Guidelines for Preventing, Identifying and Managing Wound Infection

This guidance does not override the individual responsibility of health professionals to make appropriate decisions according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

This guideline should be used in conjunction with the Wound Management Policy

INTRODUCTION

The guidelines provide advice on preventing, identifying and managing wound infection. It focuses mainly on patients with/at risk of chronic wounds. The guideline aims to promote consistent, evidence-linked practice to improve outcomes for patients who have chronic wounds/wound infection.

THIS GUIDELINE IS FOR USE BY THE FOLLOWING STAFF GROUPS :

All clinical staff involved in preventing, identifying and managing patients with wound infection

Lead Clinician:

Lisa Martin	Tissue Viability Nurse
Approved by SKIN Matters Group on:	22nd June 2015
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Key amendments to this guideline

Date	Amendment	By
19/03/2012	Approval given to extend until the end of June 2012	TIPCC
14/06/2012	Extended to allow time for preparation for ratification at the August 2012 TIPCC	Louise Morris
05/07/2012	Extended to allow time for preparation for ratification at the August 2012 TIPCC	Heather Gentry
Sept 2012	All pages have been revised	Louise Morris
June 2015	Formatting	Lisa Martin
November 2016	Documents extended for 12 months as per TMC paper approved on 22nd July 2015	TMC
December 2017	Sentence added in at the request of the Coroner	
June 2018	Document extended for 3 months as per TLG recommendation	TLG
October 2018	Document extended until end of November	Heather Gentry
April 2019	Document extended for 6 months whilst review process takes place	TIPCC
February 2021	Document extended as per Trust agreement 11.02.2021	
January 2023	Document extended for 6 months whilst review process takes place	Clare Hughes

Contents

Appendices

1. INTRODUCTION

Wound infection remains a major cause of morbidity and mortality. It often results in patients being admitted or re-admitted for treatment. With patient safety being uppermost on the Quality Agenda and Government announcing intentions to reduce annual hospital readmissions, reduction of infection rates is integral to achieving these aims. The accurate identification of wound infection and its subsequent management provides a clinical challenge to all disciplines involved in patient care but is quintessential in addressing these intentions.
Wound infection has been linked with affecting patients psychologically, precipitating anxiety and depression, often bought on by coping with the physical symptoms of the condition and subsequent deterioration of wounds. This is further augmented by media publicity on infection risks from inadequate hospital hygiene processes and MRSA (methicillin-resistant Staphylococcus aureus). Patients may refuse hospital referrals and specialist advice because of their fear over developing resistant or hospital-acquired infections with detrimental consequences.

2. DEFINITIONS

The following should be considered in relation to the assessment and documentation of wounds

Contamination	Presence of bacteria within a wound without multiplication or host reaction; wound healing is not delayed.
Colonisation	Multiplication of bacteria within a wound that does not cause damage to the host or initiate infection.
Critical colonisation	Multiplication of bacteria within a wound causing delayed healing, no obvious host reaction. May be associated with increased pain.
Infection	Microbial growth, multiplication and invasion into host tissue leads to cellular injury and overt host immunological reactions. Wound healing is interrupted.
Healing by Primary Intention	Occurs when a wound has been sutured after an operation and heals to leave a minimal, cosmetically acceptable scar. (Taken from NICE Guideline 74)
Healing by Secondary Intention	Occurs when a wound is deliberately left open at the end of an operation because of excessive bacterial contamination, particularly by anaerobes or when there is a risk of devitalised tissue, which leads to infection and delayed healing. It may be sutured within a few days (delayed primary closure), or much later when the wound is clean and granulating (secondary closure), or left to complete healing naturally without the intervention of suturing. (Taken from NICE Guideline 74)
Antimicrobial	Any agent that kills or prevents the multiplication of microorganisms, e.g. bacteria or fungi. Antimicrobials may be antibiotics, antiseptics or disinfectants agents that act selectively against bacteria and may be administered systemically or sometimes topically (although topical antibiotics are not recommended for wounds).
Antibiotics	They usually have one specific target of disruptive activity in bacterial cells and act against a narrower range of bacteria than antiseptics. Development of resistance to antibiotics is an increasing problem

Antiseptics	Chemical agents that can be applied topically to skin or wounds. They are relatively non-selective agents that inhibit multiplication of, or kill, microorganisms. They may also have toxic effects on tissue cells, which has led to controversy and reduced their widespread use. Development of resistance to antiseptics is unknown in wound care. Antiseptics are often referred to as 'topical antimicrobials' even though the term also applies to topical antibiotics
Disinfectants	Relatively non-selective agents often with multiple sites of action that kill a wide range of microorganisms including bacteria and fungi. Disinfectants are generally not suitable for use on body tissues because they are toxic to human cells
Bacteriostatic	Prevents bacteria from growing or reproducing
Bacteriocidal	Kills bacteria
Antimicrobial tolerance	Bacteria in a biofilm may take on a dormant state in which their slower metabolism makes them less susceptible to the effects of antimicrobials
Antibiotic resistance	The ability of bacteria to avoid harmful effects of antibiotic agents by undergoing genetic changes
Interactive dressing	Modern (post-1980) dressing materials. Designed to promote the wound healing process through the creation and maintenance of a local, warm, moist environment underneath the chosen dressing, when left in place for a period indicated through a continuous assessment process.

3. DETAILS OF GUIDELINE

3.1 Risk Factors

The DoH (2011) document “Saving Lives” High Impact Intervention Chronic Wound Bundle identifies the risk of infection in chronic wound is increased by

- Reduced perfusion of blood to tissues.
- Raised blood glucose levels
- The severity of the lesion
- Reduced immune status, stress, alcohol, smoking, drug abuse, lack of sleep.
- A patient’s age; the very young and older people are at particular risk
- A patient’s nutritional status; emaciation or obesity place people at risk.
- Medication; immunosuppressive agents, steroids and non-steroid anti-inflammatory agents
- Contamination either at the point of injury (e.g. by soil, gravel) or at a later stage (e.g. by faeces).
- Poor wound management (e.g. inadequate wound debridement).
- Failure to exclude osteomyelitis.

The risk of infection in patients with diabetic foot ulcers is further increased by:

- Presence of diabetic neuropathy and any structural deformity such as Charcot joints.
- Failure to off load pressure.

4. Surgical Site Infection (SSI's)

Surgical site infection is a type of healthcare-associated infection in which the surgical incision site becomes contaminated and this subsequently leads to infection. NICE (2008) report surgical site infections have been shown to compose up to 20% of all of healthcare-associated infections. At least 5% of patients undergoing a surgical procedure develop a surgical site infection. A national prevalence study of infections in hospitals in 2006 showed that SSI made up 14.5% of the total number of infections (Smyth 2006) but they are considered to be largely preventable. The most significant risk factor for SSIs is the level of bacterial burden. Modern surgical techniques and the use of prophylactic antibiotics have reduced this risk.

Signs and symptoms

ACUTE WOUNDS e.g. surgical or traumatic wounds, burns
Localised:

- Classical signs and symptoms:
  - new or increasing pain
  - erythema
  - local warmth
  - swelling
  - purulent discharge
- Pyrexia
- Delayed or stalled healing
- Abscess
- Malodour

Systemic: As for localised infection, plus:

- Further extension of erythema
- Lymphangitis
- Crepitus in soft tissues
- Wound breakdown/dehiscence

NICE (2008) indicate that surgical site infections can have a significant impact on quality of life for the patient, being linked with considerable morbidity and extended length of hospital stay. Surgical site infections impose a considerable financial impact on healthcare providers. Advances in surgery and anaesthesia have resulted in patients who are at greater risk of surgical site infections being considered for surgery. In addition, increased numbers of infections are now being seen in primary care because patients are allowed home earlier following day case and fast-track surgery.
Surgical wounds are classified as: clean, clean-contaminated, contaminated or dirty. The risk of infection increases from one category to the next (Cruse & Foord, 1980, HAIS 2006).

Classification	Criteria
Clean	Elective, non-traumatic, closed by primary intention, no acute inflammation, no break in technique; no invasion of respiratory, gastrointestinal, biliary or genitourinary tract.
Clean-contaminated	Urgent or emergency case that is clean; elective opening of respiratory, gastrointestinal, biliary or genitourinary tract with minimal spillage (e.g. appendectomy) not encountering infected urine or bile; minor technique break.
Contaminated	Non-purulent inflammation; gross spillage from gastrointestinal tract; entry into biliary or genitourinary tract in the presence of infected bile or urine; major break in technique; penetrating trauma <4 hours old; chronic open wounds to be grafted or covered.
Dirty	Purulent inflammation (e.g. abscess); preoperative perforation of respiratory, gastrointestinal, biliary or genitourinary tract; penetrating trauma > 4 hours old.

Only those wound infections that occur within 30 days of surgery are classified as SSIs and are categorised into one of three groups: **superficial, deep incisional and organ/space SSI's** (Health Protection Agency 2007)

● **Superficial**
Involves only skin or subcutaneous tissue around the incision and with at least one of the following:
- purulent drainage from the superficial incision
- organisms isolated from an aseptically obtained wound swab, fluid or tissue from the superficial incision
- at least one of the following signs or symptoms: pain, localised swelling, redness or heat – and the incision is opened by a surgeon (unless the culture is negative).
- diagnosis of a superficial incisional SSI by a surgeon or physician

● **Deep**
Involves deep soft tissues such as the fascia or muscles and with at least one of the following:
- purulent drainage from the incision but not from the organ/space of the surgical site
- spontaneous dehiscence of a deep incision or deliberate opening by a surgeon when patient has at least one of the following: temperature >38 degrees, localised pain – unless the culture is negative
- an abscess or other evidence of infection involving the incision following direct, histopathologic or radiological examination
- diagnosis of a deep incisional SSI by a surgeon or physician

● **Organ/space**
Involves organ/spaces such as joints, arteries, veins, breasts and intra-abdominal cavities. The criteria for defining these SSIs will depend upon the organ or space involved

5. Prevention of SSI's

The Department of Health document "Saving Lives: reducing infection, delivering clean and safe care" (2007) includes a high impact intervention or "care bundle" focusing on preventing SSI's. The High Impact Interventions (HII) are simple evidence based tools which reinforce the practical actions that clinical staff need to undertake to significantly reduce health care acquired infection (HCAI). This HII or care bundle is based on Evidence Based Practice in Infection Control EPIC guidelines (2006; http://www.epic.tvu.ac.uk/), expert advice and other national infection prevention and control guidance. The elements of care are divided into 3 sets of actions. The risk of infection reduces when all elements within the clinical process are performed every time and for every patient. The risk of infection increases when one or more elements of a procedure are excluded or not performed.

Preoperative phase
● Screening and decolonisation
  ○ Patient has been screened for MRSA using local guidelines. If found positive they have been decolonized according to the recommended protocol prior to surgery.
● Preoperative showering
  ○ Patient has showered (or bathed/washed if unable to shower) preoperatively using soap
● Hair removal
  ○ If hair removal is required, it is removed using clippers with a disposable head (not by shaving) and timed as close to the operating procedure as possible.

Intra operative phase
● Skin preparation
  ○ Patient's skin has been prepared with 2% chlorhexidine gluconate in 70%

isopropyl alcohol solution and allowed to air dry. (*If the patient has a sensitivity, povidone-iodine application is used).*

- Prophylactic antibiotics
  - Appropriate antibiotics were administered within 60 minutes prior to incision and only repeated if there is excessive blood loss, a prolonged operation or during prosthetic surgery.
- Normothermia
  - Body temperature is maintained above 36°C in the peri-operative period
- Incise drapes
  - If incise drapes are used they are impregnated with an antiseptic
- Supplemented oxygen
  - Patients' haemoglobin saturation is maintained above 95% (or as high as possible if there is underlying respiratory insufficiency) in the intra and post-operative stages (recovery room)
- Glucose control
  - A glucose level of <11mmol/l has been maintained in diabetic patients (This tight blood glucose control is not yet considered relevant in non-diabetic patients)

Post-operative phase

- Surgical dressing
  - The wound is covered with an interactive dressing at the end of surgery and while the wound is healing.
  - Interactive wound dressing is kept undisturbed for a minimum of 48 hours after surgery unless there is leakage form the dressing and need for a change.
  - The principles of asepsis (non-touch technique) are used when the wound is being redressed.
- Hand Hygiene
  - Hands are decontaminated immediately before and after each episode of patient contact using the correct hand hygiene technique. *(Use of the WHO '5 moments of hand hygiene or NPSA 'Clean your hands campaign is recommended).*

Patients and carers must be provided with clear, consistent information and advice throughout all stages of their care. This should include the risks of surgical site infections, what is being done to reduce them and how they are managed.

The Trust uses this care bundle to monitor and audit practice on a monthly basis and ensure standards of care are maintained

6. Chronic Wounds

All chronic wounds will be colonised with micro-organisms but this does not generally delay healing. However, if the quantity of these organisms overwhelms the local defences, healing will be halted and the wound can be termed infected. Therefore correct identification of the signs of infection is of key importance in wound management. The management of chronic wounds in both primary and secondary care settings, especially those identified as being infected or critically colonised, presents an ever-increasing challenge and potential financial burden to the NHS. In 2009, analysis of a twelve month period of methicillin resistant *Staphylococcus aureus* (MRSA) bacteraemia cases was completed. Where the source of the bacteraemia was identified, over 18% were due to skin and soft tissue infections. Of these 28% had diabetes identified as a risk factor. Chronic wounds have been identified as the sources of infection in as many as 40% of MRSA bacteraemia cases within the West Midlands and are likely to be implicated in many other causes of blood stream infection resulting in potentially avoidable harm to patients (West Midlands RCA data; 2009). Wound infection can contribute to septicaemia as bacteria migrate from the wound into the circulatory system.

This results in:

- acute care admission

- complicated antibiotic treatment regimes
- risk of mortality

A chronic wound is defined as any wound which has remained unhealed for longer than 6 weeks (Cutting & Tong 2003) and include:

- Pressure ulcers
- Leg ulcers
- Diabetic foot wounds
- Non-healing surgical wounds/wounds healing by secondary intention
- Traumatic wounds.

The presence of bacteria in the tissue of a chronic wound may act as a major factor in delaying healing by stimulating chronic inflammation. The effects of bacteria in a wound are often described as a continuum which extends from contamination (the presence of bacteria without problems), to colonisation (the presence of multiplying bacteria), to
infection with tissue invasion. Infection may be localised to the wound, spread into nearby tissues, or cause systemic illness such as systemic inflammatory response syndrome (SIRS) or multiple organ dysfunction syndrome (MODS).

Signs and symptoms
Localised:
- New, increased or altered pain
- Delayed (or stalled) healing
- Periwound oedema
- Bleeding or friable granulation tissue
- Distinctive malodour or change in odour
- Wound bed discolouration
- Increased, altered or purulent exudate
- Induration
- Pocketing or bridging

Systemic: As for localised chronic infection, plus:
- Wound breakdown
- Erythema extending from the wound edge
- Crepitus, warmth, induration or discolouration spreading into periwound area
- Lymphangitis
- Malaise or non-specific deterioration in the patient's general condition

Systemic infection
- Sepsis: documented infection with pyrexia or hypothermia, tachycardia, tachypnoea, raised or depressed white blood cell count
- Severe sepsis: sepsis and multiple organ dysfunction

Biofilms
Biofilms are complex microbial communities, containing bacteria and sometimes also fungi, which are embedded in a protective polysaccharide matrix. The matrix attaches the biofilm to a surface, such as a wound bed, and protects the microorganisms from the host's immune system and from antimicrobial agents such as antiseptics and antibiotics. Biofilms are commonly present in chronic wounds, and are thought to contribute to, and perpetuate, a chronic inflammatory state that prevents healing.
The management of biofilms includes:

- Reduction of biofilm burden through debridement and/or vigorous cleansing to remove the biofilm and the dormant (persister) bacteria
- Prevention of biofilm reformation through the use of topical antimicrobials to kill

planktonic (free-floating) bacteria

7. Prevention and Management

The Department of Health "Saving Lives" High Impact Actions Chronic Wound Bundle (2011) provides instructions on how to reduce the risk and incidence of chronic wound infections and chronic wound-related blood stream infections. The risk of infection reduces when all the key elements of care within the clinical process are performed every time and for every patient. Nursing staff must be trained and competent to carry out these tasks.

8. Wound care actions

- **Hand Hygiene**
  - Hands are decontaminated immediately before and after each patient contact, using correct hand hygiene technique

- **Personal Protective Equipment**
  - Disposable apron and gloves are worn and disposed of following use and between each patient.
  - Eye/face protection is worn if there is a risk of splashing blood or other body fluids.

- **Principles of Asepsis**
  - The principles of asepsis are adhered to for redressing the wound.

- **Wound assessment**
  - The wound is assessed as per local policy at every dressing change. Accurate assessment is a fundamental aspect of any wound management. Recognition of the early signs of critical colonisation or infection can reduce the risk of complications and lead to improved patient outcomes
  - Conduct a comprehensive assessment of the patient, wound and environment before deciding whether an antimicrobial dressing is appropriate

- **Wound swabs**
  - Wound swabs are taken only when signs and symptoms of infection are pre sent or when non-healing persists. They will determine the microbial content of a wound but not differentiate between colonisation and infection. This procedure only collects surface bacteria, therefore may fail to identify the causative organism
  - Refer to the Infection Prevention and Control Policy for the process for under taking this procedure
  - Swabs are taken, if indicated as above, from the base or margin of the ulcer following removal of slough if present.

- **Wound Cleansing**
  - Warmed normal saline (0.9% sodium chloride) must be used for cleansing acute wounds, whereas, mains-drawn tap water is suitable for chronic wounds such as venous leg ulcers except those that can be probed to bone. The aim of wound cleansing is to remove foreign particles from the wound including gravel, soil or dressing debris and to remove loose sloughy or necrotic tissue which may otherwise delay healing and give a false impression of the tissue type in the wound. (See appendix for types of wound cleansers).

- **Dressing**
  - Wound care techniques may include drainage of pus, debridement of necrotic tissue and consideration of the use of topical antimicrobials
  - Choose an antimicrobial dressing on the basis of patient and wound needs, i.e. exudate level, wound depth, need for conformability, odour control, ease of

removal and safety (see types in appendix).
- The major roles for antimicrobial dressings such as silver, iodine, Chitosan and in some instances honey dressings in the management of infected wounds are to:
  - reduce bioburden in acute or chronic wounds that are infected or are being prevented from healing by microorganisms
  - act as an antimicrobial barrier for acute or chronic wounds at high risk of infection or re-infection
  - not to promote wound healing directly

- THE TWO WEEK 'CHALLENGE'
  - It has been recommended that silver dressings should be used for two weeks initially and then the wound, the patient and the management approach should be re-evaluated.

- If after two weeks:
  - There is improvement in the wound, but continuing signs of infection – it may be clinically justifiable to continue the antimicrobial dressing with further regular reviews
  - The wound has improved and the signs and symptoms of wound infection are no longer present – the antimicrobial dressing should be discontinued
  - There is no improvement – the antimicrobial dressing should be discontinued and consideration given to changing the dressing to one that contains a different antimicrobial agent and if the patient is unwell using a systemic antibiotic and re-evaluating possibly untreated comorbidities.

- Once the bioburden is under control and the wound is improving, a non-antimicrobial dressing that creates an optimum wound healing environment should be considered.
- When not to use antimicrobial dressings
  - In the absence of signs of localised (overt or covert), spreading or systemic infection
  - Clean surgical wounds at low risk of infection, e.g. donor sites, closed surgical wounds
  - Chronic wounds healing as expected according to comorbidities and age
  - Small acute wounds at low risk of infection
  - Patients who are sensitive to iodine or silver or any of the dressing components or have an allergy to bee sting or honey
    or if they are allergic to shell fish when using chitosan dressing (kytocel). Dressings containing SSD should not be used in patients with sensitivity to sulfonamide antibiotics or hepatic/renal impairment, or in pregnancy, during lactation or in new-borns
  - Wounds being treated with enzymatic debridement
  - During pregnancy or lactation
  - When contraindicated by the manufacturer, for example, some manufacturers recommend that their silver dressings are not used during magnetic resonance imaging (MRI), or on/near body sites undergoing radiotherapy

- Follow manufacturer's instructions regarding indications, contraindications, method of application, wound cleansing procedures, need for dressing moistening before application, and use in patients undergoing MRI or radiotherapy
- Use silver dressings with caution in children and very large wounds

- **Antibiotics**
  - Use of systemic antibiotics is considered, as per local formulary, for non-healing or progressive ulcers with clinical signs of localised and/or systemic infection
  - Antibiotics should not be considered for routine topical application
  - If antibiotics are to be considered their use must be discussed with a

consultant microbiologist first.

- **Documentation**
  - Dressing type and frequency, wound assessment and next wound review date are documented
  - Document the rationale for using an antimicrobial dressing in the patient's healthcare records

- **Sensitivities/Allergies**
  - Antimicrobial products can precipitate sensitivity reactions in some patients, for example patients with leg ulcers. The prescriber must ask the patient if they have any known allergies / sensitivities to any antimicrobial products before use. If the patient has a known sensitivity to an antimicrobial product then it must not be applied. The patient must be monitored for any allergies if an antimicrobial product is used and this will be discontinued if such sensitivity is exhibited. Any sensitivities / allergies to antimicrobial products must be recorded in the patients' notes.

- **Prophylaxis**
  - Antimicrobial dressings such as silver dressings may be used as a barrier to microorganisms in wounds at high risk of infection or re-infection. Examples of such wounds may include burns, surgical wounds, pressure ulcers near the anus, wounds with exposed bone, or wounds in patients who are immunocompromised, have poor circulation, unstable diabetes or neoplastic disease. There may also be a role for antimicrobial dressings in preventing entry of bacteria to medical device entry/exit sites such as tracheostomy sites, externally placed orthopaedic pins, post-surgical drains, chest drains, nephrostomy sites, central venous lines, dialysis catheters, and epidural catheters. When a silver/iodine dressing is used for prophylaxis, the rationale should be fully documented in the patient's health records and use of the dressing reviewed regularly, e.g. every two weeks

Patient Management

- **Patient education**
  - Education and information is provided to the patient as appropriate
  - The patient is involved with decision making

- **Glucose control**
  - Optimal glucose levels are maintained in patients with diabetes.

- **Referral to other health care specialists**
  - Early referral is made in the case of static or deteriorating wounds (referral may include tissue viability specialist, surgeon, dermatologist and other specialists as required).
  - Deep seated infections are referred for imaging and biopsy.
  - Urgent referral of patients with diabetes to a Multidisciplinary Foot Care team

- **Nutritional assessment**
  - Nutritional support is given to patients with an identified deficiency
  - Dietary advice is provided to any patient with dietary needs.

- **Communication of infection status**
  - Clear communication of patients known to be infected or colonised with pathogenic organisms, including MRSA, is given to all relevant healthcare providers involved with the patient's care

- **Pressure Ulcers**

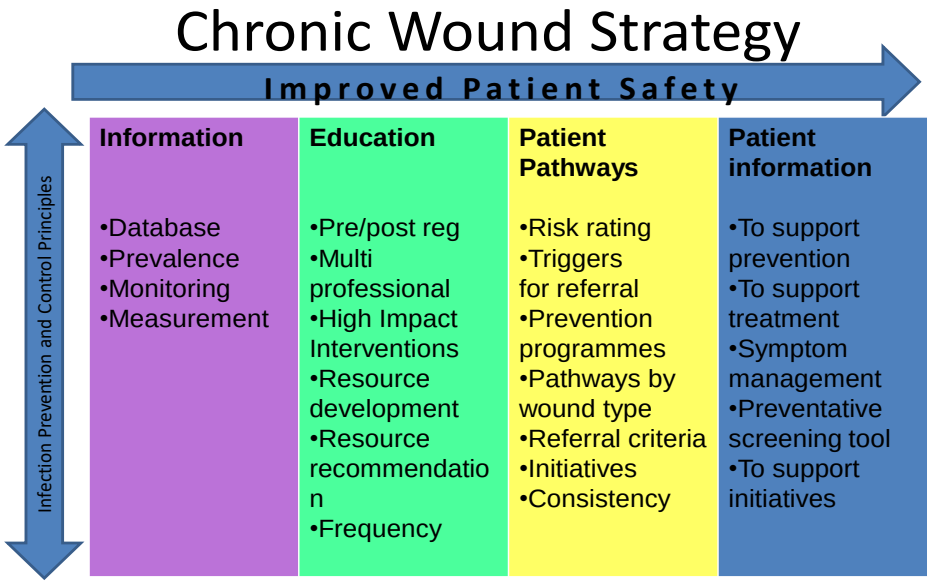
- Patients with pressure ulcers are placed on appropriate pressure relieving/ reducing mattresses/cushions

- **Diabetic Foot Ulcers**
  - The pressure is offloaded in patients with diabetic foot ulcers, including providing appropriate footwear and insoles

The Trust will work towards fully implementing the care bundle in order to audit and monitor practice, but healthcare staff must follow advice denoted above for chronic wounds.

In addition, the Trust will aim to implement the NHS West Midlands Chronic Wound Tool Kit, which focuses on prevention, early intervention, referral and specialist treatment pathways in order to:

- Assisting the delivery of MRSA objective
- Prevent admissions associated with chronic wounds
- Reduce costs of dressings and associated technologies
- Increase patient satisfaction
- Improve quality of services
- Prevent unnecessary associated morbidity and mortality
- Deliver one of the Chief Nursing Officer's high impact interventions (no avoidable pressure ulcers in NHS provided care)



Chronic Wound Tool Kit Actions

- Education on chronic wounds and wound infection is included in Tissue Viability and Infection Prevention Link Nurse training

- A chronic wound and wound infection management pathway is included in the appendix

- The Trust has patient information leaflets on pressure ulcer prevention and surgical site infection readily available

9. Monitoring Tool

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
4	Monitor Surgical site infections in hip and knee surgery	Audits of all patients having hip and knee surgery	Ongoing	IP identified key clinicians	Directors of nursing, orthopaedic consultants	Quarterly
7	Ag dressings are used for 2/52 and reviewed –written as so on the drugs chart	Pharmacy to spot check. TVN's to spot check	Ongoing	Pharmacy and TV	Link nurse to be advised	Ongoing

10. TRAINING

Training on the guideline will be encompassed in existing training on wound management, including formulary updates, link nurse study days and tissue viability conferences. The Tissue Viability service will provide additional training to those areas requiring further support or have poor compliance with the guideline.

11. CONCLUSION

The development of a wound infection depends on the complex interplay of many factors. The importance of wound infections, in both economic and human terms, cannot not be underestimated. Therefore, prevention of wound infection is the role of all healthcare professionals. This includes the need to be competent in the prevention of wound infection, but also being able to recognise the signs of and subsequently manage infected wounds.

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The guidelines are based on the University Hospital Birmingham guidelines for prevention, detection, treatment and management of infected wounds (2008) and Saving Lives High Impact Interventions (2007)

13. CONTRIBUTION LIST

This key document has been circulated to the following individuals for consultation;

Name	Designation
Lindsey Webb	Chief of Nursing
David Shakespeare	Associate Chief of Nursing for Infection Prevention and Control
Lisa Miruszenko	Deputy Director of Nursing
Ann Carey	Divisional Director of Nursing
Sarah King	Divisional Director of Nursing
Carole Brooks	Divisional Director of Nursing
Patti Paine	Divisional Director of Nursing
Susan Aston	Clinical Governance Lead
Denise Curson	Clinical Governance Lead
Brenda Smith	Clinical Governance Lead
Christine Mitchell	Clinical Governance Lead
Isla Brown	Clinical Governance Lead
Surjit Bhogal	Business Intelligence Consultant
Jennifer Garside	End of Life Facilitator
Justin King	Clinical Governance
Suzanne Hardy	Safeguarding Adults Lead Nurse

This key document has been circulated to the chair(s) of the following committee's/groups for comments;

Committee/Group
SKIN Matters
Clinical Policies Group

APPENDIX 1

WOUND CLEANSING AGENTS

Potassium Permanganate

Potassium permanganate is an antiseptic, oxidising agent that has an astringent action. It is prescribed in tablet form and this is diluted to a solution of 1:1000, i.e. 1 tablet is diluted in 4 litres of warm tap water. The affected limb is then soaked in the solution for 10 minutes. To avoid irritation to the skin the limb should be rinsed in clean water following the procedure. The course of treatment is generally 4-5 days but persistent problems may require 7 days treatment.

Indications for use

- Cleansing and deodorising suppurating eczematous reactions and wounds (BNF 2008)
- Wet weeping eczema or infected eczema (Grey et al BMJ 332, 2006)
- Fungal infections (New Zealand Dermatology Society 2006)

Precautions

- Gloves are required to protect the healthcare professional's skin from the solution.
- It can be an irritant to the skin so the skin should be rinsed following use or accidental splashes.
- It will stain soft furnishings so these areas should be protected.
- It has the potential to ignite combustible material.
- It is not considered to be an environmentally friendly product.

Chlorhexidine

Chlorhexidine gluconate 4%

Skin disinfection

- It is sometimes requested by the vascular team to treat infected wounds that have not responded to conventional treatments.

Recommended use

- Dilute 2 capfuls in a bucket of warm tap water. Soak the limb for 10 minutes. Rinse the limb following treatment.

Cautions

- Avoid contact with eyes.
- Not for use in body cavities

Disposal: Domestic drain

Chlorhexidine Gluconate 4% "Hibiscrub" can be used for the following:

- Pre-operative surgical hand disinfection
- Post-operative skin antisepsis for the patient

The Trust policy and manufactures guidance detailing how these products are used must be followed Methicillin Resistant *Staphylococcus aureus* skin carriage eradication: Within areas where Octenisan is not available or there is a known allergy to it Hibiscrub can be used as a body wash, washing daily as per Trust policy / manufactures instructions for five days with at least one hair wash undertaken.

'Hibiscrub' preparations are contraindicated for patients who have previously shown a hypersensitivity reaction to chlorhexidine. However, such reactions are extremely rare. This product is for external use only and should be kept out of the eyes, contact with the brain, meninges and middle ear to be avoided. In patients with head or spinal injuries or perforated ear drum, the benefit of use in pre-operative preparations should be evaluated against the risk of contact. If chlorhexidine solutions come into contact with the eyes, wash out promptly and thoroughly with water.

Chlorhexidine Gluconate Solution 20% w/v BP 0.05% w/v. Sterile aqueous solution (Unisept)

This Chlorhexidine gluconate based product is a potent antibacterial agent for general antiseptic purposes. It is bactericidal to a broad spectrum of organisms, and is recommended for use in obstetrics and for pre op cleansing where an alcohol based solution is not appropriate.

It should be used without further dilution for topical administration only.

Unisept should not come into contact with the brain, eyes, meninges or middle ear and is also contraindicated in patients who have shown hypersensitivity to chlorhexidine.

For external use only. Not for injection. When Sterets Unisept is used in aseptic procedures, the outside of the sachet should be disinfected before opening. Discard any surplus immediately after use. Contact with eyes should be avoided. Do not use within body cavities.

Chlorhexidine Gluconate Solution 20% equivalent to Chlorhexidine Gluconate 0.015% w/v ; Cetrimide 0.15% w/v. (Tisept Sachets) Cutaneous solution

A broad spectrum antiseptic with detergent properties for swabbing pre operatively when chlorhexidine is not appropriate e.g. some gynaecology and urology procedures. Use without further dilution, for topical administration only.

Tisept should not come into contact with the brain, eyes, meninges or middle ear and is contraindicated for persons who have previously shown a hypersensitivity to chlorhexidine. It is for external use only, do not use within body cavities. It must be

noted that when used in aseptic procedures, the outside of the sachet should be disinfected before opening. Discard any surplus immediately after use.

Povidone Iodine 10% Aqueous or Alcoholic Povidone Iodine

For use as an antiseptic cleanser for pre-operative scrubbing and washing by surgeons and theatre staff, and pre-operative preparation of patients' skin.
For topical administration only. For adults, the elderly and children, apply full strength as a pre-operative antiseptic skin cleanser. For pre-operative skin prep the area must be dry prior to the incision being made.
It must be noted that Povidone iodine is not recommended for regular use in neonates and is contraindicated in very low birth weight infants (below 1500 grams). It should not be used in those with a known or suspected iodine hypersensitivity. Regular use is also contraindicated in patients and users with thyroid disorders (in particular nodular colloid goitre, endemic goitre and Hashimoto's thyroiditis).
Absorption of iodine from povidone iodine through either intact or damaged skin may interfere with thyroid function tests. Contamination with povidone iodine of several types of tests for the detection of occult blood in faeces or blood in urine may produce false-positive results. Special caution is needed when regular applications to broken skin are made to patients with pre-existing renal insufficiency. Regular use should be avoided in patients on concurrent lithium therapy.
Regular use of povidone iodine should be avoided in pregnant or lactating women as absorbed iodine can cross the placental barrier and can be secreted into breast milk. Although no adverse effects have been reported from limited use, caution should be recommended and therapeutic benefit must be balanced against possible effects of the absorption on foetal thyroid function and development.

Octenisan

Methicillin Resistant *Staphylococcus aureus* skin carriage eradication*:*

Octenisan is an antimicrobial hair and body wash designed to be effective against a broad range of micro-organisms and forms part of the programme for eradication of Meticillin Resistant *Staphylococcus aureus* carriage within hospital settings whilst caring for skin.
It can be used for antimicrobial washing of patients prior to surgery and to eliminate MRSA carriage. It may also be used as part of regular cleansing in intensive care and isolation units, to support infection prophylaxis and reduce recurrences and secondary infections
For washing, apply product undiluted to a damp washcloth, rub onto the areas of the body to be cleansed (contact time 3 minutes) and wash off.
For showering or hair washing, simply use antimicrobial wash lotion in the same way as other hair and skin washing preparations. Always observe the recommended contact time of 3 minutes.

APPENDIX 2

ANTIMICROBIAL DRESSINGS

Dressings with topical antimicrobials are indicated for the treatment of infected wounds, critically colonized wounds or in specific cases for the prevention of infection. They should not be used routinely on wounds healing normally. These products must be prescribed / indicated for use by a specialist practitioner. Antimicrobial dressings aim to reduce the number of micro-organisms at the wound bed to allow normal healing to re-sume. Effectiveness is dependent on their remaining active throughout the life of the dressing therefore slow-release presentations have been developed.

Dressings containing non-sensitising antibacterial agents (as included on the Worcestershire Wound Management Formulary) will be considered for topical treatment. These must be discontinued once signs of infection resolve. The European Wound Management Association (2006) stipulates:

"As with all wounds it is important to frequently reassess the wound bed and surrounding tissues, monitoring for signs of spreading or systemic infection".
If the wound improves and signs of infection resolve, therapy will be discontinued and wound managed in accordance with the Trust Wound Management Formulary. See flow chart in Appendix 1 for use

Antiseptic dressings

These are generally used for up to 2 – 4 weeks. If signs of infection persist after this time and the antiseptic dressing product is continued, then the rationale for this decision must be documented in the patients' notes, including dates for re-evaluation of use. The single exception to this may be the use of dressings such as iodine based preparations used within palliative care patients, when managing symptoms are a key priority.

Frequency for re-dressing must be daily for acute wound infection, but is otherwise dependant on the level of exudate, overall condition of the patient and wound and the manufacturer's recommendations for that product.

Iodine

Indications: Iodine has a broad-spectrum microbial activity and is available in dressing form as iodine impregnated viscose tulle or as slow-release cadexomer iodine. (Cadexomer is a modified starch hydrogel). Iodine impregnated dressings may be sufficient for infection in low exuding, superficial wounds. The slow release form of iodine (cadexomer iodine) showed no evidence of toxicity and an improvement in wound healing (Zhou et al, 2002).
Precautions: Avoid in patients with a known sensitivity to iodine or with thyroid disease. Refer to the information leaflet for product-specific cautions. Application: Refer to the latest BNF (www.bnf.org) and the individual information leaflet for product-specific advice.

N.B. Betadine soaked gauze is not recommended by the Tissue Viability Service as it quickly becomes deactivated in the presence of pus, a moist wound environment is not maintained as the gauze dries out quickly and the dressing may cause trauma on

removal. Also needs frequent reapplication, which requires large amounts of nursing time. Iodine based preparations must never be used in addition to chlorhexidine based preparations

Silver

Indications: Silver has antibacterial properties and has been incorporated into a number of dressings, which either have slow release properties for sustained antimicrobial effect or are bacteriostatic and sequester bacteria into the dressing

Forms of silver:

- elemental silver – e.g. silver metal, nanocrystalline silver
- an inorganic compound – e.g. silver oxide, silver phosphate, silver chloride, silver sulphate, silver-calcium-sodium phosphate, silver zirconium compound, SSD
- an organic complex – e.g. silver-zinc allantoinate, silver alginate, silver Carboxymethylcellulose (ionic)

The silver component of dressings may appear:

- as a coating – on one or both external surfaces of the dressing (elemental or nanocrystalline silver)
- within the structure of the dressing – either as a coating on dressing materials (elemental or compound silver), within the spaces of the dressing materials (elemental or compound silver), or as a compound that forms part of the dressing structure (eg silver alginate)
- as a combination of these.

In metallic (elemental) form, silver is unreactive and cannot kill bacteria. To become bactericidal, silver atoms (denoted as Ag or Ag^0) must lose an electron and become positively charged silver ions (Ag+). Elemental silver ionises in air, but ionises more readily when exposed to an aqueous environment such as wound exudate. Silver ions are highly reactive and affect multiple sites within bacterial cells, ultimately causing bacterial cell death. They bind to bacterial cell membranes, causing disruption of the bacterial cell wall and cell leakage. Silver ions transported into the cell disrupt cell function by binding to proteins and interfering with energy production, enzyme function and cell replication. Silver ions are active against a broad range of bacteria, fungi and viruses, including many antibiotic-resistant bacteria, such as meticillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant Enterococci (VRE)
Precautions: Long term use of some silver products causes staining. Refer to the information leaflet for product-specific cautions and the latest BNF (www.bnf.org). Silver dressings are unlikely to cause true argyria because only low levels of silver are presented for systemic absorption. True argyria is the result of deposition of silver compounds in the skin and internal organs and presents as generalised blue-grey skin discolouration, particularly in light exposed areas.

Silver has multiple actions against microbial cells. This reduces the chance that resistance to silver will develop. In contrast, antibiotics generally have a single target site and hence bacterial cells may more easily develop resistance. Clinically, there may be alternative explanations for apparent silver resistance. For example, infected wounds that appear not to respond to an antimicrobial dressing may have a deeper unrecognised infection, may contain biofilm that facilitates antimicrobial tolerance, or may have an inadequately managed underlying comorbidity. An apparent lack of response to silver does not relate to resistance, rather to inappropriate treatment of the underlying infection and/or wound aetiology. There has been concern that the use of silver dressings may lead to the emergence of bacteria that are resistant to antibiotics. The major cause of antibiotic resistance remains misuse or overuse of antibiotics themselves

Application: Refer to the information leaflet for product-specific advice.

Proflavine

Indications: Available as a lotion or cream. Mildly bacteriostatic against gram-positive bacteria but less effective against gram-negative organisms.

Precautions: In aqueous cream form proflavine is not released from the cream into the wound so is ineffective against bacteria. Proflavine packs can cause significant pain on removal. Refer to the information leaflet for product-specific cautions. Application: Refer to the information leaflet for product-specific advice and the latest BNF (www.bnf.org).
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Honey

Honey is recognised as having the following therapeutic properties

- Antimicrobial
- Deodorising
- Debriding
- Anti-inflammatory
- Stimulation of new tissue growth
- Pain management
- Reduction in scarring

The antimicrobial action of honey is effective against the common wound-infecting organisms *Pseudomonas aeruginosa, Staphylococcus aureus, Candida albicans* and *Escherichia coli*. Significantly, honey can be effective against antibiotic-resistant strains of bacteria (Cooper and Molan, 1999, Cooper et al, 1999; Dunford et al, 2000; Thorne, 2005, Cooper 2008). It is also available in a variety of forms but as a wound dressing should be sterile

Precautions: Do not use if patient is allergic to bee venom. Monitor the blood sugar of patients with diabetes. Some products may need frequent dressing change to avoid maceration. Discontinue if the patient experiences unabated pain. Refer to the information leaflets for product-specific cautions and contra-indications

Application: Refer to the information leaflets for product-specific advice and www.bnf.org

Topical Antibiotics

The Infection Control Policy will be followed regarding systemic management of infection. The use of topical antibiotics is a prescription only medicine and is not recommended for the treatment of chronic wounds.

In general, antibiotics applied directly to the wound bed are an inconsistent way to treat infection, associated with poor uptake of active dose and being too specific in the type of pathogen killed. Both of these factors can lead to resistant strains of micro-organisms. Some topical presentations containing antibiotics are also associated with causing allergic reactions. Therefore, topical antibiotics do not hold any place in routine wound management as the risks of toxicity, sensitisation and bacterial resistance far outweigh any potential benefits to the wound. In some instances they may still be recommended for use following discussion with a consultant microbiologist

Metronidazole gel

Indications: Metronidazole e.g. Metrotop/Anabact, is effective against anaerobic bacteria and protozoa. It may be useful in the management of malodorous fungating carcinomas, where the malodour is a result of anaerobic infection. In specific cases it may be useful in conjunction with other interventions to treat chronic wound infection where there are multiple pathogens present including anaerobes.

Precautions: Sensitivity to Metronidazole can develop and is contraindicated when pregnant or breast-feeding. Over use will allow resistance to develop. Refer to the information leaflet for product-specific cautions.

Application: Apply thickly to the wound, can be mixed with a hydrogel if a wound is sloughy. Requires a secondary dressing. Usually reapplied daily, refer to the latest British National Formulary for reference (www.bnf.org). Refer to the information leaflet for product-specific advice.

Mupirocin

Indications: Mupirocin is effective against most organisms responsible for skin infections e.g. *Staph aureus,* including MRSA, other staphylococci and streptococci and gram-negative organisms. It is available as an ointment for primary bacterial skin infections and as a cream for secondary infected traumatic lesions.

Precautions: May cause stinging, burning or itching on application. Resistance to *Staph aureus* has been reported and sensitivities should be considered. It is advised that this is only used for MRSA as opposed to fully sensitive *Staphylococcus aureus*. To avoid resistance, mupirocin should not be used for longer than 10 days and its use in hospital should be avoided. Refer to the information leaflet for product-specific cautions.

Application: Refer to the information leaflet for product-specific advice.

Refer to the Wound Management Guideline for further advice on the selection of dressings

APPENDIX 3

SURGICAL WOUND DRESSINGS

This flow chart provides guidance on the type of dressings used for

different kinds of surgical wound

Patient Characteristics	Dressing
Normal/healthy skin, young, minor surgery	Island dressing with vapour permeable film backing e.g. Tegaderm+Pad
Patient has undergone major surgery such as TKR, THR, major breast surgery, laparotomy, fem-pop bypass, caesarean section, cardiovascular surgery	Island dressing with vapour permeable film backing e.g. Tegaderm+Pad
Patient is over 70 years, has fragile skin, diabetes, obesity, rheumatoid arthritis, history of previous wound dehiscence/wound complications, history of having MRSA, breast reconstruction	Aquacel with Tegaderm+Pad
Patient has raised BMI with abdominal surgical wound e.g. C.Section	Aquacel with Tegaderm+Pad with strips of Tegaderm applied intermittently across the dressing in the opposite direction to splint the wound
Patient has a small cavity wound / sinus	Aquacel ribbon
Patient has a moderate-sized cavity wound	Sorbsan / Aquacel
Patient has a large-sized cavity wound	Aquacel / consider VAC
Patient has an infected cavity wound	Aquacel AG
Patient has a fistula, profusely exuding wound	Wound Manager Bag

APPENDIX 4 PATIENT INFORMATION LEAFLET

PATIENT SERVICES DEPARTMENT

It is important that you speak to the department you have been referred to (see the contacts section) if you have any questions (for example, about medication) before your investigation or procedure.

If you are unhappy about the service you have received and would like to talk about it or make a formal complaint, please contact Patient Advice and Liaison Service on 0300 123 1732

If you have a complaint and you want it to be investigated, you should write direct to the Chief Executive at Worcestershire Acute Hospitals NHS Trust, Kidderminster Hospsital, Bewdley Road, Kidderminster DY11 6RJ, or contact the Patient Services Department for advice.

Please contact the Patient Services on 0300 123 1733 if you would like this leaflet is another language or format (such as Braille or easy read).

Bengali

"আপনি যদি এই লিফলেটটি বিকল্প কোনো ভাষায় বা ফরমেটে (যেমন ব্রেইল বা সহজ পাঠ) চান, তাহলে এই নম্বরে 0300 123 1733 পাশেন্ট সার্ভিসের সাথে যোগাযোগ করুন।"

Urdu

"اگر آپ کو یہ دستی اشتہار کسی متبادل زبان یا ساخت میں چاہیے (جیسے کہ بریل / ایزی ریڈ) تو پیشنٹ سروسز سے 0300 123 1733 پر رابطہ کریں۔"

Portuguese

"Por favor, contacte os Serviços de Apoio ao Paciente através do número 0300 123 1733 caso precise deste folheto numa língua alternativa ou formato (como Braille / fácil de ler)."

Polish

"Jeżeli pragniecie Państwo otrzymać tę broszurę w innym języku lub formacie (Braille / duży druk) proszę skontaktować się z Obsługą Pacjentów pod numerem 0300 123 1733

Chinese

"如果您需要此份傳單的其他語言選擇或其他版本

(如盲人點字版/易讀版容易的閱讀),請致電 0300 123 1733 與病患服務處聯繫。"

WR2218 - Version 1 - Issued: August 2010

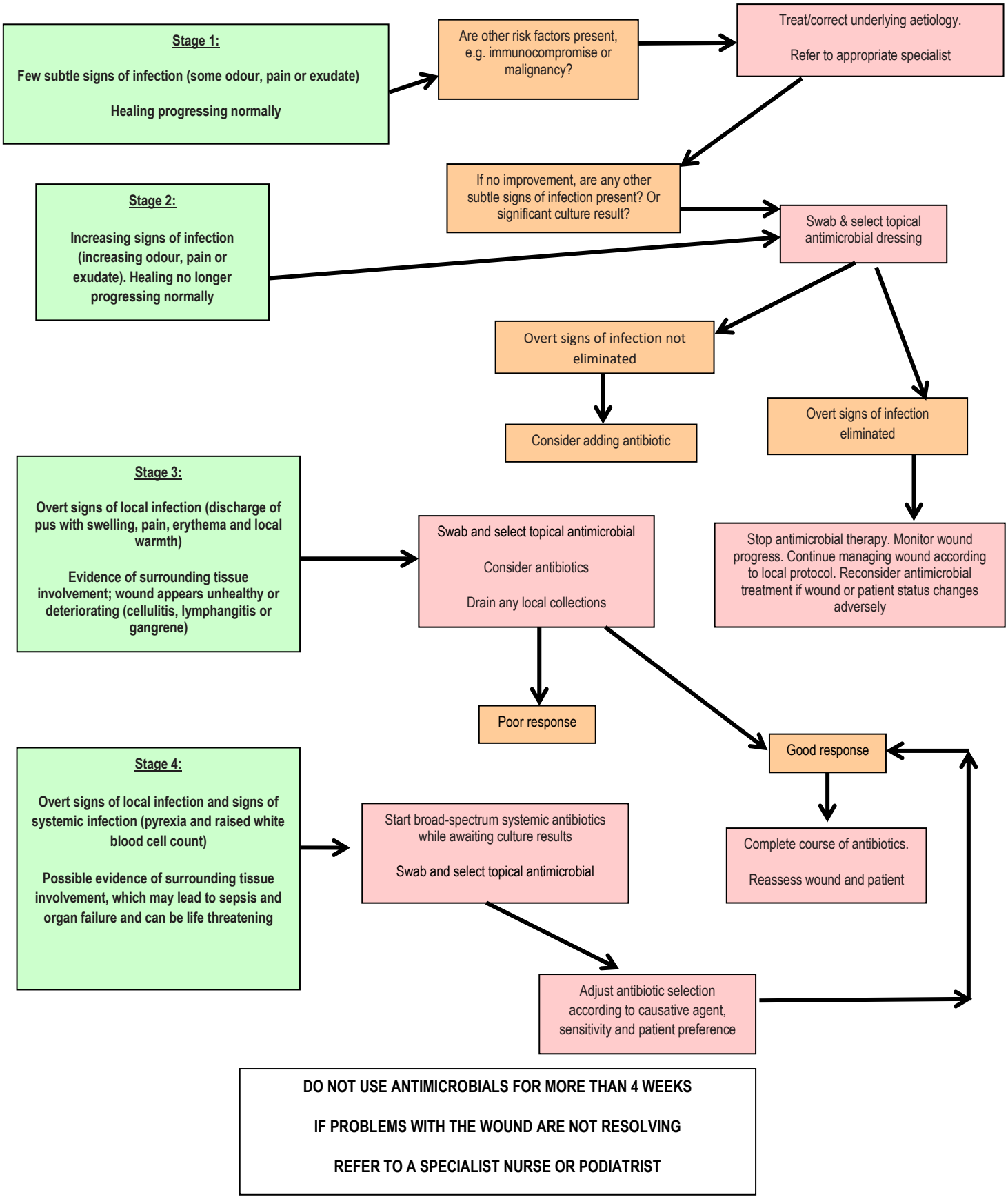
Worcestershire NHS
Acute Hospitals NHS Trust

PATIENT INFORMATION FOR SURGICAL WOUNDS

Patients | Respect | Involvement | Delivery | Efficiency

Taking pride in our healthcare services

APPENDIX 5 STAGES OF WOUND INFECTION & MANAGEMENT ALGORITHM



Appendix 6

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

		Yes/No	Comments
1.	**Does the policy/guidance affect one group less or more favourably than another on the basis of:**		
	Race	No	
	Ethnic origins (including gypsies and travellers)	No	
	Nationality	No	
	Gender	No	
	Transgender	No	
	Religion or belief	No	
	Sexual orientation including lesbian, gay and bisexual people	No	
	Age	No	
	Disability – Learning disabilities, physical disabilities, sensory impairment and mental health problems	No	
2.	**Is there any evidence that some groups are affected differently?**	No	
3.	**If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?**	NA	
4.	**Is the impact of the policy/guidance likely to be negative?**	No	
5.	**If so can the impact be avoided?**	NA	
6.	**What alternatives are there to achieving the policy/guidance without the impact?**	NA	
7.	**Can we reduce the impact by taking different action?**	NA	

If you have identified a potential discriminatory impact of this key document, please refer it to Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact Human Resources.

Appendix 7

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	NO
2.	Does the implementation of this document require additional revenue	NO
3.	Does the implementation of this document require additional manpower	NO
4.	Does the implementation of this document release any manpower costs through a change in practice	NO
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	NO
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval.