Best Practice Statement

The use of topical antiseptic/antimicrobial agents in wound management

CONTRIBUTORS

The following experts have contributed to this document throughout its formation, have reviewed and will continue to review further editions and endorse the content:

Simon Barrett, Tissue Viability Nurse, East Riding of Yorkshire PCT

Pauline Beldon, Nurse Consultant, Tissue Viability, Epsom and St Helier NHS Hospitals Trust

Janice Bianchi, Nurse Lecturer, Glasgow Caledonian University

Paul Chadwick, Principal Podiatrist, Department of Podiatry, Hope Hospital, Salford

Rose Cooper, Professor of Microbiology, Cardiff School of Health Sciences, University of Wales Institute Cardiff

Mark Collier, Lead Nurse Consultant — Tissue Viability, United Lincolnshire Hospitals NHS Trust (ULHT)

Jacqueline Denyer, Clinical Nurse Specialist for children with epidermolysis bullosa (EB), Great Ormond Street Hospital, London

Jeannie Donnelly, Lead Nurse — Tissue Viability, Belfast Health and Social Care Trust/Teaching Fellow Assistant, Queens University, Belfast.

Caroline Dowsett, Nurse Consultant, Tissue Viability, Newham NHS

Val Edwards-Jones, Professor of Medical Microbiology and Director of Research, Metropolitan University, Manchester

Stuart Enoch, Specialist Registrar in Burns and Plastic Surgery, University Hospitals of South and Central Manchester

Jacqueline Fletcher, Senior Professional Tutor, Department of Dermatology and Wound Healing, Cardiff

Sian Fumarola, Clinical Nurse Specialist, University Hospital of North Staffordshire NHS Trust

Georgina Gethin, Research Co-ordinator/Lecturer, Centre for Nursing and Midwifery Research, Royal College of Surgeons Ireland

David Gray, Clinical Nurse Specialist, Department of Tissue Viability, NHS Grampian, Aberdeen

Lorraine Grothier, Clinical Nurse Specialist, Tissue Viability/Lymphoedema Manager, Central Essex Community Services

Keith Harding, Professor of Rehabilitation Medicine, Head of the Department of Dermatology and Wound Healing, Cardiff University

Andrew Kingsley, Clinical Manager Infection Control and Tissue Viability, Northern Devon Healthcare Trust David Leaper, Visiting Professor, Imperial College, London and Cardiff University

Heather Newton, Tissue Viability Nurse Consultant, Royal Cornwall Hospitals NHS Trust, Truro

Caroline McIntosh, Head of Podiatry/Senior Lecturer, Discipline of Podiatry, School of Health Sciences, National University of Ireland, Galway

Karen Ousey, Principal Lecturer, Department of Nursing and Health Studies, Centre for Health and Social Care, University of Huddersfield

Sarah Pankhurst, Service Head/Clinical Nurse Specialist — Tissue Viability, Nottingham

Pam Spruce, Clinical Director, TVRE Consulting

Duncan Stang, National Diabetes Foot Co-ordinator, Scotland

Jackie Stephen Haynes, Consultant Nurse and Senior Lecturer in Tissue Viability, Worcestershire Primary Care Trust and the University of Worcester

John Timmons, Clinical Nurse Specialist, Department of Tissue Viability, NHS Grampian, Aberdeen

Peter Vowden, Visiting Professor Wound Healing Research and Consultant Vascular Surgeon, Bradford Royal Infirmary

Richard White, Professor of Tissue Viability, Department of Health, Social Care and Psychology, University of Worcester

© Wounds UK, a Schofield Healthcare Media Company, 2010

All rights reserved. No reproduction, copy or transmission of this publication may be made without written permission from the publishers

The views expressed in this document do not necessarily reflect those of Wounds UK. Any products referred to should only be used as recommended by manufacturers' data sheets

To reference this document, please cite the following:

Best Practice Statement: The use of topical antiseptic/antimicrobial agents in wound management. Wounds UK, Aberdeen, 2010

FOREWORD

This Best Practice Statement has been produced in accordance with the standards set out by the Appraisal of Guidelines for Research and Evaluation (AGREE) collaboration (AGREE, 2003).

A working group was formed as a result of concern arising from a paper published in the British Journal of Surgery on the VULCAN trial (Michaels et al, 2009). This clinical trial examined the use of topical antiseptic/antimicrobial agents for the treatment of leg ulcer patients, compared with standard non-antimicrobial therapy.

A small subgroup of contributors met to develop the basic document, for which they were paid an attendance honoraria and travel expenses. This meeting was funded by an unrestricted educational grant from ConvaTec Ltd and Mölnlycke Health Care and the project was directed and managed by Wounds UK. No other payments were paid to any of the contributors.

The guidelines contained in this document were subsequently drawn up and circulated to a wider group of contributors who received no fee for their reviews on whether they agreed or disagreed with the statements.

The document progressed through four drafts, with all comments and reviews being considered, discussed and agreed upon before reaching the final draft, which was endorsed by the contributors before publication.

It is envisaged that this document will support the appropriate use of topical antiseptic/antimicrobial agents, and promote clinical decision-making that ensures their prescription only when clinically indicated.

This Best Practice Statement on topical antiseptic/antimicrobial agents is seen as a basis for further discussion and development of practice. To this end, a website has been established which will allow individuals to comment on each section of the document between 30th June and 30th September 2010. After this time, comments will be reviewed and a new version of the document published. This process will continue in 2011, with updated documents being published annually. This will allow for as broad a collaboration as possible.

The development of this Best Practice Statement has been made possible as a result of an unrestricted educational grant from:

ConvaTec Ltd Mölnlycke Health Care

INTRODUCTION

Towards the end of 2009, a clinical trial comparing silver-containing dressings with non-medicated dressings in venous leg ulcer treatment was published (Michaels et al, 2009; VULCAN study). This has provoked a reaction within the UK and internationally. Clinicians and scientists have commented on its design and conclusions, and it has led to a subsequent review in the *Drug and Therapeutics Bulletin* (DTB, 2010). This latter article has been reported in the national press (*Daily Mail*, 2010).

The findings of the VULCAN study do not mean that antimicrobial agents are not valid for treatment of critical colonisation/local infection. which is what some people might erroneously presume from the study results. However, they go some way towards dispelling the belief that topical silver 'aids' wound healing. There are repercussions for the availability and clinical use of silver dressings. For example, there is increasing evidence that the three publications mentioned above are serving to restrict the wider availability of silver dressings. The 'evidence' on silver dressing efficacy is now so well-publicised that patients are refusing silver on the basis that 'they don't work' — because of what is written in the popular press.

From the positive perspective, the VULCAN study confirms that silver should not be used just to get quicker healing, which was a common theme being touted at the time the study was planned. The articles by Michaels et al (2009) and DTB (2010) have served to 'mobilise' wound care experts to make their feelings, and considered opinions, clear. A carefully reasoned article by Gottrup et al (2010) is testimony to this effect. The authors state that:

The extended definition by Sackett (1996) may be more relevant in the wound sector. Evidence-based medicine is not restricted to randomised trials and meta-analyses, but involves exploration of all types of best external evidence with which to answer our clinical question. Prospective cohort studies may be particularly helpful, especially when cost and resource use are the major outcomes of interest, as background information on the natural progression towards healing can be obtained.

These sentiments echo those of Sir Douglas Black in 1998 about the limitations of evidence.

This approach towards clinical evidence in wound care is certainly not new; correspondence in key journals has posed provocative questions (Maylor, 2007; Cutting, 2008; White, 2008). If confusion exists in what is required as evidence to support wound dressings, it probably stems from the overlapping definitions of medical devices and medicinal products (pharmaceuticals). A medical device can be used for diagnosing, preventing, monitoring, treating or alleviating disease, whereas a medicinal product or pharmaceutical can be used in diagnosis, restoration, correction or modification of physiological functions. Those involved in the appraisal of pharmaceuticals often demand the same level of evidence as required for medical devices used in the treatment of wounds.

Wound dressings, as medical devices, should not, in our opinion, be judged as if they are pharmaceuticals; they are not. No regulatory authority in any of the developed nations currently regards them as such. This does not, however, reduce the need for the development of robust evidence to support and guide dressing use to gain the best outcomes for patients in the context of best value. The wider wound care community is now anxious to present their case for 'reasonable' and 'realistic' clinical trials.

Similarly, the wound dressings' industry now realises that it, too, has a responsibility to provide clear, evidence-based instructions for use, and to educate customers in the best practice for use of their products. On this latter point, the NHS must recognise that unless it invests in its own tissue viability workforce to provide impartial evidence-based education to its staff on effective use of dressing products, it will continue to need to rely on wound care company staff to provide training as an essential adjunct to product supply, something which to date has often been viewed with suspicion by those outside the immediate clinical arena.

In the VULCAN trial, antimicrobial agents were placed on wounds without a justified clinical indication for use and were used for a prolonged period of time, i.e. 12 weeks. This practice can no longer be supported as it is incompatible with current clinical practice (Greenwood et al, 2007; Lo et al, 2009; Carter et al, 2010; Fife et al, 2010). Clinical 'titration' (adjusting therapy to the presence of clinical signs and symptoms of infection) of antimicrobial therapy is not new; it

would certainly apply to silver dressings in the hands of informed clinicians. The basic principles of bioburden control in any wound involve debridement, as necessary, and treatment with careful monitoring up to a defined endpoint. This would never be dictated purely by time elapsed. but rather by sound clinical parameters.

The Michaels et al and DTB articles have now. albeit without intention, led to restrictions in the availability of silver. This could lead to increased morbidity in wound patients; indeed, there is already evidence that arbitrary withdrawal of silver dressings can lead to increased incidence of septicaemia (Newton, 2010).

The literature does have reviews of the use of topical antiseptic/antimicrobial agents (White et al, 2006), but this is the first exercise of this kind conducted according to this format.

This Best Practice Statement aims to provide guidance as to the appropriate use of antiseptic/ antimicrobial agents in wound management.

TOPICAL ANTISEPTIC/ **ANTIMICROBIAL AGENTS**

For the purposes of this document, this term means substances capable of broad spectrum bacteriocidal activity (both Gram-positive and Gram-negative, aerobic and anaerobic bacteria that are commonly found in wound bioburden and capable of causing infection in wounds healing by secondary intention). Additionally, the active substances must be contained in a containment/ delivery system. This would normally, although not exclusively, be a contact dressing that can be left in contact with the wound for 12 hours or more and remain active for the duration of wear-time. Included in the definition are products containing/delivering chlorhexidine, iodine, silver, silver sulfadiazine (SSD), polyhexamethylene biguanide (PHMB), and honey. Other products that have microbial control effects principally by other physical methods, such as sequestration, pathogen binding, toxin binding, exudate removal, and debridement are excluded.

Antimicrobial dressings all have different physical properties, such as the level of antimicrobial they release, the duration of effective action, the base dressing's ability to handle different levels of exudate or manage odour or pain, and

specific products should be chosen to reflect the overall treatment requirements of the wound.

The topical antiseptic agents silver, PHMB and iodine should always be used with caution in paediatric cases.

WOUND INFECTION

Wound infection is without doubt the most troubling of all wound complications (Cutting, 1998). Whether present in a closed surgical wound or in a large open pressure ulcer, the impact on the patient is such that they may experience relatively minor symptoms such as pain, swelling and discharge, but also may be at risk of a potentially life-threatening sepsis (Collier, 2004).

Wound infection occurs as a result of the imbalance between the patient's immune system, bacteria and the conditions within the wound, which may precipitate bacterial proliferation (European Wound Management Association [EWMA], 2006; World Union on Wound Healing Societies [WUWHS], 2008). Therefore, infection occurs when conditions in the wound are ideal for the bacteria to multiply and also when there is lowered host resistance.

In the case of elective surgical wounds that have been closed using primary closure techniques, such as clips or sutures, the wound is most likely to have been contaminated during the actual operation (Reilly et al, 2004). There are a number of factors that could lead to perioperative contamination, including the type of surgery. For example, in bowel surgery the risk of faecal contamination of the abdominal cavity, the length of time in theatre, the surgeon's technique, the amount of bleeding, and even the number of people in theatre can all influence the development of post-operative infection (Reilly et al, 2004). Add to this the patient's nutritional state, hydration, and the presence of concurrent conditions, and lack of perioperative warming and there is a significant group of risk factors to consider.

Chronic wounds such as pressure, leg and diabetic foot ulcers are likely to be colonised with bacteria due to the nature of the open wound and the tissue types within the wound (Vasquez-Boland et al, 2006). The presence of sloughy and necrotic tissue provides an ideal environment for bacterial growth, due to the availability of nutrients and oxygen that are necessary for the organism's survival.

Foot infections are common in patients with diabetes. Although infection is not considered to be a direct cause of diabetic foot ulceration (DFU), infection plays a major role in wound healing impairment, hospitalisation, high mortality rates and the incidence of lower extremity amputation (Falanga, 2005; Bader, 2008), Indeed, infection is reportedly the final common denominator that leads most people with chronic DFU to lower limb amputation (Lipsky et al 2004; O' Loughlin et al, 2010). Therefore, prompt recognition and early management of infection in the diabetic foot is imperative. If infection is left undetected or treatment is delayed, DFU can become limb- and life-threatening (Sheppard, 2005). There is much variability in treatment approaches to infected DFUs and, as Lipsky et al (2004) suggested, there is a need for evidence-based guidelines in this area to prevent the chronic complications and adverse outcomes associated with diabetic foot disease.

Elbright (2005) suggested that infection in wounds can present as increased local pain, cellulitis, abscesses, necrotising fasciitis, osteomyelitis, sepsis or bacteraemia. Systemic antibiotics should be administered when infection is suspected. (It should be noted that Elbright does not describe infection in the same terms as this document, e.g. critical colonisation, local and spreading infections.) Pressure ulcers provide a portal of entry for bacteria, as the bacteria will first multiply on the wound surface and then, over time, may move deeper into the tissues (Elbright, 2005). The release of toxins by the bacteria destroys local tissue and, once established in the deeper tissues, the bacteria can continue to multiply and enter the circulation.

Bryan et al (1983) examined 102 patients with decubitis ulcers who had developed bacteraemia over a period of five years in a US hospital. In 49% of episodes, pressure ulcers were thought to be the probable cause of the bacteraemia. The mortality for the groups was 55%, with 51% of these deaths attributed to infection. The findings would indicate that pressure ulcers are strongly linked to soft tissue infection, which may lead to bacteraemia.

Cooper (2005) also states that all microorganisms require supplies of nutrients to provide carbon, nitrogen, minerals and water. In addition, some bacteria will proliferate in wounds that are either oxygen-rich (aerobes) or oxygen-poor (anaerobes), while others can adapt to both types of environment — these are known as facultative organisms (Ratliff et al, 2008).

Bacterial quality, quantity and virulence are also important factors to consider, as many Grampositive cocci produce excessive virulence factors, such as biofilms, adhesins and polysaccharide capsules, all of which can reduce the impact of antiseptic/antimicrobial agents on the bacteria (Vasquez-Boland et al, 2006).

In addition to the virulence of the bacteria. and central to its impact on the patient, is their susceptibility to infection. This is influenced by the patient's immune system, which can be affected by a number of factors such as the presence of concurrent chronic illness. Illnesses that affect patients over prolonged periods of time can continually erode the immune system. This decrease in immunity coupled with an increase in bacterial virulence can impact on the development of wound infection. Conditions such as diabetes, vasculitic disease and malnutrition all have the ability to lower the host resistance to infection. Other factors such as oedema can also reduce the potency of antiseptic/antimicrobial agents. Many patients who present with wounds, particularly chronic wounds, are likely to have concurrent conditions which may precipitate the wound formation or be unrelated, but either way these conditions may impact on the healing process.

IDENTIFICATION OF WOUND INFECTION

Identifying wound infection should be viewed as a clinical skill which can be supported by laboratory findings when necessary, but it should not rely on pure laboratory science. To date, there have been few bedside tests which can identify the presence or absence of bacteria in wounds. So, armed with a thorough patient history and good clinical assessment skills, the clinician should be able to establish the reason for changes in the wound status which are indicative of infection.

Infection in the diabetic foot is common and can prove severe, placing the patient's limb and life at risk (Cavanagh et al, 2005). Practitioners should remain vigilant for subtle signs of infection to allow prompt diagnosis and implementation of management strategies. Identifying infection in the diabetic foot can, however, prove challenging.

Edmonds and Foster (2006) advise that only half of infection episodes in DFU show signs of infection. This is attributed to peripheral neuropathy and ischaemia that can diminish the classic signs of infection, including pain and heat, erythema and inflammation.

The clinical signs of increased erythema, pain, swelling, and localised heat provide a fundamental guide to the outward signs of infection. However, as wounds become more complex, a number of authors have attempted to summarise the potential key features of an infected wound.

In 1994, Cutting and Harding produced a guide to identifying wound infection. In addition to the criteria of erythema, pain, swelling and localised heat, they identified the following potential signs:

- >> Increased discharge
- Delayed healing
- ▶ Wound breakdown
- >> Pocketing at the base of the wound
- >> Epithelial bridging
- >> Unexpected pain or tenderness
- >> Friable granulation tissue
- >> Discolouration of the wound bed
- ▶ Abscess formation
- Malodour.

In 2004, the Applied Wound Management (AWM) assessment tool was designed to assist in the assessment of wounds using three continua, wound healing, wound infection and wound exudate (Gray et al, 2005). The wound infection continuum identified a wound state which had once been known as an 'occult infection'. This continuum was designed to allow clinicians to consider the wound state as either colonised, critically colonised, locally infected or with spreading infection. The state of critical colonisation is one which many clinicians recognised as being 'pre-infected', i.e. there are changes in the wound, healing has stopped or slowed down, the tissue may look unhealthy, but there are none of the normal signs of infection present. In this critically colonised state, there is possibly a role for the use of antiseptic/antimicrobial agents to attempt to redress the balance, supporting the work of the immune system by disrupting bacteria on the surface of the wound (Gray et al, 2005).

The concept of Wound Bed Preparation (WBP) has also gained international recognition as a framework that can provide a structured

approach to wound management. By definition, WBP is the management of a wound to accelerate endogenous healing or to facilitate the effectiveness of other therapeutic measures (Falanga, 2000; Schultz et al, 2003; EWMA, 2004). The concept focuses the clinician on optimising conditions at the wound bed so as to encourage normal endogenous healing (Dowsett, 2008). It is an approach that should be considered for all wounds that are not progressing to normal wound healing. The mnemonic TIME is frequently used as summary of the main focus within WBP:

- >> T represents the tissue types in the wound itself. Is it non-viable or healthy?
- refers to the presence or absence of infection or inflammation
- M addresses the issue of moisture balance, and avoiding dessication or maceration
- **E** is the wound edge. Is this non-advancing or non-migrating? The aim being to promote wound healing.

WOUND SWABS

There is little clinical evidence to support the role of wound swabs in identifying wound infection and the topic is an ongoing subject of debate. Using a wound swab may identify some or all of the bacteria within the wound, but may not always indicate the clinically significant species. There is also a significant delay in obtaining the results, during which time the patient's condition could deteriorate if not treated (EWMA, 2006; Dow, 2008).

However, despite their limitations, wound swabs remain part of clinical practice until advanced techniques are developed and validated.

MANAGEMENT OF **WOUND INFECTION**

All wounds contain microorganisms, yet the majority are not infected. The spectrum of interactions between the microbial community and the host may gradually reach a point at which the wound healing process is impaired or localised detrimental host effects are initiated. When this transition occurs, immediate intervention to pre-empt infection is indicated.

Vowden and Cooper, 2006

Once thorough assessment of the wound has been carried out and the wound is considered to be either critically colonised, locally infected or has spreading infection, appropriate topical antiseptic/

antimicrobial treatment may be started. Depending on local protocol, a wound swab may be taken, however, as stated, this should not delay treatment.

In recent years there has been a groundswell of opinion that over-reliance on antibiotics has led to resistance. However, while possible resistance is discussed, there is no significant evidence (White et al, 2001).

In addition to using topical antiseptic/ antimicrobial agents and/or antibiotics, other appropriate wound management techniques should be employed which can impact on the bacterial burden. Debridement of necrotic or sloughy tissue can alter the wound environment significantly, help to reduce the overall bioburden, and reduce odour (EWMA, 2006).

In wounds that are thought to be critically colonised, a topical antiseptic/antimicrobial agent may be considered. However, it is imperative to select a wound management product that is appropriate for the tissue types present, the level of exudate and patient comfort. When topical antiseptic/antimicrobial agents are utilised and consistent signs of progress towards healing are observed, antimicrobial intervention may be stopped. If the wound is unchanged after 14 days, it is recommended that an alternative topical antiseptic/antimicrobial agent is used. If the wound begins to show further signs of infection, the use of a systemic antibiotic should be considered.

In locally infected wounds where there are no signs of the infection spreading, topical antiseptic/antimicrobial agents should be used. If the signs of infection subside and the patient shows no signs of systemic infection, the antiseptic/antimicrobial agent should be discontinued. If the wound continues to show signs of infection, a systemic antibiotic should be considered (EWMA, 2006). In patients with high risk or immunocompromised conditions, such as diabetes, or where poor vascularity may mask the cardinal signs of infection, experienced clinicians may consider the use of systemic antibiotics.

For wounds which are assessed as having spreading infection and/or systemic infection, the patient should have blood cultures taken to identify the offending organism and to assess for differential diagnosis. The patient should be treated with broad spectrum antibiotics which

in some cases may be given intravenously. Topical antiseptic/antimicrobial dressings should also be used to help reduce the wound bioburden (EWMA, 2006).

In the case of DFU, it should be noted that medical treatment, with antibiotic therapy, and/ or topical antiseptic/antimicrobial agents may be insufficient to resolve infection in the diabetic foot. Surgical incision, aggressive debridement and drainage, with or without revascularisation, are often required to effectively manage diabetic foot infection (American Diabetes Association [ADA], 2003).

The use of topical antiseptic/antimicrobial agents is one of the key ways to assist in treating patients with signs of wound infection, and without judicious use of the products, patients may be at risk. If there is a culture of fear regarding the use of antiseptic/antimicrobial agents, some patients may be at risk of untreated infection which could progress to sepsis (Newton, 2010). It is equally important to avoid using topical antiseptic/antimicrobial agents on wounds in situations where infection is not present, or where there is no significant clinical risk of infection, as discussed within this Best Practice Statement.

A recent case in point being the publication in the British Journal of Surgery by Michaels et al (2009). In a study of 300 patients with leg ulcers, the patients were randomly allocated to receive a topical antiseptic/antimicrobial dressing or a standard dressing, yet allocation was not based on the presence or absence of infection. The authors assert that this is standard practice, however, no evidence to support this statement was provided. Certain limitations were acknowledged in the published article. The two centres were noted to have different demographics and healing rates. The original sample size was reduced after an interim analysis showed regional recruitment difficulties. These were attributed to 'reconfiguration of services in South Yorkshire'. This led to patient management being provided by practice nurses, rather than in specialist clinics. It was openly acknowledged that this care may have been less than optimal. The overall impact on the study is difficult to gauge.

The following Best Practice Statement is designed to give guidance to clinicians who have to make daily judgements which impact on the quality of care patients receive.

The flowcharts on pages 16–17 aim to help clinicians consider their own practice in relation to their patient group and should not be interpreted as a prescriptive treatment plan.

REFERENCES

AGREE Collaboration (2003) Appraisal of Guidelines for Research and Evaluation. Available online at: www.agreecollaboration.org/pdf/aitraining.pdf

American Diabetes Association (2003) Peripheral arterial disease in people with diabetes. Diabetes Care 26(12): 3333-41

Bader MS (2008) Diabetic foot infection. Am Fam Physician 78(1): 71-9

Bryan CS, Dew CE, Reynolds KL (1983) Bacteraemia associated with decubitus ulcers. Arch Intern Med 143: 2093-5

Carter MJ, Tingley-Kelley K, Warriner RA (2010) Silver treatments and silver-impregnated dressings for the healing of leg wounds and ulcers: a systematic review and meta-analysis. J Am Acad Dermatol [epub ahead of print]

Cavanagh PR, Lipsky BA, Bradbury AW, et al (2005) Treatment for diabetic foot ulcers. Lancet 366: 1725 - 35

Collier M (2004) Recognition and management of wound infections. Worldwidewounds. Available online at: www.worldwidewounds.com/2004/ january/Collier/Management-of-Wound-infections. html [accessed May 2010]

Cooper R (2005) The antimicrobial activity of honey. In White R, Cooper R, Molan P, eds. Honey: A modern wound management product. Wounds UK, Aberdeen: chap 2

Cutting K (1998) Wounds and Infection. Wound Care Society (educational booklet), London

Cutting KF (2008) Should evidence dictate clinical practice, or support it? J Wound Care 17(5): 216

Cutting KF, Harding KG (1994) Criteria for identifying wound infection. J Wound Care 3: 198-201

Daily Mail (2010) NHS wastes £25m on silver dressings that don't beat bugs. Available online at: www.dailymail.co.uk/health/article-1266093/NHSwastes-25m-silver-dressings-dont-beat-bugs.html

Dow G (2008) Bacterial swabs and the chronic wound: when, how and what do they mean. WOUNDS 49(5A): supplement

Dowsett C (2008) Using the TIME framework in wound bed preparation. Br J Community Nurs 13(6 Suppl): S15-S22

Drug and Therapeutics Bulletin (2010) Iheanacho I; Silver dressings: do they work? DTB 48(4): 38-42

Edmonds ME, Foster AVM (2006) Diabetic foot ulcers: ABC of wound healing. Br Med J 332: 407-41

Elbright JR (2005) Microbiology of chronic leg and pressure ulcers: clinical significance and implications for treatment. Nurs Clin N Am 40(2): 207-16

European Wound Management Association (2004) Position Document: Wound bed preparation in practice. MEP Ltd, London.

European Wound Management Association (2006) Position Document: Identifying criteria for wound infection. MEP, London

Falanga V (2000) Classification for wound bed preparation and stimulation of chronic wounds. Wound Rep Regen 8(5): 347–52

Falanga V (2005) Wound healing and its impairment in the diabetic foot. Lancet 366: 1736-43

Fife C, Carter MJ, Walker D, Thomson B (2010). A retrospective data analysis of antimicrobial dressing usage in 3,084 patients. Ostomy Wound Manage 56(3): 28-42

Gottrup F, Apelqvist J, Price PE (2010) Outcomes in controlled and comparative studies on non-healing wounds: recommendations to improve the quality of evidence in wound management. J Wound Care 19(6): 237-68

Gray D, White RJ, Cooper P, Kingsley AR (2005) Understanding applied wound management. Wounds UK 1(1): 62-8

Greenwood D, Finch R, Davey P, Wilcox M (2007) General principles of the treatment of infection. In: Antimicrobial Chemotherapy. 5th edn. Oxford University Press, Oxford: Chap 13

Lipsky BA, Berendt AR, Deery HG, et al (2004) Diagnosis and treatment of diabetic foot infections. Clin Infect Dis 39: 885-910

Lo SF, Chang CJ, Hu WY, Hayter M, Chang YT (2009) The effectiveness of silver-releasing dressings in the management of non-healing chronic wounds: a meta-analysis. J Clin Nurs 18(5): 716-28

Maylor M (2007) Don't give me evidence, give me reality! Br J Nurs 16(20): Suppl S3

Michaels JA, Campbell B, King B, Palfreyman SJ, Shackley P, Stevenson M (2009) Randomized controlled trial and cost-effectiveness analysis of silver-donating antimicrobial dressings for venous leg ulcers (VULCAN trial). Br J Surg 96(10): 1147-56

Newton H (2010) Reducing MRSA bacteraemias associated with wounds, Wounds UK 6(1): 56-65 O'Loughlin A, McIntosh C, Dinneen SF, O'Brien T (2010) Basic concepts to novel therapies: a review of the diabetic foot. *Int J Lower Extremity Wounds* **9(2)**: 90–102

Ratliff CR, Getchell-White S, Rodeheaver GT (2008) Quantitation of bacteria in clean non-healing chronic wounds. *Wounds* 10. Available online at: www.woundsresearch.com/content/quantitation-bacteria-clean-nonhealing-chronic-wounds

Russell AD, Hugo WB (1994)Antimicrobial activity and action of silver. *Prog Med Chem* **31**: 351–71

Reilly J, Allardice G, Bruce J, Hill R, McCoubrey J (2006) Procedure-specific surgical site infection rates and postdischarge surveillance in Scotland. *Infect Control Hosp Epidemiol* **27(12)**: 1318–23

Sackett DL, Rosenberg W, Gray J, et al (1996) Evidence-based medicine: what is and what isn't. *Br Med J* 312: 71–2

Schultz GS, Sibbald RG, Falanga V, et al (2003) Wound bed preparation: a systematic approach to wound management. *Wound Rep Regen* 11(Suppl 1): S1–28

Sheppard SJ (2005) Antibiotic treatment of infected diabetic foot ulcers. *J Wound Care* 14(6): 260–3

Storm-Versloot MN, Vos CG, Ubbink DT, Vermeulen H (2010) Topical silver for preventing wound infection. Cochrane Database of Systematic Reviews 2010, Issue 3. Art. No.: CD006478. DOI: 10.1002/14651858.CD006478.pub2

Vazquez-Boland J, Stachowiak R, Lacharme L, Scortti M (2006) Listeriolys. In: Alouf JE, Popoff, MR, eds. *The Source Book of Bacterial Protein Toxins*. Elsevier Academic Press, Amsterdam: 700–16

Vowden K, Cooper RA (2006) Managing wound infection. In: Position Document: *Identifying criteria for wound infection*. MEP, London

White RJ,Cooper R, Kingsley A (2001) Wound colonization and infection: the role of topical antimicrobials. *Br J Nurs* 10(9): 563–78

White RJ, Cutting K, Kingsley A (2006) Topical antimicrobials in the control of wound bioburden. *Ostomy Wound Manage* **52**(8): 26–58

White RJ (2008) Letter to the Editor. *Br J Nurs* 17(6): 54

World Union of Wound Healing Societies (2008) Principles of best practice: Wound infection in clinical practice. An international consensus. MEP, London

BEST PRACTICE STATEMENT

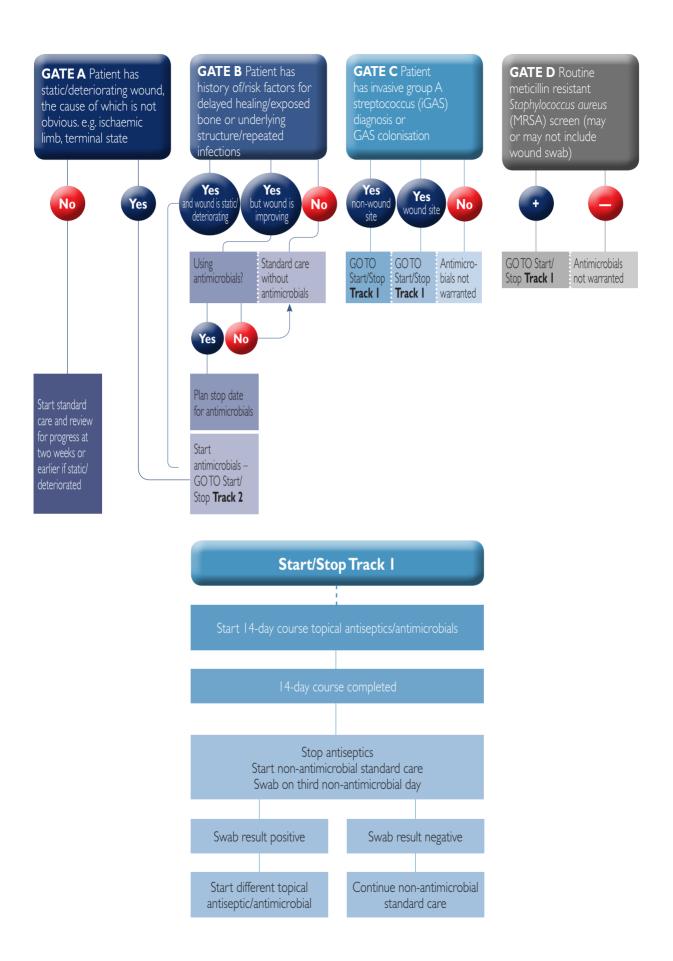
	Statement	Reason for statement	How to demonstrate statement is being achieved
G	Gateway to topical antiseptic/antimicrobial agent use:		
*	 The patient should receive the standard care for this type of wound, e.g. leg ulcer 	 Failure to adhere to standard care may contribute to delayed healing or development of infection 	 Compare patient health records with local/national standards
*	 Care should be delivered in line with national and local guidelines and local prescribing practices using the best evidence available 	 Practice should be based on the best available evidence 	 All organisations will compare patient health records with local/national standards
*	 Baseline data should be recorded in the patient's health records 	 This allows for continuity of assessment by other healthcare professionals 	 The patient's health records will contain the recording of baseline data
*	Patients presenting with a clinical picture of critically colonised, localised or spreading wound infection (hereinafter referred to as wound infection) should be considered for treatment with topical antiseptic/antimicrobial agents	 Patients who present with an established infection may benefit from the use of topical antiseptic/antimicrobial agents as part of their treatment/care 	 Health records of patients who present with a clinical picture of wound infection will demonstrate that they have been considered for treatment with topical antiseptic/ antimicrobial agents
0	Contraindications and precautions:		
*	 Manufacturers' guidelines should be followed and products used in line with license 	 Failure to follow manufacturers' guidance may lead to inappropriate care 	 The patient's health records must demonstrate that the products are being used in line with manufacturers' guidance, or will contain a rationale for not following these instructions
*	· Multiple antimicrobial products should not be used in combination, unless there is an overriding clinical indication	 Multiple products used on the same wound are likely to be against manufacturers' guidance and may compromise the patient 	 The patient's health records will demonstrate that the products are being used in line with manufacturers' guidance or must contain a rationale for not following these instructions
	 Products selected should reflect clinical and patient needs 	 Each patient will have different clinical indications and social/psychological requirements which can be met by different preparations at different times 	 A clear rationale supporting the product selected must be recorded in the patient's health records
*	 Accurate baseline data and or images should be recorded at each review 	 Failure to establish accurate baseline data and/or images could result in an inability to assess the interventions' outcome 	 Sequential records should be included in the patient's records

Statement	Reason for statement	How to demonstrate statement is being achieved
Contraindications and precautions continued Unless clinically indicated the patient's treatment should be continued for the prescribed period	 The termination of an antiseptic/antimicrobial treatment between scheduled assessments or after transfer to another care setting, without justifiable reasons, is unlikely to contribute to optimum care for the patient 	 The rationale for terminating treatment before the prescribed period is complete must be recorded in the patient's health record
* Patients who present with the following should be considered for treatment with topical antiseptic/ antimicrobial therapy — spreading infection, local infection, history of wound infection with genuine risk of re-infection, critical colonisation and where the patient's overall condition indicates a significant risk of infection	 Topical antiseptic/antimicrobial agents can help to reduce wound bioburden Patients with recurring infection are at risk of cellulitis and spreading infection which can significantly impact on clinical outcomes and quality of life 	 Patient health records and outcomes must demonstrate the appropriate use of topical antiseptic/antimicrobial agents in the patient groups mentioned Patients without signs of infection should not routinely be given topical antiseptic/antimicrobial agents, and this will be reflected in the patient's health records Patient health records will indicate appropriate treatment regimens, or not
 Topical antiseptic/antimicrobial treatment is not indicated for patients being treated using standard care for their particular wound type and who have no signs of infection The patient's health records should state why the treatment has been started, how long it is prescribed for, and provide clear treatment objectives 	 There is a risk of selecting for bacterial resistance if antimicrobial/antiseptic agents are used inappropriately Where standard therapy is proving successful, topical antiseptic/antimicrobial agents are not indicated 	 Regular auditing of patient's health records should demonstrate accurate information regarding treatments and rationales for treatments, with timely review of each prescription The patient's health record must accurately reflect appropriate requests for specialist input relating to clinical need, i.e. wound deterioration or failure to progress to healing

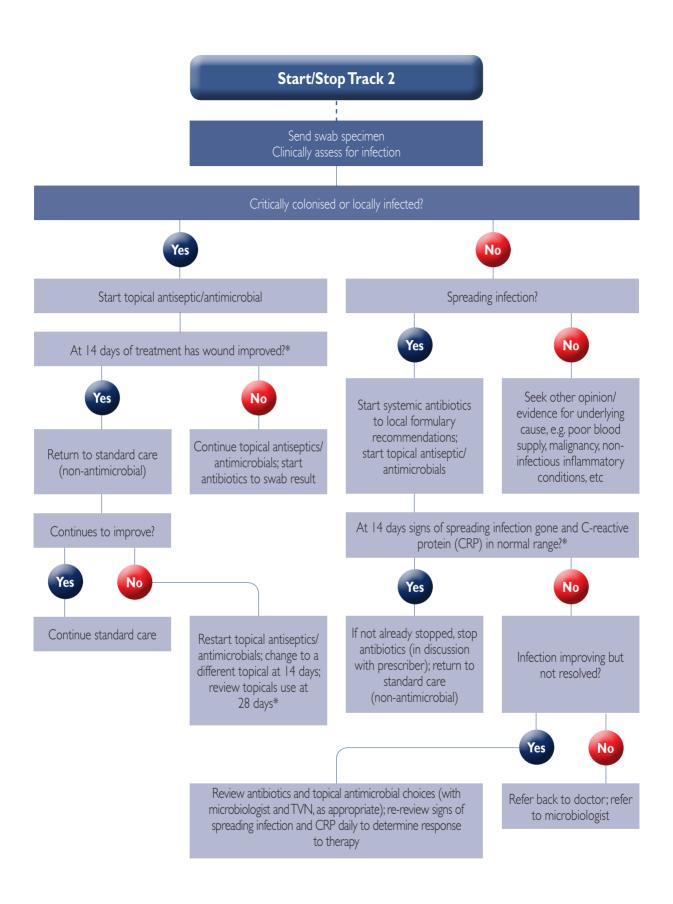
	Statement	Reason for statement	How	How to demonstrate statement is being achieved
Prescr * Fo no ob be he	 Prescribing continued For the majority of patients, the initial prescription should normally be for 14 days with a formal review of treatment objectives at around seven days. However, a review should be conducted at each dressing change by a qualified healthcare professional 	 To prevent clinical ambiguity, promote continuity of care and provide an auditable paper trail which can be used to collect information on prescribing data 	*	The number of individual dressings supplied under a single prescription should be 14 days divided by the change frequency
sign in	No prescription should extend beyond 14 days without discussion with a local specialist, unless previously agreed or indicated by clinical need	 If a wound fails to respond to treatment there may be a number of other clinical differential diagnoses, such as vasculitis or carcinoma, both of which require specialist input 	*	Significant rationale supported by multidisciplinary clinical assessment and specialist support must be documented within the patient's health records
* If a	If a prescription extends beyond 28 days, a specialist referral should be made unless previously agreed	 Patients at high risk may develop significant infection within a short timeframe 	Evidence of specialist re consultation (notes fror direct patient consultati patient's health records	Evidence of specialist referral and record of specialist consultation (notes from phone call, telemedicine record or direct patient consultation) will be found in the patient's health records
ang ang	In some cases, such as in diabetic foot disease, a patient at high risk of infection may benefit from prophylactic antimicrobial intervention	 Clinical signs of infection may be diminished due to background pathology allowing infections to progress to more advanced stages before they are recognised, leading to worse outcomes 	*	Reason for prophylactic use will be recorded in the patient's health records
Treatn	Treatment plan/goals			
» Th	The treatment selected should reflect both clinical and patient needs	 Each patient will present with different clinical indicators of infection. Product selection should be based on thorough clinical assessment and may require different preparations at different times 	*	A clear rationale supporting the selected product must be recorded in the patient's health records
. Th cle	The patient's health records should state why the treatment has been started, how long it is prescribed for and provide clear treatment objectives	 * Failure to provide a clear rationale to support treatment selection, along with guidance on duration of treatment and treatment objectives may expose the patient to bacterial resistance 	* Pu	The patient's health records must demonstrate a clear auditable trail of product selection, application and review in line with manufacturers' guidelines. A clear plan of care determining expected outcomes with evidence of planned and systematic review must also be included
르. 끊 그	The patient's health records should contain clear evidence that at each dressing change the patient has been assessed in line with the stated treatment objectives	 Failure to demonstrate evidence of ongoing review may contribute to delayed healing, development of an infection 	*	The patient's health records must include appropriate justifications for altering treatment plans

Statement	Reason for statement	How to demonstrate statement is being achieved
 Monitoring between and at dressing changes The acceptability of the treatment should be assessed with particular attention paid to discomfort or pain at or between dressing changes, and the treatment plan altered accordingly 	 Once treatment has started the clinical presentation of the wound and associated symptoms, i.e. exudate, pain may alter. Clinicians should be aware of this and treatment interventions altered accordingly 	 The patient's health records must document any complications/adverse effects or therapy compromises associated with the treatment and demonstrate that action has been taken to reduce or change treatment to enhance patient comfort and compliance
Use of dressings with other dressings/treatments Manufacturers' guidelines should be followed and products used in line with license	 Failure to follow manufacturers' guidance may lead to inappropriate care 	 The patient's health records must demonstrate that the products are being used in line with manufacturers' guidance or will contain a rationale for not following these instructions
 Multiple products used on the same wound are likely to be against manufacturers' guidance and may compromise the patient 	 The use of multiple products is normally contraindicated by the manufacturer and should only be used in accordance with their guidelines If multiple products are to be used, clinicans must be aware of potential risks to the patient and plan care accordingly 	 The patient's health records must demonstrate that the products are being used within the manufacturers' guidelines If multiple products are to be used, health records must demonstrate a clear rationale for not following guidelines and demonstrate an awareness of expected outcomes, complications and timelines for assessment
 Assessment of treatment plans/goals Assessment of progress towards treatment goals should be considered at every dressing change and, more formally, no less than 10 days while the patient is receiving topical antiseptic/antimicrobial treatment 	 Failure to assess and record wound condition at each dressing change may contribute to delayed healing or development of infection 	 The health records must demonstrate that assessment and review has been carried out and any change in patient/ wound/infection condition has been acted upon

Statement	Reason for statement	How to demonstrate statement is being achieved
Assessment of treatment plans/goals continued		
Specialist input should be obtained and referral considered if the treatment goals are not achieved within 14 days without obvious explanation	It is expected that the majority of wounds should demonstrate a significant improvement in wound condition within 14 days. If this does not occur, specialist referral should be sought to ensure appropriate and best practice is achieved	 The patient's health records must demonstrate that specialist referral has been sought
 If the treatment has not been successful without obvious reason, the treatment should be discontinued and a new assessment and prescription started 	Each patient will have different clinical indications and social/psychological requirements. If the treatment is not successful, a comprehensive review of the wound/patient should occur and a new treatment plan devised to show reason for change in rationale	 The patient's health records must show evidence of a clear and concise plan of action and rationale for change in dressing selection and ongoing treatment plan



NB: These flowcharts aim to help clinicians consider their own practice in relation to their patient group and should not be interpreted as a prescriptive treatment plan.



^{*}Timings are suggested and assessment and taking action should not be restricted if outcomes are achieved earlier

Notes

Best Practice Statement

The use of topical antiseptic/antimicrobial agents in wound management

Available online at: www.wounds-uk.com

