Microbe of the month

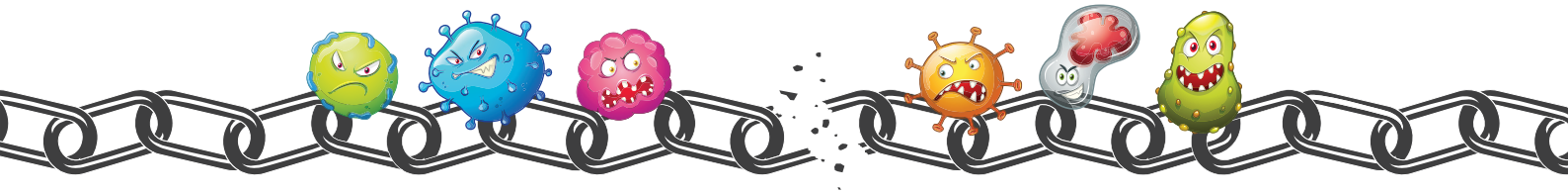
Breaking The Chain of Infection

essity

November 2018

Newsletter

Compiled by Helen Loudon, Independent IPC Practitioner



World Antibiotic Awareness Week 12th - 18th November 2018

Did you know – antibiotic utilisation worldwide increased by 36% between 2000 and 2010, with countries such as China, India and South Africa accounting for 76% of this increase.[4]

The increasing use and misuse of antibiotics has escalated the prevalence of antimicrobial resistance. Antimicrobial resistance has been found in all regions of the world and is one of the biggest public health challenges of our time. New microbial mechanisms of resistance continue to emerge and spread globally through modern travel of people, animals and goods – threatening the practice of modern medicine, animal health and food security.

GET SMART About Antibiotics Week
WWW.CDC.GOV/GETSMART

Antibiotics are amongst the most commonly prescribed drugs used in human medicine. *50% of all antibiotics prescribed for people are not needed or are not optimally effective as prescribed.*

How are antimicrobials used?

1. **Empirical therapy** is treatment for a possible or likely infection before laboratory results become available, or when they are impossible to obtain. Empirical choices may have to be made on the basis of microscopy, without the benefit of culture and sensitivity data. This type of use is most common in low resource settings and in community or outpatient care. However, it is strongly recommended that the use of antibiotics is reviewed if and when laboratory reports are available.
2. **Pathogen-directed therapy** is antibiotic treatment guided by the results of microbiological investigations, with choices determined by specific sensitivity/resistance data.
3. **Prophylaxis** is the use of antibiotics to prevent infection. Generally used just prior to surgery or other invasive procedures, antimicrobial prophylaxis must target the microorganisms most likely to cause an infection following the procedure (e.g., colorectal surgery, the prevention of subacute bacterial endocarditis, and in prolonged ruptured membranes prior to delivery). It may also be prescribed to prevent infections in immunocompromised patients (e.g., AIDS, cancer and transplant patients), as well as 'contacts' of known infected cases (e.g., meningococcal meningitis and TB). Prophylaxis should be used for the shortest possible time and given when antibiotics are likely to be most effective.

What is the evidence for using topical antibiotics in septic chronic and surgical wounds healing by secondary intention? [2,7]

This concept remains controversial, since ongoing studies suggest it is less the density of microorganisms in the wound than the presence of particular microbial species (e.g., Pseudomonas aeruginosa, Enterococci, Staphylococcus aureus and/or anaerobes), as well as the complex polymicrobial nature of biofilm structures, which delay healing and are intrinsically resistant to antimicrobials.

The first topical antibiotics were derived from agents developed for systemic use (e.g., sulfonamides in the mid-1930s), followed in the next decade by topical penicillin, bacitracin, gramicidin, aminoglycosides (including neomycin), polymyxin, tetracyclines and chloramphenicol. Agents that were introduced later include fusidic acid, clindamycin, metronidazole and mupirocin. Topical antimicrobial therapy does have a role in specific circumstances. Evidence upholds its use for burn wounds to prevent or treat infection.Topical agents may also be used to control colonising wound bacteria prior to skin grafting, or for reducing malodour associated with non-healing necrotic wounds.

In principle, however, clinically-infected wounds should be treated with systemic antibiotic therapy. It is best to avoid using topical antibiotics which are available for systemic therapy when treating wound infections, because they can provoke delayed allergic reactions, favour superinfections, and select for resistant pathogens.[2]

Compared with systemic antibiotic therapy, topical application has many potential disadvantages, including the following:

- There is minimal penetration in wounds with cellulitis or deep compartment infection
- Accurate dosage is not possible
- It can lead to alteration of the wound flora, leading to drug resistance by 'selective pressure'
- Systemic absorption is possible in wounds with a large surface area
- Some agents cause local allergic reactions and contact dermatitis
- Frequent applications may be necessary
- Multi-dose containers / tubes become contaminated
- It can result in fibroblast toxicity and delayed wound healing

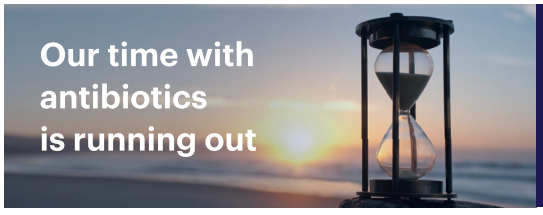
A recent series of Cochrane reviews on this subject indicate that there is little robust evidence on the effectiveness of topical antibiotics for chronic wounds.[7] Unfortunately, many of the published trials do not define the types of patients and wounds included, select inappropriate control groups, or have inadequate sample sizes. Because wound infection may be poorly defined, the comparison of study outcomes is difficult, and the quality of evidence is therefore classified as moderate to low.

What are the drivers for the use and misuse of antibiotics?

- Extensive use of antimicrobials in animal agriculture
- Surveillance systems are weak or absent
- Poor clinical governance for procurement processes, healthcare risk waste (HCRW), cleaning and disinfection
- Systems to ensure the quality and/or supply of antibiotics may be inadequate
- Over the counter availability of antibiotics in some countries
- Inappropriate topical use of antibiotics in wound care
- Economic and social pressures, e.g., poverty (sharing or selling personal antibiotics), working mothers with small children in crèches,etc.
- Patient pressure on general practitioners
- Medical tourism
- Desire for clinical autonomy and professional 'prescribing etiquette'
- Consumers and governments are not engaged or committed

The role of antimicrobial stewardship (AMS)

Antimicrobial stewardship is a coordinated programme that seeks to promote the appropriate use of all antimicrobials, including antibiotics, antivirals and antifungals. An effective programme helps to reduce microbial resistance, improve patient outcomes, and reduce the opportunity for the spread of microorganisms, including those that are multidrug-resistant. AMS programmes are key to modifying the prescribing practices of physicians and other healthcare providers, decreasing antibiotic use. Antibiotic guidelines or policies (which can be national or local / healthcare facility-specific) should focus on using antibiotics with the narrowest spectrum, with minimal toxicity, and the least impact on the development of resistance.



The principles of prudent antimicrobial prescribing can best be outlined as *"the right antibiotic, for the right indication (right diagnosis), the right patient, at the right time, with the right dose and route, causing the least harm to the patient and future patients."*

The role of the laboratory [1,2]

The microbiology laboratory plays a crucial role in helping to manage the use of antibiotics in healthcare settings. The routine application of sensitivity tests (antibiograms) helps to identify individual levels of sensitivity and resistance to specific antibiotics, and helps clinicians choose appropriate therapy.

Additional microbiology laboratory information, which can offer general guidance in the choice of antibiotics and reduce unnecessary use, includes:

- Restricted reporting of antibiotic sensitivities to narrow spectrum agents, only reporting second- and third-line antimicrobials when first-line agents will not be effective.
- Newer technologies, such as 'matrix assisted laser desorption / ionisation time-of-flight' (MALDI TOF) mass spectrometry. These have been utilised in the last few years to identify bacterial species much more rapidly and cheaply than was previously possible. In critically ill patients, it has become possible to identify isolates from blood cultures within hours of the cultures signalling positive, ensuring that tailored antimicrobial therapy can be administered at the earliest opportunity.
- Screening for carriage of resistant microorganisms.
- Specific microbial surveillance (e.g., MRSA, extended spectrum beta-lactamase and carbapenemase producing Enterobacteriaceae, C. difficile, etc.) and resistance trends with regular feedback to prescribers.

Think twice... seek advice! The misuse of antibiotics puts us all at risk. [WHO 2018]

Right Antibiotic	• What organisms could be infecting this patient? • What risk factors for resistance does this patient have? • Does this antibiotic penetrate to the site of infection?
Right Time	• Did we obtain cultures prior to initiating antibiotics? • Was this patient administered antibiotics within an hour?
Right Dose	• Is the antibiotic dosing appropriate for the patient's renal or hepatic function?
Right Route	• Is this patient a candidate for oral treatment?
Least Harm	• Are we choosing the most narrow spectrum antibiotic? • Are we choosing the minimum duration of treatment? • Are we choosing the antibiotic with the least amount of side effects?

The antimicrobial stewardship committee

All hospitals and healthcare facilities should have a team to advise on antibiotic use and audit prescribing practices. Ideally, it should include an infectious disease physician, a clinical pharmacist (with AMS training), the Infection Control Practitioner, clinical microbiologists, and doctors who support the principles of AMS and are influential amongst their colleagues.

The Core Elements of a Hospital Antimicrobial Stewardship Programme [6]

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

1. **Leadership Commitment**: Dedicating necessary human, financial and information technology resources.
2. **Accountability**: Appointing a single physician leader responsible for programme outcomes.
3. **Drug Expertise**: Appointing a single clinical pharmacist leader responsible for working to improve antibiotic use.
4. **Action**: Implementing key clinical actions, such as evaluating the need for ongoing treatment after 48 hours of initial treatment (i.e., 'antibiotic time out'), and removing intravascular catheters as soon as possible.
5. **Tracking**: Monitoring antibiotic prescribing and resistance patterns.
6. **Reporting**: Regular reporting information on antibiotic consumption and resistance to doctors, nurses and relevant staff.
7. **Education**: Educating clinicians about resistance and optimal prescribing.

Key points[1]

- **Reduce** the need for antibiotics through improved water, sanitation and immunisation
- **Improve** healthcare infection control and antimicrobial stewardship
- **Change** incentives that encourage antibiotic overuse and misuse to incentives which encourage antibiotic stewardship
- **Reduce** and eventually phase out subtherapeutic antibiotic use in agriculture
- **Educate** health professionals, policy makers and the public on sustainable antibiotic use
- **Ensure** political commitment to meet the threat of antimicrobial resistance

In conclusion – *antibiotic stewardship is everybody's business.*

Antimicrobial resistance (AMR) is a major global public health crisis and the future trend is alarming. According to the World Health Organisation, 700,000 people die each year from antibiotic resistant infections – and the numbers are increasing. Resistance is projected to kill more people than cancer by 2050.[6]

The resulting drop in global economic output, combined with large pharmaceutical companies ceasing development of new antimicrobials, will severely cripple modern medical and surgical advances.

A potentially stark future awaits us, in which patients will die of untreatable bacterial infections which were previously easily-managed. To be able to alter this course, it is vital that the key drivers of prescribing behaviours are recognised, and that responsibility for change is implemented locally, globally and across healthcare, veterinary and agricultural sectors alike.

References

1. British Society for Antimicrobial Chemotherapy in collaboration with ESGAP/ESCMID (2018). ANTIMICROBIAL STEWARDSHIP: From Principles to Practice. Available from http://www.bsac.org.uk/antimicrobialstewardshipebook/BSAC-AntimicrobialStewardship-FromPrinciplestoPractice-eBook.pdf
2. Richards, J. (2016). Principles of Antimicrobial Stewardship. International Federation of Infection Control (IFIC) Ebook; 3rd Edition: Chapter 9
3. SA Department of Health. Antimicrobial Resistance National Strategy 2014-2024
4. Schellack N, Bronkhorst E, Cooetzee R et al (2018). SASOCP position statement on the pharamacist's role in antibiotic stewardship 2018. *SA Jnl. of Infectious Disease* 2018;33(1):28-35
5. US Centers for Disease Control and Prevention (CDC). Core Elements of Hospital Antibiotic Stewardship Programs. Atlanta, GA: US Department of Health and Human Services, CDC; 2014.
6. World Health Organisation Antimicrobial Resistance http://www.who.int/antimicrobial-resistance/en/
7. Norman G, Dumville JC, Mohapatra D, Owens GL, Crosbie EJ. (2016) Antibiotics and antiseptics for surgical wounds healing by secondary intention. Cochrane Database of Systematic Reviews. Issue 3. Art. No.: CD011712. DOI:10.1002/14651858.CD011712.pub2

askcutimed@bsnmedical.com

Your comments or suggestions for future topics?

Cutimed® Sorbion® Sorbact®

A unique combination

One dressing for infected and highly exuding wounds

Each layer of Cutimed® Sorbion® Sorbact® is designed to provide an optimal treatment outcome:

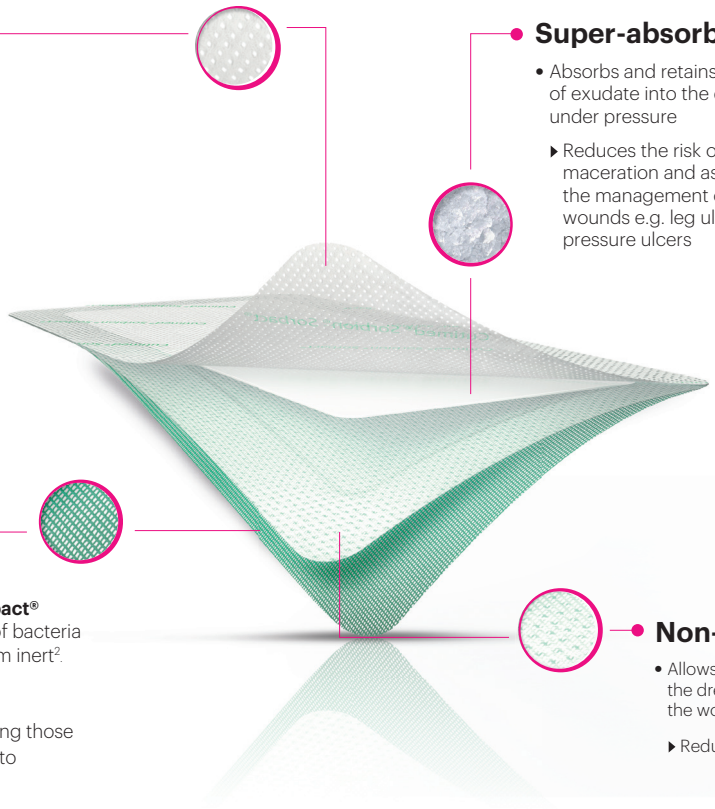
Anti-strikethrough Backing layer

- Low risk of strike-through bedding
  - To protect patients clothes and
  - To improve patient comfort
- Printed surface
  - Enables easy dressing application

Super-absorbent core

- Absorbs and retains large volumes of exudate into the dressing even under pressure
  - Reduces the risk of skin maceration and assists with the management of different wounds e.g. leg ulcers and pressure ulcers

The **Cutimed® Sorbion® Sorbact®** internal core expands and gels to effectively retain high to very high levels of exudate



Rounded edges

- Remain flat
  - To provide additional patient comfort

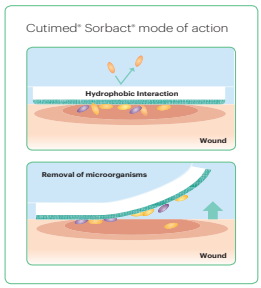
Cutimed® Sorbact® wound contact layer

Due to its coating of DACC, **Cutimed® Sorbact®** enables safe[1], irreversible, physical binding of bacteria and fungi to the dressing and rendering them inert[2].

- Low risk of allergies
  - Can be used safely on all patients including those with sensitivities or previously sensitised to antimicrobial dressings
- No release of chemically active agents
  - No known risk of bacterial or fungal resistance
- In contrast to antimicrobial wound dressings, it does not increase cell debris in the wound
  - Helping to support wound healing
- No contraindications
  - Can be used on all patient groups

Non-woven distribution layer

- Allows for optimal distribution of fluid throughout the dressing and prevents exudate returning to the wound bed
  - Reduces the risk of skin maceration



Ordering Information Cutimed® Sorbion® Sorbact®

Ref-No.	Size	Wound Pad Size	Items per Unit	NAPPI Code
72698-00	10 x 10 cm	8 x 9 cm	10	274714-001
72698-01	10 x 20 cm	7.7 x 17.8 cm	10	274715-001
72698-02	20 x 20 cm	17.8 x 17.8 cm	10	274716-001
72698-03	20 x 30 cm	17.5 x 27.5 cm	10	274717-001

Wound depth Superficial + deep **Wound phase** Infected Sloughy **Exudate level** Moderate to high

[1]Haycocks S, Chadwick P (2011). Use of a DACC coated antimicrobial dressing in people with diabetes and a history of foot ulceration. Wounds UK Vol 6 No 4
[2]Ljungh et al (2006) Using the principle of hydrophobic interaction to bind and remove wound bacteria. Journal of Wound Care, 15 (4): 175 80

Win the race against wound infection

Cutimed® Sorbact®

Antibacterial and Antifungal Wound Dressings

S **SAFE**
Suitable for **at risk** patient groups

T **TOOLBOX**
Full assortment for a **wide variety** of wound types

A **ADVANCED**
Unique microbial binding technology

R **RESISTANCE**
No bacterial or fungal resistance

T **TIME**
Suitable for **prolonged** treatment

Management and prevention of wound infection is possible when choosing **Cutimed® Sorbact®** as your **1st line** option

BSN medical
an Essity company

Cutimed®
Closing wounds. Together.

essity

Tel: +27 (0)31 710 8111 | Fax: +27 (0)31 710 8225 | 30 Gillitts Road, Pinetown, 3610 | PO Box 526, Pinetown, 3600 | Web: www.bsnmedical.co.za | www.essity.com