Microbe of the month

Breaking The Chain of Infection

Cutimed®

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Newsletter
Compiled by Helen Loudon, Independent IPC Practitioner

Featured this month:

MRSA

A most unwelcome guest

Hello readers!

We are re-visiting MRSA (methicillin-resistant Staphylococcus) this month, since you may not be aware that there are several strains of this pathogen, capable of colonising both humans and animals, who are asymptomatic carriers?
In the present climate of antibiotic resistance, hospital and community-associated strains of MRSA are combining to create new strains – it is important that out-patient clinics, long-term care and Frail Aged facilities also have MRSA policies to break the chain of transmission.
This newsletter summarises the key facts you need to know and the infection control measures which should be routinely implemented to protect vulnerable individuals.

Staphylococcus aureus (S. aureus) is a common pathogenic commensal bacterium found in warm, moist areas of the body, particularly the nose, axilla and perineum. Approximately 30% of the population are colonised with the bacterium – that is, they carry *S. aureus*, but it does not cause them harm and they do not require treatment. However, within the healthcare environment, this means that both patients and staff can act as a reservoir and source for the spread of infection to susceptible individuals.

S. aureus causes a range of infections, from superficial abscesses and boils to the more serious infections of osteomyelitis, endocarditis, septicaemia, pneumonia and septic shock.

Methicillin-resistant strains of S. aureus (MRSA) are the result of decades of antibiotic use and abuse. MRSA was first isolated in the early 1960s, not long after methicillin came into use as an antibiotic. Although methicillin is no longer used, MRSA has become widespread – it is believed that at least 50 million people worldwide carry the organism. MRSA also lingers on surfaces for months, allowing it to spread easily through households and healthcare facilities.

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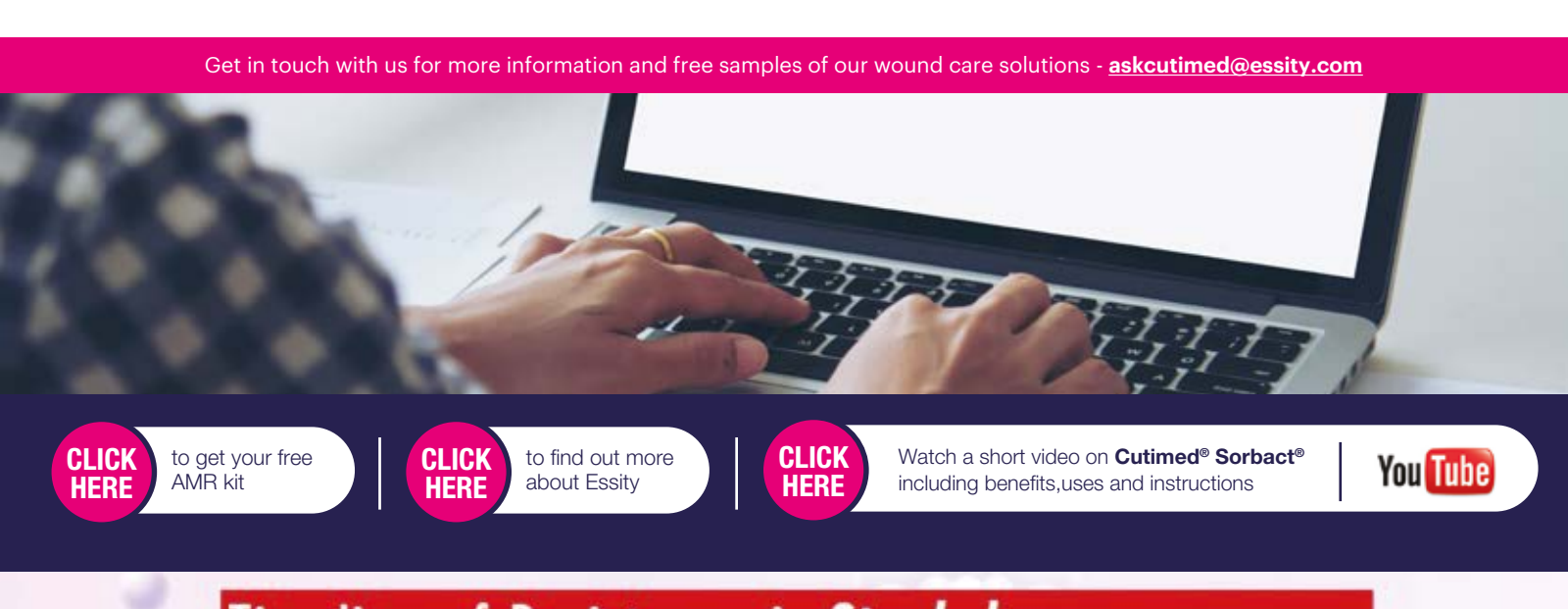

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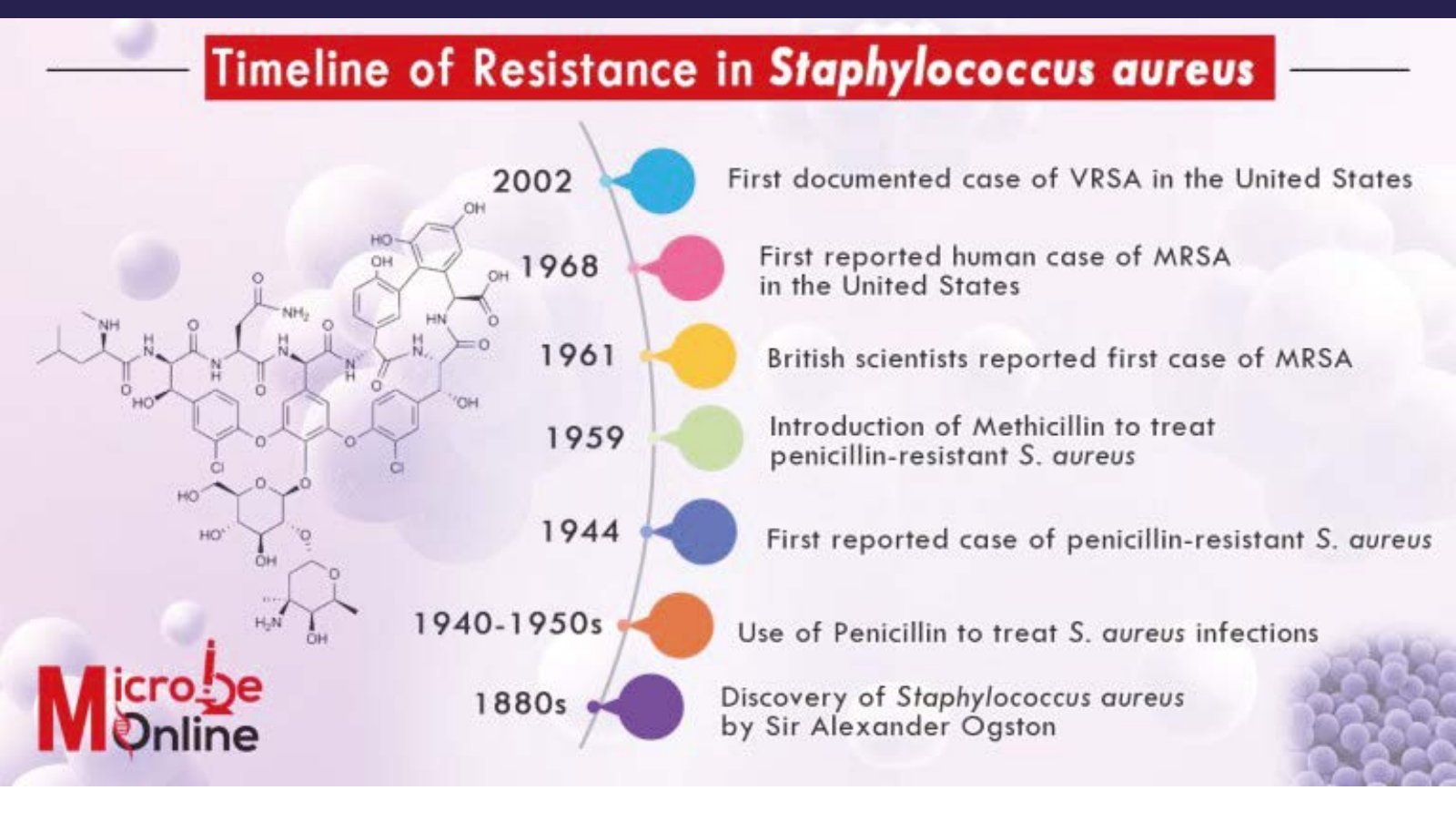


! It is also important to recognise that multiple strains of MRSA exist.

MRSA colonisation and infection can be acquired from healthcare facilities (i.e., hospital-acquired MRSA, referred to as HA-MRSA) as well as **from the community** (i.e., community acquired MRSA referred to as CA-MRSA).

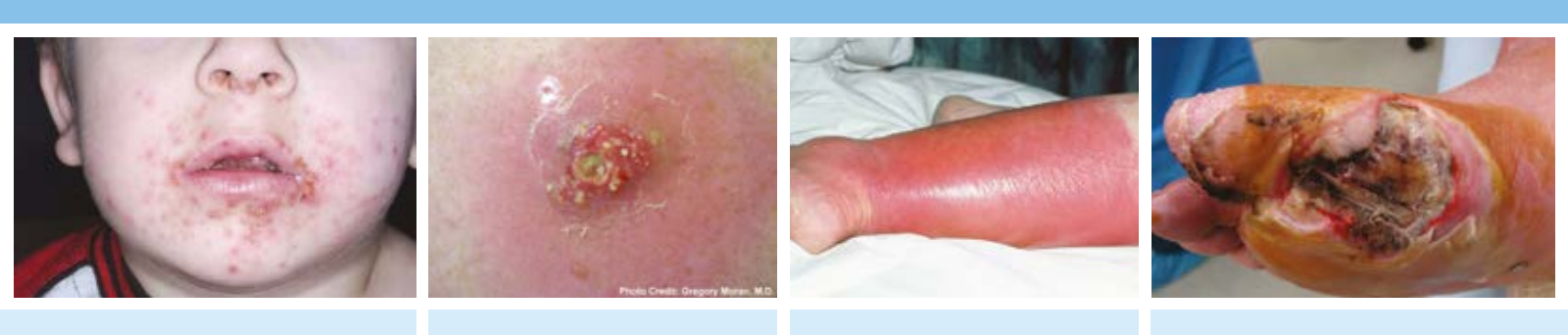
Risk factors for healthcare (hospital) associated strains of MRSA	Risk factors for acquiring community-associated strains of MRSA
Intensive care, transplant units, orthopaedic and trauma wards, burns units and neonatal units	Homeless people
Hospital stay >7 days	Military personnel living in barracks, prison inmates, students in dormitories, day care centres
Invasive catheters, devices and drains	Intravenous drug users
Transfer from another healthcare facility	Competitive athletes, especially contact sports
History of admission to a healthcare facility within the past 12 months	Diabetes mellitus / HIV positive and immuno-compromised individuals
Broad-spectrum antibiotic therapy	Veterinarians, livestock handlers and pet owners

How is MRSA spread?

The primary mode of transmission of MRSA is by **direct contact**, usually via a person's hands, although cross infection via environmental and equipment contamination also plays a role (referred to as 'indirect contact' transmission).

MRSA may also be released into the atmosphere on the millions of skin squames shed daily, as well as fibres from clothing, and can be carried as dust particles. Therefore, scrupulous attention to hand hygiene is essential, patient care equipment should be reprocessed according to accepted standards, and environmental surfaces should be damp dusted with detergent and a disinfectant agent with proven efficacy against Staph. aureus.

The wide spectrum of soft tissue infections caused by MRSA



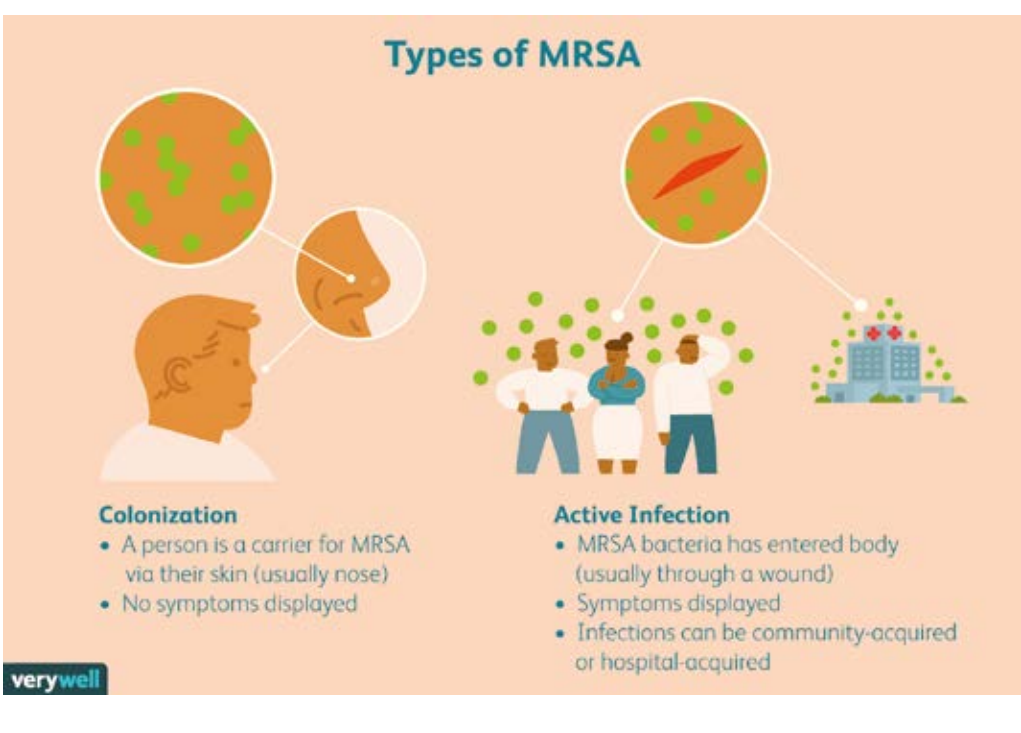
Impetigo | Boils / abscesses | Cellulitis | Diabetic osteomyelitis

How is MRSA diagnosed?

MRSA 'carriage' (i.e., colonisation with MRSA where the individual has no symptoms) is usually picked up accidentally, when unrelated diagnostic laboratory cultures are undertaken (for example: urine, sputum and wound specimens).

- At least two (2) swabs should be taken – a high nasal swab (both nostrils) and a swab from the groin or perineum.
- The instruction to the laboratory is 'MRSA culture'.
- Note: Rapid molecular tests are now available (PCR) – and although more costly, can detect both methicillin and mupirocin resistance in under 24 hours.

Healthcare workers can act as a reservoir for the spread of MRSA to susceptible patients.



MRSA ANTIBIOTIC RESISTANCE MECHANISM

Under normal conditions, beta-lactam antibiotics (which include all the penicillin derivatives, cephalosporins, monobactams and carbapenems) work by disrupting the structure of the bacterial cell wall, causing the cytoplasm to leak out and the cell to die.
Genes encoding for antibiotic resistance are transferred between bacteria by plasmids – the gene for methicillin resistance (called the 'mecA' gene) enables S. aureus to produce an enzyme called ***beta-lactamase***, which damages the molecular structure of the beta-lactam class of antibiotics, making them ineffective for treating infections caused by MRSA.

Clinical relevance?

- Due to the diverse and complex nature of MRSA infections – from community-acquired boils and abscesses, to life-threatening sepsis and organ failure in hospitalised patients – it is recommended that physicians and pharmacists consult accredited treatment guidelines and liaise with a clinical microbiologist.[6,7]
- Every healthcare facility should have an IPC policy for MRSA
- High risk areas with the potential to develop serious infection as a result of acquiring MRSA include intensive care and organ transplant units, orthopaedic and trauma wards, haemodialysis, burns and neonatal units.
- The single most effective method of preventing and controlling the spread of MRSA is the effective decontamination of hands after every patient episode of contact.
- Targeted screening for MRSA carriage (i.e., pre-operative screening of patients undergoing major GIT, cardiothoracic, vascular and joint prosthetic surgery, ICU admissions or haemodialysis) may be beneficial as a risk management strategy for identifying both community-acquired and hospital strains.

Should healthcare workers be routinely screened for MRSA carriage?

The short answer is **NO**.
- In the event of an outbreak situation or "clusters" of MRSA infection in a unit, screening measures should be undertaken with advice from a medical microbiologist.
- Swabbing of environmental surfaces is also of limited value and is *not recommended*.

MRSA DECOLONISATION REGIMEN

Regimens intended to eliminate MRSA colonisation should not be used in patients with active infections.

After treating active infections and reinforcing hygiene and appropriate wound care, consider consultation with an infectious disease specialist regarding decolonisation measures when there are recurrent infections in an individual patient or members of a household.

MRSA decolonisation (treatment) regimen	
25% of patients will become recolonised with MRSA – therefore, it is prudent to manage patients as if they still have MRSA.	Apply Mupirocin nasal ointment (e.g., Bactroban®) twice daily to anterior nares for 5-10 days
	Shower with chlorhexidine gluconate 4% liquid soap twice daily (including hair) for 5-14 days
	In the community setting, household contacts should also be treated
	Re-swab the patient's nose and groin not less than 30 days after completion of the decolonisation regimen
	3 negative cultures are required to confirm clearance
	Refer the patient to a dermatologist if they have a concomitant skin condition (eczema, psoriasis)

INFECTION PREVENTION AND CONTROL for patients with confirmed or suspected MRSA carriage and infection

- **Isolate** the patient and implement **contact and respiratory precautions** (i.e., ready access to hand basins, 70% alcohol-based hand rub, disposable gloves, aprons and surgical facemasks).
- **Avoid the sharing of patient equipment** and keep only essential equipment and furniture in the room – avoid clutter!
- **Cohort** multiple cases (combined isolation) with other MRSA patients (provided they have no other infection).
- **Limit visitors** and discourage close physical contact. Stress the importance of hand hygiene before entering the isolation room and upon exit.
- **Operating theatre**:
  - Since *Staphylococcus aureus* is the most common cause of surgical site infection (SSI), patients should bathe/shower with 4% chlorhexidine gluconate (CHG) antiseptic liquid soap the night before and the day of surgery if possible.
  - Clippers should be used for hair removal at the surgical site
  - MRSA positive patients should be operated on at the end of the list.
  - All non-essential equipment should be removed from the operating theatre.
  - Minimal staff should be present in the theatre to prevent cross-contamination between staff and patients.
  - Patients should ideally be recovered within the operating theatre vs. the recovery room.
- **ICU and long-term patients** should be bathed routinely with 4% CHG antiseptic liquid soap to control the density of skin flora.
- **Clean isolation and ablution facilities last**, using designated and colour-coded (yellow) cloths, buckets and mops.

- **Use chlorine-based detergent disinfectants** for environmental damp dusting (e.g., Biocide-D™ 3 gram sachet: 4.5 litres of tepid water).
- **Cleaning - special attention should be paid to frequently-touched surfaces**, not forgetting bath-tubs and toilet seats.
- **Handle and dispose of used linen carefully** (use yellow plastic bags, which should be collected directly from the isolation room and not stored in the sluice room), as well as **healthcare risk waste** (e.g., contaminated dressings).
- **Avoid inter-hospital transfer of patients** where possible (unless they have been screened for MRSA beforehand) and always inform receiving facilities of a patient's MRSA status.
- **Discharge patients colonised with MRSA as early as possible**.
- **Place 'alerts'** on patients' electronic records for if/when that patient is re-admitted.
- "Once MRSA, always MRSA" - implement contact and isolation precautions until the laboratory screening result is known.
- **Monitor and control the inappropriate use of antimicrobial agents!**

Contact your local Essity representative for back copies and to sign up for the 'Microbe of the Month' mailing list

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