

THE NEED FOR BIOSECURITY IN A VETERINARY PRACTICE TODAY

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SUMMARY

Veterinary facilities are not excluded from the risk of hospital-acquired infections and these occur more often than we would care to admit. In order to provide the best veterinary care possible, veterinarians and their staff have an underlying responsibility to minimize the risk of additional harm that might befall a patient because of their interventions. This includes minimizing the risk of exposing patients to infectious agents. It is therefore incumbent upon vets to actively manage the risk of nosocomial infections. These infections in veterinary facilities are not solely a patient-care concern; as in human health the spread of infectious agents can also significantly impact on normal daily operations, revenue, client satisfaction, client confidence, public image and can even affect the morale of staff. The most important factor in preventing these infections is improving the hygiene practices of health care providers. All staff members associated with animal care must be educated in proper hand-washing procedures, aseptic technique, basic hygiene principles and the appropriate use of disinfectants.

The aim of this article is to highlight the need for proper infection control programmes in veterinary practices.

INTRODUCTION

Nosocomial or hospital-acquired infections are an inherent risk of hospitalization and are undesirable, costly, can be life-threatening and can usually be prevented. Sources of such infections can be either endogenous (e.g. from the patient's own flora) or exogenous (e.g. from a source other than the patient). Most nosocomial infections are endemic, occur with predictable frequency, are endogenous in origin and occur among immunocompromised, severely ill, or elderly patients. Epidemic infections are less common and imply a common source (exogenous), vector transmission and are often associated with specific procedures or devices. Factors that predispose patients to nosocomial infections can be classified as intrinsic (e.g. age, sex, breed, immune status of patient) or extrinsic (e.g. surgical procedures, diagnostic or therapeutic interventions, staff exposures). Although many factors affect the risk of virtually all nosocomial infections, such as severity of underlying illness, advanced age, immunosuppression and surgical procedures, others affect the risk of a specific infection. For example, mechanical ventilation specifically increases the risk of nosocomial pneumonia and indwelling urinary catheters are associated with urinary tract infections.

The prevention of nosocomial infections by the identification of risk factors and the development, i.e. introduction and monitoring the effectiveness and efficiency of preventative measures, is the principle objective of hospital biosecurity.



Respiratory equipment can easily become sources of infection

THE HUMAN HEALTH SERVICES SITUATION

According to figures released by the Centre for Disease Control and Prevention (CDC) in March 2005, 90,000 Americans die each year due to nosocomial infections and another 1.9 million suffer needlessly from infection related illnesses. These patients spend up to 30 more days in hospital and together with the additional treatment it adds a considerable amount to the nation's health care bill - as much as \$5 billion dollars annually.

In the UK hospital acquired infections strike about 100,000 people a year, costing £1 billion and resulting in about 5,000 deaths. (Weekly Telegraph 24 March 2004). A recent report in the same newspaper indicates that the situation has worsened dramatically over the past two years. The reasons given for the increase is that the hospitals are too full at 85% capacity. The initiative taken to get staff to wash their hands or use an alcohol hand gel has not had any significant effect on reducing hospital acquired infections. (Weekly Telegraph 14 March 2007).

"South Africa is on the verge of a massive increase in the outbreak of infectious diseases in our hospitals with very few measures to control it" (Sunday Tribune 24 July 2005). "We suspect that in South Africa a conservative estimate of hospital acquired infections is about 15% of admissions. I would not be surprised if in some institutions this figure is even more horrific" (Prof Sam Mhlongo, Medunsa, The Star 24 December 2004).

Unfortunately infection control and more particularly disinfection are too often seen as a cost to be minimized rather than a Quality Assurance issue to be properly dealt with in the delivery of the medical care to the patient.

A VETERINARY PERSPECTIVE: THE NEED FOR BEST PRACTICE

The responsible use of antibiotics in veterinary medicine to safeguard the efficacy of antibiotic therapy in animals and



minimize possible public health risks is currently a worldwide concern. Everything possible must be done to prevent the emergence of resistance and the spread of resistant bacteria. Such measures include individual preventative practices, improvement in hygiene and nursing practices, control of antibiotic use and shortening hospitalization periods.

"Hospital acquired infections are particularly difficult to control in a busy veterinary practice. Biosecurity measures that can be implemented on a farm, or at boarding kennels, are far easier to put into place, and monitor, than what is possible in a practice. Referral practices are especially at risk, as they regularly admit animals that have already been treated, and therefore are more likely to be carrying resistant bacteria." - Dr Marijke Henton, Golden Vet Labs.

WHAT ARE THE RISKS?

We just never know what will be walking or carried in through the door! An example of a nosocomial infection that occurred a number of years ago was a series of *Klebsiella pneumoniae* infections in animals being examined for infertility. The initial strain was isolated from a mare, where *Klebsiella* is a recognized pathogen. Alarm bells only rang 9 months later, after 9 cows and 4 bitches had yielded exactly the same capsular type in the interim. Whereas *Klebsiella* is regarded as a common cause of infertility in mares, it is seldom found associated with infertility in dogs and cows. A search for the source of the infection located it in a tub of lubricant gel that was used to introduce the speculum into the animals. The rare strain of *Klebsiella* had probably been introduced into the gel from the mare, and it had survived for nine months in the gel.

Recently, two trans-tracheal aspirates, received on the same day from the same veterinary diagnostic hospital, yielded *Pseudomonas stutzeri*. The two isolates were identical and the antibiograms were also the same. The sampling apparatus had not been properly disinfected after the first aspirate had been taken.

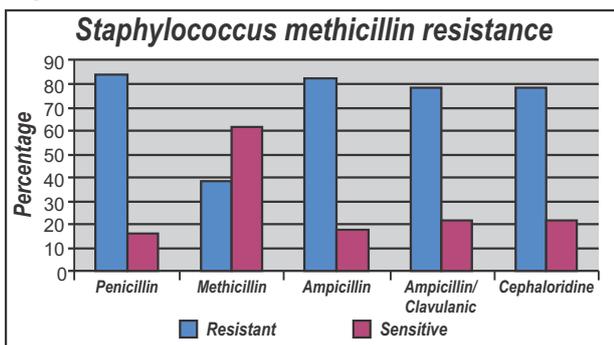
Another example, *Haemophilus parasuis* was isolated from samples from a sheep as well as a pig, sent on the same day, from the same practice. *Haemophilus parasuis* is not found in sheep at all, and there had been cross-contamination from the pig samples.

RESISTANT STRAINS

Case studies and lab results indicate that the threat of emerging diseases due to resistant strains like MRSA infections in veterinary practice is very real, e.g. 50 samples received by a veterinary diagnostic laboratory in just a 30 day period presented the following: -

An analysis of the *Staphylococcus* strains isolated from dogs during January and February 2007, from samples received showed that 38% of the strains were resistant to methicillin. Most of the isolates (78%) were *S. intermedius* and 22% were *S. aureus*. There was no real difference in the resistance rates between the two species, and they are therefore combined in the Fig A.

FIG. A



The resistance rates of penicillin (84%), ampicillin (82%), and ampicillin combined with clavulanic acid (78%) and a member of the first generation of cephalosporins, cephaloridine (78%) are also given as a comparison.

"Samples received at a diagnostic laboratory are of course not representative of all the strains causing disease, but only reflect initial treatment failures.

It is nevertheless an indication of a worrying trend and a forecast of severe problems in the future." Dr Marijke Henton, Golden Vet Lab.

A SOUTH AFRICAN INITIATIVE

In 2000 the SAVC launched a pilot project where veterinary practices could voluntarily opt to be inspected by inspectors appointed by Council. The aim was for the practices to obtain accreditation through meeting set standards pertaining to amongst others; facilities, diagnostic imaging, recordkeeping, hygiene and infection control. Feedback indicated a need for guidance at both a policy and practical level. The Council subsequently circulated a guideline document "Disinfectants and Antiseptics in Veterinary Practice" to assist practice management develop, implement and evaluate an infection control and hygiene policy best suited for their particular applications.

Legislation pertaining to the new regulations for the veterinary profession is pending, but compulsory inspections for accreditation purposes will soon be a reality for every practice.

FORMULATING AND IMPLEMENTING A POLICY

Step 1 - Identify the risks!

The first step in formulating a biosecurity policy is to identify where cleaning, disinfection or sterilization is required.

FIG. B - RISK IDENTIFICATION IN MODERN VETERINARY PRACTICE

INTENDED USE	USAGE/RISK	
	HIGH	MEDIUM
Surgical instruments	X	
Intravenous catheters	X	
Hypodermic needles	X	
Anaesthesia equipment		X
Endotracheal tubes		X
Laryngoscopes		X
Urinary catheters		X
Rectal thermometers		X
Otoscope attachments		X
Stethoscopes		X
Endoscopes	X	
Diagnostic imaging probes		X
Razor blades		X
Bedding		X
Food and drink bowls		X
Kitchen utensils		X
Brushes and toys		X
Scale		X
Door knobs, light switches		X
Staff clothing		X
Nail brushes		X
Soap containers		X
Cages		X
Litter trays		X
Basins		X
Drains		X
Waste bins		X
Cleaning equipment		X

High=Sterilization essential

Medium=Sterilization / High level disinfection

The nature of instrument/equipment disinfection or sterilization can be understood more readily if these items are divided into categories based on the known risk of infection involved in their use. This classification scheme was first suggested by Dr. E.H. Spaulding in 1972 and provides a good base. Unfortunately this assessment was based upon the need to deal with surface cross-contamination whereas now we know that a significant risk of infection arises from airborne contamination as well, commonly via the air conditioning system or simply from dust carried from surface to surface by air movement.

The simpler the programme the less confusing to the staff and the more cost-effective it will be.



Semi-critical devices that pose a medium risk of transmitting an infection and require high level disinfection

Step 2 - Reduce the risks!

The aim is always to reduce the microbe level to the lowest possible level in the most practical and cost-effective way. Basic hygiene principles and good housekeeping will go a long way. Surfaces that look clean, dry and shiny are probably safe and good for staff morale.

Staff should be aware and well trained in basic hygiene principles and routine cleaning procedures. Good practices such as damp dusting, vacuuming and fogging should be the norm.

Vacuum cleaning

Vacuum cleaning is an efficient and effective method collecting dust and hair in veterinary settings.

Fogging

This is a novel way of applying a disinfectant in the form of aerosol micro droplets and can be extremely effective and economic if done correctly. The disinfectant can reach onto surfaces otherwise difficult to reach and if used with a safe disinfectant (product specific toxicological data must be available for a fogging application), it can be used in the presence of staff and patients. Foggers that produce different droplet sizes (average 12 - 22 microns) are commercially available.



Fogging with a safe product can be done in the presence of staff and patients

Biofilm removal

Biofilm is a complex aggregation of micro-organisms marked by the excretion of a protective and adhesive matrix. There is an increasing awareness in health environments of the need to deal more effectively with this very difficult problem.

Surfaces in the animal production environment (poultry & pig houses, milking machines & bulk tanks etc. etc.) as well as clinics and keeping cages, kennels and catteries - often develop a microfilm fatty layer within which pathogenic micro-organisms escape general surface washing/disinfection due to the use of ineffective products and or procedures and therefore act as a reservoir population to infect the next batch of animals/ patients. Biofilm can coat the inside surfaces of water reticulation pipes used in intensive animal production or, as has been found, the inside surfaces of catheters. Such situations demand periodic deep cleans with a product formulated to remove natural fats and oils (F919SC Degreaser/Cleaner has proved to be very effective in such applications) and the daily use of effective disinfectant/cleaner products such as F10SCXD Veterinary Disinfectant/Cleaner.

Air quality

Airborne contamination can be a significant source of contamination particularly in buildings that are more than 4 years old. Sick buildings are not limited to office buildings.

The cleaning and disinfection of primary and secondary filters in central air conditioning systems and the ducts themselves need to be regularly monitored in terms of pressure drops at the filters as well as settle plate sampling at individual diffuser outlets. Products such as the F10 HVAC range of cleaners and disinfectants for central systems and F10HVAC aerosols for individual units have achieved exceptional reductions in micro-organism counts. They are a significant step forward in making these tasks more effective and efficient because in most situations they can be used whilst the building is occupied.

Step 3 - Manage the risks

There is little point in going to all the trouble of identifying and reducing infection risks if measures are not in place to maintain the achievements.

Monitoring of physical standards can be done using a simple inspection sheet and performing a physical inspection on a weekly/monthly basis involving the staff responsible for each area. Results should be compared to standards that have been set and used to motivate staff by recognising good results and re-training where poor results are found. Microbiological surveys should be carried out at least quarterly.

PRODUCT SELECTION

New, exciting and often useless products are presented in all shapes and sizes with weird and wonderful claims being made about efficacy, dilutions, contact times and residual effect. If you accept that the risks are increasing then product selection is a critical decision and cannot be left to uninformed persons. This in turn means efficacy test reports, toxicity reports, MSDS, must be checked for relevance and adequacy. Are they registered by an appropriate Authority, e.g. in South Africa there is a Compulsory (general) Standard Act 29 for disinfectants but only products registered under the Dept of Agriculture Stock Remedies Act 36 are assessed for their efficacy against animal diseases. Look at the depth of a product's performance. A product that can just manage a log³ challenge is not suitable for the varying demands to be found in a veterinary practice. Products should be capable of dealing with at least log⁵ as required by the EU, EN Standards, or better still the US, AOAC Standards that require a log⁶ kill for hospital applications. Mutations resulting in resistance micro-organisms only occur when the challenge is not totally eliminated. If the product is not up to the challenge, what relevance has cost, fragrance or staff satisfaction?

SAVA Medico Committee recommendations issued in 2001 and endorsed by the SAVC set out a product selection model Fig C below. F10SC Veterinary Disinfectant has been used as an example of compliance evaluation.

PRODUCT SELECTION CRITERIA

EVALUATION OF DISINFECTANTS FOR USE IN THE VETERINARY PRACTICE

(Extract from DISINFECTANTS AND ANTISEPTICS IN VETERINARY PRACTICE a document prepared by SAVA MEDCO 2001)

- A** Hard Surfaces with animals present
B Air Spaces with animals present
C Cage Kennels with animals present
D Instruments without rinsing before use
E Skin and Mucous Membranes
F Laundry pre-soak.

APPLICATION	A	B	C	D	E	F
1 = Recommended standard 2 = F10 being evaluated	1	2	1	2	1	2

Y = YES IT COMPLIES **N = NON COMPLIANT**

EFFICACY	A	B	C	D	E	F
• Gram positive bacteria	Y	Y	Y	Y	Y	Y
• Gram negative bacteria	Y	Y	Y	Y	Y	Y
• Enveloped viruses	Y	Y	Y	Y	Y	Y
• Non enveloped viruses	Y	Y	Y	Y	Y	Y
• Yeasts and moulds	Y	Y	Y	Y	Y	Y
• Fungi	Y	Y	Y	Y	Y	Y
• Fungal spores		Y	Y	Y	Y	Y
• Bacteria spores		Y	Y	Y	Y	Y
• Protozoa, including cysts					Y	N
• Other specifics						
• Are relevant claims included on the Act 36 label	Y	Y	Y	Y	Y	Y
• Were tests carried out on the finished product	Y	Y	Y	Y	Y	Y
• Were the tests carried out by an accredited laboratory	Y	Y	Y	Y	Y	Y

SIDE EFFECTS	A	B	C	D	E	F
• Oral toxicity > 3000g/kg	Y	Y	Y	Y	Y	Y
• Dermal toxicity > 4000g/kg	Y	Y	Y	Y	Y	Y
• Inhalation toxicity is non toxic	Y	Y	Y	Y	Y	Y
• Ocular irritation - draize score not more than 2 after 24 Hrs	Y	Y	Y	Y	Y	Y
• Skin irritation - intact skin score < 4 (SABS 671)	Y	Y	Y	Y	Y	Y
• Skin irritation - abraded skin < 4 (SABS 671)	Y	Y	Y	Y	Y	Y
• Tissue compatibility substantiated				Y	Y	Y
• Non corrosive to all metals	Y	Y	Y	Y	Y	Y
• Can it be used without the use of safety equipment/ protective clothing	Y	Y	Y	Y	Y	Y
• Can it be used in the presence of animals/Humans	Y	Y	Y	Y	Y	Y
• Unrestricted use in terms of the Act 36 label (1)	Y	Y	Y	Y	Y	Y
• Were tests carried out on the finished product	Y	Y	Y	Y	Y	Y
• Were the tests carried out by an accredited laboratory	Y	Y	Y	Y	Y	Y

ACCREDITATION AND REGISTRATION	A	B	C	D	E	F
Registered in terms Act 36 of 1947 (1)	Y	Y	Y	Y	Y	Y
Compulsory Registration of Disinfectants Act 29 (2)	Y	Y	Y	Y	Y	Y
• Other	3					

QUALITY ASSURANCE	A	B	C	D	E	F
• SABS Approval Marks (Efficacy and QA process)	4					
• SABS Compliance Marks (Safety and QA process)	5					
• Other	6					

APPROVALS SUCH AS EQUIPMENT MANUFACTURERS	A	B	C	D	E	F
• Equipment manufacturers - Endoscopes				Y	7	
• Other						

- (1) Disinfectant products claiming to control or eliminate specific animal pathogen must be registered under Act 36/1947 Stock Remedies
 (2) Disinfectant products registered under Act 29 do not cover specific animal pathogens
 3 Other registrations in countries in addition to SA
 4 SABS Approval Marks
 5 SABS Compliance Marks
 6 Quality Assurance Other, GMP approved by APVMA to manufacture veterinary medicines
 7 Manufacturer's Approval, Olympus, Flexible Endoscopes

CONCLUSION

Hospital-acquired infections may not be an everyday occurrence in your facility, you may even not be aware that such an infection ever occurred, but the threat is real.

Why compromise your patient's well-being, your practice image, and your client's trust in you or your own health when an effective policy backed up by Best Practices Processes will ensure a good standard is maintained?

Is a clean and safe environment not the very least your clients and patients can expect from you?



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