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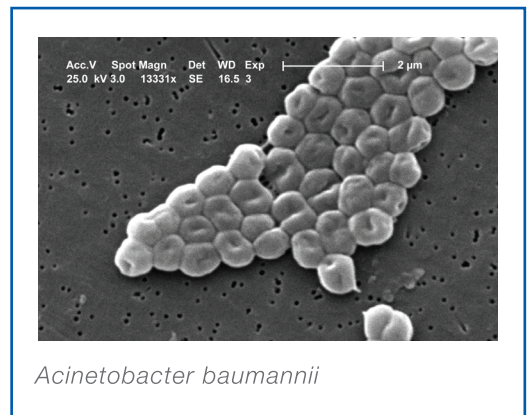
## SYNERGISING MEDICAL MICROBIOLOGY, PATIENT SAFETY AND CLINICAL PRACTICE

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### A 'WOLF IN SHEEP'S CLOTHING' ...

*Acinetobacter* [as-zin-ée-toe-back-ter] is a group of bacteria commonly found in soil and water. It was first described in 1911 as *Micrococcus calcoaceticus*, and since then, has had several names, becoming known as *Acinetobacter* in the 1950's. The most commonly encountered strains in health care are *Acinetobacter baumannii* and *Acinetobacter lwoffii* – the former accounts for approximately 80% of *Acinetobacter* infections.

This micro-organism poses very little risk to healthy individuals and was previously considered an organism of low virulence; however, it is now increasingly reported as an important nosocomial pathogen implicated in outbreaks of respiratory, bloodstream, central nervous system, urinary and wound infections.



*Acinetobacter baumannii*

### RISK FACTORS

Most information about health care-associated *Acinetobacter* infections is based on outbreak investigations. Infections with *A. baumannii* tend to occur in debilitated patients, ICU's, burns units and long-term care facilities. Risk factors for colonization and infection include recent surgery, central vascular catheterization, tracheostomy, mechanical ventilation, cardiovascular organ failure, enteral feeding, and treatment with third-generation cephalosporin, fluoroquinolone, or carbapenem antibiotics.

Interestingly, higher rates of nosocomial *Acinetobacter* infections appear to be in the summer months than in other seasons. Possible explanations include warmer, more humid ambient air, which favours the growth of *Acinetobacter* in its natural habitats, and in potentially preventable environmental sites, such as the condensate from air-conditioning units, which has been implicated as a cause of *Acinetobacter* infections. Asymptomatic colonization of the patient's skin, respiratory and/or gastrointestinal tract, is a precursor to infection, with the lower respiratory tract (endotracheal tubes) and vascular catheters being the most common sources of health care-associated infection.



**FAST FACT:** *Acinetobacter* forms a protective **biofilm** to facilitate its adherence to environmental surfaces. Some strains survive environmental desiccation (drying) for weeks, which promotes transmission via contaminated surfaces and shared patient care equipment.

## ANTIBIOTIC RESISTANCE

The organism's resistance is acquired from the assimilation of genetic material from other microorganisms and therefore multidrug resistance can develop rapidly. Many strains have a polysaccharide cell capsule to protect against phagocytosis (engulfment) by macrophages and immune defence mechanisms such as the action of antibodies. Infections from *Acinetobacter baumannii* are notoriously difficult to treat due to the organism's intrinsic antimicrobial resistance – therefore it is recommended that decisions regarding antibiotic therapy should be made on an individual patient basis and in close consultation with the medical microbiologist.

Differentiation between colonization (treatment is not warranted) and infection, as well as judicious antibiotic prescribing practices, are also important. Antibiotics used in treatment include meropenem, tigecycline, minocycline, colistin, amikacin, rifampin, and polymyxin B, however, combination therapy may be required in some cases.

**Note:** Multidrug resistant *Acinetobacter* is commonly susceptible to antiseptics and disinfectants. Reports of failure to contain the bacteria are likely to be due to *personnel not following correct cleaning procedures* than with disinfectant resistance. An outbreak will be more successfully controlled if the source is identified and eliminated.



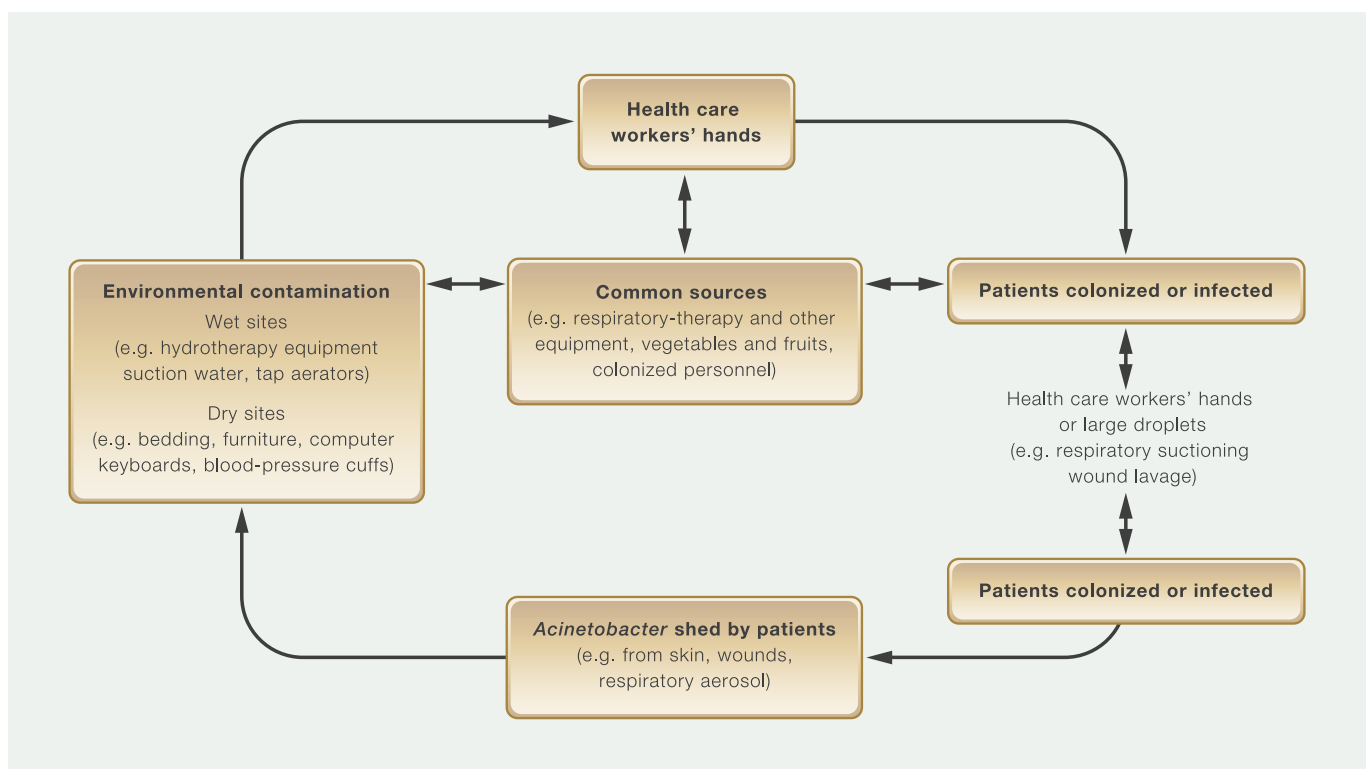
### KEY CONCEPTS

**Colonization** - the presence, growth, and multiplication of the organism without observable clinical symptoms or immune reaction

**Pathogenic** – capable of causing disease or infection

**Virulence** – the degree of pathogenicity of a microorganism

**Pan-resistance** - (also referred to as 'extensively drug resistant') describes strains of microorganisms which are resistant to all standard antimicrobial agents tested.

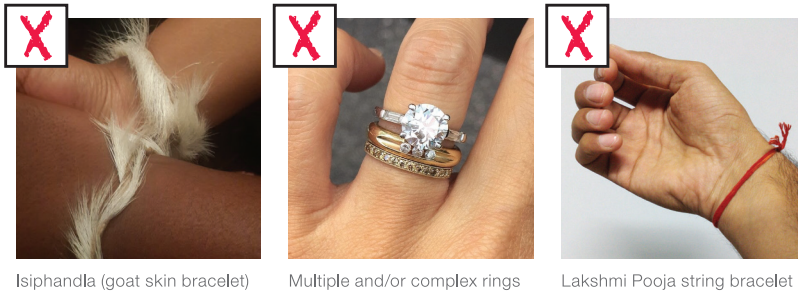


## ACINETOBACTER OUTBREAKS

Outbreaks have been traced to common sources of contamination, particularly contaminated respiratory-therapy and ventilator equipment. Cross-infection occurs via the hands of health care workers who have cared for colonized or infected patients or touched contaminated surfaces and equipment - health care workers may also become carriers of epidemic strains of *Acinetobacter*.

Once introduced into a hospital, a series of, or overlapping outbreaks caused by various multidrug resistant strains of *Acinetobacter* may occur – prolonged periods of colonization of patients and health care workers is thought to perpetuate this phenomenon.

Eradication measures should be multifaceted, including in-depth risk assessment, appraisal of hand hygiene facilities, products, and practices, as well as close supervision routine and terminal cleaning and disinfection of the care environment.



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## INFECTION PREVENTION AND CONTROL MEASURES FOR ACINETOBACTER

- Fastidious hand hygiene and adherence to the 'bare below the elbows' rule
- Frequent use of alcohol-based hand rub which is rapidly microbicidal by denaturing proteins in the microbial cell wall
- Aseptic vascular catheter care
- Avoidance of shared patient care equipment
- Isolation of patients colonized or infected with drug resistant strains
- Correct use and disposal of protective clothing (PPE) including disposable caps, aprons and gloves
- Careful handling of soiled linen and HCRW (healthcare risk waste)
- Thorough cleaning and appropriate disinfection of reusable devices
- Thorough daily 'top-down' environmental cleaning and disinfection (especially high touch surfaces) with a 1:10 detergent based sodium hypochlorite agent (E.g. Sintol®, Biocide-D®)
- Hydrogen peroxide vapour may be used after terminal cleaning
- Ensure that personnel responsible for cleaning and disinfection are appropriately trained, supervised and use the correct PPE.
- Avoidance of fresh flowers and potted plants in high-risk clinical areas

1. Munoz-Price, L.S.Weinstein, R.A. (2008) *Acinetobacter* Infection. *New England Journal of Medicine* 358:1271-81. 2. Centers for Disease Control and Prevention <https://www.cdc.gov/HAI/organisms/acinetobacter.html> [Accessed 19.4.2018] 3. CDC/HICPAC 2008 Guideline for Disinfection and Sterilization in Healthcare Facilities