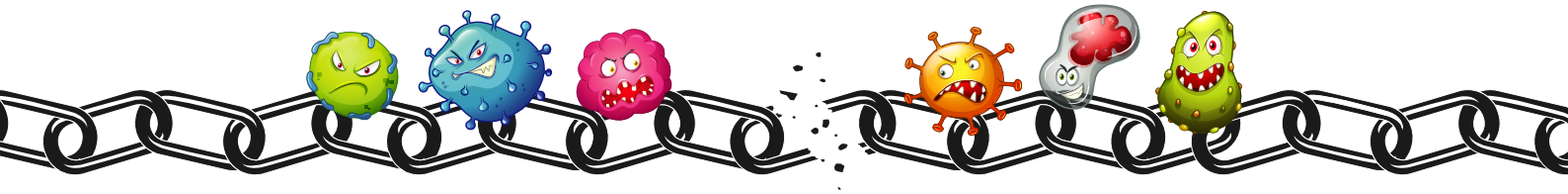
Microbe of the month

Breaking The Chain of Infection

Cutimed®
Closing wounds. Together.

JULY 2019
Newsletter

Compiled by Helen Loudon, Independent IPC Practitioner



Featured this month:

Understanding 'CRE'

Carbapenem-resistant Enterobacteriaceae

Making sense of all the microbiological terms and names of pathogenic microorganisms commonly connected to healthcare-associated infections (HAIs) can be overwhelming and confusing for healthcare practitioners.

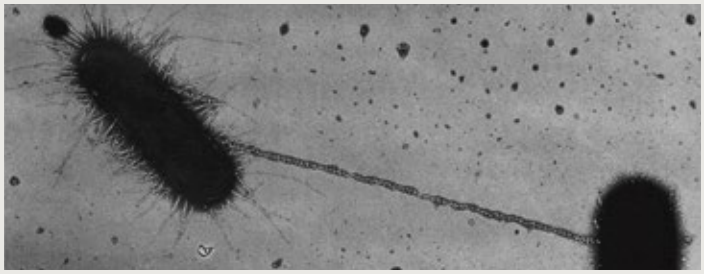
The aim of this month's article is to demystify the term 'CRE', clarify which bacteria are included and why, and outline the important infection control measures that should be implemented to prevent transmission of these pathogens.

What is 'CRE'?

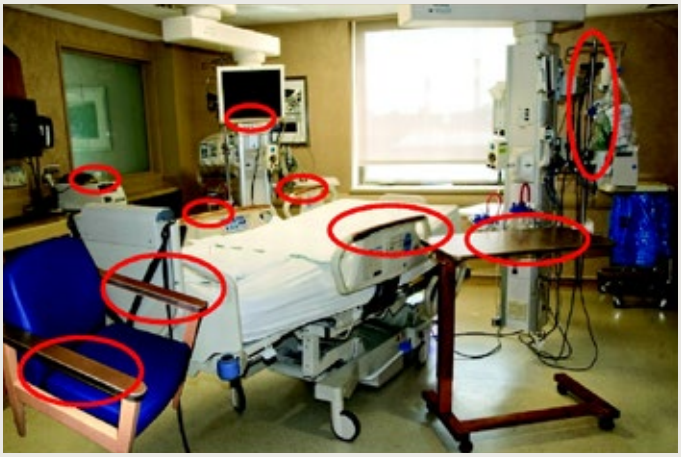
The abbreviation 'CRE' stands for carbapenem-resistant Enterobacteriaceae, a group of bacteria that are difficult to treat because they have a high level of resistance to antibiotics. They include bacteria such as *Klebsiella pneumoniae*, *Serratia marcescens, Enterobacter species*, *E. coli, Pseudomonas aeruginosa* and *Acinetobacter baumannii*.

These bacteria produce **enzymes** referred to as **carbapenemases** which damage the molecular structure of carbapenem antibiotics (e.g., meropenem, imipenem) rendering them useless, leaving few or no other antimicrobial therapy alternatives available to treat the patient.

Carbapenem-resistant bacteria can be carried in the gut of asymptomatic patients, and this is called 'colonisation'. These patients are not sick and do not require antibiotic therapy; however, they can act as reservoirs for transmission to other patients – particularly those that have undergone major surgery, have invasive devices, have been hospitalised for an extended period or have underlying comorbid conditions.



Electron microscope image depicting a sex pilus extending from an E. coli to another bacterium, enabling the exchange of genetic material encoding antibiotic resistance.When a plasmid carrying the genetic material for antibiotic resistance is inserted into other bacteria, antibiotic resistance can spread quickly and easily.



Clinical relevance?
Once the healthcare environment has been contaminated with these drug-resistant pathogens – either from asymptomatic carriers or patients with active CRE infections – they are transmitted via unclean hands (direct contact) or contaminated equipment and surfaces (indirect contact), causing outbreaks of life-threatening pneumonia, and urinary, wound and bloodstream infections.

CRE – who is at risk?

- Healthy individuals do not usually get CRE.
- Patients hospitalised for long periods, usually in an ICU, and treated with invasive devices such as catheters, ventilators and antibiotics face the highest risk.
- Other risk factors include transplant patients, renal failure, diabetes mellitus and patients in long-term care and frail-aged nursing homes.

HOW ARE CARBAPENEM-RESISTANT ENTEROBACTERIACEAE (CRE) SPREAD?

These gram-negative pathogens are spread through direct contact with the patient or indirectly from the patient's care environment (including equipment).

Clinical relevance?
- Patients colonised or infected with a multi-drug-resistant pathogen must therefore be isolated from other *non-colonised / non-infected patients*.
- Patients with infections caused by the same microorganism (i.e., two carbapenem-resistant Klebsiella patients) can be cohorted.

DEFINITION OF COHORT

This is the grouping of patients with the same infection (i.e., the same species of microorganism) within an isolation area. Cohorting is also used as an overflow strategy when single room capacity is exceeded or not available.

THE TRANSMISSION OF CRE CAN BE PREVENTED BY BASIC INFECTION CONTROL MEASURES!

1. **STANDARD PRECAUTIONS** reduce the chance of infection transmission from both known and unrecognised sources of infection. They protect healthcare workers and patients from acquiring infection and should be applied to ALL patients in ALL circumstances, whether or not they are known to pose an infection risk.

Standard precautions *are based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin and mucous membranes may contain transmissible infectious agents.*

The following precautions are applicable at all times:

- Wash hands promptly after contact with infective material, and upon glove removal.
- Apply alcohol-based hand rub frequently during tasks when hands are not visibly soiled, and after touching a patient, his environment or possessions.
- Wear gloves when in contact with blood, body fluids, secretions, mucous membranes and contaminated items such as drainage tubes.
- Handle sharps carefully and use appropriate infection control precautions during the preparation of medication for injection.
- Ensure that single-use items are discarded appropriately, and that patient care equipment is cleaned and disinfected prior to re-use on another patient.
- Handle used linen and waste with care and ensure appropriate disposal at the point of use.
- Clean up spills promptly and disinfect surfaces appropriately.

Hand hygiene is a core element of standard precautions and the cornerstone of preventing CRE transmission.

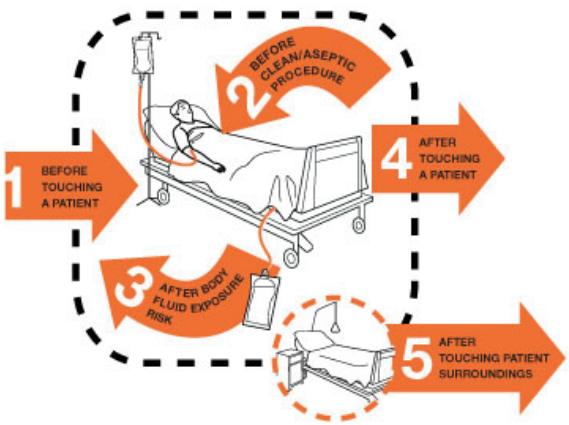
2. CONTACT PRECAUTIONS

Since carbapenem-resistant bacteria are ***Gram-negative*** organisms, they are spread via ***contact means*** (i.e., via unclean hands or contact with contaminated patient care equipment or environmental surfaces). Therefore, in addition to standard precautions, '**contact precautions**' must also be implemented to break the 'chain of infection'.

Contact precautions are an important fundamental component of the infection prevention and control measures necessary to control HAI and other infections.
Always consult the Infection Prevention and Control Specialist should you have any questions!

The following contact precautions are applicable:

- Place the patient in isolation or cohort with patients with the same carbapenem-resistant pathogen.
- Create awareness with pictorial signage outside the room.
- Minimise furniture and designate patient care equipment for use on that patient only. Use disposable supplies where possible.
- Practice scrupulous hand hygiene after contact with contaminated material, utilising antiseptic liquid soap and the frequent use of alcohol-based hand rub.
- Disposable aprons / gowns and gloves are to be worn for all patient contact with hand hygiene upon removal and before leaving the room.
- Avoid the use of invasive devices where possible, and practice strict aseptic techniques for their insertion and after-care.
- Bathe the patient with chlorhexidine gluconate antiseptic liquid soap daily.
- Handle used and soiled linen carefully, moisten any soiling with water and place in yellow plastic bags - these are to be kept inside the room.
- Dispose of waste (especially dressings or items contaminated with urine or faecal material) carefully into red healthcare risk waste (HCRW) receptacles – use disposable HCRW containers where possible (including sharps bins). These are to be kept inside the room.
- Yellow linen bags and waste containers are to be collected from the isolation room directly (and not stored in the sluice room).
- Prioritise cleaning of the isolation area daily and disinfect using a sodium hypochlorite-based detergent cleaner, with colour coded cloths, mops and buckets where possible. Frequently-touched surfaces (cot sides, lockers, monitors, light switches, etc.) should be cleaned and disinfected twice daily.
- Limit transport and movement of these patients.
- If the patient has to be transferred to another ward or hospital, inform them of the patient's CRE status (including the name of the bacterial isolate, e.g., *Klebsiella pneumoniae*).
- There are no restrictions for visitors, but they should be encouraged to wash their hands with soap and water before entering and leaving the patient's room.



SCREENING PATIENTS FOR CRE CARRIAGE [3,4,5,6,9]

Who should be screened?

- Patients transferred from another healthcare or long-term care facility
- History of prior hospitalisation (in the last 3, 6 or 12 months, for a period of >7 days)
- Patients admitted to the intensive care unit (ICU) or high care unit
- Patients admitted with an indwelling invasive device (e.g., urinary and vascular catheters)
- Patients transferred in from another country
- A patient transferred from a facility with a known CRE problem
- Patients on haemodialysis
- Prior antibiotic use (in the last 3 months, and with repeated courses)
- Immunocompromised patients
- Patients known to be previously colonised or positive for the detection of a carbapenem-resistant organism

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

The best protection is early detection!

Specimens must be sent as soon as possible to avoid delays and unnecessary implementation of infection prevention and control measures.

HOW?

Specimens submitted for CRE screening must include:

- **Stool**: This is the specimen of choice, but this is not always feasible. Screening should not be delayed while waiting for the patient to pass a stool.
- **Rectal swab**: A rectal swab must be visibly soiled with the stool. The rectal swab must be inserted into the anal canal to a sufficient depth so as to sample from the rectum (i.e., to a depth of 3-5 cm in adults, and there is no longer resistance to the swab.)
- **Swab any other site** that is either actively infected or considered to be colonised (eg., IV sites, wounds).

A note to community-based nurse practitioners!

- You do not need to make patients who are colonised or infected with a carbapenem-resistant pathogen your last scheduled home visit, as standard and contact precautions are sufficient to prevent cross infection.
- Instruments and patient care equipment should be reprocessed as normal.
- Patients in the community do not need to be screened weekly for CRE.
- Crockery, cutlery, etc. can be washed as normal.
- Non-soiled clothing and linen can be washed as normal at the hottest temperature suitable for the fabric.
- If laundry is soiled with wound exudate, urine or faecal material, it should be washed separately, preferably at 60°C.

Lessons learned for infection prevention and control

1. The global increase in infections with CRE is cause for concern, because these highly-resistant bacteria are associated with higher patient morbidity and attributable mortality, and few or no antimicrobials remain effective for treatment.
2. The Centers for Disease Control listed carbapenemase-producing pathogens as an **URGENT GLOBAL THREAT** in 2013 – concerted efforts at containment through infection control measures, antibiotic stewardship, and reducing person-to-person spread through screening, treatment and education must be a priority.
3. Hand hygiene after every episode of patient contact is the single most important procedure to prevent the transmission of pathogens and infection!
4. Standard infection control precautions augmented with strict contact precautions must be implemented by ***everyone*** involved in the patient's care.
5. Practice antimicrobial stewardship!
6. Order recommended cultures before antibiotic therapy is commenced and start drugs promptly (i.e., 'hang time' should be within one hour of prescribing).
7. Verify that positive cultures represent true infection and not just colonisation (no antibiotic therapy required).
8. Use a designated prescription and administration chart for antibiotics, ensuring that the indication, dose and expected duration are specified in the patient record.
9. Reassess antimicrobial therapy after 48 hours and liaise with the medical microbiologist where possible.

Your input is important to us

Your feedback helps us make this newsletter a valuable resource for healthcare practitioners. Please send all queries, comments or requests for future topics to

askcutimed@essity.com

and we will do our best to address them in the next issue!

1. British Society for Antimicrobial Therapy in collaboration with ESGAP/ESCMID (2018). ANTIMICROBIAL STEWARDSHIP: From Principles to Practice e-Book. **2.** Centers for Disease Control (CDC) 2013 Report. Antibiotic Resistant Threats in the USA. **3.** Centers for Disease Control (CDC) 2015 Facility Guidance for Control of Carbapenem- Resistant Enterobacteriaceae (CRE) November 2015: Update. **4.** Lowman, W., Bamford, C., Govind, C., et al (2014). The SA Society of Clinical Microbiologists CRE-Working Group: consensus statement and working guidelines for the screening and laboratory detection of carbapenemase-producing Enterobacteriaceae. South Afr J Infect Dis. 5 2014;29(1) **5.** Magiorakos, A.P., Burns, K., Rodríguez Baño J. et al (2017). Infection prevention and control measures and tools for the prevention of entry of carbapenem-resistant Enterobacteriaceae into healthcare settings: Guidance from the European Centre for Disease Prevention and Control. Antimicrobial Resistance and Infection Control (2017) 6:113 **6.** British Infection Association (BIA), British Society for Antimicrobial Chemotherapy (BSAC), Infection Prevention Society (IPS) and Healthcare Infection Society (HIS) 2016. Multidrug-Resistant Gram-negative Organisms (MDRGNO's): Information for Healthcare Workers. Jnl. of Hospital Infection Vol 92; 2016. **7.** Smith, P. (2008) Making sense of multidrug resistant organisms. Professional Nursing Today Vol. 12; No 5. Sept/Oct 2008. **8.** World Health Organisation (WHO) Department of Communicable Disease, Surveillance and Response (2002). Prevention of hospital-acquired infections. A PRACTICAL GUIDE (2nd edition). **9.** World Health Organisation (WHO) 2017. Guidelines for the prevention and control of carbapenem-resistant Enterobacteriaceae, Acinetobacter baumannii and Pseudomonas aeruginosa in health care facilities.

Cutimed® Sorbion® Sorbact®

A unique combination

One dressing for infected and highly exuding wounds

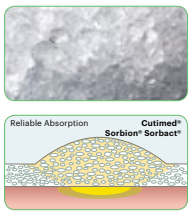
Each layer of Cutimed® Sorbion® Sorbact® is designed to provide an optimal treatment outcome:

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

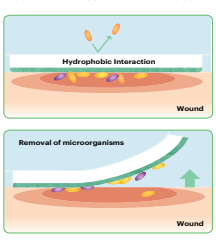
Due to its coating of DACC, **Cutimed® Sorbact®** enables safe[1], irreversible, physical binding of bacteria and fungi to the dressing and rendering them inert[2].

- 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

Cutimed® Sorbact® mode of action



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

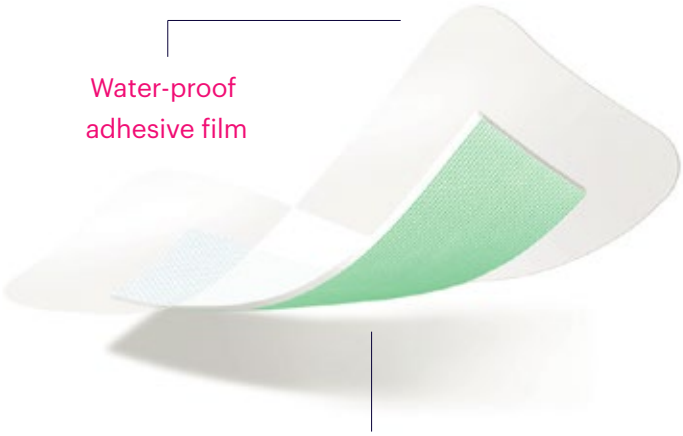
Leukomed® Sorbact®

Reduces risk of infection by more than 60%*

The last thing you need is surgical site infection

Leukomed® Sorbact®

Antibacterial & Antifungal
Post-Operative Dressings



Intelligent dressings. **Reducing** risk.

For use on:

- IV sites
- Surgical incisions
- Post-op dehisced wounds
- Lacerations, cuts and abrasions
- Minor burns

* P. J. Stanirowski, et al. Dialkylcarbamoyl chloride-impregnated dressing for the prevention of surgical site infection in women undergoing cesarean section: a pilot study. Arch Med Sci 2016; 12, 2

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

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