



BURSA ULUDAĞ UNIVERSITY
FACULTY OF VETERINARY MEDICINE



BIOSECURITY GUIDE

Standard Operating Procedures for Student,
Administrative and Academic Personnel



**BURSA ULUDAĞ UNIVERSITY
FACULTY OF VETERINARY MEDICINE**

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**(Standard Operating Procedures for
Students, Administrative and Academic
Staff
Standard Operating Procedures)**

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PREFACE

Biosafety may generally be defined as the totality of the measures that must be taken to ensure that advanced and modernized biotechnology is applied without harming either human health or the environment.

Owing to the technological developments experienced worldwide in recent times, the subject of biosafety has become extremely important. Because of requirements such as the prevention and control of newly emerging infectious diseases, being prepared against bioterrorism and attacks that could be carried out with biological weapons, the protection of biological resources, and the prevention of the malicious use of biotechnology, biosafety has become a subject to which every country must give attention and take strategic steps with regard to national security. The World Health Organization adopts the following approach: “*The containment principles, technologies and practices that are implemented to prevent unintended exposure to pathogens and toxins, or their accidental release*”. As is understood from this statement, biosafety aims to protect both the persons present in the working environment and the entire environment outside the working area. Here, biological risks are encountered in many facilities because of the transmission of dangerous agents capable of causing diseases to persons or to the environment. Laboratories, hospitals and clinics, laboratory-animal and waste-processing and disposal facilities are among the most important of these.

As can be seen, we are confronted with biosafety risks in many areas and environments. Biological agents can pose great risks not only for those who handle and work with these substances but also, when precautions are not taken, for the environment and public health at the same time. For this reason, the requirements pertaining to biosafety must, within the framework of the relevant legislation and guidelines, be taken into account and applied in all working areas, and the responsibilities must be fulfilled.

Prof. Dr. Bayram ŞENLİK
Dean

Chapter 1

GENERAL BIOSAFETY

ANIMAL HEALTH RESEARCH AND
APPLICATION CENTER

STANDARD OPERATING PROCEDURES FOR BIOSAFETY
WORKING PRINCIPLES

GENERAL BIOSAFETY STANDARD OPERATING POLICIES and PROCEDURES APPLICABLE IN ALL AREAS BELONGING TO THE FACULTY OF VETERINARY MEDICINE

The international definition of biosafety with respect to animal health is quite broad:

“Biosafety is the implementation of measures that prevent transmission (bio-exclusion) and the spread of disease agents (bio-containment); it requires the adoption by people of a set of attitudes and behaviours in order to reduce risk in all practices involving domestic animals as well as controlled exotic and wild birds and their products” (World Organisation for Animal Health, 2008).

The Approach of the Faculty of Veterinary Medicine of Bursa Uludağ University (BUÜ) to the Protection and Control of Infections: Biosafety is a fundamental function of all health services and research facilities, including veterinary hospitals. The procedures used at the Faculty of Veterinary Medicine have been planned to reduce all risk of nosocomial and zoonotic disease, and the biosafety, infection-prevention and control procedures applied have been developed specifically in accordance with infectious disease agents.

Objectives of the Biosafety Program

- To protect hospital and laboratory staff, students and animal owners from zoonotic agents.
- To create a patient-care area that can be optimized to reduce the risk of nosocomial infection.
- To enhance the educational experience of students in matters of biosafety and infection control by demonstrating appropriate infection-prevention, control and disease-monitoring practices.
- To provide social support to animal owners and the community regarding the control and prevention of infectious/parasitic diseases in animals and humans.

Principles of Infection Prevention and Control

The following principles form the basis for the development of all procedures explained in this document. These measures help to prevent the transmission of disease from staff to patient, between patients, from patient to staff, and between staff.

- Ensuring hygiene within the context of standard precautions, which include hand washing and sanitation, appropriate clothing–barrier protection, minimal unnecessary contact with patients, appropriate disposal of infectious materials, and appropriate cleaning and disinfection. **ensuring hygiene.**
- Breaking the cycles of transmission through the effective use of hygiene protocols, an understanding of the routes of disease transmission, and the application of barriers against direct and indirect transmission. **breaking the cycles of transmission.** This concept includes taking into account patient density, patient housing conditions, and also human traffic.
- Targeting and developing infection-prevention and control procedures through surveillance and other research procedures. **targeting and developing infection-prevention and control procedures.**
- Increasing the level of education and awareness with respect to nosocomial and zoonotic risks by means of the communication ensured for the purpose of this guide and these procedures. **increasing the level of education and awareness.**

FACULTY OF VETERINARY MEDICINE BIOSAFETY COMMITTEE (FVMBC)

Our Faculty, of which it has been a full member since 1992, underwent its first evaluation process for accreditation in November 2004 by the European Association of Establishments for Veterinary Education (EAEVE), and was conditionally accredited as a result of the 2nd Evaluation process in April 2008. In April 2010 the final evaluation was carried out by the EAEVE panel, and as of June 2010 it was fully accredited for 10 years. After the completion of the accreditation period, our Faculty was audited by the EAEVE panel on 24–28 February 2020, and in this audit the non-conformities of the infrastructure and procedures with respect to biosafety were emphasized. For this reason, in March 2020 the biosafety

committee that existed at our Faculty was expanded and the detailing of our Biosafety Standard Operating Procedures (SOP) was begun. At the same time, the Committee recommended improvements to the Faculty infrastructure in order to ensure compliance with respect to biosafety.

The Faculty of Veterinary Medicine Biosafety Committee (FVMBC) has an advisory capacity that targets biosafety within the framework of teaching activities and makes recommendations to our Faculty. The recommendations of the FVMBC relate to the biosafety procedures to be applied and to the infrastructures where live or dead animals, animal products and biological samples are present. The FVMBC defines the procedures that allow the assessment and management of biological risks within the framework of teaching activities, the assessment of compliance with the biosafety rules, and the monitoring of drug resistance at the Faculty of Veterinary Medicine.

DUTIES OF THE BIOSAFETY COMMITTEE

- Updating the biosafety procedures by taking into account new legislation, the emergence of infectious diseases, and recommendations coming from within or outside the university,
- Putting into force a biosafety training program for all components of the Faculty of Veterinary Medicine,
- Assessing, in cooperation with the relevant departments, the human and logistical means necessary to achieve the aforementioned aims,
- Elaborating crisis scenarios.

STRUCTURE OF THE BIOSAFETY COMMITTEE

The members and the chair of the FVMBC are appointed by the Faculty Dean. Depending on the content of our Standard Operating Procedures (SOP), the FVMBC is represented by faculty members who are experts in their field. The members of the FVMBC *Animal Health Research and Application Center (Hospital), Student–Research Laboratories the Animal Health and Animal Production, Research and Application Center, and Food Establishment–Sales Points, as well as Vector–Pest Control* are responsible for activities such as these.

FUNCTION OF THE BIOSAFETY COMMITTEE

FVMBC meetings are held at least three times a year, and additionally when needed, in order to address ongoing matters and to evaluate matters submitted. A report is written systematically by the secretary and, after being approved by all FVMBC members, is transmitted to the Dean, the Deanship, and the persons concerned with the matter addressed.

DEFINITIONS

Antiseptic: A chemical applied to epithelial surfaces that causes the destruction or inhibition of microorganisms, preventing the growth or multiplication of microorganisms without harming animals.

Hospital infection-prevention measures: Materials and practices used as a barrier between patients and people to reduce the risk of nosocomial transmission between patients and to prevent cross-contamination of the body, clothing and footwear. The primary responsibility for these practices lies with the chief physician or the deputy .

Infectious diseases: A disease that can be transmitted from one animal to another.

Disinfectant: A chemical agent that kills microorganisms on inanimate objects (surgical equipment, floors, tables, patient-care equipment) or prevents the growth of microorganisms.

Disinfection: A process used to reduce the number of microorganisms to a level that is not harmful to health.

Hospital-specific clothing: Clothing, footwear and/or outerwear worn only while at the Faculty of Veterinary Medicine or during field practice.

Development of resistance to hospital infections: Antimicrobial resistance; the condition that develops when bacterial drugs, chemicals or other agents that prevent/treat infection have their effectiveness reduced or eliminated.

Nosocomial infection: A local or systemic condition that develops as a result of a reaction to the presence of an infectious pathogen or toxin that was not present or incubating at the time of hospital admission.

Personal protective equipment (PPE): Barriers that protect a person against acquiring or transmitting a microorganism or disease, or against exposure to potentially hazardous chemicals such as disinfectants. Examples: gloves, gowns, masks, protective goggles, overshoes, caps, etc.

Sanitizer: A chemical that reduces the number of microorganisms to a 'safe' level without completely eliminating them.

Sterilization: The removal of all microorganisms, including bacterial spores, from an inanimate object.

Subclinical infection: The invasion of the body by microorganisms without clinical symptoms being observed. It may also be an early-stage or very mild form of infection in which clinical signs are not evident or cannot be detected by clinical examination or laboratory tests.

Personnel: Refers to all persons who work or are present in the Faculty of Veterinary Medicine environment, regardless of whether they are employees, students, visiting veterinarians or scientists, visiting students or volunteers.

Zoonosis: A disease that can be transmitted between vertebrate animals and humans.

CLASSIFICATION OF MICROORGANISMS ACCORDING TO THEIR BIOLOGICAL RISKS

In the classification of a microorganism, taking into consideration the risk it poses to health, the community and animal diseases and its possible economic impact, it is divided into four risk groups:

- **Risk class 1 (RC1):** These are microorganisms that are non-pathogenic and not harmful to the environment. The class includes organisms whose harmlessness has been proven and strains that may be opportunistic pathogens or allergens.
- **Risk class 2 (RC2):** These are microorganisms that can cause disease in animals and, at varying levels, exhibit one or more of the following characteristics (interspecies transmission of limited geographical importance that is absent or rare, non-vectorial).
- **Risk class 3 (RC3):** These are microorganisms that cause serious diseases or epidemics in animals. Interspecies transmission may be significant.
- **Risk class 4 (RC4):** These are microorganisms that, in affected regions, cause very high mortality rates and dramatic economic losses, and highly serious pandemics or epidemics in animals.

The parameters used in defining the clinical condition are presented in Table 1, and examples of microorganisms according to risk classes in humans and animals in Table 2.

Table 1. Parameters Used in Defining the Clinical Condition

Species	Fever (rectal temperature)	Leukopenia (cells x 10 ³ /mL)	Neutropenia (cells x 10 ³ /mL)
Cattle	> 39.0 °C (adult) > 39.5 °C (calf)	< 5.0	< 0.6
Dog	> 39.5°C	< 6.0	< 3.0
Goat	> 40.5°C	< 4.0	<1.2
Horse	> 38.5°C	< 4.0	< 2.5
Cat	> 39.5°C	< 5.0	< 2.0
Camel	> 39.5°C	< 7.5	< 4.6
Sheep	> 40.0°C	< 4.0	< 0.7

Table 2. Examples of microorganisms in humans and animals according to risk classes

Pathogen	RC 2		RC 3		RC 4	
	Humans	Animals	Humans	Animals	Humans	Animals
Bacteria and similar organisms						
<i>Borrelia burgdorferi</i>	X	X				
<i>Clostridium perfringens</i>	X	X				
<i>Brucella abortus</i>			X	X		
<i>Yersinia pestis</i>			X	X		
Fungi						
<i>Aspergillus fumigatus</i>	X	X				
<i>Candida albicans</i>	X	X				
<i>Coccidioides immitis</i>			X	X		
<i>Histoplasma capsulatum</i> <i>var. capsulatum</i>			X	X		
Parasites						
<i>Fasciola hepatica</i>	X	X				
<i>Toxocara canis</i>	X	X				
<i>Leishmania infantum-tropica</i>			X	X		
<i>Taenia solium-saginata</i>			X	X		
<i>Echinococcus granulosus</i>			X	X		
<i>Toxoplasma gondii</i>			X	X		
Viruses						
Feline calicivirus		X				
Equine infectious anaemia virus		X				
Rabies virus			X	X		
West Nile			X	X		
Foot-and-mouth disease						X

RC = Risk classes

RISK CATEGORIES USED AT THE FACULTY OF VETERINARY MEDICINE

A special risk classification is applied in the clinics of the Faculty of Veterinary Medicine. Based on the infectious diseases encountered in hospitalized animals and their potential for pathogen transmission to other animals and/or their zoonotic potential, the risk classification in the clinics of the Faculty of Veterinary Medicine is set out in Table 3.

Table 3. Risk classification in the clinics of the Faculty of Veterinary Medicine

CLASS 1: NORMAL HOUSING Infectious diseases caused by pathogens that have no likelihood of transmission to other animals and no infection potential for humans.
CLASS 2: NORMAL HOUSING Infectious diseases caused by pathogens that have a low level of transmission and may include non-resistant bacterial infections.

CLASS 3: Hospital infection-prevention measures

Subclass A: Multidrug-resistant bacteria. Infections caused by bacteria with a high level of antibiotic resistance as determined by a bacteriology laboratory.

Subclass B: Infectious diseases caused by pathogens that have a moderate level of transmission and/or zoonotic potential

CLASS 4: ISOLATION

Infectious and notifiable diseases caused by pathogens that have a high level of transmission and/or can cause various diseases in humans.

For each class, examples relating to the species are listed under the relevant hospital service.

GENERAL RULES**1. Hand Hygiene**

Hand hygiene is one of the most effective measures for preventing the transmission of pathogens in a hospital environment.

Hands must be washed in the following situations.

- Before and after handling each patient,
- After any contact with blood, body fluids, secretions, waste and contaminated substances, whether gloved or ungloved,
- Immediately after gloves are removed,
- Between different procedures on the same patient, to prevent cross-contamination of different body regions,
- After handling laboratory samples or cultures,
- After cleaning cages or benches,
- Before meals, breaks, smoking, or leaving work,
- Before and after using the toilet,
- Technical “hand-washing procedures” have been defined for hand washing and the use of hand sanitizer.

Faculty of Veterinary Medicine staff and students who are in direct contact with patients or who handle biological samples are advised to keep their fingernails short and to wear no jewellery on their hands, in order to minimize contamination and improve hand cleanliness. In addition, any skin lesions present on the hands and forearms must be covered (for example, with the aid of a waterproof sterile bandage).

2. Hospital Infection-Prevention Measures

Hospital infection-prevention measures must be appropriate for the type of procedures being performed and the type of exposure expected. These rules apply when working with infected tissues or body fluids, treating live animals in cages/stall boxes, cleaning facilities occupied by infectious animals, or coming into contact with the carcass of an animal that has died of a potentially infectious/zoonotic disease.

- Gloves and protective clothing (laboratory coat, gown or coverall) are used when handling patients known or suspected to be infected with infectious or zoonotic diseases (class 3 or 4).
- During surgical interventions, gloves, a surgical mask and protective goggles must be used for situations such as the splashing of blood and other body fluids.
- A glove must be removed after tearing, needle-stick or other different types of damage, and replaced with a new one as soon as patient safety permits.
- Washable boots, shoes or foot protectors play an important role in preventing the spread of infectious material within the hospital.
- Depending on the circumstances and the disease, additional protection in the form of face shields or N95 respirator masks must be used.
- One must not leave the area in which the procedure is being carried out while wearing this equipment

3. Standard Clothing

The Faculty maintains a dress code to assist with biosafety practices.

Small Animal Clinic:

- Surgery (academics): Green (Figure 1).
- Obstetrics (academics): Turquoise blue (Figure 2).
- Internal Medicine (academics): Maroon (Figure 3).
- Student: Navy blue (Figure 4).
- Cleaning staff: Grey
- In the operating theatres it must be separate, in light blue (Figure 5).
- Closed shoes are to be worn in the small animal clinics.

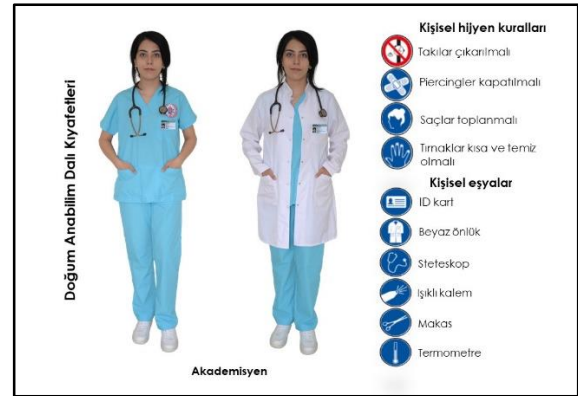


Figure 1. Department of Surgery, Academic Staff Clothing.

Figure 2. Department of Obstetrics,

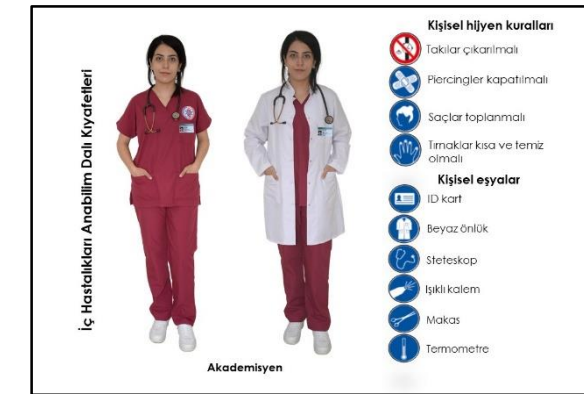


Figure 3. Department of Internal Medicine, Academic Staff Clothing

Figure 4. Small Animal Clinic Student Clothing



Figure 5. Small Animal Operating Theatre Clothing.

Large Animal Clinic:

- Academics: Beige coverall
- Students: Navy blue coverall
- Steel-toe-capped boots or work boots (Figure 6).



Figure 6. Large Animal Academic Staff and Student Clinic Clothing.

Central Laboratory and Pharmacy:

- White coat
- In “ISOLATION”, a disposable coverall and overshoe boots

Student laboratories and Anatomy dissection hall: White cotton laboratory coat

- The use of the clothing designated by the Faculty of Veterinary Medicine is the first line of defence against the spread of pathogens outside the hospital.
- Working staff and students (in their contacts with patients or their environment) must wear hospital-specific clothing (clothing, footwear and outerwear worn at the Faculty or during field practice).
- In all clinics, staff and students are ensured to wear safe, protective, clean and cleanable closed shoes. Soiled or contaminated shoes must be cleaned and subsequently disinfected. Shoes must not be made of a porous or absorbent material. For safety reasons, shoes suitable for the small animal clinic may not be suitable for large animal clinics and establishments.
- Long hair must be tied back.
- At least one spare clean set of PPE must always be kept available.
- During each rotation, reusable PPE must always be clean and freshly washed.

- In some hospital areas, special requirements apply with respect to clothing; these are listed by the chief physician's office.

4. Patient Care – Patient Hygiene

- In order to reduce the fundamental hygiene problem and the risk of infection, it is of great importance that patients be placed in a clean stall box/cage and kept as clean as possible.
- Water and feeding buckets or containers must be changed and cleaned regularly.
- If patients defecate outside their facilities (inside or outside the building), the faeces must be collected and the floor then cleaned immediately after defecation (in the small animal clinic the floor must be dried). If patients urinate inside the building, the urine must be cleaned and dried as soon as possible.
- The cage/stall environment must be clean and tidy; there must be no medicines or materials lying around, and no personal belongings of students. Staff and students are expected to collect materials after use and to leave the area clean.
- Sector-specific requirements with regard to patient hygiene are listed in the relevant hospital department.

Prevention of Unnecessary Contacts with Patients:

- Patient care, the provision of education, and routine activities require intensive contact with numerous patients. It is important to remember that such contacts can contribute to the transmission of infectious and/or zoonotic pathogens.
- Staff and students must minimize contact with patients in order to limit the risk of nosocomial exposure (especially if they are not directly responsible for them).
- Responsible physicians may, at their own discretion, permit and encourage students to have contact with animals for educational purposes. For teaching purposes, if students examine more than one patient or assist with procedures, stethoscopes and other equipment must be regularly wiped with alcohol or hand sanitizer, and they must systematically wash and disinfect their hands between patients.
- Staff and students who are in contact with suspected/confirmed infectious patients must limit their contacts to those patients.
- Where appropriate, patients must, if possible, be monitored remotely with the aid of a camera, without physical contact.
- To reduce the spread of pathogens, staff and students must minimize the use of shared common areas wherever possible. For example, medical staff and students must limit their visits to the operating theatre as much as possible (for example, staff and students on duty in the equine clinic must avoid entering the small animal clinic).
- Staff and students must enter stalls/cages only when necessary (for example, entering during rounds must be avoided), and must avoid touching or petting animals when passing by them.
- Staff and students must, where possible, work in areas of higher contamination risk after having attended to other patients.

5. Food and Drink

- Food or drink must not be consumed, prepared or stored in places where animals are examined, treated or housed.
- It is forbidden for staff and students to eat, drink or store food in areas where biological samples are handled and medicines are prepared/stored. This includes archive rooms, corridors, the operating theatre, examination rooms and reception areas.
- Food and drink may be consumed and stored in the following areas:
 - Faculty cafeterias and restaurants
 - Departmental kitchens
 - Offices of technicians and clinicians

- Outside the clinical departments
- Student rest rooms
- Because eating and drinking are permitted in these areas, animals, biological samples and medicines are not permitted.
- No storage of food and drink is permitted in any refrigerator/freezer used to store medicines or biological samples.
- Microwaves used in animal-care areas (for example, the equine laboratory and the small animal hospital kitchen) **MUST NOT BE USED** to heat human food.

Faculty Canteen:

- It is forbidden for staff and students to wear hospital clothing in the faculty canteen (for example, blue clothing, laboratory coats, boots, stethoscopes, etc.). Faculty staff and students must be ensured to comply with these hygiene rules. Companion animals are not admitted to the canteen.

6. Medicines and the Like (Pharmacy)

Storage and Transport:

- Medicines (as stated on the label) must be stored under the most suitable conditions in a clean environment and must not be exposed to significant temperature variations and/or humidity.
- Medicines must be arranged appropriately (for example, in alphabetical order/by class).
- Opened medicine bottles must be separated from stock.
- The pharmacy must not be accessible to persons other than staff, to children, or to animals. It is forbidden for students to enter the pharmacy unless special permission is obtained from staff.
- Opioid narcotics, ketamine and euthanasia products (green prescription, etc.) must be stored in a secure room or a secure place; only physicians must have access, using a code or key (password).
- The opening or sterility expiry date of medicines, including liquids, must be clearly labelled on the medicine with a waterproof marker.
- Medicine must be discarded into medical waste 24 hours after opening, or earlier if stated on the label.

Preparation of Medicines and the Like:

- The preparation of medicines must be carried out under the supervision or control of physicians/pharmacy staff. During preparation, contamination with other medicines or sources of infection must be prevented. For parenteral medicine, the rubber caps of the bottles must be wiped with alcohol before each puncture. A new (sterile) syringe and needle must be used to prepare medicine. Medicine-administration needles and syringes must never be reused for other patients or for the same patient (exception: after rinsing and cleaning, syringes intended for **oral** medicines may be reused).
- After preparation, a new needle tip must be used for injection.
- The preparation of toxic or hazardous medicines must be carried out under safe conditions, for example by persons equipped with appropriate PPE (depending on the medicine itself: gloves, protective goggles, mask, under a fume hood, etc.). It must not be carried out in the presence of individuals who do not have special clothing.
- If the medicine is not administered immediately after preparation, the name of the medicine must be clearly labelled on each syringe with a waterproof marker.
- Medicines that cannot be returned to the pharmacy or that are unused must be discarded into waste containers and recorded.

7. Disposal of Waste

- Precautions must be taken to prevent injuries caused by needles, scalpels and other sharp objects. In order to prevent injuries, the reuse of sharps such as needles and scalpel blades is completely forbidden. Staff and students must avoid deliberately bending or breaking needles. Sharp objects must be disposed of in special puncture-resistant containers. Once filled, these puncture-resistant

containers must be placed in **60 L yellow-waste (MEDICAL WASTE)** bins for removal.

- Waste must be disposed of in the area where it is generated, in accordance with the regulations set out in this section. For specific waste products, please refer to the relevant hospital departments.
- General hospital waste from animals in which zoonotic or infectious pathogens are not suspected must be discarded into ordinary waste bags.
- Hospital waste from animals suspected of being infected with a zoonotic or highly contagious pathogen must be discarded into yellow-waste (MEDICAL WASTE) bins.
- All waste generated in the isolation ward must be discarded into yellow-waste (MEDICAL WASTE) bins.
- Biological samples collected from potentially infectious patients must be sealed in waterproof plastic bags (double-layered) and labelled with appropriate information and the risk possibility before being sent to diagnostic laboratories. Care must be taken not to contaminate the outside of the plastic bags, and they must be taken to a special area.
- The bandaging of wounds infected by pathogens of concern (MRSA or other multidrug-resistant bacteria) must be carried out in low-density areas that can easily be cleaned and disinfected. Barrier measures must be used to prevent the contamination of hands and clothing, and environmental spread must be avoided (for example, discharging washing solutions or careless handling of the bandage). For the environmental disinfection and disposal of materials, please follow the procedures explained in this document.
- Biological samples or anatomical parts (fur, feet, skeleton, etc.) must not be allowed to leave the hospital except for medical purposes or disposal.

8. Basic Cleaning and Disinfection

Cleaning Service:

- Before sending laundry, equipment or instruments to the waste/laundry facility, sharps must be discarded into puncture-resistant containers.
- Soiled laundry must not be placed together in the same place with refuse, straw or bedding material, sharps or anatomical parts.
- Before being sent to the laundry, all organic materials must be separated from surgical instruments and equipment.
- The belongings of patients or patient owners must not be washed in the laundry.
- Personal belongings must not be washed in the laundry.

So that staff and students using detergents and disinfectants understand their potential interactions with other products used at the Faculty;

- Organic material rapidly inactivates most disinfectants. When choosing a disinfectant for surfaces, the potential presence of residual organic material must be taken into account.
- Disinfectants differ greatly according to their activity spectra. In general, protozoa such as *Cryptosporidium* spp., bacterial spores, mycobacteria and non-enveloped viruses are very resistant to disinfectants.
- To ensure optimal decontamination, the manufacturer's instructions regarding dilutions and contact time must be followed (usually at least 10–15 minutes).
- Although most disinfectants are used for short-term decontamination activities, some maintain disinfection activity in the form of a residue when left on surfaces for a long time.
- It is important to rinse off and remove all residues of the previously used product(s) (detergent and disinfectant).

General Cleaning and Disinfection Protocol for an Environment Containing Contaminated Surfaces:

- When using disinfectants, appropriate clothing and, when there is a possibility of splashing, additional PPE (mask, face shield, protective goggles, waterproof clothing and footwear) must be worn.
- Before disinfection, all visible residues must be removed. The presence of gross contamination will inactivate most disinfectants. If a hose is used (spraying), care must be taken to minimize

aerosolization and the further spread of pathogens.

- The affected areas must be cleaned with water, detergent or soap; scrubbing or mechanical disruption is always required to break down the protective layer (biofilm) and residual deposits that impede or restrict the disinfection process.
- Since some disinfectants can be inactivated by detergents, the cleaned area must be rinsed thoroughly to remove detergent residues.
- To prevent the dilution of disinfectant solutions, the area must be allowed to empty or dry as much as possible.
- The area must be thoroughly wetted with disinfectant solution. Ideally, the disinfectant must remain in contact with the surfaces for at least 15 minutes and comply with the manufacturer's instructions.
- Excess disinfectant must be cleaned up with water, clean paper towels, a mop or a squeegee.
- Before a patient is placed, the disinfectant must be rinsed off all surfaces of a cage/stall or left to dry for a sufficient period (see the disinfectant label).
- All multi-use areas where animals are examined or treated (care areas, examination rooms and tables) must, regardless of infectious status, be cleaned and disinfected immediately after use by the staff and students responsible for the patient.
- While the cleaning/disinfection process is being carried out, contact of blood or body fluid with non-intact skin (open wounds, etc.) or mucous membranes must be prevented. Non-intact skin must be protected (for example, with a waterproof plaster).
- After disinfection, PPE must be removed and hands washed.
- For non-routine disinfection measures, only staff trained and authorized to wear and use the necessary PPE must be permitted access to the areas to be disinfected.

9. Disinfectants

Various disinfectants are used at the Faculty of Veterinary Medicine to reduce the likelihood of pathogen transmission (Table IV). Various factors were taken into account in the selection of the disinfectants.

Foot Baths and Mats:

- Pathogens are frequently isolated from the floor surfaces of environments containing infected animals.
- Foot-bath/mat solutions must be changed every morning by staff, students, technicians or veterinarians, and when an excessive amount of bedding material/dirt has accumulated.
- Foot baths/mats must be refilled by anyone who notices that they are dry or depleted; this is the responsibility of **ALL** persons working in the area concerned (staff and students).
- Staff and students must use foot baths/mats appropriately whenever they come across them.
- Because foot mats are designed to disinfect the soles and sides of shoes, they do not require full immersion of the feet. Nevertheless, when walking on a foot mat, it mostly splashes onto the tops and sides of the shoes as well. For this reason, waterproof shoes are strongly recommended for everyone working in areas where foot mats are used.

Disinfection Protocol for Instruments and Equipment:

To minimize the risk of pathogen transmission, all faculty equipment must be appropriately cleaned and disinfected before storage. Equipment specific to small or large animals will be discussed in the relevant sections. A summary of the detergents and disinfectants approved for use at the Faculty is provided at the end of each section.

Thermometers:

- Glass thermometers **MUST NOT BE USED** at the Faculty of Veterinary Medicine, in order to reduce the risks associated with broken glass and mercury exposure. Electronic devices must be used instead.
- Electronic thermometers must be thoroughly cleaned and disinfected after each patient using alcohol and/or chlorhexidine wipes.

- The probes of thermometers used for continuous body-temperature monitoring (for example, anaesthesia) must be thoroughly cleaned and disinfected by wiping and washing (to remove all faecal material) and immersing them in alcohol and/or chlorhexidine solutions.
- For use in infectious areas (classes 3 and 4), patient-specific thermometers must be available.
- Thermometers must be cleaned and disinfected immediately, systematically, when they become visibly soiled and after patient examination.

Endoscopes:

- Endoscopes must be cleaned and disinfected after each use with quaternary ammonium compounds and only by authorized staff.

Stethoscopes:

- It is recommended that stethoscopes be disinfected daily with hydro-alcoholic hand sanitizer.
- In areas where patients with infectious disease are housed (classes 3 and 4), patient-specific stethoscopes are allocated.
- In addition, cleaning and disinfection must be carried out immediately and systematically after examining a class 3 or class 4 patient when stethoscopes become visibly soiled.

BREAKING THE CYCLE OF TRANSMISSION

General Conduct:

- The workplace smoking ban must be observed.
- At the Faculty of Veterinary Medicine, dogs must be walked on a leash; cats must be carried in a carrier.
- In accordance with university regulations, faculty staff may not bring their own companion animals to the Faculty without medical reasons.
- In the event of a pandemic, pandemic rules must be observed.

1. Visitors at the Faculty of Veterinary Medicine

- Educating people about the role of veterinarians in society is an important duty of the Faculty of Veterinary Medicine, and granting visitors limited access to the Faculty supports this mission. However, there are safety and health concerns specific to exposure to the hospital environment, and visitors could potentially spread pathogens present in the hospital environment.
- Patient owners must be kept under observation during their visits to the Faculty of Veterinary Medicine. Physical contact with patients other than their own animals is not permitted.
- Guided tours for the public are coordinated through the Deanship of the Faculty of Veterinary Medicine and conducted by trained staff.
- Visitors are never permitted to enter any isolation department.
- Visitors under the supervision of Faculty of Veterinary Medicine staff must be informed about the zoonotic and nosocomial disease hazards associated with hospitalized animals.
- Visitors must not be permitted to enter anaesthesia-preparation areas, emergency services and operating theatres.
- Special arrangements may be made to permit visiting scientists or veterinarians to enter the aforementioned areas, by contacting them with the knowledge of the Deanship of the Faculty of Veterinary Medicine and the approval of the chief physician's office. Visitors are also not permitted to gather, smoke, eat or drink in the care areas.

All visitors are obliged to comply with the hospital rules. The accompanying staff member is responsible for ensuring compliance with these rules.

2. Patient Owners at the Faculty of Veterinary Medicine

- Patient owners are permitted free access to the waiting rooms, toilets, libraries and canteens of the

Faculty of Veterinary Medicine. For their access to other areas of the hospital, they must be accompanied by Faculty of Veterinary Medicine staff and students.

- To minimize the risks of zoonotic or nosocomial infection, access to patient-care areas may be restricted. In addition, physicians may, at their own discretion, keep patient owners outside patient-care areas for safety reasons and when there is a risk of disruption to the working environment.
- At the discretion of the responsible physician, patient owners may remain unsupervised with their animals in examination rooms, but this is prohibited in treatment and patient-housing areas. In addition, these persons must be asked to avoid touching other animals.
- Permission for patient owners to visit patients under containment is decided upon. Permission will be granted only exceptionally, in cases of euthanasia or agony, and provided that the biosafety measures applied are complied with.
- Patient owners must at all times comply with all policies regarding infection-control measures.
- Faculty of Veterinary Medicine staff and students responsible for patient care are obliged to educate patient owners about the zoonotic and hospital-acquired hazards associated with the hospitalization of animals.

3. Children at the Faculty of Veterinary Medicine

- There are safety and health risks specific to the Faculty environment. For this reason, children cannot be admitted to the hospital environment without authorized permissions being obtained.
- To minimize the risk of zoonotic infection, access to patient-care areas may be restricted.
- Children (under 18 years of age) of Faculty of Veterinary Medicine staff and students are not permitted to remain in the hospital unless they are under the supervision of an adult.
- Children visiting the Faculty of Veterinary Medicine must at all times be under the supervision of an adult.
- Because of the risk of acquiring zoonotic disease and/or physical injury, children must be forbidden from touching any animal other than their own.

4. Companion Animals at the Faculty of Veterinary Medicine

- In accordance with university policy, companion animals are not permitted on the premises of the Faculty of Veterinary Medicine except for medical purposes. The regulation does not apply to the following:
 - Animals admitted to the hospital as patients
 - Dogs and cats to be used for blood donation
 - Animals enrolled in an approved research project
 - Companion animals used in approved teaching exercises

5. Research and Teaching Animals

Staff and students who use animals for research and teaching at the Faculty of Veterinary Medicine must comply with all applicable biosafety procedures. Before commencing such activities, approval must be obtained from the Dean of the Faculty of Veterinary Medicine and from the Biosafety and Ethics Committee. Teaching and research animals, except in exceptional circumstances or for medical reasons, **MAY NOT BE PLACED** in hospital areas housing patients. It is mandatory that all equipment be cleaned and disinfected at least 15 minutes beforehand.

ROUTES OF DISEASE TRANSMISSION

Many pathogens can survive for a long time in the air, on surfaces and in organic materials. Pathogens can spread from animal to animal, from animal to human, and even from human to animal, through inhalation, oral, nasal or ocular mucosal contact, and through direct contact with fomites or vectors. Knowing these routes of disease transmission can help to reduce their potential effects.

1. Aerosol Transmission

- Aerosol transmission occurs when pathogens are transmitted via aerosol droplets. Most pathogens do not survive for a long time in aerosol droplets. For this reason, proximity between infected and susceptible animals is required for effective transmission. The greater the distance between animals, the lower the likelihood of transmission.
- Aerosol transmission can occur in an animal hospital through close contact with animals and/or humans. Pathogens can be aerosolized (for example, a cat, through the sneezing of a cat infected with a respiratory virus) and re-aerosolized by high-pressure cleaning of cages, benches or paddocks, or by air currents (for example, *Coxiella burnetii*). Temperature, relative humidity and ventilation play an important role in the aerosol transmission of pathogens.
- Zoonoses must always be taken into consideration.

2. Oral Transmission

- Oral transmission involves exposure to pathogens via the gastrointestinal tract. Another form of oral transmission consists of the inhalation and swallowing of aerosolized material.
- It includes contaminated equipment, food and water containers, and any other substance that an animal may lick or chew. Feed and water contaminated with faeces or urine cause oral contamination.
- For humans, oral contact with contaminated hands is frequently involved in the faecal–oral transmission cycle of pathogens. For this reason, excellent hand hygiene is required among people working around animals. The appropriate handling and separation of patients with diarrhoea, as well as the strict cleaning and disinfection of feed and water containers, will help to control the spread of microorganisms via faeces.
- Zoonoses must always be taken into consideration.

3. Direct and Indirect Transmission

- **Direct contact** transmission requires an animal or person to come into direct contact with another infected animal or person.
- **Indirect contact** transmission occurs through contact with surfaces/materials contaminated with biological fluids (examples: blood, wound exudate, saliva, nasal secretions or aerosolized respiratory droplets, genitourinary secretions, faeces, etc.).
- The likelihood of transmission of infectious pathogens to hospitalized patients is high. For this reason, the likelihood of surfaces becoming contaminated throughout the facility is also significant. Separating infected animals and minimizing contact with them are two fundamental measures for reducing the risk of transmission through direct or indirect contact.

4. Transmission via Fomites

- Fomites are inanimate objects that serve as intermediaries in transmission cycles. Almost any object, even a person (for example, a caretaker), can play the role of a fomite. For example, doorknobs, keyboards, telephones, clothing, thermometers, stethoscopes, hoses, leashes, brushes, shovels, etc. are items that can become contaminated and transmit a pathogen to other animals or humans.
- The main measures for controlling the transmission of fomites are: correct cleaning and disinfection, the taking of infection-prevention measures, the use of equipment allocated to infectious patients, and the appropriate identification and separation of sick animals.
- As far as possible, animals showing clinical signs of infectious diseases must be examined and treated after healthy patients.

5. Vector-Borne Transmission

- Vector-borne transmission occurs when an insect or arthropod transmits to another animal a pathogen that it has acquired from an animal. For example, *Leishmania*, heartworm and West Nile Virus are vector-borne pathogens.
- Fleas, ticks and flies are common biological/mechanical vectors.
- The most effective way to prevent vector-borne transmission is to eliminate or reduce insect populations, or at least to separate the vector from the host; for practical measures see (pest control).

ZOONOTIC INFECTIONS

- Although the risk of contracting a zoonotic disease among the general population is on average low, the exposure risk of veterinarians and other people in routine contact with animals is high.
- In the event of exposure to a suspected or confirmed zoonotic pathogen, the patient owners, the veterinarian, the Faculty of Veterinary Medicine staff, the students and all contacts must be recorded, and
- it is strongly recommended that a person with a known or suspected occupational infection seek medical attention immediately after notifying their supervisor.

RISK COMMUNICATION

Special Situations with Regard to Infectious Disease:

- All persons, including students, must inform their supervisors, before handling any patient, of any special health issues (for example, pregnancy, immunosuppression, etc.) that could affect the risk or the consequences of infection with zoonotic pathogens. All notifications and discussions will be kept confidential.
- These notifiable diseases (including but not limited to) include: potential zoonotic diseases, highly contagious diseases, highly pathogenic diseases, infections caused by (multi)drug-resistant bacteria, and pathogens that are highly persistent in the environment or difficult to eliminate with routine hygiene practices. These notifications must be made by the responsible veterinarian via email/a WhatsApp group:



Figure 7. Schematic Representation of the Hospital Biosafety Protocol

Faculty of Veterinary Medicine Risk Communication Regarding the Infectious Status of Patients:

Given the complexity of patient care at the Faculty of Veterinary Medicine and the number of people working in such an environment, effective communication regarding the risk of the spread of infectious pathogens is essential. Effective and early communication regarding the actual and potential infectious status of patients reduces the likelihood of the spread of nosocomial or zoonotic diseases. A communication list is created and updated by the chief physician's office.

Protocol for the Hospital (Small Animals, Horses and Ruminants):

- The infectious hazard must be clearly labelled on the cages/examination tables housing infectious patients and their surroundings; the following information must be visible:
 - The classification of the disease (see Table 2)
 - Appropriate disinfection procedures for infection control
 - Hospital infection-prevention measures and hygiene requirements
 - Probable zoonotic risk
 - Suspected/confirmed diagnosis (name of the disease/condition)
- Staff and students responsible for infectious patients must ensure that special considerations and care needs are appropriately communicated to other people likely to work with the patients or their environment. They must also ensure that information is appropriately communicated to the FVMBC.

Protocol for Reception Staff:

- If, during a consultation between an animal owner and a clinical-practice or intern student present alongside the reception staff, there is suspicion/a sign of an infectious disease (for example, acute vomiting, diarrhoea, ataxia, abortion, coughing, sneezing, acute fever, etc.):
 - The reception staff must immediately contact the patient-admission service and coordinate the direction of the animal to the emergency service or isolation in order to minimize the environmental contamination of the hospital.

Protocol for Students:

- In order to minimize the risks for students and other patients, a minimum number of students will be assigned by the clinician to follow the consultations/examinations of potentially infectious patients.
- After the examination room has been vacated, areas or equipment contaminated with faeces and/or body fluids must be cleaned and disinfected immediately by the student and/or the staff responsible for the patient.
- An appropriate warning sign must be placed on the door, and the room must not be used for another patient until complete cleaning and disinfection have been ensured.
- Students must KNOW (video instructions, lectures and the Faculty of Veterinary Medicine biosafety website) and apply the biosafety protocol to be followed when in contact with infectious patients.

Criteria for Refusal of Admission and/or Hospitalization:

- A patient with a notifiable disease cannot be admitted to the hospital (and cannot be hospitalized). If the risks to other hospitalized patients or staff are more significant than the risk to the animal itself, the patient may not be admitted. Specific refusal criteria for each animal species are listed under the relevant hospital service.
- Only physicians (not interns) have the authority to refuse an animal.

BIOSAFETY SURVEILLANCE

This program has been established to monitor and identify the spread of infectious disease at the Faculty of Veterinary Medicine. Environmental samples and patient samples are cultured to detect specific microorganisms, general environmental contamination, and disease syndromes potentially associated with nosocomial infections and complications.

- In general, responsible physicians must alert the FVMBC as soon as possible in the following situations:

- The occurrence of known or suspected nosocomial events
- The existence of any trend suspicious of nosocomial events, even if the clinical outcomes are not severe
- As a result of exposure to any known or suspected zoonotic infection thought to have arisen at the Faculty of Veterinary Medicine
- Responsible physicians are encouraged to use appropriate diagnostic tests to determine the aetiology of nosocomial events, even if the results do not affect the patient's clinical outcome.
- The traceability of infected animals and contacts is of great importance for biosurveillance. At the Faculty of Veterinary Medicine hospital, the information of all incoming cases will be recorded in full in the E-VET record program.

Required Diagnostic Tests in Suspected Infections:

Diagnostic confirmation of infection is critical for the appropriate clinical management of infectious patients, especially when a zoonotic pathogen is involved. Laboratory tests benefit both the patient and the animal owner by allowing appropriate management of the disease at home (protecting human health against zoonotic pathogens). They also help the Faculty of Veterinary Medicine to correctly manage the risk for all concerned (for example, Faculty of Veterinary Medicine patients, staff and students).

For this reason, it is strongly recommended that the patient be tested during the differential diagnosis to determine whether an infectious or zoonotic pathogen is present. For this, reference tests defined using the algorithms established by the Ministry of Agriculture and Forestry of the Republic of Türkiye will be used.

Diseases That Must Be Tested:

- If any of the following diseases or conditions is part of the differential diagnosis, it is mandatory to test appropriate samples. A full description of the test, management, diagnosis and potential treatment information can be found on the OIE website:
 - Data on animal diseases - OIE Technical disease cards:
<http://www.oie.int/en/animal-health-in-the-world/technical-disease-cards/>
 - Terrestrial Animal Health Code:
http://www.oie.int/eng/normes/mcode/en_sommaire.htm
 - Manual of Diagnostic Tests and Vaccines for Terrestrial Animals:
<http://www.oie.int/en/manual-of-diagnostic-tests-and-vaccines-for-terrestrial-animals/>
 - Manual of Diagnostic Tests for Aquatic Animals:
<http://www.oie.int/en/international-standard-setting/aquatic-manual/access-online/>
 - Aquatic Animal Health Code:
http://www.oie.int/eng/normes/fcode/en_sommaire.htm
- **At the Faculty of Veterinary Medicine, special attention must be paid to the following diseases:**
 - Acute diarrhoea in dogs and cats (examples: *Salmonella* spp., *Campylobacter* spp., parvovirus, *Cryptosporidium* spp. and *Giardia* spp.)
 - Canine distemper
 - Avian chlamydiosis (*Chlamydia psittaci*)
 - Equine herpesvirus type 1 myeloencephalitis
 - Equine infectious anaemia
 - Avian influenza
 - Leptospirosis
 - Rabies
 - Strangles (contagious *Streptococcus equi* subsp *equi* infection)
 - Salmonellosis (large animals)
 - *Leishmania*

SALMONELLA ENVIRONMENTAL SURVEILLANCE IN LARGE ANIMALS

Stall Cultures:

- After routine cleaning and disinfection procedures, samples must be taken from a stall housing a patient positive for spp. The stall will be suitable for housing another patient only if the environmental cultures are *Salmonella* negative.
- The technicians responsible for the decontamination of the stall, or the veterinarian responsible for the patient, must inform the FVMBC when the stall is vacated for sampling.
- Faculty of Veterinary Medicine staff report the culture results to the FVMBC as soon as the results are ready.
- These data are routinely summarized and reported by the FVMBC.

Routine Environmental Surveillance:

- Sampling for environmental surveillance must be planned every 6 months for many areas, and more frequently for areas suspected of contamination with *Salmonella* spp. (isolation unit: every 3 months).
- Faculty of Veterinary Medicine staff report any positive culture result to the FVMBC as soon as the results become apparent.
- These data are routinely summarized and reported by the FVMBC.

NOTIFIABLE DISEASES IN TÜRKİYE

It is the policy of the Faculty of Veterinary Medicine to investigate the possibility of any notifiable disease and to report it to the Ministry of Agriculture and Forestry (Provincial Directorate of Agriculture and Forestry). When a notifiable animal disease is diagnosed: 1) The disease must be notified via the HBS system. 2) The disease must be notified by telephone to the Provincial Directorate of Agriculture and Forestry, and subsequently the NAD (Notifiable Animal Disease) form must be completed by scanning the QR code provided at the consultation. On the NAD form, the notifier, the notified disease, the patient-owner information, and to whom the notification was made are stated. The NAD form can be viewed by the Deanship, the FVMBC chair and the chief physician (Figures 8 and 9).

The screenshot displays the HBS (Hastalık Bildirim Sistemi) interface for notifiable disease reporting. The user is ZAFER MECİTOĞLU (ID: 106722412). The form is titled 'İlaç Reçetesi Ekle' (Add Drug Prescription). The user's details are: Veteriner Hekimin Adı: ZAFER MECİTOĞLU, Soyadı: (blank), Diploma No: 2004-1767, İl: BURSA, Memuriyet Sicil/Oda Kayıt No: (blank), Adres: GÖRÜKLE NİLÜFER BURSA. The 'Reçete Sınıfı' (Prescription Class) dropdown menu is open, showing a list of notifiable diseases (İHBARİ ZORUNLU HASTALIKLAR) including SOLUNUM SİSTEMİ HASTALIKLARI, SİNDİRİM SİSTEMİ HASTALIKLARI, ÜRO-GENİTAL SİSTEM HASTALIKLARI, SİNİR SİSTEMİ HASTALIKLARI, KAS ve İSKELET SİSTEMİ HASTALIKLARI, KARDİYO-VASKÜLER SİSTEM HASTALIKLARI, DERİ HASTALIKLARI, DUYU SİSTEMİ HASTALIKLARI, METABOLİZMA HASTALIKLARI, and ARI HASTALIKLARI. The 'Tebhis/Süphe Edilen Hastalık Türü Listesi' (List of Diseases Suspected/Reported) and 'Diğer Tebhis Edilen Hastalık' (Other Diseases Reported) fields are also visible.

Figure 8. Notifiable disease reporting window via the HBS prescription system



Figure 9. QR code created for the NAD notification form

ADDRESS: REPUBLIC OF TÜRKİYE MINISTRY OF AGRICULTURE AND FORESTRY

Directorate General of Animal Health and Quarantine

Üniversiteler Mah. Dumlupınar Bulvarı, No: 161, 06800, Çankaya/ANKARA

Tel: 0 312 258 75 00 Fax: 0 312 258 75 21

A. Diseases of terrestrial animals

- 1- Foot-and-mouth disease (FMD)
- 2- Bovine brucellosis
- 3- Bovine tuberculosis
- 4- Rabies
- 5- Bluetongue
- 6- Rinderpest
- 7- Bovine spongiform encephalopathy (BSE)
- 8- Sheep and goat brucellosis
- 9- Peste des petits ruminants (PPR)
- 10- Sheep and goat pox
- 11- Anthrax
- 12- Scrapie
- 13- Avian influenza (fowl plague)
- 14- Newcastle disease
- 15- Pullorum disease
- 16- Fowl typhoid
- 17- Glanders
- 18- Dourine (equine syphilis)
- 19- Equine infectious anaemia
- 20- Equine encephalomyelitis (all types, including Venezuelan equine encephalomyelitis)
- 21- African horse sickness
- 22- African swine fever
- 23- Classical swine fever
- 24- Swine vesicular disease
- 25- Small hive beetle (*Aethina tumida*)
- 26- American foulbrood of bees
- 27- Tropilaelaps mite
- 28- Feline spongiform encephalopathy (FSE)
- 29- Lumpy skin disease of cattle
- 30- Vesicular stomatitis (contagious stomatitis)
- 31- Rift Valley fever
- 32- Contagious bovine pleuropneumonia
- 33- Enzootic bovine leukosis

34- Epizootic haemorrhagic disease of deer (EHD)

B. Diseases of aquatic animals

- 1- Epizootic haematopoietic necrosis
- 2- Epizootic ulcerative syndrome
- 3- Viral haemorrhagic septicaemia (VHS)
- 4- White spot disease
- 5- Yellowhead disease
- 6- Taura syndrome
- 7- Infectious haematopoietic necrosis of fish (IHN)
- 8- Infectious salmon anaemia
- 9- Infection with *Perkinsus marinus*
- 10- Infection with *Microcytos mackini*
- 11- Infection with *Marteilia refringens*
- 12- Infection with *Bonamia ostreae*
- 13- Infection with *Bonamia exitiosa*
- 14- Koi herpes virus disease
- 15- Spring Viraemia of Carp (SVC)
- 16- Crayfish plague
- 17- Bacterial kidney disease (BKD)

In the context of a laboratory analysis, the following diseases must be reported by the Laboratory Head:

- Zoonoses
 - *Viral zoonoses:*
 - Norovirus
 - Hendra virus
 - Hepatitis A virus
 - Influenza virus
 - Arthropod-borne virus
 - Viral zoonotic encephalitis
 - Nipah virus
 - CCHF
 - *Bacterial zoonoses:*
 - Borreliosis (Lyme disease)
 - Botulism
 - Brucellosis
 - Campylobacteriosis
 - Colibacillosis - Verotoxigenic *Escherichia coli* (VTEC)
 - Leptospirosis
 - Listeriosis
 - Psittacosis
 - Q fever
 - Salmonellosis
 - Tuberculosis
 - Vibriosis
 - Yersiniosis
 - *Parasitic zoonoses:*
 - Anisakiasis
 - Cryptosporidiosis
 - Cysticercosis
 - Echinococcosis
 - Toxoplasmosis

- Trichinellosis
- Leishmaniosis

For appropriate sampling and diagnostic techniques regarding notifiable diseases:

- Data on animal diseases - OIE Technical disease cards:
<http://www.oie.int/en/animal-health-in-the-world/technical-disease-cards/>
 - Manual of Diagnostic Tests and Vaccines for Terrestrial Animals:
<http://www.oie.int/en/manual-of-diagnostic-tests-and-vaccines-for-terrestrial-animals/>
 - Manual of Diagnostic Tests for Aquatic Animals:
<http://www.oie.int/en/international-standard-setting/aquatic-manual/access-online/>
- Aquatic Animal Health Code:
http://www.oie.int/eng/normes/fcode/en_sommaire.htm

RECOMMENDATIONS FOR DISEASE CONTROL AND ANIMAL TRADE

- For recommendations regarding disease control and trade advice:
 - Terrestrial Animal Health Code:
http://www.oie.int/eng/normes/mcode/en_sommaire.htm
 - Aquatic Animal Health Code:
http://www.oie.int/eng/normes/fcode/en_sommaire.htm

ANIMAL HOSPITAL

Warning Lines:

To make access more visible to patient owners, visitors and students, certain parts of the Faculty of Veterinary Medicine have been painted with coloured lines corresponding to circulation authorization.

- **Green:** No restriction, passage permitted.
- **Yellow:** Passage is restricted (for example, hospitalization corridor or laboratory entrance).
- **Red:** Passage is not permitted without the clinician's permission (examples: operating theatre, necropsy area, cadaver storage area or isolation facilities).

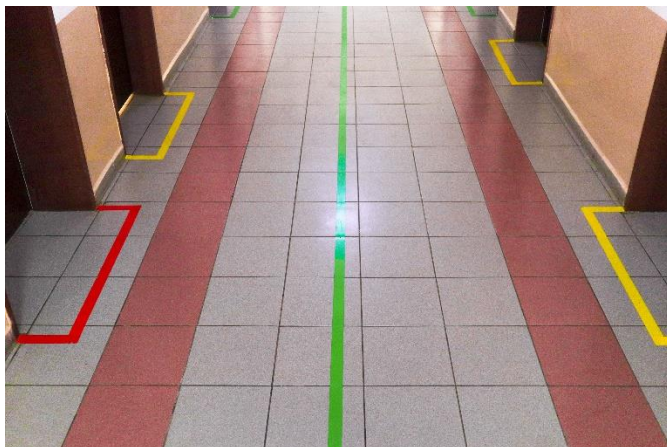


Figure 10. Animal hospital floor lines.

General Clothing Rules for the Equine Clinic:

The clinic-appropriate dressing procedure applied at the Faculty of Veterinary Medicine is intended to prevent the pathogens to which both staff and animals are exposed from being carried outside.

- All staff working in the equine clinic, when on ambulatory-clinic duty, must at all times wear clean professional clinical clothing, clothing with protective properties against the clean external environment, and clean footwear suitable for the external environment.
- This clothing must be appropriate for the work to be carried out (for example, when working with large animal patients, it is more appropriate to wear a coverall or a suitable gown and heavy shoes or boots).

- Students: They must wear suitable coveralls bearing their name badges, together with protective shoes or boots. Those who do not wear the specified clothing are removed from the clinic.
- Interns: Green gowns bearing their name badges. Those on duty in the operating theatre must wear a light-blue set.
- Clinicians: A blue shirt or blue jacket bearing their name. Those on duty in the operating theatre must wear a light-blue set.
- Technical staff: A blouse bearing the name badge: to be worn light blue in the operating theatre and green when on duty in the clinic.
- Horse keeper/groom: A working set consisting of a coverall or blouse and trousers, to be worn only when working inside the clinic.
- Footwear: The shoes or boots selected when working in the equine clinic must be made of sturdy, protective and durable material. Such shoes can be cleaned and disinfected more easily than porous shoes (for example, sports/running shoes) and help to protect the worker against impacts that may occur, especially when working around horses.
- It is essential to ensure that the shoes used while working are completely and properly disinfected. The use of shoes made of waterproof material is strongly recommended in order to limit the damage that the solutions used in the foot bath will cause to the shoes.

General Clothing Rules for the Ruminant Clinic

Shoes and Boots:

- Washable boots are required for students and staff in the relevant category who will work in all patient-care areas of the ruminant clinic. It is recommended that these boots be heavy and sturdy in order to protect the feet from crush injuries.
- Boots may not be worn either in classrooms or in offices (including the secretariat office).
- Staff and students wearing inappropriate boots will be asked to leave the ruminant clinic until they return with appropriate boots.
- Staff and students must keep their footwear clean and disinfected while working.
- Rubber boots must be cleaned and disinfected regularly, and the process must be repeated whenever they are noticed to be visibly soiled or contaminated. Each unit must have “hands-free systems” for brushing, cleaning and disinfecting boots.
- Rubber boots must be cleaned and disinfected regularly and when they become visibly soiled or contaminated.
- Staff responsible for cleaning the stall and animal care may wear special washable durable work shoes when they are not in contact with animals or their faeces. These work shoes must be reserved for use only in the ruminant clinic.

Clothing:

- Clean coveralls are mandatory items that **MUST** be worn by all staff and students in order to minimize the risk of accidental transmission of infectious pathogens to people or animals outside the Faculty of Veterinary Medicine.
- Clean coveralls must be worn in all patient-care areas of the hospital. Coveralls must be changed or cleaned daily, and even more frequently if they become macroscopically soiled or contaminated.
- The washing of staff coveralls is carried out at the animal hospital/ruminant clinic.

Surgical Clothing:

- For surgical procedures, clean blue operating gowns, a cap, a mask and disposable plastic boots are required (Figure 11).
- For standing laparotomies in cattle, a disposable operating gown must be worn.
- During the pre-operative and post-operative procedures of patients, a clean white laboratory coat must without fail be worn over the operating gowns.



Figure 11. Large Animal Operating Clothing.

DIAGNOSTIC IMAGING BIOSAFETY STANDARD OPERATING PROCEDURE

GENERAL RULES

- **Wash your hands between cases, regardless of whether the patient's condition is infectious.**
- On animals suspected of having an infectious disease, diagnostic imaging procedures or examinations must not be performed unless necessary. If an examination is necessary, it must be scheduled towards the end of the day as far as possible (immediately before or after lunch, if no other animal has been scheduled). If it must be performed before the end of the day (because of a surgical procedure, etc.), the diagnostic imaging room and equipment must be cleaned and disinfected immediately after the examination, or the examination must be carried out in a patient department where special precautions have been taken.
- For animals with a potential infectious hazard (respiratory, gastrointestinal and especially infections caused by multidrug-resistant bacteria), it is the clinician's responsibility to specify the procedures to be used to prevent the spread of infectious disease and to inform the imaging-unit staff.
- It is the responsibility of the clinician responsible for patient care to inform the staff and students taking part in the diagnostic imaging examinations of patients with increased infectious risks. The hazards must be clearly stated on the biosafety request form (i.e., the request for X-ray, ultrasound, CT and MRI consultation).
- The patient's condition must also be stated in the "animal" section of the biosafety animal folder.
- The animal's It is the clinician's responsibility to coordinate the transport of the animal to the Imaging Unit (using, as far as possible, a transport cage, stretcher or trolleys, in order to minimize hospital contamination) and, if the patient cannot be moved or will not be transported, the visit of the radiologist to the infection unit. At least one student responsible for the patient must follow the case in the Diagnostic Imaging Unit. If an infectious disease is suspected or an infectious disease has been confirmed, the patient must remain in its area until it is ready for diagnostic imaging and the imaging unit is prepared to perform the examinations.
- **The animal must not be left/kept waiting in the waiting room or corridor.**
- It is the clinician's responsibility to specify the protective clothing (gown, gloves) and the procedures to be followed (using an effective disinfectant substance). Staff and students must wear disposable clothing and gloves to restrain the patient.
- The number of persons taking part in the examinations must be limited as far as possible.
- After a procedure performed on a patient with an infectious/suspected infectious disease, the examination room must be closed. The instruments and materials used must be cleaned and

disinfected as soon as possible by the radiology technicians with the help of the students. Paper towels used to clean the instruments and dry the animals, gloves, disposable clothing, urine and faeces must be discarded into the yellow-waste container. This **waste container** must be closed immediately after cleaning and disinfection **closed**.

- All individuals who have come into contact with the patient must carefully wash and disinfect their hands when the procedure is completed.

X-ray Examinations:

- If the cassette is in contact with the patient, it must be placed in a plastic bag. Before the cassette is read, a person with clean hands must take the cassette.
- All staff and students working with X-rays must wear radiation-protective clothing (lead or xenolite) and personnel dosimetry (intended to measure the degree of exposure to radioactivity) (Figure 12).
- When animals with a known or suspected infectious disease are being examined, disposable clothing must be worn over the lead protective clothing.
- For small animals with suspected/confirmed infectious diseases (**class 3**), a plastic bag and bed-protector pad must be placed over the X-ray table.
- **The X-ray imaging of large animals in risk classes 3 and 4** must be carried out in their stalls as far as possible. A portable X-ray device must be used. If this is not technically possible, the X-ray imaging may be carried out in the Diagnostic Imaging Unit, but the examination must be scheduled for the end of the day. Complete cleaning and disinfection are required after such patients.
- When transporting small ruminants and calves to the unit, use a transport trolley.
- The Diagnostic Imaging team and students, on entering the **Large Animal Clinics**, must follow the clothing protocol appropriate for this area.



Figure 12. Radiology–X-ray Room Clothing

Ultrasound Examination:

- The ultrasound cushion used for small animals must be placed in a plastic bag and covered with a disposable bed-protector pad, and after use it must be discarded into the yellow-waste container.
- A protective disposable glove must be fitted over the ultrasound probe. After the examination, the probe and cable must be carefully disinfected with Tristel Duo for Ultrasound® and Distel Wipes respectively.
- The person performing the examination must operate the ultrasound machine with a clean hand, or the ultrasound machine must be operated by a different person.
- **The ultrasound examination of large animals in risk classes 3 and 4** must be carried out in the area where the animals are; the ultrasound machine must not be brought into the box but kept in the corridor. The **wheels of the ultrasound machine must be carefully disinfected after the**

examination. Only the necessary material must be brought into the unit. Alcohol and gel must be available for the ultrasound examination.

Imaging Room and Equipment:

- After the examination of a patient with a confirmed/suspected infectious disease, spray disinfectant onto the floor or mop with disinfectant water.
- After use on a patient with a confirmed/suspected infectious disease, disinfectant must be sprayed onto the lead apron and gloves.
- Clean and disinfect the lead ropes/lead head ropes weekly.
- Clean and disinfect all equipment daily.

Table 4. Antiseptics and Disinfectants That May Be Used in the Animal Hospital

Antiseptics and Disinfectants	Mechanism of action	Purpose of use	Application dose and method of use	Advantages and disadvantages
Ethyl alcohol (ethanol) 70% or Isopropyl alcohol (isopropanol, 50–90%)	Disrupts the structure of the proteins in the cytoplasm of the bacterium	• Hand and skin antiseptics • Skin/site antiseptics before injection and before blood collection	• Apply by spraying 3–5 ml onto the hand or skin, or • by soaking cotton, wait at least 30 seconds for it to take effect	• Broad antibacterial spectrum, toxicity potential very low • Can be used on tissues, skin, and materials in contact with mucosa • Rapid action, leaves no residue or stain, evaporates quickly and is extremely flammable • With frequent use, causes dryness and irritation of the skin • Effectiveness decreases in an environment containing organic matter
Chlorhexidine (as chlorhexidine gluconate, 2–4%)	Damages the cytoplasmic membranes of bacteria	• Hand and skin antiseptics • Pre-operative skin antiseptics • Used in the disinfection of medical devices and instruments	• Approximately 5 ml of chlorhexidine solution is poured onto the hand, and the arms are washed up to the elbows by rubbing	• Broad antibacterial spectrum, but ineffective against spores and viruses • Low toxicity potential, disinfection of patients' materials • Easily inactivated by soaps and detergents • Its residual effect on the skin reduces recolonization; works within a limited pH range (5–7) • Toxic to fish, must not be discharged into the environment • Effectiveness decreases rapidly in an environment containing organic matter
Povidone-iodine (as a 10% solution)	Disrupts the structure of the proteins of microorganisms	• Hand and skin antiseptics • Pre-operative skin antiseptics	• Apply by spraying/pouring 3–5 ml onto the hand or skin, or • by soaking cotton, wait between at least 1–5 minutes for it to take effect	• Broad spectrum, also effective against viruses and fungi, partially effective against spores • Very low toxicity, may cause contact dermatitis on repeated use • Must not be applied to the eyes. May cause staining on tissue and plastics • Stable in storage, inactivation by organic residue and quaternary ammonium compounds • Requires frequent application and is partially corrosive • Effectiveness decreases rapidly in an environment containing organic matter
Hydrogen peroxide (3%)	Disrupts the structure of the proteins of microorganisms	• Large animal foot bath, antiseptics	• Contact time approximately 15 minutes	• Broad spectrum, low toxicity • Because of irritation, wear a mask and rubber gloves when preparing the solution • Effectiveness decreases in an environment containing organic matter
Hydrogen peroxide + peracetic acid powder (1–2% solution)	Disrupts the structure of the proteins of microorganisms	• Large animal foot bath, antiseptics • Surface disinfection	• Contact time at least 10 minutes, then rinse with drinking water	• Broad spectrum, effective against bacteria, fungi and viruses • Low toxicity • Because of irritation, wear a mask and rubber gloves when preparing the solution • Effectiveness decreases in an environment containing organic matter

Quaternary ammonium compounds (such as didecyldimethylammonium chloride)	Disrupts the structure of the proteins of microorganisms, binds the phospholipids of the cell membrane	• For the surfaces and floors of operating theatres and • in the disinfection of pathology necropsy halls	• Applied directly to surfaces with cloths, applied to floors with a mop • Contact time at least 15 minutes	• Broad spectrum, effective against many bacteria, some fungi, viruses and spores • Generally of low toxicity, inactivation by anionic detergents such as soap • Stable in storage, but inactivated by hard water and limescale-laden water • May leave some residue after drying • Effectiveness decreases in an environment containing organic matter
Sodium hypochlorite (bleach, 2–5% solution)	Disrupts the structure of the proteins of microorganisms	• Disinfection of clean surfaces and floors	• Applied directly to the floor with a mop	• Broad spectrum, relatively low toxicity at standard dilutions • Not affected by water hardness, inexpensive • May cause irritation and stinging. Limited stability for stored solutions • Effectiveness decreases in an environment containing organic matter

CHAPTER 2

ANIMAL HEALTH AND ANIMAL PRODUCTION, RESEARCH AND APPLICATION CENTER

STANDARD OPERATING PROCEDURES FOR BIOSAFETY
WORKING PRINCIPLES

INSTRUCTIONS OF THE BUÜ FACULTY OF VETERINARY MEDICINE ANIMAL HEALTH AND ANIMAL PRODUCTION RESEARCH AND APPLICATION CENTER

INTRODUCTION

- The BUÜ Faculty of Veterinary Medicine Animal Health and Animal Production Research and Application Center (Farm) is located 1200 metres from the Faculty. On the farm there are cattle, sheep–goat, chicken–quail, pig, horse and bee units used for teaching and research, as well as a quarantine building and a feed unit. Except for changes depending on the season or ongoing experimental protocols, the number of animals is fixed.
- Animal Capacity:
 - Cattle: 300 head
 - Dairy cattle
 - Milking
 - Bulls over 2 years of age
 - Cattle under 2 years of age
 - Small ruminants: 400 head
 - Sheep (ewe)
 - Ram
 - Lamb
 - Goat
 - Buck
 - Kid
 - Poultry: 15000
 - Layer: 7000
 - Broiler: 15000
 - Quail: 1000
 - Pig: 20
 - Bee Colony: 30
 - Horse: 15
- The cattle are housed on the farm, as in a commercial establishment, until retail sale, slaughter or culling, in accordance with the regulations of the Ministry of Agriculture and Forestry of the Republic of Türkiye, and their inspections are ensured routinely. They are also inspected every three months by the "Animal Welfare Committee" within the Faculty.
- On the other hand, those used for experimental purposes are housed in separate sections, and additional biosafety procedures are applied for them (under the responsibility of the researchers).

IDENTIFICATION, REGISTRATION AND ANIMAL MOVEMENTS

- These are applied in accordance with the regulations applied on commercial farms.
- A holding registration number is maintained for the cattle and sheep–goat herds.
- Each animal is registered in the TÜRK VET/E-ISLAH system and an identity (passport) is created; in this way an official inventory of the animals present on the farm is kept.
- Each newborn calf is identified with two ear tags within at most 7 days after birth, and always before leaving the herd. In the event that an ear tag is lost, another tag with the same number is ordered from TÜRK VET/E-ISLAH, so that each animal carries the same ear-tag number throughout its life.
- Any cattle movement (entry into the herd, departure, transport to the slaughterhouse or death) is reported to TÜRK VET/E-ISLAH with a special document.
- The cattle on the farm are checked every 6 months for the following diseases using the specified tests, and animals found to be positive are removed from the herd.
 - Tuberculosis: intradermal tuberculin test
 - Paratuberculosis: ELISA Ab
 - Brucellosis: ELISA Ab and/or CFT

- Enzootic Bovine Leukosis: ELISA Ab
- New animal entries into the herd are limited. Animals are purchased only for use in research.
- When a new animal is brought into the herd, it is placed in the quarantine unit. Its identity is checked and examinations (clinical examination, tuberculin test) are carried out. Blood samples are taken, and the above-mentioned tests for enzootic bovine leukosis, paratuberculosis and brucellosis are carried out within our Faculty.
- The herd is free of brucellosis, tuberculosis and enzootic bovine leukosis.

EPIDEMIOLOGICAL MONITORING

- The technical persons responsible for the farm, cattle, small ruminants and poultry are faculty members of the Department of Animal Science and Animal Nutrition appointed by the Deanship.
- The responsible veterinarian(s) are responsible for purchases and for the implementation of epidemiological screenings (including the suspicion of infectious disease).
- When an animal is purchased, the responsible physician is called within 48 hours of purchase. He/she examines the animal and, if the animal is over one year of age and will not be used for fattening, takes a blood sample. Depending on the intended use or working status of the animal, other samples are taken.
- If workers or students notice one or more animals showing an abnormal finding, they report the situation to the responsible veterinarian so that he/she can examine the animals. If, as a result of clinical examination, a notifiable disease is suspected, the Deanship and the Ministry of Agriculture and Forestry of the Republic of Türkiye are officially informed.
- In the event that an infectious disease is suspected, in addition to cleaning and disinfection applications, the movements of animals, people and equipment will be restricted.
- Medicines are stored in a specific room on the farm under the responsibility of the farm veterinarian.

Personnel:

- Workers wear special coveralls, jackets and safety boots for their work. This clothing is worn only on the farm and is cleaned regularly.
- Personnel wash their hands regularly according to the procedures explained.
- If personnel need to visit other farms, they must use different clothing (coveralls, jackets and boots).
- There are showers, a cloakroom and a dining hall in the farm administration building. Eating and drinking anything is not permitted outside the administration building and the social room.

Students' Activities on the Farm:

- Students take part in the applications carried out on the farm by different departments. In these applications, they follow the practical work and also take part in the treatment and observation of the animals.
- The content of such activities is well planned and determined in advance. The applications are carried out mainly in the form of observing and performing tasks such as prophylactic and diagnostic procedures on animals (vaccination, blood sampling), hoof care and trimming, dehorning, rectal examination, castration and basic care.
- Students are also involved in the care and treatment processes of sick animals.

Instructions for students:

- Students wear the coveralls and boots available in the changing room; these must be worn only on the farm and must not be used in the clinic. Students must change in the changing room before going to the stalls.
- Students use their own thermometers and stethoscopes for clinical activities. These materials must be cleaned regularly with soap and water and disinfected with hand sanitizer.
- A coverall may be used several times. When it is macroscopically soiled, it must be discarded into the bucket reserved for soiled laundry. When soiled, the coveralls are washed in a high-capacity

washing machine on the farm.

- When returning from the stalls, the boots must be washed at the boot washing stations located at the entrance of the changing room or next to the administration building.
- After the farm visit, students wash their hands with disinfectant soap in the changing room, in accordance with the procedures explained in Chapter 1.

Manure Management:

- Solid and liquid manure is stored temporarily in a specific area on the farm. It is then used on the fields belonging to the Faculty of Veterinary Medicine for crop production.
- The solid manure of large animals and teaching horses housed in the clinics is brought to the farm manure storage area in closed boxes. The faeces of animals taking part in experimental protocols are considered risky waste and are not brought to the farm.
- Fly-pest and rodent control is applied throughout the farm (Chapter 5).

Calf Management:

Calves are housed separately from birth until weaning. Calf hutches are completely cleaned and disinfected with a disinfectant.

Special measures:

- On the farm, activities such as an 'educational farm' for children may be organized on request. These activities are carried out only for small groups, under the continuous supervision of a competent member of the Farm staff.
- Visitors may have contact only with healthy animals and may not eat or drink in the stalls.
- Visitors must apply a certain level of biosafety:
 - Clean boots or disposable overshoes must be used.
 - Boots must be washed at the boot-washing station located at the entrance of the administration building. This procedure is mandatory before entering the stalls and at the end of the activities.
 - Hands must be washed, especially at the end of the activity.
 - If disposable overshoes and a gown were used, they are discarded into medical waste.

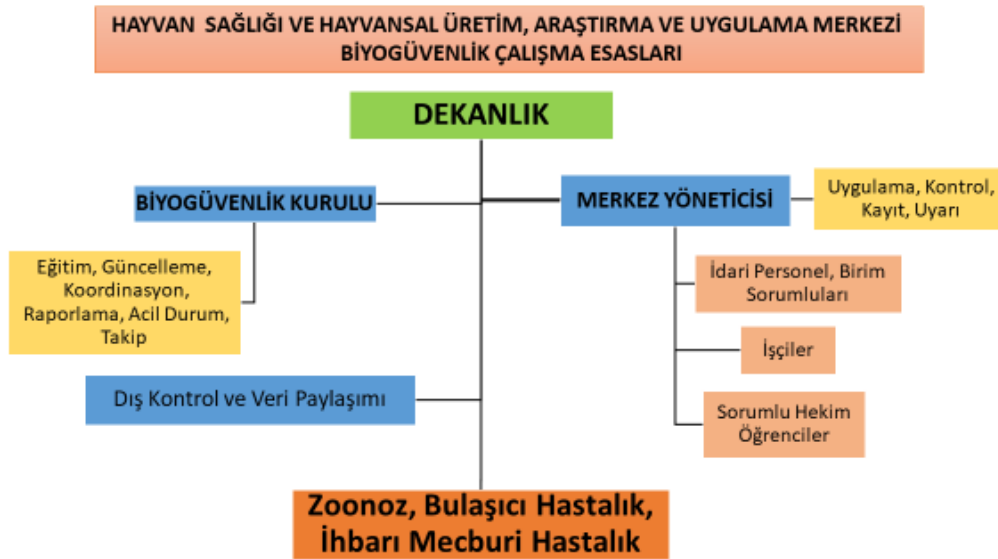


Figure 13. Schematic Representation of the Biosafety Protocol of the Animal Health and Animal Production, Research and Application Center

Table 5. Antiseptics and Disinfectants That May Be Used on the Farm

Antiseptics and Disinfectants	Mechanism of action	Purpose of use	Application dose and method of use	Advantages and disadvantages
Ethyl alcohol (ethanol) 70% or Isopropyl alcohol (isopropanol, 50–90%)	Disrupts the structure of the proteins in the cytoplasm of the bacterium	• Hand and skin antiseptics • Skin/site antiseptics before injection and before blood collection	• Apply by spraying 3–5 ml onto the hand or skin, or • by soaking cotton, wait at least 30 seconds for it to take effect	• Broad antibacterial spectrum, toxicity potential very low • Can be used on tissues, skin, and materials in contact with mucosa • Rapid action, leaves no residue or stain, evaporates quickly and is extremely flammable • With frequent use, causes dryness and irritation of the skin • Effectiveness decreases in an environment containing organic matter
Chlorhexidine (as chlorhexidine gluconate, 2–4%)	Damages the cytoplasmic membranes of bacteria	• Hand and skin antiseptics • Pre-operative skin antiseptics • Used in the disinfection of medical devices and instruments	• Approximately 5 ml of chlorhexidine solution is poured onto the hand, and the arms are washed up to the elbows by rubbing	• Broad antibacterial spectrum, but ineffective against spores and viruses • Low toxicity potential, disinfection of patients' materials • Easily inactivated by soaps and detergents • Its residual effect on the skin reduces recolonization; works within a limited pH range (5–7) • Toxic to fish, must not be discharged into the environment • Effectiveness decreases rapidly in an environment containing organic matter
Povidone-iodine (as a 10% solution)	Disrupts the structure of the proteins of microorganisms	• Hand and skin antiseptics • Pre-operative skin antiseptics	• Apply by spraying/pouring 3–5 ml onto the hand or skin, or • by soaking cotton, wait between at least 1–5 minutes for it to take effect	• Broad spectrum, also effective against viruses and fungi, partially effective against spores • Very low toxicity, may cause contact dermatitis on repeated use • Must not be applied to the eyes. May cause staining on tissue and plastics • Stable in storage, inactivation by organic residue and quaternary ammonium compounds • Requires frequent application and is partially corrosive • Effectiveness decreases rapidly in an environment containing organic matter
Hydrogen peroxide (3%)	Disrupts the structure of the proteins of microorganisms	• Large animal foot bath, antiseptics	• Contact time approximately 15 minutes	• Broad spectrum, low toxicity • Because of irritation, wear a mask and rubber gloves when preparing the solution • Effectiveness decreases in an environment containing organic matter
Hydrogen peroxide + peracetic acid powder (1–2% solution)	Disrupts the structure of the proteins of microorganisms	• Large animal foot bath, antiseptics • Surface disinfection	• Contact time at least 10 minutes, then rinse with drinking water	• Broad spectrum, effective against bacteria, fungi and viruses • Low toxicity • Because of irritation, wear a mask and rubber gloves when preparing the solution • Effectiveness decreases in an environment containing organic matter
Sodium hypochlorite (bleach, 2–5% solution)	Disrupts the structure of the proteins of microorganisms	• Disinfection of clean surfaces and floors	• Applied directly to the floor with a mop	• Broad spectrum, relatively low toxicity at standard dilutions • Not affected by water hardness, inexpensive • May cause irritation and stinging. Limited stability for stored solutions • Effectiveness decreases in an environment containing organic matter

Chapter 3

- FACULTY OF VETERINARY MEDICINE
RESEARCH AND STUDENT
LABORATORIES

- ANATOMY DISSECTION HALL

STANDARD OPERATING PROCEDURES FOR BIOSAFETY WORKING
PRINCIPLES

STUDENT LABORATORIES

GENERAL RULES

- The storage and consumption of food and drink in the laboratories is completely forbidden.
- While in the laboratory, the face and hair must not be touched.
- The use of a mobile phone while in the laboratory is strictly forbidden.
- During the practical session, the laboratory door must remain closed at all times.
- Special transport boxes or additional containers must be used to transport the samples in the laboratory.
- Mouth pipetting is completely forbidden; mechanical pipetting devices are used instead.
- Work with sharp objects must be minimized.
- Hair must be tied up and no jewellery worn. No accessories are permitted, in order to prevent contamination.
- Personal belongings must be left in the special lockers reserved for this purpose before entering the laboratory.
- Wearing the laboratory coat outside the laboratory is strictly forbidden.

BASIC LABORATORY RULES

- Long trousers (ankle length) or other clothing covering exposed skin must be worn.
- Shoes suitable for the floor must be worn; closed-toe shoes covering the tops of the feet are preferred.
- Students must wear a long-sleeved white cotton coat, and the laboratory coat must remain buttoned continuously throughout the entire activity. The sleeves must completely cover the sleeves of their outer clothing (Figure 14).
- Students **in the Anatomy practical hall** must, when necessary, wear a tie-on plastic long apron, sleeve covers, disposable gloves and rubber boots.
- It is mandatory for students performing manipulation in the laboratories to wear nitrile disposable gloves.
- Wearing gloves when working with a Bunsen burner is not recommended.
- Gloves must be discarded into the red waste bins.
- After gloves are removed, the hands must without fail be washed and disinfected (the disinfection rules must be written above the sinks in the disinfection area).
- Students in the Anatomy Practical Hall are asked to leave the dissection hall after washing and disinfecting the dissection instruments and their rubber boots; the dissection room and tables are cleaned and disinfected.
- The laboratory coat must be removed and buttoned.
- Dissection instruments used by authorized staff must be washed after each use, and left disinfected at the end of each week in which dissection is carried out. The dissection hall must be cleaned with detergents every week.

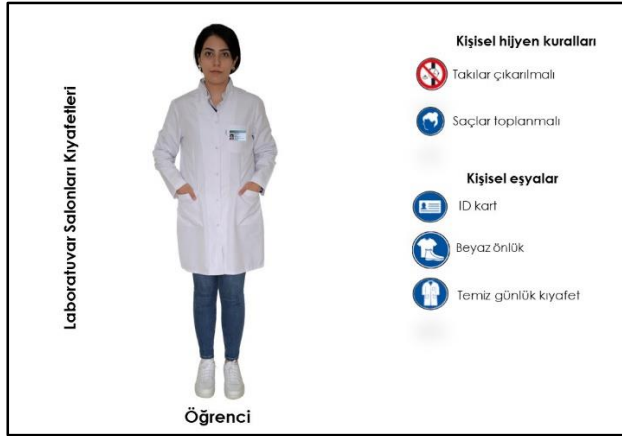


Figure 14. Student Laboratory Clothing

EMERGENCY

- In risky situations, if the student has not been vaccinated against tetanus, he/she must without fail go to a health institution and be given anti-tetanus serum and the tetanus vaccine.
- If a student sustains a cut that will harm them, they must immediately wash their hands and the injured area, examine the condition of the cut and carry out the necessary intervention and antiseptics.
- Each laboratory must have eyewash stations.

In the event of accidental contamination of work surfaces (splashes, spills, overflows);

-The responsible staff must be informed, and the spill must be covered with paper towel or another absorbent material. It must be cleaned by pouring disinfectant onto the edges of the spill, with movements towards the centre of the spill. The disinfectant is allowed to react for the minimum contact time recommended by the manufacturer. Finally, the paper towel is removed and discarded into the yellow-waste container. After the process, the gloves are removed and the hands are washed and disinfected.

- In the event of a burn while using a Bunsen burner; a cooling procedure is applied (with 20 °C water, with the burnt area 20 cm below the tap, for 10 minutes).

- In the event of a fire in the bacteriology laboratory: close the gas supply valve and, in the event of a fire, follow the general emergency plan.

HAZARD GROUP 4 (HG4) ANIMAL PATHOGENS

- These pathogens are responsible for outbreaks that cause considerable economic loss, since they require the very serious action necessary for the restriction of trade and the eradication of the disease in affected regions.
- When any suspected case is detected, in addition to all measures applied by the official health authorities, the faculty students and the staff taking part in the autopsy will not, for a period of one week, have contact with farmers, farms and farm animals .

HAZARD GROUP 3 (HG3) HUMAN PATHOGENS

- These pathogens can cause a serious human disease and can pose a serious hazard to autopsy participants; furthermore, they can spread within the community.
- In practice, the situations giving rise to such concerns are the autopsies of primates. In such cases, students are not admitted to the autopsy room.
- Only expert staff using adequate protective equipment (APE), i.e., masks and eye protection, carry out the autopsy and sampling procedures.

HAZARD GROUP 2 (HG2) HUMAN PATHOGENS

- The most likely route of transmission of these pathogens in the necropsy hall is hand-to-mouth transmission. Good hygiene procedures, including appropriate hand washing and disinfection, should prevent their transmission.
- Transmission by inoculation is also possible, but has been minimized by standard modern universal precautions.
- Necropsy of animals showing granulomatous lesions: the risk of inhalation during the procedure is low, so wearing a respiratory mask that protects against the risk of tuberculosis and tularaemia is sufficient. Additional antibiotic prophylaxis may be assessed on a case-by-case basis.

Entry into the necropsy hall:

1. Changing room: students place their personal belongings in a locker and sign the forms.
2. Anteroom: students put on their disposable coverall and yellow boots.
3. Entry to the main building via the entrance passage of the anteroom.
4. Entry to the working area where disposable gloves (long-sleeved and nitrile) and disinfected dissection equipment are located.



Figure 15. Pathology–Necropsy Hall Clothing

Exit from the necropsy hall:

1. They are asked to discard their gloves and to wash and disinfect their hands.
 2. Exit is made by walking through the boot-washing basin.
 3. Students are directed back to the anteroom, where they take off their coveralls and remove their boots, and wash and disinfect their hands again.
 4. Changing room: students sign the exit form and collect their personal belongings.
- Faculty staff and students comply with the above procedure, except in emergencies (fire).
 - In the disinfection area: students leave the dissection equipment and wash their boots; during the necropsy, faculty students and staff must wear the following (Figure 15):
 - A waterproof disposable coverall that completely protects the arms, chest and legs.
 - Long-sleeved disposable gloves provide additional protection for the arms
 - Nitrile gloves (worn over the long-sleeved gloves)
 - Long boots with a reinforced toe section.
 - If necessary, a face mask and eye protection are also available.

EMERGENCY

- Students must be vaccinated against tetanus. If a student sustains a cut that will harm them during dissection, they must immediately stop the dissection process, inform an attendant in the hall of the situation, wash their hands and the injured area, examine the condition of the cut and carry out the necessary intervention and antisepsis.

IN THE EVENT OF A LABORATORY ACCIDENT

- **Eyewash:** each laboratory must have eyewash stations.
- **Accidental contamination of work surfaces (e.g., splashes, spills, overflows):**
 - Inform the responsible staff and remove persons not involved in the cleaning from the area.
 - Cover the spill with paper towel or another absorbent material.
 - Pour disinfectant onto the edges of the spill and clean with movements towards the centre of the spill during cleaning.
 - Allow the disinfectant to react for the minimum contact time recommended by the manufacturer.
 - Remove the paper towel and discard it into the yellow-waste container.
 - After the process, remove your gloves and wash and disinfect your hands.
- **Burn:** Apply the cooling procedure (with the burnt area 20 cm below the tap, with 20 °C water, for 10 minutes).
- **Fire in the bacteriology laboratory:** close the gas supply valve and, in the event of a fire, follow the general emergency plan.

BIOLOGICAL MATERIALS

Biological samples are the responsibility of the staff. Biological materials such as every petri dish, bag or tube containing a sample must be clearly labelled. Before and after the activity, biological samples must be stored in refrigerators/freezers reserved for sample storage. Technicians are responsible for the preparation and collection of the samples.

- The staff giving the lesson are responsible for the preparation and collection of the samples.
- For parasitology diagnostic activities, analysis samples must be left in the special refrigerator.
- It is located at the entrance of the BSL2 laboratory (clinically suspicious samples must be labelled).
- It is forbidden for students to remove materials from the laboratory.
- Inoculated petri dishes must be handled carefully; this practice helps to prevent the contamination of people and equipment. Care must be taken with the possibility of water splashing, spilling, overflowing, etc.

EQUIPMENT AND MATERIALS

- **Safety data sheets must be available in the laboratory for all chemicals.**
- **Virology:** calculators are available in the laboratory, so mobile phones are not permitted.
- **Note-taking:**
 - Pens and pencils are provided in the laboratories.
 - If it is necessary to take notes on personal sheets (which will be removed from the laboratory), this must be done in a special non-contaminated area of the laboratory and only after gloves have been removed, followed as far as possible by hand washing and sanitation. Maximum precaution must be taken to avoid contaminated note-taking sheets.
 - As far as possible, practical sessions must be arranged in a way that allows notes to be taken beforehand.
 - The staff are responsible for disinfecting the equipment used for laboratory work.
 - For activities in the bacteriology laboratory, the inoculating loop must be disinfected between uses.
 - The surface of the biological safety cabinet is systematically disinfected at the end of the staff's practical work. The entire cabinet must be thoroughly cleaned at least once a month.

WASTE

- All solid biologically contaminated waste and small bottles of biologically contaminated liquid waste are discarded into yellow, leak-proof and rigid plastic containers (the waste is packaged and processed in accordance with the regional regulations of the facility).
- Biologically contaminated liquid waste is decontaminated (autoclaving) before being specifically disposed of; collectors for chemicals.
- Hand-washing and all non-biologically contaminated laboratory waste; special containers (B1 waste).
- All solid biologically contaminated waste and biologically contaminated liquid waste flasks are discarded into yellow, leak-proof and rigid plastic containers (the National Regulation is followed).
- Hand-drying towels and all non-biologically contaminated laboratory waste must be disposed of by placing them in the relevant bins (B1 class refuse).

VISITORS

- Visitors are permitted to be only in corridors and risk-free areas.
- Floor lines are arranged, as specified in Chapter 1, to guide visitors.
- Neither staff nor students are permitted to bring their animals into the Anatomy facilities.
- The presence in the facility of any animal not used for Anatomy purposes is strictly forbidden.

LABORATORY COAT

- **Virology:** a disposable laboratory coat is provided in the laboratory.
 - The laboratory coat must remain buttoned continuously throughout the entire activity. The sleeves must completely cover the sleeves of the outer clothing.
 - Nitrile disposable gloves are available in the laboratory. Wearing gloves is mandatory for everyone. Pathogens with a risk of infection through the skin must not come into direct contact with damaged or injured skin.
- **Bacteriology and Food Science:** wearing gloves when working with a Bunsen burner is not recommended.
- **Parasitology and Virology:** wearing gloves is mandatory when handling biological material.
 - If necessary, respiratory masks are available in the bacteriology laboratory.

EXIT FROM THE LABORATORY

- When leaving risky areas, the hands must without fail be washed and disinfected (the disinfection rules must be written above the sinks in the disinfection area). Disposable gloves are mandatory when dissecting, but this does not override hand washing and disinfection.
- If an infectious disease is suspected, students are asked to leave their gloves and coats in a separate yellow waste bin and to leave the dissection hall after washing and disinfecting their hands, dissection instruments and rubber boots. The dissection instruments, rubber boots and workers' special shoes, the dissection room and tables are cleaned and disinfected.
- The laboratory coat must be removed, then hung on a hanger on the rack, and buttoned (in order to prevent the inner part of the folds of neighbouring laboratory coats from becoming soiled).
- Gloves must be discarded into the yellow waste bins.
- Hands must be washed thoroughly and disinfected with a hydro-alcoholic solution.
- The removal of the laboratory coat and gloves, followed by hand washing, must be carried out at each exit.
- Outside the laboratory, wearing the laboratory coat and gloves is strictly forbidden.
- Before students take away the dissection instruments belonging to them, they must clean and disinfect them thoroughly after each dissection.
- Boots must be brushed and disinfected in the disinfection area after each dissection before being taken home.
- Dissection instruments used by authorized staff must be washed after each use, and left disinfected at the end of each week in which dissection is carried out. The dissection hall must be cleaned every week with a rotary washing machine and industrial detergents. Daily, it must be swept and washed with water.

Table 6. Antiseptics and Disinfectants That May Be Used in the Anatomy and Student Laboratories

Antiseptics and Disinfectants	Mechanism of action	Purpose of use	Application dose and method of use	Advantages and disadvantages
Ethyl alcohol (ethanol) 70% or Isopropyl alcohol (isopropanol, 50–90%)	Disrupts the structure of the proteins in the cytoplasm of the bacterium	• Hand and skin antiseptics	• Apply by spraying 3–5 ml onto the hand or skin, wait 30 seconds	• Broad antibacterial spectrum, toxicity potential very low • Can be used on tissues, skin, and materials in contact with mucosa • Rapid action, leaves no residue or stain, evaporates quickly and is extremely flammable • With frequent use, causes dryness and irritation of the skin • Effectiveness decreases in an environment containing organic matter
Chlorhexidine (as chlorhexidine gluconate, 2–4%)	Damages the cytoplasmic membranes of bacteria	• Hand and skin antiseptics	• Approximately 5 ml of chlorhexidine solution is poured onto the hand, and the arms are washed up to the elbows by rubbing	• Broad antibacterial spectrum, but ineffective against spores and viruses • Low toxicity potential, disinfection of patients' materials • Easily inactivated by soaps and detergents • Its residual effect on the skin reduces recolonization; works within a limited pH range (5–7) • Toxic to fish, must not be discharged into the environment • Effectiveness decreases rapidly in an environment containing organic matter
Sodium hypochlorite (bleach, 2–5% solution)	Disrupts the structure of the proteins of microorganisms	• Disinfection of clean surfaces and floors	• Applied directly to the floor with a mop	• Broad spectrum, relatively low toxicity at standard dilutions • Not affected by water hardness, inexpensive • May cause irritation and stinging. Limited stability for stored solutions • Effectiveness decreases in an environment containing organic matter

WORK SURFACES

- Work surfaces must be cleaned and disinfected before and after use.
- The disinfectants used must be effective against the pathogens used in the laboratories.
- The disinfectants in Table 6 are used in our Faculty's BSL2 laboratories:
 - Anatomy
 - Biochemistry
 - Physiology
 - Histology–Embryology
 - Microbiology
 - Pathology
 - Parasitology
 - Virology
 - Pharmacology and Toxicology
 - Aquatic Animal Diseases
 - Internal Medicine

- Surgery
- Obstetrics and Gynaecology
- Reproduction and Artificial Insemination, Animal Nutrition and Nutritional Diseases
- Animal Science
- Genetics
- Clinical Laboratory
- Obstetrics and Gynaecology
- Reproduction and Artificial Insemination

EQUIPMENT AND MATERIALS

- The staff are responsible for the disinfection of the equipment used for laboratory work.
- Surface disinfection of the biological safety cabinets must be carried out by the responsible staff between the sessions of the groups and at the end of the session. The entire cabinet must be cleaned at least once a month.

ANATOMY DISSECTION HALL

- As soon as students enter the anatomy dissection hall, they must put on a tie-on plastic long apron, and must be wearing sleeve covers, disposable gloves and rubber boots; when they leave the hall, they must remove these immediately.
- After each dissection, the apron and sleeve covers must be left on the rack.
- Rubber boots and dissection instruments must be disinfected after each use.
- Used scalpel blades must be left in the special yellow box. Soiled gloves must be discarded into the yellow waste bin.
- When authorized staff enter risky areas, they must be wearing an apron and rubber boots.
- Rubber boots must be kept in the lockers until the next use.
- Long trousers (ankle length) or other clothing covering exposed skin must be worn.
- Appropriate shoes must be worn; closed-toe shoes covering the tops of the feet are preferred.
- Everyone working in the hall must wear appropriate protective equipment.

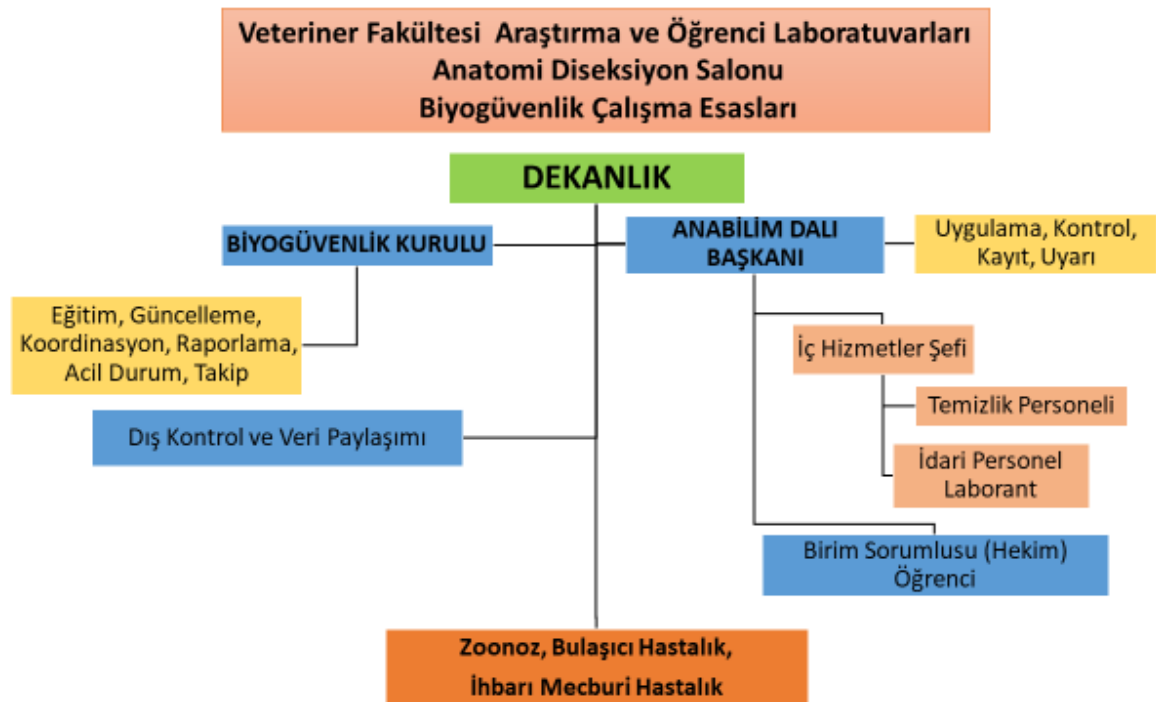


Figure 16. Schematic Representation of the Biosafety Protocol of the Research and Student Laboratories and the Anatomy Dissection Hall.

CHAPTER 4

FOOD ESTABLISHMENTS AND SALES UNITS

STANDARD OPERATING PROCEDURES FOR BIOSAFETY
WORKING PRINCIPLES

DEPARTMENT OF FOOD HYGIENE AND TECHNOLOGY STANDARD OPERATING PROCEDURE: OFF-SITE PRACTICES

INTRODUCTION

Purpose of Preparing the Procedure:

This procedure contains the conditions that must be complied with in order to minimize the risks of transmission of disease agents.

These are:

- Prevention/reduction of the risk of transmission of disease agents from the students or staff who go on facility visits for practical purposes to farm animals or foodstuffs,
- Prevention of the transmission of disease agents from animals and foods to humans,
- As sources of transmission, in addition to farms, dairies, slaughterhouses, food-processing units, other facilities where animals are present, food products and unprocessed animal materials, substances such as animal secretions and waste (saliva, etc.), manure, urine, contaminated feed, animal bedding, water, waste and milk are also factors that must be taken into account.

To Whom These Practices Are Addressed:

Faculty of Veterinary Medicine Students:

- Students taking the meat inspection course visit the designated slaughterhouse in groups each week under appropriate conditions during the practical part of the course. These students initially visit the slaughterhouse conditions and environment, and then, in the following weeks, carry out meat inspection together with the responsible physician at the establishment. They inspect the organs and meat allocated to them under appropriate conditions.
- Students doing their internship in the Department of Food Hygiene and Technology also carry out the meat inspection process together with the responsible physician at the slaughterhouse .

GENERAL HYGIENE PRINCIPLES

Students' Medical History and Slaughterhouse Obligations

- If a student is carrying an infectious disease that could potentially be harmful to animals or foodstuffs, they are obliged to inform the relevant instructor of the course. Such a student is not permitted to enter the slaughterhouse or product production area.
- The slaughterhouse veterinarian and those responsible must have knowledge and foresight regarding all zoonotic hazards that may be encountered at their facilities.
- When necessary, they must inform the instructor who will visit the facility for practical purposes about the presence of potential hazards. In this way, contact of the students with contaminated material (animals, carcasses, tissues, secretions, waste, etc.) will be prevented.

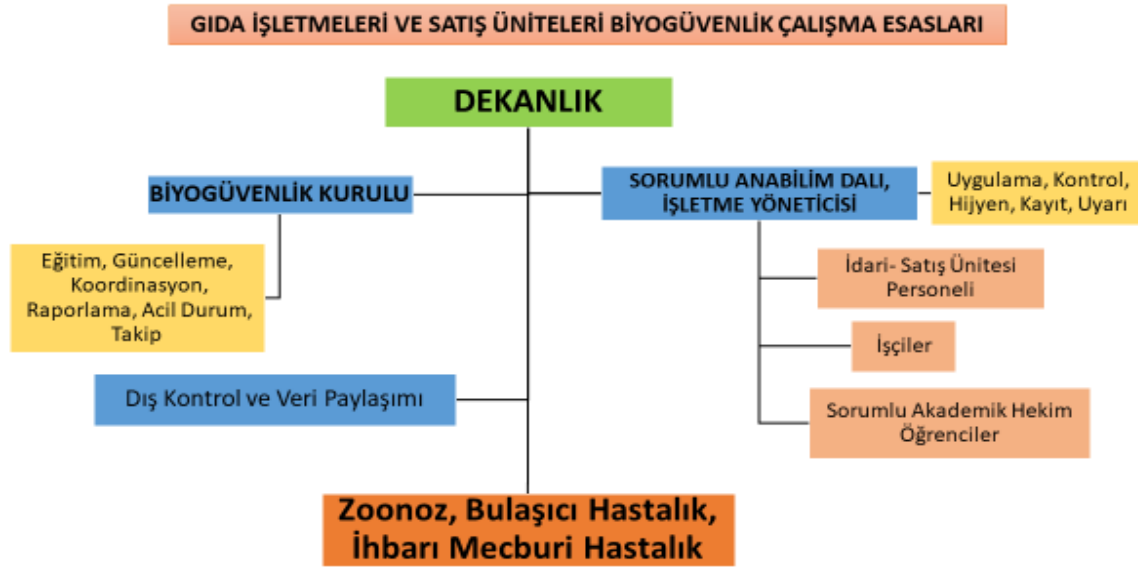


Figure 17. Schematic Representation of the Biosafety Protocol of Food Establishments and Sales Units

General Hygiene Principles:

- To minimize the risk of food contamination, clear instructions/information on food hygiene are given to the students. In addition, students must comply with the requirements of the HACCP and/or ISO certificates held by the slaughterhouse/food establishments to be visited, and therefore with the hygiene rules and programs established for the establishment.
- Students must be adequately equipped in terms of both theoretical and practical knowledge regarding personal hygiene.
- The instructor of the course reminds the students of the general hygiene rules, and the students sign the prepared form indicating that the necessary information and instructions on the subject have been communicated to them. This form is kept by the instructor.
- If the student, within 48 hours before the facility visit, entered a farm where other animals are present or an area where manure or other waste is present, they must inform the instructor.
- During the facility visit, the instructor monitors whether the students comply with the hygiene rules.
- Students taking the meat inspection course are permitted only to tour the facility during the first weeks of practice; they are not permitted to carry out inspection. In the following weeks, and at the internship stage, students may touch the carcasses or organs together with the responsible veterinarian.
- Clothing and footwear used in another slaughterhouse/farm visit must be cleaned and disinfected before being used at the facility to be visited.
- Any wounds present on the hands must be covered (with a plaster or a covering material that can be wrapped around the hand).
- Apart from a wedding/engagement ring, wearing jewellery, including watches, earrings, piercings and false nails, is forbidden.
- Bringing and consuming food/drink in slaughterhouse/food-processing buildings is forbidden.
- Smoking, and using or carrying alcohol or narcotic substances, is forbidden in the production areas.

Hand-Washing Procedure:

- At entrances to and exits from food facilities, after using the toilet, and also when there is visible soiling,

the hands must be washed with soap and disinfected with an appropriate disinfectant.

- Hands must be washed at knee/foot-operated or photocell sinks.
- Disposable paper towels must be used to dry the hands, and these must be discarded into the designated bin. Disposable latex gloves may also be used, but the correct hand-washing procedure must not be neglected. Disposable gloves must not be used if there is a wound on the hand (even if it is covered with a plaster or wound dressing).

Student Clothing:

Students must come in clean clothing and, in addition, must wear a disposable gown, a cap or hairnet, a plastic safety helmet, and clean boots or disposable overshoes at the entrance to the facility (Figure 18).



Figure 18. Food Establishment (Slaughterhouse) Clothing.

POINTS TO BE OBSERVED REGARDING THE FACILITIES TO BE VISITED

To minimize the risk of cross-contamination during the facility visit, the visit must start from the clean area and continue towards the dirty parts. If this is not to be the case, the students and workers must completely change their clothing, wash their boots and carry out the biosafety procedures.

Slaughterhouse visits:

Students;

- on arriving at the slaughterhouse, must first gather in the area reserved for them and put on clean gowns, boots and overshoes,
- must wear personal protective equipment at the slaughterhouse entrance,
- must be attentive to clean and dirty areas,
- must always comply with the rule of the tour route from clean to dirty.

Slaughterhouse visits must, as far as possible, end at the cattle paddocks where ante-mortem inspection is carried out.

Intern students and postgraduate students, in appropriate protective clothing (disposable gown, cap, latex gloves, etc.), also observe the meat inspection alongside the inspection veterinarian and carry out the process by touching the organs.

In the event that a student injures themselves, the inspection process is stopped, the hands are washed with soap at a knee-operated/photocell sink, and the wound is disinfected with alcohol or another disinfectant.

Visit to the meat-cutting and processing unit:

- Before visiting the meat-cutting and processing facility, students put on their clean gowns or disposable laboratory coats and their boots/overshoes, put on their mouth/nose masks, and then wash their hands and put on their latex gloves.
- At the facility exit, the overshoes, masks and gloves are removed and appropriately discarded into the waste bin.

Poultry slaughterhouse visit:

When intern students visit the poultry slaughterhouse, they pay attention to the general hygiene rules.

WASHING AND DISINFECTION OF EQUIPMENT

The boots and helmets used in the slaughterhouse must not be used in another meat-processing facility or other facilities.

Boots:

- Must be washed at the washing station at each entry to and exit from the slaughterhouse.
- At least once a week, must be immersed in a warm disinfection solution, then rinsed with clean water and dried.

Safety Helmets:

After the facility visit, the helmets must be washed with soapy water and then disinfected with an appropriate disinfectant solution.

DEPARTMENT OF FOOD HYGIENE AND TECHNOLOGY STANDARD BIOSAFETY PROCEDURE**INTRODUCTION**

In slaughterhouses, farms or food establishments, biosafety rules must be complied with in order to minimize the risk of transmission of potential pathogens (from animals and animal products to humans, or from humans to animals). During visits, measures that minimize the risk of transmission of pathogens between farms must be applied.

During the practical work, students and instructors are obliged to comply with the specified rules in order to prevent possible accident or injury risks or to eliminate any damage that occurs.

1. POINTS TO BE OBSERVED ON VISITS TO FARMS

- Bringing or consuming any food (including chewing gum and drinks) is forbidden.
- Smoking/using tobacco products in the production areas is forbidden.
- The instructions of those responsible at the facility and of the instructors must be complied with.
- When necessary, disinfectant and cleaning materials (hand-washing sinks, foot baths, boot-washing stations, etc.) must be used.
- The forms required for the visit must be completed.

Preparatory procedures:

Students with the following ailments/diseases must inform the instructor before the practice/visit:

- If they have an infectious disease (gastroenteritis, runny nose, etc.),
- If they have a disability that could affect the course of the practice,
- If they have a condition that would create difficulty in moving (a fracture, etc.),
- If, within 72 hours before the practice/visit, they had any contact with wildlife or a slaughterhouse/farm visit is involved,
- If pregnancy is involved

Human movement:

Movement must always be according to the designated hygiene scheme (from the clean area to the dirty area). The instructions of those responsible and of the instructors must be complied with.

In the event of an accident:

In the event of an accident (burn, cut, fainting, etc.), the unit supervisor must be informed and, if necessary, the emergency service must be called.

Clothing and equipment

Personal hygiene rules



Jewellery (earrings, bracelets, watches, piercings, etc.) must be removed



A plaster must be applied over visible piercings



Hair must be tied up



Nails must be short and clean

Personal belongings



Daily clothing must be clean



Clean rubber boots must be worn

Materials to be available for visitors



A disposable coverall must be worn



Boots



Clean coverall

2. POINTS TO BE OBSERVED ON SLAUGHTERHOUSE VISITS

During practice and visits:

- Bringing or consuming any food (including chewing gum and drinks) is forbidden.
- Smoking/using tobacco products in the production areas is forbidden.
- The instructions of the establishment's supervisors and of the instructors must be complied with.
- Except for the inspection practice, touching processed/prepared products within the establishment is strictly forbidden.
- In the practice, the necessary measures (good hygiene practices, hand washing and disinfection, glove changing, etc.) must be taken to minimize the risk of cross-contamination.

When must hands be washed?

- After using the toilet
- After blowing the nose
- After gloves are removed
- After touching waste materials

In the event of an accident

In the event of an accident (burn, cut, fainting, etc.), the unit supervisor must be informed and, if necessary, the emergency service must be called.

The first-aid kit must be used.

Waste management

After the slaughterhouse practice or visit, disposable gowns, caps and overshoes must be discarded into the waste bins.

Students must be informed about which waste bins the waste must be discarded into.

Clothing and equipment

Personal hygiene rules



Jewellery (earrings, bracelets, watches, piercings, etc.) must be removed



A plaster must be applied over visible piercings



Hair must be tied up



Nails must be short and clean

Personal belongings and equipment



Daily clothing must be clean



Clean rubber boots must be worn



A clean coverall must be worn



Helmet



Disposable cap



Disposable gown



White boots



Overshoes



Disposable gloves must be available for students who will perform meat inspection

3. POINTS TO BE OBSERVED ON VISITS TO FOOD ESTABLISHMENTS

Preparatory procedures:

Students with the following ailments/diseases must inform the instructor before the practice/visit:

- If they have an infectious disease (gastroenteritis, runny nose, etc.),
- If they have a disability that could affect the course of the practice,
- If they have a condition that would create difficulty in moving (a fracture, etc.),
- If, within 72 hours before the practice/visit, they had any contact with wildlife or a slaughterhouse/farm visit is involved,
- If pregnancy is involved.

During practice and visits

- Bringing or consuming any food (including chewing gum and drinks) is forbidden.
- Smoking/using tobacco products in the production areas is forbidden.
- The instructions of the establishment's supervisors and of the instructors must be complied with.
- Touching processed/prepared products that are prepared at the establishment and fall outside the subject of the practice is strictly forbidden.
- In the practice, the necessary measures (good hygiene practices, hand washing and disinfection, glove changing, etc.) must be taken to minimize the risk of cross-contamination.

When must hands be washed?

- After using the toilet
- After blowing the nose
- After gloves are removed
- After touching waste materials

In the event of an accident

In the event of an accident (burn, cut, fainting, etc.), the unit supervisor must be informed and, if necessary, the emergency service must be called.

The first-aid kit must be used.

Clothing and equipment

Personal hygiene rules



rem

Jewellery (earrings, bracelets, watches, piercings, etc.) must be



A plaster must be applied over visible piercings



Hair must be tied up



Nails must be short and clean

Personal belongings



Clean daily clothing



Disposable coverall



Disposable cap



Overshoes

4. POINTS TO BE OBSERVED IN THE LABORATORY

In general;

- Any food (including chewing gum and drinks) must not be brought in or consumed.
- Tobacco and its products must not be used.
- The burner flame must be used carefully.
- The instructions must be complied with.
- When necessary, the gas valve must be closed and the responsible person called.
- In microbiological analyses, one must not act unsupervised in view of the possibility of contamination; attention must also be paid to situations such as splashing, spilling, overflowing, etc.

In the event of an accident:

- In the event of an accident (burn, cut, fainting, etc.), the unit supervisor must be informed and, if necessary, the emergency service must be called.
- In the event of contamination (splashing, spilling, overflowing, etc.), the following practices within the scope of the Emergency Procedure must be carried out:
 - The unit supervisor must be informed,
 - Other persons present in the contaminated area must be moved away,
 - The contaminated area must be covered with paper towel or another absorbent material,
 - Disinfectant must be applied to the contaminated area, from the edge towards the centre,
 - The disinfectant must be allowed to act for the minimum contact time,
 - After decontamination, gloves must be removed, and hands must be washed and disinfected.

Waste management

At the end of the practice, waste must be discarded into the waste containers. Every week, these containers must be removed from the laboratory by the relevant staff.

Clothing and equipment

Personal hygiene rules



Jewellery (earrings, bracelets, watches, piercings, etc.) must be removed



A plaster must be applied over visible piercings



Hair must be tied up



Nails must be short and clean

Personal belongings



White coat



Disposable gloves

Table 7. Antiseptics and Disinfectants That May Be Used in Food Establishments

Antiseptics and Disinfectants	Mechanism of action	Purpose of use	Application dose and method of use	Advantages and disadvantages
Ethyl alcohol (ethanol) 70% or Isopropyl alcohol (isopropanol, 50–90%)	Disrupts the structure of the proteins in the cytoplasm of the bacterium	• Hand and skin antiseptics	• Apply by spraying 3–5 ml onto the hand or skin	• Broad antibacterial spectrum, toxicity potential very low • Can be used on tissues, skin, and materials in contact with mucosa • Rapid action, leaves no residue or stain, evaporates quickly and is extremely flammable • With frequent use, causes dryness and irritation of the skin • Effectiveness decreases in an environment containing organic matter
Chlorhexidine (as chlorhexidine gluconate, 2–4%)	Damages the cytoplasmic membranes of bacteria	• Hand and skin antiseptics	• Approximately 5 ml of chlorhexidine solution is poured onto the hand, and the arms are washed up to the elbows by rubbing	• Broad antibacterial spectrum, but ineffective against spores and viruses • Low toxicity potential, disinfection of patients' materials • Easily inactivated by soaps and detergents • Its residual effect on the skin reduces recolonization; works within a limited pH range (5–7) • Toxic to fish, must not be discharged into the environment • Effectiveness decreases rapidly in an environment containing organic matter
Hydrogen peroxide + peracetic acid powder (1–2% solution)	Disrupts the structure of the proteins of microorganisms	• Surface disinfection in places where meat and milk are produced and sold	• Contact time at least 10 minutes	• Broad spectrum, effective against bacteria, fungi and viruses • Low toxicity • Because of irritation, wear a mask and rubber gloves when preparing the solution • Effectiveness decreases in an environment containing organic matter
Sodium hypochlorite (bleach, 2–5% solution)	Disrupts the structure of the proteins of microorganisms	• Disinfection of clean surfaces and floors	• Applied directly to the floor with a mop	• Broad spectrum, relatively low toxicity at standard dilutions • Not affected by water hardness, inexpensive • May cause irritation and stinging. Limited stability for stored solutions • Effectiveness decreases in an environment containing organic matter

CHAPTER 5

PEST CONTROL (VECTOR CONTROL PROGRAM)

STANDARD OPERATING PROCEDURES FOR BIOSAFETY
WORKING PRINCIPLES

Many pathogens, whether zoonotic or not, are transmitted mechanically or biologically by arthropods. Vector-borne diseases are a major concern in Western Europe, so the implementation of control is important. Measures to reduce the risk of transmission include the following:

Mosquitoes:

- *Culex* spp.: vectors of canine dirofilariasis, West Nile fever, Rift Valley fever, etc.
- *Aedes* spp.: vectors of canine dirofilariasis, Chikungunya, dengue, Japanese encephalitis, etc.; *Aedes* spp.
- *Culicoides* biting midges: bluetongue, Schmallenberg disease, Akabane disease, etc.
- Tabanids (horse flies): mostly mechanical vectors of pathogens. They can transmit viral diseases (e.g., equine infectious anaemia), parasitic diseases (for example, anaplasmosis, trypanosomiasis, besnoitiosis, etc.) and bacterial diseases (anthrax, tularaemia, Lyme disease, etc.).

Flies:

- House flies (*Musca domestica*): mechanical transmission of more than 100 pathogens that cause disease in animals and/or humans, for example, *Bacillus anthracis*, classical swine fever virus, *Dermatophilus congolense*, *Escherichia coli*, *Mycobacterium*, *Salmonella* spp., *Shigella* spp., *Vibrio*, cholera, *Yersinia*, *pseudotuberculosis*, PRRS virus, etc.
- Stable flies or stomoxes (*Stomoxys calcitrans*): viruses (equine infectious anaemia virus, West Nile virus), bacteria (for example, *Bacillus anthracis*, *Pasteurella multocida*, *Erysipelothrix rhusiopathiae*, *Francisella tularensis* or *Dermatophilus congolense*), rickettsia (for example, *Anaplasma marginale*) and parasites (*Trypanosoma* spp. and *Besnoitia besnoiti*, *Habronema microstoma*, etc.).
- Face flies (*Musca autumnalis*): vectors of *Moraxella bovis*; they can transmit *Corynebacterium pyogenes* and *Thelazia* spp. and *Parafilaria* spp.
- Horn flies (*Haematobia irritans*): there is no need to report them as vectors of diseases, but the animals are brought under control
- Black flies (*Genus Simulium*): vectors of onchocerciasis, avian leucocytozoonosis, mansonellosis, mechanical vectors of simuliotoxicosis, etc.
- Black flies lay their eggs in fast-flowing, oxygen-rich stream and river waters (aquatic or semi-aquatic habitats), and therefore bite mostly along river banks.

Sand flies (*Phlebotomus* spp.): vectors of leishmaniasis:

- Ticks: Lyme disease, babesiosis, Theileria, CCHF, Rickettsia, anaplasmosis and tick-borne encephalitis, tularaemia and myxomatosis, hepatozoon.
- In addition to being a source of nuisance for dogs and cats, the flea plays a role in the transmission of bacteria.
- *Bartonella henselae* (cat-scratch disease in humans) and *Mycoplasma haemofelis* (feline infectious anaemia).
- In addition, they are hosts for *Dipylidium caninum* (a helminth) and *Yersinia pestis*.
- Lice of the genera Mallophaga or Anoplura are host-specific. Sucking lice are mainly involved in the transmission of pathogens such as swine pox virus, and also *Anaplasma* spp. and *Trichophyton verrucosum* in cattle.
- Mites feed on skin scurf or lymph and potentially affect all animal species; *Chorioptes* spp., *Psoroptes* spp. and *Demodex* spp. are generally host-specific. *Sarcoptes scabiei* has more varieties. Host-specific (var. bovis, var. ovis, var. equi, var. canis, var. suis, etc.).

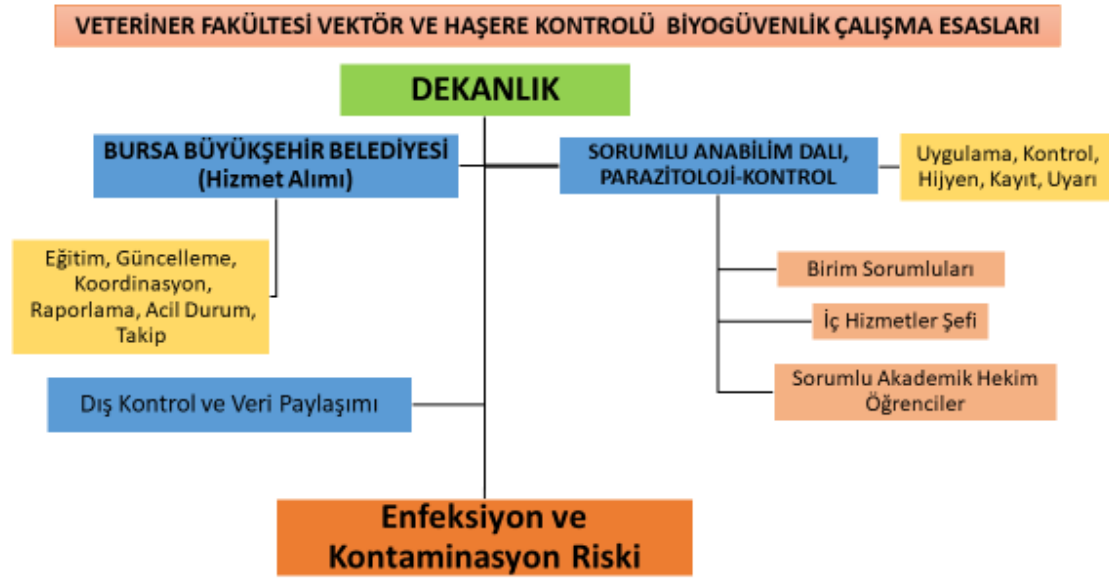


Figure 19. Schematic Representation of the Biosafety Protocol of the Indoor/Outdoor Area and Canteen

MONITORING OF THE VECTOR FAUNA

ADULT FLIES

- On-site monitoring is based mainly on the capture of adult flies.
- Reduction of insect populations
- Validation of control measures (and, if necessary, justification for the implementation of additional measures if required)
- Detection of the emergence of new species
- Identification of breeding sites.
- Traps are adapted to the targeted species.

DIRECT OBSERVATIONS / COUNTS ON ANIMALS

- Poor skin/fur/wool/hair condition often indicates ectoparasite infestation.
- A weekly direct fly count on at least 15 randomly selected hosts monitors their numbers:
 - Obligate flies: on the outside of the foreleg nearest the observer and on the opposite foreleg into the eye (economic-impact threshold on cattle = 5 obligate flies per leg).
 - Horn flies and face flies: horn flies feed actively at the rear and on the sides of cattle, and face flies around the eyes and face.

ANIMAL BEHAVIOUR

The presence of flies (e.g., horn flies) increases tail movements, bunching, etc.

The quantity, the number of cattle tail movements, is a measure of fly activity: an economic threshold of 10 per animal within a 2-minute period (15 randomly selected animals).

CONTROL OF ARTHROPODS

With regard to flies, in order to reduce the potential for disease transmission, the aim of control is to limit their numbers to acceptable densities,

It is impossible to completely eliminate ectoparasites. Preventing their access to animal facilities, especially living areas, is very important. It minimizes contact with infectious/contagious patients and potential hosts. Non-flying arthropods (ticks, mites, etc.) are mostly moved around facilities by the movements of rodent hosts, the accidental transport by humans, and the sharing of equipment between animals (e.g., grooming material).

The best approach for arthropod/vector control is an integrated vector management program (IVMP) combining various methods; for example, simultaneously reducing larvae, and pesticide and environmental control against adults.

PHYSICAL CONTROL MEASURES

- Doors must always be kept closed!
- Barriers can be installed at strategic points (for example, windows, the ventilation system).
- Traps must be installed at strategic points to minimize the entry of flying insects and, especially in large-animal isolation, to prevent their exit.

CHEMICAL CONTROL MEASURES

- The use of chemical insecticides must be combined with non-chemical methods. Chemicals cause serious environmental damage, and resistance to insecticides is also increasing in insect populations.
- Two categories of chemicals are available:
 - Larvicides: used against species with well-delimited and defined breeding sites, where the larval stage is concentrated in a specific habitat. Critical places such as the manure heap, the storage tank and drainage grates must be treated regularly.
 - Adulticides: applied as fogging in the evening hours, with limited success in suppressing adults; it is important not to use them too often when flies are most active (unsustainable and resistance development). Care must be taken to minimize the effect on wildlife and beneficial insects.
- Different formulations are available, such as chemical sprays, toxic baits, air sprays/aerosols or fumigation. Space sprays act in the environment for only 1–2 hours and must be applied at temperatures between 18 °C and 32 °C.
- Chemical sprays can be used on fly resting surfaces (for example, barns, walls, ceilings, beams and calf hutches); **beware of the development of resistance!**

ENVIRONMENTAL CONTROL OF BREEDING SITES AND LARVAL HABITATS

Environmental control is based on preventing insect breeding and eliminating breeding sites.

Table 8. Feeding Areas of Flying Insects

Flying Insects	Main feeding areas
Mosquitoes	Culex spp.: stagnant water Aedes spp.: tree holes, buckets, tyres, water-storage containers, container-like vessels such as pots, plants, roof gutters, used cans, bottles, pet foods, etc.
Culicoides and biting midges	Wet organic matter such as decaying leaf litter, manure and decaying organic matter
Stable and house flies	Wet (fermenting) organic matter; the larvae feed on a wide variety of food sources: blood, meat, carrion, faecal material, organic waste products and the decomposition of vegetables
Sand fly	Garden soil, animal burrows, forest litter and tree leaves
Horn and face flies	Dung pats
Black fly	Along flowing streams

*Oviposition-site control is the key to adult control.

- A radius of 1.5–2 km around farms (the maximum flight range for most mosquitoes)
- Mosquitoes require water that persists for more than 96 hours to lay eggs, so it is important to map risky areas.
- Black flies need flowing water located less than 1 km away; it is necessary to take into account the larval breeding sites along sections of streams and watercourses (e.g., the application of a larvicide made from *Bacillus thuringiensis israelensis* is a deterrent).
- Ticks: environmental control to deter ticks is based on landscape management to make the environment less suitable. **ENVIRONMENTAL PESTICIDES ARE NOT USED!**
- Landscape management must be carried out in a sustainable manner in order to limit the potential negative impact on TICK biodiversity.

INTEGRATED VECTOR MANAGEMENT PROGRAM (IVMP)

- The IVMP focuses on the long-term control of vector populations through the combination of several synergistic, ecosystem-based techniques such as:
 - Surveillance of the species in a given area (which may influence the control methods)
 - Physical control and/or source reduction
 - Chemical control: adulticides and larvicides (if necessary)
 - Education: informing people about potential breeding habitats and how they can be reduced/eliminated
- The measures applicable to the different facilities of the farm and the like are detailed below.

LARGE-ANIMAL FARMS (RUMINANTS AND HORSES)

- The control and preventive measures specific to facilities housing large animals and insects/vectors are detailed.
- The physical control of flying insects, i.e., window screening and trapping, is essential. But above all, doors, especially those of buildings housing animals, must be kept closed as far as possible.
- With regard to ectoparasites, the separation/limitation of contacts between DOMESTIC and FREE-ROAMING animals, and the limitation of cattle movements between facilities, help to reduce the transport of ectoparasites.
- Obligate and house flies must be targeted in confined systems. Chemicals: the chemical control of adults is recommended if populations reach harmful levels. Pyrethroids can be sprayed onto fly resting places (walls and structures). However, the emergence of resistance must be prevented. Low-toxicity botanical extracts and essential-oil repellents have recently begun to become widespread. The management of *Culicoides* breeding sites is generally difficult or impossible.
- Insecticides or insect repellents applied directly to animals provide some protection but were not very successful in reducing virus transmission during bluetongue outbreaks in Europe.
- Keeping animals indoors reduces biting by some *Culicoides* that are reluctant to enter structures.

FARM ISOLATION

- Maintenance of the screens/filters is important, as it reduces the effectiveness of ventilation.
- Damage (holes, tears) must be checked regularly and cleaned once a month.
- Small mesh (fly screen) size and a dusty environment contribute to a rapid fouling of the ventilation.
- To improve tick control, restrict access of high-risk tick habitat and wild hosts to cattle pastures, and combine this with targeted applications of the least toxic pesticides.
- In general, new animals must be quarantined, examined and treated with insecticide before entry.
- Regarding sheep:
 - Shearing of sheep before lambing reduces/prevents fly strike by preventing fleece soiling.

Table 9. Control Measures for Flying Arthropods – Large-Animal Farms

MEASURES	MOSQUITO	CULICOIDES	TABANID	FLYING*	BLACK FLY
PHYSICAL					
DOOR ALWAYS CLOSED	X	X	X	X	X
SCREEN MESH (smaller than 1.5 mm)	X		X	X	
SCREEN MESH (smaller than 1 mm)		X			X
CO ₂ AND LIGHT TRAP	X				
Light trap		X			
Sticky trap				X	
Ultraviolet trap				X	
Electric trap				X	
Spot-on card and repellent				X	
Black attractant trap			X		
PASTURE: DARK SHELTER					X
CHEMICAL					
ORGANOPHOSPHATE	X				
CARBAMATE	X				
PYRETHROID	X	X	X	X	X
DEET			X		
INSECTICIDES (treated ear tags, topical pour-on, sprays)	X	X	X	X	X
SPACE SPRAY	X			X	X
ENVIRONMENTAL					
AVOIDANCE OF STAGNANT WATER	X				
MOISTURE CONTROL		X	X	X	
UNWANTED VEGETATION	X				
30–40 CM WATER SURGE AT 6-DAY INTERVALS	X				
FEED KEPT COVERED				X	
SILAGE KEPT COVERED				X	
MANURE HEAP SANITATION		X		X	
REMOVAL OF FRESH MANURE		X		X	
CLEAN WATER					X
GAMBUSIA AND BIOLOGICAL LARVICIDE	X				
DRAINAGE AND WATER CLEANING	X				
REFUSE BINS	X			X	
DRAINAGE SYSTEM	X				

* Flies: house flies (*Musca domestica*), stomoxes (*Stomoxys calcitrans*), face flies (*Musca autumnalis*) and horn flies (*Haematobia irritans*)

Table 10. Control Measures for Flying Arthropods – Small-Animal Farms

MEASURES	MOSQUITO	HOUSE FLIES	SAND FLIES
PHYSICAL			
DOOR ALWAYS CLOSED	X	X	X
SCREEN MESH (smaller than 1.5 mm)	X	X	X
SCREEN MESH (smaller than 1 mm)			X
CO ² AND LIGHT TRAP	X		
STICKY TRAP		X	
Ultraviolet trap		X	
Electric trap		X	
CHEMICAL			
ORGANOPHOSPHATE	X		
CARBAMATE	X		
PYRETHROID	X	X	X
INSECTICIDES (treated ear tags, topical pour-on, sprays)			X
SPACE SPRAY	X	X	X
ENVIRONMENTAL			
AVOIDANCE OF STAGNANT WATER	X		
MOISTURE CONTROL		X	
UNWANTED VEGETATION	X		X
REFUSE BINS	X	X	X
DRAINAGE SYSTEM	X		

Table 11. Control Measures Against Persistent Ectoparasites (Small and Large Animals)

MEASURES	TICK	LOUSE	MITE	FLEA
PHYSICAL				
PHYSICAL SEPARATION		X	X	X
HOSPITALIZATION		X	X	
EQUIPMENT SEPARATION	X	X	X	X
SEPARATION OF SMALL ANIMALS	X			
TRAVEL, ANIMAL MOVEMENTS	X	X	X	X
PERIODIC INSPECTION	X			
DAILY CLEANING				X
CULLING IF NECESSARY		X	X	X
CHEMICAL				
CHEMICAL TREATMENT	X	X	X	X
FARM PERIODIC TREATMENT (ivermectin, etc.)	X	X	X	
ENVIRONMENTAL INSECTICIDE-LARVICIDE				X
ENVIRONMENTAL				
VEGETATIVE HABITAT AROUND THE SHELTER	X			
WOODLAND AND SHADE	X			
RODENT CONTROL	X			X

RODENTS –RODENT SPECIES

- Rodents of concern on farms:
 - House mice (*Mus musculus*) nest in and around the facility; they are omnivorous and prefer stored foods
 - Black rats (*Rattus rattus*) prefer grains and fruits (not meat); excellent climbers
 - Brown rats (*Rattus norvegicus*) eat everything and nest under surfaces; good swimmers.
 - Wood mice (*Apodemus sylvaticus*) live in wooded areas, around houses, ruins, rocky areas and parks, avoid open pastures and are found everywhere.
- Rats need daily water and are afraid of new objects.
- Animal feed, bedding and animal waste are food sources.

RODENT CONTROL

- Both physical and chemical controls must be combined.
- Dead rodents must be removed regularly, and protective gloves must be worn during this operation.
- Rodent-control methods (for example, traps) are also useful monitoring tools.

1. Physical Control

- Place traps at strategic points:
 - In rodent runs, near walls, behind objects, in dark corners and at other rodent activities, feed-storage facilities (not too close to feeding), but in patient-sensitive areas, for example operating theatres.
- Two traps one behind the other to prevent rats from jumping.
- Prefer plastic traps for easy cleaning and less rodent odour.
- **DO NOT USE** (ultra)sound devices in animal facilities to avoid putting animals under stress **DO NOT USE**.

2. Chemical Control

- The most frequently used rodenticides are anticoagulants (paraffin blocks, foam, gel, etc.). Two types of anticoagulant are available:
 - (1) First generation - rodents must feed for several days
 - (2) Second generation requires only a single feeding.
- Place baits along rodent routes (distance between baits: 1 to 2 m for mice and 7 to 10 m for rats).
- Follow the instructions on the product label to the letter.
- Baits must be fresh and palatable in order to remain attractive (dispose of unconsumed baits safely).
- Inspect frequently to check bait availability and the removal of dead animals.
- Record bait disappearance.
- Place baits in a bait station to protect them.
- For rats, set up the bait station 5–7 days before placing the bait.
- Reserve the bait station for a fixed type of bait.
- The most suitable time to control a serious rodent problem is when the facilities are empty. removal of bait residues (no bait for rodents).

ABBREVIATIONS

EAEVE: European Association of Establishments for Veterinary Education

IVMP: Integrated Vector Management Program

PPE: Personal protective equipment

SOP: Standard Operating Procedures

VFBK: Faculty of Veterinary Medicine Biosafety Committee (FVMBC)

YKE: Adequate protective equipment (APE)