BSAVA practice guidelines
Reducing the risk from MRSA and MRSP

Introduction
It is likely that veterinary practices will have to manage animals that are colonised or infected with meticillin resistant *Staphylococcus aureus* (MRSA) or *S. pseudintermedius* (MRSP). It is also likely that veterinary staff and premises can act as reservoirs of these organisms. These guidelines describe measures designed to prevent the establishment and dissemination of MRSA and MRSP in veterinary practice. The four key points are:

1. Scrupulous hand hygiene
2. A clean environment
3. Prudent antibiotic use
4. Compliance with ALL of the above

These guidelines represent the best working advice available to date but are generic guidelines. Veterinary practices should use these and other guidelines to develop specific protocols relevant to their needs and activities. All staff must be aware of, understand and adhere to infection control protocols. Designating specific staff to monitor and enforce infectious disease control measures, and undertake infection control audits is advisable.

Routine measures to prevent the spread of MRSA and MRSP
Relatively simple hygiene measures have reduced the prevalence of MRSA in NHS hospitals by up to 80%. Most of these measures can be easily implemented in veterinary practice.

Hand hygiene
1. Effective hand hygiene and disinfection must be practiced between patients.

It is important that the methods used for hand decontamination are effective against MRSA and MRSP. Antibacterial gels or hand rubs attached to uniforms and placed in rooms are a useful cue for cleanliness and can be quickly used before and after handling an animal, and before touching pens, keyboards etc. Placing gel dispensers in waiting rooms encourages hand hygiene among clients, and lets them know that practice hygiene is taken seriously (clients will be used to this from human hospitals). Where hands are soiled then a detergent and water must be used, as disinfectants (including alcohol gels) are ineffective in the presence of organic debris. Practice design should allow staff to wash their hands without having to open a door.

2. Hands should be washed (if necessary) and disinfected:

- Before and after touching a patient
- Before and after touching a patient’s surroundings
- Before gloving
- Before any clean or aseptic task
- After any risk of exposure to contaminated fluids or tissues
3. Hand washing and disinfection procedure:

- Use enough soap to cover the entire hand if washing
- Apply 3-5ml of an alcohol gel if disinfecting only
- Rub palms together
- Rub the back of each hand with the palm of the other, interlacing the fingers
- Fold and interlock the fingers so that the back of each finger is rubbed against the palm of the opposite hand
- Clasp and rub each thumb with the opposite hand
- Rub the tips of the fingers into the palm of the opposite hand
- Rub each wrist with the opposite hand
- Rinse thoroughly and dry with a paper towel (if washing)
- Allow alcohol to air dry (if disinfecting)

Jewelry, wrist bands and watches that interfere with hand washing and disinfection should not be worn (simple wedding bands and watches with metal or rubber straps are acceptable). Nails should be natural, trimmed short and clean.

4. Gloves (and, where necessary, other protective equipment such as aprons) should be worn for clean or aseptic tasks, and where there is direct contact with potentially infectious agents from patients, body fluids, lesions and other contaminated materials. Gloves and other protective clothing must be changed between patients. Face and eye-protection should be worn if aerosols are likely to be generated. Gloves are not a substitute for hand washing and disinfection.

5. Skin wounds or lesions should be covered with waterproof dressings. Invasive procedures and contact with infectious material should be avoided when suffering from skin lesions on hands.

Cleaning and disinfection of premises and equipment

1. All surfaces and equipment must be effectively cleaned and disinfected between patients.

   It is important that the methods used are effective against MRSA and MRSP. Antibacterial sprays or wipes attached to kennel doors and in rooms are a visual cue for cleanliness and can be quickly used to disinfect equipment and surfaces between patients. Where equipment or surfaces are soiled then a detergent and water must be used, as disinfectants (including alcohol) are ineffective in the presence of organic debris.

2. It is important to avoid using materials and equipment that can’t be cleaned at hand touch, clinical or other high-risk sites. Consider using waterproof keyboards or keyboard covers, wipe-clean white boards, non-fabric upholstery etc. Replace torn or damaged upholstery and fabrics.

3. Appropriate cleaning, disinfection and sterilisation protocols must be clearly displayed at the relevant sites. Routine cleaning and disinfection should be divided into daily, weekly and monthly tasks, based on the risk of contamination. Completed tasks should be recorded.

4. High standards of ward cleaning must be practiced:

   - Cages/kennels should be cleaned and bedding replaced at least once daily.
   - Cages/kennels should be cleaned and disinfected thoroughly between patients.
   - In use cages/kennels must be clearly identified to prevent sharing and cross-contamination.
• Soiled bedding must be disposed of or cleaned and disinfected as soon as possible. There must be no contact with clean bedding or other animals.

5. There should be a ‘clean as you go’ culture. All waste should be disposed of promptly into a segregated bag of the appropriate size, strength and colour. Sharps should be placed in an approved container immediately. Staff should be able to dispose of all waste into the appropriate container without having to move between rooms.

6. Staff should wear simple uniforms/coats (e.g. side-fastening coats or smock-type scrub suits). Ties should not be worn. Ideally, uniforms should be laundered on site or by a professional laundry service at >30°C with a detergent. Uniforms should be changed regularly (depending on the type of work and risk), or as soon as they are soiled. Uniforms should not be worn outside or they should be covered - the general public tends to believe that clinical clothing can disseminate infection, although there is little evidence for this.

**Good clinical practice**

Good clinical practice should be followed at all times. This includes:

1. Appropriate isolation of patients with, or suspected of having, a communicable infection.

2. Rational use of antibiotics to minimise the development and spread of antibiotic resistance. In particular, the speculative use of antibiotics in animals without a diagnosis of a bacterial infection and/or routine use to prevent bacterial infection should be avoided.

3. High standards of aseptic technique for all invasive procedures. This includes: minimising theatre staff to necessary personnel only; use of sterile gowns, gloves, hats and masks; proper sterilisation of equipment and restricting use to a single patient (or employing single use, disposable equipment where appropriate); effective disposal of contaminated material; and as stated above, hand hygiene and disinfection of surfaces between patients.

**Managing patients with MRSA or MRSP**

**Diagnosis of MRSA and MRSP infections**

1. MRSA or MRSP should be suspected in the following cases:

   • Patients from known MRSA/MRSP positive households.
   • Patients with non-healing wounds.
   • Patients with non-antibiotic responsive infections where previous cytology and/or culture indicates that staphylococci are involved.
   • Nosocomial or secondary infections, especially in at-risk patients. These include immunocompromised animals, long-term hospitalised cases, patients with widespread skin and/or mucosal defects, and surgical cases, especially those undergoing invasive procedures and/or those with implants.
   • Animals dying of sepsis or other invasive infections.

Animals suspected to have MRSA or MRSP infections should be managed as such until proven to be negative following culture.

2. Swabs or tissue samples should be obtained as soon as possible in all suspect cases. Samples could include:
• Skin lesions or wounds
• Surgical sites, implants or drains
• Insertion sites of intravenous catheters
• Urine if an indwelling catheter in place and/or there is a urinary tract infection.
• Faeces if the patient has diarrhoea
• Sputum or bronchiolar lavage fluid if there is a respiratory tract infection

3. Samples to detect persistent mucosal colonization should be taken from both the nares and the perineum to reduce the chance of a false negative result.

4. Samples should be sent to a laboratory with sufficient expertise and resources to correctly identify MRSA and MRSP, and determine their antimicrobial susceptibility.

5. All samples and bodies sent for post-mortem examination should be securely sealed and packaged using materials of sufficient strength and security. A form outside the sealed container should clearly state that MRSA/MRSP is suspected.

6. Staff should be informed about known or suspected MRSA/MRSP cases before admission. This may not, however, be possible, in first opinion practice. Veterinary practices should, where possible, culture suspected cases and inform other practices of the result before referral.

Admission of animals with MRSA and MRSP infections
1. Known or suspected cases should be taken directly into a consultation room to avoid contamination and contagion in the waiting room. The floor, table and other contact surfaces should then be disinfected before they are used for other patients.

2. Movement of infected or suspected patients around the practice and procedures involving them should be kept to a minimum, and where possible scheduled for the end of the day. Discharging wounds should be covered with an impermeable dressing. Using a trolley will help minimise contamination of corridors and other rooms. Contact between MRSA/MRSP positive patients and other animals and staff should be kept to a minimum. The trolley, and any potentially contaminated rooms or corridors should be disinfected before further use.

Hospitalisation of animals with MRSA and MRSP infections
1. Patients with MRSA or MRSP should be isolated as far as possible from other patients.

2. Staff contact should be limited to essential personnel only.

3. Staff with major skin barrier defects (e.g. eczema, psoriasis, open wounds etc.) or who are immunosuppressed should not nurse MRSA/MRSP positive animals. Where this is a concern occupational health advice should be sought.

4. Barrier nursing precautions include:
   • Wearing disposable gloves, gowns and face masks. Long hair should be tied back and protected with a disposable hat. Sleeves should be rolled up to the elbow. Eye protection may be necessary if there is a risk of splashing or aerosols.
   • Strict washing of the hands and forearms before and after handling the patient. Watches, rings or other jewellery that could interfere with the efficacy of washing should be removed before handling the patient.
• Pens/pencils, stethoscopes, thermometers and other equipment should be kept for use with the affected patient only and disposed of or disinfected after use.

• Bedding should be disposed of. If re-use is essential it should be laundered at 60°C. Great care should be exercised to avoid contaminating other bedding during cleaning, but separate laundering isn’t necessary.

• The cage and immediate floor environment should be cleaned and disinfected thoroughly at least once daily. Faeces and urine should be collected and disposed of to avoid contamination. Any blood or bodily fluids should be cleaned immediately.

5. Bathing every 2-3 days with chlorhexidine wash can reduce mucosal and cutaneous carriage, and the potential for contamination, but may be not be clinically or logistically possible and increases staff contact.

6. Owners should not be unnecessarily discouraged from visiting hospitalised patients. However, they should be informed of the potential risks, wear protective clothing and thoroughly wash and disinfect their hands as outlined above. Contact should be restricted to their animal.

Managing deceased and discharged patients with MRSA and MRSP infections
1. If an MRSA/MRSP positive animal dies the body should be placed in a sealed, impervious bag as soon as possible. Bodies and tissues sent for examination should be securely packaged as above. Bodies should be cremated rather buried, but bodies may be returned for burial at home provided that they are in a sealed bag or container and the risks of direct contamination are discussed with the owner.

2. MRSA/MRSP-positive patients should be discharged from the hospital as soon clinically fit. They should be cultured prior to discharge to identify persistent colonisation. If the animal remains colonised the potential risks and precautions that should be taken must be discussed with the owner. They should sign an acknowledgement prior to discharge.

Decolonisation of animals with MRSA and MRSP
1. Animals with persistent mucosal colonisation following successful treatment should be allowed to decolonise without antibiotic treatment. Most animals colonised with MRSA/MRSP appear to lose this once they are away from the veterinary healthcare environment and off antibiotics. Chlorhexidine washes may be used at home, and the owners should be given advice on infection control measures, especially hand hygiene.

2. Where necessary, active decolonisation can be considered. This may be appropriate in households with in-contact humans at risk of infection, during decolonisation of persistently colonised households (in cooperation with the appropriate medical authorities), or where urgent surgery or other treatment of the animal is necessary.

3. Colonised animals should be treated with a chlorhexidine shampoo and intranasal fusidic acid or mupirocin once daily.

4. Before surgery, it may be possible to decontaminate the patient as above. Bathing with a chlorhexidine shampoo, covering lesions with impermeable dressings, and cleaning lesional and/or surgical sites with 70% alcohol may also reduce the risk of colonising the surgical site. Using dressings and collars may help to reduce contamination of the wound after surgery.
Screening staff and the environment for MRSA and MRSP

Routine screening of staff and the environment is not recommended in most circumstances. Screening is not a substitute for rigorous infectious disease control measures, particularly hand hygiene and cleaning. The role of the environment in the spread of MRSA/MRSP in veterinary premises is still debatable and no microbiological standards have been established. It is therefore difficult to determine the clinical significance of positive cultures, particularly if they are non-quantitative. MRSA contamination rates in human hospitals have declined where cleaners have been trained in microbiological rather than visual cleanliness, and without using routine environmental screening.

Screening of the staff and the environment may be used as part of an epidemiological investigation in situations where MRSA or MRSP has become endemic. This should be done in collaboration with experts in epidemiology and infection control. Any resident animals (e.g. the practice cat) should also be screened.

Screening of staff
1. Transient carriage must be differentiated from persistent colonisation. Transient carriage is more common, accounts for the majority of MRSA/MRSP cross infection and is most effectively controlled by hand hygiene and other cleaning measures.

2. If the epidemiology suggests staff to animal transmission that is not contained by infectious disease control measures, then staff associated with these patients should be encouraged to undergo screening.

3. Colonised staff members should be encouraged to be assessed by their GP for wider carriage and seek treatment. It is important that confidentiality is maintained and that no stigma or blame is attached.

Environmental screening
Hand touch sites seem to be most important in contamination and transmission, but other sites could include floors, tables anaesthetic machines, taps, door handles, cages, clinical equipment (stethoscopes, otoscopes, endoscopes etc.), and computer mice and keyboards etc.