Infection control and hygiene: ensuring high standards in practice

Author : Emma Gerrard

Categories : Practical, RVNs

Date : December 8, 2016

Infectious disease outbreaks can be catastrophic in veterinary practice, especially considering a variety of antimicrobial resistant and zoonotic bacteria, such as MRSA, are becoming an increasing concern.

These can cause serious and life-threatening infections when they freely colonise in veterinary premises as a result of poor hygiene, so effective implementation of hygienic measures is essential. This will prevent and contain the colonisation of pathogens and transmission of nosocomial or hospital-acquired infection to animals and humans, both in the veterinary practice and the wider community. Therefore, effective infection control methods are vital.

The three main reasons for maintaining good hygiene in veterinary practice are to:

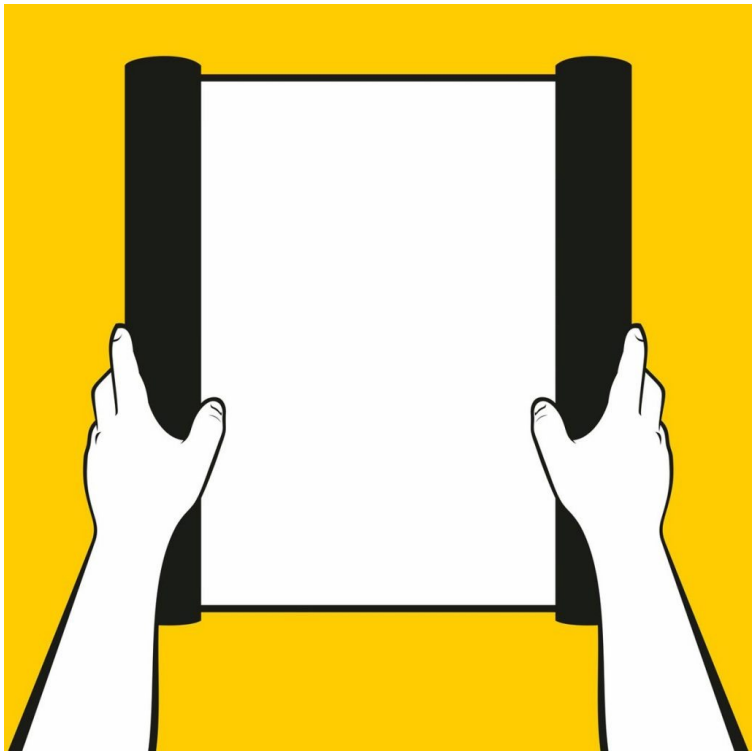
- prevent transmission of zoonotic disease
- prevent transmission of diseases between patients
- reduce the risk of antibiotic resistance

Key recommendations for hygiene and infection control in veterinary practice include:

- hand hygiene
- wearing personal protective clothing (PPC) and personal protective equipment (PPE)
- surgical preparation
- cleaning and disinfecting premises
- laundering of clothing and bedding
- staff training
- owner education

Practice infection control and biosecurity protocols

A practice infection control manual must be developed to cover all areas of biosecurity, including infection control and risk strategies. This should include a list of all rooms, surfaces and equipment to be cleaned, with which product, its dilution and its frequency.



A manual on all areas of biosecurity must be created for practice, says Emma. IMAGE: Fotolia/ jamesbin.

The manual should also cover other aspects of infection control, such as hand hygiene and dealing with potentially infectious patients.

The establishment of one folder as a reference will ensure all practice staff members are singing from the same hymn sheet, while, ideally, one member of staff should be designated as the infection control officer.

This person should act as the point of contact for personnel within the practice, who will ensure infection control protocols are implemented, known, understood, reviewed and followed by all staff.

With this in mind, the BVNA has introduced an online course titled “Infection control for practice standards”. This is a three-month, three-module course worth 120 hours of CPD that meets the RCVS Practice Standards Scheme criteria, as well as:

- enhancing knowledge
- implementing change
- raising standards

Hand hygiene

Hand hygiene is the most important aspect in the control of nosocomial infections in practice. However, it is a difficult step to enforce across a team (O'Dwyer, 2013). Hand washing and disinfection should follow World Health Organization (WHO) guidelines – while displaying hand hygiene posters above sinks can help with staff compliance and hand washing contact time (WHO, 2009).

Hands must be washed before and after contact with patients – particularly before performing invasive procedures, before and after contact with bodily tissues or fluids, and during and after contact with its environment. Staff must also be hand washing before eating or drinking, after using the toilet and nose blowing.

Nails must be kept clean and short, and jewellery, including wrist watches, bracelets and rings, should not be worn because it inhibits effective mechanical hand washing, which may increase the bacterial load on hands – thus posing an infection risk. It has been reported rings increase the number of microorganisms on hands, and also raise the risk of tears in gloves (WHO, 2009). However, this evidence is outdated and further studies are needed.

Nevertheless, it is likely poorly maintained rings and jewellery may harbour microorganisms that could put a patient at risk from potential pathogens. Hand hygiene practices are also likely to be performed in a suboptimal way if large rings with sharp edges or surfaces are worn.

With the introduction of hospital-grade hand rubs, a move away from the traditional methods of hand preparation is being encouraged. An isopropanol and n-propanol surgical hand disinfectant in a ready-to-use, alcohol-based, rub-in product is good and used independently of water and a wash basin.

It offers superior efficacy to traditional chlorhexidine gluconate (CHG) scrub methods (Kampf and Kapella, 2003), achieving surgical asepsis within a 90-second application, while avoiding the abrasive action of brushes and excessive use of water. This is backed by comprehensive scientific evidence and supported by the WHO hand hygiene guidelines.

The aim of surgical hand disinfection is to significantly reduce the skin flora and eliminate the transient microorganisms from the hands of the surgical team for the duration of the surgical procedure. A study published by Verwilghen et al (2011) showed the application of alcohol-based hand disinfectants before surgery resulted in a significant reduction of bacterial flora on the surgeon's hands, compared to a scrub solution based on CHG or povidone-iodine.

Personal protective clothing and equipment

PPC and PPE are vital tools in infection control. Their purpose is to:

- reduce the risk of pathogen exposure to the skin and mucous membranes of staff

- prevent contamination of personal clothing
- reduce the transmission of pathogens between patients and staff

Each case should be considered on a holistic basis, taking into account the basic principles of infection control, the patient, environment, procedure being performed and infectious disease suspected.

PPE and PPC, while important for protection, also play a vital role in infection control.

It is a common misconception wearing gloves is a substitute for suitable hand hygiene, but this is not the case as gloves only act as a barrier – reducing the risk of transmission of pathogens from both handler and patient.

Gloves should be worn when handling bodily fluids, potentially infectious material and patients, as well as when dealing with wounds, surgical skin preparation, and during surgery when asepsis is required.

Gloves should be changed when moving from a dirty to clean procedure on the same patient, between patients and before touching equipment and surfaces that will be handled by non-gloved staff members.

Gloves should always be worn when cleaning out kennels and other contaminated surfaces, as well as when handling laundry. Following their use, gloves should be removed carefully to prevent contact between the outer glove and the skin, and hands must be washed or disinfected with an alcohol-based sanitiser.

Personal protective outerwear must be used to protect and reduce the risk of pathogen transmission by clothing to patients, owners, staff and the public. Protective outerwear should be worn whenever there may be contact with an animal or when working in the clinical environment. Ideally, practice uniforms should be restricted to being worn only within the practice and not outside

of the workplace, nor should they be taken home by staff.

PPC should be washed on site at the end of the day, or whenever contaminated. This is an excellent way to help prevent the transmission of potential pathogens from patients to other pets in the home environment and wider community.

Theatre staff, meanwhile, should wear designated surgical scrubs and shoes in line with best practice recommendations. These designated items must not be used outside of theatre or for other tasks. This will help to minimise the spread of pathogens from clothing worn while dealing with patients in other parts of the practice and then into theatre.

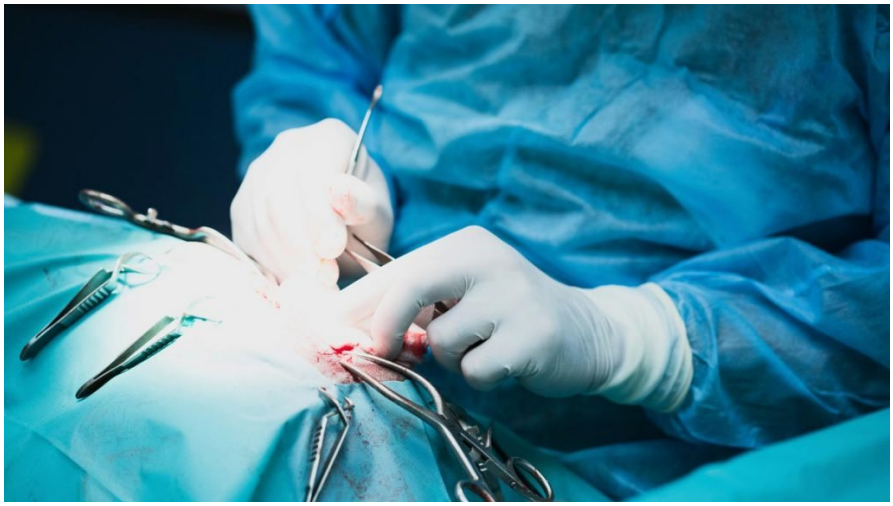
The use of theatre wear – either sterile or non-sterile – is important in maintaining theatre discipline and may, therefore, reduce the risk of surgical site infection (SSI). Disposable hats should be worn in aseptic theatre environments, when handling infectious cases and when barrier nursing. This will help prevent contamination of the scalp and hair, which could lead to the distribution of microorganisms.

Surgical preparation

The purpose of preoperative skin preparation is to remove soil and transient microorganisms from the skin and to reduce the residual microbial count to subpathogenic levels in a short space of time, and with as little tissue irritation as possible (Fossum, 2007).

While it is impossible to make the skin a completely sterile area, the aim should be to free the surgical site from microorganisms as much as possible prior to surgery, with methods including bathing the patient, hair removal and surgical skin preparation. The primary source of SSIs is the patient’s own skin flora (Dohmen, 2006).

Recent studies in the human field have shown a back-and-forth scrub movement reduces microbial counts on the skin (McDonald Vox San, 2006).



While it is impossible for surgical sites to be completely sterile, the aim in preparation is to reduce the microbial count to subpathogenic levels. IMAGE: Fotolia/ptnphotof

Historically, surgical sites were prepared in concentric circles, starting from the incision site, working outwards until the outer margins are reached. However, this method is not evidence-based.

Research has shown a scrub containing 2% chlorhexidine and 70% isopropyl alcohol has demonstrated significantly better antimicrobial activity than other combinations (Hibbard, 2005).

Studies show the most effective way to apply this scrub is with a back-and-forth scrubbing movement as this gives a lower microbial count on the skin than using other application methods (Rosenthal, 2006).

Cleaning/disinfecting premises

A cleaning protocol in the practice must be simple and consistent. Laminated protocols should be visible in each room detailing specific cleaning and disinfection guidelines. A routine for cleaning and disinfection should be considered for items such as keyboards and stethoscopes too, while protective covers for keyboards, particularly in consulting rooms, are beneficial.

All surfaces and equipment must be cleaned before and after each patient, and when visibly soiled or contaminated. For maximum microbial kill, surfaces must be used according to the manufacturer's guidelines.

Clinical governance

Clinical audits are a useful tool for checking the effectiveness and adherence of infection control

guidelines. The audit can be as simple as a postoperative surgical wound audit or regular environmental swabs from key areas.

A postoperative audit can be invaluable for assessing the frequency of postoperative sepsis and it can be used to assess each surgical postoperative patient via a five-point scale (**Table 1**). This is obviously a subjective mode of assessment, but it allows a comprehensive monthly audit on postoperative surgical cases.

This audit will quickly identify any outbreak of hospital-acquired infection and enables the practice to localise the outbreak to a specific routine or staff member. This should, of course, not be used to single out any particular employee, should an issue arise, but initiate a review of techniques within the practice.

This type of clinical audit can also be implemented as evidence for the RCVS Practice Standards Scheme under “clinical governance”, as well as under the new reviewed modular scheme, which includes “infection control”. Clinical audits can either be developed internally within the practice (**Table 1**) or via a free tool at www.vetaudit.co.uk

It is also recommended regular environmental swabbing and environmental surveillance is performed under the guidance of an external laboratory.

Table 1. Postoperative audit developed and used in practice

Postoperative check number	PMS code	Description
Postoperative check 1	CPO1	Normal, clean, no inflammation, no self-induced trauma (SIT), no erythema, no suture irritation, no dehiscence, normothermia, comfortable.
Postoperative check 2 (minor complications)	CPO2	Clean contaminated, slight inflammation, slight SIT, some skin suture irritation, some dermatitis, seroma formation possible. No pharmaceutical intervention required.
Postoperative check 3 (moderate complications)	CPO3	Contaminated, inflammation, erythema, slight dehiscence not requiring surgical intervention, pyrexia, SIT, skin suture irritation, discomfort, seroma formation. Pharmaceutical intervention required.
Postoperative check 4 (considerable complications)	CPO4	Dirty, infection starting, erythema, SIT, pyrexia, pain, skin suture irritation, decreased blood supply to wound possible. Pharmaceutical intervention required.
Postoperative check 5 (major complications)	CPO5	Infected, major dehiscence, odour, SIT, pain, exudate, ischaemia, necrosis, orthopaedic failure. Surgical intervention required.

Table 1. Postoperative audit developed and used in practice (click to zoom).

The purpose of this is to identify quantitative and qualitative evidence of unexpected levels of bacterial burden and the presence of antibiotic-resistant bacteria, with results that can be used to establish the efficacy of cleaning and biohazard control protocols.

It is also now possible to perform a self-audit via the Bella Moss Foundation Practice Hygiene Self-Audit (http://bit.ly/2fX5uvO). This infection control tool is a web-based assessment that allows staff to monitor, and routinely measure, cleanliness across the whole practice, including surgical theatre and prep rooms to laundry and waiting rooms.

The simple tick sheet format allows staff to rate the hygiene protocols in each area, resulting in a room-by-room percentage hygiene score, as well as an overall contamination risk score within the practice.

Antibiotic resistance

The development of antimicrobial resistance by microbial pathogens and commensals represents a major threat to animal and public health.

Antibacterials are used in human and veterinary health care for the treatment of, and prophylaxis against, bacterial infections, while antibiotic resistance is an increasing problem, particularly in human health care – this affects both disease morbidity and mortality, with significant financial implications (Gould, 2009; Wilcox, 2009).

The use of prophylactic antibiotic administration has received abundant press. Antibiotic prophylaxis should not be administered in clean, uncomplicated surgeries where no implants are used (National Institute for Health and Care Excellence, 2008) and only administered to clean surgeries involving the placement of implants, clean-contaminated surgery and contaminated and dirty surgeries.

A practice standard operating procedure should be established on responsible antimicrobial use in combination with infection control protocols, while the Federation of European Companion Animal Veterinary Associations Hygiene Working Group has published four posters with recommendations for responsible use of antimicrobials.

VNs, with all the different tasks they do, have a pivotal role in infection control. IMAGE: Fotolia/Ermolaev Alexandr.

The development of infection control protocols and a good surgical technique will help minimise tissue trauma and infection, thus reducing the use of routine antibiotics to prevent postoperative infections.

Summary

Infection control is a dynamic and developing topic in both human and veterinary medicine. With this in mind, the infection control manual should be reviewed and revised regularly.

VNs play a central role in the development and review of infection control measures in practice, but it is important to remember infection control practices are formed on a multimodal team approach.

It is also important to identify infection risks, including those from outside of the veterinary environment.

References

- Dohmen P (2006). Influence of skin flora and preventive measures on surgical site infection during cardiac surgery, *Surgical Infections (Suppl)* **7**(S1): 13-17.
- Fossum TW (2007). Preparation of the operative site. In *Small Animal Surgery* (3rd edn), Mosby Elsevier, St Louis: 34.
- Gould IM (2009). Antibiotic resistance: the perfect storm, *International Journal of Antimicrobial Agents (Suppl)* 34(S3): 2-5.

- Hibbard JS (2005). Analyses comparing the antimicrobial activity and safety of current antiseptic agents: a review, *Journal of Infusion Nursing* **28**(3): 194-207.
- Kampf G and Kapella M (2003). Suitability of sterillium gel for surgical hand disinfection, *The Journal of Hospital Infection* **54**(3): 222-225.
- McDonald Vox San (2006) Standard operating procedures, Chloraprep, Invicta Animal Health.
- National Institute for Health and Care Excellence (2008). *Surgical site infection: prevention and treatment of surgical site infection*, National Collaborating Centre for Women's and Children's Health, http://bit.ly/2fkyoT6
- O'Dwyer L (2013). How to implement an infection control strategy, *The Veterinary Nurse* **4** (9): 558-564.
- Rosenthal K (2006). *Nurse Manager*: 55-66.
- Verwilghen DR, Mainil J, Mastrocicco E et al (2011). Surgical hand antisepsis in veterinary practice: evaluation of soap scrubs and alcohol based rub techniques, *Veterinary Journal* **190**(3): 372–377.
- Wilcox MH (2009). The tide of antimicrobial resistance and selection, *International Journal of Antimicrobial Agents* **34**(S3): 6-10.
- World Health Organization (2009). *Hand hygiene: why, how and when?* http://bit.ly/1DGCf0c

Further Reading

- www.fecava.org
- www.invictavet.com
- www.itsinfectious.co.uk
- www.thebellamossfoundation.com