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BIOSAFETY AND BIOSECURITY MANUAL

Institute of Veterinary Medicine and Animal Sciences
Estonian University of Life Sciences

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I Abbreviations

EMÜ	Estonian University of Life Sciences (in Estonian: <i>Eesti Maaülikool</i>)
PPE	personal protective equipment
MRSA	methicillin resistant <i>Staphylococcus aureus</i>
MRSP	methicillin resistant <i>Staphylococcus pseudintermedius</i>
VLI	Institute of Veterinary Medicine and Animal Sciences (in Estonian: <i>Veterinaarmeditsiini ja loomakasvatuse instituut</i>)

II Definitions

Antimicrobial Agent – Any substance – of natural, semi-synthetic or synthetic origin – that kills or inhibits the growth of a microorganism. Examples: enrofloxacin, penicillin, monensin.

Antibiotic – A substance produced by a microorganism that kills or inhibits the growth of another microorganism. All antibiotics are antimicrobial agents. Examples: penicillin, lincomycin.

Biosafety - the containment principles, technologies and practices that are implemented to prevent unintentional exposure to pathogens and toxins, or their accidental release.

Biosecurity – Management-practice activities that reduce the opportunities for infectious agents to gain access to, or spread within a food animal production unit or an animal hospital environment.

Contagious disease – subset category of transmissible diseases, which are transmitted to others, either by physical contact with the person suffering the disease, or by casual contact with their secretions or objects touched by them or airborne route among other routes.

Disinfectant – antimicrobial agents that are applied to the surface of non-living objects to destroy microorganisms that are living on the objects.

Disinfection – the act of disinfecting, using specialized cleansing techniques that destroy or prevent growth of organisms capable of infection.

Fomites (singular: **fomes**) – inanimate communicators of infection (e.g. rubber boots, vehicles, clothes).

Infectious disease - caused by living organisms that cause harm while residing in or on an animal's body, where these living agents replicate and are involved in a trophic relationship with the animal.

Nosocomial infection – hospital-acquired infection.

Personal protective equipment (PPE) – protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter.

Zoonosis – an infection shared in nature by humans and animals (other vertebrates).

III Legislation

- Riigiteataja 2013. Bioloogilistest ohuteguritest mõjutatud töökeskkonna tervishoiu ja tööohutuse nõuded. <https://www.riigiteataja.ee/akt/107052013017>
- Occupational Health and Safety Requirements for Working Environment Affected by Biological Hazards http://osh.sm.ee/legislation/biological_hazards.pdf
- Riigiteataja 2017. Loomatauditõrje seadus. <https://www.riigiteataja.ee/akt/116062017015>
- Riigiteataja 2017. Infectious Animal Disease Control Act <https://www.riigiteataja.ee/en/eli/ee/Riigikogu/act/522062017001/consolide>

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1. Introduction

The aim of this manual is to provide biosafety and biosecurity instructions for the staff and students of the Institute of Veterinary Medicine and Animal Sciences (VLI) of Estonian University of Life Sciences (EMÜ). Standard operating procedures gathered in this manual are applied only in VLI. The goals of these procedures include minimizing the risk of nosocomial infections and minimizing the exposure to zoonotic disease agents.

New staff members and students will be notified about this manual by his/her immediate supervisor. After reading this manual the employee will give his/her signature as a sign of having acquainted with the manual and understanding the procedures needed in his/her special line of work and/or studies. For students, this will be done during the course 'Introduction to veterinary studies'.

On institute level the staff member who is responsible for biosafety and biosecurity is appointed by the director of the Institute.

2. Employee and student health

2.1. Health insurance for students

All students studying at the University are covered by the **Estonian Health Insurance Fund** (*Haigekassa*). International students studying in Estonia are covered if they have the right of permanent residence or they have a long-term residence permit. The health insurance is valid **for the nominal period of studies** and a further three months after their graduation. If the student does not graduate from the university within the standard period of study (except for medical reasons), or he or she is expelled from the university, the health insurance ends one month after the end of the standard period of study or after ex-matriculation. **During the academic leave the health insurance stops**, except in the case when the leave has been taken for medical reasons. The details of students are submitted to the Health Insurance Fund by the Ministry of Education and Research.

The students bound for student exchange or study abroad must, in order for the Estonian health insurance to continue, submit the Health Insurance Fund a document certifying the studies abroad. On the basis thereof, the health insurance shall be formalized for up to 12 months. The certificate of studies is delivered to the Health Insurance Fund each academic year.

2.1.1. Accident and liability insurance during practical training

The Institute of Veterinary Medicine and Animal Sciences has signed an **accident insurance** with ERGO Insurance SE, which is valid during the practical training in the educational institution and practical training at the appointed host institution outside the educational institution. The insurance contract does not apply to accidents that take place on the way to the educational institution and the place of practical training and back. The territorial coverage of the insurance policy is the whole world, but medical treatment expenses are compensated only in Estonia. In the event of doing the practical training in a foreign country, a travel insurance contract must be concluded to cover unexpected health expenditures abroad. The students are also covered with the **liability insurance** with insurance company If, that provides coverage for the loss or damage that the students have caused to third parties with their professional activity (e.g. incorrect use of equipment, medical

mistreatment, etc.). Liability insurance covers bodily injuries and property loss or damage to third parties to the extent prescribed by law but it does not cover additional contractual liability or self-inflicted loss or damage.

In case of an accident the students must send a free text message to the address isikukahjud@ergo.ee, and in case of liability issues to info@if.ee. Detailed information will be sent to the student on how to notify of the accident. The university must also be notified by the student by sending an e-mail to the address: vl@emu.ee.

2.2. Special infectious disease risks

Immune deficiencies may put the staff, students and clients at increased risk for acquiring zoonotic infections. Additionally, immunocompromised personnel are more likely to develop serious complications from infections. Immune deficiencies may result from underlying medical conditions (e.g. HIV/AIDS, diabetes mellitus, asplenia, pregnancy, certain malignancies), therapy for a variety of conditions (e.g. steroids, chemotherapeutic and immunosuppressive agents, radiation) or may be congenital.

Antibiotic-resistant bacteria including methicillin resistant *Staphylococcus pseudintermedius* and multidrug-resistant *E. coli* have been isolated from both clinically normal and hospitalized dogs. The potential for the transfer of infection to immunocompromised staff in a veterinary clinic is real and should be addressed.

Immunocompromised employees and their supervisors should be aware of the following workplace encounters that may result in exposure to zoonotic pathogens:

- Processing laboratory samples.
- Direct patient care, especially with the following high risk animals:
 - Young animals (ruminants prior to weaning, dogs and cats less than six months of age)
 - Animals with diarrhoea
 - Parturient animals
 - Stray or feral animals; especially predators of rodents and wildlife
 - Animals fed raw meat diets
 - Reptiles or exotic, imported species
 - Animals housed in crowded conditions (such as shelters)
 - Unvaccinated animals or those with untreated internal or external parasites.

The risks associated with the exposure to zoonotic pathogens in the workplace can be mitigated by appropriate infection control measures. Since medical practitioners' knowledge of the risk of zoonotic diseases is often limited, veterinarians are called upon to share respective information and help with diagnosing the diseases.

During **pregnancy**, women experience physiologic suppression of cell-mediated immunity, increasing their susceptibility to certain infections. These include toxoplasmosis, lymphocytic choriomeningitis virus infection, brucellosis, listeriosis, Q fever, leptospirosis and *Chlamydia psittaci*. Vertical transmission of certain zoonoses may result in abortion, stillbirth, prematurity or congenital anomalies. Measures to reduce the risk from infection with these pathogens will vary depending on individual circumstances, but may include:

- avoiding jobs such as obstetrics due to the contact with birth fluid;

- avoiding contact with young cats, cat faeces or raw meat to lessen the chance of contracting toxoplasma.

Employees and students who are pregnant or who have immune dysfunction should discuss their status with the clinic manager, immediate supervisor or teacher so the University can provide appropriate accommodations to protect them. The use of infection control measures and personal protective equipment is needed to reduce the risk of infection. In some cases, it may be advisable to consult the employee's healthcare provider (with the person's consent) or an infection control, public health or occupational health specialist in managing the zoonotic disease risk. The employee should be assured that confidential information will not be disclosed to others.

2.3. Bites and scratches

In general, veterinarians and animal handlers should be able to recognize behaviour in animals and situations that are associated with an increased tendency for an animal to bite. Professional judgment should be exercised to guide bite prevention practices. Precautions may include physical restraint or chemical restraint (sedation or anaesthesia) of an animal.

Appropriate equipment, such as different sizes of muzzles, bite-resistant gloves, halters, rearing bits or a cattle crush should be readily available. Such equipment should also be as easy to clean as possible. Experienced veterinary personnel rather than owners should restrain animals for procedures whenever possible. Personnel should always be aware of changes in their patients' behaviour, which may precede attempts to bite. Veterinary personnel should not let client perceptions or attitudes prevent them from using appropriate bite-prevention measures such as muzzling.

Having been bitten or scratched by an animal:

- Immediately wash the wound thoroughly with soap and water and seek medical advice.
- For a bite or scratch from a flying fox (bat), wash the wound for about 5 minutes and then apply a virucidal antiseptic (e.g. povidone-iodine).
 - Medical attention is particularly important and should be sought as soon as possible for any bite that:
 - is on a hand or is over a joint
 - is over a prosthetic device or an implant
 - is in the genital area
 - is over a tendon sheath, such as bite on the wrist or the ankle
 - causes a large amount of tissue damage such as a deep tear or a tissue flap
 - is caused by a flying fox (fruit bat) or microbat
 - is a tetanus-prone wound.

Medical attention is also particularly important and should also be sought for any bite (particularly from a cat) sustained by a person with any of the following conditions:

- Compromised immune system (e.g. HIV/AIDS, transplant or chemotherapy patients).
- Chronic swelling (oedema) in the area that was bitten.
- If the person has had his or her spleen removed.
- If the person is suffering from a liver disease, diabetes, lupus or any other chronic systemic disease.

Bites may also need to be reported to the local or state public health agencies, Health Board and Veterinary and Food Board. If you have been in contact with an animal that might be rabies positive, contact the local office of the Health Board (+372 58 238 267).

If the bitten area becomes increasingly painful or swollen, if the wound develops a discharge, or if the person develops a fever or swollen lymph nodes, consult a physician as soon as possible. A physician will decide if antimicrobial therapy, tetanus vaccination, or any additional treatment (e.g. lavage, debridement, sutures) are necessary. Most bite wounds are not sutured in order to promote drainage and reduce the risk of infection. Emergency contact information (i.e. doctor, hospital, ambulance) should be clearly posted in the clinic.

2.4. Vaccination

Vaccination is highly recommended, especially against tetanus, rabies and tick-borne encephalitis (TBE). More information about vaccination can be sought from your family doctor (GP, *perearst* in Estonian) or from the Tartu University Hospital.

3. Infectious diseases

3.1. Transmission of infectious diseases

Sources of zoonotic diseases include animals or environments contaminated by animals. Pathogens may be transmitted to humans directly from the animal via blood or other body substances during diagnostic or treatment procedures, or indirectly from the animal's environment.

Host susceptibility. Animals may be clinically ill, asymptomatic carriers of an infectious agent harbouring endogenous flora that are pathogenic to humans, or in the incubation period of an infectious disease. Pathogens may also be transmitted indirectly from fomites in the environment including walls, floors, counters, equipment, supplies, animal feed, and water.

Host resistance to pathogenic microorganisms varies greatly. Some people may be immune to infection or may be able to resist colonization by an infectious agent. Others exposed to the same agent may become asymptomatic carriers while still others may develop a clinical disease. Host factors, such as age, underlying diseases, immunosuppression, pregnancy, and breaks in the body's first-line of defence mechanisms (intact skin, cough reflex, low stomach pH) may render the host more susceptible to infection or to a more serious illness if infected. Conversely, vaccination or prior exposure may reduce susceptibility to infection.

Transmission route definitions:

- Aerosol — droplets are passed through the air from one animal to another.
- Oral — consuming disease causing agents in contaminated feed, water or licking/chewing on contaminated environmental objects.
- Direct contact — a susceptible animal becomes exposed when the disease agent directly touches open wounds, mucous membranes, or the skin through blood, saliva, nose to nose contact, rubbing, or biting.
 - Reproductive — a subtype of direct contact that includes the spread of diseases through mating or to the foetus during pregnancy.
- Fomite — an inanimate object carrying a disease agent from one susceptible animal to another.

- Traffic — a subtype of fomite transmission in which a vehicle, a trailer, or a human spreads organic material to another location.
- Vector-borne — an insect acquires a disease agent from one animal and transmits it to another.
- Zoonotic — diseases are transmitted from animals to humans or *vice versa*.

Environmental contamination must always be taken into consideration.

3.2. Risk categories at the clinics

The clinics are divided into three risk categories. First, the mildest, is the patient areas and waiting room. Second, the medium risk, are the back rooms of the clinic, where no owners are allowed. Third, the highest risk, is in the surgery quarters.

The manager of the clinics, is responsible for marking these areas at the clinics. She/he should be contacted with questions about the categories or if there is a diagnosis of a highly infectious disease.

4. General principles

4.1. Veterinary standard precautions

Veterinary standard precautions are used for all clinical situations involving patient care and contact with an animal's blood, body substances, non-intact skin and mucous membranes. They are work practices that ensure a basic level of infection prevention and control. Transmission-based precautions are additional precautions that are adopted when standard precautions alone cannot control the risk of exposure or transmission. They are targeted at the route of transmission of the infectious agent to address possible transmission through physical contact, droplets and inhalation of airborne pathogens.

The range of precautions include hand hygiene, use of personal protective equipment, safe use and disposal of sharps, routine environmental cleaning and spills management, reprocessing of reusable equipment and instruments, aseptic non-touch technique, waste management and appropriate handling of linen.

4.2. Hand hygiene

- Hand hygiene is the most important way to prevent the spread of infection.
- Gloves are not a substitute for hand hygiene.
- Hand hygiene should be performed before and after each patient, after activities likely to cause contamination, before eating, drinking or smoking, after leaving clinical areas and after removing gloves.
- A mild liquid handwash (with no added substances that may cause irritation or dryness) should be used for routine handwashing, especially when hands are visibly dirty or contaminated.
- Skin disinfectants formulated for use without water (e.g. alcohol-based hand rub) may be used when hands appear clean.
- Intact skin is a natural defence against infections.

Hand hygiene (see Figure 1.) is generally considered to be the most important measure in preventing the spread of infection in health care establishments (Larson 1996). Veterinary clinic staff should perform hand hygiene before and after significant contact with any patient and after activities likely to cause contamination. Significant patient contact may include:

- contact with or the physical examination of an animal
- cleaning cages, equipment or bedding
- undertaking venipuncture or giving an injection.

Activities that can cause contamination include:

- handling equipment or instruments soiled with blood or other body substances
- handling laundry, equipment and waste in contact with blood, body substances and contaminated fomites
- going to the toilet.



Figure 1. Handwash. *Source: WHO*

All veterinary personnel should perform hand hygiene between examinations of individual animals or animal groups, such as litters of puppies or herds of cattle. Every exam room should have a sink with running water, a liquid soap dispenser, and paper towels. Alcohol-based hand rubs should also be provided for use in conjunction with handwashing.

Refillable containers are a potential source of contamination as bacteria can multiply within many products. Liquid handwash dispensers with disposable cartridges, including a disposable dispensing nozzle or sensors for movement activated delivery, are recommended. Special attention should be taken to clean pump mechanisms before refilling as these have been implicated as sources of infection. Scrub brushes should not be used because they can cause abrasion of the skin, and may be a source of infection.



Figure 2. Handrub. *Source: WHO*

Alcohol-based hand rub can be used when the hands are clean and there is no obvious contamination from body substances (see Figure 2.). It is also useful in emergency situations where there may be insufficient time or where handwashing facilities are inadequate.

Visible soil should be removed by some means (e.g. rinsing, mechanical rubbing or wipes) before the use of alcohol-based hand rubs. Veterinary personnel should wash their hands as soon as appropriate facilities become available. Veterinary vehicles should be equipped with alcohol-based hand rub, soap, water and hand towels for drying.

Hand care is important because intact skin (with no cuts or abrasions) is a natural defence against infection. Any breaks or lesions of the skin are possible sources of entry for pathogens. Rings should not be worn, nails should be short and clean, and artificial nails should not be worn, as they contribute to increased bacterial counts. Chipped nail polish can also contribute to microbial growth. Rings or artificial nails should not be worn when performing invasive procedures (i.e. where gloved hands are placed inside body cavities).

Repeated handwashing and wearing of gloves can cause irritation or sensitivity, leading to irritant or allergic contact dermatitis. This can be minimized by early intervention, including assessment of handwashing technique, the use of suitable individual-use hand creams and appropriate selection of gloves (e.g. low protein, powder-free latex gloves).

To minimize the chapping of hands, use warm water and pat hands dry rather than rub them. Cuts and abrasions should be covered by water-resistant occlusive dressings that should be changed as necessary. Veterinary personnel who have skin problems, such as exudative lesions, dermatophytosis or weeping dermatitis should seek medical advice and should be removed from direct patient care until the condition resolves.

4.3. Sharps safety

The basic principles of sharps safety are:

- The person who generates the sharp is responsible for its safe disposal
- Do not pass sharps by hand between people
- Replace the sharps containers when full
- Keep the sharps containers out of the reach of children and animals.

Needlestick injuries are among the most prevalent accidents in the veterinary workplace. The most common needlestick injury is inadvertent injection. In a 1995 survey of 701 North Carolina veterinarians, 27% of respondents had accidentally self-inoculated rabies vaccine and 7% (23% of large animal veterinarians) live Brucella vaccine. Needle punctures sustained during procedures, e.g. fine-needle aspirations, are potential sources of zoonotic pathogens. Similar risks are presented by ovine Johne's disease and anthrax vaccines in Australia.

The most important precaution is to avoid recapping needles. Recapping causes more injuries than it prevents. When it is absolutely necessary to recap needles as a part of a medical procedure or protocol, a mechanical device such as forceps can be used to replace the cap on the needle or the one-handed "scoop" technique may be used. This technique involves holding the syringe with the attached needle or the needle hub alone (when unattached) and scooping or sliding the cap, which is lying on a horizontal surface, onto the needle's sharp end. Once the point of the needle is covered, the cap is tightened by pushing it against an object, or by pulling the base of the needle cap onto the hub of the needle with the same hand holding the syringe (see Figure 3.). In the field, recapping is allowed if there is no safe way to dispose of the syringe and needle otherwise.

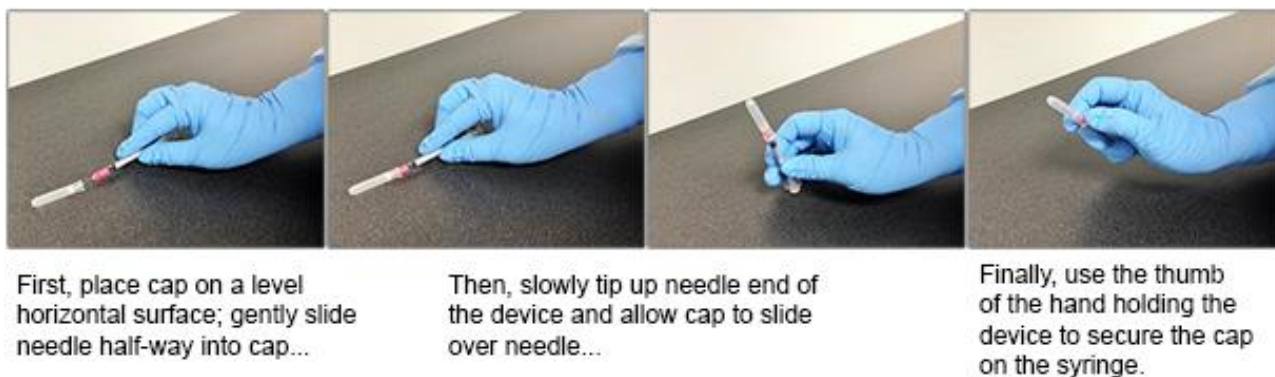


Figure 3. One-handed technique for recapping the needle. *Source: Vanderbilt University, Nashville, USA.*

When injecting live vaccines or aspirating body substances or tissue, the used syringe with the needle attached should be placed in a sharps container. Following most other veterinary procedures, the needle and syringe may be separated for the disposal of the needle in the sharps container. This can be most safely accomplished by using the needle removal device on the sharps container, which allows the needle to drop directly into the container. Needles should never be removed from the syringe by hand, if possible. In addition, needle caps should not be removed by mouth.

Sharps containers are safe and economical, and should be located in every area where animal care occurs. Sharps should not be transferred from one container to another. Devices that cut needles prior to disposal should not be used because they increase the risk of aerosolisation of the contents.

4.4. Clothing and footwear

Outdoor clothing (e.g. jackets) should not be brought to the laboratories or the clinic areas. These should be stored in lockers when possible. It is advised and in some cases even required to have a change of footwear when at classes or practicals, especially during winter time.

Lab coats and overalls are meant to protect your clothing from contamination, but generally they are not fluid resistant, so they should not be used in situations where splashing or soaking with blood or body substances is anticipated. These garments should be changed promptly whenever they become visibly soiled or contaminated with body substances, and at the end of each day. Overalls should be changed between properties when visiting farms. Lab coats should be used only in laboratory environment, not in the clinic (see exceptions below).

Clinic scrubs should not be worn outside the clinic. Staff should be aware that taking scrubs home for washing could potentially transfer pathogens from clinic to home. If scrubs are brought home, they should be kept in a plastic bag until being placed in the washing machine, and washed separately from other laundry. Scrubs should be washed on-site in hot water and detergent, with other clinic laundry. Larger clinics should consider supplying separate washing machines for animal laundry (blankets etc.) and scrubs. Scrubs should be washed at the end of each day and whenever they become visibly soiled.

Designated scrubs should always be worn during surgery – these scrubs should not be worn during other procedures or when handling patients. Scrubs worn for surgery should be covered with a lab coat outside of the surgical suite.

4.4.1 Footwear in clinic

Enclosed footwear should be worn at all times to reduce the risk of injury from dropped equipment like scalpels and needles, scratches from being stepped on by animals, and to protect the feet from contact with potentially infectious substances (e.g. faeces, discharges and other body substances).

Designated footwear or disposable shoe covers are required in areas where infectious materials are expected to be present on the floor, in order to prevent their spread to other areas. Designated footwear or disposable shoe covers may be required for staff when patients with infectious diseases are kept on the floor (e.g. in a large dog run) or may contaminate the floor around their kennel (such as an animal with severe diarrhoea). Designated footwear should also be used around stables for horses or other animals known to carry infectious diseases such as salmonellosis. This footwear should be removed as the person leaves the contaminated area, and should be immediately

disposed of in the garbage (if disposable), or left at the entrance of the contaminated area on the 'dirty' side.

4.4.2. Footwear in field visits

Footwear, such as boots, are a common form of transmission of potential pathogens from one farm to another, and can act as fomites for the transmission of zoonotic diseases to humans.

Washable rubber boots are recommended when conducting field visits. All visible soil should be removed by scrubbing with a brush and water when leaving each property. If leather boots are worn on farm they should be cleaned of all visible contaminating material (faeces, dirt, blood, and other body substances) before leaving the property and washed with a suitable disinfectant. The onus is on the veterinarian to justify the use of footwear other than washable rubber boots for field visits.

For farm visits involving potentially infectious material washable rubber boots must be worn and cleaned with water and scrubbing brush, then disinfected with a suitable disinfectant solution.

4.5. Personal protective equipment (PPE)

Personal protective equipment (PPE) is an important routine infection control tool. PPE use for standard precautions is designed to reduce the risk of contamination of personal clothing, reduce contamination of skin and mucous membranes and reduce the transmission of pathogens between patients by the veterinary personnel.

Standard precautions should be adopted as standard work practice in all clinical situations, including any contact with animals and their environment:

- always perform hand hygiene
- cover cuts
- wear gloves for contact with blood/body substances, non-intact skin and mucous membranes
- protect clothing if there is a likelihood of contamination or splashes of blood or body substances
- protect mucous membranes if there is a risk of splashes of blood or body substances to the eyes or face.

Personal protective outerwear is used to protect veterinary personnel and to reduce the risk of pathogen transmission by clothing to patients, owners, veterinary personnel and the public. Protective outerwear should be worn whenever there may be contact with an animal or when working in the clinical environment (including cleaning).

Staff must be provided with PPE in an appropriate selection of sizes to ensure proper fit. Clients should be provided with PPE in situations when they are assisting the veterinarian and there is an infection risk.

4.5.1. Sequence of putting on and taking off PPE

Putting on:

- 1) Hand hygiene
- 2) Gown
- 3) Mask

4) Protective eyewear

5) Gloves

Taking off:

- 1) Gloves – inside out!
- 2) Protective eyewear
- 3) Gown
- 4) Mask
- 5) Hand hygiene

4.6. Cleaning and disinfection of equipment and environmental surfaces

Proper cleaning of environmental surfaces, including work areas and equipment, prevents the transmission of zoonotic pathogens. Environmental surfaces and equipment should be cleaned between uses or whenever visibly soiled.

Surfaces where animals are housed, examined, or treated should be made of non-porous, easily cleanable materials. Surfaces should be cleaned to remove gross contamination before disinfection because organic material decreases the effectiveness of most disinfectants. When cleaning, avoid generating dust and aerosols that may contain pathogens by using central vacuum units, wet mopping, dust mopping, or electrostatic sweeping. Surfaces may be lightly sprayed with water prior to mopping or sweeping. Areas to be cleaned should be appropriately ventilated.

Clean items should be kept separate from dirty items. Gloves should be worn when cleaning equipment, animal cages (including such items as food bowls and toys that have been in cages), and surfaces. Clean and disinfect equipment according to its intended use, the manufacturer's recommendations, and practice policy. Equipment must be cleaned before sterilization or chemical or thermal disinfection. Exposure to droplets generated by brushes during cleaning can be minimized by implementing preventive work practices, such as wearing facial protection and gown or plastic apron, and containing splatter (e.g. by immersing items in water).

Normal dishwashing of food and water bowls is adequate for hospitalized patients with infectious diseases, although disposable dishes might be considered for animals hospitalized in isolation. Toys, litter boxes, and other miscellaneous items should be discarded or cleaned and disinfected between patients. Litter boxes should be cleaned or disposed of at least daily by a non-pregnant staff member. Hands should be washed after finishing a cleaning activity.

To ensure effectiveness, disinfectants should be used according to manufacturers' instructions, with particular regard to proper dilution and contact time. Personnel engaged in cleaning should be trained in safe practices and should be provided necessary safety equipment according to the product's safety data sheet.

4.7. Minimize unnecessary contact with patients

All personnel and students should minimize contact with patients whenever reasonable in order to minimize the risk of zoonosis and nosocomial exposure. Contact should be especially avoided by those people who are not directly responsible for the care of the patient. Avoid touching or caressing animals when passing, if not necessary or called for.

4.8. Food, beverages and makeup

Remember: always wash your hands before eating!

Students have the possibility to use refrigerators and microwaves in the rooms of different student associations. It is not advisable to eat during the lectures. Food, including chewing gum and beverages are not allowed in teaching laboratories (e.g. anatomy, parasitology, microbiology) or in

clinical studies areas (e.g. small animal clinic or large animal clinic) apart from dedicated areas (e.g. lounge /kitchen). Alcoholic beverages should not be used during workhours.

At clinics food and beverages should be stored and consumed only in the lounge areas. The refrigerators and other equipment in those areas must not be used for the storage of medication, samples or other medical equipment, or for any other medical use. Do not eat or drink in the patient areas.

Use as little makeup as possible. Lash extensions, artificial nails and piercings are not allowed. Nails should be cut short and there should be no nail polish on them.

4.9. Pets

Pets are not allowed in the offices or classrooms unless they are used for teaching purposes. At other times these pets should be held in a separate room at the clinic with no sick animals present.

5. Laboratories

5.1. Teaching laboratories

General advice:

Think before performing any actions in the laboratory! If you are unsure about something ask the supervisor for the explanation. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ask your teacher before proceeding with the activity. Make sure you are appropriately dressed (lab coat, scrubs etc.) and that your hair is up, if you have long hair. Do not use your phone in the lab!

Be prepared for accidents! Only the student, who has passed a special training may work with the instruments that use electrical current, natural gas or are in other way potentially dangerous. Observe also other students' activities and draw their attention to necessary precautions. If the violation of safety rules is intentional, inform your supervisor or lab-technician.

Keep your working place clean and tidy! Spills or pieces of substances can damage instruments, clothes or skin. Do not eat, drink or chew gum in the laboratory. Conduct yourself in a responsible manner at all times in the laboratory. Experiments must be personally monitored at all times. Do not wander around the room, distract or startle other students or interfere with their laboratory experiments. Perform only those experiments authorized by your teacher. Unauthorized experiments are not allowed. Keep your hands away from your face, eyes, mouth, and body while working in the lab. Wash your hands with soap and water after performing all experiments.

Be alert and proceed with caution at all times in the laboratory. Notify the teacher immediately of any unsafe conditions you observe. Labels and equipment instructions must be read carefully before use. Set up and use the equipment as directed by your teacher. Know the locations and operating procedures of all safety equipment including: first aid kit(s), fire blanket and fire extinguisher. Know where the fire alarm and the exits are located. Know what to do if there is a fire drill during a laboratory period — the containers must be closed and any electrical equipment turned off.

5.1.1. Anatomy and pathological anatomy laboratories

Preparation room is entered and exited only through the dressing rooms over a disinfection carpet. The exterior door is used for the transport of specimen for preparation. In order to avoid soiling and contamination, personal protective clothing (lab coat and hat, and if necessary, a rubber or a plastic apron, rubber boots or other special clothing) must be worn. Gloves must be used when handling specimen.

Only the classroom material and learning support necessary for the specific class is taken along to the preparation laboratory. All personal belongings, including the phone, tablets and laptops must be left in the locker room. Eating and drinking is not allowed in the preparation laboratory and at any other anatomy-related learning sites.

When working with anatomical specimens, students must exercise caution and care not to injure themselves and their fellow students with sharps and cutting tools. Unnecessary incisions into anatomical specimens must be avoided. In case of an injury, the gloves are removed. The injured area is washed with running water and disinfected with an antiseptic. If necessary, the wound is patched or bandaged. A new pair of gloves is used to continue working. Wound care products can be found on the open shelf in the preparation laboratory. In case of any liquid splashes in the eye, flush out the eye with plenty of running water using the eyewash next door.

After the completion of the work with the anatomical specimen:

- place the cadaver, covered with plastic, in the refrigerator. For a prolonged storage put the preparation into the conservation solution (ethanol and glycerin) in the container;
- dissection waste is collected in the specified waste bag (first removing scalpel blades and rubber gloves from the waste);
- the instruments are washed and placed in the disinfectant solution, disposable instruments are placed in the designated container;
- dissection tables are washed with detergent, rinsed and dried;
- used gloves are thrown into the garbage bag.

Rubber gloves and disposable instruments are placed in the specified waste container. The coat used is put in a separate plastic bag and washed, if necessary. Finally, hands are washed with soap and warm water and rinsed with a disinfectant solution (70% ethanol).

5.1.2. Chemistry and biochemistry

5.1.2.1. Working with glassware

Work calmly, do not hurry! If some glassware breaks, inform other people so that they would not hurt themselves. Thereafter clean up all pieces of glass and substances. Ask other students or the supervisor to help you. Use wet paper to pick up the small pieces of glass. Never handle broken glass with your bare hands. Use a brush and a dustpan to clean up broken glass. Place broken glass in the designated glass disposal container. Examine glassware before each use. Never use chipped, cracked, or dirty glassware. Do not immerse hot glassware in cold water. The glassware may shatter.

5.1.2.2. Electricity

Prior to using an electrical appliance make sure that the electrical outlet, socket and cable are intact and the voltage is suitable for the instrument. While switching on an electrical instrument, keep the other hand in your pocket. If some part of electrical instrument heats up unexpectedly, electrical sparks are produced or you smell burning, immediately stop working with the instrument and pull

the cable out of the electrical outlet. If the instrument is burning, pull its cable out of electrical outlet. Never use water to extinguish a burning electrical instrument! Only powder- or CO₂-extinguishers may be used. Inform your supervisor if an appliance acts unexpectedly, e.g. produces strange sounds.

5.1.2.3. Chemicals

Wear safety goggles and rubber gloves when working with toxic or corrosive substances. Toxic volatile chemicals and concentrated acids and bases must be handled in the fume hood. To open the door of fume hood, rise the door slightly and the doors opens completely by means of electronics. Electronics and motion detectors monitor the movements and work in the fume and the door closes itself automatically if the fume hood is not used for 8 minutes. Never take the chemicals from the fume hood to you working table. Always use a rubber bulb for pipetting. Do not use mouth to provide suction even when the substances are not toxic – it's not hygienic. Never return unused chemicals to their original container. Never remove chemicals or other materials from the laboratory area. When diluting the concentrated acid, the acid must be poured into the water. A large amount of heat is released when a strong acid is mixed with water. Otherwise, the solution may boil very violently, splashing concentrated acid out of the container. It is prohibited to throw flammable or explosive substances (alkali metals, phosphorus and others) in the sink. They must be collected in an approved container. Keep the inflammable substances (ether, alcohols, acetone, etc.) away from open flames and heat sources. Should a chemical splash in your eye(s) or on your skin, flush it immediately with a huge amount running water. Inform your supervisor or lab technician.

5.1.2.4. Gas and heating

Be careful with long hair when working with open flames. Working with a gas burner, make sure that the gas does not enter the lab. If the flame of the burner has gone out, immediately switch off the gas. To open the gas valve, raise the yellow button and then turn on the tap. Next, open the valve of the gas burner halfway and ignite the gas. Adjust the height of burner flame. Attention! Metal parts may be hot! At the end of the work control that the gas valves are closed. When heating the test tube, attach the test tube holder to the upper part of the test tube and direct the test tube away from you and other students while heating.

5.1.3. Microbiology and parasitology

Treat all micro- and macro-organisms as potential pathogens. Label all materials with your name and date. Flame transfer loops and wires before and immediately after their use to transfer biological material. Be careful around Bunsen burners. Turn off Bunsen burners when not in use. Do not open Petri dishes in the lab unless absolutely necessary. Dispose of all solid waste material in a biohazard bag and autoclave it before discarding it in the regular trash. Always wipe and clean the lenses of your microscope before putting it away. Use the appropriate tissue paper and cleaning solution for this purpose. Remember to wash your hands!

5.1.4. Food Microbiology

Always wear a lab coat. No eating, drinking or chewing gum. You are dealing with pathogenic bacteria, therefore the use of disposable (protective) gloves is necessary. Hands must be disinfected at the beginning and the end of the work. The entire work area must be disinfected before and after the work. The use of aseptic working techniques are necessary. No mouth pipetting. Place used

pipettes in designated containers of disinfectant. All tubes and plates should be labelled with the name of the microorganism, name of a group member, and the date. To prevent water vapour from condensing on the lids of the plates, all plates (except for plates with fungi) are to be incubated in an inverted position. Discard culture plates and tubes in appropriate receptacles. While visiting the toilet, remember to take off the lab coat before.

5.2. Diagnostic and science laboratories

All the rules mentioned before also apply in diagnostic and science laboratories and laboratories in animal clinic. However, due to the specific nature of these laboratories, the biosecurity rules are not thoroughly opened in this document. For more information about biosecurity in diagnostic and science laboratories contact the head of the laboratories.

6. General principles at the clinics

6.1. Protocol for front desk personnel of the clinic

In case the front desk personnel or the veterinarian on-call suspects a contagious disease in an incoming patient, certain protective measures must be implied. Such indications include acute vomiting, diarrhoea, ataxia, abortion, coughing or sneezing, skin lesions suspicious of dermatophytosis, scabies or possible resistant infections (e.g. non-healing wounds).

In the schedule, a remark of the suspicion of a contagious disease has to be made. Also, it is advised to register the patient as the last patient of the day. The owner is advised to wait outside or in the car for them to be called into the examination room. If possible, the animal should be carried to the room or the risk of contamination within the clinic must be minimized otherwise. After the patient has been moved from the examination room, a sign stating 'contaminated room' is to be placed on the door. This room must not be used before it has been thoroughly cleaned and disinfected. When the cleaners are not on duty the veterinary technicians are responsible for decontaminating the room.

6.2. Patient care and medication

Animals staying at the clinic facilities are housed in a proper cage or stall. Animals should be kept as clean as possible. Water should be provided immediately at arrival if not contraindicated by the clinician. All water and feeding bowls/buckets and bedding should be cleaned and changed regularly, and immediately when soiled or contaminated.

Clinic areas should be kept clean. After using materials or equipment, these should be arranged to the original location and replaced if needed. Equipment such as stethoscopes should be cleaned and disinfected after every use.

Medication should be stored in a secured medication room. Only active staff members (veterinarians and nurses) have access to this room. Before administering anything to the patient make sure you know exactly what and in what concentration you are going to give it. Unlabelled medication left unused should not be used for any other patient and it should be disposed of. Do not use expired medication! Be sure to write the opening date and time on the medications you open. Follow the manufacturers' instructions regarding the expiration of medication after opening them.

6.3. Cleaning and waste management

Where possible and applicable, recycle!

Needles and other sharp instruments should have a separate container that is clearly marked. Clinical waste must be separated and destroyed according to legislation. Clinical waste categories are shown in figure 4.

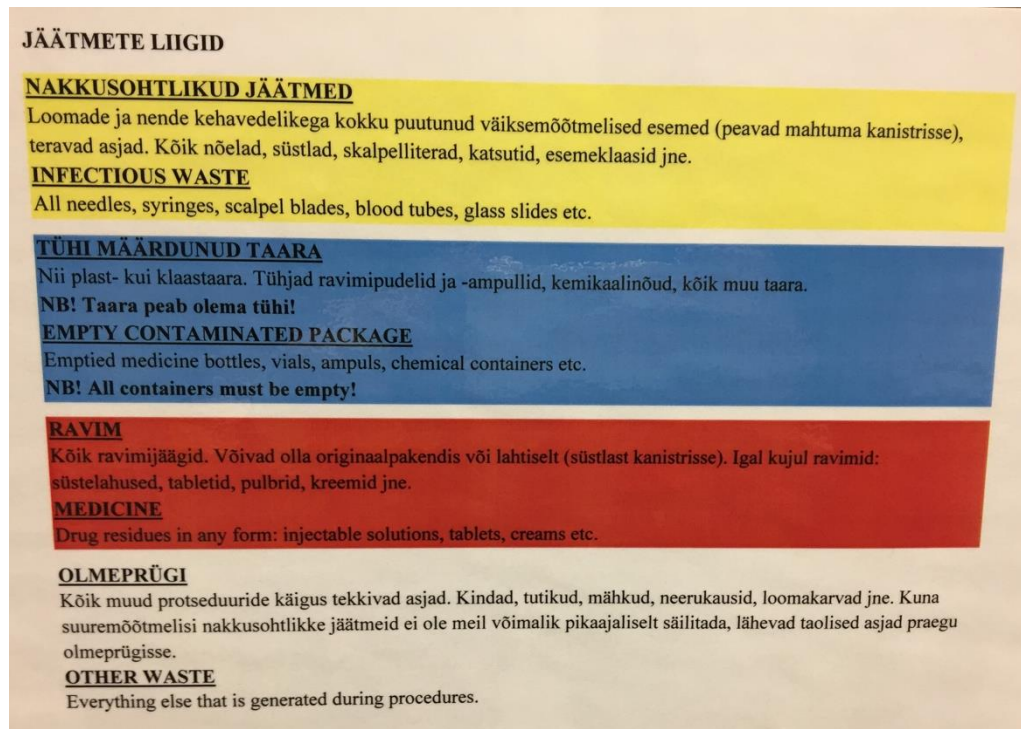


Figure 4. Waste categories at the clinic.

The principles of safe clinical waste management are:

- Segregate clinical waste at the point of generation
- Use the appropriate receptacle identified by the label (and colour)
- Wear PPE when handling waste
- Perform hand hygiene after handling waste
- Store waste away from public access and protect it from vermin.

Veterinary waste is a potential source of zoonotic pathogens if not handled appropriately. Handling clinical waste is defined and regulated at the government level, and may include sharps, tissues, contaminated materials, and dead animals.

Cleaning and disinfection of the used surfaces and instruments should be done as soon as possible. Make sure you know who is responsible for this – it might be you! Cleaning and disinfection equipment must be in every room and ready to use.

Infectious or potentially infectious urine, faeces and other body fluids must be cleaned immediately and disposed of separately in dedicated containers.

6.4. Visitors and pets at the clinics

Visiting hours are restricted to specific time periods. Visitors should not be left alone in the treatment or patient housing areas and should always be asked to refrain from touching other animals. Clients are not allowed to visit animals in isolation, unless given exceptional permission in case of euthanasia. Children should be supervised by an adult at all times during the visit.

Animals are not allowed to be in the clinic facilities except for the medical and teaching purpose.

6.5. Antimicrobial resistance

6.5.1. Introduction

Since their introduction, antimicrobials have revolutionized man's approach to treatment, control and prevention of human and animal infectious diseases. The modern antibiotic era markedly improved survival rates and longevity as catastrophic disease outbreaks were controlled and previously fatal infections became clinically manageable. Overall, these changes greatly improved the quality of human life and animal welfare. Even though there are many disease-causing agents that can be resistant to antimicrobials, from here on we will concentrate on MRSA and MRSP since they are the biggest threat in hospital environment.

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 the 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.

Relatively simple hygiene measures have reduced the prevalence of MRSA in human hospitals by up to 80%. Most of these measures can be easily implemented in the veterinary practice.

6.5.2. Routine measures to prevent the spread of MRSA/MRSP

The routine measures to prevent the spread of MRSA/MRSP comprise the following: Correctly performed hand hygiene and disinfection of surfaces and equipment between patients. It is important that methods used for hand decontamination and the environmental disinfectants used are effective against MRSA. Antibacterial gels or hand rubs attached to uniforms and kennel doors are a visual cue for cleanliness and can be quickly used before and after handling an animal, and before touching pens, keyboards etc. When hands are soiled, soap and water must be used. It is important to avoid using materials and equipment that cannot be cleaned at hand touch sites, e.g. consider using waterproof keyboards, flat keyboards or keyboard covers.

Wearing simple uniforms/coats (e.g. side-fastening coats or smock-type scrub suits) that can be laundered on site and wearing of gloves and disposable aprons for direct contact with patients, body fluids, lesions and other contaminated materials. These must be changed between patients. Face and eye-protection should be worn if aerosols are likely to be generated. Cover existing wounds or skin lesions with waterproof dressings. Avoid invasive procedures if suffering from skin lesions on hands.

Appropriate isolation of patients with, or suspected of having, a communicable infection. Rational use of antibiotics to minimise the development and spread of antibiotic resistance.

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 their use to a single patient
- employing single use, disposable equipment where appropriate
- effective disposal of contaminated material
- and as stated above, hand hygiene and disinfection of surfaces between patients.

High standards of ward cleaning are imperative: Cages should be cleaned and bedding replaced at least once a day. Cages should be cleaned and disinfected thoroughly between patients. 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.

Segregation of all waste, careful handling of clinical waste and its transport in a sealed bag of appropriate strength and colour. Sharps should be placed in the specifically earmarked container promptly.

Cross reference to hazardous waste regulations.

Apply approved procedures for sterilisation and disinfection of instruments and equipment.

Ensure that all staff are aware of, understand and adhere to the infection control guidance. Designating a specific member of staff to monitor and enforce the infectious disease control measures, and undertake the infection control audits is advisable.

6.5.3. Managing patients with MRSA/MRSP

6.5.3.1. Detection of MRSA or MRSP

The identity of staphylococci with methicillin (this is no longer produced so we now test for the equivalent antibiotic oxacillin) resistance should be confirmed by appropriate tests. Check with your local laboratory for advice on specimen type, collection and transport. In Veterinary and Food Laboratory, it is possible to test oxacillin resistance and MIC (minimal inhibitory concentration).

6.5.3.2. Identification

Screening all cases prior to admission is not feasible, especially in first opinion clinics. The prevalence and risk factors for the carriage of MRSA/MRSP in healthy dogs and cats is as yet unknown and therefore asymptomatic carrier animals will be undetected. Current opinion is that the clinical risks of this are low, but a prospective case-controlled study is underway that may further inform patient risk- assessment. At present, MRSA/MRSP should be suspected in:

- Patients from known MRSA/MRSP positive households or that belong to healthcare workers. A substantial proportion of cases have indirect or direct contact with human healthcare environments, although this has not been noted in the majority of cases reported recently.
- 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.
- Screening hospitalised cases during their stay and/or prior to discharge may be necessary in an environment where MRSA/MRSP is endemic and/or there is circumstantial evidence of transmission in the practice.
- Animals dying of sepsis or other invasive infections.

Staff must be informed about known or suspected MRSA/MRSP cases **before** admission. However, this may not be possible in first opinion practice who should be encouraged to culture suspected cases and inform referral practices of the result before referral.

Samples for bacterial culture should be submitted to a microbiology laboratory able to identify MRSA/MRSP as soon as possible. All samples and bodies sent for post-mortem examination must be packaged securely in a sealed container. A form outside the sealed container must state clearly that MRSA/MRSP is suspected.

6.5.3.3. Admission

Known or suspected MRSA/MRSP cases must be taken directly into a consultation room to avoid contamination and contagion in the waiting room. The floor, table and other contact surfaces must be disinfected before they are used for other patients. Movement of infected or suspected infected patients around the practice and procedures involving them must 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 positive patients and other animals and staff must be kept to a minimum. The trolley, and any potentially contaminated rooms or corridors must be disinfected before their further use.

A note stating that there is a (possible) MRSA/MRSP patient in that room must be put on the door. This information must also be written on the large board in the clinic or use additional way (mass e-mail or similar). In Provet, use alerts to differentiate this patient from all others so that the staff can make appropriate customizations if needed.

6.5.3.4. Hospitalisation

Patients with MRSA/MRSP or suspected MRSA/MRSP must be isolated as far as possible from other patients. Staff contact should be limited to what is essential. In common with all infected animals, 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. 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 must 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. 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 is not necessary.
- The cage and immediate floor environment should be cleaned and disinfected thoroughly at least once a day. Faeces and urine should be collected and disposed of to avoid contamination. Any blood or bodily fluids should be cleaned immediately followed by disinfection.
- Bathing every 2-3 days with an effective antibacterial wash can reduce mucosal and cutaneous carriage, and the potential for contamination, but may not be clinically or logistically possible and may increase staff contact.
- Before surgery, it may be possible to decontaminate the patient. Bathing with an antibacterial shampoo (such as based on 2-4% chlorhexidine), covering lesions with impermeable dressings, cleaning lesional and/or surgical sites with 70% alcohol, and, where indicated by intra-nasal cultures, intra-nasal anti-bacterials such as chlorhexidine, neomycin or mupirocin may also reduce the risk of colonising the surgical site.

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

6.5.3.5. Treatment

The significance of MRSA/MRSP colonisation or infection varies from case to case. Most strains are treatable with non-beta-lactam class (penicillins or cephalosporins) antibiotics. In UK, for example, veterinary isolates are usually sensitive to routine antibiotics including potentiated sulfonamides, tetracyclines, fusidic acid and mupirocin, although these may not be licensed for use in animals. The choice should be based on the culture-based antimicrobial susceptibility tests. Further treatment depends on the nature of the primary problem and may require specialist advice (e.g. removing implants, adding gentamicin impregnated beads, collagen sponges, activated silver dressings etc.).

6.5.3.6. Deceased and discharged patients

If an MRSA/MRSP positive animal dies, all lesions and body orifices should be covered. The body should be placed in a sealed, impervious bag as soon as possible and be disposed of by cremation. Write on the bag that it contains a MRSA positive carcass.

MRSA/MRSP-positive patients should be discharged from the hospital as soon as 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. The owners must sign an acknowledgement prior to discharge. Animals with persistent mucosal colonisation can be treated with an antibacterial shampoo and intra-nasal antibacterials such as chlorhexidine, neomycin or mupirocin 2-3 times a day. Other topical or systemic antibiotics may be appropriate depending on the sensitivity pattern. Re-colonisation in the community may well require visits to the home to assess carriage by family members and possible MRSA/MRSP dispersion, and examining the environment and pets for MRSA/MRSP. Decolonisation should only

be undertaken where necessary (e.g. if there is an immunosuppressed or otherwise vulnerable owner), with the full consultation and cooperation of medical healthcare services.

It is unfeasible to screen every in-patient prior to discharge, and it is therefore possible that some animals who become persistent carriers during the hospitalisation will be undetected. In practice, pre-discharge screening, however, is only a measure of the colonisation rate and it is uncertain whether this is of much clinical importance in healthy individuals.

6.6. Isolator

In isolator, strict precaution control measures must be introduced. Only personnel who must be present should enter the isolator. Use the PPE (shoe covers, gowns, masks, gloves etc.) provided at the entrance of the isolator. Each animal within the isolator should have their personal equipment, e.g. thermometer. The equipment must be cleaned and disinfected after every use and more thoroughly after the patient has left.

Patient cards are located on the door of the isolator and when the isolator is occupied a respective sign is placed on the door. The sign includes the name of the doctor and assistants who are responsible for the patient(s) inside. That doctor is also responsible for notifying the cleaning staff of whether and how thorough cleaning is needed apart from routine protocols indicated for isolation process.

6.7. X-ray and MRI

Use the PPE provided (lead apron and thyroid collar). The fit of wrap-around aprons should be such that the overlapping material provides appropriate and adequate shielding. The area of the body covered by this material should include the entire front of the body (anterior surface) and should extend to the posterior midline of the body. The thyroid collar and apron should fit together in a complementary fashion so that there are no gaps between them. Do not leave your extremities directly under the beam! Use dosimeters when working with x-ray.

If you are pregnant, you should not be in the X-ray or MRI room during the use.

All used materials and surfaces should be cleaned and disinfected after each animal.

7. Large animal clinic specifics

7.1. At the clinic

If you see a foot mat or bath – use it! Also use the brush to make sure the boots are clean before using the disinfectant (see Figure 5.).



Figure 5. How to disinfect your boots in foot bath.

Using a stiff bristled hand brush, remove as much organic matter as possible from the boots remembering to pay particular attention to the sole. Place the boot into the foot dip and scrub using a soft hand brush making sure that the whole boot is washed thoroughly with disinfectant solution and paying particular attention to the sole. Replace the disinfectant solution on a daily basis, disposing of the soiled disinfectant responsibly around the farm. *Source: Virkon.*

Wash and disinfect your boots/shoes at the water source on main corridor. Use the brush provided. Remember, that up to 99% of the bacteria and viruses can be removed from the surfaces by adequate cleaning!

Storing of clothes – overalls are stored in a separate room. Personal clothing can be stored in the changing room during the practical studies or while on property visit.

7.2. Farm visits and mobile clinic

7.2.1 Before going to the farm

After being abroad it is not allowed to visit any farms in Estonia before 48h has passed.

Ensure you have all the required PPE, sampling and decontamination equipment. Make sure you know what samples are required and you are familiar with the case definition for the suspected disease.

7.2.2. At the property

The following is applicable when contagious and/or zoonotic diseases are suspected. When you arrive, park your vehicle outside the property, or outside the 'dirty' area if it is not the property boundary.

- Identify the 'dirty' area (where the suspected case is located) and the 'clean' area outside this. Select an entry/exit point between the 'clean' and 'dirty' areas. Designate a small transition area at the entry/exit point where actions will be taken to move back and forth between the 'clean' and 'dirty' areas.
- In the 'clean' area lay out all PPE and equipment to be taken with you into the 'dirty' zone. Ensure that you have everything you need including overalls, boots, eye protection, mask or respirator, two pairs of gloves, sampling equipment, two plastic bags for samples, disinfectant wipe, stethoscope, thermometer, bucket, soap or detergent and scrubbing brush for gross decontamination. If no water is available in the dirty area you will need to fill the bucket with water now.
- Set up the transition zone ready for decontamination when you move from the 'dirty' zone back into the 'clean' zone:
 - Lay out a ground sheet if you have one
 - On the 'dirty side', place a footbath full of disinfectant, a bucket and/or spray bottle full of disinfectant, a scrubbing brush and two large plastic bags with ties for waste.
 - On the 'clean' side place a bucket and/or spray bottle full of disinfectant and 2 x large plastic bags with ties for contaminated PPE.
- Put on PPE in the following sequence:
 - Wash hands with soap or detergent and water and dry.
 - Put on overalls.
 - Put on boots (overall legs go outside boots).
 - Put on the mask or the respirator. Check that it fits correctly.
 - Put on eye protection.
 - Put on a cap or the hood of overalls if there is one.
 - Put on two pairs of gloves. Ensure the outer gloves fit snugly over the sleeves of your overalls. If required, you can tape the outer gloves to the overall sleeves with the duct tape.
- Pick up the sampling equipment, stethoscope, thermometer, bucket, soap or detergent and scrubbing brush and enter the dirty area. Anyone assisting you will require the same PPE.
- Undertake the examination, live animal sampling or post mortem sampling as required.
- Decontaminate the primary sample containers by wiping with disinfectant after collection and place in a plastic bag and seal. Repeat this step so that the sample is double bagged. This is important to protect the sample during decontamination into the clean area as disinfectants may leach into the sample and destroy it.
- Remove any gross contamination from you and your equipment while in the 'dirty' area using the brush, soap or detergent and water you have brought with you. Clean the treads on your boots.
- Leave the bucket, soap or detergent and scrubbing brush in the 'dirty' area if they will be needed again, or otherwise take them with you and return to the 'dirty' side of the transition area.
- Place the waste in a plastic bag and seal it. Decontaminate the outside by dipping in or spraying with disinfectant. Place it in a second plastic bag, seal and decontaminate the outside. Place the double-bagged waste in the 'clean' area.
- Decontaminate yourself and your equipment:
 - Decontaminate the boots by scrubbing in a footbath of disinfectant.
 - Spray the disinfectant on the outer gloves or dip them into the bucket of disinfectant.

- Decontaminate the sample containers and other equipment to the 'clean' side by dipping them in or spraying with disinfectant.
- Move to the 'clean' side of the transition area and remove the PPE in the following sequence:
 - Remove the outer pair of gloves and wash hands (still encased in the inner pair of gloves) in disinfectant.
 - Remove the overalls and boots.
 - Remove the cap and eye protection.
 - Wait for the dust to settle before removing the respirator.
 - Put the removed PPE in the contaminated waste bag.
 - Remove the inner pair of gloves and put them in the contaminated waste bag. Tie off the bag.
 - Disinfect the bag by spraying or dipping it in the disinfectant, then put it in the second bag and repeat the disinfection. Place in the clean area for disposal.
- Wash your hands and dry them.

Before leaving the property, advise the owner or manager on biosecurity procedures for use on the property to contain the disease, as well as any measures needed to protect people against infection. Ensure they know what PPE they will require for handling affected animals and where to get this PPE from. Notify the relevant authorities and dispatch the samples.

If accidental exposure to blood or body fluid or sharps injury occurs, wash the affected area of skin thoroughly with soap and water and/or irrigate mucous membranes with water or saline. If the suspected disease is zoonotic (e.g. leptospirosis), seek prompt medical advice.

All the vehicles used for farm visits should have enough PPE's for the staff and students, proper disinfectants and waste disposal (also sharps).

7.3. Horse clinic

7.3.1. *Infectious and potentially infectious patients*

All patients that are potentially infectious should be housed in the isolator until proven non-infectious. It is better to use the isolator when you might have an infection in your clinic than not use the isolator and have an outbreak at the clinic. This is especially important with zoonotic agents. In the isolation unit use the PPE and behave as described in 8.6. *Isolator* of this manual.

Infectious or possibly infectious manure and body fluids should be stored and disposed of separately from other waste materials in dedicated containers and disposed accordingly.

7.3.2. *Tape isolation*

If the patient is suffering from temperature of unknown origin, use tape isolation at the box. Coloured (e.g. yellow) tape should be used to make a square of 2mx1m in front of the box. Boots of various sizes, gowns and gloves should be kept inside this square. Every time when dealing with the patient, boots should be changed and the gloves and the gown used. If the gown is not dirty, it may be used again. Gloves are for one-time use only. There must also be a trash can inside the square. The patients should have their own equipment, if possible. If not, a cover for the thermometer should be used, which should be disinfected after use.

After the patient has left, a thorough cleaning with chlorhexidine should be done.

8. Märja farm

Follow the same precautions as for the Large Animal Clinic. Store your personal clothes in the changing room. Shoes and boots are left in the corridor. Boots are washed and disinfected in the corridor at the water source.

9. Wildlife and exotic animals

Always use gloves when handling reptiles – most of them carry Salmonella and shed it either continuously or intermittently. Always use mask when working or handling birds – many of them can transmit Chlamydophilosis (also known as chlamydiosis, ornithosis, psittacosis or parrot fever), caused by the intracellular bacterium *Chlamydophila psittaci*.

Always use gloves when handling rodents or cleaning their cages – many of them carry zoonotic bacteria and fungi. Thoroughly wash any bite or scratch wounds gotten from rodents (especially rats) and report injuries.

Always wash your hands thoroughly after touching or handling any exotic animal, their cage or any other equipment. If you touch any exotic animal, avoid further touching your hair, clothes and other items until you have thoroughly cleaned your hands.

Dispose of waste water and droppings from exotic pets down the toilet and not in the sink or bathtub. Ensure that all surfaces that come into contact with exotic animal and raw or defrosting exotic animal food are cleaned thoroughly afterwards.

Do not use sinks to bathe exotic animals.

Remember your hand hygiene! Use also other PPE besides the items listed in section 5.5., if needed (e.g. mittens for handling the animal, glasses).

10. References

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APPENDIX I: Contacts

1. Important contacts within the University

Small Animal Clinic		loomakliinik@emu.ee	+372 731 3224
Large Animal Clinic			+372 731 3713
Institute administration	Kairi Marjapuu	kairi.marjapuu@emu.ee	+372 731 3707
Institute director	Toomas Tiirats	toomas.tiirats@emu.ee	+372 731 3205
Head of Department of Clinical Veterinary Medicine	Aleksandr Semjonov	aleksandr.semjonov@emu.ee	+372 731 3213
Coordinator for the Small Animal Medicine Module	Andžela Lehtla	andzela.lehtla@emu.ee	+ 372 731 3727
Coordinator for the Farm Animal and Equine Medicine Module	Piret Kalmus	piret.kalmus@emu.ee	+372 7313219
Head of the Animal Clinic	Helena Randoja	helena.randoja@emu.ee	
Head of the Equine Clinic	Reet Herm	reet.herm@emu.ee	+372 731 3724
Head of the Production Animal Clinic	Hertta Pirkkalainen	hertta.pirkkalainen@emu.ee	+372 5257873
Head of Department of Basic Veterinary Sciences and Population Medicine	Arvo Viltrop	arvo.viltrop@emu.ee	+372 731 3210
Head of Department of Food Hygiene	Mati Roasto	mati.roasto@emu.ee	+372 731 3433

1. Other contacts

Veterinary and Food Laboratory		info@vetlab.ee	+372 738 6107 (food) +372 738 6117 (animal diseases)
Veterinary and Food Board	Veterinary Centre of Tartu County	info.tartu@vet.agri.ee	+372 740 1208
Health Board		Kesk@terviseamet.ee	+372 794 3500
Tartu University Hospital		kliinikum@kliinikum.ee	+372 731 09401

APPENDIX II: Highly contagious notifiable animal diseases

List of highly contagious notifiable animal diseases according to Estonian legislation (*Teatamiskohustuslike ja registreerimiskohustuslike loomataudide loetelu*, <https://www.riigiteataja.ee/akt/92734>):

- African horse sickness
- Venezuelan equine encephalomyelitis
- Highly pathogenic avian influenza
- Sheep pox and goat pox
- Bluetongue
- Newcastle disease
- Lumpy skin disease
- Rift Valley fever
- African swine fever
- Classical swine fever
- Swine vesicular disease
- Foot and mouth disease
- Rinderpest
- Contagious bovine pleuropneumonia
- Bovine spongiform encephalopathy (BSE)
- Vesicular stomatitis
- Peste des Petits Ruminants

Samples can be sent to Veterinary and Food Laboratory (Kreutzwaldi 30, 51006 Tartu). For infectious diseases, VFL has an on-call phone (+372 5065587) where you can ask additional information.

APPENDIX III: Useful links

- Veterinary- and Food Board: <http://www.vet.agri.ee>
- Veterinary- and Food Laboratory: <http://www.vetlab.ee>
- Health Board: <http://www.terviseamet.ee>
- Tartu University Hospital: <http://www.kliinikum.ee>
- Antimicrobial resistance learning site for veterinarians: <http://amrls.cvm.msu.edu>
- FECAVA guidelines: <http://www.fecava.org/en/what-is-fecava/guidelines>
- International Society of Companion Animal Infectious Diseases: <http://www.iscaid.org/>
- BSAVA guidelines: <https://www.bsava.com/Resources/Veterinary-resources/Medicines-Guide/Antibacterials>