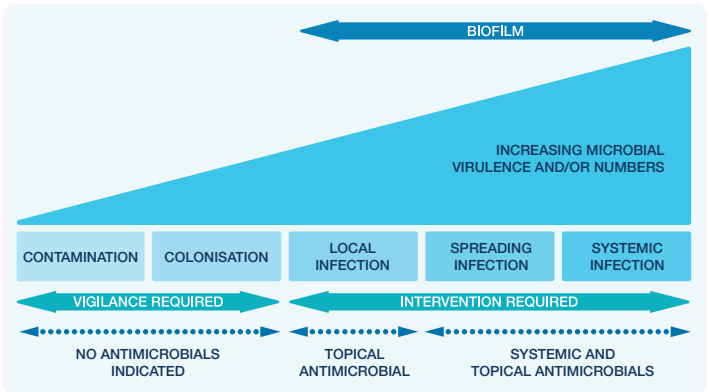
## Local infection

Wound infection occurs when bacteria or other microbes move deeper into the wound tissue and proliferate at a rate that invokes a response in the host. Local infection is contained in one location, system or structure.

Especially in chronic wounds, local wound infection often presents as subtle signs that can be considered covert signs of infection that may develop into the classic, overt signs of infection.

## Spreading infection

Spreading infection describes the invasion of the surrounding tissue by infective organisms that have spread from a wound. Microorganisms proliferate and spread, to a degree that signs and symptoms extend beyond the wound border. Spreading infection may involve deep tissue, muscle, fascia, organs or body cavities. (International Consensus Update, 2016).



# RISK OF INFECTION

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There are several factors that can increase an individual's susceptibility to infection.

- age
- diabetes (poorly controlled)
- hypoxia/poor tissue perfusion e.g. anaemia, cardiac/respiratory disease, arterial/vascular disease, renal impairment, rheumatoid arthritis, shock
- immune deficiency/immunosuppressant
- drugs
- obesity
- malnutrition
- smoking, alcohol, drug use
- recent/prior surgery
- inappropriate use of prophylactic antibiotics

# EXAMPLE OF AN INFECTED WOUND

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# SIGNS AND SYMPTOMS

Recognising infection can be challenging in clinical practice. Infection may produce different signs and symptoms in wounds of different types and aetiologies. Vigilance is key, accompanied by a full patient and wound assessment.

## ACUTE WOUNDS

e.g. surgical or traumatic wounds or burns

LOCALISED INFECTION	SPREADING INFECTION
<b>Classical signs and symptoms:</b>	<b>Same indications as localised infection PLUS:</b>
Pain - new or increasing	Further extension of erythema Lymphangitis Crepitus in soft tissues Wound breakdown/dehiscence
Erythema	<b>Notes:</b>
Local warmth	<ul style="list-style-type: none"><li>• Burns: consider skin graft rejection noting that pain is not always a feature of infection in full thickness burns</li><li>• Deep wounds: consider induration, extension of the wound, unexplained increased white cell count or signs of sepsis may be signs of deep wound (i.e. subfascial) infection</li><li>• Immunocompromised patients: signs and symptoms may be modified and less obvious.</li></ul>
Swelling	*Lymphangitis – Inflammation of lymph vessels, seen as red skin streaks running proximally from a site of infection.
Purulent discharge/Exudate	*Crepitus – A crackling feeling or sound detected on palpation of tissues that is due to gas within the tissues.
Pyrexia – in surgical wounds, typically five to seven days post-surgery	
Delayed (or stalled) healing	
Abscess	
Malodour	
Wound breakdown/Enlargement	

*Adapted from C Dowsett 2011 and International Consensus 2008*

## CHRONIC WOUNDS

e.g. diabetic foot ulcers, venous leg ulcers, arterial leg and foot ulcers or pressure ulcers

LOCALISED INFECTION	SPREADING INFECTION
New, increased or altered pain	<p>Same indications as localised infection PLUS: Wound breakdown Erythema extending from wound edge Crepitus, warmth, induration or discoloration spreading into periwound area Lymphangitis/Cellulitis Malaise or other non-specific deterioration in patient's general condition</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"><li>• In patients who are immunocompromised and/or who have motor or sensory neuropathies, symptoms may be modified and less obvious. For example, in a diabetic patient with an infected foot ulcer and peripheral neuropathy, pain may not be a prominent feature.</li><li>• Arterial ulcers – previously dry ulcers may become wet when infected. Clinicians should also be aware that in the diabetic foot, inflammation is not necessarily indicative of infection. For example, inflammation may be associated with Charcot's arthropathy. *Individually highly indicative of infection.</li><li>• Infection is also highly likely in the presence of two or more of the other signs listed.</li></ul> <p><i>Adapted from C Dowsett 2011 and International Consensus 2008</i></p>
Delayed (or stalled) healing	
Periwound oedema	
Bleeding or friable (easily damaged) granulation tissue	
Distinctive malodour or change in odour	
Wound bed discoloration	
Increased, altered or purulent exudate	
Increase in local skin temperature	
Deterioration of wound	
Wound bed extension/increase in width and depth	
Induration	
Pocketing	
Bridging	

## Investigations

Wound infection diagnosis can be difficult. Clinical judgement is required to understand the signs and symptoms. There is no single test that can identify an infection. A full assessment of both the patient and the wound can detect risk factors and when an infection is present. Some wounds may not exhibit any of the classic signs, in particular chronic, stagnating wounds. Appropriate investigations such as swabbing can assist in verifying sensitivities and/or resistance to current treatment. Please refer to your local policy regarding obtaining a swab. It is important to note that the interpretation of the results should be in context with both the patient and the wound.

IMPROVE HEALTH	REDUCE WOUND BIOBURDEN	GENERAL MEASURES
Management of existing diseases	Prevention of cross infection	Effectively manage symptoms
Reduce, remove risk factors where possible	Assist wound drainage	Undertake wound care in a clean environment
Increase nutritional status and hydration	Periwound protection	Establish appropriate aseptic technique
Treatment of systemic symptoms	Exudate management	Store equipment and supplies in line with local policy
Psychological support	Wound bed preparation	Regular reviews
Appropriate systemic antimicrobial therapy	Selection of suitable dressing	Referral to local policies and procedures
Patient/carer education	Consideration of antimicrobials, (if selecting 2 Week rule)	
Individual management plan to encourage engagement		

## Managing Wound Infections

A holistic approach is necessary to ascertain whether the patient is at risk of, or there is an infection of the wound. The management plan should reflect the patients' individual situation. Effective management of infection may require a multidisciplinary approach. The aim is to re-address the balance in both the wound and the patient. This can be achieved by improving general health, reduction of the wound bioburden and general measures.

Topical antimicrobials should only be used when signs and symptoms suggest that the wound bioburden is interfering with healing. Products vary according to their concentration, active ingredients, mode and duration of action along with their ability to handle exudate, odour and pain. The appropriate dressing should be selected according to the assessment of the wound.

### Two week challenge

International Concerns (2012) recommends that antimicrobial dressings be used for a two week challenge period. At the end of the 2 week period the wound and patient management should be re-evaluated.

If after 2 weeks the wound has improved, but has continuing signs of infection; it may be clinically justifiable to continue with the same antimicrobial dressing. If at the end of this

this period the wound has failed to improve, other alternatives antimicrobials should be considered following a full wound assessment.

If the wound has improved and there are no longer signs or symptoms of infection, antimicrobials should be discontinued.

## Infection prevention for Healthcare professionals

To protect both you and the person receiving care, adopting the practices below can minimise the risk of infection and cross infection:

- Good hand hygiene
- Aseptic technique/Aseptic Non Touch Technique
- Planned order of care
- Personal protective equipment
- Clean procedures for chronic wounds
- Management of sharps

## Sepsis

Sepsis is a life-threatening complication, characterised by a range of signs and symptoms, arising from an overwhelming host response to infection.

See Dressing Selection simplified for information on choice of Antimicrobial dressings.

# CONCLUSION

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It is essential that clinicians can identify wound infections correctly and when appropriate choose a topical antimicrobial or antibiotic for the treatment with the goals of preventing/preventing and eradicating infection to promote wound healing.

## References:

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