



SYNERGISING MEDICAL MICROBIOLOGY, PATIENT SAFETY AND CLINICAL PRACTICE

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WELCOME! to the first in a series of microbial factsheets which we hope will heighten awareness of commonly encountered microorganisms in the healthcare environment and support best practice in advanced wound management and vascular-related care.

With **World Cancer Day on 4th February**, it is appropriate to look at **opportunistic pathogens**, the infections they cause, and the infection prevention and control precautions which should be routinely implemented to reduce their potentially lethal consequences.

DEFINITION: 'an opportunistic microorganism' may include normal flora – which seize the opportunity to invade tissues and express their pathogenicity.

Examples of opportunistic pathogens include **Acinetobacter baumannii**, **Pseudomonas aeruginosa**, **Candida** species (yeasts) and **Staphylococcus aureus** (*S. aureus*) or it's methicillin-resistant counterpart **MRSA**.



STAPHYLOCOCCUS: (*staf'i-lo-kok'us*) *aureus* (from the Latin term for gold) is a gram positive bacterium often found on the skin and in the nares of healthy people, who are generally referred to as 'carriers' – however, carriage rates are much higher in hospitalised patients and healthcare workers.

Staphylococcus aureus may invade the skin to cause infections such as boils, pimples, impetigo, cellulitis and skin abscesses. It is also the most common cause of wound infection. If *S. aureus* enters the bloodstream (e.g., via vascular catheters or by contaminated manual manipulation of vascular devices) it causes potentially fatal infections in people who are already debilitated or immunocompromised such as septicaemia, pneumonia, osteomyelitis and endocarditis.

PATHOGENESIS: *S. aureus* possesses many **virulence factors** – including defensive proteins attached to its cell wall which interfere with the attack and phagocytosis by macrophages and neutrophils (white blood cells), including the production of highly toxic enzymes which cause acute physiological reactions (e.g., renal failure).

VIRULENCE: describes the ability of a microorganism to cause severe infection or disease by aggressively interfering with the immune system of the host. The term is derived from the Latin word 'virulentus', meaning 'full of poison'.

The main mode of transmission of S. aureus is via hands, so specific infection prevention and control precautions should include:

- Scrupulous hand washing with chlorhexidine gluconate-based liquid soap, and the frequent use of alcohol-based hand sanitiser rub.
- Disinfection of stethoscopes and monitoring equipment.
- The avoidance of neckties, long sleeves, watches, jewellery and untied hair.
- Avoid sharing patient care equipment in high-risk units.
- Careful handling of used linen and the safe disposal of healthcare risk waste.
- Daily damp dusting of all patient care surfaces with a detergent-based sodium hypochlorite 1:1000 solution.

Management of patients with methicillin-resistant Staphylococcus aureus (MRSA)

- Place colonised or infected patients into 'contact isolation'; or cohort (combined isolation) with other MRSA patients (provided they have no other infection).
- Wear surgical facemasks, gloves and disposable aprons.
- Wash your hands immediately after removing gloves.
- Treat colonised and/or infected patients with the 'MRSA decolonisation regimen' i.e., mupirocin (Bactroban®) nasal ointment and chlorhexidine gluconate showers BD for 5 – 7 days.
- Note: If the strain is a community acquired MRSA, treating family contacts is recommended to prevent re-colonisation.
- Avoid inter-hospital transfer of patients where possible (unless they have been screened for MRSA beforehand).
- Discharge MRSA-colonised patients as early as possible.
- 'Tag' patient records electronically to alert hospital personnel if/when the patient is re-admitted ("once MRSA, always MRSA").
- Implement contact and isolation precautions until the nasal screening result is known.
- Monitor and control the inappropriate use of antimicrobial agents!

PREVENTION OF SURGICAL SITE INFECTION (SSI)

- Pre-operative showering with chlorhexidine gluconate-based liquid soap.
- Hair removal with clippers.
- Appropriate use of antibiotic prophylaxis.
- Keep patients warm during the intra-operative period.
- Maintain blood sugar <8mmol/L.
- Strict vascular and urinary catheter care.
- Laboratory screening for S. aureus carriage by swabbing the nares, axillae, groin and/or perineum of patients scheduled for major vascular and orthopaedic surgery (approximately one week beforehand.)

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