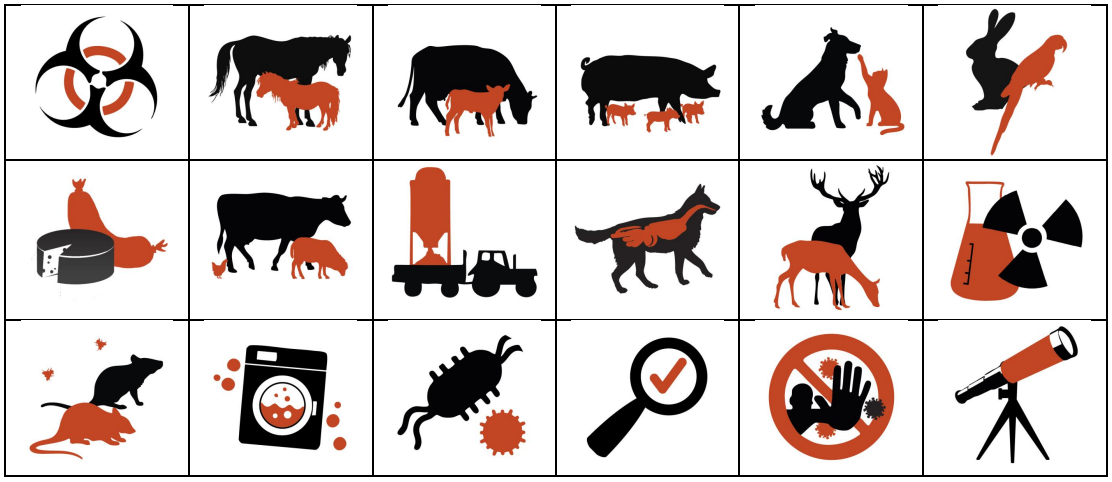
Biosecurity SOPs applied to the Faculty of Veterinary Medicine, Liège University, Belgium

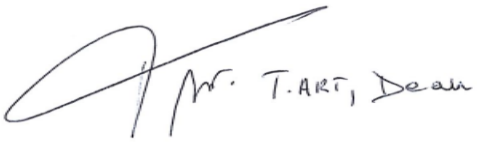


June 2025

Edited by the Faculty Biosecurity Unit (CFB)

Biosecurity SOPs applied to the Faculty of Veterinary Medicine, Liège University, Belgium

Identification number:	SOP-FVM-01-REV4-2025
Version:	June 2025
Date of implementation:	June 2025
Responsible Administration:	Faculty of Veterinary Medicine (FVM), Liège University
Responsible Services:	All services of the FVM
Secretariat:	FVM Biosecurity Unit
Destination:	▪ The Rector of Liège University ▪ The Dean of the FVM ▪ All Chairmen of FVM Departments ▪ All technical services of the FVM ▪ All members of the FVM ▪ All students of the FVM ▪ The Director of the External Service for Prevention and Protection at work (COHEZIO)

Redacted by the CFB and updated by Faculty Delegates, in alphabetic order: D. Alarcon C. Bayrou G. Bolen P. Burnotte S. Crèvecoeur C. De Meeûs d'Argenteuil L. Dams I. Dufrasne A. Gabriel C. Gatez H. Guyot M.-F. Humblet (secretary) N. Korsak-Koulagenko C. Lagamme M. Laitat L. Lecoq A. Linden F. Maréchal D. Marlier L. Martinelle C. Remy F. Rollin C. Saegerman (Chairman) D. Thiry **The drawings were created by:** S. Tasnier	**Verification and finalisation by, in alphabetic order:** M.-F. Humblet (secretary) & C. Saegerman (Chairman) **Approved by:** Claude Saegerman, Chairman of the CFB  Prof. T. Art, Dean of the FVM 	**Approved by:** Dr Christine Grignet, Ph. D ULiège Biosafety Officer  Prof. Anne-Sophie Nyssen, Rector of ULiège 

Biosecurity Standard Operating Procedures (SOPs) applied to the Faculty of Veterinary Medicine, Liège University (FVM)

Members of the « Faculty Biosecurity Unit » in alphabetic order:

BURNOTTE Priscilla, CREVECOEUR Sébastien, DE MEEÛS D'ARGENTEUIL Constance, DUFRASNE Isabelle, HUMBLET Marie-France (Secretary), LAITAT Martine, LECOQ Laureline, MARTINELLE Ludovic, PADUANELLI Chiara (Master student), RENOUF Fiona (Bachelor student), SAEGERMAN Claude (Chairman), VOTION Dominique

Standing Invitees:

ART Tania (Dean of FVM), GRIGNET Christine (SUPHT), SURLERAUX Cécile (COHEZIO) and GARIGLIANY Mutien-Marie. (Committee of Biosafety, for activities involving contained use GMOs/pathogens, i.e. research laboratories and laboratory animal facilities).

Used abbreviations in alphabetic order:

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road (***A**ccord Européen relatif au transport international des marchandises **D**angereuses par **R**oute*)
AI	Avian Influenza
AIDS	Acquired Immunodeficiency Syndrome
AMCRA	Centrum of expertise for Antimicrobial Consumption and Resistance in Animals
ARI	Administration of real estate resources (*Administration des Ressources Immobilières* – ULiège)
Arsia	Regional Association for Animal Identification and Health (*Association Régionale de Santé et d'Identifcation Animales*)
ASF	African Swine Fever
ATB	Antibiotics
BSL	Biosafety level
BVM	Bachelor of Veterinary Medicine
BRC	British Retail Consortium
BRRPZE	Bird, pet Rabbit/Rodent, pet Poultry, Zoological and Exotic animals
BSE	Bovine Spongiform Encephalopathy
BVD	Bovine Viral Diarrhoea
CCPPT	ULiège Consultative Committee for Prevention and Protection at Work
CEMESPO	Equine Sports Medicine Center (FVM, ULiège)
CFB	Faculty Biosecurity Unit *(Cellule Facultaire de Biosécurité)*
CMT	California Mastitis Test
COHEZIO	ULiège External Service for Prevention and Protection at Work (occupational physicians)
COVID-19	Coronavirus Disease 2019
CR	Class of Risk
CRA-W	Walloon Agricultural Research Center
CRum	Clinic of Ruminants
CSF	Cerebrospinal fluid
CT	Computer Tomography
CTA	Centre for Agricultural Technologies (Strée)
DEET	Diethyltuloamide
DNF	Division of Nature and Forests
EAEVE	European Association of Establishments for Veterinary Education
ECOVE	European Committee on Veterinary Education
ECVPH	European College of Veterinary Public Health
EDTA	EthyleneDiamineTetraacetic Acid
EEE	Eastern Equine Encephalomyelitis
EHV	Equine Herpesvirus
EIA	Equine Infectious Anaemia
ELISA	Enzyme-Linked ImmunoSorbent Assay

ET	Endotracheal tubes
EU	European Union
EVA	Equine Viral Arteritis
FASFC	Federal Agency for the Safety of the Food Chain
FCV	Feline Calicivirus
FeLV	Feline Leukaemia Virus
FePEx	Educational and Experimental Farm *(Cellule d'Appui à la Recherche et à l'Enseignement – Ferme Pédagogique et Expérimentale)* – support cell for Research and Education
FMD	Foot and mouth disease
FFP3	Filtering Face Piece 3 => respiratory mask that filters at least 99% of particles (liquid or solid) of around 0.6 microns (0.01 to 1 micron) in diameter or larger.
FVM	Faculty of Veterinary Medicine (ULiège)
GMP	Good Manufacturing Practices
MVM	Master of Veterinary Medicine
HACCP	Hazard Analysis and Critical Control Points
HG	Hazard Group
HPAI	Highly Pathogenic Avian Influenza
IBR	Infectious Bovine Rhinotracheitis
ICU	Intensive Care Unit
ID	Identification
IFS	International Featured Standard
INRAE	National Research Institute for Agriculture, Food and the Environment (France)
ISO	International Organization for standardization
IU	Isolation Unit
IVMP	Integrated Vector Management Program
LCU	FASFC Local Control Unit
LPAI	Low Pathogenic Avian Influenza
MDR	multidrug-resistant
MRI	Magnetic Resonance Imaging
MRSA	Methicillin-Resistant *Staphylococcus aureus*
NCD	Newcastle Disease
NRL	National Reference Laboratory
OIE	World Organisation for Animal Health (former name)
OVI	Onderstepoort Veterinary Institute
Oz	Ounce (28.35 grams)
PCA	Central Alarm (*Poste Central d'Alarme* – ULiège)
PCR	Polymerase Chain Reaction
PI	Persistently infected (for BVD virus)
PPE	Personal Protective Equipment
PRRS	Porcine Reproductive and Respiratory Syndrome
QACs	Quaternary Ammonium Compounds

QFL	Quality Milk Sector (*Qualité Filière Lait*)
RHD	Rabbit Haemorrhagic Disease
RT-PCR	Real Time-Polymerase Chain Reaction
SAH	Small Animal Hospital (ULiège)
Sanitel	Belgian Computer Animals and Herds Identification System (Belgian system of computerized management for identification, registration and follow-up of animals – cattle, ovine, caprine, cervids and poultry)
SAP	Systems, Applications, and Products in Data Processing
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus type 2
Sciensano	Belgian National Public Health Institute (result of the merger of two former institutions, i.e. the ISP (Scientific Institute of Public Health) and the CODA-CERVA (Veterinary and Agrochemical Research Centre)
SPW	Public Service of Wallonia
SOP	Standard Operating Policies and Procedures
SUPHT	ULiège Department of Occupational Protection and Hygiene
TTM	Treatment
UCLouvain	Catholic University of Louvain
ULB	Free University of Brussels
ULiège	University of Liège
UNamur	University of Namur
VEE	Venezuelan Equine Encephalomyelitis
VRE	Vancomycin-Resistant *Entercocci*
VS-FCV	Virulent Systemic – Feline Calicivirus
VSV	Vesicular Stomatitis virus
VTEC	Verocytotoxin-producing *Escherichia coli*
WEE	Western Equine Encephalomyelitis
WOAH	World Organisation for Animal Health
YOPI's	Young, Old, Pregnant and Immunocompromised people

Table of contents

Chapter 1	**General Biosecurity SOP**	**9**
Chapter 2	**Equine Biosecurity SOP**	**48**
Chapter 3	**Ruminant Biosecurity SOP**	**88**
Chapter 4	**Pig Farm Biosecurity SOP**	**116**
Chapter 5	**Small Animal Biosecurity SOP**	**123**
Chapter 6	**Bird, Pet Rabbit / Rodent / Pet Poultry, Zoological and Exotic Animal (BRRPZE) Biosecurity SOP**	**147**
Chapter 7	**Food Science Biosecurity: *Extra Muros* Practical Works**	**157**
Chapter 8	**Experimental Farm (FePEx) Biosecurity SOP**	**161**
Chapter 9	**Veterinary Management of Animal Resources (DRA) Biosecurity SOP**	**167**
Chapter 10	**Anatomy Biosecurity SOP**	**169**
Chapter 11	**Wildlife Health and Pathology Biosecurity SOP**	**173**
Chapter 12	**Teaching Laboratories and Diagnostic Biosecurity SOP**	**180**
Chapter 13	**Pest control SOP**	**191**
Chapter 14	**Laundry SOP**	**205**
Chapter 15	**Antimicrobial Resistance SOP**	**210**
Chapter 16	**Quality Assurance and Biosecurity in the Faculty of Veterinary Medicine**	**213**
Chapter 17	**Crisis Scenarios SOP**	**219**
Chapter 18	**Future Tasks of the Biosecurity Unit (CFB)**	**235**
References		**237**
Appendices		**250**

Chapter 1.

GENERAL BIOSECURITY SOP

1. General Biosecurity Standard Operating Policies and Procedures (SOPs) applicable in all sectors of the Faculty of Veterinary Medicine

According to the World Health Organization and the Food and Agriculture Organization[1] of the United Nations, biosecurity is 'a strategic and integrated approach that encompasses the policy and regulatory frameworks (including instruments and activities) that analyse and manage risks in the sectors of food safety, public health, animal life and health, and plant life and health, including associated environmental risk'. Focusing on livestock, the most popular biosecurity definition is the one that conceptualizes the rules of 5B's, and consider all measures: (1) to limit the risk of introduction (bio-exclusion); (2) to limit the spread of the pathogen within the same facility, e.g., by isolating excreting animals (bio-compartmentation); (3) to limit the spread of the disease agent outside the facility (inter-herd transmission) (bio-containment); (4) to prevent the risk of human contamination (bio-prevention); and (5) to prevent any environmental bio-contamination and persistence of the pathogen (bio-preservation) (Saegerman et al 2012, 2023).

FVM Philosophy Regarding Infection Prevention and Control: Biosecurity, infection prevention and control, and biosafety are essential functions in all health care and research facilities, including veterinary hospitals. Good infection prevention and control practices are not the only feature defining excellence in veterinary care, but it is impossible to achieve excellent patient care without implementing logical procedures for infection control. Procedures used in the FVM are intended to reduce the risk of all nosocomial and zoonotic illnesses. Biosecurity and procedures of infection prevention and control as implemented in the FVM are specifically tailored to address contagious disease threats.

Goals for the FVM Biosecurity Program

- Protect hospital staff, students and clients from exposure to zoonotic pathogens.
- Create an environment where patient care can be optimized by minimizing the risk of nosocomial infection.
- Optimize educational experiences for students, regarding biosecurity and infection control, by demonstrating appropriate infection prevention and control, and disease surveillance practices.
- Provide outreach to clients and the public regarding the control and prevention of infectious and parasitic diseases in animals and humans.
- Protect operational capacities in the FVM.

Principles of Infection Prevention and Control: The following principles have guided the development of all procedures described in this document: These precautions help preventing disease transmission from staff to patient, between patients, from patient to staff and between staff members.

- ***Optimize hygiene*** using standard precautions including hand washing and sanitizing, proper attire and barrier protection, minimal unnecessary contacts with patients, appropriate disposal of infectious materials and appropriate cleaning and disinfection.
- ***Break transmission cycles*** through effective use of hygiene protocols, understanding of disease transmission pathways and implementation of barriers against direct and indirect pathogen transmission. Such concept involves considering patients' traffic patterns and housing, as well as people (staff, students and visitors) traffic routes within the FVM.
- ***Target and refine procedures of infection prevention and control*** through surveillance and other investigative procedures.
- ***Enhance education and awareness*** towards nosocomial and zoonotic risks through optimizing communication on the purpose of these guidelines and procedures.

[1] https://www.fao.org/4/a1140e/a1140e01.pdf

1.1. The Faculty Biosecurity Unit (CFB)

Following the first visit of experts for issuing the agreement by the EAEVE (European Association of Establishments for Veterinary Education) and ECOVE (European Committee on Veterinary Education) of the FVM, non-conformities of infrastructures and procedures in terms of biosecurity were highlighted. In March 2009, the *ad hoc* Biosecurity Working Group was created and allowed the elaboration of our Biosecurity SOPs. Concurrently, the working group proposed improvements of the faculty infrastructures to ensure compliance, from the biosecurity point of view.

In January 2010, the working group became a permanent body, the **Faculty Biosecurity Unit (CFB)**, to continue the work undertaken so far. The CFB has an advisory capacity, targeting biosecurity within the frameworks of teaching activities (clinics, para-clinics, practical activities and tutorial classes); it provides recommendations to the FVM. The CFB advises deal with biosecurity procedures to adopt, and infrastructures where live or dead animals, animal products and biological samples are found. The CFB defines procedures allowing the assessment and management of biological risks within the frameworks of teaching activities, the assessment of compliance with biosecurity SOPs and the surveillance of antibiotic resistance in the FVM.

1.1.1. Missions of the CFB

- Update of Biosecurity SOPs and website, with special focus on new legislations, emergence of infectious diseases and recommendations from bodies, either internal to the University, such as the Department of Occupational Protection and Hygiene (SUPHT), or external, e.g. the External Service for Prevention and Protection at Work (COHEZIO).
- Implementation of a biosecurity education programme for all actors of the FVM, through, among others, the organisation of the annual Biosecurity Day especially dedicated to the FVM staff.
- Assessment of human and logistical means required to reach the objectives mentioned above, in collaboration with the relevant Departments (strategic plan).
- Elaboration of crisis scenarios.

1.1.2. Composition of the CFB

Members of the CFB are assigned by the Faculty Council for a 2 year- and renewable mandate, starting from October 1st. The President is elected internally, for a 2-year- and renewable mandate as well. Each FVM Department is represented in the CFB. Permanent guests include: the FVM Dean, the ULiège Biosafety Officer, an Occupational Health Doctor and the President of the FVM Biosafety Committee (responsible for activities related with contained use, i.e. mainly research labs and laboratory animal facilities).

1.1.3. Functioning of the CFB

CFB meetings are held at least three times a year, and in any situation requiring it, to treat ongoing topics and assess submitted issues. A report is systematically written by the secretary, and transmitted to the Dean, the Dean's office and any person concerned by one of the treated topics, after validation by all CFB members.

1.2. Definitions

Antiseptic: A chemical that can be applied to epithelial surfaces that causes the destruction or inhibition of microorganisms, preventing their growth or multiplication, without injuring the animal.

Barrier Nursing Precautions: Materials and practices employed as a barrier between patients and people to prevent cross-contamination of body, clothing, and footwear, which, in turn, decreases the risk of nosocomial transmission to other patients. Barrier nursing precautions are used in all isolation facilities (class 4) and for patients with special needs (animals at higher risk of shedding contagious pathogens [class 3], young or naive animals, immuno-compromised patients, etc.).

NOTE: Care must be taken with barrier garments to prevent contamination of materials and hand contact surfaces.

Table I. Parameters Used in Defining Clinical Status

Species	**Fever** (rectal temperature)	**Leukopenia** (cells x 10^3/mL)	**Neutropenia** (cells x 10^3/mL)
Bovine	> 39.0 °C (adult) > 39.5 °C (calf)	< 5.0	< 0.6
Canine	> 39.5°C	< 6.0	< 3.0
Caprine	> 40.5°C	< 4.0	<1.2
Equine	> 38.5°C	< 4.0	< 2.5
Feline	> 39.5°C	< 5.0	< 2.0
NW Camelid	> 39.5°C	< 7.5	< 4.6
Ovine	> 40.0°C	< 4.0	< 0.7

Biofilm: complex aggregation of bacteria adhering to surfaces in an exopolysaccharide matrix, resulting in a thin residue remaining after cleaning; these bacteria are highly resistant to disinfection.

Biosecurity: All measures with the aim (1) to limit the risk of introduction (bio-exclusion); (2) to limit the spread of a pathogen within a same facility, e.g., by isolating excreting animals (bio-compartmentation); (3) to limit the spread of a pathogen outside a facility (inter-herd transmission) (bio-containment); (4) to prevent the risk of human contamination (bio-prevention); and (5) to prevent any environmental bio-contamination and persistence of a pathogen (bio-preservation) (Saegerman et al 2012)

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

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

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

Hospital-acquired infection: infections developing after 48 hours of hospitalization or stay at a healthcare facility that was not present or incubating at the time of admission

Hospital Dedicated Attire: Clothing, footwear, and outer garments that are worn only when working at the FVM or while on field service duty.

Multiple Drug (or Multidrug) Resistance: Bacteria that have developed the ability to survive in the presence of several antibiotics. Antimicrobial resistance occurs when bacteria reduce or eliminate the effectiveness of drugs, chemicals, or other agents designed to cure or prevent infections. Often, antibiotics that can still kill such bacteria may be toxic to the animal and their number is limited. Examples of multidrug resistant bacteria include some strains of *Salmonella enterica*, Methicillin-Resistant *Staphylococcus aureus* and Vancomycin-Resistant *Entercocci*.

Nosocomial Infection: A localized or systemic condition resulting from an adverse reaction to the presence of an infectious pathogen or toxin and that was not present or incubating at the time of admission.

Personal Protective Equipment (PPE): Barriers that a person wears to be protected from acquiring or transmitting a microorganism/disease, or from exposure to potentially noxious chemicals, e.g. disinfectants. Examples: gloves, gowns, masks, protective eyewear, overshoes, caps, etc.

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

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

Subclinical infection: Invasion of the body by (a) microorganism(s) but without observation of clinical signs. It may be the early stage or very mild form of an infection in which clinical signs are not apparent or detectable by clinical examination or lab tests.

Staff: Refers to all people working or present in the FVM environment in any capacity, regardless of whether they are employees, students, visiting veterinarians or scientists, visiting students, or volunteers.

Zoonosis: Disease that can be transferred between vertebrate animals and humans, or vice versa.

1.2.1. Classification of Microorganisms in The Context of Contained Use, Based on Their Biological risk (Regulatory Framework)

Regional decrees[2] regulating contained uses of genetically modified organisms and pathogens classify human, animal and plant pathogens into four classes of risk. The classification of a microorganism considers the risk for health, for the community, and, for animal diseases, the possible economic impact. The following definitions are defined for animal pathogens[3]:

- **Class or risk 1 (CR1)**: micro-organisms known as non-pathogenic for the man, the animal, the plant and not harmful for the environment or presenting a negligible risk for the man and the environment at the laboratory scale. This class includes, beside organisms whose harmlessness was proven, strains which can be allergens and opportunistic pathogens.
- **Class of risk 2 (CR2)**: micro-organisms that can cause disease in animals and present, at different levels, one or other of the following characteristics: limited geographical importance, no or weak interspecific transmission, no vectors or carriers. The economic and or veterinary significance is limited. There is usually effective prophylaxis or treatment (TTM) available.
- **Class of risk 3 (CR3)**: micro-organisms that can cause serious disease or epidemics in animals. Interspecific diffusion can be important. Some of these pathogens require the implementation of sanitary regulations for species indexed by the authorities of each country concerned. Medical and/or sanitary prophylactic measures are available.
- **Class of risk 4 (CR4)**: micro-organisms that cause extremely serious pandemics or epidemics in animals with a very high mortality rate or dramatic economic consequences in the affected farming-regions. Either no medical prophylaxis is available or only one exclusive sanitary prophylaxis is possible or obligatory

Table II. Examples of micro-organisms according to their classes of risk in humans and animals (https://www.biosafety.be/content/tools-belgian-classification-micro-organisms-based-their-biological-risks)

	CR 2		CR 3		CR 4	
Pathogen	**Humans**	**Animals**	**Humans**	**Animals**	**Humans**	**Animals**
Bacteria and similar organisms						
Borrelia burgdorferi	X	X				
Clostridium perfringens	X (T)	X				
Brucella abortus			X	X		
Yersinia pestis			X	X		
Fungi						
Aspergillus fumigatus	X	X				
Candida albicans	X	X				
	CR 2		**CR 3**		**CR 4**	
Fungi (following)						
Coccidioides immitis			X	X		
Histoplasma capsulatum var. capsulatum			X	X		
Parasites						
Fasciola hepatica	X	X				
Toxocara canis	X	X				
Leishmania brasiliensis			X (*)	X		
Taenia solium			X (*)	X		
Viruses						
Feline calicivirus		X				

[2] https://www.biosecurite.be/node/286

[3] https://www.biosafety.be/content/contained-use-definitions-classes-biological-risk

Equine infectious anaemia virus		X				
Rabies virus			X	X		
Venezuelan equine encephalitis			X	X		
Foot-and-mouth disease						X
Classical and African swine fevers						X

CR = class of risk; T = toxin production; * = Pathogens of biological class of risk 3 that may present a limited risk of infection for humans and animals because they are not normally infectious by the airborne route.

1.2.2. Categories or risks used in the FMV

In the FVM clinics, a specific categorization of risks is implemented. Infectious diseases encountered in hospitalized animals are assigned to the following classes, based on the pathogen transmissibility to other animals and/or its zoonotic potential.

Table III. Classification of risks in the FVM Clinics

CLASS 1: NORMAL HOUSING
Infectious diseases caused by pathogens that have no likelihood of transmission to other animals and no potential for human infection.
CLASS 2: NORMAL HOUSING
Infectious diseases caused by pathogens with a low level of transmission and which may include non-resistant bacterial infections.
CLASS 3: BARRIER NURSING PRECAUTIONS
Subclass A: (multi)drug resistant bacteria. Infections caused by bacteria with a high antibiotic-resistance pattern, as determined by a bacteriology laboratory. ***Subclass B***: infectious diseases caused by pathogens with a moderate level of transmission and/or potentially zoonotic.
CLASS 4: ISOLATION
Infectious diseases caused by pathogens with a high level of transmission and/or causing severe disease in humans. Reportable diseases fall in that class of risk.

Species-related examples are listed for each class under the corresponding clinic.

1.3. General rules

1.3.1. Hand Hygiene

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

- ***Hands should be washed (or at minimum sanitized if not macroscopically dirty):***
  - Before and after handling each patient
  - After any contact with blood, body fluids, secretions, excretions and contaminated items, gloves being worn or not.
  - Immediately after removing gloves
  - Between different procedures on a same patient, to prevent cross-contamination of different body sites
  - After handling laboratory samples or cultures
  - After cleaning cages or stalls
  - Before meals, breaks, smoking or leaving work for the day
  - Before and after using the restroom
- ***Recommended technique for hand washing***:
  - Wet hands and forearms with warm water.
  - Add at least 3-5 ml (1-2 full pumps) of soap to palm of hand.
  - Lather up and vigorously scrub each side of hands beyond the wrist for 10-30 seconds, clean between fingers, under rings and fingernails.

- Rinse under warm water until all soap residue is removed.
- Dry hands with paper towel or warm air dryer.
- If it is not possible to wash your hands immediately, wet alcohol-wipes or hand sanitizer can be used until access to warm water and soap.

- ***Recommended method for using a hand sanitizer:***
  - Apply a thumbnail-sized amount to the palm.
  - Work sanitizer into fingertips of opposite hand, then on the rest of the hand.
  - Repeat with opposite hand.
  - Rub briskly until dry and do not rinse.

FVM staff and students who have direct contacts with patients or who handle biological samples are encouraged to maintain short fingernails and not to wear jewellery on hands to minimize contamination and improve hand cleanliness. Furthermore, any skin lesion on hands and forearms should be plastered (e.g. waterproof band aid).

1.3.2. Barrier Nursing Precaution

Barrier nursing precaution should be appropriate for the type of procedures being performed and the type of exposure anticipated. These guidelines apply to working with infected tissues or body fluids, treating live animals in cages/stalls, cleaning facilities (that were) occupied by infectious animals or handling the carcass of an animal that died from a potentially infectious/zoonotic disease.

- Wear gloves and protective clothing (lab coat, gown, apron or coveralls) when you are handling patients known or suspected to be suffering from infectious or zoonotic diseases (Class 3 or 4).
- Gloves, surgical masks and protective eyewear (safety goggles) should be worn for procedures that generate droplets or bone chips and splashing of blood or other body fluids.
- If a glove is torn or after a needle stick or other injury, the glove should be removed and replaced with a new one as soon as patient safety allows it.
- Washable boots and shoes, or shoe covers, enhance the ability to prevent the spread of infectious material throughout the hospital.
- Additional protection in the form of face shields or FFP3 respirators may be necessary, depending on the circumstances and disease.

1.3.3. Standard Attire

- The FVM maintains a dress code to promote professionalism and to assist with biosecurity efforts (for details, see various hospital sections):
  - Surgery (veterinarians, technicians and students): **blue**
  - Medical consultations and hospitalisation (veterinarians and technicians):
    - Large animals: **green**
    - Small animals: **dark blue** scrubs for veterinarians and for technicians:
      - Hospitalisation: **violet** scrubs
      - Consultation: **light blue** scrubs
      - Intensive Care Unit (ICU): **pink** scrubs
  - Students:
    - Small animal clinics:
      - Consultation, hospitalisation and ambulatory (Prince Laurent Foundation): **burgundy** scrubs
      - Intensive Care Unit (ICU): scrub suit
      - Surgery: white lab coat over surgery scrub suit
    - Teaching laboratories: **white** cotton lab coat
    - Anatomy dissection rooms: **white** cotton lab coat or **green/blue** tissue coverall
    - Large animal clinics: **green or blue** tissue coverall
  - Isolation facilities:
    - Small animals: **white** disposable coveralls (class 4)
    - Large animals:

    - **Yellow** disposable apron or single-use overalls (class 3)
    - **White** disposable coveralls (class 4).
- The use of FVM-dedicated attire is the first line of defence against dissemination of pathogens outside the hospital.
- Staff and students working in the clinics (contacts with patients or their environment) are encouraged to wear hospital-dedicated attire, i.e. clothing, footwear, and outer garments worn only in the FVM or on field service duty.
- People working in the hospital (staff and students) are required to wear footwear and protective outer garments in line with the job at hand. For example, coveralls and heavy boots or booties are the most appropriate footwear and protective outer garments when working with large animals.
- In all clinics, staff and students are encouraged to wear closed-toe footwear that is safe, protective, clean, and cleanable. Soiled or contaminated footwear must be cleaned then disinfected and should not be made of a porous or absorbent material. From a safety perspective, footwear suitable in the small animal hospital may not be appropriate for the large animal facilities.
- Long hair must be tied back.
- At least one extra set of clean PPE should always be available.
- During each rotation, re-usable PPE should always be clean and freshly laundered (see chapter 14 for procedure).
- In some hospital areas, specific requirements in terms of attire are in force; they are listed under the corresponding hospital section.

1.3.4. Patient care

1.3.4.1. Patient hygiene

- For a question of basic hygiene and to reduce infection pressure, it is of major importance for FVM patients to be housed in a clean stall/cage and to be maintained as clean as possible.
- Water and feeding buckets or bowls need to be regularly changed and cleaned.
- If patients defecate outside their facility (whether inside or outside a building), faeces should be removed, and the floor subsequently cleaned (and dried in the SAH), immediately after defecation. If patients urinate inside (but not outside a building), urine should be removed and the floor cleaned and dried as soon as possible.
- The cage/stall environment should be clean, tidy and neat, which means no medications or materials lying around, no bedding outside the stable/cage, and no students' personal belongings. Staff and students are expected to tidy away material once used and to leave the location in its original condition.
- Sector-specific requirements in terms of patient hygiene are listed under the corresponding hospital section.

1.3.4.2. Minimize Unnecessary Contacts with Patients

- Performing patient care and ensuring teaching obviously require intensive contacts with multiple patients through routine activities. However, it is important to remember that such contacts might contribute to the transmission of infectious and/or zoonotic pathogens.
- Staff and students should minimize contacts with patients (especially if one is not directly in charge) to limit the risk of nosocomial exposure for patients.
- Primary clinicians may, at their discretion, allow and encourage contacts of students with animals for teaching purposes. If, for teaching purpose, students perform examinations or assist with procedures on multiple patients, they should systematically wash and disinfect their hands between patients, while stethoscopes and other equipment should be regularly wiped with alcohol or hand sanitizer.
- Staff and students in contact with suspected/confirmed contagious patients must limit contacts to those essential for a correct patient care.

- When appropriate, patients should be monitored by observation without physical contact, if possible, with the help of cameras.
- To decrease the dissemination of pathogens, staff and students should also minimize, whenever possible, movements to areas shared by different services. For example, when possible, medical staff and students should minimize the visits to the surgery department; staff and students assigned to the equine hospital should avoid visiting the SAH, etc.
- Staff and students should enter stalls/cages only when necessary (e.g. avoid entering during rounds) and should avoid touching or petting animals when passing by.
- Whenever possible, staff and students should work last in areas with higher risks of contamination (***after*** caring for other patients).

1.3.5. Food and Beverage

- Food or beverage should not be consumed or stored where animals are examined, treated, or housed.
- Staff and students are also prohibited from eating, drinking, or storing food in areas where biological samples are handled, or medications are reconstituted or stored. This includes record rooms, hallways, surgery rooms, examination rooms, or reception areas.
- It is allowed to consume and store food and beverages in:
  - FVM cafeteria and restaurant
  - Department kitchens
  - Technicians' and clinicians' offices
  - Outside the clinical departments
  - Students' on-call rooms
- Because eating and drinking is authorised in these areas, animals, biological samples and medications are not allowed.
- Storage of food and beverages is not allowed in any refrigerator/freezer used to store medications or biological samples.
- Microwaves used in animal care areas (e.g. equine laboratory and SAH kitchen) **MUST** not be used to heat food for people.

1.3.5.1. FVM restaurant

- Staff and students are prohibited from wearing professional attire (e.g.: blue/green reusable overalls, clinical scrubs, lab coats, boots, stethoscopes, etc.) in the FVM restaurant. The restaurant staff should make sure that FVM staff and students comply with these hygienic rules. Companion animals are not allowed in the restaurant.

1.3.6. Medications

- Each clinic has a drug depot reserved for the treated animals and disposes of a record of medicines, according to the legislation[4]: any drug acquisition for the depot is recorded in an entry register and each release from the depot must be recorded in an exit register.

1.3.6.1. Storage and access

- Medications should be stored in optimal conditions (see label: appropriate temperature, in the dark), in a clean environment, and should not be subject to important temperature variations and/or humidity.
- Medications should be arranged in an orderly fashion (e.g. alphabetically/by class).
- Opened medication vials should be physically separated from stock (other room or place).

[4] 29 MAI 2024. – Royal decree amending the Royal Decree of 21 July 2016 on the conditions of use of medicinal products by veterinarians and animal holders

- The Pharmacy should not be accessible to people who are not Department affiliates, to children or animals (hospitalised or not, including pests). Students are prohibited from entering the Pharmacy unless specific authorisation from and/or accompanied by the Staff.
- Opioid narcotics, ketamine and euthanizing products should be stored in a secured room or in a safe; only active clinicians should have access using a code or a key.

1.3.6.2. Expiry date

- Date of opening or sterility seal-breaking should clearly be labelled on medications, including fluids, with a water-resistant marker.
- The medication should be discarded 24 hours after opening or sooner if specified on the label.

1.3.6.3. Preparation of medications

- Preparation of medications should be performed by or under the direct supervision of technicians or clinicians. During preparation, contamination by other medication or dirt should be prevented. For parenteral medication, the bottle rubber tops should be wiped with alcohol before each puncture. New (sterile) syringe and needle should be used for preparing medication. Needles and syringes for drug delivery should never be reused neither for other patients nor for the same patient (exception: syringes for oral medications can be reused after rinsing and cleaning).
- Needle re-capping is forbidden, as responsible for many accidents.
- After preparation, a new needle will be used for injection.
- Preparation of toxic or dangerous drugs should be performed under safe circumstances, i.e. wearing the appropriate PPE (depending on the drug itself: gloves, protective eyewear, mask, eventually under a vacuum, etc.), and not in the presence of non-equipped individuals.
- The medicine should be encoded in the FMV SAP system immediately after use.
- Some medications (e.g. sodium penicillin, ampicillin) should not be prepared beforehand due to their very short stability.
- The drug name should be clearly labelled with a water-resistant marker on each syringe if not administered immediately after preparation.

1.3.6.4. Return of Medications

- Discontinued or unneeded medications that cannot be returned to the Pharmacy must be disposed of in the yellow waste containers.

1.3.7. Cleaning service

1.3.7.1. General Considerations

- Dispose of sharps in dedicated puncture-resistant yellow containers before returning laundry, equipment, or instruments to the Central Supply.
- Do not put trash, hay or bedding, sharps, or anatomical pieces with dirty laundry.
- Remove all organic material from surgical instruments or equipment before returning them to the Central Supply.
- Buckets, pumps, and tubes need to be cleaned or rinsed; traces of oil must be removed before returning them to the Central Supply.
- The Laundry service will not wash clients' items; they are often lost or damaged.
- The Laundry service will not wash personal items, i.e. blankets, students' scrubs or smocks.

1.3.8. Waste Disposal

- Precautions should be taken to prevent injuries from needles, scalpels, and other sharp objects. To prevent needle injuries, recapping needles is totally forbidden. Staff and students should avoid purposely bending or breaking needles. Sharps should be disposed of in puncture-resistant dedicated containers. Once filled, these puncture-resistant containers must be placed in a 60L-yellow waste container for removal.

- Waste should be disposed of in the area where it was generated, according to the regulations outlined in this chapter. For specific waste products, please see under various hospital sections.
- General hospital waste from animals with no suspicion of zoonotic or infectious pathogen ought to be discarded in *ad hoc* green bags for B1 waste (= Walloon designation for non-hazardous medical waste).
- Hospital waste from animals suspected to be infected by a zoonotic or a highly infectious pathogen MUST be disposed of in yellow containers for B2 waste (= Walloon designation for biohazardous waste).
- All waste generated in the isolation ward needs to be discarded in yellow containers for B2 waste.
- Biological samples collected from potentially contagious patients should be sealed in water-proof plastic bags (double packaging) and labelled with the appropriate information and risk, prior to submission to diagnostic laboratories. Care should be taken to avoid contaminating the outside of plastic bags.
- Bandaging of wounds infected by pathogens of concern (e.g., MRSA or other multidrug resistant bacteria) should be performed in low traffic areas that can be easily cleaned and disinfected. Barrier precautions should be used to prevent contamination of hands and attire, and environmental dissemination should be avoided (e.g. drainage of flush solutions or careless handling of bandaging). Please follow the procedures described in this document for environmental disinfection and disposal of such materials.
- Biological samples or anatomical pieces (feathers, feet, skeleton, etc.) are not allowed to leave the hospital other than for medical purpose or destruction.

1.4. Basic Cleaning and Disinfection

- Staff and students using detergents and disinfectants are expected to be familiar with the following section to understand their activity and potential interactions with other products used in the FVM.
- Organic material rapidly deactivates most disinfectants. The potential presence of residual organic material should be considered when choosing a disinfectant for surfaces.
- Disinfectants vary greatly in their spectrum of activity. In general, protozoa such as *Cryptosporidium* spp., bacterial spores, mycobacteria, and non-enveloped viruses are very resistant to disinfectants.
- Ensuring an optimal decontamination requires the respect of manufacturer's guidelines regarding dilutions and contact time (often 10-15 min at least).
- Although most disinfectants are used for their short-term decontamination activity, some of them maintain a residual disinfectant activity when left on surfaces for longer periods.
- It is critical to rinse and remove all residues from previous product(s) (detergent and disinfectant).

1.4.1. Appropriate cleaning

1.4.1.1. General cleaning and Disinfection Protocol for the Environment including contaminated surfaces

- Appropriate attire should be worn whenever using disinfectants. Additional PPE (mask, face shields or protective eyewear, impervious clothing and boots) should be worn when there is a probability of splash.
- Remove all visible debris prior to disinfection. The presence of gross contamination will inactivate most disinfectants. If using a hose, care must be taken to minimize aerosolization and further spread of pathogens.
- Clean the affected areas with water and detergent or soap; scrubbing or mechanical disruption is always needed to break down biofilms and residual debris that hinder or inhibit the disinfection process.
- Thoroughly rinse the cleaned area to remove any detergent residue as some disinfectants may be inactivated by detergents.

- Allow area to drain or dry as much as possible to prevent the dilution of disinfectant solutions.
- Thoroughly wet the area with the disinfectant solution. Disinfectant should ideally remain in contact with surfaces for at least 15 minutes and following manufacturer's guidelines.
- Remove excess disinfectant with water, clean paper towels, mop, or squeegee.
- Disinfectant should be rinsed off all surfaces of a cage/stall or allowed to dry for enough time (see disinfectant label) prior to housing a patient.
- All multi-use areas (stocks, examination rooms and tables, etc.) where animals are examined or treated, should be cleaned and disinfected immediately after use by staff and students in charge of the patient - irrespective of its infectious status.
- When performing the cleaning/disinfection process, you must prevent any contact of blood or body fluid with non-intact skin or mucous membrane. Non-intact skin should be protected (e.g. waterproof band aid).
- After disinfection, remove the PPE then wash your hands.
- For non-routine disinfection measures, only staff trained and approved to wear and use the required PPE will be allowed to access the areas to be disinfected.

1.4.2. Disinfectants

- A variety of disinfectants are used in the FVM, to decrease the likelihood of pathogen transmission. Several factors were considered in selecting disinfectants. See also pages 21-22 for a summary of detergents and disinfectants approved for use in the FVM.
- Disinfectants vary in their toxic and irritation potential for people and animals. In general alcohols, povidone iodine, and chlorhexidine solutions are used when contact with skin or other tissues is likely or required. Other disinfectants such as hypochlorite (bleach), phenols, quaternary ammonium compounds, hydrogen peroxide or aldehydes are only applied to equipment, facility surfaces or in footbaths/foot mats.
- Disinfectants are effective when applied on clean and non-porous surfaces. Some materials such as unsealed wood and dirt cannot be disinfected or decontaminated through routine procedures. In addition, non-porous surfaces will not be reliably decontaminated if disinfectants are applied in the presence of dirt, oil, biofilms and biological materials.
- Non-routine protocols applied in specific cases (e.g. *Cryptosporidum* spp., *Leptospira* spp. and ringworm) are described in clinical chapters.

1.4.3. Footbaths and Foot mats

- Pathogens are frequently isolated from floor surfaces in the environment of infected animals.
- Footbaths/foot mats solutions should be changed every morning by students, technicians or veterinarians, and whenever they contain excessive amounts of bedding or dirt.
- Footbaths/foot mats should be refilled by anyone noticing they are dry or low on volume; this is the responsibility of ALL people working in the area (staff and students).
- Staff and students are required to use footbaths/foot mats appropriately whenever they are encountered.
- Foot mats do not require full immersion of feet, as they are designed to disinfect shoe soles and sides. However, shoe tops and sides are commonly splashed when walking on a foot mat, thus, impervious footwear is strongly recommended for anyone working in areas where foot mats are used.

1.4.4. Disinfection Protocol for Instruments and Equipment

- All FVM equipment must be appropriately cleaned and disinfected prior to storage to minimize the risk of pathogen transmission. Small or large animal-dedicated equipment will be discussed in the respective sections. See also pages 21-22 for a summary of detergents and disinfectants approved for use in the FVM.
- **Thermometers:**

- Glass thermometers **MUST NOT** be used in the FVM to decrease the risks associated with broken glass and mercury exposure. Electronic devices should rather be used instead.
- Electronic thermometers should be thoroughly cleaned and disinfected after each patient using alcohol and/or chlorhexidine wipes.
- Probes from thermometers used for continuous temperature monitoring (e.g. anaesthesia) should be thoroughly cleaned and disinfected between patients by wiping and washing (to remove gross faecal material) and soaking in alcohol and/or chlorhexidine solutions.
- Patient-dedicated thermometers are assigned for use in contagious areas (class 3 and 4).
- Immediate cleaning and disinfection are required when thermometers are visibly soiled and systematically after patient examination.

- **Endoscopes:**
  Endoscopes should be cleaned then disinfected after each use with quaternary ammonium compounds, and by the staff only.
- **Stethoscopes:**
  - It is recommended to disinfect stethoscopes daily with hydro-alcoholic hand sanitizer.
  - Patient-dedicated stethoscopes are assigned for use in areas housing contagious patient (class 3 and 4).
  - In addition, immediate cleaning and disinfection are required when stethoscopes are visibly soiled and systematically after examining a class 3 or class 4 patient.

1.4.5. Summary of main Detergents and Disinfectants Approved for Use in the FVM

- Detergents and disinfectants approved for use in the FVM are selected from approved lists (according to the field activity) by the Federal Public Service - Health, Food Chain Safety and Environment. Only biocidal products authorised by the Federal Government may be made available on the Belgian market. You can find these products in the list of authorised biocidal products[5].

[5] https://biocide.be/fr

Table IV. Main detergents and disinfectants used in veterinary medicine

(from: Linton et al., 1987 – adapted to the European metric system)

Disinfectants and their Dilutions	**Activity in Organic Material**	**Spectrum of Activity**	**Comments**
Chlorhexidine 0.05%-0.5% *Used for disinfection of items in contact with skin or mucosal surfaces (e.g., muzzles, endotracheal tubes, etc.)* *Dilutions: 60ml of 2% solution per gallon of water = 0.06% solution* *Soak barrels: 256.4 ml of 2% solution per 10 litres of water = 0.05% solution (23.79 ml per litre of water is used in equine anaesthesia for soak barrels)* *Contact time: at least 15 minutes.*	Rapidly Reduced	• Mycoplasmas: Very effective • Mycobacteria: Variable • Gram+ Bacteria: Very effective • Gram– Bacteria: Very effective • *Pseudomonas*: Limited activity • Rickettsiae: Limited activity • Enveloped Viruses: Limited activity • Chlamydiaceae: Limited activity • Non-Enveloped Viruses: No Activity • Fungal Spores: Limited activity • Bacterial Spores: No Activity • Cryptosporidia: No Activity • Prions: No Activity	• Broad antibacterial spectrum but limited effectiveness against viruses. • Used to disinfect materials in close contact with patients (muzzles, endotracheal tubes, etc.) • Easily inactivated by soaps and detergents. • Low toxicity potential; usual dilutions are non-irritating even if contacts with mucosa. • Inactivated by anionic detergents. • Bactericidal activity on skin is faster than many other compounds, including iodophors. • Residual effect on skin diminishes re-growth. • Only function at limited pH (5-7). • Toxic to fish => should not be discharged in the environment.
Povidone Iodine *Used for skin decontamination and disinfection (e.g. surgical preparation).*	Rapidly Reduced	• Mycoplasmas: Very effective • Mycobacteria: Limited activity • Gram+ Bacteria: Effective • Gram– Bacteria: Effective • *Pseudomonas*: Effective • Rickettsiae: Effective • Enveloped Viruses: Effective • Chlamydiaceae: Effective: • Non-Enveloped Viruses: Limited activity • Fungal Spores: Effective • Bacterial Spores: Effective • Cryptosporidia: No Activity • Prions: No Activity	• Broad spectrum. • Very low toxicity potential => appropriately diluted solutions are suitable for use on tissues or materials in contact with skin or mucous membranes • People can become sensitized after skin contact. • Dilution of iodophors increases free iodine concentration and antimicrobial activity. • Staining of tissues and plastics can occur. • Stable in storage • Inactivated by organic debris and quaternary ammonium compounds. • Requires frequent application • Corrosive
Alcohol (90% isopropanol or 70% denatured ethanol) *Used to disinfect materials in close contact with people and patients (e.g. muzzles, instruments, hand sanitizing solutions, etc.)*	Reduced	• Mycoplasmas: Very effective • Mycobacteria: Effective • Gram+ Bacteria: Very effective • Gram– Bacteria: Very effective • *Pseudomonas*: Effective • Rickettsiae: Limited activity • Enveloped Viruses: Effective • Chlamydiaceae: Limited activity • Non-Enveloped Viruses: No activity • Fungal Spores: Limited activity • Bacterial Spores: No Activity • Cryptosporidia: No Activity • Prions: No Activity	• Broad spectrum. • Very low toxicity potential => appropriately diluted solutions are suitable for use on tissues or on materials in contact with skin or mucous membranes. • No residual activity on surfaces • Fast acting • Leaves no residue. • Rapid evaporation • Extremely flammable
Sodium Hypochlorite (Bleach)* *Used for disinfecting clean surfaces, especially to increase the spectrum of activity of disinfectant.* *Dilutions:*	Rapidly Reduced	• Mycoplasmas: Very effective • Mycobacteria: Effective • Gram+ Bacteria: Effective • Gram– Bacteria: Effective • *Pseudomonas*: Effective • Rickettsiae: Effective • Enveloped Viruses: Effective	• Broad spectrum. • Relatively low toxicity potential at standard dilutions; higher concentrations or prolonged contact can result in irritation to mucous membranes or skin. • Can be used in the presence of anionic detergents

• *1:64 = 15.85 ml per litre of water. Appropriate for most applications in FVM* • *1:32 dilution = 33.02 ml per litre of water* • *1:10 dilution = 100 ml per litre of water. Limited use-very strong*		• Chlamydiaceae: Effective • Non-Enveloped Viruses: Effective at higher concentrations • Fungal Spores: Effective • Bacterial Spores: Effective • Cryptosporidia: No Activity • Prions: No Activity	• Not affected by water hardness. • Inexpensive • Bactericidal activity is reduced with increasing pH, lower temperatures, and in the presence of ammonia and nitrogen, which is important to consider when urine is present. Also inactivated by cationic soaps/detergents, sunlight and some metals. • Chlorine gas can be produced when mixed with other chemicals. Strong oxidizing (bleaching) activity that can damage fabric and is corrosive on metals such as sliver, and aluminium (not stainless steel). • Limited stability for stored solutions
Quaternary Ammonium Compounds (QACs) *Primary surface disinfectant used in the FVM (spot disinfection as well as general environmental disinfection)* *1:256 dilution: 4 ml per litre of water* *Contact time: at least 15 minutes*	Moderate	• Mycoplasmas: Effective • Mycobacteria: Variable • Gram+ Bacteria: Very effective • Gram– Bacteria: Effective • *Pseudomonas*: No Activity • Rickettsiae: Limited activity • Enveloped Viruses: Effective • Chlamydiaceae: No Activity • Non-Enveloped Viruses: Limited activity • Fungal Spores: Limited activity • Bacterial Spores: No Activity • Cryptosporidia: No Activity • Prions: No Activity	• Broad spectrum. • Irritation and toxicity is variable among products, but these compounds are generally non-irritating and have low toxicity at typical dilutions • Inactivated by anionic detergents • Some residual activity after drying • More effective at alkaline pH • Less effective in cold temperatures • Stable in storage • Inactivated by hard water • Inactivated by soap/detergents
Oxidizing Agents: Hydrogen Peroxide *Used for disinfecting misting (fogging) and in all disinfectant footbaths in the large animal hospital.* *Dilution: 10 grams per litre of water is a 1% solution* *Spray bottle: 5 ml powder (5 grams) added to 500 ml water (1% solution)* *Contact time: At least 15 minutes*	Variable in class; very good for peroxymono-sulfate and accelerated hydrogen peroxide	• Mycoplasmas: Very effective • Mycobacteria: Effective • Gram+ Bacteria: Effective • Gram– Bacteria: Effective • *Pseudomonas*: Effective • Rickettsiae: Effective • Env. Viruses: Effective • Chlamydiaceae: Effective • Non-Enveloped Viruses: Limited activity • Fungal Spores: Limited activity • Bacterial Spores: Effective • Cryptosporidia: Limited activity • Prions: No Activity	• Broad spectrum • Products listed have very low toxic potential but can cause skin irritation through drying, especially as powder or in concentrated solutions. • Other compounds not used in FVM can be very toxic (e.g. chlorine dioxide) • No harmful decomposition products • Residual activity on surfaces • Poor lipid solubility • Less active at low temperatures • Corrosive to plain steel, iron, copper, brass, bronze, vinyl • Add powder to water helps in mixing. • Wear a mask and rubber gloves when preparing solution to avoid irritation.
Phenols *Used only for disinfection of instruments and necropsy areas that may be contaminated with prions (e.g. bovine spongiform encephalopathy, chronic wasting disease and scrapie).*	Very Good	• Mycoplasmas: Very effective • Mycobacteria: Variable • Gram+ Bacteria: Very effective • Gram– Bacteria: Very effective • *Pseudomonas*: Very effective • Rickettsiae: Effective • Enveloped Viruses: Effective • Chlamydiaceae: Limited activity • Non-Enveloped Viruses: Limited activity • Fungal Spores: Effective • Bacterial Spores: No Activity • Cryptosporidia: No Activity • Prions: Limited activity, variable among compounds	• Broad spectrum • Irritation potential is variable among compounds in this class, but phenolic disinfectant products are generally considered highly irritating and should not be used on surfaces in contact with skin or mucous membranes. • Concentrations over 2% are highly toxic to animals, especially cats. • Activity not affected by water hardness • Some residual activity after drying • Effective over broad pH range • Non-corrosive • Stable in storage

Table V. The Antimicrobial Spectrum of Disinfectants (Adapted from: Linton et al., 1987)

Most susceptible	Chemical Disinfectants									
	Note: Removal of organic material must always precede the use of any disinfectant									
	Acids (hydrochloric acid, acetic acid, citric acid)	**Alcohols** (ethyl alcohol, isopropyl alcohol)	**Aldehydes** (formaldehyde, paraformaldehyde, glutaraldehyde)	**Alkalis** (sodium or ammonium hydroxide, sodium carbonate)	**Biguanides** (chlorhexidin)	**Halogens**		**Oxidizing Agents** (hydrogen peroxide, peracetic acid)	**Phenolic compounds**	**Quaternary Ammonium compounds (QACs)**
						hypochlorite	iodine			
Mycoplasmas	+	++	++	++	++	++	++	++	++	+
Gram-positive bacteria	+	++	++	+	++	+	+	+	++	++
Gram-negative bacteria	+	++	++	+	++	+	+	+	++	+
Pseudomonas	+	++	++	+	±	+	+	+	++	-
Rickettsiae	±	+	+	+	±	+	+	+	+	±
Enveloped viruses	+	+	++	+	±	+	+	+	±[a]	±
Chlamydiaceae	±	±	+	+	±	+	+	+	±	-
Non-enveloped viruses	-	-	+	±	-	+	±	±	-	-
Fungal spores	±	±	+	+	±	+	+	±	+	±
Picornaviruses (i.e. FMD)	+	N	+	+	N	N	N	+	N	N
Parvoviruses	N	N	+	N	N	+	N	N	N	-
Acid-fast bacteria	-	+	+	+	-	+	+	±	±	-
Bacterial spores	±	-	+	±	-	+	+	+[b]	-	-
Coccidia	-	-	-	+[c]	-	-	-	-	+[d]	-
Prions	-	-	-	-	-	-	-	-	-	-

Legend: ++ highly effective, + effective, ± limited activity, - no activity, N = information not available; [a] varies with composition, [b] peracetic acid is sporicidal, [c] ammonium hydroxide, [d] some have activity against coccidia; FMD = foot-and-mouth disease virus.

Table VI. Characteristics of selected disinfectants and antiseptics (Adapted from Linton et al. 1987 and CFSPH 2023)

miDisinfectant class	Alcohols	Aldehydes	Biguanides	Halogens-hypochlorite	Halogens-iodine compounds	Oxidizing agents	Phenols	QACs
Examples of active ingredients	Ethanol Isopropanol	Glutaraldehyde Formaldehyde	Chlorhexidin (antiseptic)	Sodium hypochlorite	Povidone iodine (antiseptic)	Hydrogen peroxide, Peracetic acid	Chloroxylenol	Benzalkonium chloride
Mechanism of Action	• Precipitates proteins • Denatures lipids	• Denatures proteins • Alkylates nucleic acids	• Alters membrane permeability	• Denatures proteins	• Denatures proteins	• Denatures proteins and lipids	• Denatures proteins • Alters cell wall permeability	• Denatures proteins • Binds phospholipids of cell membrane
Characteristics	• Fast acting • Leaves no residues • Rapid evaporation • No residue or residual action	• Broad spectrum • Noncorrosive • Pungent odour	• Broad spectrum	• Broad spectrum • Short contact time • Inexpensive • Degrades rapidly once prepared	• Stable in storage • Relatively safe	• Broad spectrum • Fast acting • Low toxicity at lower cc	• Non-corrosive • Stable in storage • Strong odour • Residual film • Can damage rubber, plastic	• Stable in storage • Effective at high temperatures and high pH (9-10)
Factors affecting effectiveness	• Inactivated by organic matter	• Affected by organic matter, hard water, soaps/detergents, pH, temperature and relative humidity	• Effective in a limited pH range (5-7)	• Inactivated by sunlight, heat • Requires frequent application • Affected by pH, temperature, etc.	• Inactivated by QACs • Requires frequent application		• Affected by temperature	• Affected by pH, best at neutral or alkaline
Health hazards	• Skin irritation	• Carcinogenic • Highly irritating to skin, mucous membranes		• Irritation to mucous membranes, skin, eyes		• Powder can irritate mucous membranes	• Irritation to skin, eyes, respiratory tract • Burns at high cc	• Can cause irritation to skin, eyes and respiratory tract
Precautions	• Flammable	• Only use in well-ventilated areas • Flammable	• Toxic to fish (environmental concern)	• Never mix with adds, toxic chlorine gas will be released • Corrodes metals	• Corrosive • Stains clothes and treated surfaces	• May damage some metals (aluminium, copper, steel, ...)	• May be toxic to animals, especially cats and pigs	• Can accumulate in environment • Damaging to some metals at high cc
Vegetative bacteria	Effective	Effective	Effective	Effective	Effective	Effective	Effective	Variable
Mycobacteria	Effective	Effective	Variable	Effective		Effective	Variable	Not effective
Enveloped viruses	Effective	Effective	Limited	Effective	Effective	Effective	Effective	Variable
Non-enveloped viruses	Variable	Effective	Limited	Effective	Limited	Effective	Variable	Not effective
Spores	Not effective	Effective	Not effective	Variable	Limited	Variable	Not effective	Not effective
Fungi	Effective	Effective	Limited	Effective	Effective	Variable	Effective	Variable
Efficacy with organic matter	Inactivated	Reduced	?	Inactivated		Variable	Effective	Inactivated
Efficacy with hard water	?	Reduced	?	Effective	?	Variable	Effective	Inactivated
Efficacy with soap/detergents	?	Reduced	Inactivated	Inactivated	Effective	?	Affected by cationic cleaners	Inactivated by anionic cleaners

Legend: ? = Information not found; QAC = Quaternary Ammonium Compounds; cc = concentration

1.5. Breaking Transmission Cycles

1.5.1. General behaviour

- Ban on smoking in the workplace must be respected.
- Dogs should be walked on leash on the FVM site.
- According to the University regulations, staff members cannot bring their own companion animal to the FVM unless for medical reasons.

1.5.2. Visitors in the FVM

- Educating the public about the role of veterinarians in the society is an important duty of the FVM, and allowing visitors a limited access to the faculty supports such mission. However, there are unique safety and health issues associated with exposure to the FVM environment, and visitors can potentially spread pathogens in the hospital environment.
- Patients' owners must be constantly supervised while visiting the FVM. Physical contact with patients' others than their animal is not allowed.
- Guided tours for the public are coordinated through the FVM Dean's office and are led by trained personnel.
- Visitors are never allowed to enter any isolation department (class 4).
- FVM staff supervising visitors should inform them about zoonotic and nosocomial disease hazards associated with hospitalized animals.
- Visitors must refer to the Clinic secretariat before entering the facilities.
  - They should not be allowed to enter anaesthesia preparation areas, emergency rooms and surgery theatres.
  - Special arrangements can be made by contacting the FVM Dean's Office to allow visiting scientists or veterinarians to enter aforementioned areas.
  - Visitors are not allowed to gather in the care areas.
  - Smoking, eating and drinking are not allowed for visitors either.
  - Visitors will not take along any other animals (*e.g.* cats and dogs).

1.5.3. Clients in the FVM

- Clients are allowed unescorted access to FVM waiting rooms and adjacent restrooms, library, and restaurant/cafeteria. Clients must be escorted to other hospital areas by FVM staff and students.
- Access to patient care areas might be restricted whenever appropriate to minimize risks of zoonotic or nosocomial infections. In addition, clinicians may, at their discretion, exclude clients from patient care areas for safety reasons and whenever there is a risk of disrupting the work environment.
- At the primary clinician's discretion, clients may be left unattended with their animals in examination rooms, however this is prohibited in TTM and patient housing areas. In addition, clients must always be asked to refrain from touching any other animal.
- Clients are not allowed to visit patients housed in class 4 (isolation unit). Permission will only be given exceptionally in case of euthanasia or agony and complying with biosecurity measures.
- Clients must always adhere to policies regarding barrier nursing precautions.
- Visiting hours are restricted to specific periods determined by hospital departments, unless expressly allowed by the primary clinician.
- FVM staff and students responsible for patient care are required to educate clients about zoonotic and nosocomial disease hazards associated with hospitalization of animals.

1.5.4. Children in the FVM

- There are unique safety and health risks in the FVM environment. A child becoming ill or injured after exposure to the FVM environment is clearly unacceptable.

- Access to patient care areas may be restricted whenever appropriate to minimize risks of zoonotic infections. In addition, clinicians may, at their discretion, exclude children (minors under the age of 18) from patient care areas for their own safety and whenever there is a risk of disrupting the work environment.
- Children (minors under the age of 18) of FVM staff and students are not permitted to remain in the hospital, unless supervised by an adult.
- Children visiting the FVM must always be supervised by an adult.
- All children must be restricted from touching any animal except their own due to the risk of zoonotic disease and/or physical injury.

1.5.5. Companion animals in the FVM

- In accordance with the University policy, companion animals are not allowed in the FVM facilities except for medical purpose. The regulation does not apply for:
  - Animals admitted to the hospital as patients
  - Dogs and cats scheduled for blood donation
  - Subjects enrolled in an approved research project
  - Companion animals used for teaching activities

  For such exemptions contacts between sick and healthy animals should be avoided and concerned animals should be housed in different units.
- Staff and students must adhere to all FVM policies when handling and managing animals in the hospital.
- Pets are not allowed in offices and classrooms unless they are being used in classroom activities.
- Pets are not allowed in cafeterias.
- Dogs enrolled in a guide dog education programme are only allowed in classrooms.

1.5.6. Routes of Disease Transmission

- Many pathogens can survive for extended periods of time in the air, on surfaces and in organic matter.
- Pathogens can spread from animal-to-animal, animal-to-human or even human-to-animal, through inhalation, oral route, contact with nasal or ocular mucosal surfaces, and direct contact with fomites or vectors.
- Awareness of these routes of disease transmission can help mitigate their potential effects.

1.5.6.1. Aerosol transmission

- Aerosol transmission occurs when pathogens are transmitted through aerosol droplets. Most pathogens do not survive for extended periods of time in aerosol droplets. Thus, proximity between infected and susceptible animals is required for an effective transmission. The greater the distance between animals, the less likely transmission will occur.
- Aerosol transmission may occur in a veterinary hospital through close contact of animals and/or humans. Pathogens may be freshly aerosolized (e.g. through sneezing of a cat infected with a feline respiratory virus), may be re-aerosolized through high-pressure cleaning of cages, stalls or pens or on dust particles by air currents (e.g. *Coxiella burnetii*). Temperature, relative humidity and ventilation play an important role in the aerosol transmission of pathogens.

1.5.6.2. Oral transmission

- Oral transmission involves exposure to pathogens through the gastrointestinal route. Another form of oral transmission consists in inhaling then swallowing aerosolized material.
- Contaminated equipment includes food and water dishes, and any other items an animal could have licked or chewed. Feed and water contaminated with faeces or urine are frequently responsible for oral contamination.

- For people, oral contact with contaminated hands is frequently involved in the faecal-oral transmission cycle of pathogens, which militates for an excellent hand hygiene among people working around animals. Appropriate handling and segregation of diarrhoeal patients as well as strict cleaning and disinfection of feed and water dishes, will help controlling the spread of microorganisms through faeces.

1.5.6.3. Transmission Through Direct and Indirect Contact

- Transmission through **direct contact** requires an animal or a person comes directly in contact with another infected animal or person.
- Transmission via **indirect contact** occurs through contact with surfaces/materials contaminated by biological fluids (e.g., blood, wound discharge, saliva, nasal secretions or aerosolized respiratory droplets, genitourinary secretions, faeces, etc.).
- The probability for hospitalised patients to be infected with contagious pathogens is high. Therefore, the likelihood for surfaces to be contaminated throughout the facility is important as well. Segregating infected animals and minimizing contacts with them are two key measures to reduce the risk of transmission through direct or indirect contacts.

1.5.6.4. Transmission Through Fomites

- Fomites are inanimate objects that serve as intermediates in transmission cycles. Virtually any object can play the role of fomite, even a person (e.g. caregiver). For example, doorknobs, keyboards, telephones, clothing, thermometers, stethoscopes, hoses, leashes, brushes, shovels, etc. are all items that can be contaminated and transmit the pathogen to other animals or humans.
- The main measures to control transmission by fomites include correct cleaning and disinfection, use of barrier nursing precautions, use of equipment dedicated to infectious patients, as well as appropriate recognition and segregation of sick animals.
- Whenever possible, animals showing clinical signs of infectious disease should be handled and treated after healthy patients.

1.5.6.5. Vector-Borne Transmission

- Vector-borne transmission occurs when an arthropod acquires a pathogen from one animal and transmits it to another. For example, heartworm and West Nile virus are vector-borne pathogens.
- Fleas, ticks, flies and mosquitoes are common vectors of pathogens.
- The most effective means to prevent a vector-borne transmission are to eliminate or reduce arthropod populations, or at a minimum, to separate the vector from the host; see Chapter 1b (pest control) for practical measures.

1.5.7. Zoonotic Infections

- While the risk of contracting a zoonotic disease among the general population is, on average, low, veterinarians and other people who have routine contacts with animals are at an increased risk of exposure.
- In case of exposure to a suspected or confirmed zoonotic pathogen, all known client(s), referring veterinarian, FVM staff, students and contacts should be recorded and reported to the CFB: **biosecurity-fmv@lists.uliege.be**.
- The CFB Chairman and the FVM clinician in charge of the case will then work together to ensure that all potentially exposed individuals are contacted, as well as the necessary local and state health officials (when applicable).
- Any individual with a known or suspected occupational infection is strongly encouraged to seek medical attention immediately after notifying a supervisor.
- Any known or suspected exposure to a zoonotic pathogen should be reported to the CFB Chairman and to the Director of the clinic by the veterinarian primarily responsible for the patient.

- The Department of Occupational Protection and Hygiene (SUPHT – internal department of occupational protection and hygienes) should be informed for further redirection towards an occupational health doctor aware of zoonoses (COHEZIO, external service of occupational prevention and protection at work).
- FVM staff and students, as well as their friends and family members who might be at an increased risk for zoonoses or who have questions regarding exposure to zoonotic pathogens, are strongly encouraged to contact their general practitioner.

1.5.8. Special Risks with Regards to Infectious Disease

- Any person whom immune system is compromised is at greater risk of exposure to zoonotic diseases. Apart from disease- or drug-related causes of immunosuppression, other physiological conditions affect the immune status, e.g. children < 5 years old, pregnancy and advanced age. These categories of persons are named YOPI's, i.e. young, old, pregnant and immunocompromised.
- Numerous diseases and conditions can compromise or alter the immune function, including HIV (AIDS), organ failure, diabetes, alcoholism and liver cirrhosis, malnutrition or autoimmune disease.
- Several TTMs can also cause immunosuppression, including radiation therapy, chemotherapy, chronic corticosteroid therapy, or immunosuppressive therapy associated with bone marrow or organ transplants, implanted medical devices, splenectomy, or long-term haemodialysis.
- Some of these conditions/diseases may have a social stigma, making it difficult for a person to share such confidential health information.
- All people, including students, are required to inform their supervisor about any special health concern (e.g., pregnancy, immunosuppression, etc.) that might impact the risk or consequences of infection with zoonotic pathogens prior to handling any patient.
- All discussions will be kept confidential; however, communication among staff about the situation may be necessary to implement appropriate precautions and/or adapt classical clinical or teaching procedures in the hospital.

1.6. Risk Communication on the contagious status of patients

- Efficient communication regarding the risk of spreading contagious pathogens is essential, given the complexity of patient care in the FVM and the number of individuals working in such environment. Effective and proactive communication regarding the real and potential infectious status of patients decreases the likelihood of spreading nosocomial or zoonotic diseases. For biosecurity concerns, communicating on risk involves appropriate notification and education about risks for all individuals in contact with infectious patients, appropriate precautions necessary to limit the spread to people or other patients, and appropriate precautions to disinfect contaminated areas or materials.
- All FVM patients should be evaluated by clinicians to identify potentially contagious risks. It is the responsibility of the senior clinician to assess correctly the risk of contagious disease transmission and to implement appropriate infection control efforts consistent with Biosecurity SOPs.
- THE **CFB MUST BE NOTIFIED OF ALL IMPORTANT INFECTIOUS HAZARDS (KNOWN OR SUSPECTED)**, which include, but is not limited to, reportable diseases, potentially zoonotic diseases, highly contagious diseases (e.g. African swine fever), highly pathogenic diseases, infections by MDR bacteria (e.g. MRSA or VRE), and pathogens that are highly persistent in the environment or difficult to eradicate with routine hygiene practices. This notification should be done by the veterinarian responsible at the earliest through the following email address: **biosecurity-fmv@lists.uliege.be**.
- All contagious risks must be appropriately communicated to the FVM staff, students and clients to effectively manage the threat of infection for people and animals in contact.
- A patient's infectious status may evolve during hospitalization, and materials of risk communication should then be updated.

1.6.1. Biosecurity E-mail Listservs

- The FVM uses electronic mail lists (Email Listservs) to facilitate communication regarding infectious disease hazards in the hospital.
- **Purpose:** To provide communication and improve awareness regarding patients with increased risks for contagious and/or zoonotic disease in the FVM.
- **People Sending Emails:** Open to anyone, **required when patients are admitted to class 4 (isolation)**.
- **People Receiving Emails:** Selected CFB members, cleaning personnel, technical staff, SAH, Equine Hospital, Clinic of Ruminants, and Diagnostic Laboratory.

1.6.2. Floor lines

- To make access more visible to clients, visitors and students, floor lines have been painted in specific parts of the FVM. The line colour corresponds to the authorisation of circulation:
  - **Green:** no restriction, passage is allowed.
  - **Yellow:** passage is restricted (e.g. entry to the hospitalisation aisle or to a laboratory).
  - **Red:** passage is not allowed unless clinician's authorization (e.g. operating theatre, cadaver storage place or isolation facilities).

1.6.3. Hospitals - Small animals, Horses and Ruminants

- The infectious hazard should be clearly labelled on cages/stalls housing contagious patients, as well as their surrounding environment; the following information should appear:
  - Class of the disease (☞ see **Table II**)
  - Suspected/confirmed diagnosis (name of the disease/condition)
  - Disinfection procedures appropriate for infection control
  - Applicable barrier nursing and hygiene requirements
  - Barrier precautions
  - Eventual zoonotic risk
- Staff and students responsible for contagious patients must ensure that special considerations and nursing needs have been appropriately communicated to other people likely to be working with the patients or their environment. Furthermore, they must ensure the information was communicated appropriately to the CFB (**biosecurity-fmv@lists.uliege.be**).

1.6.4. Protocol for Front Desk Staff

- If a client call mentions any suspect sign of contagious disease (e.g. acute vomiting, diarrhoea, ataxia, abortion, coughing, sneezing, acute fever, etc.):
  - The receptionist will schedule the appointment ONLY AFTER approval by a clinician and if an isolation stall/cage is available.
  - The motive for consultation will be indicated on the schedule (e.g. acute diarrhoea, acute vomiting, acute coughing, acute sneezing, acute fever, etc.).
  - '*Suspect d'être contagieux*' (suspected to be contagious) will be written next to the complaint.
  - The client will be asked to leave the animal in the vehicle until checking in. The clinician or intern in charge will then perform a quick clinical overview of the patient to determine the risk before authorizing the patient into the hospital. According to the risk category and circumstances, the animal will be brought directly to an examination room, or to the isolation unit (class 4). Small animals should be transported preferably on a gurney (or in a cat carrier) to prevent the risk of contaminating the hospital environment.
- If a patient with signs or history of acute and/or possibly contagious disease is presented directly at the reception desk, the receptionist should immediately contact the receiving service and coordinate the re-direction of the animal to an examination/emergency room or to isolation with the view of minimizing the environmental contamination of the hospital.

1.6.5. Protocol for Students

- The admission of potentially contagious patients will be organised as follows:
  - The motive for consultation will be written on the schedule (e.g. acute diarrhoea, acute vomiting, acute coughing, acute sneezing, acute fever, etc.).
  - "*Suspect d'être contagieux*" (suspected to be contagious) will be written next to the complaint.
  - The client will be asked to keep the animal in the vehicle until checking in. The clinician or intern in charge will then perform a quick clinical overview of the patient to determine the risk before authorizing the patient into the hospital. According to the risk category and circumstances, the animal will be brought directly to an examination room, or to the isolation unit. Small animals should be transported preferably on a gurney (or in a cat carrier) to prevent the risk of contaminating the hospital environment.
  - No direct contact between the suspect patient and other FVM patients is allowed.
  - To minimize the risks for students and other patients, only a minimum number of students (assigned by the clinician) will be allowed to follow the consultation/examinations of potentially contagious patients.
  - After the examination room is vacated, areas or equipment contaminated by faeces and/or body fluids should be cleaned and disinfected immediately by the student and/or staff member in charge of the patient.
  - Appropriate sign should be placed on the door and the room cannot be used for another patient until complete cleaning and disinfection.
  - Students **MUST BE AWARE** (video instructions, course, and FVM Biosecurity website) and follow the biosecurity protocol in case of contacts with contagious patients.

1.6.6. Exclusion criteria for entry and/or hospitalisation

- A patient suspected of a reportable disease (☞ see section 1.6.6.) cannot enter the hospital (and further be hospitalised). Admission can also be denied if the risks for other hospitalised patients or staff are too important compared to the risk for the animal itself. The specific refusal criteria for each species are listed under the corresponding hospital service.
- Only clinicians (not interns) have the authority to refuse an animal.

1.7. Biosecurity Surveillance

- This program was established to monitor and identify the spread of infectious disease in the FVM. Environmental and patient samples are cultured to detect specific microorganisms, general environmental contamination, and disease syndromes potentially associated with nosocomial infections and complications.
- In general, the clinicians should alert, as soon as possible, the CFB of:
  - Occurrence of known or suspected nosocomial events
  - Any suspected trends in nosocomial events, even if clinical consequences are not severe
  - All known or suspected zoonotic infections that are thought to have arisen through exposure in the FVM

  Clinicians are encouraged to use appropriate diagnostic testing to determine the aetiology of nosocomial events, even if the results may not affect the clinical outcome of the patient. Apparent trends cannot be investigated without appropriate surveillance data.
- Traceability of infected animals and contacts is of major importance for bio-surveillance. In the FVM Clinics, the SAP computer program compiles a complete databank of all incoming cases, contact information of owner(s) and referring veterinarian(s), as well as medications used to treat the patient.
- Clinicians, technical staff and students are expected to handle information about cases and possible infectious/contagious diseases with confidentiality. For the future, a clinical program optimizing traceability for all other services to a unique computer database is encouraged.

1.7.1. Required diagnostic testing in suspected infections

- The diagnostic confirmation of infection is critical to an appropriate clinical management of infectious patients, especially when a zoonotic pathogen is involved. Lab testing benefits both patient and clients by allowing an appropriate at home-management (protection of human health in case of zoonotic pathogens). It also benefits the FVM for the correct risk management towards all stakeholders (e.g. FVM patients, staff and students).
- It is therefore highly suggested to test any patient if a contagious or zoonotic pathogen is included in the differential diagnosis. If the owner is reluctant to pay for testing, the animal will be automatically categorised as a class 4 patient; the ensuing financial repercussion will be billed to the client.
- The senior clinician in charge of a patient is responsible for ensuring that appropriate information regarding infectious and/or zoonotic pathogens is provided to the client.
- The senior clinician in charge of a patient is responsible for ensuring that appropriate samples are submitted for testing, and that appropriate biosecurity precautions are implemented for the patient management.
- If the clinician in charge of a patient suspects one of the conditions listed below, she/he should notify the CFB as early as possible. This notification can be done using the following email address: **biosecurity-fmv@lists.uliege.be**.

1.7.2. Disease for which testing is mandatory

- Testing of appropriate samples is mandatory if the following disease or condition is part of the differential diagnosis. A full description of testing, management, diagnosis, and potential TTM information is available on the World Organisation for Animal Health (WOAH) website:
  - Data on animal diseases – Technical disease cards: **https://www.woah.org/en/what-we-do/animal-health-and-welfare/animal-diseases/**
  - Terrestrial Animal Health Code: **https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/**
  - Manual of Diagnostic Tests and Vaccines for Terrestrial Animals: **https://www.woah.org/fileadmin/Home/eng/Health_standards/tahm/A_summry.htm**
- In the FVM, a special attention should be devoted to:
  - **All species**:
    - Salmonellosis
    - Leptospirosis
    - Rabies
  - **Small animals** (including unconventional, zoological and exotic animals)
    - Acute diarrhoea in dogs and cats (e.g. *Salmonella* spp., *Campylobacter* spp., parvovirus, *Cryptosporidium* spp. and *Giardia* spp.)
    - Canine distemper
    - Avian chlamydiosis *(Chlamydia psittaci)*
    - Leptospirosis
    - Avian influenza
    - Brucellosis caused by *B. canis*
    - Infection with hypervirulent feline calicivirus
  - **Equids**:
    - Equine herpesvirus type 1 myeloencephalitis
    - Equine infectious anaemia
    - Strangles (*Streptococcus equi* subsp *equi)*
  - **Ruminants**: cryptosporidiosis

1.7.3. Environmental Surveillance of *Salmonella* spp. in the equine clinic

1.7.3.1. Stall cultures

- A stall that housed a patient that cultured positive for *Salmonella* spp. must be sampled after routine cleaning and disinfection. The stall will only be released for housing another patient if environmental cultures are *Salmonella*-negative.
- Technicians in charge of decontaminating the stall or the veterinarian primarily responsible for the patient should notify the CFB when the stall is vacated to arrange for sampling.
- FVM staff reports culture results to the CFB as soon as results become available, through the following list: **biosecurity-fmv@lists.uliege.be**.
- These data are routinely summarized and reported by the CFB.

1.7.3.2. Routine Environmental surveillance

- Sampling for environmental surveillance should be scheduled every 6 months for most areas, and more frequently for areas more susceptible to be contaminated by *Salmonella* spp. (class 4-isolation unit: every 3 months)
  - FVM staff reports any positive culture to the CFB as soon as results become available.
  - These data are routinely summarized and reported by the CFB.

1.7.4. Management of Patients Infected or Colonized with Resistant Bacteria

- Patients infected with/carriers of MDR bacteria are a potential hazard to FVM staff, students, clients, and other patients. As such, they are managed with increased biosecurity precautions (class 3) to prevent the dissemination of these bacteria inside but also outside the faculty.

1.7.5. Antimicrobial Resistance and Antimicrobial Drug Use

- Antimicrobial resistance is one of the most important issues of the 21st century. A relevant infection control program must consider the major impact of antimicrobial resistance on the ability to provide quality medical care. The CFB oversees the monitoring of antimicrobial use in the FVM and promoting practices that help preserving the usefulness of antimicrobial drugs. Clinics routinely summarizes patterns of antimicrobial resistance among commonly isolated bacteria and makes the report available for the CFB. See Chapter 15 for additional information.
- NOTE: Such report summarizes results from samples sent to the lab for diagnosis, which is not representative of the real prevalence of such bacteria in animal populations. Isolates compiled in this report are likely more resistant than those prevalent in average animal populations.

1.7.6. Reportable animal diseases and zoonoses in Belgium

- It is FVM policy to investigate and rule out the possibility of any disease reportable to the Federal Agency for the Safety of the Food Chain (FASFC). Contact the CFB Chairman or its secretariat in case of absence ASAP when a reportable animal disease is diagnosed or suspected. The primary clinician should directly contact:

  FASFC – Liège LCU (Local Control Unit – sector of primary production)
  Alexandra SCIPIONI, Head of sector - primary production
  Tel.: 04/224.59.11; Fax: 04/224.59.01
  GSM: + 32 478 87 62 13 (only outside working hours, in case of extreme emergency)
  Email for mandatory report: **Notif.LIE@afsca.be**

For the species of concern in the FVM, diseases reportable in Belgium include the following (Royal Degree of 03 Feb 2014, referring to animal diseases submitted to the application of chapter III, Act of 24 March 1987 relating to animal health and including the regulations of mandatory reporting) (**https://favv-afsca.be/fr/themes/animaux/sante-animale/situation-zoosanitaire-en-belgique** [in French]):

- Multiple species diseases
  - Anthrax
  - Aujeszky's disease
  - Rabies
  - SARS-CoV-2 infection
- Equine diseases
  - Other potentially zoonotic equine viral encephalitis (St Louis encephalitis, Borna disease, etc.)
  - African horse sickness
  - Dourine
  - Equine infectious anaemia
  - Epizootic lymphangitis
  - Equine encephalomyelitis (Eastern [EEE], Venezuelan [VEE] and Western [WEE])
  - Glanders
  - Hendra virus infection
  - Japanese encephalitis
  - Surra (*Trypanosoma evansi*)
  - Vesicular stomatitis
  - West Nile fever
- Diseases of ruminants and camelids
  - Bluetongue (ovine catarrhal fever)
  - Epizootic haemorrhagic disease
  - Foot and mouth disease
  - *Peste des petits ruminants*
  - Q fever
  - Rift Valley fever
  - Rinderpest
- Cattle diseases
  - Botulism
  - Bovine brucellosis (*Brucella abortus*)
  - Bovine spongiform encephalopathy (BSE)
  - Bovine tuberculosis
  - Bovine viral diarrhoea (BVD)
  - Contagious bovine pleuropneumonia
  - Enzootic bovine leukosis
  - Epizootic haemorrhagic disease
  - Infectious bovine rhinotracheitis (IBR)/Infectious pustular vulvovaginitis
  - Lumpy skin disease
  - Vesicular stomatitis
- Camelids
  - Brucellosis (*Brucella abortus*, *B. melitensis & B. suis*)
  - Epizootic haemorrhagic disease
  - Infectious bovine rhinotracheitis (IBR)/Infectious pustular vulvovaginitis
  - Surra (*Trypanosoma evansi*)
  - Tuberculosis (*Mycobacterium tuberculosis* complex)
- Sheep and goat diseases
  - Brucellosis (*Brucella abortus*, *B. melitensis*)
  - Contagious caprine pleuropneumonia
  - Epizootic haemorrhagic disease
  - Ovine epididymitis (*Brucella ovis*)
  - Scrapie
  - Sheep pox and goat pox

  - Surra (*Trypanosoma evansi*)
  - Tuberculosis (*Mycobacterium tuberculosis* complex)
- Swine diseases
  - African swine fever
  - Classical swine fever
  - Enzootic encephalomyelitis (Teschen Disease)
  - Foot-and-mouth disease
  - Japanese encephalitis
  - Nipah virus encephalitis
  - Swine brucellosis (*B. abortus, B. melitensis* & *B. suis*)
  - Swine vesicular disease
  - Trichinosis (*Trichinella* spp.)
  - Vesicular stomatitis
- Diseases of lagomorphs (rabbits, hares and rodents): tularaemia
- Mink diseases: mink viral enteritis
- Poultry and avian diseases
  - Avian cholera
  - Avian mycoplasmosis (*Mycoplasma gallisepticum* and *M. meleagridis*)
  - Highly pathogenic avian influenza (HPAI)
  - Low pathogenic avian influenza (LPAI)
  - Newcastle disease (domestic poultry and pigeons)
  - Paramyxovirus (pigeons)
  - Salmonellosis (*Salmonella* Pullorum/Gallinarum – *Salmonella* Arizonae)
- Diseases of cervids
  - Brucellosis (*B. abortus, B. melitensis* & *B. suis*)
  - Chronic wasting disease
  - Epizootic haemorrhagic disease
  - Infectious bovine rhinotracheitis (IBR)/Infectious pustular vulvovaginitis
  - Surra (*Trypanosoma evansi*)
  - Tuberculosis (*Mycobacterium tuberculosis* complex)

The following zoonotic diseases must be reported by the Head of Laboratory, in the context of a lab analysis:

- *Viral zoonoses:*
  - Arthropod-borne viruses
  - Ebola virus
  - Hendra virus
  - Hepatitis A virus
  - Influenza virus
  - Mpox virus
  - Nipah virus
  - Norovirus
  - SARS-CoV-2 infection
  - Viral zoonotic encephalitis
- *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

1.7.6.1. Required samples and diagnostic tests

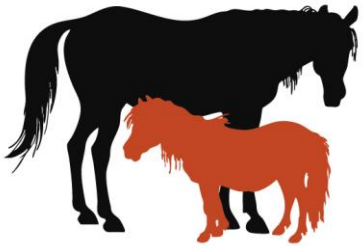
- For appropriate sampling and diagnostic techniques concerning reportable diseases consult:
  - Data on animal diseases – WOAH Technical disease cards: **https://www.woah.org/en/what-we-do/animal-health-and-welfare/animal-diseases/**
  - Manual of Diagnostic Tests and Vaccines for Terrestrial Animals: **https://www.woah.org/fileadmin/Home/eng/Health_standards/tahm/A_summry.htm**

1.7.6.2. Recommendations for disease control and animal trade

- For recommendations on disease control and trade, see WOAH Terrestrial Animal Health Code: **https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/**

1.7.6.3. Research and Teaching Animals

- Staff and students using animals for research and teaching in the FVM must adhere to all applicable biosecurity procedures. Approval should be obtained from the FVM Dean and the ULiège Ethics Committee prior to initiating such activities.
- Teaching and research animals may NOT be housed in FVM areas housing patients except for extraordinary circumstances or medical reasons.



Chapter 2.

EQUINE BIOSECURITY SOP

2. Equine Biosecurity SOP

2.1. General attire for the Equine Hospital

The FVM promotes the use of hospital-dedicated attire to decrease the risk of carrying pathogens home where people or animals may be exposed.

- All individuals are required to wear clean professional attire, clean protective outer garments, and always clean and appropriate footwear when working in outpatient areas of the Equine Hospital.
- This attire should be appropriate to the job at hand (e.g. coveralls or blouses and heavy boots or shoes are probably the most appropriate footwear and protective outer garments when working with large animal patients; performing tasks is accompanied by a high risk of being soiled with infectious materials).
  - ***Students***: coveralls with boots or safety shoes with name card. If they do not wear correct attire they will be expelled from the clinic.
  - ***Interns***: green blouse with name card. Light blue scrubs when working in the surgical theatre.
  - ***Clinicians***: blue shirt or blue jacket with name on it. Light blue scrubs when working in the surgical theatre.
  - ***Technical staff***: blouse with name card: light blue when working in the surgical theatre and green, when working in the clinic.
  - ***Stablemen***: coveralls or working blouse and trouser used only inside the clinic.
- Footwear: the permanent wearing of sturdy boots or safety shoes is recommended while working in the Equine Hospital. This type of footwear is easier to clean and disinfect compared to footwear constructed of porous materials (e.g. running shoes) and helps to protect against injury while working around horses.
- People must disinfect footwear while working, which provides a good check regarding suitability (are you willing to fully immerse them in a footbath!?) Water-resistant footwear is strongly recommended to limit damage to footwear due to footbath solutions-exposure.

2.2. Food and Beverages

- Food and beverages may only be stored and consumed in the Equine Hospital kitchen or in the technicians' and clinicians' offices.
- Students can eat in their bedroom, seminar room or in the faculty cafeteria/restaurant.
- In Equine Hospital kitchen, a refrigerator and a microwave are available to store and heat food or drinks intended for human use only. This refrigerator should not be used to store medication, samples or other medical equipment. The microwave is not intended for medical use. No other form of storage of medication, samples or other medical equipment is allowed in the Equine Hospital kitchen.

2.3. General Cleanliness and Hygiene

- Maintaining hospital cleanliness and appropriate personal hygiene are responsibilities of ALL people working in the Equine Hospital.
- It is mandatory to wash hands with soap then disinfect them with an alcohol-based hand sanitizer (Sterillium®) prior to, and after examining each patient (see page 12 for hand washing protocol).
- Hand washing is mandatory before and after the following acts: treating wounds and changing bandages, ophthalmic care, placing a catheter, performing endoscopy, any contact with class 3 and class 4 patients. It is also mandatory when hands are visibly soiled.
- Clean examination gloves should be worn when handling high-risk patients (i.e. class 3 and class 4 patients, MRSA carriers, infected wounds or neonatal foals) and for any contact with excretions, secretions, or wounds.

- Surfaces, trolleys or equipment contaminated by faeces, secretions, or blood must be cleaned and disinfected immediately by people in charge of the patient. This is especially important regarding patients known or suspected of shedding important pathogens.
- All members of staff and students are expected to tidy up material once used and to leave the place in its original condition.

2.3.1. Summary of Soaps, Detergents and Disinfectants Approved for Use in the equine hospital

- **Hand soaps and disinfectants:**
  - **Dermasoft®** (Global net): pink classic soap
  - **Baktolin®** wash basic pure (BODE): neutral hand soap
  - **Sterillium®** (BODE): alcohol-based hand sanitizer
- **Detergents and disinfectants for walls, floor, furniture, etc.**
  - **Umonium 38® Master** (Huckert's International): disinfectant for floor and furniture; EN1040-EN1275-EN1276-EN1650-AFNOR-NFT72190
  - **JAVEL 15** (Global Net): bleach, disinfectant for floor and furniture
  - **Vygor** (Global Net): **detergent**
  - **KOALA Tornado Nettoie-tout** (Koala): multipurpose detergent
  - **Cif, Mr Propre** (Global Net): classic multipurpose detergent
  - **Linseed oil soap** (LG): floor cleaner
  - **Keno™san** (Cid Lines): detergent for surfaces (floor and wall cleaner)
  - **Virocid®** (Cid Lines): disinfectant for all surfaces (floor and walls)
  - **Virkon™ S** (Lanxess Deutschland GMBH): disinfectant for all surfaces (floor and walls)
- **Detergents and disinfectants for (surgical) materials and equipment**
  - **Umonium 38® Instruments** (Huckert's International): disinfection by bathing instruments and endoscopes for 15 min; EN1040-EN1275-EN1276-EN1650 et DE93:42CE ISO9002 EN46002; isopropyl alcohol + benzalkonium chloride (quaternary ammonium) + tridecyl ceteh alcohol
  - **RBS 50®** (Chemical Products): disinfectant for cycle washing machine AFNOR 72-151
  - **Steranios®** (Anios): for cold sterilization by bathing, glutaraldehyde 2%; NF EN 1040-1275 and AFNOR NFT72-171/72-190/72-180/72-230
  - **Formaldehyde tablets:** for cold sterilization of sensitive material; trioxymethylene paraformaldehyde 91%
  - **ECUTAN 5%®** (Ecuphar): disinfection for instruments and tubes, chlorhexidine 50g/l diluted at 10%
  - **Virkon™ S** (Lanxess Deutschland GMBH): disinfectant for all surfaces
- **Disinfectants for footbaths/foot mats**
  - **Virkon™ S** (Lanxess Deutschland GMBH)
  - **Umonium 38® Master** (Huckert's International)

Table VI. Effectiveness of disinfectants on different viruses and bacteria (from *The Equine Hospital Manual*, 2008)

Disease	Agent and incubation period	Mode of transmission	Clinical signs in horses	Clinical signs in humans	Diagnostic testing	Disinfection	Biosecurity and precautions for personnel
Anthrax*	*Bacillus anthracis* 1-7 days	Direct contact (cutaneous), aerosol (pulmonary), possibly vector, e.g. horseflies (cutaneous), ingestion of undercooked contaminated meat by humans (GI)	Horses very susceptible, can present as acute enteritis with signs of colic, usually very rapid progression, septicaemia, fever, haemorrhagic enteritis, depression, death	Cutaneous (most common), pruritic macule leading to black eschar. Pulmonary, febrile respiratory disease rapidly fatal. Intestinal, febrile GI disease	High level of bacteraemia on smears of blood or aspirated oedema fluid. Culture and ID possible but fluorescent antibody testing of smears of froth, blood or splenic aspirate safer for personnel	Anthrax spores resistant to heat, drying and many disinfectants. Spores killed by 2% glutaraldehyde or 5% formalin	Complete protection (gloves, boots, protective overalls respiratory and eye protection) required when handling suspects. Avoid necropsy of infected or suspect cases beyond blood collection. Unopened carcass decomposes rapidly, and spores are destroyed. Burn or deep bury carcass
Clostridial enteritis†	*Clostridium difficile* Neonatal foals, adults primarily during or immediately after antimicrobial therapy and *Clostridium perfringens* neonatal foals. *C. difficile* most important in terms of nosocomial infection. 8-24 hours	Faecal-oral spread by direct contact, environmental contamination, on fomites, via humans on hands, etc. Public health risk of equine clostridial infections uncertain	Acute colitis, abdominal pain, diarrhoea of varying severity, may be accompanied by dehydration, fever, toxaemia and leukopenia	Sudden onset abdominal discomfort, diarrhoea, nausea; vomiting and fever usually absent. Generally self-limiting, short duration but may be more severe disease, necrotising enteritis, sepsis. *C. difficile* common cause of antimicrobial-associated and nosocomial diarrhoea. *C. perfringens* more frequently foodborne	Culture and toxin detection in faecal samples, blood culture	Vegetative form killed by exposure to air; spores resistant to many disinfectants but can be reduced by thorough cleaning with a detergent followed by disinfection with diluted (1: 10) bleach solution	Isolation of confirmed cases with protective clothing (boots, barrier gown, gloves). Strict hand hygiene. Minimize stress especially dietary. Judicious use of antimicrobials. Consider routine examination for *C. difficile* and toxins A and B in foals and with antimicrobial-associated diarrhoea
Dermatoses - Dermatophytosis (ringworm)	*Trichophyton equinum* most common; also *T. mentagrophytes* *Microsporum equinum* (*M. canis* and *M. gypseum*) 4-14 days	Direct contact or indirect contact with fomites-saddle blankets, grooming equipment, etc.	Round hairless, scaly skin lesions	Circular or annular lesions with scaling, occasionally erythema, itching	Direct examination of hair, culture, histology of biopsy. Wood's lamp unreliable for equine dermatophytosis	Diluted (1: 10) bleach (sodium hypochlorite) solution	Gloves, strict hygiene, disposal or disinfection of grooming and other equipment

- Dermatophilosis (rain rot)	*Dermatophilus congolensis* Less than 7 days	Direct contact. Trauma and biting insects aid in spread	Exudative crusted skin lesions, hair in "paintbrush" clumps	Rare zoonosis. Afebrile, acute to chronic pustular to exudative dermatitis	Cytology – Gram strain of crust, histology, culture		For dermatophilosis also minimize exposure to excessive moisture, employ insect control/repellents
Ectoparasites - Acariasis (mange), zoonotic scabies	*Sarcoptes*, *Psoroptes*, *Chorioptes*, *Demodex* (rare in horses) and other mites. 1-2 weeks after infestation	Highly contagious by direct contact with infected animal. Also transmitted on fomites	Intense pruritis, alopecia, crusting may be lichenification of skin. Location depends on mite involved	Resolves spontaneously not transmitted between humans	Physical examination	Most effectively controlled by treating infested animal with acaricides	Gloves, boots and protective clothing. Do not share equipment. Discard or disinfect equipment used on infected animal
- Pediculosis	Biting or chewing lice *Werneckiella* (*Damalinia*) *equi* or sucking lice *Haematopinus asini*. Obligate parasite, all stages on horse, egg to egg development time 4-5 weeks	Direct contact but can possibly spread on blankets and other equipment	Itching and skin irritation leading to scratching, rubbing, and biting. Most common location affected are head, mane and ventral neck area	Non zoonotic	Physical examination	As above, treat with insecticides such as pyrethrins	Separate grooming equipment, blankets etc. Lice can live 2-3 weeks off host, but a few days more typical. Eggs may continue to hatch over 2-3 weeks in warm weather. Rigorously clean and disinfect areas that housed infested animals
Equine herpesvirus (EHV) infection (equine rhinopneumonitis) *†	Eight different types, EHV-1 and EHV-4 of major concern in horses. Incubation 2-10 days. Abortion occurs 2-12 weeks after infection, usually between 7 and 11 months of gestation	Direct contact, aerosol (up to 35 feet), fomites	EHV-1 inapparent to mild respiratory disease with fever, to abortion in mares, to rapidly progressing, often fatal, neurological disease (ascending paralysis). EHV-4 rhinopneumonitis primarily horses <3 years of age	Non zoonotic	PCR or virus isolation from nasopharyngeal secretions or white blood cells	Easily killed by many disinfectants including 1% bleach, 70% ethanol, iodine-based disinfectants, quaternary ammonium disinfectants, peroxygen disinfectant, phenolics, etc.	Isolation for EHV-1 infection for 28 days, monitor temperature of surrounding animals, submit samples for testing if fever (≥38.6°C) develops. Proper disposal of aborted foetuses and related material. EHV-4 barrier precautions, no sharing of equipment

Equine infectious anaemia (EIA, swamp fever) *†	Lentivirus, related to another important lentivirus including HIV but not zoonotic. 1-3 weeks but may be as long as 3 months	Primarily via transfer of contaminated blood by biting insects (most often tabanids) or fomites contaminated with blood	Intermittent fever, depression, inappetence, weight loss, oedema, thrombocytopaenia, transitory or progressive anaemia. No therapy	Non zoonotic	AGID (Coggins test); for animals testing positive a second confirmatory test recommended. Other ELISA tests available	Diluted (1: 10) bleach solution, 70% ethanol, 2% glutaraldehyde peroxygen disinfectants, phenolics	Proper handling and disposal of biohazard material. Strict insect-proof isolation until testing confirmed. Due to lifelong infection risk, consider euthanasia for positive animals
Equine influenza *†	Orthomyxovirus A Usually 1-3 days, range 18 hours to 5, or rarely 7, days. Most frequently diagnosed and economically important viral respiratory disease of the horse	Respiratory route; aerosol, direct contact with infected secretions. Survives and may spread on fomites for several hours. Highly contagious, despite careful hygiene horses sharing same air space likely to become infected	Acute, febrile, respiratory disease. High fevers, coughing, nasal discharge common; as are depression, anorexia, weakness. Occasionally pneumonia or other complications	Although influenza A viruses can infect humans, equine-lineage viruses have very limited zoonotic risk. Recently, however, transmission of equine-lineage H3N8 virus has caused influenza in dogs in the United States	Virus isolation or PCR from nasopharyngeal swab collected as soon as possible after onset of illness, or paired serology. Directigen Flu-A test can be used "stall side"	Easily killed by many disinfectants – see EHV above	Isolation. Avoid sharing equipment. Strict hand hygiene. Maintain isolation until no symptoms and body temperature normal for ≥21 days. Consider vaccination of contact animals to control an outbreak
Equine viral arteritis (EVA)*†	Arterivirus, equine arteritis virus. Average 7 days, range 2 to 13 days	Respiratory from acutely infected horse, direct contact or via relatively close contact, e.g. adjacent stall, limited spread on fomites. Venereal from acute or chronically infected stallion	May be subclinical or only transient oedema, or acute fever, depression, dependent oedema especially limbs, scrotum and prepuce in stallions, conjunctivitis, nasal discharge, abortion	Non zoonotic	Virus isolation or PCR from nasal secretions, conjunctival swabs or buffy coat. Paired serology. Virus isolation from semen of infected stallions	Easily killed by many disinfectants – see EHV above	Isolation of cases. Quarantine close contacts for at least 21 days after last clinical case, 30 days used in some previous outbreaks
Multidrug-resistant bacterial infections or infections caused by organisms with antimicrobial resistance of concern†	Various including *Salmonella*, MRSA, *E. coli*, *Klebsiella*, *Enterobacter*, *Enterococcus* (VRE and non-VRE), *Pseudomonas*, *Acinetobacter*, organism resistant to extended spectrum beta lactams, etc	Multiple including faecal-oral, by direct contact with infected animals, via humans, or on fomites, in some cases aerosol. For some organisms, e.g. MRSA, *Salmonella* animals and/or humans can be inapparent carriers	Depending on organism, many different clinical presentations, e.g., GI respiratory, catheter-related, or surgical site infections, septicaemia (especially in foals), etc. Nosocomial cases may occur as low-level endemic infections or in epidemic outbreaks of varying severity	Many have zoonotic potential. Clinical signs depend on organism involved	Culture and sensitivity. Regular monitoring required to assess incidence and detect changes that may require investigation or intervention. Additional molecular ID may be necessary if a nosocomial problem is suspected	Often susceptible to many disinfectants. Prior cleaning with detergent is mandatory to avoid biofilm formation. Regular cleaning and disinfection controls environmental load. If nosocomial problem identified additional cleaning and disinfection of specific areas may be required. Conduct of disinfectant kill-curves may aid in control	Judicious use of antimicrobials. Barrier precautions or possibly isolation for confirmed cases (organism dependent). Strict hand hygiene. Maintenance of good, regular hygienic practices for equipment and environment

Rabies (not a nosocomial problem but an important zoonotic disease) *	Rhabdovirus of genus *Lyssavirus*. Few days to several years, most cases apparent after 1-3 months	Contact (saliva, CSF, neural tissue). Mucous membranes or compromised skin, bites, cuts, etc	Wide range of possible clinical signs. Progression of encephalic signs may be aggression (furious form, more common), or depression (paralytic, dumb form). Average survival from onset of clinical signs 5 days, maximum 10 days.	Early signs of malaise, fever, headache, pruritus at site of virus entry. Progressive anxiety, confusion, abnormal behaviour. Encephalitic or paralytic form can occur. Death usually in 2-10 days	No definitive *ante mortem* test. Brain from suspect animal must be submitted to an approved laboratory for rabies testing	Lipid solvents (soap solutions, acetone), 2% bleach, 2% glutaraldehyde, 45%-75% ethanol, iodine-based or quaternary ammonium disinfectants. Inactivated by sunlight, limited environmental survival	Clearly label as rabies suspect. Strictly limit number of personnel involved in managing suspect animal. Record all in-contact personnel. Clearly label any laboratory specimens as rabies suspect. Full barrier precautions including gloves, boots, protective clothing, face shield. Promptly submit necropsy samples using approved methods
Rhodococcus equi infection	*Rhodococcus equi*, incubation period uncertain, often insidious onset	Environmental exposure (soil), aerosol, contact, rarely via wound contamination	Most often respiratory but other body systems can be involved. Most commonly fever, coughing, increased respiratory rate and effort, mucopurulent nasal discharge, pyogranulomatous pneumonia. Primarily foals 1-6 months old	Rare human infection, only in the severely immunocompromised, appears to be via environmental exposure. Slowly progressive granulomatous pneumonia	Culture and PCR of tracheobronchial aspirate or other samples. Radiographs and abdominal ultrasound useful	70% ethanol, 2% glutaraldehyde, phenolics, and formaldehyde	Shed in faeces, prompt removal of manure and good hygiene limits accumulation. Frequent hand washing. Uncertain infection risk but consider barrier precautions on affected foals (at least up to 72 hours after starting antimicrobial therapy) if susceptible foals housed in same area

Rotavirus infection†	Rotavirus group A 12-24 hours	Faecal-oral, highly contagious, spreads readily on fomites or other contaminated material	Variable severity of diarrhoea in foals from mild to life threatening	Non zoonotic	Shed in faeces of foals for several weeks after diarrhoea ceases. Where introduction a concern, test faecal swab using faecal antigen test, e.g., Virogen Rotatest, Rotazyme	Phenolics are virucidal even in presence of organic material	Isolate. Full barrier precautions. Proper sanitation and disinfection of contaminated material and equipment. In general, without other explanation, e.g., typical foal heat, diarrhoeic foals should be considered infectious and possibly contagious until proven otherwise. Good hygiene critical
Salmonellosis†	Various *Salmonella enterica* 12-72 hours in humans, possibly similar in debilitated horses, incubation in the healthy exposed animal variable and uncertain	Contact with faeces from an infected animal, most commonly ingestion, possibly via inhalation. Readily spread on fomites, in feed, water or via vermin, birds, insects. Good environmental survival, can be very difficult to control	Inapparent, to fever, leukopenia, severe diarrhoea, to septicaemia in foals. Anorexia and depression common	Most common equine zoonosis. Inapparent, to self-limiting but often severe gastroenteritis (diarrhoea generally much more prominent than vomiting), can be invasive leading to septicaemia	Faecal culture (sensitivity for MDR), gastrointestinal reflux may also be cultured. Consider additional molecular ID if a nosocomial problem is suspected	2% bleach, 70% ethanol, 2% glutaraldehyde, iodine-based disinfectants, phenolics, peroxygen disinfectants and formaldehyde	Isolate confirmed cases. Strict hygiene. Prompt cleaning of all areas contaminated with faeces. Gloves, frequent hand washing, protective clothing, boots or footwear that can be easily cleaned, face mask/shield with pipe-stream diarrhoea
Staphylococcosis†	*Staphylococcus* spp. Methicillin (oxacillin) resistant *S. aureus* of special concern	Direct contact most important, particularly hand-to-nose transfer. Purulent discharge from infected sites very infectious. Aerosol less important but can occur with coughing or snorting	Inapparent nasal carriage (including of MRSA), to thrombophlebitis, other suppurative draining lesions	Subclinical, can be nasal carriers of MRSA and spread to other animals or people. Clinical may be suppurative lesions, usually skin (impetigo, boils). Gastroenteritis associated with toxin ingestion sudden onset nausea, cramps, vomiting	Standard culture with speciation to identify *S. aureus* because MRSA strains in horses can by very weakly coagulase positive and may be misidentified. Sensitivity, Oxacillin resistant = MRSA	2% bleach 70% ethanol, 2% glutaraldehyde, iodine-based disinfectants, quaternary ammonium disinfectants phenolics, peroxygen disinfectants	Gown, gloves, boots strict hand hygiene. Surgeon-type facemask may help limit hand-to-nose transfer in personnel. Consider isolation with full barrier precautions for MRSA positive animals

Strangles†	*Streptococcus equi equi* 3 to 15 days	Direct contact, also spread on fomites contaminated with infected secretions	Abrupt onset fever, mucopurulent nasal discharge, acute swelling and subsequent abscess formation in submandibular, retropharyngeal lymph nodes. May be metastatic spread, purpura haemorrhagica or other complications	Non zoonotic	PCR and aerobic culture of nasal/pharyngeal wash or swab, pus from abscesses ± guttural pouch/upper airway endoscopy especially in suspected carriers	Quaternary ammonium disinfectants, 1% bleach, 70% ethanol, iodine-based disinfectants, phenolics	Isolation. Fever occurs 2-3 days before nasal shedding: promptly isolate febrile horses in an outbreak. Good hygiene and sanitation, careful cleaning or disposal of contaminated equipment or other material. 3 PCR negative guttural pouch wash before free from carriage
Vesicular stomatitis *†	Rhabdovirus of genus *Vesiculovirus* 3-7 days	Direct contact or aerosol, insect vectors (sand flies, black flies). In endemic areas, oral examination prior to admission may prevent introduction during outbreaks	Excess salivation, fever, vesicles on mucous membranes of mouth, epithelium of tongue, coronary band	Infection rates in exposed humans are low. Manifest as fever, headache, myalgia, rarely oral blisters. Recovery usually in 4-7 days	Standard test for VSV antibodies is virus neutralisation, complement fixation or ELISA can also be used	2% solution carbonate, 4% sodium hydroxide, 2% iodophor disinfectants, chlorine dioxide	Vector control, gloves, protective clothing including facemask, strict hand hygiene

* World Organisation for Animal Health (WOAH) listed diseases. Some of these diseases are reportable in Belgium in animals and/or humans; CSF = cerebrospinal fluid

† Agents that have been linked to nosocomial outbreaks of disease.

2.3.2. Patient Hygiene

- It is of major importance for basic hygiene and for reducing the infection pressure that patients of the Equine Hospital are housed in a **clean stall**. Stablemen remove faeces and dirty bedding from the stalls and clean the hallways every day. If a stall is dirty outside stablemen working hours, students, interns and/or clinicians should remove faeces and wet bedding and add fresh bedding if necessary. When a horse leaves the stall, the person responsible for the patient discharge places a red flag on the stall door signalling to stablemen that it must be cleaned and disinfected thoroughly before a new horse can be housed in it. Once this has been done, the flag is repositioned on the green side. In the case of neonates, patient hygiene is of extreme importance and thus faeces or wet bedding should be removed directly from the stall by students, interns or stablemen as soon as they are produced.
- **Water buckets or automatic drinkers** need to be cleaned and disinfected between patients. When a horse is hospitalised in a stall, the automatic drinker should be checked, and the owner should be asked if the horse knows how to use it. If the horse drinks from a bucket, the presence of water should be checked regularly, and fresh water should be added as needed.
- **Feeding bowls** need to stay clean throughout the horse hospitalisation and should be cleaned and disinfected between patients. If a horse has not eaten, this should be reported to the clinician and feed should be removed from the feeding bowl.
- **Horses** should be kept as clean as possible, regularly groomed and have their hoofs picked; excretions or secretions on the horse should be removed.
- **The environment around the stall** should be clean, tidy and neat. Medications and materials should not be left lying around, bedding outside the stall should be picked up, and students should not leave camping equipment in front of the stall. All staff members and students are expected to clean up the material used and to leave the location in its original condition.
- If horses **defecate outside their stall** (whether inside or outside a building), faeces need to be removed immediately after defecation. Shovels are available at different locations throughout the barn. If this concerns diarrhoea, faeces need to be removed and the floor cleaned, disinfected and dried. If patients **urinate** inside (but not outside a building), urine needs to be removed, and the floor cleaned and dried.

2.3.3. Appropriate cleaning

- Maintaining hospital cleanliness and appropriate personal hygiene is the responsibility of **ALL** people (staff and students) working in the Equine Hospital.

2.3.4. General cleaning and Disinfection Protocol

- Gloves and appropriate attire should be worn whenever using disinfectants. Additional PPE (mask, face shields, goggles, impermeable garment and boots) should be worn only when there is a probability of splash when performing the disinfection process.
- Remove all bedding and faeces prior to disinfection. The presence of gross contamination and urine will inactivate most disinfectants. If a hose is used to de-bulk material, care must be taken to minimize the potential spread of pathogens through aerosolization.
- Wash the stall, including walls, doors, automatic water drinker and feeding bowl, with water and detergent or soap (Keno™san, Vygor®, Koala Tornado® multipurpose cleaner-Cif® without bleach-Mr Proper®); the foamer can be used on a regular basis but scrubbing or mechanical disruption may always be needed to break down films and residual debris that prevent or inhibit the disinfection process.
- Thoroughly rinse the cleaned area to remove any residue of detergent and let it thoroughly dry. Note: bleach may be inactivated by detergents or soap; therefore, it is very important to rinse sufficiently after washing the area.
- Allow area to drain or dry as much as possible to prevent dilution of disinfectant solutions.

- Wet the affected stall, including walls, doors, automatic water drinker and feeding bowl, thoroughly with Virocid®, sodium hypochlorite (2%-bleach), Umonium 38® Master or Virkon™ S. This disinfectant should remain in contact with surfaces for 30 minutes, particularly if an infectious agent is suspected.
- Remove excess disinfectant with water.
- Bleach and Virkon™ S should be rinsed off all surfaces prior to housing a patient in a stall.
- After disinfection, remove the protective attire and wash your hands.
- For non-routine disinfection measures (e.g. airborne decontamination with hydrogen peroxide), only personnel trained and approved to wear and use the required PPE will be authorized in the areas being disinfected.
- All multiple use areas (examination rooms, etc.) where animals are examined or treated, should be tidy, cleaned and disinfected after use by people responsible for the patient - irrespective of its infectious status. Cleaning tools must be cleaned and disinfected after use (including handles).

2.3.5. Foot mats

- Disinfecting solutions with Umonium 38® Master or Virkon™ S are changed every morning by stablemen.
- Foot mats should be cleaned whenever they contain excessive amounts of bedding or dirt and refilled when dry; this is the responsibility of **ALL** people working in the area (students, technical staff, interns and clinicians).
- Personnel and students are required to use foot mats appropriately whenever they are encountered. Disinfectant solutions might damage footwear if not water-resistant.

2.3.6. Disinfection Protocol for Instruments and Equipment

- All instruments, equipment or other objects, including stomach tubes, floats, mouth speculums, fasten baskets, twitch, endoscopes, grooming tools, clipper blades, etc. must be cleaned and sterilized or disinfected between uses on different patients.
- Materials that are sterilized between uses ([surgical]instruments and equipment) must be cleaned with soap and water then disinfected with a 0.5% chlorhexidine solution or Umonium 38® Master immediately after use on patients. The equipment should then be returned to Central Supply for sterilization.

2.3.6.1. Stethoscopes

- Cleaning: wiping with wet paper.
- Disinfection: wipes of alcohol, chlorhexidine or hand sanitizer solution available all over the hospital.

When?

- Personal stethoscopes may be used on animals in the ***non-contagious areas (classes 1-2) and in class 3*** but must be cleaned and disinfected after use (recommendation: classes 1-2: at the beginning and at the end of the day; class 3: after each patient). Immediate cleaning and disinfection are required when stethoscopes are visibly soiled.
- Individual, FVM-owned stethoscopes are assigned for use with each high-risk contagious patient (***class 4***). These are stored at patients' stalls during hospitalization and cleaned then disinfected after discharge.

2.3.6.2. Thermometers

- Cleaning: wiping or washing with soap to remove gross faecal material
- Disinfection: wipes of alcohol, chlorhexidine or hand sanitizer solution available all over the hospital or soaking in alcohol or chlorhexidine

When?

- Glass thermometers are forbidden in the FVM to decrease potential risks associated with broken glass and mercury exposures. Electronic thermometers are used instead.
- Personal electronic thermometers may be used on animals in the ***non-contagious areas (classes 1-2)*** and in ***class 3*** but should be cleaned and disinfected after each patient.
- Probes of thermometers used for continuous temperature monitoring (e.g. anaesthesia or intensive care) should be thoroughly cleaned and disinfected between patients.
- Immediate cleaning and disinfection are required when thermometers are visibly soiled.
- Individual thermometers are assigned for use with each high-risk contagious patient (***class 4***). These are stored at patients' stalls during hospitalization and cleaned then disinfected after discharge.

2.3.6.3. Hoof picks

- One hoof pick assigned to each horse
- Cleaning: washing with soap to remove gross material
- Disinfection: soaking in Umonium 38® Master or chlorhexidine

When?

- Staff and students should use hoof picks to clean the horse's feet before it leaves the stall.
- Hoof picks should be cleaned and disinfected once a week by stablemen.
- After use on a horse with bacterial or mycotic hoof problems, hoof picks should be immediately cleaned and disinfected.
- Individual hoof picks are assigned for use of each patient. These are stored at patients' stalls during hospitalization and cleaned and disinfected after discharge.

2.3.6.4. Brushes

- One brush assigned to each horse
- Cleaning: washing with soap to remove gross material. Brushes used for a horse with a parasitic skin disease (chorioptic/psoroptic/sarcoptic mange, pediculosis, etc.) should be treated with an anti-parasitic (Sarnacuran®) before disinfection; in the case of a patient suffering from a mycotic infection, an anti-mycotic (Imaverol®) should be used before disinfection.
- Disinfection: soaking in alcohol or chlorhexidine

When?

- Horses should be regularly groomed by students and staff.
- Brushes should be cleaned and disinfected (using alcohol or 0.5% chlorhexidine) once a week by stablemen, and between patients.
- Individual brushes are assigned for use with each high-risk contagious patient (***classes 3 and 4***). These are stored at patients' stalls during hospitalization and cleaned then disinfected after patient discharge.
- Before and after use on a horse with a dermatological problem (either contagious or potentially infected), brushes should be immediately cleaned and disinfected.

2.3.6.5. Twitches

- Cleaning: washing with soap to remove gross material
- Disinfection: soaking in Umonium 38® Master or chlorhexidine

When?

- Twitches must be cleaned and disinfected every week by technical staff.
- After use on a class 3 or class 4 patient, the twitch should be immediately cleaned and disinfected.

2.3.6.6. Other personal instruments

- Other personal instruments and equipment (e.g., haemostats, scissors, etc.) may be used on multiple patients, but they must be cleaned and disinfected after use.
- Disinfection: Sterillium® or 0.5% chlorhexidine available in the Pharmacy and in front of every stall.

When?

- After each use, other personal instruments must be cleaned and disinfected.

2.3.7. Cleaning and Disinfection Protocols for Equine Facilities

2.3.7.1. Equine Trailer/Parking Area and Courtyard

- The technical staff/stablemen will clean the area daily on regular workdays (Monday-Saturday). A shovel is available in the courtyard to pick up the manure.

2.3.7.2. Equine Outpatient Examination Areas and Breezeway

- Now, the Equine Hospital has no outpatient stalls.
- The examination rooms are thoroughly cleaned and disinfected daily by the technical staff, and after each patient if they are visibly soiled.
- The breezeway is cleaned (e.g. swept and hosed) daily and disinfected weekly by the stablemen.

2.3.7.3. Routine Stall Cleaning in the Equine Hospital

- It is imperative to remember that, when using disinfectants, more does not mean better! Using the dilutions of disinfectants as recommended by the manufacturer provides an optimal disinfecting action. Overuse of disinfectants may encourage resistance of microorganisms and may contribute to the formation of biofilms.
- To be effective, disinfectants must be used on **CLEAN** surfaces. Biofilm formation occurs in areas of standing water, and where disinfectant is allowed to sit on dirty surfaces.
- Use care when working in high-risk areas - avoid contamination of equipment or other areas (e.g. avoid dropping manure on the ground when picking stalls).

Cleaning procedures for occupied stalls in the main hospital

- Daily picking of stalls and addition of fresh bedding by stablemen.
- Use appropriate clothing (overalls; barrier clothing where required).
- Use the area-dedicated dumpster (specific dumpsters and cleaning material dedicated to class 3 and class 4 patients are available) - care should be taken to avoid dropping manure/straw outside the dumpster.
- Avoid any contact of patients with the dumpsters.
- Cleaning tools used for class 1-2 stalls should be cleaned and disinfected once a week. Cleaning tools used for class 3 and class 4 stalls should be cleaned and disinfected after each use.
- Dumpsters used in the Ruminant facility should not be moved into the Equine facility or vice versa.
- Aisle-way must be hosed daily and disinfected once a week.

General procedures for cleaning a vacated stall

- When a horse is discharged, the flag on the door is turned from green to red and the stall should be cleaned as soon as possible. Once it has been done, the flag is moved back to the green side.
- If the horse was contagious, the red flag is placed on the door and can only be moved back to green by the clinician in charge. If the pathogen is known or suspected, effectiveness of the disinfection protocol should be assessed and adapted if necessary:
  - See the general cleaning and disinfection protocol
  - Standard protocol: Keno™san detergent – Virocid® or Umonium 38® Master

- Horses infected by *Salmonella* spp.: Keno™san detergent – 1st disinfection with Virkon™ S – 2nd disinfection with Umonium 38® Master.
- Foals with *Rhodococcus equi*: Keno™san detergent – Virocid® or Umonium 38® Master.
- Horses with parasitic skin disease (chorioptic mange, pediculosis): Keno™san detergent – Sarnacuran® – bleach
- Foal with suspected rotavirus diarrhoea: Keno™san detergent – Virocid® or Umonium 38® Master or bleach

- The stablemen should empty, clean and disinfect the stall as soon as possible, but after completing the cleaning of non-contagious stalls. The stall is considered as a contagious area until disinfected and thus, no horse is admitted in it before its complete cleaning and disinfection.
- The stall harbouring *Salmonella* spp. patients are still considered contagious after disinfection until environmental controls (swabbing of stall and bacterial culture) have been done.
- Boxes used for non-contagious horses are emptied, cleaned and disinfected after each patient.

Weekly routines

- The floor of the Equine Hospital feeding room should be cleaned once a week and disinfected before every delivery (see general cleaning and disinfection protocol)
- Sinks in aisle-ways, in the reception area and in the examination rooms should be cleaned and disinfected with Virocid®, Umonium 38® Master or dilute bleach (2%) by technicians or stablemen.

Monthly routines

- Areas that are not used daily (i.e. tops of walls, rarely used areas, etc.) should be hosed monthly to prevent dust accumulation.

Biannual routines

- Filters from the ventilation system in the class 4 building should be disassembled and cleaned every 6 months by the technical staff.

Annual routines

- The entire Equine Hospital is thoroughly cleaned, scrubbed and disinfected from top to bottom, including all equipment (bug-out).
- Filters under the roof of the class 3-4 building should be disassembled and cleaned by the technical staff.

2.4. Guidelines for Receiving and Managing Equine patients

2.4.1. Outpatients (coming for a consultation but not hospitalized)

- The client will be asked to check in before unloading the horse. Following the check in, a quick clinical examination will be performed by a veterinarian to allocate the animal in a certain risk category. According to the risk category and circumstances, the animal may then be unloaded in the equine trailer parking area and be directed to one of the examination rooms or sent home.
- Upon checking-in, the client should provide the horse passport. If he/she has no official papers, the owner (and only the owner!) will assume the consequences of such federal transgression.
- As much as possible, outpatients should not be taken into equine inpatient areas.

2.4.2. Inpatients

- The client will be asked to check in before unloading the horse. Following the check in, a quick clinical examination will be performed by a veterinarian to allocate the animal to a certain risk category. According to the risk category and circumstances, the animal may then be unloaded in the equine trailer parking area and be directed to an examination room, inpatients areas or sent home.

- Upon checking-in, the client will be asked to provide the horse passport; it will remain in the secretary's office during the whole hospitalization period.

2.4.2.1. Stall Assignments

- Stalls are assigned by clinicians and stablemen. Staff and students must check with the clinician and the stablemen to find out where to house newly admitted inpatients.

In general:

Class 1 and 2 buildings:

- The stalls in front of the recovery boxes: class 1 and 2 intensive care units for horses hospitalized for medical colic or post-colic surgeries or horses requiring oxygen therapy.
- The neonatal unit: class 1 and 2 foals and mares requiring intensive care or needed to be separated.
- The middle unit of stalls: other problems classified as class 1 or 2 (e.g. elective surgery, ophthalmology, older foals or neonatal foals that do not need to be separated from the mare, endocrinology, etc.)
- The padded box: class 1 and 2 neurological diseases and/or horses with difficulties getting up and requiring the sling (laminitis, long bone fractures, etc.)
- The class 1 and 2 stalls in the building across the parking area: class 1 and 2 horses hospitalized for problems such as:
  - Surgery cases: arthroscopy, wounds, castrations, laminitis, etc.
  - Internal medicine cases: class 1 or 2 respiratory diseases, digestive problems, dermatological cases, etc.
  - Theriogenology cases: insemination, etc.

Class 3 building:

- The stalls behind the automatic shutter should be kept for class 3 horses with known or suspected contagious or zoonotic diseases (and exceptionally class 4 horses with the same barrier precautions as in class 4 if class 4 stalls are full or if one of the stalls is already occupied by a patient with a different disease).

Class 4 (isolation unit - IU)

- Known or suspected class 4 contagious or zoonotic infections.

2.4.2.2. Patient Records and Medications

- Patient records should be stored in front of the stalls (the front sheet, the directives and the recent clinical examinations) and at the secretary's office (records of complementary examinations, old clinical examinations). These records may be consulted by students, interns and clinicians, but may not leave the stall area or the secretary's office, respectively.
- Medications and other materials used for patient care should be stored in the pharmacy (medication, flush, other material), in a little box clipped to the stall door (ophthalmological TTMs) or on the trolley (alcohol, povidone-iodine, gloves, etc.).

2.4.2.3. Stall board, Treatment Orders, and Patient Census Board

The stall board **must** be filled by the time the patient is admitted or as soon as possible.

- The stall board must list patient identification, the type and frequency of forage (none, grass, hay, silage, other) and concentrates (mash, normal mix, others) being fed, and the need for a water bucket if the horse is not familiar with an automatic drinker.
- A sign with the infectious status of the horse (class 3) should be placed on the unit door. This allows all people and students to be more aware of the infectious hazards and associated precautions that should be implemented with those patients.

- The infectious status must be updated as it may change during hospitalization.
- Patient diagnosis and infectious status must also be recorded on the census board located in the Secretary's office. Anticipated discharge date and time should also be noted on the census board when available.
- TTM orders are posted on the directives sheet in the stall doors.
- Stall boards and TTM orders contain confidential patient information. As such, visitors should never be allowed to read this information for animals they do not own.

2.4.2.4. Feed and Water

- All grains or other supplements (including those provided by clients) must be stored in containers with tight fitting covers.
- Only minimal amounts of bedding, forage, and concentrate feeds should be stored in the Equine Hospital to decrease the likelihood of contamination and the availability of feed and hiding places for wildlife.
- The floor of the Equine Hospital feed room should be cleaned and disinfected before each new delivery (see general procedure for cleaning and disinfection protocol)
- Information on the type of forage and/or concentrates to be fed and the frequency should be written clearly on the stall board.
- See section on patient hygiene for cleaning of automatic drinkers, buckets and feeding bowls.

2.4.2.5. Bedding

- Students, interns and clinicians are responsible for bedding stalls and feeding patients if they arrive after office hours. The stablemen should take care of it during office hours.
- Occupied stalls (including Class 3 and Class 4 stalls) are cleaned and re-bedded with clean straw or shavings every morning by stablemen. If the stall gets excessively soiled or wet later in the day, students, clinicians, and technical staff are responsible for cleaning and re-bedding stalls.

2.4.2.6. Discharge

- Prior to discharge, clients must be instructed on infectious hazards associated with patients and how to control them at home. The anticipated time and date of discharge should be noted on the census board at the Secretary's office and the green flag should be turned around to the red side in prevision of departure.
- Stablemen should be notified if patients will be discharged by the colour coded flag (red flag) in front of the stall so that unnecessary effort is not expended cleaning these stalls.
- When the patient is discharged, the stall board should be erased to indicate that the animal is no longer hospitalized, and all records should be collected at the Secretary's office.
- Stalls used to house patients of classes 1 and 2 should be cleaned and disinfected before a new horse enters the stall.
- Stalls used to house patients of classes 3 and 4 (known or suspected of contagious disease) should be marked with a sign: "to be disinfected" and the red flag should be kept in place until further notice. No other horse is allowed to enter these stalls before cleaning and disinfection. The stablemen should check with the clinician responsible of the patient or the clinician responsible for biosecurity if the flag can be turned back to green.
- Students, nursing staff, and clinicians are responsible for cleaning up all items around the stall and ensuring that they are discarded, filed, or cleaned and disinfected (fluids, brushes, barrier gowns, etc.).

2.4.2.7. Tack (halters, leads, blankets, leg wraps, etc.)

- Client-owned tack or other items should not be left with patients at the FVM, except halters.
- The FVM supplies leads for patients (muzzles and blankets are also available if required).

- FVM-owned tack is stored at the patients' stall when not in use.
- All FVM-supplied tack is cleaned and disinfected between patients by soaking in Umonium 38® Master.

2.4.2.8. Walking and grazing area

When may horses be walked?

- When the horse's pathology allows it to walk and when the clinician has given permission for the horse to be walked.
- When they have a class 1 or 2 status.
- Class 3 horses are only allowed to leave their stall for necessary medical examinations, but not for walking.
- Class 4 horses are allowed outside their stall **ONLY** for medical examinations that cannot be performed in their stall (e.g. X-rays) unless degraded to a lower class.
- When accompanied by a person used to horse handling.

Where? The walking area is restricted to the hallways of the Equine Hospital, the courtyard, the little meadows around the Equine Hospital and the arena. Any dropped faeces in these walking areas should be removed by the person walking the horse as soon as possible.

When may horses be grazed?

- When the health condition allows the horse to walk and graze, provided the clinician's authorization.
- Only class 1 and class 2 horses may be grazed.
- Class 3 horses are only allowed to leave the box for necessary medical examinations, but ~~not~~ never for walking and grazing.
- Class 4 horses are allowed outside their stall **ONLY** for medical examinations that cannot be performed in their stall (e.g. X-rays) unless degraded to a lower class.
- When led by a person used to horse handling.

Where? The grazing area is restricted to the little meadows around the Equine Hospital. Any dropped faeces on these meadows should be removed by the person responsible for the horse as soon as possible.

2.4.3. *Salmonella* Surveillance in The Equine Hospital

- Stalls that housed animals which were culture-positive for *Salmonella* must undergo two cleaning and disinfection processes with a waiting period of one day between both procedures. Then, they should be cultured before they are released for use by another patient.
- FVM Staff reports culture results back to the CFB as soon as they are available.
- These data are routinely summarized and reported to the CFB. An occupation log of the class 4 IU is available at any time through the Equine Clinic secretary's office; the confirmed/suspected infectious disease is stated for each patient.

Routine Environmental surveillance

- Routine environmental surveillance on smooth floors and hand-contact surfaces throughout the hospital should be conducted every 6 months for most areas, and more frequently for areas more susceptible to be contaminated with *Salmonella*, i.e. class 4 IU (every 3 months).
- Responsible clinicians report any positive culture results back to the CFB as soon as available.
- These data are routinely summarized and reported to the CFB.

2.5. Management of Patients with Suspicion of Contagious Disease

- Special precautions are required when managing patients known or suspected to be infected with contagious pathogens. Because of their potential for nosocomial transmission, conditions of special concern include acute gastrointestinal disorders (e.g. diarrhoea), acute respiratory tract infections (respiratory viruses), acute neurologic diseases, abortions or infections with multidrug resistant bacteria.
- Patients with a high risk of contagious disease will be isolated from the general Equine Hospital, housed in the dedicated area, and discharged as soon as possible.
- Clinicians, interns or students are encouraged to conduct the initial clinical examination of such patients outside the trailer, in the parking lot, to evaluate the risk of contagiousness (see receiving patients).
- Staff should consider implementing barrier nursing precautions when handling these patients until confirmation that the risk of contagious disease transmission is discarded.
- The CFB should be notified as soon as possible **(email sent to the following address: biosecurity-fmv@lists.uliege.be)** when a ***class 4*** patient (high risk of contagious disease) is admitted or develops suspicious clinical signs while hospitalized. To do so, an occupation log of the class 4 IU is available at any time through the Equine Clinic secretary's office; the confirmed/suspected infectious disease is stated for each patient.
- Only the primary clinician can authorise the housing of patients with a class 4 status (known or suspected highly contagious diseases) in locations other than the class 4 IU (exceptional circumstances).
- When ***class 3*** patients are housed in the main inpatient areas, effort must be made to use appropriate barrier nursing and biocontainment practices with the patient.
  - Barrier nursing precautions must be always used.
  - Disinfecting footbaths or foot mats are required.
  - The unit of stalls housing these patients should be cordoned off by closing the sliding door. The door should remain closed all the time.
  - Stalls on either side and across the aisle should be maintained empty or occupied by similarly contagious patients.
  - Using stalls at the end of aisles is preferred to stabling near main traffic corridors.
  - **Any unusual MDR pattern identified in a class 3 patient should be reported as soon as possible to the CFB (email sent to the following address: biosecurity-fmv@lists.uliege.be) so that they can assist in communication and evaluate if appropriate precautions are being taken to house the animal.**

2.5.1. Classification of suspected/confirmed contagious animals

- Infectious diseases encountered in hospitalized animals are assigned by the primary clinician to the following classification levels, based on the pathogen transmissibility to other animals and/or its zoonotic potential.

CLASS 1: NORMAL HOUSING - green

- Non-infectious diseases or infectious diseases caused by pathogens that have no likelihood of transmission to other animals and no potential for human infection.
- In the Equine Hospital, the following conditions/patients are included:
  - No fever, no respiratory problem, no history of fever or respiratory problems during the last 2 weeks
  - Trauma, wounds
  - Pre- et postoperative patients, colic patients (without contagious complications)
  - Ophthalmologic patients

- Non-contagious neonates
- And other similar animal conditions

CLASS 2: NORMAL HOUSING - green

- Infectious diseases caused by pathogens with a low level of transmission; non-resistant bacterial infections are included in the category.
- In the Equine Hospital, the following conditions/patients are included:
  - Wounds infected with non-resistant bacteria
  - Bacterial pneumonia, pleuropneumonia without suspicion of contagious bacteria
  - Bacterial corneal ulcers with non-resistant bacterial infections
  - And other similar conditions

CLASS 3: BARRIER NURSING - orange

Subclass A: (Multi)drug-resistant bacteria: infections caused by (multi)drug-resistant bacteria, as determined by a bacteriology laboratory.

Subclass B: Infectious diseases caused by pathogens with a moderate level of transmission and/or potentially zoonotic.

- The 6 stalls used for this purpose are located behind the automatic shutter. When this area is full (for example if multiple horses develop fever and respiratory problems during their hospitalization), stalls located before the automatic shutter should be used in priority and separated from other patients by closing the unit. In the Equine Hospital, the following conditions should require a hospitalisation in the Class 3 unit:
  - Fever and/or leukopenia of unknown origin
  - Viral respiratory diseases: cough, nasal discharge (< 2 weeks), with fever.
  - Infection by *Rhodococcus equi*: foals under the age of 10 months with respiratory problems and fever
  - Acute diarrhoea with either fever and/or leukopenia
  - Non-surgical digestive problem with haemorrhagic reflux OR non-haemorrhagic reflux with fever and/or leukopenia.
  - MRSA or other MDR bacterial infections
  - Contagious dermatologic infections: dermatophytosis, dermatophylosis (*Dermatophilus congolensis*), chorioptic mange, pediculosis and other parasitic skin diseases.

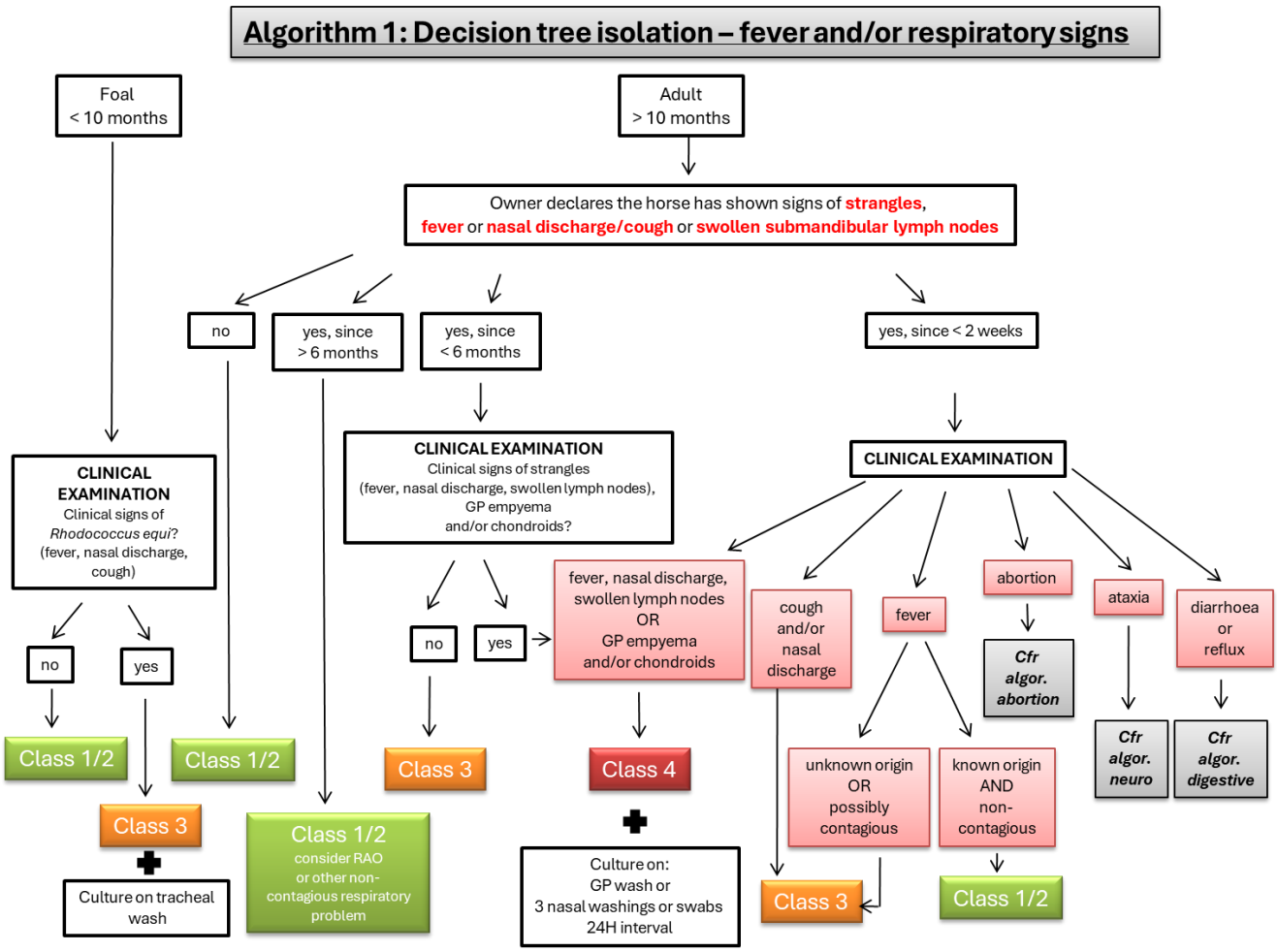
CLASS 4: ISOLATION - red

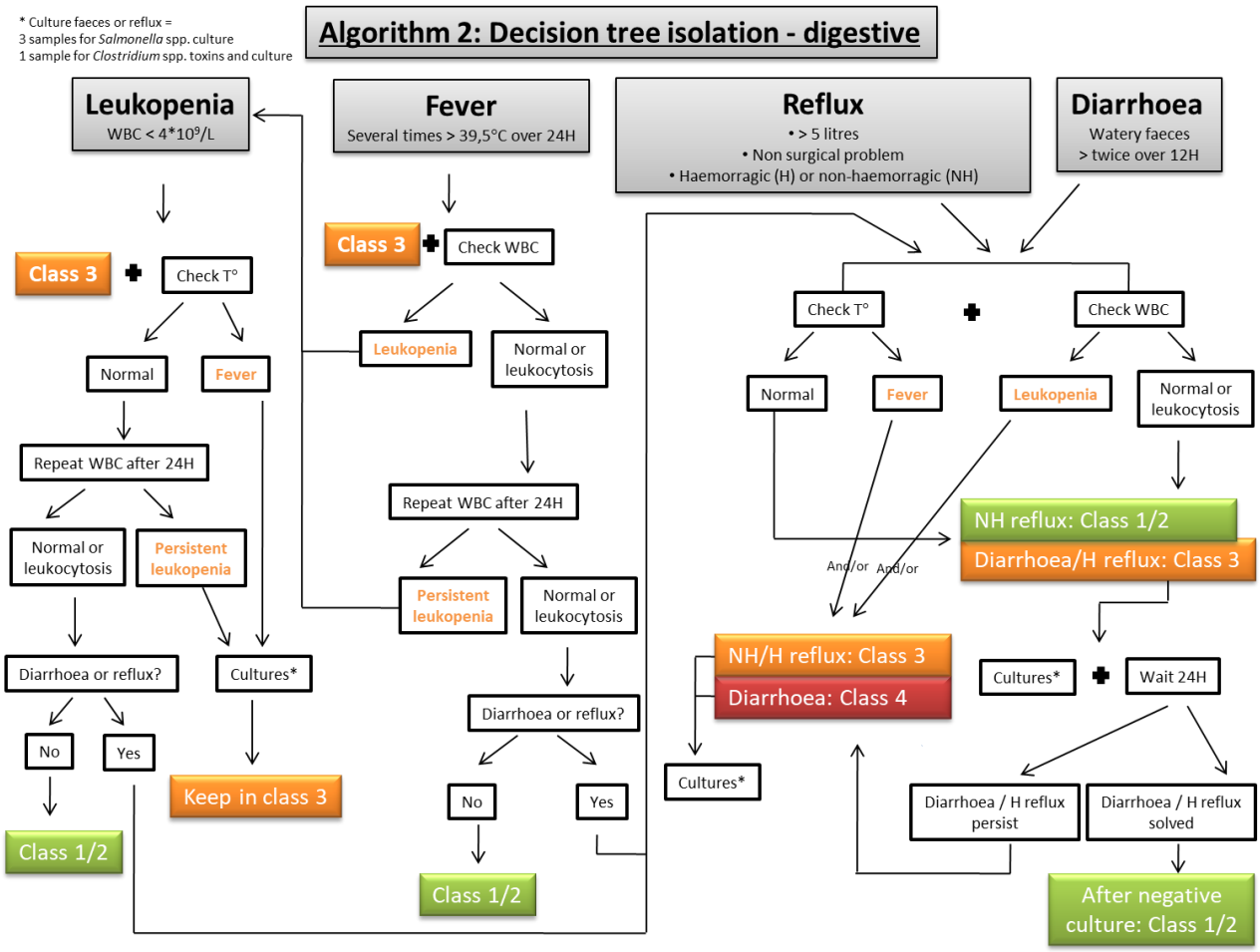
- Infectious diseases caused by highly contagious pathogens and/or extremely serious human pathogens.
- Class 4 patients are housed in the large animal IU. Exceptionally, when the isolation unit is full, they can be housed in the class 3 unit behind the automatic shutter; however, the barrier precautions should remain the same as in the IU.
- In the Equine Hospital, the following conditions/patients are included:
  - Strangles: swollen submandibular lymph nodes, nasal discharge, cough, fever **OR** suspicion of guttural pouch empyema and/or chondroids in the guttural pouches.
  - Salmonellosis: acute diarrhoea with leukopenia and/or fever
  - Acute, rapidly deteriorating neurological disease or acute neurological disease with fever (e.g. suspicion of EHV-1 neurological form)
  - Abortion (150-300 days of gestation)
  - Perinatal death (> 300 days of gestation) without presence of dystocia, premature placental separation, a congenital abnormality or twins explaining the perinatal death.
  - Zoonotic diseases e.g. rabies, glanders (*Burkholderia mallei*), brucellosis, anthrax, *Mycobacterium bovis & M. tuberculosis*-associated tuberculosis, etc.

- Horses that were in contact with a horse suffering from a suspected or confirmed contagious disease are considered as contagious until proven otherwise or until the incubation time has passed without

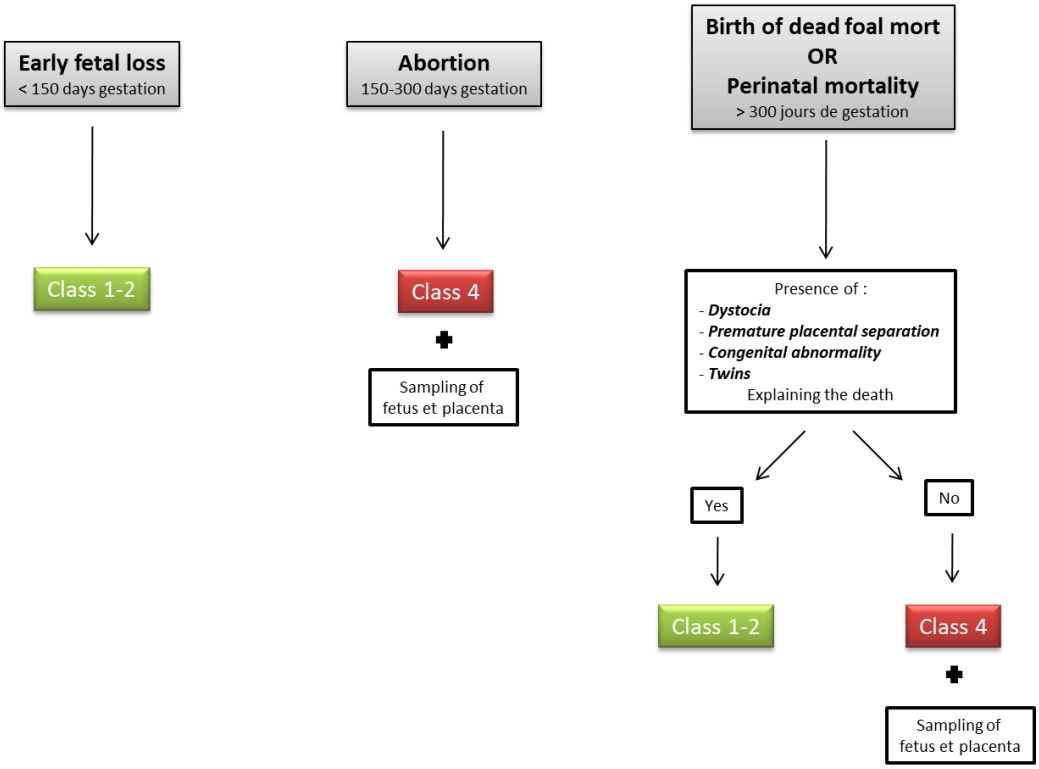
the horse developing clinical signs. A particular attention must be given to subclinical diseases, as they might still be transmitted by the horse.

- A table containing incubation times, transmission modes, clinical signs, diagnostic tests and disinfectants to be used for the main contagious diseases is included in Table VI.
- The following algorithms / decision trees are also included and are available in the Clinicians' Office:

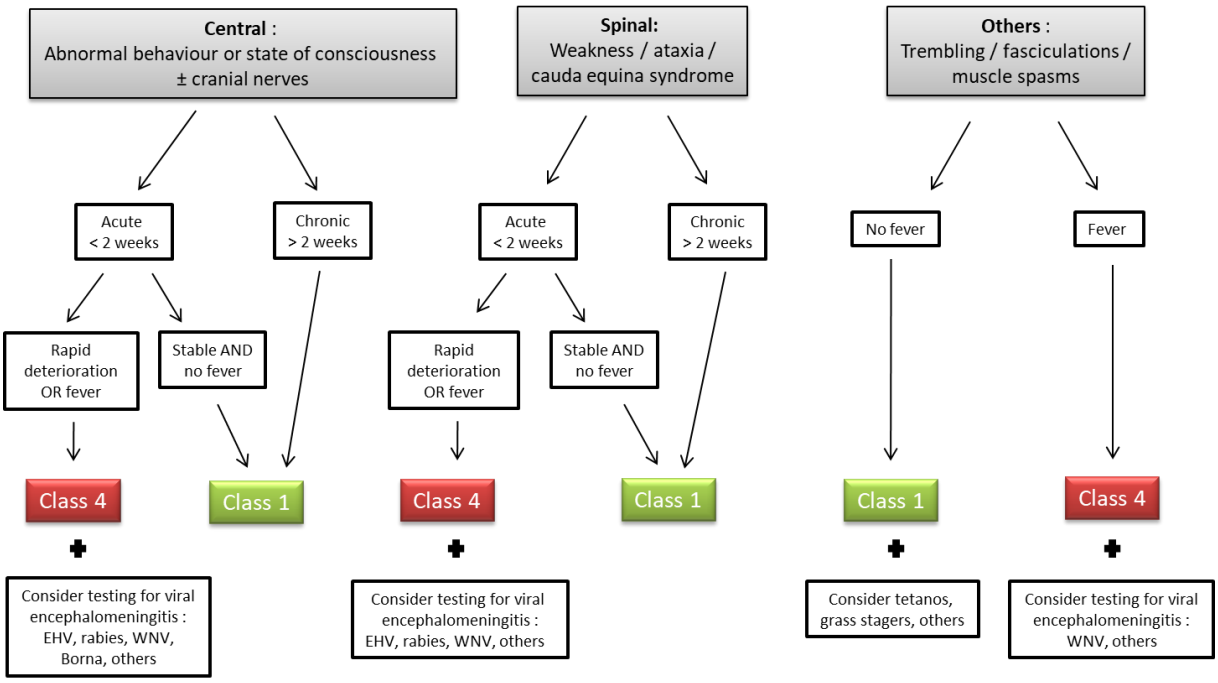



* Culture faeces or reflux =
3 samples for Salmonella spp. culture
1 sample for Clostridium spp. toxins and culture
Algorithm 2: Decision tree isolation - digestive
Leukopenia
WBC < 4*10⁹/L
Fever
Several times > 39,5°C over 24H
Reflux
• > 5 litres
• Non surgical problem
• Haemorragic (H) or non-haemorragic (NH)
Diarrhoea
Watery faeces
> twice over 12H
Class 3
Check T°
Normal
Fever
Repeat WBC after 24H
Normal or leukocytosis
Persistent leukopenia
Diarrhoea or reflux?
No
Yes
Class 1/2
Cultures*
Keep in class 3
Class 3
Check WBC
Leukopenia
Normal or leukocytosis
Repeat WBC after 24H
Persistent leukopenia
Normal or leukocytosis
Diarrhoea or reflux?
No
Yes
Class 1/2
Check T°
Check WBC
Normal
Fever
Leukopenia
Normal or leukocytosis
And/or
And/or
NH reflux: Class 1/2
Diarrhoea/H reflux: Class 3
NH/H reflux: Class 3
Diarrhoea: Class 4
Cultures*
Cultures*
Wait 24H
Diarrhoea / H reflux persist
Diarrhoea / H reflux solved
After negative culture: Class 1/2

Algorithm 3: Decision tree isolation – abortion



Algorithm 4: Decision tree isolation – neurological



Fever = history of fever in the last 2 weeks OR fever at clinical examination

2.5.2. Exclusion Criteria for Admission and/or Hospitalisation

- In case of animal diseases reportable in Belgium.
- If the risk for other hospitalised patients or people is too important compared to the health risk for the animal itself; the animal can be refused to enter the hospital or to be hospitalised.
- Only senior clinicians are allowed to make the decision of refusing an animal.
- The refusal criteria for horses are the following:
  - Suspicion of viral respiratory diseases (cough, nasal discharge, fever for < 2 weeks), with no life-threatening status for the horse.
  - Suspicion of strangles (swollen submandibular lymph nodes, nasal discharge, cough, fever **OR** suspicion of guttural pouch empyema and/or chondroids in the guttural pouches) with no life-threatening status for the horse or if no surgery is needed.
  - Suspicion of EHV-1 neurological form (acute ataxia with presence or history of fever, possibly other cases) with no life-threatening status for the horse.
  - Abortion with no life-threatening status for the horse (this concerns the mare, the placenta and the foetus; however, the placenta and the foetus can be brought to the Necropsy Department).

2.5.3. Communication Requirements for the Equine class 3 Barrier-nursing Unit and the class 4 Isolation Unit

- The CFB must be notified as soon as possible whenever class 4 patients are admitted to the Equine Hospital and when they are discharged. This notification can be made by using the following email address: **biosecurity-fmv@lists.uliege.be**, and should be performed by the veterinarian responsible the patient or through consultation of the class 4 occupation log (available at any time through the secretary of the Equine Hospital).
- Responsible stablemen must be notified when patients with contagious diseases are placed in barrier nursing (class 3) or isolation (class 4) and when they are discharged or moved.
- Stalls must be visibly labelled with the according class of risk (class 1&2, class 3 or class 4) as well as the infectious pathogens, along with the required biosecurity precautions. It is very important to communicate the pathogen(s) of concern for such patients so that all staff members and students can take appropriate precautions to prevent human exposure and avoid the contamination of other patients, and to ensure that appropriate cleaning and disinfection procedures are used.

2.5.4. Guidelines for The Management and Care of Patients with suspected or confirmed Contagious Diseases

2.5.4.1. General

- Strict attention to hygiene and use of barriers are critical for the appropriate containment of contagious pathogens.
- Before and after examining each patient, hands must be washed with soap and water then disinfected with alcohol-based hand sanitizer.
- Surfaces or equipment contaminated by faeces, other secretions or blood must be cleaned and disinfected immediately by staff members or students in charge of the patient.
- Special care must be taken to prevent contamination of environment by dirty hands, gloves, or boots.
- Use all footbaths or foot mats encountered.
- Environmental hygiene is the responsibility of **ALL** people working in the barrier nursing- and isolation units. Do not wait for a technician or other staff member to clean. Avoid contaminating anterooms with straw or manure and assist with general clean up and maintenance whenever possible.
- Students and interns assigned to the contagious case are responsible for routine cleaning and organization of anterooms, which includes cleaning and disinfecting of counters, door handles, and doorknobs, changing footbaths when needed, etc. A technician from the Equine Hospital should check the cleaning and replace the material that is missing daily.

- Food is not allowed in the Equine Hospital, including the barrier nursing- and isolation units, because of the risk of exposure to zoonotic pathogens.

2.5.4.2. Class 4 – isolation unit (UI)

- Clean examination gloves must be always worn when working in the IU perimeter (concrete apron), anteroom, and patient stalls. Gloves must be changed between patients.

2.5.5. Minimizing Entry into the Equine Class 3 Barrier Nursing Unit or Class 4 Isolation Unit

2.5.5.1. General

- Entry into these units should only occur when necessary.
- People should not enter stalls unless contact with patients is required. Primary clinicians may at their discretion take students into a stall for teaching purposes, but this should be minimized as much as possible, and any person entering a stall must use appropriate precautions.
- Only the clinicians, students, nurses and cleaning personnel responsible for patient care should enter isolation.
- When possible, it is optimal to have specific people in charge of patients in these units (i.e., it is best if the same person is not caring for both, i.e. patients in the main hospital, and those housed in the IU or barrier nursing area). If it is necessary to work on patients in multiple housing areas, personnel should take optimal precautions when moving between areas and handling patients with different infectious status. When possible, students assigned to class 3 or 4 patients should have NO contact with immunocompromised patients (leukopenic patients, young or very old animals, animals under immunosuppressive therapy, etc.) elsewhere in the FVM. When caseload demand generates contacts with animals suspected of infectious disease, treat non-infectious patients before handling class 3 or class 4 infectious cases.
- The appropriate barrier precautions must be worn by anybody entering the class 3 and 4 units. Required barrier precautions will be posted on the board outside.
- **The primary clinician is responsible, always, for ensuring that patients receive appropriate care.**

2.5.5.2. Class 3 – barrier nursing

- Barrier precautions: these precautions count for the whole unit and not just for the stall!!
  - Footbath/foot mat before and after entering the unit (and stall if several horses are housed in the unit)
  - Hand washing and sanitizing before and after entering the unit (and stall if several horses are housed in the unit)
  - Disposable apron identified with the name of the animal
  - Examination gloves
- Owners (but not friends, nor the barn staff and nor the referring vet) can visit their horses only under certain circumstances and under the supervision of the responsible veterinarian; they are not allowed to enter the stall. They should be informed on the contagious status of their horse for other horses outside the Equine Hospital (at the owner's home or in a barn). As for owners of all horses, they are not allowed to visit other parts of the Equine Hospital.

2.5.5.3. Class 4 – isolation unit (UI)

- Barrier precautions:
  - Footbath/foot mat
  - Hand washing and sanitizing
  - Disposable and water-resistant overalls identified with the name of the animal
  - Examination gloves

- Dedicated boots
- Protective respiratory mask and eye protection (safety goggles) should be available in the anteroom if necessary.

- Clients are **not** allowed to enter the IU for large animals unless under exceptional circumstance, provided the permission of the primary clinician and always accompanied by a staff member.

2.5.6. Equipment and Material

2.5.6.1. General

- Each area has its own colour code for instruments, buckets, etc. Material that is shared between class 1-2 and class 3 areas should be disinfected properly before leaving the class 3 area.
  - Class 1-2 main stable: **green** buckets
  - Class 1-2 small stable: **blue** buckets
  - Class 3: **orange** buckets
  - Class 4: **red** buckets
- Material taken behind the automatic shutter (class 3) is sent to the class 3 disinfection area. Material brought in the class 4 IU should not be taken back to the main hospital unless a thorough disinfection protocol is applied by a technician or stablemen. A first on-site disinfection (24h-bath in Umonium 38® Master) is required before the material can leave the IU. ®
- If equipment or material that cannot be used or discarded (e.g. canisters for intravenous infusions, sling, etc.) was brought inside the units, it should be thoroughly disinfected before being sent back to the main hospital. A first on-site disinfection (24h-bath in Umonium 38® Master) is required before the material can leave the IU.
- Any disposable supplies taken behind the automatic shutter (class 3) or IU (class 4) should be used for that patient or discarded.
- No equipment or supplies (bandages, syringes, disinfectant, etc.) should be taken behind the shutter (class 3) or IU (class 4) without first checking with the responsible clinician if it is necessary.
- Medications used for class 3 or class 4 patients should be billed to the client upon discharge. Do not return these medications or intravenous fluids to the Pharmacy. All medications sent home with clients must be dispensed in appropriate containers with a complete prescription label.
- Additional cleaning supplies and disinfectants are stored in the IU.
- Additional scrubs, isolation gowns, supplies, etc., are stored in the Pharmacy.

2.5.6.2. Class 3 – barrier nursing

- An individual brush and hoof pick are assigned to ***each*** class 3 patient. A bag containing these FVM-owned instruments is stored in front of the patients' stalls during hospitalization and cleaned and disinfected after discharge. Clinicians or students-owned stethoscopes are used but need to be disinfected after use on these patients.

2.5.6.3. Class 4 – isolation unit (UI)

- An individual stethoscope, thermometer, twitch, brush and hoof pick are assigned for use with ***each*** class 4 patient. A box containing these FVM-owned instruments is stored in front of the patients' stalls during hospitalization and cleaned and disinfected after discharge.

2.5.7. Procedures for People Entering and Exiting the Equine Class 3 Barrier Nursing Unit or Class 4 Isolation Unit

2.5.7.1. General

- The following policies also apply to all ancillary services.

- Cleaning staff and/or stablemen are required to adhere to all relevant policies regarding attire worn in the class 3 barrier nursing unit and class 4 IU.
- Doorknobs and cords of the automatic shutters should be disinfected regularly.
- Upon entering a class 3 or 4 stall:
  - Bring all necessary supplies at once upon entering the stall, to minimize in and out-traffic.
  - Procedures involving highly contaminated sites should be performed last (e.g. contacts with mucous membranes, MRSA-infected wounds, rectal temperature taking, rectal palpation, handling of strangles abscesses, etc.).
- Upon exiting a class 3 or 4 stall:
  - Avoid dragging bedding or faeces into the hallway (of major importance for stablemen!!).
  - Appropriately dispose of sharps or garbage in yellow waste containers.

2.5.7.2. Class 3 – barrier nursing

- To enter the barrier nursing unit:
  - Use the incoming disinfecting footbath or foot mat.
  - Put on a clean disposable apron provided next to the patient's stall
- To enter the barrier nursing stall:
  - Every person MUST wear a clean and closed disposable apron.
  - Wash hands then use hand sanitizer before entering a stall.
  - Put on a new pair of disposable gloves before entering a stall.
  - Use the footbath/foot mat in front of the stall upon entering a stall.
  - People handling, examining or feeding different isolated patients should change of disposable apron and examination gloves but also wash and sanitize hands between patients.
- Exiting the barrier nursing stall
  - Footbaths/foot mats in front of the stall must be used upon exiting the stall.
  - Clean and disinfect used material/equipment not assigned to the case by wiping with Sterillium®.
  - Wash hands then use hand sanitizer.
  - Complete flow sheets and process samples with clean hands.
- Exiting the barrier nursing unit:
  - Remove the disposable apron and hang it back at the stall or dispose of it in a yellow waste container if macroscopically dirty.
  - Dispose of examination gloves in the yellow waste container.
  - Use the footbath/ foot mat prior to exiting the unit (if several horses are housed in the unit; if there is only one patient in the unit, only upon exiting the stall).

2.5.7.3. Class 4 – isolation unit (IU)

- **To enter the isolation area – upon entering clean area of the anteroom for people:**
  - Open the anteroom door with a key (available at any time in the secretary's office), then close the door behind you.
  - Remove the PPE worn in the Equine Hospital, (overalls/green blouse, blue jacket, etc.) and leave it in a locker, along with your personal equipment (thermometer, stethoscope, mobile phone, pens, etc.).
  - Remove your shoes (boots/booties) and put them along the wall.
  - Sit on the bench and turn around to the dirty area.
- **To enter the isolation area – upon entering dirty area of the anteroom for people:**
  - Put on white coveralls.
  - Put on a pair of yellow boots.
  - Wash and disinfect your hands.
  - Put on a pair of disposable examination gloves.

- Exit the anteroom and close the door (doors must always remain closed).

- **To enter the isolation area – upon entering the anteroom for animals:**
  - Walk through the footbath at the entrance to the animal anteroom, after closing the folding door (which must always remain closed).
  - Pull the yellow cord to open the first automatic shutter.
  - Pull the yellow cord on the other side of the automatic shutter to close it behind you.
  - Cross the animal anteroom and pull the third yellow cord to open the second automatic shutter (do not open this automatic shutter if the outside shutter is still open).
  - Use the footbath between the animal anteroom and the isolation stalls.
- **To enter the isolation area – upon entering isolation stalls:**
  - All people (staff members, students, technicians and stablemen) are required to wear, at least, clean boots, clean overalls and clean examination gloves before entering the isolation stalls.
  - Use footbath in front of the stall when entering it.
  - People handling, examining or feeding different patients in the IU should change gloves and white overalls between patients (follow the exit procedure, then the entry procedure for another patient). They should also walk through the footbath placed between both stalls.
- **To exit the isolation area – upon exiting isolation stalls:**
  - Clean and disinfect thermometer, stethoscope, and all other material/equipment used by wiping it with Sterillium®.
  - Store the thermometer, stethoscope and all reusable equipment on the trolley in front of the stall door of each class 4 patient. Nothing should be left directly on the floor (bucket, food, etc.).
  - Dispose of gloves in the individual yellow waste container in front of the stall (each patient has its own yellow waste container).
  - Walk through the foot bath.
  - Pull the yellow cord to open the automatic shutter.
- **To exit the isolation area – upon exiting the anteroom for animals:**
  - Make sure everything is tidy and clean before exiting the animal anteroom. The sink should be free of any material and/or medication. Every respective patient's item should be placed either on the trolley in front of the stall or inside the cupboard above the sink.
  - Wash your hands at the sink then disinfect them.
  - Wash your boots to the boot-washing station located next to the sink.
  - Open the second automatic shutter by pulling the yellow cord.
  - Walk through the footbath.
- **To exit the isolation area – upon entering the dirty area of the anteroom for people:**
  - Wash your hands at the sink then disinfect them.
  - Remove your boots and put them back in place. Make sure you use the place identified "Patient#1" and "Patient#2", corresponding to the right patient.
  - Remove white overalls, avoiding re-contaminating hands, and hang them back on the dedicated coat rack identified "Patient#1" and "Patient#2", corresponding to the right patient or dispose of them in the yellow waste container if dirty.
  - Sit on the bench and turn around to the clean area of the people anteroom.
- **To exit the isolation area – upon entering the clean area of the anteroom for people:**
  - Use hand sanitizer (Sterillium®) for hand disinfection.
  - Put your PPE back on (overalls/green blouse, blue jacket, etc.).
  - Put your shoes back on (boots/booties).
  - If material is lacking in the unit, write it down on the white board (for resupply by technical staff)
  - Pick up your personal belongings and equipment (thermometer, stethoscope, mobile phone, pens, etc.) in the locker.
  - Exit the anteroom and close the door with the key.

2.5.8. Procedures for Moving Equine Patients to the Equine Class 3 Barrier Nursing Unit or Class 4 Isolation Unit

2.5.8.1. General

- Facilities should be prepared to receive patients prior to moving them to a barrier nursing- or IU stall.
- Set up footbaths/foot mats with Virkon™ S or Umonium 38® Master solution.
- Set up other barrier supplies depending on the class of risk.
- Patients that need to be moved from the main hospital to a class 3 barrier nursing stall or to the class 4 IU should be walked on a path that minimise contacts with other horses. It is best to have two people assisting:
  - One person dresses in appropriate IU attire, sets up the IU stall, and receives the patient at the gate.
  - The other person moves the patient from the main hospital to the IU perimeter.
- It is essential to clean and disinfect surfaces contaminated by faecal material or body fluids while moving the patient.
- Staff will place the grey/orange flag on the stall door and write "**DO NOT USE, DISINFECTION REQUIRED**" on the board of the stall door in the main hospital.
- The person responsible for the patient will ensure to tidy up the stall and its surroundings (clean up any unused material, throw away cardboard boxes and empty fluid bags, etc.).

2.5.8.2. Class 3 – barrier nursing

- Supplies to enter the unit (disposable aprons, gloves) are available in the storage room.
- Whenever possible, a patient requiring hospitalisation in a class 3 barrier nursing stall upon admission should be directly taken to the stall, thus avoiding contact with other hospital areas, people or horses.

2.5.8.3. Class 4 – isolation unit

- Supplies for the IU people anteroom (disposable overalls, gloves) are available in the storage room.
- As much as possible, patients to be housed in isolation upon admission should be transported directly to the area in the owners' trailer/transport vehicle and unloaded in the IU yard.
- Patients with a *Salmonella* spp. infection coming from the hospital should have the grey/white flag placed on the door of the former class 1-2 stall.

2.5.9. Cleaning and Feeding in the Equine class 3 barrier nursing- and class 4 Isolation Units

- All staff members and students are responsible for assisting with cleaning and maintenance of the class 3 barrier nursing- and class 4 isolation units! Everyone should help cleaning when necessary.
- Stablemen are responsible for feeding horses hospitalized in the class 3 barrier nursing- and the class 4 isolation units, twice a day, and following instructions provided by the responsible veterinarian (as for any other patient in the hospital).
- Stablemen will clean and re-bed stalls once daily, in the morning, and will clean stall walls if contaminated with diarrhoeal faeces, blood or other excretions/secretions.
- Footbaths/foot mats are changed/supplied daily, in the morning, by stablemen.
- Additional cleaning and changing/supplying of footbath, as well as horse feeding, should be done throughout the day by clinical staff and students, if necessary.
- Students and interns assigned to the case are responsible for routine cleaning in front of the stalls (trolley, sink, etc.) as needed.
- When class 4 patients are hospitalised in the IU, technical staff should clean both "clean" and "dirty" areas of the people anteroom as well as the animal anteroom, once a day. They should refurnish any

missing item (written on the white board in the clean area of the people anteroom) and make sure that lockers and cupboards contain what is needed during the patient hospitalisation. Clinicians are responsible for supervising the cleaning, disinfection, and stocking of the IU.

2.5.10. Procedures for Patients Leaving the Equine class 3 Barrier nursing or class 4 Isolation Unit *(for discharge or diagnostic procedures, but while the horse is still contagious)*

2.5.10.1. General

- The horse's hooves must be picked in the stall prior to exiting.
- Hooves should be scrubbed using 0.5% chlorhexidine solution which should be prepared in isolation buckets using 100 ml of chlorhexidine (Ecutan® 5%) added to 1L of water.
- Every person moving the patient is required to wear all appropriate attire and apply barrier precautions.
- Every person handling the patient should avoid contaminating doors, gates, etc. with contaminated gloves while moving the patient.
- Every person must ensure that instructions given to clients adequately address the infectious hazard associated with the patient (with regards to other animals and humans) and provide appropriate suggestions for mitigating the risks to people and animals.
- Horses housed in the class 3 barrier nursing unit or in the class 4 IU should not be walked nor exercised.

2.5.10.2. Class 3 – barrier nursing units (for discharge or diagnostic procedures)

- Patients moving from class 3 barrier nursing units should not be walked through the breezeway unless necessary (e.g. to enter surgical facilities). If it is necessary to move horses through the breezeway, people in charge should take appropriate precautions to minimize contacts with other patients and people in the breezeway.
- Diagnostic and therapeutic procedures that must be performed on class 3 patients in the main hospital should be scheduled for the end of the day. All surfaces and floors that are potentially contaminated must be promptly cleaned and disinfected to minimize the likelihood of nosocomial transmission.

2.5.10.3. Class 4 – isolation unit (for discharge or highly exceptional procedures)

- All diagnostic and therapeutic procedures should be performed in the IU unless necessary.
- In case a surgical intervention is required, it will be performed in the class 4 IU whenever possible or exceptionally in the surgical theatre.
- Exiting the horse:
  - The person in charge must brush and clean the horse from faeces, body secretions/excretions and pick hooves in the stall prior to exiting the IU.
  - Prior to exiting the stall, the horse coat should be wiped from head to tail with a cloth drenched in chlorhexidine solution and hooves scrubbed using 0.5% chlorhexidine solution which should be prepared in isolation buckets by adding 100 ml of chlorhexidine (Ecutan® 5%) to 1L of water.
    - The person moving the patient **MUST** wear all appropriate attire and apply barrier precautions.
    - The person handling the patient should avoid contaminating doors, gates, etc. with contaminated gloves or hands.
    - It is critical to clean and disinfect surfaces contaminated by faecal material or body fluids while moving the patient.
- The surgery:
  - Surgeries will be planned at the end of the day, as much as possible.

  - During the whole surgery, all people present in the surgical theatre must wear appropriate attire and apply barrier precautions.
- Return to the IU:
  - Prior to exiting the recovery box, hooves should be scrubbed with 0.5% chlorhexidine solution, which should be prepared in isolation buckets by adding 100 ml of chlorhexidine (Ecutan® 5%) to 1L of water.
  - The person moving the patient should wear all appropriate attire and apply barrier precautions.
  - People moving the patient should avoid contaminating doors, gates, etc. with contaminated gloves or hands.
  - It is critical to clean and disinfect surfaces contaminated by faecal material or body fluids while moving the patient.
  - After use, the recovery box and surgical theatre are considered as contaminated areas and should be thoroughly cleaned and disinfected. Under no circumstances will another horse undergo a surgical procedure before thorough cleaning and disinfection.

2.5.11. Required Diagnostic Testing and Surgical Procedures for Patients with Suspected Infections

- Diagnostic testing to detect some (zoonotic) pathogens provides essential information for an appropriate clinical management of infected patients. Such testing directly benefits patient and owner(s) by allowing an appropriate management of their other animals and protection of their families. It also benefits FVM patients and staff as it contributes to an appropriate risk management.
- It is therefore highly suggested to test hospitalized patients if infection with a specific contagious or zoonotic pathogen is suspected. Diagnostic testing is considered as an essential part of case management in the FVM and is therefore billed to the client.
- The senior clinician in charge of a patient is responsible for ensuring that appropriate samples are sent for testing, and that appropriate biosecurity precautions are implemented for handling such patients.
- The biosecurity officer (senior clinician in internal medicine working in the clinic that week) clinician should be notified as soon as possible if a hospitalized patient is (suspected of being) infected by a class 3 or class 4 disease. To do so, a class 4 occupation log is available at any time through the secretary of the equine clinic; the suspected/confirmed disease is registered for each patient in the log.
- Whenever possible, diagnostic, surgical, or other procedures should be performed wherever high-risk patients are housed, rather than moving the patient to common examination and TTM areas.
- Appropriate barrier nursing precautions must always be followed by all staff members and students, during diagnostic or other procedures.
- If the patient requires diagnostic or other procedures (e.g. X-rays, scintigraphy, surgery) which can only be performed in the main hospital facility, they should be performed at the end of the day whenever possible.
- The attending clinician is responsible for notifying of the suspected infectious pathogen and methods that should be implemented for containment (including cleaning and disinfection after procedures).
- This information should be clearly marked on the SAP request.
- In general, all barrier nursing precautions that are required in the patient housing area will be required whenever handling that patient.
- Instruments, equipment, and environment should be thoroughly cleaned and disinfected after the procedure, regardless of where it is conducted.
- The senior clinician must ensure that all services assisting with procedures are informed of the known/suspected pathogen, and appropriate barrier clothing precautions.
- If the patient has diarrhoea, one person is needed to lead the animal, and another one must follow with a trash bag to catch any faecal matter, and immediately clean/disinfect contaminated areas.

- The senior clinician is also responsible for ensuring that the environment and equipment are appropriately cleaned and disinfected after the procedure, which includes induction and surgical areas, recovery stall, and any other hospital area.

2.5.11.1. Use of Ultrasonography, Radiography, Endoscopy or Electrocardiogram in the Equine class 3 Barrier nursing Units and the class 4 Isolation Unit

- People from ancillary services must wear appropriate clothing and barrier precautions when handling class 3 or class 4 patients.
- People from the ancillary service, along with their necessary equipment, should remain in front of the stall and not enter unless essential to the procedure.
- After performing an ***electrocardiogram***, people must clean and disinfect the leads with a gauze sponge soaked in disinfectant (0.5 % chlorhexidine or Sterillium®) before leaving the unit, paying particular attention to cleaning and disinfecting the clips and wires that were in direct contact with the patient.
- After performing ***endoscopy***, people will clean and disinfect the endoscope, light source, etc. with Umonium 38® before leaving the unit. Once back in the endoscopy room, the material will be cleaned and disinfected again according to the recommended procedure.
- The portable ***X-Ray*** machine should be used whenever possible on large animals with known or suspected infectious diseases.
- For radiology examinations, the cassette should be placed in a plastic bag that will be retrieved by a person with clean hands before processing.
- For ***ultrasound examinations,*** the probe should be placed in a disposable glove for protection. The probe and the cable should be carefully disinfected after use. The ultrasound machine should be kept in the corridor and should not enter the box. The wheels should be carefully disinfected after use. Upon exiting the unit, the ultrasound machine should roll over the foot mats.
- Only the necessary material should be brought in the infectious units. Alcohol and gel for ultrasound examinations should be kept in the infectious unit.
- All radiography and ultrasonography equipment, as well as supplies, must be cleaned and disinfected with 0.5 % chlorhexidine, Sterillium® or Umonium 38® after use.

2.5.11.2. Biological Samples from Patients Suspected or Confirmed as Contagious

- Samples from high-risk patients should be properly identified and labelled, then placed in a Ziplock bag (double packaging is strongly advised).
- Avoid contaminating the outside of the bag when placing a sample in it.
- The suspected disease or pathogen should be clearly labelled on all submission forms.
- Samples from patients with a zoonotic disease should be double-packed and the disease/pathogen clearly labelled on all submission forms.

2.5.12. Preparation of the Equine class 3 Barrier nursing Unit or class 4 Isolation Unit Prior to Disinfection

- Contact cleaning personnel **IMMEDIATELY** upon patient's discharge so that they can clean and disinfect the stall or unit before admission of another patient.
- The cleaning staff **MUST** be informed and notified of the specific pathogen and associated barrier precautions before room disinfection.
- The primary clinician, intern and student in charge are responsible for the following procedures so that the room can be fully cleaned and disinfected.
- Throw away **ALL** disposable items in yellow waste containers.
- Seal all yellow waste containers and leave them in the IU until removed by the cleaning personnel.

- All medical equipment undergoes a 24 hours-dipping in a disinfecting solution (Umonium 38® Master) before leaving the unit. Technical staff can then collect it for thorough cleaning and disinfection, and final storage.
- If another patient is admitted before stablemen can disinfect the stall or unit, it must be disinfected by the veterinarians or by the technical staff.
- No other patient should enter the stall without prior disinfection.

2.5.13. Reducing Biosecurity Precautions for a Patient Housed in the Equine class 3 Barrier nursing Unit or class 4 Isolation Unit

- In general, biosecurity precautions will not be reduced for horses with class 4 diseases (they remain in their IU stall). For class 3 patients, biosecurity precautions can be reduced, depending on the disease.
- Only the primary clinician responsible for the patient can authorize the amendment of precautionary requirements or reduce strictness of biosecurity precautions for class 4 patients. If necessary, the CFB can be consulted for advice.

2.6. Management of Patients Infected by or colonized with (Multi)drug-Resistant Bacteria

- Patients infected by MDR bacteria represent a potential health hazard to people and other patients. They are thus managed as class 3 patients and increased biosecurity precautions are implemented to prevent the dissemination in the facilities (yellow apron, disposable gloves, footbath/foot mat, etc.). Bandaging of wounds known to be infected by such pathogens (e.g., MRSA or other highly resistant bacteria) should be performed in low traffic areas that can be easily cleaned and disinfected.

2.7. Biosecurity Precautions for Mares and Foals

- New-born foals hospitalized in the FVM are often at high risk of acquiring infections because of concurrent diseases or compromised immune system. In addition, hospitalized foals and their mares can shed enteric pathogens during the periparturient period. If foals or their dams show signs of contagious disease or come from farms experiencing outbreaks of contagious diseases, they must be housed in the class 3 barrier nursing- or class 4 isolation units, and all protocols should be followed appropriately. Animals with no signs of contagious disease or coming from farms with no reported contagious disease outbreaks can be housed in the neonatal ICU or in the main hospital, and applying the following protocols:
  - Foals **≤ *21 days-of-age***: barrier nursing precautions required for any people in direct contact or entering stalls include => wear disposable gloves and when necessary, a disposable apron, and set up footbaths/foot mats at every entry point to the mare-foal stall.
  - Examination gloves should be disposed of upon leaving the stall to avoid contaminating other areas.
  - People should not enter stalls unless contact with patients is required. Primary clinicians may, at their discretion, take students into a stall for teaching purposes, but such initiative should be minimized as much as possible, and any person entering a stall must use appropriate barrier nursing precautions.

2.8. Equine Surgery and Anaesthesia

2.8.1. Attire for the "Clean" Areas of the Equine Surgical Facility (Refer to the FVM Dress Code)

- Clean surgical light blue scrubs are required to enter designated "clean" areas of the surgical facility, including scrub rooms and surgical theatres. These areas are located behind the red line painted on the facility floor.
- Overshoes or footwear dedicated for use in designated "clean" surgical areas are also required for any person entering the surgical facility.
- Surgical scrubs are to be worn **ONLY in the FVM**; scrubs **CANNOT** be worn outside the FVM building, even when traveling to and from the FVM.
- Outside designated "clean" areas of the surgical facility, any person should wear a protective clean outer garment over scrubs (e.g., white lab coat). Overshoes must be removed when exiting "clean" surgical areas [people wearing dedicated surgical footwear should put on overshoes prior to exiting designated "clean" areas]).
- Every person, including cleaning and maintenance staff, **MUST** adhere to all relevant policies regarding attire worn in equine surgery facilities.

2.8.2. Hygiene for Perioperative Management of Equine Patients

- High standards of cleanliness and hygiene must be maintained everywhere in the equine surgery facility.
- The surgical team and the patient's surgery site must be aseptically prepared. Aseptic conditions must be maintained throughout the surgery.
- Nonessential persons are always prohibited.
- Movement of anaesthesia students and staff between the anaesthesia preparation area and the Equine Hospital will be minimized.
- People must wear clean examination gloves before placing IV catheters.

2.8.3. Guidelines for Perioperative Management of Equine Patients

- Perioperative management of patients can greatly influence the likelihood of surgical site or other nosocomial infections. As such, basic management procedures should always emphasize on the use of barrier nursing precautions and maximize the separation between patients. Standards for personal, patient, and environmental hygiene in the surgical and perioperative areas should be among the highest in the FVM.
- Hands must be washed and sanitized between patients. Hands should also be washed after contact with the patient, to prevent contamination of hand-contact surfaces (e.g., doors, counter tops, equipment, etc.). Examination gloves can be worn, as a barrier nursing precaution, but should be disposed of after each patient. Wearing gloves does not exempt from hand washing and sanitizing.
- Clean examination gloves must be worn when placing catheters or endotracheal tubes.
- Faecal material should be removed immediately from any area of the surgical facility.
- If needed, the floor should be hosed between patients and disinfected with appropriately diluted Umonium 38® Master.
- Equipment such as belly bands, hobbles, mouth syringe, endotracheal tubes, etc., will be cleaned and disinfected between uses using appropriately diluted chlorhexidine.
- Routine (e.g. daily) environmental cleaning and disinfection should be carried out rigorously and following prescribed protocols.

2.8.4. Anaesthesia Induction Area

2.8.4.1. Activities conducted prior to entering the anaesthesia induction area

- Pre-anaesthetic examination forms should be completed the day prior to the surgery, whenever possible. Any known or suspected contagious disease should be clearly reported on the form.
- The surgery site **SHOULD** only be clipped the day of the surgery, to avoid colonisation of incisional sites by potentially pathogenic bacteria if performed earlier.
- Patients should be thoroughly brushed or bathed prior to entering the anaesthesia induction area. The patient mouth should be rinsed outside the induction area. For emergency surgeries, the patient should be cleaned as much as possible.
- Interns assigned to the case are primarily responsible for ensuring that such steps are followed.
- Whenever possible, horseshoes should be removed prior to entering the anaesthesia induction or standing surgery areas. People should wear disposable gloves when handling patient feet then thoroughly wash and disinfect hands after completion. Interns assigned to the case are primarily responsible for ensuring the respect of procedures.
- All horse feet should be picked and scrubbed with chlorhexidine solution prior to entering the anaesthesia induction or standing surgery areas. People should wear disposable gloves when handling patient feet then thoroughly wash and disinfect hands after completion. Interns assigned to the case are primarily responsible for ensuring the respect of procedures.

2.8.4.2. Activities conducted in the anaesthesia induction area

- Patients will be led to the anaesthesia prep area one hour prior to surgery (i.e. scheduled table time), until induction.
- Rinse the patient mouth with water. The metal mouth syringe will be soaked in chlorhexidine solution between cases and should be rinsed prior to use it for another patient.
- Prepare the IV catheter site aseptically and place the catheter using aseptic technique. Clean examination gloves must be worn for this procedure.

2.8.5. Postoperative Activities

- Equine patients must return to their stall as soon as it is safe for them after recovery, to minimise faecal contamination of recovery stalls, and provide sufficient time for their cleaning.
- Recovery stalls must be swept and mopped with Umonium 38® Master solution between patients.
- The oxygen insufflation hose used during recovery must be cleaned and sprayed with chlorhexidine solution (allowing 15 min contact time). The tube distal end (used in the horse) must be cleaned of debris with soap and water, soaked in chlorhexidine solution (allowing 15 min contact time), and rinsed between patients.
- Anaesthesia machines must be cleaned and disinfected between cases:
  - Valves and domes will be cleaned with water, then dried.
  - Y-pieces and reservoir bags will be rinsed thoroughly, soaked in chlorhexidine solution (15 min contact time), then thoroughly rinsed and dried before the next use.
  - Y-piece adapters will be cleaned with soap and water, soaked in chlorhexidine solution (15 min contact time) and rinsed after use.

2.8.6. Other Routine Cleaning and Disinfection Procedures

- All induction, surgery, and recovery areas are thoroughly cleaned and disinfected by technical staff.
- Endotracheal tubes (ET):
  - Clean the inside and outside of ET tubes with mild soap and water, using a scrub brush.
  - Soak ET tubes in a large barrel of chlorhexidine solution for at least 15 minutes.
  - Thoroughly rinse ET tubes with warm water, without setting them down in the sink.
  - Hang ET tubes to dry in designated cabinet of the anaesthesia induction area.

  - ET tubes are stored in this cabinet until needed.
  - **Any ET tube laid on the ground will require disinfection before use.**
- The mouth gag must be soaked in chlorhexidine solution for 15 minutes after use, then rinsed and placed on the rack to dry and prevent corrosion.
- The hobbles are scrubbed with soap and water and soaked in chlorhexidine solution as needed.
- Lead ropes and halters used by the anaesthesia team will be thoroughly rinsed with clean water, scrubbed with soap and water then soaked in chlorhexidine solution as needed.
- All large animal anaesthetic machines and ventilators will be regularly dismantled and thoroughly cleaned/disinfected. Days and times of the cleaning/disinfection process will be recorded in a log file.
- Environmental samples should be obtained from the recovery rooms and surgical theatres on a regular basis and cultured for the presence and bacterial counts of pathogenic bacteria.

2.8.7. Cleaning of the surgical theatre and unit

2.8.7.1. After each procedure

- All surgical equipment, carts and stands are put aside and cleaned properly.
- Blood and other dirt are removed and discarded in yellow waste containers.
- The theatre is pre-rinsed to remove all organic material from the floor.
- The floor is cleaned / mopped with RBS solution.

2.8.7.2. At the end of the day or after an invasive contaminating surgery (enterotomy, sinus or abscess drainage, etc.)

- Surgical theatre should be emptied of all carts, stands and material prior to cleaning.
- All blood or dirt on the floor should be removed and discarded in yellow waste containers.
- Rinse the floor and walls with hose.
- Scrub floor with the disinfecting solution.
- Rinse solution and leave to dry.
- Clean wheels of carts and stands prior to entry in the surgical theatre.
- All waste containers should be removed from the theatre (non-used yellow containers should remain in the theatre overnight).
- Doors should be kept always closed.

2.8.7.3. Once a week

- Empty the room.
- Scrub walls at breast height.
- Clean and disinfect theatre and hall drains.
- Clean table piston.
- Remove dust from tablets and lights.

2.8.8. Management of Surgical Patients with Contagious Diseases

- Clinicians and interns assigned to surgical cases are responsible for identifying and communicating when patients are known or suspected to be contagious (e.g. strangles, etc.).
- Surgeries of such patients should be scheduled for the end of the day or performed in the class 4 IU whenever possible.
- Clinicians and students assigned to these patients are responsible for correctly identifying induction and recovery areas as potentially contaminated with contagious pathogens: they must ensure that these areas are appropriately decontaminated prior to use them with other patients.

2.9. Consultation at the Ghlin racetrack

- The CEMESPO Department (sports medicine) regularly performs consultations at the Ghlin racetrack. From the biosecurity point of view, it is of major importance to separate racetrack activities from the Equine Hospital activities, to prevent cross-contamination of horses between both sites and between individual horses at the racetrack itself.
- The following biosecurity precautions should be applied before, during and after these consultations.
- The same precautions will be implemented for all other CEMESPO activities outside the Equine Hospital.

2.9.1. Preparation for consultation at Ghlin

- A registration of horses is available.
- Any horse suspected at beforehand to suffer from any class 3 or class 4 contagious diseases should be prohibited to come to the racetrack.
- Clinicians, technical staff and students wear clean and specific coveralls provided by the CEMESPO and should not wear attire worn in the FVM. They all wear clean boots that should be disinfected upon leaving the FVM.
- Only equipment and material necessary for consultations will be taken to the racetrack. If possible, separate material and equipment used for racetrack consultations and for the clinic (e.g. separated boxes for needles, syringes to be used at the racetrack and at the clinic). All equipment and material used both during consultations at the racetrack and in the clinic should be cleaned and disinfected before departure and before returning.

2.9.2. During consultation

- Any horse arriving at the racetrack and suspected of any class 3 or class 4 contagious disease at primary examination should leave immediately the racetrack and avoiding any contact with other horses.
- Hands should be washed (with water and soap or with hand sanitizer available on site) after each patient.
- Endoscope, nasogastric tubes, heart rate meters should be cleaned and disinfected between patients.

2.9.3. After consultation

- Equipment and materials dedicated for use at the racetrack will be clearly identified for such use only.
- All double-use equipment and materials should be cleaned and disinfected after use.
- Clothing should be discarded, never worn in the FVM and cleaned. Boots should be washed and disinfected upon leaving the racetrack.

2.10. Equine Colic

- In the future, and because of an increased risk of *Salmonella* spp. shedding, colic patients will be hospitalized separately and managed using more stringent biosecurity precautions. Colic patients are hospitalized, whenever possible, in the ICU, unless they meet criteria for hospitalization in a class 3 barrier nursing unit or in the class 4 IU.

2.10.1. Attire and Precautions

The following rules should be followed by all staff members and students managing colic patients:

- Wear clean protective outer garment as in the rest of the Equine Hospital.

- People should not enter stalls unless contact with patients is required. Primary clinicians may, at their discretion, take students into a stall for teaching purposes, but this should be minimized as much as possible.
- Hands should be washed and sanitized before and after handling every patient.
- Personnel consulting from special services (Imaging Unit, Ophthalmology, etc.) are required to follow the same requirements when handling colic patients.

2.10.2. Guidelines for Managing Equine Colic Patients

2.10.2.1. Case Definition

- All pre-operative and/or post-operative colic cases, as well as acute and chronic/recurrent medical colic cases, should be stalled in the ICU whenever possible.
- *Salmonella*-positive and -suspected patients must be housed in the class 4 IU. Diarrhoeal patients will be housed in a class 3 barrier nursing unit (if: no fever or leukopenia, non-haemorrhagic diarrhoea) or class 4 IU (if: fever or leukopenia or haemorrhagic diarrhoea) (see algorithm #2).

2.10.2.2. Colic Equipment and Materials

- If the patient has a nasogastric tube allowing reflux, all necessary equipment (including pump, tube, bucket and dose syringe if needed) should be put stall-side with the patient.
- When the patient does not need the equipment anymore, it should be thoroughly cleaned with soap and water, then placed into the disinfecting barrel of the main hospital cleaning room where it will be picked up by a technician and taken back to central supply for re-sterilization.

2.10.2.3. Walking and Grazing Areas for Colic Horses

- If the horse defecates while walking, faeces should be picked up and thrown into the dumpster.

2.10.3. Visit of colic horses by Clients

- Please ensure that clients stay with their horse and do not wander around the hospital observing or interacting with other patients.
- The number of visitors per patient should be limited; please ask clients to use discretion.
- Clients must follow all procedures regarding footbaths/foot mats and hand washing.

2.11. Deceased patients

2.11.1. Cleaning up of patient environment after death

- Stablemen should be notified as soon as possible when a patient is deceased or euthanized.
- The trolley in front of the stall should be cleaned and all records should be collected and sent to the secretary's office.
- Stalls used to house patients of classes 1 and 2 should be cleaned (remove manure and wet bedding) and disinfected before a new horse enters the stall.
- Stalls used to house patients of classes 3 and 4 should be marked with a sign: grey/orange flag on the door and "to be disinfected" written on the board. No other horse is allowed to enter these stalls before complete cleaning and disinfection.
- Students, nursing staff, and clinicians are responsible for tidying up items around the stall and ensuring that they are discarded, filed, or cleaned and disinfected (fluids, brushes, barrier gowns, etc.).

2.11.2. Storage of patient body

- If the horse is deceased or euthanized in the stall, the cadaver should be removed as soon as possible.

- If the horse was euthanized in a recovery box, the horse should be removed as soon as possible. The recovery box should be cleaned and disinfected afterwards.
- During the process of euthanasia and cadaver removal, the unit should be closed to limit the view for passing owners.
- The horse cadaver should be taken to the Necropsy Department in a water-resistant transport container, with help of the Forklift (Bobcat), as soon as possible:
  - During weekdays and working hours: immediate transport of the cadaver to the Necropsy Department is mandatory.
  - During evenings or weekends: the cadaver should be transported the following morning, including Saturday morning, or Monday morning. In the meantime, the cadavers will be stored in the B41 cold chamber.
- Whenever possible, a class 3 or 4 dead patient should remain in the stall until its direct transport to the Necropsy Department by the FVM Forklift.
- The cadaver of a class 4 patient with a reportable disease will be stored in the B41 cold chamber, then evacuated following the instructions of FASFC (Federal Agency for the Safety of the Food Chain) officers.
- After transporting a cadaver, the Forklift should be thoroughly cleaned and disinfected outside the Necropsy Department.

2.11.3. Referral for

2.11.3.1. Pathology

- The Forklift brings the cadaver to the Necropsy Department where it will be placed in:
  - The cold chamber if a necropsy must be performed. In such case, the necropsy request form should be clearly taped to one of the cadaver's legs. On the outside of the request form, it should be clearly mentioned to which class the horse belonged (class 1-2, 3 or 4).
  - **OR** in the cadaver resembling container for further collection by the rendering plant if no necropsy is needed. This occurs when no request form is present on the horse. However, it should be clearly mentioned if the patient falls into the class 3 or class 4 category.

2.11.3.2. Cremation

- If the owner asks for cremation:
  - The following services should be informed: *Cremanima Respet*, in Sombreffe (Phone: 071/88 88 45), or *Samsara Eternity*, in Soignies (Phone: 067/49 32 80).
  - It is the client responsibility to take all the appropriate measures to transport the horse to the cremation unit as soon as possible.
  - While waiting for the transport, the cadaver should be stored in the B41 cold chamber.
- Cremation is not possible for class 4 horses since cadavers are not allowed to leave the faculty; they should be transported to the Necropsy Department as soon as possible, except for patients with a reportable disease; in such cases, the cadaver will be evacuated following the instructions provided by the FASFC veterinary officers.

2.12. Breaking Transmission Cycles

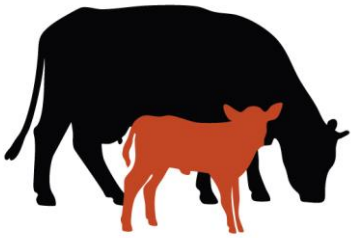
2.12.1. Visitors in the Equine Hospital

- See the general part of the Biosecurity Protocol for more information concerning clients, visitors, children and companion animals in the FVM.
- Visiting hours for the Equine Hospital are from 14:00 to 18:30, Monday to Sunday and public holidays. Under no circumstances are owners allowed to stay overnight with their horse in the Equine Hospital.

- All visitors must check in at the Equine Clinic reception desk prior to entering the Hospital. A student, clinician, or equine nurse should escort clients to the stall housing their animal.
- Clients must adhere to all barrier nursing requirements that apply to their animal if they enter the stall or touch it.
- All visitors should be informed to wash and disinfect their hands after leaving inpatient areas.
- Clients may visit their animal but are not allowed to wander in the facility and specifically are not allowed to touch other patients, read stall cards or TTM orders. Information on other patients is confidential, including diagnoses, and should not be disclosed.
- The public is not allowed to tour inpatient areas of the Equine Hospital. Special arrangements can be made to provide tours.
- Owners may visit hospitalized inpatients; other interested parties are not allowed to visit inpatients without express authorization of owners.
- Owners (but neither the neighbours, nor the barn manager, nor the referring vet) can visit their horses only from the outside perimeter of the class 3 stall; they are not permitted to enter the stall. They should be informed on the contagious risk of their horse for horses outside the Equine Hospital (at the owner's home or at the barn). As for any other owners, they are not allowed to visit other parts of the Equine Hospital.
- Clients are **only exceptionally** allowed to visit animals housed in the equine class 4 IU. Exceptions may be granted under extraordinary circumstances, such as when patients are critically ill, hospitalized for very long periods or are going to be euthanized. In such cases, the same biosecurity SOP are applied for owners, and they should be accompanied by the veterinarian responsible for the case.
- Dogs or other companion animals are not allowed in the Equine Hospital.

2.13. Risk Communication

- See Chapter 1 of FVM Biosecurity SOPs for information concerning risk communication at the FVM.



Chapter 3.

RUMINANT BIOSECURITY SOP

3. Ruminant Biosecurity SOP

3.1. General Attire - Clinic of Ruminants

General Attire

- Coveralls and rubber boots are the required personal attire for activities in the Clinic of Ruminants (CRum).
- Students put their personal attire on in the dedicated area next to Amphi B (equipped with lockers). It is not allowed to arrive in the CRum already equipped.
- Before entering the CRum, students leave their personal belongings in the dedicated lockers next to Amphi B. They put their personal attire.
- Street shoes must be available for activities organised in classrooms: neither coveralls nor boots are allowed in these areas.
- Students and staff must walk through the cleaning foot bath located next to the main entrance before entering the clinic.

Footwear

- Washable boots are required for all students and categories of staff in all patient care areas of the CRum. They are recommended to be heavy and sturdy to protect feet from crush injuries.
- Boots may NOT be worn, neither in classrooms, nor in offices (including secretary's office).
- Staff and students wearing inappropriate boots will be asked to leave the CRum until they come back with appropriate boots.
- Staff and students must clean and disinfect footwear while working.
- Rubber boots should be cleaned and disinfected regularly, and whenever they are obviously soiled or contaminated. Special no-hand systems are installed in each unit to scrub, clean and disinfect the boots.
- Stablemen may wear specific sturdy washable work shoes when not in contact with animals or their faeces. These work shoes should be dedicated for use in the CRum only!

Outerwear

- Clean coveralls are compulsory MUST be worn by all staff members and students to minimize the risk of inadvertent transmission of infectious pathogens to people or animals outside the FVM.
- Clean coveralls must be worn in all patient care areas of the hospital. Coveralls should be changed or cleaned daily or more frequently if they become macroscopically contaminated or dirty.
- Washing of staff coveralls is achieved in the Clinical Department of Food-Producing Animals.
- Surgical Attire:
  - Clean blue surgical scrubs, cap, mask and cover-boots are required for surgical procedures.
  - Wearing a disposable gown is required for laparotomy on standing cattle.
  - A clean white lab coat must be worn over scrubs when handling pre- and post-operative patients.

3.2. Biosecurity Students

- Each week, two MVM 3 students (option food-producing animals) are designated as biosecurity students.
- Biosecurity Students are responsible for:
  - Footbaths/foot mats maintenance
  - Daily inventory of material and supplies to ensure correct biosecurity
  - Cleaning and Disinfection of the consultation room
  - General cleaning and disinfection

3.3. General Cleanliness and Hygiene

- Persons entering the CRum should use the main entrance accessed from the B42 yard (and not use the walkthrough from the equine treadmill). The walkthrough between ruminants and equine areas should only be used for admission of class 3 ruminants.
- A boot washer is located outside the CRum, next to the main entrance, and is available for visitors.
- Hands must be washed and disinfected with an alcohol-based sanitizer prior to, and after examining, each patient (see Chapter 1 - for the hand washing protocol).
- Clean examination gloves should be worn when handling a patient, biological fluids or wounds.
- Surfaces or equipment biologically contaminated (faeces, secretions, or blood) must be cleaned and disinfected immediately by the staff or student(s) handling the patient. This is especially important regarding patients known or suspected of shedding important pathogens. Cleanliness is the responsibility of **ALL** people involved in the Clinic.
- People are required to walk through all disinfecting foot mats/footbaths that are encountered. Regarding footbaths, people are expected to fully immerse footwear, after scrubbing with a brush to remove organic debris.
- All equipment or material (e.g. stomach tubes, paring knife, mouth speculums, endoscopes, and thermometers, etc.) must be disinfected or sterilized before use.
- Instruments and equipment such as buckets, stomach tubes, fluid pumps, funnels, and mouth speculums must be cleaned then disinfected with 0.5% chlorhexidine after use. When applicable, return equipment for complete sterilization.
- Trolleys used for patient transport are systematically cleaned then disinfected outside the clinic after use. A card is then attached to it to specify which disinfectant was used, to ensure a correct contact time (15 minutes for Virocid® vs. 2 hours for Keno™cox)
- Equipment wheels or sides soiled with faeces must be cleaned and disinfected prior to entering or leaving the facility or before use in another area.
- The student premises should be kept clean including table, counter tops and floors.
- Rectal thermometer, stethoscope, haemostats, and scissors must be cleaned then disinfected between patients using 70% isopropyl alcohol or 0.5% chlorhexidine available in various areas.

3.3.1. Appropriate cleaning

- It is of major importance for basic hygiene and for reducing the infection pressure to house patients in a **clean stall**.
- Before using a stall, faeces or dirty bedding should be removed and the stall cleaned and disinfected before hospitalisation of a new patient.
- Stablemen clean the stalls and the hallways twice a day. If a stall is dirty outside their working hours, students and veterinary staff (interns and clinicians) should remove faeces and wet bedding.
- In the case of neonates, patient hygiene is of extreme importance and thus, as soon as a pile of faeces or wet bedding is present, it should be removed by students or veterinary staff.

3.3.1.1. Procedure

- **When a ruminant is discharged**, the stall should be cleaned as soon as possible.
  - If the patient was suffering from a contagious disease, the box should be marked by the veterinary staff: "**to be disinfected**". The stablemen should empty, clean and disinfect the box as soon as possible, but ideally, after cleaning the non-contagious stalls (see disinfection protocol). The stall is considered as a contagious area until disinfected and thus, no new case should be admitted in it before complete cleaning and disinfection.
  - Boxes used for non-contagious patients are regularly emptied, cleaned and disinfected between patients. The stall should be cleaned between patients, but the frequency of disinfection depends on the case turnover; this is not necessary after each animal, but as often as possible.

- **Water buckets or automatic drinkers** should be regularly cleaned and cleaned and disinfected between patients. When a patient is hospitalised, the automatic drinker should be checked, to see if it works correctly, and one should verify the animal knows how to drink from it. If the ruminant drinks from a bucket, the presence of water in the bucket should regularly be checked and the bucket re-filled with fresh water at least twice a day or whenever it is necessary.
- **Mangers** should be cleaned every morning before feeding and cleaned and disinfected between patients. If a patient has not eaten all feed, the clinician should be informed and feed removed from the manger.
- **Patients** should be kept as clean as possible, regularly brushed and eventually sheared or clipped.
- **The environment around the stall** should be clean, tidy and neat, which means without medications or materials scattered around, neither bedding outside the stable or box, nor student personal belongings. An effort is expected from all people working in the clinic to tidy up material once it has been used (and not to leave it for someone else).
- If a patient **defecates outside a stall** (whether inside or outside a building), faeces need to be removed immediately. If a patient **urinates** inside (but not outside) a building, urine should be removed and the floor cleaned and dried.

3.3.2. General Disinfection Protocol

- Gloves and appropriate attire should be worn whenever using disinfectants. Gloves providing protection against chemical risk must be worn when handling disinfectants. Additional PPE (mask, face shields, goggles, water-resistant clothing and boots) should be worn only when there is a probability of splash from the disinfection process.
- Remove all bedding and faeces prior to disinfection. The presence of gross contamination will inactivate most disinfectants. Care must be taken to minimize aerosolization and further spread of potentially infectious pathogens.
- Wash the stall, including walls, doors, automatic water drinker and manger with Keno™san detergent (Cid Lines) sprayed through the foaming equipment; scrubbing or mechanical disruption is always needed to break down films and residual debris that prevent or inhibit the disinfection process.
- Thoroughly rinse the cleaned area to remove any detergent residue (note: some disinfectants may be inactivated by detergents or soap; therefore, it is very important to rinse correctly after cleaning).
- Allow area to drain or dry as much as possible to prevent dilution of disinfectant solutions.
- Wet the stall, including walls, doors, automatic water drinker and manger, thoroughly with the disinfectant at the appropriate dilution (Virocid® or Keno™cox [calves' unit] – Cid Lines). This disinfectant should remain in contact with surfaces for 15 minutes for Virocid® and 2 hours for Keno™cox, particularly if the stall might be contaminated with infectious pathogen(s).
- Remove excess disinfectant with water.
- The disinfectant should be rinsed off all surfaces prior to housing a patient in a box or stall.
- After disinfection, remove the protective attire and wash your hands.
- All multiple use areas (*e.g.*, stocks and examination rooms) where animals are examined or treated, should be tidied up, cleaned and disinfected by people (students and staff) responsible for the patient – irrespective of the animal infectious status.

3.3.3. Footbaths and Foot mats

- A foot bath is installed at the entrance of each calves' unit and a foot mat is found at the entrance to the Class 3 unit.
- Footbaths and foot mat disinfecting solutions are changed every morning by students in charge of biosecurity.
- Footbaths and foot mats solutions should be changed whenever they contain excessive amounts of bedding or dirt.

- Footbaths and foot mats should be refilled when dry or low on volume; this is the responsibility of students in charge of biosecurity.
- People are required to use footbaths or foot mats appropriately whenever they are encountered. Footbaths require full immersion of feet, and therefore waterproof footwear must be worn wherever such devices are used.

3.3.4. Disinfection Protocol for Instruments and Equipment

- All instruments, equipment or other objects, including stomach tubes, paring knife, nose pinch, mouth speculums, endoscopes, grooming tools, clipper blades, etc. must be cleaned and disinfected or sterilized between uses on different patients.
- Materials that are sterilized between uses (e.g. surgical instruments) undergo:
  - A first cleaning in the dishwasher (long programme).
  - Sterilisation in the dry heat oven (180°C for 3 hours).
- **Stethoscopes**:
  - Personal stethoscopes (staff and students) may be used on animals in the non-contagious areas but must be regularly disinfected with alcohol or hand sanitizer solution (recommendation: at the beginning and at the end of the day). Immediate cleaning and disinfection are required when stethoscopes are visibly soiled or after examining a class 3 or class 4 patient (suspicion of infectious disease).
  - Individual, FVM-owned stethoscopes are assigned for use with contagious patients (class 3 and class 4). These are stored in the class 3 or class 4 box left next to the stall during hospitalization then cleaned and disinfected after discharge.
- **Thermometers**:
  - Glass thermometers are forbidden in the FVM to avoid mercury exposure if broken.
  - Electronic thermometers are used instead: they should be thoroughly cleaned and disinfected using alcohol and/or chlorhexidine wipes after use.
  - Multi-use thermometers should never be used on patients suffering from enteric infectious diseases (e.g. BVD, salmonellosis).
  - Immediate cleaning and disinfection are required after use.
  - Individual, FVM-owned thermometers are assigned for use with class 3 and class 4 patients. They are stored in the class 3 or class 4 box left next to the stall during hospitalization and cleaned then disinfected after discharge.
- Other staff instruments and equipment (e.g., haemostats, scissors, etc.) may be carried and used on multiple patients, but must be cleaned then disinfected between patients using 70% isopropyl alcohol or 0.5% chlorhexidine available in various areas.
- People walking patients are responsible for cleaning any faeces from the ground. Shovels and forks are available in many locations throughout the barn.
- Student premises and offices must be always kept clean and neat, including tabletops, counter tops, and floors. Personal belongings should be stored in the lockers of lecture theatre B ("*amphi B*"). Do not store extra clothing, backpacks, etc. in the breezeway or the staging area.

3.3.5. Summary of Detergents and Disinfectants Approved for Use in the Clinic for Ruminants

- **Detergents and soaps**:
  - Baktolin® (Hartmann) for handwashing
  - Keno™san (Cid Lines) for surfaces
- **Disinfectants**:
  - Bleach for disinfection of surfaces in case of leptospirosis
  - Cid 20® (Cid Lines) for footbaths/foot mat
  - Hyprelva® (Hypred) for footbaths/foot mat

- Virocid® (Cid Lines) for footbaths/foot mat and routine disinfection of surfaces and equipment
- Keno™cox (Cid Lines) for disinfection of surfaces and equipment in case of diarrhoea (e.g. calves with coccidiosis and cryptosporidiosis)
- Virkon™ S (Lanxess Deutschland GMBH) in the event of a health crisis (e.g. contagious infectious disease)

3.3.6. Food and Beverages

- No food or drink is allowed in the CRum except in student premises (room 0.35c – duty room).
- Food and beverage should be sealed in non-spill containers and stored in the lockers (MVM 3 students: or in the fridge of the students' duty room).
- **DO NOT LEAVE FOOD OUT AT ANY TIME.**

3.4. Guidelines for Receiving and Managing Ruminants

3.4.1. Patient History (phone call from referring vet practitioner or animal owner)

- If, based on the patient history, the clinician suspects a class 4 disease (e.g. reportable disease), she/he will notify the referring veterinary practitioner or the animal owner that it cannot be admitted at the clinic. A visit of the FVM staff to the farm is then proposed for patient examination.
- The following conditions should discourage patient admission and be replaced by an on-farm visit by the FVM staff:
  - Non-tagged calves
  - Unknown BVD status (adults or calves)
- If the BVD status is unknown (ear notching or blood sample), the referring vet practitioner will be asked if no PI (persistently infected) calves were identified in the farm over the previous two years; a blood sample is sent for BVD-PCR to the regional reference laboratory (Arsia).
- Information on IBR status must be considered as well; indeed, the CRum is officially IBR-free since March 1st, 2018. Thus, no patient coming from a non-officially free herd is accepted; an on-farm visit is proposed.

3.4.2. Outpatients

Reception of outpatients

- Ruminants with no sign(s) of a reportable disease should be unloaded in B42 yard.
- Before unloading, the class of risk should be determined by the clinician:
  - A class 3 patient will be directly led to the class 3 unit through the pathway between theatre B (*Amphi B*) and the CRum.
  - **A class 4 patient will not be unloaded in B42 yard**! An on-farm visit will rather be suggested as a class 4 patient should not be admitted at the clinic.
- Trailers should not block the access between the CRum and the road. They can be parked temporarily in the yard or along the access to the clinic.
- Outpatients should never be fed but may be watered using an FVM-bucket, which will be cleaned and disinfected by the staff with chlorhexidine at the correct concentration before and after use.

3.4.3. Inpatients

Routine management of inpatients

- The staff assigns the stalls to patients. The class of risk MUST be indicated on the stall patient's card.
- Any leads or halters that came with the patient should, whenever possible, be sent home with the owner. If not, they should be machine-washed then soaked in a disinfecting solution before being left to dry and be returned to the owner. If not possible, the halter will be clearly identified with the patient's name so that it will not be used for another animal. When the patient is discharged, halter and rope will be cleaned and disinfected before using them for another patient.

- A patient's card must be prepared and placed on the stall immediately upon occupancy; it includes the following data:
  - Client/patient information
  - Class of risk (1-2 or 3)
  - Clinician's names
  - Any safety information for handling the patient (e.g. aggressive, etc.)
  - Feeding instructions (approved by the clinician in charge of the patient)
- Fresh water must be provided to each patient, except when restriction is ordered by the clinician.
- Feeding instructions should be discussed with the staff. Feeding of patients is the responsibility of stablemen except when specific recommendations involve students.
- Stablemen will clean the stall in the morning and add fresh bedding as needed except if emergencies arrived during the night.
- After a patient discharge, put the stall card on the door to inform on its departure.

3.4.3.1. Stall Assignments

- Individual boxes at the entry of the hospital (rooms 0.48a, b, c and d) are dedicated to bulls and down cows. Small ruminants and calves less than 150 kg are housed in the individual boxes at the back of the hospital (rooms 0.41, 0.42 and 0.43).
- Patients with known or suspected contagious or zoonotic infections (class 3) occupy the four boxes located in the equine part of the clinic, in the bounds of possibility.
- Patients with known or suspected reportable animal disease in Belgium (class 4) must be housed in the large animal class 4 or isolation unit (IU) (building B41).
- A rope will be assigned to each patient; it must be hanged in front of the box during the whole hospitalisation while not used.

3.4.3.2. Stall Cards, Treatment Orders and Patient Census Board

- A stall card **must** be posted by the time of patient's admission.
- The front of the stall card must list pertinent client and patient identifications, the class of risk, as well as the names of students and clinicians assigned to the case. Feed to be distributed to the patient (type of forage and concentrates) should also be listed.
- The back of the stall patient's card must list the admitting complaint or attempted diagnosis especially for a suspicion of infectious disease (such measure allows the cleaning crew to better understand the infectious hazards and the precautions to be taken with the patient).
- The infectious status indicated on the back of the stall card must be updated if the patient status evolves during hospitalization.
- Patient information must also be recorded on the census board of room 0.17. Anticipated discharge date and time should also be specified on the census board once they are known.
- A care sheet is posted on the stall door; it is filled by students at each care and is controlled twice a day by Clinicians.
- Stall cards, TTM orders and the patient census board contain confidential information on the patient. As such, visitors should never be allowed to read such information for animals they are not concerned with.

3.4.3.3. Feed and Water

- A numbered nursing bottle and a bucket will be assigned to each calf while hospitalised.
- All concentrates or other supplements (including those provided by the clients) must be stored in plastic containers with tight fitting covers.
- Only minimal amounts of forage, and concentrates should be stored in the clinic, to decrease the likelihood of contamination and the availability of food and hiding places for wildlife.

3.4.3.4. Bedding

- Stablemen are responsible for bedding stalls and feeding patients as they arrive, except for emergencies admitted during the night.
- Occupied stalls are systematically cleaned and re-bedded with clean straw in the mornings and evenings by stablemen.
- If the stalls are excessively soiled or wet meanwhile, students, clinicians, and technical staff are responsible for cleaning and re-bedding stalls.
- Only minimal amounts of bedding are stored in the clinic to decrease the likelihood of contamination and decrease suitable habitat for rodents and birds.

3.4.3.5. Cleaning Protocols: Ruminant facilities

- **Ruminant trailer/parking area**
  - The FVM trailer is cleaned and disinfected after each transport.
  - The unloading area is cleaned once daily on regular workdays and every time faeces, urine or straw soil the ground.
  - The breezeway is cleaned (*e.g.*, swept and hosed) twice weekly and disinfected weekly by the cleaning crew.
- **Ruminant examination areas**
  - Areas soiled by faeces, discharges, urine, or blood must be cleaned and disinfected immediately by attending personnel.
  - Cleanliness is ultimately the responsibility of clinicians.
- **Main hospital**
  - Monday through Saturday, the day crew picks stalls in the morning and in the evening and adds fresh bedding as needed.
  - On Sundays and public holidays, another crew picks stalls in the morning and adds fresh bedding as needed.
  - The ruminant crew feeds hay concentrates and milk in the morning and in the evening, unless otherwise specified on the stall card, and sweeps the hospital ways after morning feeding.
  - All grains/concentrates must be stored in plastic garbage cans with lids.
  - Equipment wheels or sides soiled with faeces must be cleaned and disinfected prior to entering or leaving the facility or being moved to another area.

3.4.3.6. Routine Stall Cleaning

General cleaning principles:

- Order of cleaning for stablemen:
  - Class 1 calves
  - Class 2 calves
  - Class 1 adults
  - Class 2 adults
- Class 3 boxes will be cleaned by a dedicated stableman, and if not possible, after cleaning class 1 and class 2 units.
- Unconsumed feed must be emptied from the manger before adding new feed, and the clinician/intern must be informed.
- It is imperative to remember that, when considering disinfectants, more does not mean better!
- Using the correct disinfectant dilution, as recommended by the manufacturer, provides an optimum disinfecting action.
- Overuse of disinfectants may encourage resistance in microorganisms and contribute to the development of biofilms.
- To ensure their effectiveness, disinfectants must be used on **CLEAN** surfaces.
- Biofilms develop in areas of standing water, and where disinfectant is allowed to sit on dirty surfaces.

- Be careful when working in high-risk areas — avoid contaminating equipment or other areas (e.g. when picking stalls into dumpsters, avoid dropping manure on the ground).

General procedures for decontamination of a vacated class 1 and class 2 stall:

- Remove all bedding and feed into a dumpster.
- Sweep floor to remove small debris.
- Use the Clinic cleaning station to clean floor and walls with a detergent (Keno™san) and remove gross debris; scrub soiled areas using detergent and a brush.
- Rinse the entire stall with water.
- Disinfect the stall with:
  - Virocid® (Cid Lines) for routine disinfection
  - Keno™cox (Cid Lines) after housing a diarrheic calf
  - Virkon™ S (Lanxess Deutschland GMBH) in the event of a health crisis (e.g. contagious infectious disease)
- Allow to dry.
- Clean and disinfect adjacent aisle-way as above.
- Cleaning tools must be cleaned and disinfected daily (including handles).
- Dumpsters used in the CRum should not be used into the equine facility or vice versa.

Decontamination procedures for any class 3 vacated stall

- Wear barrier clothing, put gloves on and use foot mat
- Remove all bedding into the class 3-dedicated dumpster. Avoid dropping manure/straw outside the dumpster. Avoid any contact between patients and the dumpsters.
- Sweep to remove small debris.
- Use the cleaning station to clean floor and walls with a detergent (Keno™san)
- Rinse, then apply an approved and correctly diluted disinfectant, as recommended by the manufacturer, i.e. Virocid® or Virkon™ S.
- Allow disinfectant to remain in contact for at least 10-15 minutes.
- Hose floor and walls to rinse the disinfecting solution.
- Allow to dry.
- Cleaning tools must be cleaned and disinfected (including handles) prior to cleaning the next stall.
- Aisle-way must be hosed and disinfected daily.
- Occasionally, stalls will be cleaned and disinfected with a high-pressure cleaner. However, it is not a routine procedure for these stalls.

Weekly Routines

- Clean the floor of the feed room (i.e. sweep, rinse, scrub with detergent then rinse again).
- Sinks in aisle-ways and in the general TTM area should be cleaned and disinfected with correctly diluted disinfectants, as recommended by the manufacturer, by technicians or barn crew.
- Empty stalls should be hosed with water if not used within one month to remove accumulating dust.
- The CRum corridors are cleaned once a week with Keno™san applied thanks to a scrubbing machine.

Monthly Routines

- Areas that are not used daily (i.e. tops of walls, scales, wash rack, etc.) should be hosed monthly to prevent dust accumulation.
- Sweepers should be cleaned and maintained.

Semi-annual Routines

- All floors should be stripped, cleaned and disinfected with Virocid®.
- Calf boxes should be thoroughly cleaned, scrubbed, and disinfected top to bottom.
- Drains in the large animal IU should be scrubbed with detergent — brush available on site — rinsed, then filled with disinfecting solution — do not fill a drain with disinfectant without cleaning it first.

Annual Routines

- The entire clinic is thoroughly cleaned, scrubbed and disinfected from top to bottom, including all equipment.
- During summer holidays, after the annual cleaning/disinfection process, the facilities are left emptied for two weeks, to allow a complete drying and the death of environmental microorganisms.
- An airborne decontamination with hydrogen peroxide 6% (Nocospray®) is performed in the calves' unit and in the <300 kg surgery room, once a year, during the downtime period.

General Cleaning

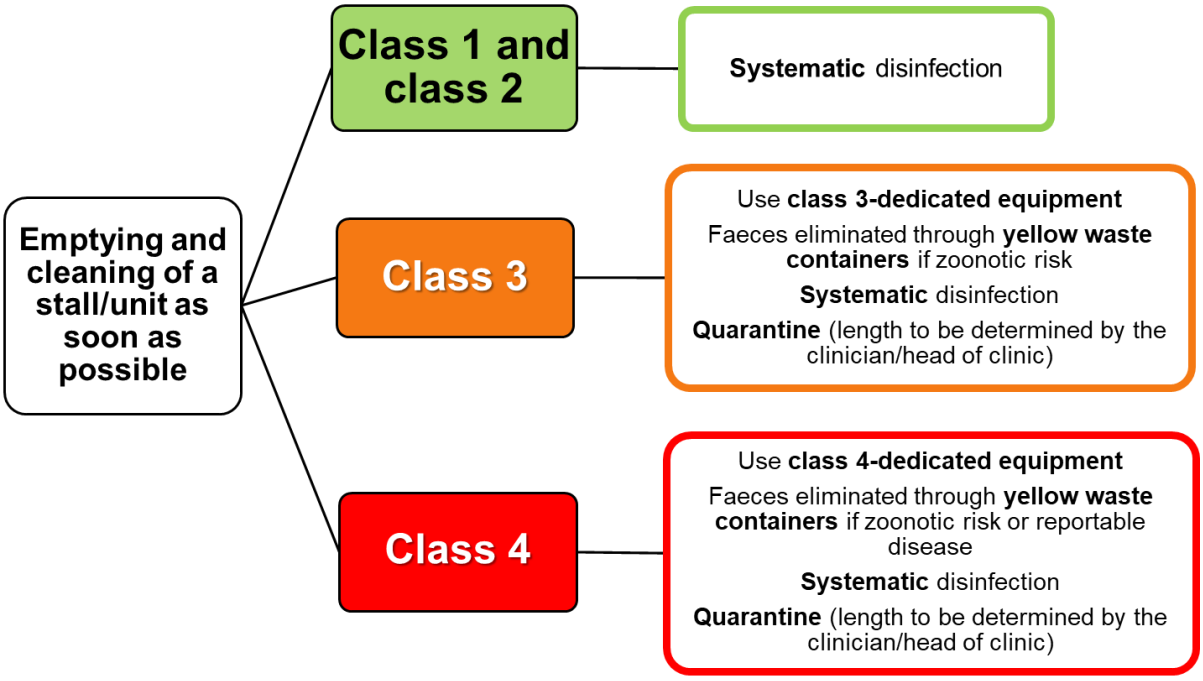
- When the forklift (Bobcat) is used to take cadavers to necropsy, it must be thoroughly cleaned and disinfected at the necropsy dock with the professional high-pressure cleaner available on site.
- Storage of feed (hay) and bedding should be minimized, and the feed storage area will be cleaned weekly to avoid rodent infestation. Rodent traps will be set up in these areas and in the main feed storage areas by the barn crew.

3.4.3.7. Discharge

- Prior to discharge, clients must be informed on potential infectious hazards associated with their animal; they should be informed on infection control on their own premises. The anticipated time and date of discharge should be indicated on the census board.
- A signboard 'DISCHARGE' should be hanged on the stall door (to avoid unnecessary bedding)
- When patients are discharged, stablemen should be notified as soon as possible to ensure a rapid cleaning of the stall.
- When a patient is discharged, the stall card should be tossed in the stall to indicate that the animal is no longer hospitalized.
- A stall that housed a patient with a known or suspected contagious disease should be marked with a sign **'DO NOT USE, SPECIAL CLEANING REQUIRED'**. The known or suspected infectious disease must be marked on a white tape marker placed on the stall door. The biosecurity contact person, and the supervisor of cleaning and maintenance crew should be notified of the patient stall number and ID.
- Students, nursing staff and clinicians are responsible for breaking down items around the stall and ensuring that they are discarded, filed, or cleaned and disinfected (fluids, brushes, barrier gowns, paperwork, etc.).
- All material used for the patient (infusion bottles, ropes, buckets, hoses, pomp) will be collected, then cleaned and disinfected if in direct contact with the patient. Heating lamps will be tidied away.

3.4.3.7.1. Stall cleaning and disinfection

- Decision tree for **stall cleaning and disinfection**



3.4.3.8. FVM Equipment

- Client's tack (e.g. halters, leads, blankets, etc.) should not be left with the patient but sent home.
- The FVM supplies halters and leads for patients. FVM-owned tack is stored at the patient's stall when not in use. All tack supplied by the FVM is cleaned and disinfected between patients by soaking in chlorhexidine solution.
- All equipment/material provided by the FVM is systematically cleaned and disinfected between patients.

3.4.3.9. *Salmonella* Surveillance in Ruminants Patients

- To date, the clinic has never been confronted with hospital-acquired salmonellosis.

3.4.3.9.1. Surveillance of *Salmonella* spp. in the Clinic of Ruminants

- After housing a *Salmonella*-positive patient, the housing stall must be cultured after routine cleaning and disinfection before being released for housing another patient.
- Technicians responsible for the stalls or the veterinarian(s) responsible for the patient should notify the CFB ASAP **(email sent to the following address: biosecurity-fmv@lists.uliege.be)**.
- The stall will be completely cleaned and disinfected prior to sampling.
- FVM Staff reports culture results back to the CFB as soon as they become available.
- If cultures come back *Salmonella*-positive, the cleaning and disinfection procedure will be repeated.
- The stall cannot be used for housing another patient until cultures provide negative results.
- These data should be recorded in a log accessible at the secretary's office at any time. They should be routinely summarized and reported to the CFB.

3.4.3.9.2. Routine environmental surveillance

- Routine environmental surveillance on smooth floors and hand-contact surfaces throughout the hospital should be conducted every 6 months for most areas, and more frequently for areas more susceptible to be contaminated with *Salmonella* spp. (every 3 months for the class 4 IU).
- Culture results are recorded in a log accessible at any time at the secretary's office. Results are also communicated to the CFB as soon as available.
- These data are routinely summarized and reported by the CFB.

3.5. Management of Patients with Suspicion of Contagious Disease

- Special precautions are required when managing patients known or suspected to be infected with contagious pathogens. Because of their potential for hospital-acquired transmission, special conditions of concern include:
  - Calves with acute gastrointestinal disorders (e.g. diarrhoea) suspected of cryptosporidiosis.
  - Acute respiratory diseases of viral origin
  - Infections by (multi)drug resistant bacteria.
  - Small ruminants suspected of Orf (contagious ecthyma) or caseous lymphadenitis
- Patients with a high risk of contagious disease (e.g. no status for infectious diseases such as IBR and BVD) will be managed as outpatients or isolated from the general hospital population if clinical signs occur while hospitalised (in function of the disease) and discharged as soon as possible.
- The CFB should be notified as soon as possible **(email sent to the following address: biosecurity-fmv@lists.uliege.be)** when a patient with a high risk of contagious disease is admitted or develops suspicious clinical signs while hospitalized.
- When patients with a high risk of contagious disease are housed in the main inpatient areas, effort must be made to use appropriate barrier nursing and biocontainment practices.
  - Barrier nursing precautions must always be applied.
  - Stalls in the main housing area used for these patients should be cordoned off with barricades.
  - Adjacent stalls should be kept empty if possible.
  - Use class 3 stalls (equine corridor of the clinic) or large animal class 4 (IU of B41).
  - The suspected or confirmed disease status must be relayed to the CFB as soon as possible (biosecurity-fmv@lists.uliege.be) so it can assist in communication and evaluate if appropriate precautions are taken to house the animal.
- All calves and small ruminants with a history or clinical signs suggestive of contagious enteric condition and respiratory disease will be examined and hospitalized in the calf unit as deemed appropriate by the clinician on duty.
- Large ruminants with a history or clinical signs suggestive of contagious enteric condition, respiratory disease, or BVD/mucosal disease should be examined in the trailer. The clinician is responsible for determining the likely diagnosis and will decide whether the animal is admitted for inpatient hospitalization and/or TTM.
- Any three of the following clinical signs are suggestive of contagious enteric disease:
  - Diarrhoea
  - Septic mucous membranes
  - Fever
  - Weight loss
  - Hypoproteinemia
- Any three of the following clinical signs are suggestive of contagious respiratory disease:
  - Tachypnoea-dyspnoea
  - Nasal discharge
  - Fever
  - Roaring
  - Cough

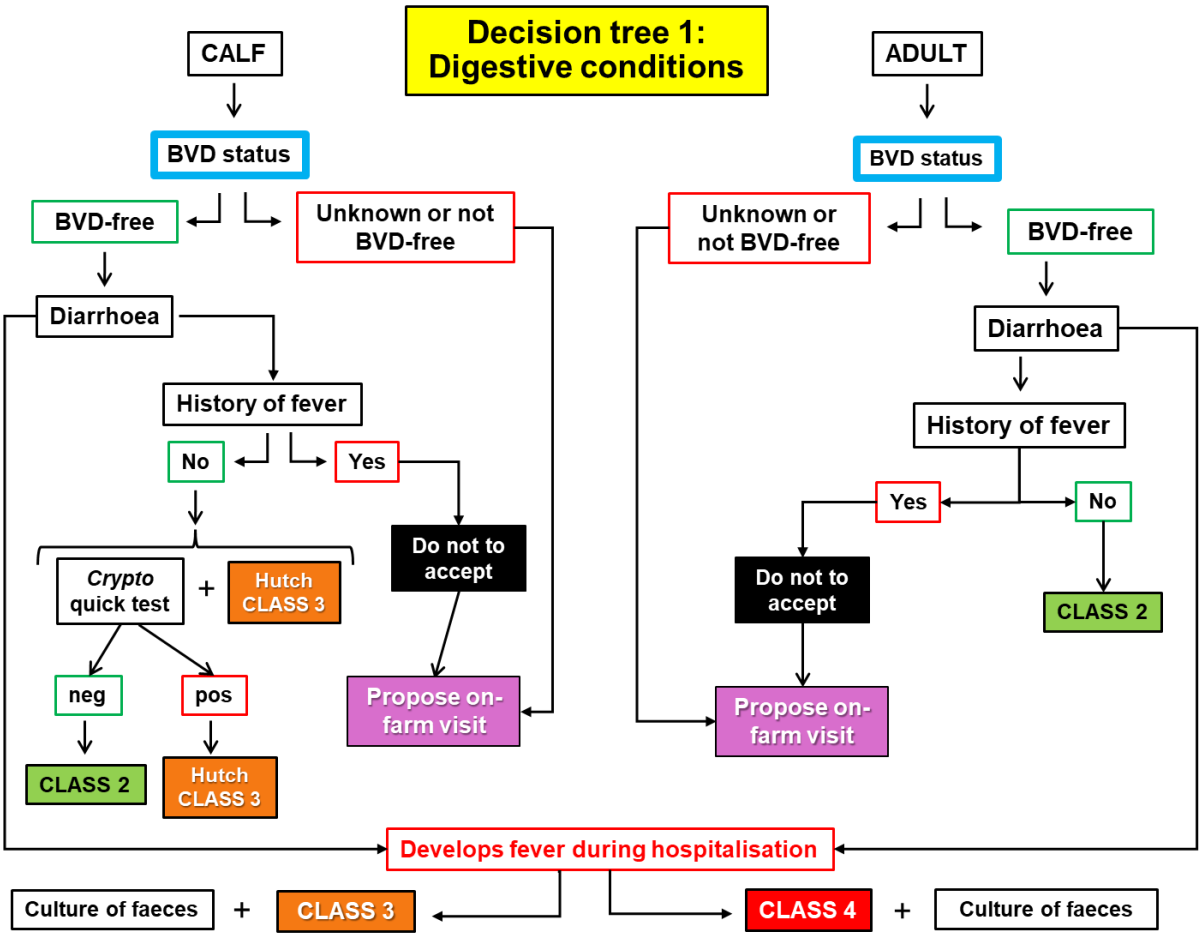
- The contagious status of patients that must be housed in the clinic should be written on the back of their stall card. In class 3, cones with chains will be placed if several patients are hospitalised, to delimit the zones assigned to each box in the common area of class 3 and to reduce traffic in the area. Stalls on either side of the contagious patient should be left empty as much as possible.
- It is critical to limit the number of persons in contact with the patient.
- Diarrhoeic calves will be housed in one of the wheeled calf hutches installed in a box of class 3. Each hutch will be thoroughly cleaned and disinfected with Keno™cox (2 hour-action time) after the patient leaves.
- When an animal suspected of contagious disease leaves the hospital, place a '**DO NOT USE, SPECIAL CLEANING REQUIRED**' sign on the stall. Label the stall with the suspected or confirmed disease on a note or white tape label.
- Animals suspected or known to present a reportable ruminant disease in Belgium (☞ see section 1.6.6., p.30) will be hospitalised in the large animal IU (B41 building) if the disease is contagious by direct transmission (i.e. not BSE, nor enzootic bovine leukosis).
- Any suspicion of a ruminant disease reportable in Belgium (https://favv-afsca.be/fr/themes/animaux/sante-animale/situation-zoosanitaire-en-belgique [in French]) will be immediately notified to the Liège LCU (FASFC Local Control Unit) (see 1.6.6., p.30).

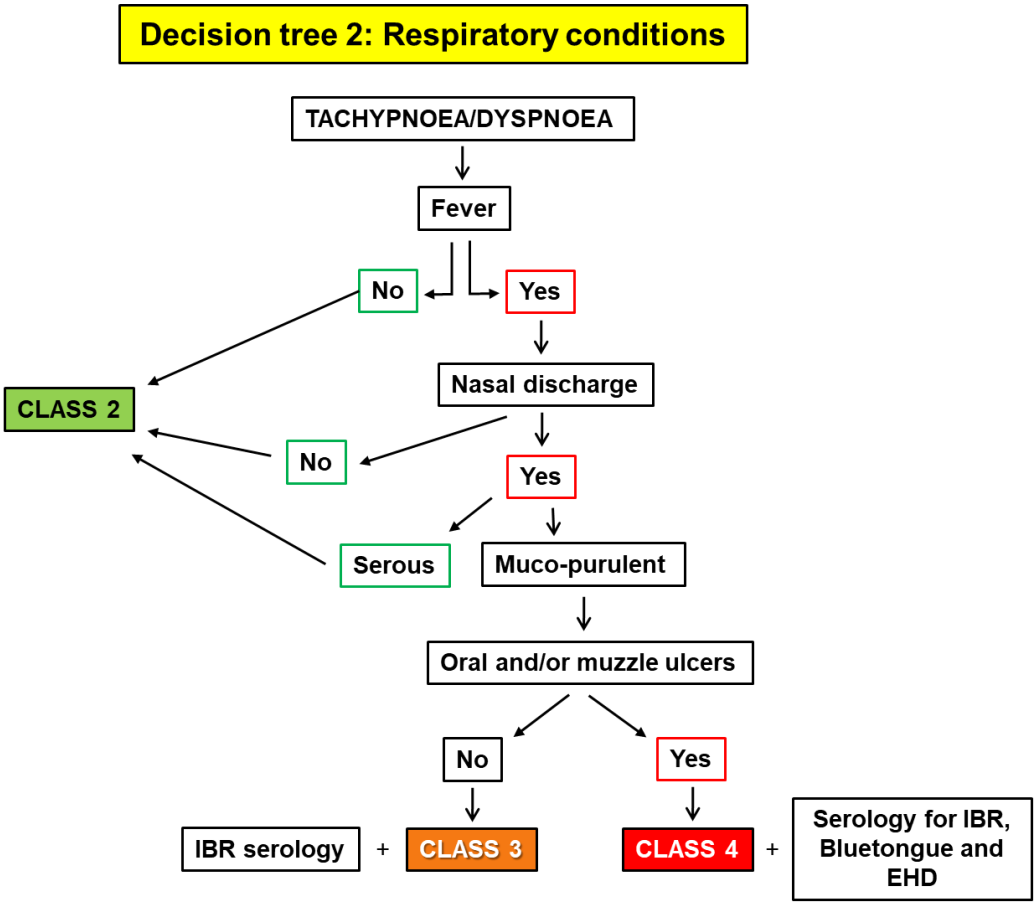
3.5.1. Classification of suspected/confirmed contagious patients

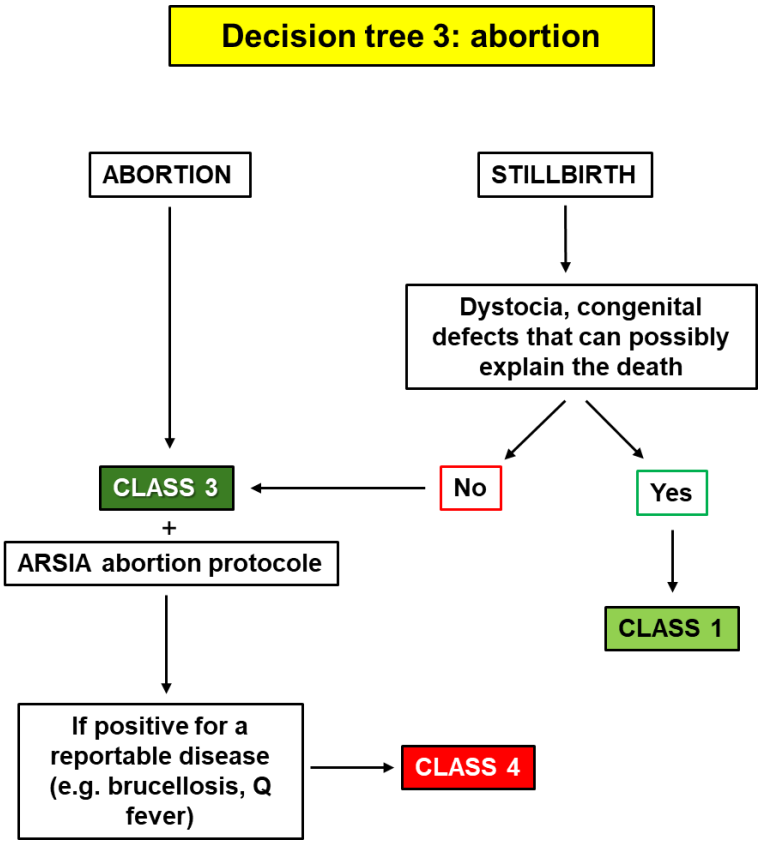
3.5.1.1. General rules

Classification of suspected/confirmed contagious animals

CLASS 1: NORMAL HOUSING – Green Non-infectious diseases or infectious diseases caused by pathogens that have no likelihood of transmission to other animals and no potential for human infection • No fever, no respiratory problem upon arrival at the clinic (and during the previous month) • Trauma / non-infected wounds • Pre- and post-operative patients (with no known infectious complication) • Non-contagious newborn calves
CLASS 2: NORMAL HOUSING – Green Infectious diseases with a low level of transmission or caused by non-resistant bacteria • Wounds infected by non-resistant bacteria • Bacterial pneumonia
CLASS 3: BARRIER NURSING – Orange Infectious diseases caused by (multi)drug-resistant bacteria or infectious diseases moderately transmissible and/or potentially zoonotic • Fever and/or leukopenia of unknown origin • Viral respiratory diseases • Diarrhoea without fever nor leukopenia • Diarrhoea in calves • MRSA or other (multi)drug-resistant bacterial infections • Contagious dermatologic infections
CLASS 4: ISOLATION – Red Infectious diseases with a high level of transmission and/or highly pathogenic for humans. Most reportable diseases fall in this category (see Chapter 1). • Diarrhoea with fever and/or leukopenia in adults • Respiratory diseases with oral/muzzle ulcers, fever and/or leukopenia, cough, nasal discharge • Abortion or perinatal death or unknown origin with fever and/or leukopenia • Zoonotic diseases such as rabies, brucellosis, anthrax, *Mycobacterium bovis*-tuberculosis, etc.


Decision tree 1: Digestive conditions
CALF
BVD status
BVD-free
Unknown or not BVD-free
Diarrhoea
History of fever
No
Yes
Crypto quick test
+
Hutch CLASS 3
Do not to accept
neg
pos
CLASS 2
Hutch CLASS 3
Propose on-farm visit
ADULT
BVD status
Unknown or not BVD-free
BVD-free
Diarrhoea
History of fever
Yes
No
Do not to accept
CLASS 2
Propose on-farm visit
Develops fever during hospitalisation
Culture of faeces
+
CLASS 3
CLASS 4
+
Culture of faeces


Decision tree 2: Respiratory conditions
TACHYPNOEA/DYSPNOEA
Fever
No
Yes
CLASS 2
Nasal discharge
No
Yes
Serous
Muco-purulent
Oral and/or muzzle ulcers
No
Yes
IBR serology
+
CLASS 3
CLASS 4
+
Serology for IBR, Bluetongue and EHD



3.5.1.2. Special Precautions (Class 3)

3.5.1.2.1. Movements of High-Risk Patients

- Movements of high-risk patients MUST be restricted as much as possible.
- When the animal is hospitalized in class 3 (equine corridor), it will preferentially come in or out by the exit located between the CRum and the equine corridor.
- All faeces must be cleaned directly after emission.
- Whenever possible, these patients will be examined and treated in their own box, rather than being moved to common examination and TTM areas.
- If the patient has diarrhoea, one person is needed to lead the animal, and another person must follow with a trash bag to catch any faeces; contaminated areas should be immediately cleaned and disinfected.
- Entry of people (staff and authorized students only) in the class 3 unit must be minimised as much as possible.

3.5.1.2.2. Required Diagnostic Testing in Patients with Suspected Infections

- Appropriate samples must be sent as soon as possible to Arsia (https://www.arsia.be/) or Sciensano laboratory (https://www.sciensano.be/en/analysis-request/veterinary-analysis-request).
- Appropriate barrier nursing precautions must be always applied by staff and students during diagnostic or other procedures.
- If the patient requires diagnostic or other procedures (e.g. radiography, ultrasonography or surgery) which can only be performed in the main hospital or in the FVM Imaging Unit, they should be performed at the end of the day whenever possible.
- The primary clinician must be consulted prior to moving any high-risk patient for diagnostic or surgical procedures, except when clinicians consider that such movement is necessary, e.g. patient in life-threatening/critical condition.

- The attending clinician is responsible for notifying appropriate FVM staff of the suspected infectious disease and procedures in force for containment (including cleaning and disinfection).
- This information should be mentioned on all SAP request forms.
- In general, all barrier nursing precautions required in the patient housing area will be required whenever handling that patient.
- Instruments, equipment, and environment should be thoroughly cleaned and disinfected after the procedure, regardless of where it was performed.
- The senior clinician must ensure that all services assisting with procedures are informed of the known/suspected disease and appropriate barrier clothing precautions.
- The senior clinician is also responsible for ensuring that environment and equipment are appropriately cleaned and disinfected after the procedure, including induction and surgical areas, recovery stall, and any other concerned area of the hospital.
- Whenever possible, surgery on such patients will be performed at the end of the day, after surgeries of all other patients, except in case of emergency.

3.5.1.2.3. Biological Samples from Suspected or Confirmed Contagious Patients

- Samples collected from suspected or confirmed contagious patients should be correctly labelled and identified, then placed in a Ziplock or Whirlpak bag.
- Pay attention to avoid contaminating the outside of the bag when placing samples in it.
- The suspected disease or pathogen should be clearly specified on all submission forms.

3.5.1.3. Special guidelines for Management and Care of Patients with suspected or confirmed Contagious Diseases

General

- Strict attention to hygiene and use of barrier nursing precautions are critical for the appropriate containment of contagious diseases.
- Before and after examining each patient, hands must be washed with soap and water then disinfected with alcohol-based hand sanitizer.
- Surfaces or equipment contaminated by faeces, other secretions or blood must be cleaned then disinfected immediately by staff or students in charge of the patient.
- Special care must be taken to prevent contamination of environment by dirty hands, gloves, or boots.
- Use all footbaths or foot mats encountered.
- Environmental hygiene is the responsibility of **all** individuals working in the barrier nursing unit (class 3) and IU (class 4). Do not wait for a technician or other staff member to clean. Avoid contaminating anterooms with straw or manure and assist with general cleaning up and maintenance whenever possible.
- Students and interns assigned to a contagious patient are responsible for routine cleaning and organization of anterooms. This includes cleaning and disinfecting counters, door handles, and doorknobs, changing footbaths/wetting foot mats when needed, and emptying trash into the dumpster.
- Food is not allowed in the CRum, and certainly not in the barrier nursing- and isolation units, because of the risk of exposure to zoonotic pathogens.

Class 4 – isolation unit

- Clean examination gloves must be always worn when working in the IU perimeter (concrete apron), anterooms, and patient stalls. Gloves must be systematically changed when working in different anterooms, or stalls.

3.5.1.3.1. Minimizing Entry into the Ruminant Barrier-nursing (class 3) or Isolation Unit (class 4)

General

- Entry in these units should only occur when necessary.
- People should not enter the class 3 and class 4 units unless necessary.
- People should not enter stalls unless contact with patients is required. Primary clinicians may, at their discretion, take students into the class 3 unit for teaching purposes, but this should be minimized as much as possible.
- A minimal number of people (staff and students) should be allowed to enter the class 3 stalls and must be cautious and wear the appropriate PPE.
- Only the clinicians, students, technicians and cleaning personnel responsible for patient care should enter the class 4 IU.
- Whenever possible, only a few people will be dedicated to the patients in these units; they will not care for patients housed in the main hospital. Nevertheless, if someone needs to work on patients in multiple housing areas, people should take optimal precautions when moving between areas and handling patients with different infectious risks. Low-risk patients should be cared for at first. When possible, students assigned to class 3 or 4 patients should have no contact with immunocompromised patients (patients with leukopenia, young or very old animals, animals under immunosuppressive TTM, etc.) elsewhere in the FVM. When caseload requires contact with potentially infectious patients, care for other patients before handling class 3 or 4 patients.
- The appropriate barrier precautions must be worn by anybody entering the class 3 and 4 units. Required barrier precautions will be posted on the board outside.
- The primary clinician is always responsible and must ensure that patients receive appropriate care.

Class 3 – barrier nursing

- Barrier precautions are worth for the whole unit and not just for the stall!!
  - Footbath/Foot mat before and after entering the unit (and stall if several ruminants are housed in the unit). If several patients are housed in class 3, a foot mat will be added in front of each stall.
  - Hand washing and disinfection before and after entering the unit (and stall if several ruminants are present in the unit)
  - Disposable calving gown and plastic boot covers
  - Examination gloves
  - In the event the patient is suspected/confirmed of being infected with a zoonotic disease (e.g. leptospirosis or salmonellosis): disposable white coveralls, masks and protective goggles (essential if risk of splash) are available and must be worn when entering the stall.
- Owners are not allowed to visit their animal(s) if hospitalized in the class 3 unit. They should be informed if their animal is contagious for other ruminants (owner's home or congeners of the holding). Owners are not allowed to visit other parts of the CRum.

Class 4 – isolation

- Barrier precautions: see point 3.5.5. for details.
  - Footbath/Foot mat before and after entering the unit and the stall
  - Hand washing and disinfection before and after entering the unit and the stall
  - Coverall and additional PPE, if necessary, i.e. respiratory mask and goggles
  - Disposable examination gloves
  - Class 4-dedicated boots
- Clients are **not** allowed inside the large animal IU.

3.5.1.3.2. Equipment and Material

General

- If possible, material taken inside the barrier-nursing unit (class 3) or the IU (class 4) should not be taken back to the main hospital.
- If equipment or material that cannot be used or discarded (e.g. infusion bags, sling, etc.) was introduced in the units, it should be thoroughly cleaned and disinfected before bringing it back to the main hospital.
- Any supplies brought inside the barrier nursing (class 3) or isolation (class 4) unit should be used for that patient only or discarded.
- No equipment or supplies (bandages, syringes, disinfectant, etc.) should be taken inside a barrier nursing unit (class 3) or in the isolation unit (class 4) without first checking with the responsible clinician if it is necessary.
- Medications used for class 3 and class 4 patients should be billed to the client and sent home with the patient at discharge, or else discarded; do not return them (including intravenous fluids) to the Pharmacy. All medications sent home with the patient must be dispensed in appropriate containers and with a complete prescription label.
- Additional cleaning supplies and disinfectants are available in the storage room. Disinfecting solutions are prepared on demand, upon admission of the patient in the class 3 unit. A red sprayer is available to disinfect any potentially contaminated area.
- Additional scrubs, isolation gowns, supplies, etc. are available in the storage room and in the students' storage room (first necessity supplies like PPEs, hydroalcoholic solution, paper, pads, etc.), specially arranged for students on duty to have access to supplies outside working hours.

Class 3 – barrier nursing

- Individual material, dedicated to the patient, is available in the class 3 box, which contains a thermometer, a stethoscope, etc. The box is assigned for use with ***each*** class 3 patient. The box containing FVM-instruments is stored in front of the patient stall during hospitalization; it will be cleaned and disinfected after discharge.

Class 4 - isolation

- Individual stethoscope and thermometer are assigned for use with ***each*** class 4 patient. A box containing these FVM-instruments is stored in front of the patient stall during hospitalization and cleaned; it will be cleaned and disinfected after discharge.

3.5.1.3.3. Procedures for People Entering and Exiting the Ruminant Barrier-nursing (class 3) or Isolation Unit (class 4)

General

- The following policies also apply to all ancillary services.
- Cleaning staff and/or stablemen are required to adhere to all relevant policies regarding attire worn in the Ruminant barrier nursing unit (class 3) and large animal IU (class 4).
- Doorknobs and cords of the class 4 automatic shutters should be disinfected regularly.
- Upon entering a class 3 or class 4 stall:
  - Bring all necessary supplies at once upon entering the stall, to minimize in and out-traffic.
  - Procedures involving highly contaminated sites should be performed last (e.g. contacts with mucous membranes, MRSA-infected wounds, rectal temperature taking, rectal palpation, handling of abscesses, etc.)
- Upon exiting a class 3 or 4 stall:
  - Avoid dragging bedding or faeces into the hallway (of major importance for stablemen!!).
  - Appropriately dispose of sharps or garbage in yellow waste containers.

Class 3 – barrier nursing

- To enter the barrier nursing unit:
  - Use the incoming disinfecting footbath/foot mat.

- Put on a clean disposable calving gown and plastic boot covers or white coveralls, mask and protective goggles in case of a zoonotic disease, available in the main storage room and or in the students' storage room (outside working hours).

- To enter the barrier nursing stall:
  - Every person MUST wear the *ad hoc* PPE, i.e. a clean disposable calving gown and plastic boot covers, or white coveralls, mask and protective goggles in case of a zoonotic disease.
  - Wash hands then use hand sanitizer before entering a stall.
  - Walk through the foot mat in front of the Class 3 unit.
  - People handling, examining or feeding different patients should dispose of gloves, change disposable calving gown or PPE worn in case of zoonotic disease but also wash and disinfect their hands between patients.
- Exiting the barrier nursing stall
  - The foot mat in front of the stall must be used upon exiting the stall.
  - After use, clean and disinfect (wiping with alcohol) material/equipment (e.g. stethoscope, thermometer) and put it back in its class 3 box.
  - Dispose of examination gloves in the yellow waste container (and mask if worn).
  - Wash hands then use hand sanitizer.
  - If applicable, remove protective goggles and disinfect them by wiping with alcohol; hang them back next to patient's stall then disinfect your hands once more.
  - Process samples only after hand washing and disinfection.
- Exiting the barrier nursing unit:
  - Remove the disposable calving gown or white coveralls if worn.
  - Wash and disinfect your hands
  - Wash boots (at the boot-washing station).
  - Use the foot mat prior to exiting the unit

Class 4 – isolation (large animal isolation unit – B41)

- **To enter the isolation area – upon entering clean area of the people anteroom:**
  - Open the anteroom door with a key (available at any time in the Equine Hospital secretary's office), then close the door behind you.
  - Remove PPE worn in the CRum (overalls, green blouse) and leave it in a locker, along with personal equipment and belongings (thermometer, stethoscope, mobile phone, pens, etc.).
  - Remove boots and put them along the wall.
  - Sit on the bench and turn around to the dirty area.
- **To enter the isolation area – upon entering dirty area of the people anteroom:**
  - Put on the PPE dedicated to the patient: disposable white coveralls.
  - Put on a pair of yellow boots
  - Wash and disinfect your hands.
  - Put on a pair of disposable examination gloves.
  - Exit the anteroom and close the door (doors must always remain closed).
- **To enter the isolation area – upon entering animal anteroom:**
  - Walk through the footbath at the entrance to the animal anteroom, after closing the folding door (which must always remain closed).
  - Pull the yellow cord to open the first automatic shutter.
  - Pull the yellow cord on the other side of the automatic shutter to close it behind you.
  - Cross the animal anteroom and pull the third yellow cord to open the second automatic shutter (do not open this automatic shutter if the outside shutter is still open).
  - Use the footbath between the animal anteroom and the isolation stalls.
- **To enter the isolation area – upon entering isolation stalls:**
  - All people (staff members, students, technicians and stablemen) are required to wear, at least, clean boots, clean overalls and clean examination gloves before entering the isolation stalls

- Use footbath in front of the stall when entering it
- People handling, examining or feeding different patients in the IU should change gloves and white overalls between patients (follow the exit procedure, then the entry procedure for another patient). They should also walk through the footbath placed between both stalls.

- **To exit the isolation area – upon exiting isolation stalls:**
  - Clean and disinfect thermometer, stethoscope, and all other material/equipment used by wiping it with Sterillium®.
  - Store the thermometer, stethoscope and all reusable equipment on the trolley in front of the stall door of each class 4 patient. Nothing should be left directly on the floor (bucket, food, etc.).
  - Dispose of gloves in the individual yellow waste container in front of the stall (each patient has its own yellow waste container)
  - Walk through the foot bath.
  - Pull the yellow cord to open the automatic shutter
- **To exit the isolation area – upon exiting animal anteroom:**
  - Make sure everything is tidy and clean before exiting the animal anteroom. The sink should be free of any material and/or medication. Every respective patient's item should be placed either on the trolley in front of the stall or inside the cupboard above the sink
  - Wash your hands at the sink then disinfect them.
  - Wash your boots to the boot-washing station located next to the sink.
  - Open the second automatic shutter by pulling the yellow cord.
  - Walk through the footbath.
- **To exit the isolation area – upon entering the dirty area of the people anteroom:**
  - Wash your hands at the sink then disinfect them.
  - Remove your boots and put them back in place. Make sure you use the place identified "Patient#1" and "Patient#2", corresponding to the right patient.
  - Remove white overalls, avoiding re-contaminating hands, and hang them back on the dedicated coat rack identified "Patient#1" and "Patient#2", corresponding to the right patient or dispose of them in the yellow waste container if dirty.
  - Sit on the bench and turn around to the clean area of the people anteroom.
- **To exit the isolation area – upon entering the clean area of the people anteroom:**
  - Use hand sanitizer (Sterillium®) for hand disinfection
  - Put your PPE back on (overalls/green blouse, etc.).
  - Put your boots back on.
  - If material is lacking in the unit, write it down on the white board (for resupply by technical staff)
  - Pick up your personal belongings and equipment (thermometer, stethoscope, mobile phone, pens, etc.) in the locker.
  - Exit the anteroom and close the door with the key.

3.5.1.3.4. Procedures for Moving Patients to the Ruminant Class 3 Barrier-nursing or Class 4 Isolation Unit

General

- Facilities should be prepared to receive patients prior to moving them to a barrier nursing- or IU stall.
- Set up footbaths with Cid 20® solution (class 3) and Virkon™S (class 4).
- Set up other barrier supplies, depending on the class of risk.
- Patients that need to be moved from the main hospital to a class 3 barrier nursing stall should be walked on a path that minimise contacts with other patients.
- Patients needing to be moved to the class 4 IU should be transported by the faculty cattle trailer (for some diseases, transportation will be forbidden, *e.g.*, foot-and-mouth disease). It is best to have two people assisting:

- One person dresses with the appropriate IU attire, sets up the IU stall, and receives the patient at the gate.
- The other person moves the patient from the main hospital to the cattle trailer.

- It is essential to clean and disinfect surfaces contaminated by faecal material or body fluids while moving the patient.
- Staff will place a **'DO NOT USE, DISINFECTION REQUIRED'** sign on the stall in the main hospital.
- Staff in charge of the patient will ensure that the stall has been 'broken down', empty fluid bags discarded, etc. and all equipment can be properly disinfected.

Class 3 – barrier nursing

- A box with supplies and PPE for the unit is available in the students' storage room.
- Whenever possible, a patient requiring hospitalisation in a class 3 barrier nursing stall upon admission should be directly taken to the stall, thus avoiding contact with other hospital areas, people or ruminants. Access to the class 3 area through the walkaway between the CRum and theatre B (*'Amphi B'*).

Class 4 - isolation

- A box with supplies and PPE for the IU anteroom (coveralls, gloves, etc.) is available in the preparation room.
- When possible, patients to be housed in isolation upon admission should be transported directly to the Large Animal IU in the owner's trailer/transport vehicle and unloaded in the IU yard.

3.5.1.3.5. Cleaning and Feeding in the Ruminant Class 3 barrier-nursing- and Class 4 Isolation Units

- All staff members are responsible for assisting with cleaning and maintaining the barrier-nursing units! Every staff member should help cleaning when necessary. Nevertheless, ensure that only a minimal number of people enter the units.
- Cleaning and disinfection of the IU are performed by the staff!
- Stablemen will clean and re-bed stalls once daily, after cleaning class 1 and 2 stalls (order of cleaning and re-bedding: 1) class 1 and 2, 2) class 3 and 3) class 4); they will clean the walls if soiled by diarrhoea, blood or other excretions/secretions.
- Footbaths are changed and foot mats refilled daily, in the morning, by students in charge of biosecurity, after cleaning.
- In the barrier-nursing area (class 3), additional cleaning should be done throughout the day by staff members.
- Students in charge of biosecurity are responsible for changing footbaths/refilling foot mats as needed during the day.
- Interns are responsible for feeding ruminants housed in the large animal IU (class 4).
- Technical staff and clinicians are responsible for supervising cleaning and disinfection, and stocking of the IU anterooms.
- When class 4 patients are hospitalised in the IU, technical staff should clean both "clean" and "dirty" areas of the people anteroom as well as the animal anteroom, once a day. They should refurnish any missing item (written on the white board in the clean area of the people anteroom) and make sure that lockers and cupboards contain what is needed during the patient hospitalisation. Clinicians are responsible for supervising the cleaning, disinfection, and stocking of the IU

3.5.2. Procedures for Patients Leaving the Ruminant Class 3 Barrier-nursing or Class 4 Isolation Units (for discharge or diagnostic procedures, but while the patient is still contagious)

General

- Every person moving the patient is required to wear all appropriate attire and apply barrier precautions.
- Every person handling the patient should avoid contaminating doors, gates, etc. with contaminated gloves while moving the patient.
- Staff must ensure that instructions given to owners adequately address the infectious hazard associated with the patient (with regards to other animals and humans) and provide appropriate suggestions for mitigating the risks to people and animals.
- Ruminants housed in the class 3 barrier-nursed unit, or the large animal IU (class 4) may not be walked while hospitalised.

Class 3 – barrier nursing unit (for discharge or diagnostic procedures)

- Patients moved from barrier-nursed units should not be walked through the breezeway unless necessary (e.g. to go to surgical facilities). If necessary, people in charge should take appropriate precautions to minimize contacts with other patients and people in the breezeway.
- Diagnostic and therapeutic procedures that must be performed on class 3 patients in the main hospital should be scheduled for the end of the day. All surfaces and floors potentially contaminated must be promptly cleaned and disinfected to minimize the likelihood of hospital-acquired transmission.

Class 4 – isolation unit (for discharge or highly exceptional procedures)

- All diagnostic and therapeutic procedures should be performed in the IU unless necessary.
- Leaving the isolation facility, dead or alive, is only permitted when a suspicion of a reportable disease is discarded. If such disease is diagnosed, the animal could only leave the IU after euthanasia, then collected by the rendering plant, and following FASFC instructions.

3.5.3. Required Diagnostic Testing and Surgical Procedures for Patients with Suspected Infections

- Diagnostic testing to detect some (zoonotic) pathogens provides essential information for an appropriate clinical management of infected patients. Such testing directly benefits patient and client(s) by allowing an appropriate management of their other animals and protection of their families. It also benefits FVM patients and staff as it contributes to an appropriate risk management.
- It is therefore highly suggested to test hospitalized patients if a specific contagious and/or zoonotic pathogen is suspected. Diagnostic testing is considered as an essential part of case management in the FVM and is therefore billed to the client.
- The senior clinician in charge of a patient is responsible for ensuring that appropriate samples are sent for testing, and that appropriate biosecurity precautions are implemented for handling such patients.
- The Biosecurity focus point should be notified as soon as possible that a hospitalized patient is suspected of being infected with a class 3 or class 4 pathogen.
- Whenever possible, diagnostic, surgical, or other procedures should be performed wherever high-risk patients are housed, rather than moving the patient to common examination and TTM areas.
- Appropriate barrier nursing precautions must be followed by all staff members and students, always, during diagnostic or other procedures.
- If the patient requires complementary examinations or other procedures (e.g., radiography, surgery), which can only be performed in the main hospital, these procedures should be performed at the end

of the day. Class 4 patients will be x-rayed in the large animal IU itself: the staff of the Imaging Unit will use its mobile equipment that will be completely cleaned and disinfected after use, and before leaving the IU (see Chapter 10).

- The attending clinician is responsible for notifying of the suspected infectious pathogen and methods that should be implemented for containment (including cleaning and disinfection after procedures).
- This information should be clearly marked on the SAP request.
- In general, all barrier nursing precautions that are required in the patient housing area will be required whenever handling that patient.
- Instruments, equipment, and the environment should be thoroughly cleaned and disinfected after the procedure, regardless of where it is conducted.
- The senior clinician must ensure that all departments assisting with procedures are informed of the known/suspected pathogen, and appropriate barrier clothing precautions.
- If an adult patient has diarrhoea, one person will lead the animal, and another person will follow with a trash bag to collect any faecal matter, then immediately clean and disinfect contaminated areas. Diarrhoeal calves requiring a complementary examination in the Imaging Unit are transported in a cart that will be strictly cleaned and disinfected after use.
- The senior clinician is also responsible for controlling that environment and equipment are appropriately cleaned and disinfected after the procedure, which includes induction and surgical areas, recovery stall, and any other hospital area.

3.5.3.1. Use of Ultrasonography, Radiography, Endoscopy or EKG in the Ruminant Class 3 Barrier-nursing unit and large animal isolation Unit (class 4)

- Whenever possible, class 4 patients will undergo ultrasonography, radiography, endoscopy and EKG in the large animal IU itself: the staff of the Imaging Unit will use mobile equipment that will be completely cleaned and disinfected after use, and before leaving the isolation area (see Chapter 12 for details).

3.5.3.2. Biological Samples from Suspected or Confirmed Contagious Patients

- Samples from high risk-patients should be properly identified and labelled, then placed in a Ziplock bag (double packaging is strongly advised).
- Avoid contaminating the outside of the bag when placing a sample in it.
- The suspected disease or pathogen should be clearly labelled on all submission forms.
- Samples from patients with a zoonotic disease should be double-packed and the disease/pathogen clearly labelled on all submission forms.

3.5.4. Breakdown of the Ruminant Class 3 Barrier-nursing Unit or Class 4 Isolation Unit Prior to Disinfection

- Contact the Clinic Biosecurity focus point **IMMEDIATELY** upon patient's discharge so that he can arrange for cleaning and disinfection of the stall and/or unit before admission of another patient.
- The primary clinician, intern and student in charge are responsible for the following procedures so that the room can be fully cleaned and disinfected. The room will not be disinfected unless stablemen are notified of the specific suspected/confirmed pathogen:
  - Throw away **ALL** disposables in yellow waste containers.
  - Seal all yellow containers and leave them in the IU until removed by stablemen.
  - All medical equipment undergoes a 24 hour-dipping in a disinfecting solution before leaving the unit. It is then brought back to the main hospital and cleaned with detergent in the washing machine for 3 hours. Technical staff can then perform the additional disinfection and proceed to final storage.
- If another patient is admitted before stablemen can disinfect the stall or unit, it must be disinfected by the intern, primary clinician, or technical staff.

- After disinfecting the contaminated stall (class 3 or 4), it will be inspected by a clinician who must approve the procedure before another ruminant is allowed to occupy the stall.
- For boxes that housed *Salmonella*-infected adults, the efficiency of the cleaning and disinfection process must be assessed through environmental cultures. The box will not be released for a new patient until environmental samples test negative for *Salmonella* spp. If cultures are positive after the first cleaning/disinfection process, it will be repeated, and cultures will be performed again until negative results.

3.5.5. Reducing Biosecurity Precautions for a Patient Housed in the Ruminant Class 3 Barrier-nursing- or Class 4 Large Animal Isolation Units

- Biosecurity precautions will never be reduced for a ruminant with a class 4 disease, as it will generally be an officially reportable condition.
- Biosecurity precautions for class 3 patients can be reduced, depending on the disease.
- Only the Primary Clinician responsible for the patient can authorize the adaptation of precautionary requirements or the reduction of biosecurity precautions for patients with a risk of contagious disease. The CFB can be consulted, if necessary, for advice.

3.5.6. Disease Differentials for Which Testing is Mandatory in Ruminants

- Testing of appropriate samples is mandatory if the patient disease or condition is included in the differential diagnosis. A full description of testing, management, diagnosis, and potential TTM information is available in the section on 'specific contagious diseases of concern' in Chapter 1.
- For each disease, additional information can be obtained by following the links below:
  - **http://www.cfsph.iastate.edu/DiseaseInfo/factsheets.htm**
  - **https://www.woah.org/en/what-we-do/animal-health-and-welfare/animal-diseases/**

3.5.7. Management of Patients Infected or Colonized with Resistant Bacteria

- If the patient's history lets suspect an infection or colonization by (a) (multi)drug resistant bacteria, it will be directly hospitalised in class 3.

3.6. Ruminant Surgery and Anaesthesia

3.6.1. Attire for the 'Clean' Areas of the Surgical Facility for Ruminants

- With reference to the FVM, surgical (blue) scrubs and head covers, are required to enter the designated 'clean' areas of the surgical facility, including scrub rooms and surgical theatres.
- Shoe covers or footwear dedicated for use in designated 'clean' surgical areas (plastic clogs, easy to clean and disinfect) are also required for any person entering the area.
- **Surgeries on calves (< 300 kg) or small ruminants** are performed in the dedicated operating theatre. Once prepared for the surgery, the patient will be brought inside the operating theatre through the access for patients and put on the table. People bringing the patient inside the surgery room must put on overshoes to avoid contaminating the room. After preparing the patient in the large examination room, people who take part to the surgery must go to the people anteroom to put on the surgery PPE (blue surgical scrubs, overshoes for students and footwear dedicated to the area for the staff, head cap, surgical gloves and respiratory mask). Protective goggles are strongly recommended if the risk of splashes is present.
- Blue surgical scrubs should be worn in the Ruminant facility ONLY, and not outside the building, even when traveling to and from the FVM.
- Outside the designated 'clean' areas of the surgical facility, every person should wear the classical attire for the main hospital facilities or a white lab coat over the blue scrubs. Shoe covers must be removed upon exiting 'clean' surgical areas.

- All people, including cleaning and maintenance staff, are required to adhere to all relevant policies regarding attire in surgery facilities for ruminants.

3.6.2. Hygiene for Perioperative Management of Ruminants

- High standards of cleanliness and hygiene must be maintained throughout the surgery facility.
- The surgical team and patient surgery site must be aseptically prepared. Aseptic technique must be maintained all along surgery.
- Nonessential people are always prohibited.
- Minimise the movements of anaesthesia students and staff between the anaesthesia preparation area (one box with upholstery padding in the hospitalization facility or the main examination room) and the operating theatre.

3.6.3. Guidelines for Perioperative Management of Ruminants

- Perioperative management of patients can greatly influence the likelihood of surgical wound or other nosocomial infections. As such, basic management procedures should always emphasize the use of barrier nursing precautions and maximise the separation between patients.
- Standards for people, patient, and environmental hygiene in the surgical and perioperative areas should be among the highest in the FVM.
- Hands must be washed and disinfected between patients. Hands should also be washed and disinfected after any contact with a patient to avoid contaminating hand-contact surfaces (e.g. doors, counter tops, equipment, etc.). Wearing examination gloves as a barrier nursing precaution is mandatory. Gloves must be disposed of after each patient. Wearing gloves does not exempt from hand washing and disinfection.
- Faeces should be removed immediately from the anaesthesia preparation area or other areas of the surgical facility. If needed the floor should be hosed between patients and disinfected.
- Equipment such as ET tubes will be cleaned and disinfected between uses with appropriately dilute chlorhexidine.
- Routine (e.g. daily) environmental cleaning and disinfection should be carried out rigorously following the prescribed protocols.

3.6.4. Anaesthesia Induction Area

The following steps are conducted prior to entering the anaesthesia induction area:

- Anaesthesia request forms should be completed the day prior to procedures whenever possible. All known or suspected contagious diseases should be clearly mentioned on the request form.
- Animals are prepared in the examination room.
- Clip the surgery site on the day of the surgery to avoid colonisation of incisional sites by potentially pathogenic bacteria if performed earlier. Collect clipped hair and dispose of it in the dedicated waste container.
- Small ruminants, i.e. sheep and goats, should ideally be put on a table for preparation.
- Patients should be thoroughly brushed or bathed prior to entering the anaesthesia induction area. Students assigned to the case are responsible for the operation.

Activities conducted in the anaesthesia induction area (surgery room):

- Animals' induction is performed in the surgery room itself.
- Prepare the IV catheter site aseptically (catheterization requires aseptic conditions).

3.6.5. Postoperative Activities

- Patients must be returned to their stall as soon as possible after recovery to minimize the faecal contamination of recovery stalls, and to provide sufficient time for their cleaning.
- Patient transport tables must be cleaned and disinfected with Virocid® (allowing 15 min contact time), then thoroughly rinsed with water between uses.
- Anaesthesia machines must be cleaned and disinfected between cases:
  - Valves and domes will be cleaned with water then dried.
  - Pieces and reservoir bags will be rinsed thoroughly, soaked in chlorhexidine solution, for at least 15 minutes, after use, then thoroughly rinsed and dried before the next use.
  - Piece adapters will be cleaned with soap and water, soaked in chlorhexidine solution (15 min-contact time) and rinsed after use.

3.6.6. Other Routine Cleaning and Disinfection Procedures

- Induction, surgery, and recovery areas are thoroughly cleaned and disinfected by animal care staff.
- Endotracheal tubes:
  - Clean the inside and outside of ET tubes with mild soap and water, using a scrub brush.
  - Soak ET tubes in a large barrel of chlorhexidine solution for at least 15 minutes.
  - Thoroughly rinse ET tubes with warm water, being careful not to set them down in the sink.
  - Hang ET tubes to dry in the designated cabinet of the anaesthesia induction area.
  - ET tubes are stored in this cabinet until needed.
  - **Any ET tube laid on the ground will require disinfection before use.**
- The mouth gag must be soaked in chlorhexidine solution for 15 minutes after use, then rinsed and put back on the rack to allow drying and prevent corrosion.
- All anaesthetic equipment and ventilators will be broken down and thoroughly cleaned/disinfected regularly.
- Environmental samples should be obtained from the surgical theatres on a regular basis and cultured for the presence and bacterial counts of pathogenic bacteria.

3.6.7. Management of Surgical Patients with Contagious Disease

- Clinicians and students assigned to surgical cases are responsible for identifying and communicating when patients are known or suspected to be contagious.
- Surgeries on such patients should be scheduled for the end of the day whenever possible.
- Clinicians and students assigned to these patients are responsible for correctly identifying induction and recovery areas as potentially contaminated with contagious pathogens: they must ensure that these areas are appropriately decontaminated prior to use them with other patients.

3.7. Outpatient Clinic of Ruminants

- Clean coveralls and washable rubber boots are the required attire. When indicated, overshoes/cover-boots, gloves and disposable coveralls will be provided.
- A clean pair of coveralls is required for each farm to be visited; students must plan according to the number of farms they will visit each day (seldom more than two).
- Students are expected to bring thermometer, stethoscope, penlight, haemostat, and bandage scissors.
- On the farm, boots should be washed after each batch of animals. Remove gross contamination (blood, pus or manure) before handling animals of another batch.
- Wearing examination gloves is always recommended. Gloves are required when working with adult cows with infectious diseases such as mastitis, pneumonia, or enteritis, and any calves. Change

gloves when soiled and between patients. Hands will be thoroughly washed and disinfected between different batches.

- All instruments, including stomach tubes, mouth speculums, thermometers and California Mastitis Test paddles, etc. should be cleaned and disinfected after each use.
- Eating or drinking will **ONLY** be allowed in the ambulatory vehicles or in designated rooms of the farm.
- At the end of the visit, boots will be washed (scrubbed and rinsed), and disinfected if possible. If no water is available, dirty boots and coveralls may be placed in two separate plastic bags for transport. Boots can then be washed and disinfected at the FVM. Hands are washed and disinfected.
- Clinicians are responsible for ensuring that trucks are washed, and the floors and hand contact surfaces are disinfected at least once each week.

3.8. Deceased Patients

3.8.1. Breakdown of Patient Environment

- When a patient dies, it must be transported as soon as possible to the Necropsy Department with the forklift in the dedicated-watertight closed container.
- All cadavers are transported to the Necropsy Department in the dedicated container.
- If a heavy patient (adult cow or bull) dies or is euthanized after hours, the cadaver will remain in the box and covered with a heavy plastic sheeting until one of the forklift drivers can transport it to the Necropsy Department in the closed container.
- After use, the heavy plastic sheeting must be cleaned and disinfected.

3.8.2. Storage of cadaver

- The patient's body will be led to the Necropsy Department and stored in the cold chamber as soon as possible.

3.8.3. Referral for

3.8.3.1. Pathology

- Unless otherwise specified, all cadavers of the CRum must be necropsied as soon as possible.
- When the Department of Pathology is closed (holidays), necropsies must be achieved by the CRum staff as soon as possible, in the necropsy room (see Chapter 12 for Necropsy SOPs).

3.9. Breaking Transmission Cycles

3.9.1. Visitors-Clients in the Clinic of Ruminants

- Visiting hours in the CRum are from 8:30 am to 18:30 pm, daily.
- All visitors must check in at the secretary's office prior to entering the clinic; they will be registered in the log.
- All visitors must strictly adhere to biosecurity precautions in force. Clients must wear appropriate clothing. For safety reasons, shorts and open-toe shoes are not allowed in the hospital. Boot covers must be worn and are available at the entrance to the hospital for visitors.
- A student, clinician, or technician should systematically escort the clients to their animal stall.
- Clients must comply with all barrier nursing requirements applying to their animal(s).
- No visitor is allowed in the Class 3 and Class 4 units.
- All visitors should be informed to thoroughly wash and disinfect their hands upon leaving inpatient areas.

- Clients may visit their animals if hospitalized in class 1-2, but are not allowed to wander in the CRum, and specifically are not allowed to touch other patients or to read stall cards or TTM orders. Information about other patients is confidential, including diagnoses, and should not be disclosed.
- The public is not allowed to tour inpatient areas of the clinic. Special arrangements can be made to provide tours for visiting scientists by contacting the Head of Clinic.
- Only owners may visit hospitalized inpatients. They might be very helpful for the containment of their animal upon admission; other interested parties are not allowed without the owners' authorization.
- Clients are **never** allowed to visit animals housed in the class 4 large animal IU.

3.9.2. Children in the FVM

- Children are strictly forbidden in the clinic if not accompanied by their parents or a staff member.

3.9.3. Pets in the FVM

- Under all circumstances, companion animals are strictly forbidden in the CRum.

3.10. Environmental surveillance for Salmonella

- If an inpatient is confirmed as infected with *Salmonella* spp., the housing environment will be scheduled for environmental sampling and culture.
- Clinicians must ensure that the clinic Biosecurity Focus Point is informed when such patients are discharged.
- After routine cleaning and disinfection procedures, a sign will be hung on the stall by the Biosecurity focus point.
- The stall will remain vacant until culture results are known.
- The Clinic Biosecurity Focus Point will collect environmental samples from the cleaned stall and submit for culture. The stall will be released for use with other patients when cultures are negative.

3.11. Use of Ruminant Procedure Laboratory

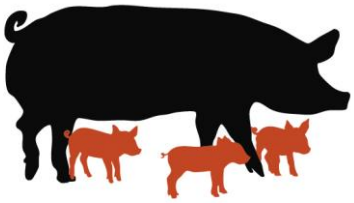
- Use of the Ruminant Procedure Laboratory is scheduled by the CRum Technicians.
- Footwear and outerwear requirements are like the PPE worn in the main hospital.
- Food and drinks are not allowed in the Procedure Laboratory.

3.12. Pharmacy

- Students must always be accompanied when entering the pharmacy. They must be constantly under the supervision of the staff.

3.12.1. Requirements for Equipment and Supplies Brought into the Area

- Equipment from other areas of the hospital or ambulatory trucks must be thoroughly cleaned and disinfected before being brought in the CRum and after use, before returning to another area. Items should be rinsed or soaked in a 0.5% chlorhexidine solution when appropriate. Alternatively, clean items may be taken to central supply for sterilization.
- Supplies to be used in the CRum are stored in the storage room adjacent to the main examination room. Ruminant technicians have access to these items when needed.



Chapter 4.

PIG FARM BIOSECURITY SOP

4. Pig Farm Biosecurity SOP

4.1. Access to the FVM Pig Farm

- Students and visitors are not allowed in the FVM pig farm in case of contact with wild boar, visit of another pig farm and/or activity in a necropsy room during the previous 72 hours.
- Students and visitors will have to state on the honour that they did not have contact with pigs and/or wild boars and/or that they did not visit any necropsy room or refrigerator of a necropsy room for minimum 72 h before entering in the FMV pig farm.
- During 72 h following their visit in the FMV pig farm, students are not allowed to visit another pig farm.
- Anyone with respiratory disease (flu-like illness) should not visit any pig farm. If the visit cannot be postponed, this person should at least wear a mask.
- **WHEN STAFF AND STUDENTS LEAVE THE PIG FARM, THE DOOR MUST BE LOCKED.**

4.2. General Equipment for visiting the FVM Pig Farm

4.2.1. Footwear

- Washable rubber boots are available for all students, staff (and visitors) in the anteroom of swine premises. They are heavy and sturdy to protect feet from crush injuries.
- Boots are dedicated to the Pig Farm and **CANNOT** be worn in the Food-Producing Animal classrooms and in offices (including secretary's office).
- Staff and students are not allowed to wear their own boots or shoes in the Pig Farm.
- Boots MUST be cleaned and disinfected before leaving the Pig Farm (boot-washing station and foot bath before entering the anteroom), and whenever they become obviously soiled or contaminated.

4.2.2. Outerwear

- Coveralls dedicated to the swine premises are available in the anteroom. Clean coveralls are compulsory to avoid the risk of pathogen introduction.
- The washing of staff's dirty coveralls will be achieved in the Clinical Department of Food-Producing Animals.

4.3. General Cleanliness and Hygiene

- Persons entering the Pig Farm should use the only entrance available in the B42 courtyard, after compulsory use of the anteroom and footbath.
- Hands must be washed and disinfected with an alcohol-based hand sanitizer prior to, and after any contact with swine (see Chapter 1 for the hand washing protocol).
- Clean examination gloves and beret cap **MUST** be worn in the Pig Farm.
- Surfaces or equipment contaminated by faeces, secretions, or blood must be cleaned and disinfected immediately. Cleanliness is the responsibility of **ALL** persons involved in the Pig Farm.
- Any visitor (staff, students and others) is required to use all disinfecting foot baths encountered in the Pig Farm. Boots are expected to be fully immersed in foot baths. Upon leaving the premises, and before walking through the foot baths, people should wash their boots at the boot-washing station to remove organic debris.
- No personal equipment is allowed in the Pig Farm (all the necessary equipment is provided inside).
- Equipment wheels or sides soiled with faeces must be cleaned and disinfected prior to entering or leaving the facility or moving to another area.
- Only equipment for examination (e.g. thermometer) belonging to the Pig Farm will be used in the Pig Farm. This equipment may not leave the Pig Farm. Any equipment must be cleaned between patients.

4.3.1. Appropriate cleaning

- It is of major importance for basic hygiene for pigs to be housed in a **clean pen**. Stablemen clean the pens and the hallway once a day.
- Cleaning should begin in the farrowing room, then in the gestation and in the room housing boars and then finish in the post-weaning and fattening pig rooms.

4.3.1.1. Procedure

- **Automatic drinkers** need to be regularly cleaned and disinfected in between use by different batches of animals. When pigs enter a pen, staff must check that automatic drinkers work correctly and that animals know how to use them.
- **Feed troughs** need to be cleaned regularly and disinfected in between use by different batches of animals. Any feed remaining in the trough should be removed.
- **The environment around the pen** should be clean, tidy and neat. This means without medications or materials lying around and no bedding outside the pens. An effort is expected from all staff to arrange material once it has been used.

4.3.2. General Disinfection Protocol

- Gloves and appropriate equipment should be worn whenever using disinfectants. Gloves worn for regular pig examination (examination gloves) or gloves worn during routine cleaning operations (rubber cleaning gloves) provide adequate protection when using disinfectants. Additional PPE (mask, face shields, goggles, water-resistant clothing and boots) should be worn when there is a probability of splashing during the disinfection process.
- In the event of a contact of the skin or cloth with a disinfectant or a disinfecting solution, it is imperative to remove the cloth as quickly as possible and run water at 15-25°C on the wet skin for at least 15 minutes. If necessary, the person concerned will take a shower as quickly as possible for at least 15 minutes. The cloth impregnated with disinfectant will be placed, alone, in a washing machine and washed using a "cold water" program for at least 1 hour before drying and being worn again[6].
- Remove all bedding and faeces prior to disinfection. The presence of gross contamination will inactivate most disinfectants. If organic material is de-bulked with a hose, be careful to minimize aerosolization and further spread of potential infectious pathogens.
- Wash the pen, including walls, doors, automatic water drinker and feed trough, with water and detergent or soap; scrubbing or mechanical disruption is always needed to break down films and residual debris that prevent or inhibit the disinfection process.
- Thoroughly rinse the cleaned area to remove any detergent residue. Note: disinfectants may be inactivated by detergents or soap; therefore, it is very important to rinse correctly after cleaning the area.
- Allow area to drain or dry as much as possible to prevent dilution of disinfecting solutions.
- Wet the pen, including walls, doors, automatic water drinker and feed trough, thoroughly with Hyprelva® (1%). This disinfectant should remain in contact with surfaces for 15 minutes.
- Remove overspray disinfectant with water.
- The disinfectant should be rinsed off all surfaces prior to housing animals in a pen.
- After disinfection, remove the protective attire and wash your hands.
- All areas where animals are handled (or treated), should be tidy, cleaned and disinfected after use by the technical staff.
- The main disinfectants used in the Pig Farm are: Hyprelva® (Hypred) for pens; Virkon™ S (Lanxess Deutschland GMBH) will be preferred also for facilities in case of outbreak of a reportable disease such as African swine fever.

[6] In accordance with the first aid measures listed in the material safety data sheet of Hypred and Lanxess Deutschland GMBH

4.3.3. Footbaths

- Footbath solutions are changed every morning, if necessary, by stablemen.
- Footbaths should be changed whenever they contain excessive amounts of bedding or dirt.
- Footbaths should be refilled when looking dry or low on volume.
- Any person is required to use foot baths appropriately whenever they are encountered. Foot baths require full immersion of boots.
- The disinfectant used in footbaths is Virkon™ S (Lanxess Deutschland GMBH).

4.3.4. Disinfection Protocol for Instruments and Equipment

- All instruments, equipment or other objects must be cleaned and disinfected between uses on different batches.
- Materials that are sterilized between uses (instruments and equipment such as surgical instruments) must be cleaned with soap and water. The equipment should then be returned for sterilization.
- Instruments and equipment provided in the Pig Farm (e.g. scissors, etc.) may be carried and used on multiple pigs, but they must be cleaned and disinfected between patients using 70% isopropyl alcohol or 0.5% chlorhexidine available in the Pig Farm office.
- Backpacks, etc. should be stored in the lockers of lecture theatre B ("*amphi B*") or in the lockers just in front of the "Crocs" lockers, before entering the Pig Farm anteroom. Do not store extra clothing, backpacks, etc. in the anteroom.

4.3.5. Summary of Detergents and Disinfectants Approved for Use in the pig farm

- **Detergents**: MS Topfoam LC (MS Schippers)
- **Disinfectants**:
  - Hyprelva® (Hypred)
  - Virocid® (Cid Lines)
  - Virkon™ S (Lanxess Deutschland GMBH): used in footbaths. In the event of a reportable disease (e.g. African swine fever), it will be generalised to infrastructures also.

4.4. Food and Beverages

- No food or drink is allowed in the Pig Farm.

4.5. Animals in the Faculty Pig Farm

No animal may be introduced in the Pig Farm. In case an animal arrives, it must be returned immediately to its farm of origin or directly euthanatized in the vehicle for necropsy. Pet pigs and their owners will be redirected to the Small Animal Hospital (SAH - phone number: 04/366 42 00).

4.5.1. Feed and Water

- All grain or other supplements must be stored in plastic and/or paper containers with tight fitting covers. Some feeds presented as meal or pellets may also be stored in silos.
- Only minimal amounts of bedding, forage, and concentrate should be stored in the Pig Farm to decrease the likelihood of contamination and the availability of food and hiding places for rodents (and wildlife in general).

4.5.2. Bedding

- The stableman is responsible for bedding pens and feeding animals.
- Occupied pens are cleaned and re-bedded with clean straw in the mornings by the stableman.

- Only minimal amounts of bedding and forage should be stored in the Pig Farm to decrease the likelihood of contamination and suitable habitat for rodents (and wildlife in general).

4.5.3. Cleaning Protocols: Pig Farm

Swine Trailer/Parking Area

- The swine trailer is cleaned and disinfected after each transport.
- The unloading court is systematically cleaned and disinfected after use.
- The breezeway is cleaned (e.g. swept and hosed) and disinfected after use by the cleaning crew.

Examination Areas

- Areas soiled by faeces, discharges, urine, or blood must be cleaned by attending staff, students and/or clinicians immediately.
- Cleanliness is ultimately the responsibility of the clinician in charge of the Pig Farm.

Pig Farm

- Monday through Sunday, the stableman removes manure from the pens and adds fresh straw throughout the box, including in the droppings area, to prevent the pigs from slipping.
- All grains/concentrates are stored in plastic and/or paper bags or in silos. Milk supplement powder for piglets is stored in plastic buckets.
- Equipment wheels or sides soiled with faeces must be cleaned and disinfected prior to entering or leaving the facility or moving to another area.

4.5.3.1. Routine Pen Cleaning

General principles of cleaning:

- It is imperative to remember that, when using disinfectants, more does not mean better!
- Using the correct dilutions of disinfectants (as recommended by the manufacturer) provides an optimum disinfecting action.
- Overuse of disinfectants may encourage resistance in microorganisms and may contribute to the development of biofilms.
- Disinfectants must be used on **CLEAN** surfaces to be effective.

The development of a biofilm occurs in areas of standing water, and where disinfectant is allowed to sit on dirty surfaces.

General Procedures for Cleaning a Vacated pen:

- Remove all bedding into a dumpster.
- Sweep floor to remove small chafe and debris.
- Rinse floor and walls with hose to remove gross debris, scrub soiled areas with a brush and detergent.
- Clean entire pen with water (high-pressure cleaner).
- Disinfect the pen with Virkon™ S.
- Allow to dry.
- Clean and disinfect adjacent aisle-way as above.
- Cleaning tools must be cleaned when necessary (including handles).

Weekly Routines

- Sinks should be cleaned by the cleaning crew.

Monthly Routines

- Areas that are not used daily (i.e. tops of walls, scales, wash rack, etc.) should be hosed monthly to prevent dust accumulation.
- Sweepers should be cleaned and maintained.

Semi-annual Routines

- All floors should be stripped, cleaned and disinfected with Virkon™ S.
- Pens should be thoroughly cleaned, scrubbed, and disinfected top to bottom.

Annual Routines

- Each pen of the Pig Farm is thoroughly cleaned, scrubbed and disinfected from top to bottom, including all equipment (bug-out).

Storage of feed and bedding

- Storage of feed and bedding should be minimized, and the feed storage area will be cleaned weekly to avoid rodent infestation. Rodent traps will be maintained in these areas and in the main feed storage areas by the barn crew.

4.5.3.2. Surveillance of *Salmonella* spp. on the Pig Farm

- Currently, the swine herd is known to be carrier of *Salmonella* spp.

4.5.3.2.1. Surveillance of *Salmonella* spp. in the Pig Farm

- Every 4 months, serological ELISA tests are performed in the Pig Farm in a way to detect anti-*Salmonella* spp. antibodies. Ideally, the mean s/p ratio must be below 0.6. Such objective is currently reached.

4.5.3.2.2. Routine Environmental surveillance

- Routine environmental surveillance on smooth floors should be conducted every 6 months for most areas.
- These data should be routinely communicated to the CFB.

4.6. Ambulatory Swine Activities

- Some students visit other pig farms (either the Walloon Agricultural Research Centre [CRA-W] or private farms) once a week.
- Students are required to wear clean street clothes not worn in another pig farm yet to leave the FVM in the ambulatory vehicle (they are not allowed to bring their own coveralls and boots). They will be provided appropriate PPE upon arriving in the farm.

4.6.1. Visits to the Walloon Agricultural Research Centre (CRA-W)

- Clean coveralls and disposable gloves and beret caps will be provided by the staff upon arriving in the farm anteroom. Examination gloves are always recommended. Change gloves when soiled. Hands will be thoroughly washed and disinfected in the anteroom, before and after the visit.
- Rubber boots are available upon entering the CRA-W pig farm: they **MUST** be worn.
- Anyone with respiratory disease (flu-like illness) should not visit any pig farm. If the visit cannot be postponed, this person should at least wear a mask.
- At the end of the visit, boots will be washed upon leaving the premises to remove gross contamination.
- Students and staff will wash and disinfect their hands in the sanitary facilities next to the anteroom.

4.6.2. Visits of Private Pig Farms

- For pig farms visits, disposable overshoes, gloves, beret caps and coveralls will be systematically provided unless farm protective equipment (boots and reusable coveralls) is available on site.
- Staff and students must state on the honour that they have not visited another pig farm for minimum 72 hours without the strict application of rigorous sanitary measures. They cannot have any contact with wild boars during 72 hours before entering a pig farm. Before leaving the farm, dirty overshoes and disposable coveralls are disposed of (but remain on site). They cannot have any contact with pigs during 72 hours after the pig farm visit.

4.7. Management of Dead Pigs

- When a pig dies, it must be transported as soon as possible to the Necropsy Department with the forklift. The cadaver must be transported in the dedicated watertight closed container.
- As soon as possible, the cadaver will be stored in the cold chambers of the Necropsy Room.

4.7.1. Referral for Pathology

- Unless otherwise specified, all dead pigs of the FVM Pig Farm must be necropsied in the shortest possible time.

4.8. Breaking Transmission Cycles

4.8.1. Visitors in the FVM Pig Farm

- Visitors are not allowed in the FVM Pig Farm, unless specific authorisation of the responsible staff.
- All visitors must strictly adhere to biosecurity precautions implemented in the Pig Farm.
- Visitors must adhere to requirements for appropriate clothing. Coveralls and boots are available in the anteroom for visitors.
- A clinician or technician or staff member will escort visitors in the Pig Farm.
- All visitors should be instructed to thoroughly wash and disinfect their hands before the visit and upon leaving the area.
- Visitors are not allowed to wander in the facility and specifically are not allowed to touch the animals.
- The public is not allowed in the Pig Farm. Special arrangements can be made to provide tours for visiting scientists by contacting the Staff responsible for the Pig Farm.

4.8.2. Children in the FVM

- Children are strictly forbidden in the FVM Pig Farm if they are not accompanied by their parents and a staff member.

4.8.3. Pets in the FVM

- Under all circumstances, companion animals are strictly forbidden in the Pig Farm.

4.9. Requirements for Equipment and Supplies Brought into the Area

- Equipment from other areas of the FVM or ambulatory trucks are not allowed in the Pig Farm.

Chapter 5

SMALL ANIMAL BIOSECURITY SOP

5. Small Animal Biosecurity SOP

- It is essential for all students, clinicians and staff to be familiar with the basics of hygiene and personal protection. All persons working in the Small Animal Hospital (SAH) are responsible for maintaining cleanliness in the facility. Please review the infection control guidelines presented in the general section of the Biosecurity SOP (Chapter 1).

5.1. General attire for the Small Animal Hospital

- The FVM recommends the use of hospital-dedicated attire and footwear for all staff and students to decrease the risk of carrying infectious pathogens home and limit the possible exposition of people or other animals.
- All staff members and students are required to wear clean professional attire, clean protective outer garments, and clean, always appropriate footwear when working in the SAH.
- **Attire** should be appropriate to the job at hand:
  - ***Consultations***:
    - Staff: dark blue scrubs for veterinarians and light blue scrubs for technicians.
    - Students: burgundy scrubs.
  - ***Hospitalisation:***
    - Staff: dark blue scrubs for veterinarians and violet scrubs for technicians.
    - Students: burgundy scrubs.
  - ***Intensive Care Unit (ICU)***:
    - Staff: dark blue scrubs for veterinarians and pink scrubs for technicians
    - Students: burgundy smock and trousers.
  - ***Surgery***: scrubs (top + trousers) and white lab coat. Scrubs should be protected with a white lab coat when outside the operating rooms.
  - ***Isolation wards***: white disposable coveralls.
- **Footwear**: should be dedicated solely to the clinic and must be worn always closed. Furthermore, footwear should be easy to clean and disinfect and resistant to a foot mat disinfecting solution.
- People must disinfect footwear while working, which provides a good check regarding suitability.
- Footwear must be transported in a waterproof closed bag and further cleaned and disinfected at home.
- Protective outer garments (scrub, lab coat, etc.) and shoes should be changed or cleaned and disinfected whenever soiled with faeces, urine, blood, nasal exudates or other body fluid. Thus, it is a good idea to have an extra outer garment available for use.

5.2. Patient Hygiene

- For basic hygiene and reduction of infection pressure, it is of major importance for SAH patients to be housed in a **clean cage**. Before housing a new patient in a cage, faeces, blood, urine, all other organic material and soiled objects should be removed. Cleaning staff cleans the hallways every day. Technicians, students and interns oversee cleaning and disinfecting the cages, following the procedures in force. Patient hygiene is of extreme importance for the management of neonates. Therefore, faeces or wet bedding should be removed immediately and the cage disinfected by students and/or interns.
- **When a patient is discharged**, the cage should be cleaned as soon as possible.
- Suspected or confirmed infectious patients (class 3 [hospitalisation] and 4 [isolation unit - IU]): the cage should be broken down and marked by the intern or clinician: **'TO BE DISINFECTED'**. Staff will empty, clean and disinfect the cage as soon as possible, after break-down by the responsible clinician, intern, nurse or student, and after cleaning non-contagious cages (see disinfection and

breakdown protocol). The cage is considered as a contagious area until disinfection is achieved. Thus, no animal should be housed in it before complete cleansing and disinfection.

- Cages used for non-contagious patients are regularly emptied, cleaned and disinfected in between use by different animals.
- **Water bowls** should be regularly cleaned (as needed, but at least twice daily) during the hospitalisation of an animal and should be cleaned and disinfected in between use by different animals. The presence of water in the bowl should be regularly checked for; the bowl needs to be refilled with fresh water at least twice daily, after cleaning.
- **Feeding bowls** must be regularly cleaned (as needed, but least twice daily) during the hospitalisation of an animal and should be cleaned and disinfected in between use by different animals. Appetite should be noted on the daily care log and food should be discarded in the appropriate waste container (green for class 1-2 animals *vs*. yellow for class 3 and class 4 patients).
- **Patients** should be maintained as clean as possible; all excretions or secretions should be removed as soon as spotted. Dirty patients should be washed accordingly, and all of them brushed regularly.
- **The environment around the cage** should be clean, tidy and neat, i.e. without medications or materials lying around, no bedding outside the cage, nor student camping equipment. An effort is expected from all staff and students to clean up used material.
- If patients **defecate outside a cage** (whether inside the building, or in the walking area), faeces must be removed immediately. If patients **urinate** inside the building or on any hard surface outside the building, urine should be removed and the floor cleaned, disinfected and dried.

5.3. Food and Beverages

- In general, food and beverages may be stored and consumed outside the hospital, in the students' cafeteria, in the interns' rooms and space, and in the staff cafeteria and offices.
- In cafeterias, a refrigerator and a microwave are available for human use only; no medication, samples, or other medical equipment should be stored in that refrigerator. No medication, samples or other medical equipment should be stored in the SAH cafeterias.
- It is strictly forbidden to store or consume food and drinks in patient care areas. However, students and staff working in hospitalization and ICU are allowed to use closed bottles, which must be stored exclusively in the rounds room of the hospitalization ward. The bottle must be constantly closed and stored above shelves when not used. A strict hand hygiene (cleaning and disinfection) is necessary before handling it. Cans are not allowed.
- Patients are excluded from areas where food and drinks storage and consumption are allowed.
- Food and drinks should not be left out for long periods, to prevent bacterial growth and the risk of foodborne illness.
- Refrigerators used to store patients' food or medications must not be used to store human food or beverage.

5.4. General Cleanliness and Hygiene

5.4.1. Appropriate cleaning

- Maintaining hospital cleanliness and appropriate personal hygiene are responsibilities of **ALL** staff and students working in the SAH.
- Hands must be washed and disinfected with an alcohol-based hand sanitizer prior to, and after handling each patient. Hands should also be washed and sanitized when exiting the hospitalisation ward, prior to working in other FVM areas (see Chapter 1 – section 1.3.1. – for the hand washing protocol).

- Clean examination gloves should be worn when handling high-risk (i.e. class 3 and class 4) but also highly susceptible patients (i.e. immunocompromised) or in case of contact with excretions, secretions, or wounds.
- Surfaces and equipment contaminated by faeces, secretions, or blood must be cleaned and disinfected by students/interns/staff in charge of the patient. This is especially important for patients suspected or known to shed class 3 and class 4 pathogens.

5.4.2. General Disinfection Protocol

- Clean and disinfect all equipment between patients (muzzles, specula, forceps, etc.). Clean equipment can be returned for sterilization when appropriate.
- Students' own equipment (e.g. scissors, thermometer, stethoscope and penlight) should be routinely cleaned and disinfected.
- If fleas or ticks are found on a patient, treat it with an appropriate external parasiticide and bill it to the client.
- Appropriate attire should be worn whenever using disinfectants. Additional PPE such as gloves, mask, face shields, goggles, impervious clothing and overshoes should be worn when there is a probability of splashing during the disinfection process.
- Remove all inorganic and organic material prior to disinfection. The presence of gross contamination will inactivate most disinfectants. If organic material is de-bulked with a hose, be careful to minimize aerosolization and further spread of potential infectious pathogens.
- Wash the cage, including walls, doors, water and feeding bowls, with water and detergent or soap; scrubbing or mechanical disruption is essential to break down films and residual debris that interfere with the disinfection process.
- Thoroughly rinse the area to remove any detergent residue. Note: disinfectants (e.g. - Umonium 38® - Huckert's) may be inactivated by detergents or soap; therefore, it is very important to rinse correctly after application.
- Allow area to drain or dry as much as possible, to prevent dilution of disinfectant solutions.
- Apply the disinfectant solution (prepared according to the manufacturer's guidelines) on the cage walls **AND** door. The disinfectant should remain in contact with the surfaces for several minutes (ideally 15 min but according to the manufacturer's instructions).
- Rinse the excess of disinfectant solution with water.
- The disinfectant should be rinsed off all surfaces prior to admission of another patient in the cage.
- After disinfection, remove the PPE and wash your hands.
- For non-routine disinfection measures (e.g. hydrogen peroxide misting), only staff trained and approved to wear and use the required PPE will be allowed to access the areas to be disinfected.
- All multi-use areas (e.g. examination rooms) should be tidy, cleaned and disinfected after use by staff and students responsible for the patient, regardless of its infectious status.

5.4.3. Foot mats

- Foot mats are not installed permanently in the at-risk areas; the use of overshoes is in force for class 3 patients and in the class 4 IU.
- Nevertheless, a foot mat must always be available, in case of emergency (e.g. reportable disease).

5.4.4. Disinfection Protocol for Instruments and Equipment

- All instruments, equipment and other objects (e.g. stomach tubes, mouth speculums, endoscopes, grooming tools, clipper blades, etc.) must be cleaned and sterilized or disinfected between uses on different patients.
- A manual of procedures is available for interns.

- Materials usually sterilized after use (instruments and equipment such as surgical instruments) must be cleaned with soap and water and returned to the cleaning service for sterilization.
- Surfaces or equipment contaminated by faeces, secretions, or blood must be cleaned and disinfected immediately by staff and students in charge of the patient. This is especially important for class 3 and class 4 patients (known or suspected of shedding important pathogens).
- **Boxes for immunocompromised, class 3 and class 4 patients:**
  - All material (stethoscope, thermometer, scissors…) used for a class 3, a class 4 or an immunocompromised patient will be dedicated to this patient only and stored in a well identified box. Items must be cleaned by the staff in charge of the patient with 20% Sekusept® after each use and discharge of the patient.
  - Class 3 patients can be taken outside using specially designed leashes made from a disposable green tie, dedicated to each patient during their hospitalization. Class 4 isolated patients, however, cannot leave isolation or be walked outside during their hospitalization.
  - After discharge and appropriate cleaning and disinfection, the box will be returned to the responsible nurse (class 3 or immunocompromised patients), or placed on the appropriate shelve in the isolation ward anteroom (class 4).
  - The box will be checked, cleaned and disinfected once more by the responsible nurse before use with a new patient.
- **Stethoscopes**:
  - Staff and students' stethoscopes may be used on class 1-2 patients but must be regularly disinfected with hydro-alcoholic solution (Sterillium®) (recommendation: at the beginning and the end of the day).
  - Immediate cleaning and disinfection are required when stethoscopes are visibly soiled.
  - Staff and student's stethoscopes should not be used on immunocompromised, class 3 or class 4 patients. However, immediate cleaning and disinfection are required if they have been used on these patients.
- **Thermometers**:
  - Thermometers should be thoroughly cleaned and disinfected after each patient using alcohol or Sterilium®. Plastic thermometer cases should be regularly soaked in a disinfecting solution.
  - Between patients, probes from thermometers used for continuous temperature monitoring (e.g. during anaesthesia) should be thoroughly cleaned (by wiping or washing) to remove gross faecal material and disinfected by soaking in alcohol and/or chlorhexidine solutions.
  - A thermometer is assigned to each immunocompromised, class 3 and class 4 patients. It is stored in the above-described box during hospitalization; thermometers must be cleaned and disinfected when visibly soiled, after each use and at discharge.
- Other staff and students' instruments and equipment (e.g. haemostats, scissors, etc.) may be used on several non-contagious patients (class 1 and 2) but must be cleaned and disinfected between patients using 70% isopropyl alcohol or Sterillium® available in various areas.
- Staff 'wifi' phones should be wiped with Sterillium® at least once a week.
- People walking the dogs are responsible for cleaning any faeces from the ground. Paper containers and waste containers are available in many locations throughout the SAH. Special waste containers and plastic bags are provided in the walking areas around the hospital.
- All rooms must always be kept clean and neat, including tabletops, counter tops, and floors. All students' personal belongings should be stored in the dedicated lockers. Extra clothing or backpacks should not be stored elsewhere.

5.4.5. Walking area

- This area should be cleaned daily and directly after each defaecation, and this is the responsibility of the student walking the dog.

5.5. Guidelines for Reception and Management of Small Animals

5.5.1. Outpatients

- Small animals with no signs of contagious disease may be accompanied by the owner in the waiting room.
- Outpatients may be hospitalised for a short period of time (if ending further examinations or procedures), in a room specifically designated for holding in a cage. This room is separated from inpatient areas and intended for outpatients only, if they do not have a class 3 or class 4 status.
- Class 3 and class 4 patients requiring further examination either stay with the owner in the consultation room, or are hospitalised, in agreement with regulations pointed out in the specific chapters regarding class 3 and class 4 inpatients. If the patient stays with the owner in the consultation room (awaiting additional procedures), the room will be marked to inform on the need of cleaning and disinfection and to avoid introducing other patients in that room.
- Suspected class 4 patients, who have not yet entered the SAH, will be admitted directly into isolation through a dedicated entrance leading straight to the isolation area.
- Outpatients should be taken into inpatient areas as little as possible.
- Students, interns or residents, and clinicians are responsible for the prompt removal and appropriate disposal of faeces from outpatient cages. If the patient urinates and/or defecates, attending personnel should temporarily remove it from the cage and clean the area, rather than using a different cage.
- If an FVM-bowl is used to water or feed the patient, the student and staff in charge are responsible for cleaning and disinfection with chlorhexidine (follow the manufacturer's instructions) after use.

5.5.2. Inpatients

5.5.2.1. Cage Assignments

- **Cages for inpatients are assigned preferentially by the Nursing Staff, the intern or the person responsible of the hospitalisation area or otherwise the primary clinician.**
- Client beds, blankets, collar tags and leashes must be returned to the owner (they get lost, soiled and may become contaminated).
- If the client insists on leaving a bed or blanket for its animal, he/she should be informed that it may not be returned.
- Locate a clean cage in the ward designated by one of the persons listed above.
- Prepare an electronic cage card in the PetUniversal® software with the client/patient information and the clinician's name.
- For ICU patients, an individual folder is particularly assigned. The cover of this folder includes the animal's signalment, the owner's contact information, the name of the clinician responsible, and the resuscitation status.
- For class 3 and class 4 patients, the suspected or confirmed infectious status must be written on the cage card immediately upon occupancy.
- Place pertinent signs on cage with important information for animal care attendants, (i.e. '**KEEP FASTED', 'LEPTO SUSPECT', 'CAUTION – WILL BITE', 'GATHER STOOLS'**, etc.)
- Diets containing raw meat or bones are not allowed in the FVM.
- Provide fresh water, unless otherwise indicated by the clinician.
- Do not move animals from cage to cage – clean and disinfect the cage/run while the animal is being walked by a colleague or student and return the patient to the same cage/run.
- When the patient is discharged, the cage must be immediately cleaned and disinfected by the student, intern or staff member. A sign **'CLEAN'** is placed on the cage afterwards to indicate the cage is available for another patient.

- To 'book' a cage for returning day patients (e.g. from operating theatre), place a sign **'SAVE CAGE'** on it.

5.5.2.2. Patient Records and Medications

- Concerning hospitalised patients, all medical information, including the hospitalization sheet is centralized in the PetUniversal® software.
- Medications are stored in the pharmacy. The pharmacist is responsible for the daily preparation of treatments to be administered to hospitalized patients. Once prepared, the medications are temporarily stored in a 'corridor medication cupboard', organized by cage, with each compartment assigned to a specific patient.
- Other materials used for hospitalized patients should be stored in the hospitalization storage room.
- All medications and material dedicated to a patient should be clearly identified.

5.5.2.3. Electronic records, Treatment Orders, and Patient tracking

- An electronic record **must** be completed by the time the patient is hospitalised via the PetUniversal® software.
- This electronic hospitalization sheet must list client and patient IDs, as well as the names of clinicians assigned to the patient.
- The electronic hospitalization sheet must list the admitting complaint or tentative diagnosis, especially for class 3 and class 4 patients (to allow cleaning staff, nurses and students to better understand the infectious disease hazards and take appropriate precautions).
- The electronic hospitalization sheet must list all call orders requiring immediate notification of the primary clinician.
- The electronic hospitalization sheet must list all scheduled TTMs for the patient.
- The electronic hospitalization sheet must be updated as the patient's status can evolve during hospitalisation.
- Patient information must also be recorded in a shared hospitalization Excel file, including the name of the responsible clinician. Anticipated date and time of discharge should also be mentioned, when available.
- All this information is confidential, and visitors are not supposed to have access to it.

5.5.2.4. Food and Water

- All food (including the one provided by clients) must be stored in appropriate bags, cans or plastic containers with tight fitting covers in the patients' kitchen.
- Only minimal amounts of food should be stored in the SAH kitchen refrigerator to avoid its contamination.
- If a new can is opened, the opening date should be clearly stated on the outside of it and a plastic cover must seal it before storage in the refrigerator.
- All cans opened for more than two days should no longer be used.

5.5.2.5. Bedding

- Students, nursing staff, and clinicians oversee bedding cages for patients upon their admission and during hospitalisation.
- Occupied cages are cleaned at least twice daily by students, technical staff, interns or clinicians and re-bedded if necessary.
- If cages are soiled or wet meanwhile, students, technical staff and veterinarians are responsible for noticing, cleaning and re-bedding.

5.5.2.6. Discharge

- Prior to discharge, animal owners must be informed on potential infectious hazards and provided recommendations on their control at home.
- The anticipated time and date of discharge should be mentioned in the patient's electronic medical record and communicated to the nurses, intern and student in charge, to optimize patient hygiene by the time of discharge.
- Students, nursing staff, and clinicians are responsible for breaking down items around the cages and ensuring that they are discarded, tidied away or cleaned and disinfected (fluids, brushes, barrier gowns, paperwork, etc.).
- When the patient is discharged, its electronic hospitalization sheet should be archived, and the cage should be cleaned as soon as possible.
- Cages that housed class 3 and class 4 patients should be marked with a sign (**'DO NOT USE, SPECIAL CLEANING REQUIRED'**). The known or suspected pathogen/infectious disease must be marked on the cage.

5.5.2.7. Owners' items

- Clients' items should not be left with the patients at the FVM.
- The FVM supplies all necessary material for patients.
- If an owner insists on handing over his/her own material, with the exceptional approval of the clinician, he/she must understand that it is very unlikely that the material will be returned.

5.6. Cleaning Protocols: Small Animal Facilities

5.6.1. Parking Area

- The parking area and its surrounding lawns will be checked at least monthly to remove all remaining faeces. The area should be cleaned, including concrete surfaces, at least once a year.

5.6.2. Small Animal Hospitalisation Area

- Students, technical staff and veterinarians clean and disinfect all used cages at least daily, and more often if needed.
- After being vacated, cages are cleaned and disinfected as soon as possible and correctly by students, technical support staff or clinicians in charge of the patient.
- Occupied cages are thoroughly cleaned and disinfected daily, preferably while the patients are walked or undergoing additional diagnostic or therapeutic procedures, or during the owner's visit.
- Whenever a cage is excessively soiled or wet, students, clinicians, and technical staff are responsible for cleaning, disinfecting and re-bedding.

5.6.3. Routine Cage Cleaning

- To be effective, disinfectants must be used on **CLEAN** surfaces. In other words, prior to disinfection, all macroscopic organic material should be removed by scrubbing surfaces with detergent. The surface needs to be rinsed prior to disinfection. Biofilms develop in areas of standing water, and where disinfectant sits on dirty surfaces.
- General principles of cleaning: it is imperative to remember that, when considering disinfectants, more does not mean better! Using the correct dilution (as recommended by the manufacturer) provides an optimum disinfecting action. Overuse of disinfectants may encourage resistance in microorganisms and contribute to the development of biofilms.
- Be careful when working in high-risk areas – avoid contaminating equipment or other areas.

Cleaning procedures for a vacated cage that housed class 1 and class 2 dogs

- Use appropriate clothing (barrier clothing if required; a sign will be posted on the cage).

- Remove all bedding into the red waste container.
- Sweep and scrub floor to remove all debris.
- Rinse floor and walls with water and detergent to remove gross debris. Scrub soiled areas with a brush and detergent.
- Rinse the cage with water.
- Apply Umonium®38 disinfectant.
- Allow the cage to dry (ideally for 15 minutes).
- Clean and disinfect adjacent aisle-way as above.
- Cleaning tools must be disinfected at the end of each day (including handles), and between corridors when required.

Cleaning procedures for a vacated cage that housed a class 3 patient

- Student, nurse or responsible clinician puts on barrier clothing, gloves and overshoes at the entrance of the class 3 unit.
- Remove all bedding into the yellow waste container located at the entrance of the unit.
- Sweep and scrub floor to remove all debris.
- Rinse floor and walls with water and detergent to remove gross debris.
- Scrub soiled areas using detergent and a brush.
- Rinse the cage with water.
- Apply Umonium®38 or dilute bleach.
- Allow the cage to dry (ideally for 15 minutes).
- Cleaning tools must be disinfected at the end of each day (including handles).

Cleaning procedures for a vacated cage that housed a class 4 patient (IU)

- Student, nurse or responsible clinician put on barrier clothing, gloves and overshoes in the entry anteroom of the isolation unit (IU)
- Remove all bedding into the yellow waste container located in the isolation ward.
- Clean bottom surface with detergent to remove all macroscopic organic material.
- Sweep and scrub floor to remove all debris.
- Rinse floor and walls with water and detergent to remove gross debris.
- Scrub soiled areas using detergent and a brush.
- Rinse the cage with water.
- Apply dilute bleach or Virkon™ S disinfectant.
- Allow the cage to dry (ideally for 15 minutes).
- Cleaning tools must be disinfected at the end of each day (including handles).

Daily routines

- All procedures performed by nurses should be carried out by interns and students if called for. In essence, dirty cages are cleaned, and animals are not switched to another cage.
- By doing so, all vacated cages are expected to be in mint condition by 08:00 AM.
- Sinks and drains of the consultation rooms and hospitalisation area should be cleaned and disinfected daily.

Monthly routines

- Areas that are not used daily (i.e. tops of walls, cages, windows, scales, wash rack, etc.) should be cleaned monthly to prevent dust accumulation.
- Sweeper should be cleaned and maintained.

Semi-annual routines

- All floors should be stripped and disinfected.
- The isolation area should be emptied and thoroughly cleaned, scrubbed, and disinfected top to bottom.
- Isolation drains should be scrubbed with detergent, rinsed, and then filled with dilute bleach. Do not fill a drain with disinfectant without cleaning it first.

Annual routines

- The entire SAH should be thoroughly cleaned, scrubbed and disinfected from top to bottom, including all equipment.
- A schedule should be made up and work should be evaluated by the Head of Clinic.

5.7. Management of Patients with Suspicion of Contagious Disease

- Special precautions are required when managing patients known or suspected to be infected with contagious pathogens. Because of their potential for hospital-acquired transmission, special conditions of concern include patients with acute gastrointestinal disorders (e.g. diarrhoea), acute respiratory tract infections, or infections by multidrug-resistant bacteria.
- Animals with suspicion of contagious disease should be treated as outpatients whenever their clinical condition allows it.
- Appointments for possible infectious disease will be handled by the receptionists, staff and students, receiving cases as follows:
  - If a client call mentions acute vomiting, coughing, sneezing or diarrhoea, suspected to be caused by a contagious disease, he/she will be asked to keep his/her companion animal in the car until checked in. Once a student has been paged, the patient can be brought directly to an examination room or the IU, depending on the circumstances. The patient should be preferably transported on a gurney or in a cage to minimise the contamination of the hospital environment.
  - The presenting complaint will be written on the schedule as well as an indication that the patient may possibly suffer from a contagious disease.
  - If the appointment is made and is coming in on the same day, the receptionist will phone the service to notify that a possibly contagious patient will be presented.
  - If the animal is presented directly to the reception desk without prior notification, the receptionist should contact the receiving service immediately and coordinate the reception of the animal in an examination room or in the IU to minimize hospital contamination.
  - Everything should be done to minimise direct contact between the patient and other FVM patients.
  - Animals should be transported to the appropriate examination / TTM / housing area through the most direct route to limit hospital contamination. Consider using a gurney, whenever possible, to limit environmental contamination.
- TTM and diagnostic areas, hospital equipment, staff and students clothing should be cleaned and disinfected immediately after contact with potentially infectious patients.
- If a contagious disease is suspected, based on history, physical examination, or evaluation of previously performed laboratory work:
  - Close off examination room
  - Place a **'DO NOT USE, DISINFECTION REQUIRED'** sign on the door.
  - Notify the staff in charge of cleaning of the suspected pathogen and do not use the room until the sign is removed, or until other adequate cleaning/disinfection has been performed.
- Class 3 precautions must be taken (appropriate barrier nursing and biocontainment practices), i.e.:
  - Barrier nursing precautions must be used.
  - Cage should be marked with a tapeline.

- Empty cages should be maintained on either side.
- Using cages at the end of aisles is preferred.
- **If a reportable and/or zoonotic disease is suspected/confirmed** (see list in Chapter 1)**, it must be relayed to the biosecurity staff and CFB as soon as possible (biosecurity-fmv@lists.uliege.be), so that they can assist in communication and evaluate if appropriate precautions are taken to house the animal.**

- Any animal with a history of acute vomiting and diarrhoea, and/or with a history of acute coughing or respiratory signs of suspected infectious origin should be handled as a suspected of being contagious (class 3 or class 4).
- Hospitalized small animals with suspicion of infectious gastrointestinal disease should be considered as possible sources of nosocomial or zoonotic infections and thus, should not be walked in common areas. All waste material must be properly disposed of, and contaminated surfaces must be appropriately cleaned, disinfected and dried as soon as possible.
- Upon discharge, staff and students must ensure that instructions given to clients adequately address the infectious hazards, to other animals and humans, and provide recommendations to protect people and other animals.

5.7.1. Classification of Suspected/confirmed Contagious Patients

5.7.1.1. General rules (Class 1, 2, 3 and 4)

- For classification, see Chapter 1 – section 1.2.2.).
- Our classification involves differences regarding possibilities of visits for the owner, which should be explained by the time of the initial consultation or as soon as possible after assigning a class 3 or 4 status to a patient.
- Class 3 dogs can still be visited by the owner if all barrier nursing rules are implemented and, if possible, in the hospitalisation cage or after transfer to a consultation room that will be disinfected after the visit.
- Class 4 dogs can only be visited under exceptional circumstances (e.g. pending euthanasia). Even in such circumstance, the owner should be discouraged to see the animal. If the owner insists, a short visit to the IU, complying with barrier nursing rules, can be authorised by the primary clinician.

5.7.1.2. Special Precautions During Hospitalisation

5.7.1.2.1. Movements of high-risk patients

- Class 4 patients should be transported directly to the IU.
- Patients moved from the main hospital to the IU will follow a route minimizing exposure of other patients and contamination of the facility.
- FVM staff moving such patients should apply barrier nursing precautions.
- Any areas or equipment contaminated during transport should be immediately cleaned with water and detergent, then disinfected.
- All movements should be minimised, and if possible, patients should be transported on a gurney or in a cage, rather than being carried in one's arms.
- All waste and faeces should be disposed of, and all contaminated surfaces should be cleaned, disinfected and dried as soon as possible. Low traffic-areas should be preferred and, if possible, patients should be moved late in the day, after moving other animals.

5.7.1.2.2. Required Diagnostic Testing in Patients with Suspected Infections

- Diagnostic testing of infectious and/or zoonotic diseases provides essential information for an appropriate patient management. Testing directly benefits patient and clients, by allowing the

protection of human health. It also allows the appropriate management of infectious risks for FVM patients, staff and students.

- It is therefore mandatory for all hospitalized patients to undergo diagnostic testing if a specific contagious or zoonotic disease is seriously considered. Diagnostic testing is essential to patient management in the FVM and therefore, is billed to the client.
- It is the responsibility of the senior clinician in charge of the patient to ensure that appropriate samples are submitted for testing, and that appropriate biosecurity precautions are taken.
- Any suspicion of a disease reportable in Belgium (**https://favv-afsca.be/fr/themes/animaux/sante-animale/situation-zoosanitaire-en-belgique** [in French]) will be immediately notified to the Liège LCU (FASFC Local Control Unit) (see section 1.7.6.) and as soon as possible to the CFB (**biosecurity-fmv@lists.uliege.be**).
- The primary clinician responsible for the patient must be consulted prior to moving any class 3 and class 4 patient for additional procedures.
- Whenever possible, diagnostic, surgical, or other procedures should be performed wherever high-risk patients are housed, rather than moving them to common examination and TTM areas.
- Appropriate barrier nursing precautions must always be followed by every person during diagnostic or other procedures.
- If the patient requires diagnostic or other procedures (e.g. x-ray, scintigraphy, surgery) which can only be performed in the main hospital facility or in the Imaging Unit, these procedures should be planned for the end of the day, whenever possible.
- The senior attending clinician is responsible for notifying any FVM staff concerned by the suspected disease and procedures required for containment (including the cleaning and disinfection process).
- Such information should be stated on all SAP request forms.
  - In general, all barrier nursing precautions required in the patient housing area will be implemented wherever the patient is handled.
  - Instruments, equipment, and environment should be thoroughly cleaned and disinfected after the procedure, regardless of where the procedure was conducted.

5.7.1.2.3. Biological Samples from Suspected or Confirmed Contagious Patients

- Biological samples should be handled with the same barrier nursing care as the patient itself (gown, gloves, mask, etc.).
- All biological samples from class 3 or class 4 patients should be stored in a sealed plastic bag (Ziplock or Whirlpak), and the suspected infectious disease/pathogen should be stated on the outside of the plastic bag.
- Pay attention to avoid contaminating the outside of the bag when placing samples in it.
- The suspected disease or pathogen should be clearly specified on all submission forms.

5.7.1.3. Isolation (Class 4)

- The small animal IU is the area used for housing class 4 patients, while class 3 patients will be housed in the hospitalization ward or the ICU, depending on the severity of their clinical condition.
- Patients with confirmed parvovirosis, suspicion/clinical signs of rabies, and suspected/confirmed infectious respiratory tract disease should always be housed in the small animal IU.
- Clients are **never** allowed to visit animals housed in the small animal IU. With express permission of the clinician, exceptions to this visitation rule may be granted under extraordinary circumstances, such as when class 4 patients are to be euthanized. In such case, the same biosecurity level should be applied.

5.7.1.3.1. Communication Requirements for Small Animal Isolation

- The CFB should be notified as soon as possible whenever patients suspected of a reportable disease are placed in isolation and when they are discharged. A notification email is sent by the veterinarian responsible for the patient at the following address: **biosecurity-fmv@lists.uliege.be**.
- The person in charge of ICU, as well as the ICU technician, must be notified when contagious patients are housed in the IU and when they are discharged or moved.
- The pathogen/infectious disease of concern must be mentioned in the animal's file, along with the required biosecurity precautions, so that all staff members and students can take appropriate precautions for preventing human exposure and to ensure that appropriate cleaning and disinfection procedures are implemented.

5.7.1.3.2. Management and care GUIDELINES FOR Patients in Isolation

- Strict attention to hygiene and use of barrier nursing precautions are critical for an appropriate containment of contagious pathogens in the IU.
- Before and after examining each patient, hands must be washed with soap and water and disinfected with alcohol-based hand sanitizer.
- Clean examination gloves must always be worn when working in the IU.
- Special care must be taken to prevent contamination of the environment by dirty hands, gloves, or shoes (see section 5.1. for precautions with footwear).
- Environmental hygiene is the responsibility of all persons working in the IU. Do not wait for another technician, staff member or student to clean. Assist with general cleanup and maintenance whenever possible. Surfaces or equipment contaminated by faeces, other secretions or blood must be cleaned and disinfected immediately by the people in charge of the patient.
- Whenever possible, students assigned to infectious patients should have no contact with immunocompromised patients elsewhere in the FVM, such as leukopenic patients, young animals, animals under immunosuppressive TTM and diabetes patients. When caseload requires contact with potentially infectious patients, treat other animals before.
- Isolated patients should not be walked. All waste must be properly disposed of, and contaminated surfaces must be appropriately cleaned and disinfected as soon as possible.
- The consumption of food and beverages is strictly forbidden in the IU to avoid the risk of exposure to zoonotic pathogens.

5.7.1.3.3. Minimizing Entry into the Isolation Unit

- Entry to the IU should only occur when necessary.
- Minimize the number of persons handling patients in the IU.
- Only the clinicians, students, and nurse responsible for patient care should enter the IU.
- The appropriate PPE (gloves, gown, head cap, mask, and overshoes) must be worn. Eye protection (e.g. safety goggles) should be available if necessary. Required barrier precautions will be posted on the board outside.
- For **plague, tularaemia or rabies**, only the primary clinician, one student and one nurse (if necessary) should have contact with the patient.
- **The primary clinician is always responsible to ensure that patients receive appropriate care.** Students and ICU nurses.
- Clients are **not** permitted to enter the IU unless under the exceptional circumstance of euthanasia. In such case, the clinician responsible should be notified and biosecurity precautions must be applied.

5.7.1.3.4. Equipment and Materials

- In general, any materials taken into the IU should not be taken back to the main hospital, unless cleaned and disinfected by the technical staff.

- Surfaces or equipment contaminated by faeces, other secretions or blood must be cleaned and disinfected immediately by staff and students in charge of the patient.
- Individual class 4 boxes with thermometer, stethoscope, scissors, etc. are available in the IU – 1 kit per patient, which needs to be clearly labelled. These boxes should not be taken back to the main hospital and must be cleaned and disinfected within the IU itself.
- Any supplies taken inside the IU should be used in the facility or discarded in the isolation yellow waste containers.
- All equipment and material used for one patient cannot be used for another one and should not be returned to the stock.
- Medications used on isolated patients should be billed to the client and sent home at discharge, or else discarded. Do not return medications or intravenous fluids from the IU to the pharmacy.
- Intravenous fluids not assigned to a patient should be stored in the IU closets.
- Samples collected from isolated patients for diagnostic testing should be immediately placed in a plastic sealed container and labelled.
- A foot mat should be installed if necessary (e.g. suspicion of reportable disease).

5.7.1.3.5. Procedures for People Entering and Exiting the Isolation Unit

- A barrier gown is patient specific. A different pair of gloves must be used for each animal.
- **To enter the small animal isolation**:
  - Leave all personal belongings and medical equipment (stethoscope, etc.) in the anteroom of the IU.
  - Wash hands for at least 30 seconds then use hand sanitizer within the anteroom and before touching any other surfaces or objects.
  - Put on clean yellow disposable gown, head cap, mask, overshoes and examination gloves; eye protection [e.g. safety goggles] should be available if necessary (strongly advised in case of zoonotic disease). Remain in the anteroom until required barrier clothing is on.
  - Bring all necessary supplies upon entering to avoid ins and outs.
  - Procedures involving highly contaminated sites should be performed last (e.g. taking rectal temperature, rectal palpation, manipulation of abscesses, etc.)
- **Finalising patient care and exiting the IU (exit lock)**
  - Avoid dispersing organic (faecal) material throughout the room.
  - Appropriately dispose of sharps in yellow sharp container.
  - Clean and disinfect thermometer, stethoscope, and other material by wiping with 70% isopropyl alcohol, and place all material in the box dedicated to the patient.
  - Clean the examination table and all other contaminated surfaces then disinfect them.
  - Once daily, clean doorknobs with disinfectant.
  - Remove gloves, disinfect your hands with hydro-alcoholic solution, and re-glove. Use clean gloves to process samples.
  - Remove gown and hang it back in the exit lock or dispose of it in the yellow waste container if visually dirty or ripped.
  - Dispose of cap, gloves and overshoes in the exit lock yellow waste container.
  - Wash hands thoroughly with soap and water and turn off water faucets with the paper towel used to dry hands.
  - Use alcohol-based sanitizer for hand disinfection and exit the exit lock.
  - Pick up all personal belongings and materials.
  - If footwear might have been contaminated (e.g. rotten overshoes), shoes must be immediately cleaned and disinfected before leaving the exit lock. Additional disinfection of the exit lock floor is also necessary.

5.7.1.3.6. Procedures for Moving Small Animals to the Class 4 Isolation Unit

- Place a clean yellow waste container.
- Stock anteroom if not already done, contact nurse or intern when supply is lacking.
- When possible, patients to be housed in isolation upon admission should be transported directly to the IU in the owner's transport means, on a gurney or in a cage, rather than being carried or walked.
- Any person handling the patient must use appropriate attire and follow barrier nursing precautions.
- Patients housed in the main hospital and that need to be moved to the IU should be walked on a path minimising contact with other animals; the path should be cleaned and disinfected right after the patient has entered isolation.
- The primary clinician in charge of the patient is responsible for ensuring that people are appropriately notified about admission of patients to the small animal IU:
  - Responsible staff must be notified immediately when an animal is moved to the IU and must be informed of the suspected pathogen(s) and potential zoonotic character.
  - If a reportable disease (e.g. rabies) is suspected/confirmed, an email must be sent to **biosecurity-fmv@lists.uliege.be** to inform the CFB.
- Staff and students handling cases in isolation: the primary clinician, intern and student should be prepared to perform all physical examinations and TTMs themselves. If necessary, the primary clinician may assign additional students and staff to help.
- Leave all equipment and supplies in the main hospital, other than medications, and the patient dedicated box. A computer is available in the IU to access the patient's medical records and hospitalization sheet at any time.
- It is critical to clean and disinfect surfaces if faeces or body fluids contaminate surfaces while moving the patient.
- If the patient was transferred from the main hospital, the sign '**DO NOT USE, SPECIAL CLEANING REQUIRED**' must be affixed on the cage in the main hospital; the suspected or known pathogen/disease must be clearly labelled on the cage.
- The technical support staff will ensure that the cage has been "broken down", empty fluid bags discarded (etc.) and all equipment placed in a labelled bag for further disinfection.

5.7.1.3.7. Cleaning and Feeding in the Small Animal Isolation Unit

- All people are responsible for assisting with cleaning and maintaining the IU! Everyone should help cleaning when necessary.
- Single-use materials are disposed of in the yellow waste container.
- Food and water do not leave the IU; unconsumed water must be discarded in the sink and unconsumed food should be thrown away in the yellow waste container.
- Cages are cleaned and disinfected once daily.
- Additional cleaning should be done throughout the day when necessary.
- Students assigned to patients are responsible for routine cleaning of the anteroom, cleaning of cage walls and floors if contaminated, under supervision of the technical support team.
- Students are responsible for feeding patients housed in isolation.
- Technical support staff is responsible for supervising cleaning, disinfection, and stocking of the IU.

5.7.1.3.8. Procedures for Patients Leaving Isolation - for discharge, diagnostic procedures or walking)

- The discharge status of the patient should be clearly marked in PetUniversal® to alert responsible cleaning staff to disinfect the room.
- Whenever possible, try to discharge isolation patients prior to 4:30 pm Monday through Friday, so that the technical support staff can help with the room breakdown.
- From 8:30 am to 4:30 pm, Monday through Friday, contact a member of the technical support staff to enlist their help in breaking down the room and to make sure it is done properly.

- People moving the patient are required to wear **A NEW SET OF** appropriate attire and implement barrier precautions.
- People must avoid contaminating doors, gates, etc. with contaminated gloves or hands.
- Patients moving from isolation should have **NO** contact with other patients, clients, and people.
- Diagnostic and therapeutic procedures that must be performed in the main hospital on isolation patients should be scheduled for the end of the day, and all potentially contaminated surfaces and floors must be promptly cleaned and disinfected to minimize environmental contamination and the likelihood of nosocomial transmission.
- Staff members must ensure that instructions given to clients adequately address the infectious hazards towards other animals and humans and provide suggestions for limiting the risks to people and other animals at home.

5.7.1.3.9. Breakdown of the Isolation Area Prior to Disinfection

- Contact the technical support staff, **IMMEDIATELY** upon discharge and breakdown so that they can clean and disinfect the ward before admission of another patient.
- The primary clinician, technical support staff and student in charge of the patient are responsible for the room breakdown procedures, cleaning and disinfection (see below). The room will not be disinfected unless technical support staff is notified of the specific pathogen/disease affecting the patient.
  - Dispose of ALL single-use material, using yellow sharps containers for disposable sharps.
  - For **plague, tularaemia or rabies** cases (confirmed or suspected), seal the sharp container and place it in the yellow waste container.
  - Seal all yellow waste containers and leave them in isolation to be removed.
  - Clean then disinfect all counters (see Chapter 1 for instructions regarding appropriate disinfection procedures).
  - Clean and disinfect all bowls.
  - Disinfect all medical equipment and put it on the appropriate cabinets of the IU.
  - Fluid pump: dispose of plastic then spray and wipe down the fluid pump.

5.7.1.3.10. Reducing Biosecurity Precautions for a Patient Housed in Isolation

- Only the Clinician in charge of ICU can authorise the amendment of precautionary requirements or the reduction of biosecurity precautions for potentially contagious patients.
- In general, these decisions will be based on the suspected pathogen, transmission route, likelihood of persistent shedding or infection, likelihood of exposure to other contagious pathogens while housed in isolation, etc.

5.7.1.3.11. Movement of High-Risk Patients

- Class 4 patients requiring isolation should be transported directly to the small animal IU.
- If patients are moved from the main SAH to the IU, they should follow a path minimizing exposure of other patients, and environmental contamination.
- FVM staff should use barrier nursing precautions while moving patients.
- Any areas or equipment contaminated with infectious material during transfer should be immediately cleaned with water and detergent before disinfection.
- All movements should be minimised; if possible, patients should be transported on a gurney or in a cage, rather than being carried in a person's arms (even if equipped with PPE, i.e. gown, gloves etc.).
- All waste and excrements should be eliminated as soon as possible, and all contaminated surfaces should be cleaned, disinfected and dried as soon as possible. Low traffic areas should be preferred and if possible, movements should occur late in the day, after all other patients.

5.7.1.3.12. Use of Ultrasonography, Radiography, or Electrocardiogram in class 4 Patients

- Staff from ancillary services must wear appropriate clothing and apply barrier precautions when handling class 4 patients outside the IU.
- Clean any gross organic material prior to disinfection.
- After performing an electrocardiogram, staff members must clean and disinfect the leads with a gauze sponge soaked in disinfectant (Umonium®38), with special attention for the clips and wires that were in contact with the patient.
- After performing endoscopy, the technical staff will clean and disinfect the endoscope, light source, etc. according to the recommended procedure attached to the endoscope.
- All radiography equipment and supplies must be cleaned and disinfected after use.
- Cassettes should be placed in plastic bags prior to use.

5.7.1.3.13. Surgery/Anaesthesia on Isolated Patients

- Staff from ancillary services must wear appropriate clothing and apply barrier precautions when handling class 4 patients outside the isolation area.
- Clean any gross organic material prior to disinfection.
- After surgery, staff members must clean and disinfect all material and place it in a sealed plastic bag labelled with the suspected or confirmed pathogen/disease, prior to dropping off the material for sterilization.
- No other patient can enter the room before complete and strict cleaning and disinfection of all surfaces.
- As much as possible, surgeries on class 3 or class 4 patients should be planned for the end of the day.
- A sign should be left for cleaning staff, mentioning the suspected or confirmed infectious pathogen/disease and the advised disinfection protocol.

5.7.2. Reducing Biosecurity Precautions for a Class 3 or Class 4 Patient

- Only the clinician in charge of ICU can authorise the amendment of precautionary requirements or the reduction of biosecurity precautions for patients with an increased risk of contagious disease (e.g. leptospirosis).
- Only the clinician in charge of ICU can give permission to move patients from isolation to other hospital areas.
- In general, such decisions will be based on the suspected pathogen/disease, transmission route, likelihood of persistent shedding or infection, likelihood of exposure to other contagious pathogens while housed in isolation, etc.

5.7.3. Disease Differentials for Which Testing is Mandatory in Small Animal Patients

- Testing of appropriate samples is mandatory if the following disease or condition is a reasonable differential. A full description of testing, management, diagnosis, and potential TTM information is available on the WOAH website:
  - Animal diseases data: **https://www.woah.org/en/what-we-do/animal-health-and-welfare/animal-diseases/**
  - Terrestrial Animal Health Code: **https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/**
  - Manual of Diagnostic Tests and Vaccines for Terrestrial Animals: **https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-manual-online-access/**
- Special attention must be drawn to the following diseases:

- Acute diarrhoea in dogs and cats (caused by *Salmonella* spp., *Campylobacter* spp., parvovirus, *Cryptosporidium* spp., *Giardia* spp.)
- Canine distemper
- Influenza
- Canine brucellosis (*Brucella canis*)
- Feline calicivirosis (hypervirulent)
- Leptospirosis
- Rabies

5.7.4. Management of Patients with Known/Suspected Contagious Diseases/Conditions

- **Gastrointestinal infections:** gastrointestinal pathogens of concern (nosocomial hazards) include parvovirus for unvaccinated and naive animals, panleukopenia virus, and *Salmonella* spp.
- **Respiratory infections:** respiratory pathogens of concern (nosocomial hazards) include influenza virus, canine distemper virus, *Aspergillus* spp., feline infectious rhinotracheitis complex, etc.
- **Neurological diseases:** neurological pathogens of concern (nosocomial hazards) include rabies virus and canine distemper virus.

5.7.5. Management of Patients Infected or Colonized with (Multi)Drug-Resistant Bacteria

- Patients infected with (multi)drug-resistant (MDR) bacteria are a potential hazard to FVM staff, students, clients, and other patients. As such, they are managed with increased biosecurity precautions intended to prevent their dissemination in the FVM (class 3).

5.8. Small Animal Surgery and Anaesthesia

5.8.1. Attire for the 'Clean' Areas of the Small Animal Surgical Facility

- Refer to the FVM Dress Code.
- Clean surgical scrubs, head covers, overshoes, and masks are required for entering the designated 'clean' areas of the surgical facility, including scrub rooms and surgical theatres.
- Surgical scrubs should be worn in the 'clean area' of the small animal surgical facility **ONLY**; they cannot be worn in other areas of the small animal surgical facility, unless protected by a closed white lab coat.
- Outside the 'clean' areas of the surgical facility, all staff members and students should wear a clean white lab coat over scrubs. People must also remove overshoes when exiting 'clean' surgical areas (personnel wearing dedicated surgical footwear should change their shoes or put on overshoes prior to exiting 'clean' areas).
- All people, including cleaning and maintenance personnel, are required to adhere to all relevant policies regarding attire in surgery facilities.

For class 3 and class 4 patients

- The set of outerwear dedicated to the patient in the hospitalisation wing (at the cage for class 3 animals and in the anteroom for class 4 patients) should be worn when transporting the animals to the clean area.
- A different set of the same outerwear should be worn in the 'clean' areas of the small animal surgical facility.
- After the procedure, this final set can be left with the animal at its cage if still in good condition.

5.8.2. Hygiene for Perioperative Management of Small Animals

- High standards of cleanliness and hygiene must be maintained throughout the surgery facility.

- The surgical team and patient surgery site must be aseptically prepared. Aseptic technique must be maintained throughout the surgery.
- Non-essential people are always prohibited.
- Movements of anaesthesia students and staff members between the anaesthesia preparation area, the surgery theatre and the animal hospital should be minimised.

For class 3 and class 4 patients

- As far as possible, clipping and surgical preparation should be performed in the cage (class 3) or on the examination table of the IU (class 4). As such, a brief surgical preparation will be performed in the clean area of the surgical area.
- All waste products should be immediately disposed of in the yellow waste containers, and all surfaces should be immediately cleaned, disinfected and dried.

5.8.3. Guidelines for Perioperative Management of Small Animals

- Perioperative management of patients can greatly influence the likelihood of surgical site or other nosocomial infections. As such, basic management procedures should always emphasize on the use of barrier nursing precautions and maximize the separation between patients. Standards for people, patient, and environmental hygiene in the surgical and perioperative areas should be among the highest in the FVM.
- Hands must be washed and disinfected with a hydro-alcoholic solution between two patients. Hands should also be washed and disinfected after contact with a patient to prevent the contamination of hand-contact surfaces (e.g. doors, counter tops, equipment, etc). Examination gloves should be worn as a barrier nursing precaution whenever necessary (e.g. contact with surgical sites, etc.) and discarded after each patient. Wearing gloves does not exempt from hand washing and disinfection after their disposal.
- Faeces should be removed immediately from the anaesthesia prep area or other areas of the surgical facility. If needed, the floor should be hosed between patients and disinfected.
- Equipment will be cleaned and disinfected after use.
- Routine (e.g. daily) environmental cleaning and disinfection should be carried out strictly and following prescribed protocols.

For class 3 and class 4 patients

- The patient should be pre-medicated in its cage (class 3) or in the small animal IU (class 4).
- Transportation to anaesthesia prep should occur just prior to induction. A gurney or transport cage should be used to minimize hospital contamination.
- A remote induction and prep table should be used.
- All contaminated instruments and equipment must be cleaned and disinfected, then placed in a plastic bag labelled with the pathogen prior to be returned for sterilization.

5.8.4. Anaesthesia Induction Area

- All known or suspected contagious diseases/pathogens should be clearly reported on the anaesthetic form.
- **The surgical site should be clipped immediately before surgery. Clipping the surgical site the day before surgery predisposes it to colonization with potentially pathogenic bacteria.**
- Unless decided otherwise by the primary clinician, surgical patients will be moved to the anaesthesia prep area one hour prior to scheduled procedures (i.e. scheduled table time) and placed in the anaesthesia preparation area until induction.
- Prepare the IV catheter site aseptically and place the catheter using aseptic technique.

- Patients shall recover from anaesthesia in their own cage whenever possible (own cage for class 3, in the IU for class 4). Class 1 and 2-dogs can also recover in the anaesthesia preparation room.
- The table used for transporting the patient must be cleaned and disinfected (allowing 15 min contact time), then thoroughly rinsed with water between uses.
- The oxygen insufflation hose used in recovery must be cleaned and sprayed with chlorhexidine solution (allowing 15 min contact time). The distal end of the tube must be cleaned of debris with soap and water, soaked in chlorhexidine solution (allowing 15 min contact time), and rinsed between patients.
- Anaesthesia machines must be cleaned and disinfected between patients:
  - Valves and domes will be cleaned with water and dried.
  - Pieces and reservoir bags will be rinsed thoroughly, soaked in chlorhexidine solution (for a minimum of 15 min) after each use, then thoroughly rinsed and dried before the next use.
  - Piece adapters will be cleaned with soap and water, soaked in chlorhexidine solution (allowing 15 min contact time) and rinsed after use.

5.8.5. Other Routine Cleaning and Disinfection Procedures

- The surgery theatre must be immediately cleaned and disinfected after surgery.
- All contaminated areas must be cleaned and disinfected immediately following the procedure.
- For class 3 and class 4 patients, all contaminated instruments and equipment must be cleaned and disinfected, then placed in a plastic bag labelled with the suspected pathogen prior to be returned for sterilization.
- For class 3 and class 4 patients, all individuals in contact must wash hands carefully, use hand sanitizer and remove contaminated clothing prior to handling other animals.
- Endotracheal tubes (ET):
  - Clean inside and outside of ET with mild soap and water, using a scrub brush.
  - Soak ET in a large barrel of Sekusept® solution for at least 15 min.
  - Thoroughly rinse ET with warm water being careful not to set them down in the sink.
  - Hang ET to dry in the designated cabinet of the anaesthesia induction area.
  - ET are stored in this cabinet until needed.
  - **Any ET laid on the ground will require disinfection before use.**
- All anaesthetic machines and ventilators will be broken down and thoroughly cleaned/disinfected on a regular basis.
- Environmental samples should be collected from the recovery rooms and surgical theatres regularly and cultured for the presence and counts of pathogenic bacteria.

5.8.6. Management of Surgical Patients with Contagious Diseases

- It is the primary clinician's responsibility to notify anaesthesia and surgical staff about impending surgery on animals with potential infectious diseases (particularly respiratory, gastrointestinal, and (multi)drug-resistant bacterial infections).
- An operating room with minimal cross traffic should be selected.
- Surgery on animals with suspected infectious diseases should be avoided as much as possible; if necessary, surgery will be planned at the end of the day to minimize exposure of other patients.
- Clinicians and students assigned to surgical cases are responsible for identifying and communicating on suspected/confirmed contagious patients.
- Clinicians and students assigned to these cases are responsible for ensuring that induction and recovery areas have been appropriately identified as being potentially contaminated, as well as ensuring that they have been appropriately decontaminated prior to use for other patients.
- If the patient is at high risk of transmitting a contagious pathogen, bathing with an antibacterial body wash (e.g. chlorhexidine soap) may be required, at the discretion of the surgeon.

5.9. Biosecurity for Small Animal Intensive Care Unit (ICU)

5.9.1. General Management Considerations for Small Animal ICU

- Because of the intensive nature of nursing care provided in ICU, it is critical to strictly adhere to barrier nursing and hand hygiene protocols.
- Thermometers should be cleaned and disinfected after each patient, and stethoscopes should be cleaned and disinfected frequently, to minimize the risk of nosocomial transmission of pathogens.
- Minimize the number of staff members and students handling cases whenever possible.
- When possible, students assigned to infectious patients should not have any contact with immunocompromised patients elsewhere in the FVM. Examples would include leukopenic patients, young animals, animals under immunosuppressive TTM and diabetes patients. When caseload requires contacts with suspected/confirmed infectious patients, treat other patients before.
- Class 3 animals requiring hospitalization in ICU will be placed in cages as far from other patients as the caseload will allow.
- An 'isolation zone' around the animal housing area will be identified with tape stuck on the floor in front of the cage.
- Disposable barrier gowns, overshoes, a dedicated box containing gloves, dedicated thermometer and a stethoscope will be available within the perimeter. If overshoes tear, footwear must be disinfected immediately.
- Hospitalized patients with confirmed or suspected infectious diseases should urinate and defecate in their cage whenever possible. If patients need to be taken outside, every effort should be made to prevent urination or defecation within the hospital. Disinfectant should be carried and used in case of urine or faecal accidents. Whenever possible, patients should be transported on a gurney or in a cage to minimize the contamination of common traffic areas.
- If taken outside. All waste must be properly disposed of, and contaminated surfaces must be appropriately cleaned and disinfected as soon as possible.

5.9.2. General considerations for housing infectious/zoonotic patients in ICU

- Patients with a known gastrointestinal or respiratory tract disease should be identified upon admission and brought to the attention of ICU attending nurses and clinicians.
- Patients with confirmed parvovirosis, suspicion/clinical signs of rabies, suspected/confirmed feline plague, suspected/confirmed canine distemper, suspected/confirmed tularaemia, feline upper respiratory disease complex, canine infectious tracheobronchitis (kennel cough), influenza, should be housed in the small animal IU.
- Only the person in charge of ICU can give exceptional permission to house a class 4 patient in the ICU under a class 3 status (exceptional load). In such case, the same biosecurity level will be applied.
- In general, such decisions will be based on the clinical condition, required TTM, suspected disease/pathogen, transmission route, likelihood of persistent shedding or infection, likelihood of exposure to other contagious agents while housed in isolation, etc.

5.9.3. Cleaning, disinfection and waste

- Immediately clean and disinfect any hospital equipment, gurneys, and examination tables after contact with suspected/confirmed infectious patients and follow general guidelines for hygiene/cleanliness.
- Clean and disinfect scales and examination tables used during the TTM of such patients immediately after the procedure. Every effort should be made to weigh and treat other animals before using common equipment for potentially infectious patients.
- Staff members and students should change any contaminated outerwear after handling infectious patients.

- A separate mop and mop bucket will be provided for infectious patients.
- After handling the infectious patient, remove the barrier nursing gown and hang it within the taped area for class 3 animals or in the anteroom of the IU for class 4 animals (discard it soiled). Remove and dispose of overshoes, then gloves, and wash and disinfect your hands.
- Yellow waste containers should be used to collect all disposables in contact with animals suspect of infectious disease.

5.9.4. Additional Information on Specific Diseases

- It is strongly encouraged for all hospitalized patients to undergo diagnostic testing if an infection with a specific contagious or zoonotic agent cannot be discarded. Diseases for which testing is strongly encouraged include canine distemper, canine influenza, cryptosporidiosis, giardiasis, leptospirosis, parvovirosis and rabies. Diagnostic testing is considered as essential to case management in the FVM and therefore, patients will be assigned a class 4 status if the owner refuses testing. The financial repercussions of the class 4 status will be billed to the client. For additional information on diagnostic testing, see the OIE website:
  - Manual of Diagnostic Tests and Vaccines for Terrestrial Animals: **https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-manual-online-access/**
- **Feline Leukaemia Virus (FeLV) (class 2)**
  - Cats with suspected or confirmed FeLV infection will be housed one cage away from other cats if possible. Signs should be placed on the cage identifying the suspected/confirmed pathogen.
  - Students and nurses assigned to the case should not handle other cats hospitalised in ICU.
  - Ideally, other cats should be handled before handling the FeLV patient if caseload does not allow segregation of cases.
- **Feline panleukopenia (class 4)**
  - Cats with suspected or confirmed feline panleukopenia will be housed in the IU and placed as far from other cats, as caseload allows it.
  - There will always be at least one cage between panleukopenic patients and other cats. Signs should be placed on the cage to identify the suspected/confirmed pathogen.
  - Students and nurses assigned to the case should not handle other cats hospitalised in ICU.
  - Ideally, other cats should be handled before handling the panleukopenic patient if caseload does not allow segregation of cases.
- **Canine parvovirus (class 4)**
  - Dogs less than 1.5 years of age with vomiting, diarrhoea, and/or leukopenia will be suspected of parvovirosis, until test results. They will be transferred to the IU and walked as described in the general housing rules above. Signs should be placed identifying the patient as **'PARVO SUSPECT'.**
  - A diarrhoea screening test is strongly recommended to investigate possible viral pathogens, parasites, and faecal culture. When the disease is confirmed, the sign should be changed to **'PARVO'**.
  - When possible, students and nurses assigned to parvovirus patients will have **NO** contact with other dogs at risk (under 1.5 years).
- **Leptospirosis (class 3)**
  - Patients identified as leptospirosis-suspected or -confirmed (Class 3) should be segregated and isolated, as described in the general housing rules above.
  - The class 3 status will be lifted once the patient has been treated for a minimum of 48 hours with targeted antibiotic therapy, based on clinical progress and laboratory results.
- **Patients carrying MDR bacteria (class 3)**

- The CFB should be notified as soon as possible of any bacterial infection presenting an unusual resistance pattern, including surgical site-, catheter-related- and gastrointestinal infections by sending an email to **biosecurity-fmv@lists.uliege.be**.
- Hospitalized patients with MDR bacteria will be separated as much as possible from other patients and will be discharged as early as possible.
- All patients infected with bacteria resistant to a wide panel of antibiotics must be managed with strict barrier nursing precautions.

5.10. Breaking Transmission Cycles

5.10.1. Visitors in the Small Animal Hospital

- Visiting hours for the SAH are from 14H00 to 16H30, daily. All visitors must check in at the reception desk and remain in the waiting room to be escorted to their companion animal.
- All visitors must strictly adhere to biosecurity precautions if required.
- All visitors should be instructed to thoroughly wash and disinfect their hands after leaving inpatient areas.
- The public is not allowed to tour SAH inpatient areas. Special arrangements can be made to provide tours for visiting scientists by contacting the Head of Department or Hospital Director.

5.10.2. Clients in the Small Animal Hospital

- Clients must adhere to requirements for appropriate clothing. PPE is available for clients if requested.
- A student, clinician, or nurse should escort clients to a consultation room or exceptionally, after permission by the primary clinician, to the animal's cage.
- Clients must adhere to all barrier nursing requirements that apply in case of direct contact with their animal.
- Clients may visit their animals but are not allowed to wander in the facility and specifically are not allowed to touch other patients or read other animals TTM cards or orders. Information on other patients is confidential, including diagnoses, and should not be disclosed.
- Owners may visit hospitalized inpatients; other interested parties are not allowed to visit inpatients without express permission of the owners.
- Clients are **never** allowed to visit animals housed in isolation. Exceptions to this rule may be granted under extraordinary circumstances, such as when patients are to be euthanized.

5.10.3. Children in the FVM

- Children are under no circumstances allowed to be left unattended in the hospital. To avoid accidents and infectious risks, children should always be supervised by an adult.

5.10.4. Pets in the FVM

- Pets are not allowed in the SAH (ULiège work regulations)
- Under no circumstances they are allowed to visit hospitalised patients.

5.11. Deceased patients

5.11.1. Breakdown of patient environment

- After a patient's death, the cage should be cleaned and all records collected.
- Cages used to house class 1 and class 2 patients should be cleaned and disinfected before housing a new patient.
- Cages used for class 3 and 4 patients should be marked with a sign: '**TO BE DISINFECTED**'. No other animal is allowed to enter these cages before complete cleaning and disinfection, and verification by the technical support staff, nurse or responsible veterinarian.

- Students, nursing staff, and clinicians are responsible for breaking down items around cages and ensuring that they are discarded, filed, or cleaned and disinfected (fluids, brushes, barrier gowns, etc).

5.11.2. Storage of a patient's body

- If the animal dies or is euthanized in the cage, the cadaver should be removed as soon as possible.
- Dead class 3 or class 4 patients should be stored in a sealed and well identified water-resistant bag to be transported to the necropsy or cremation services.

5.12. Referral for

5.12.1. Pathology

- The cadaver should be taken to the Necropsy Department as soon as possible, even during evenings or weekends. Cadavers should not be stored in the refrigerator located in the level -1 of the SAH.
- The dead animal will be placed:
  - In the pathology refrigerator if necropsy is required. The necropsy request form needs to be clearly present and taped to the cadaver. The patient status (class 1-2, 3 or 4) should be clearly mentioned on the outside of the request form.
  - **OR** in the appropriate collector if no necropsy is requested (no request form present). However, it should be clearly mentioned if the case has a class 3 or class 4 status.

5.12.2. Cremation

- If the owner wishes a cremation service for his/her animal, he/she may choose between individual or collective cremation.
- The company is authorized to transport cadavers. No other ways of transport are accepted.
- While waiting for the transport, the cadaver should be stored in the refrigerator located in the level -1 of the SAH.

Chapter 6.

BIRD, PET RABBIT / RODENT / PET POULTRY, ZOOLOGICAL AND EXOTIC ANIMAL BIOSECURITY (BRRPZE) SOP

6. Bird, pet Rabbit / Rodent / pet Poultry, Zoological and Exotic animal (BRRPZE) Biosecurity SOP

6.1. General Cleanliness and Hygiene

- Maintaining clinic cleanliness and appropriate personal hygiene are responsibilities of **ALL** people working in the BRRPZE clinic.
- Hands must be washed and disinfected with an alcohol-based hand sanitizer prior to, and after handling each patient.
- Clean examination gloves should be worn when contacts with high-risk patients (i.e. suspicion of infectious disease), and safety goggles when handling parrots suspected of chlamydiosis or when necropsying hares.
- Surfaces or equipment contaminated by faeces, secretions, or blood must be cleaned and disinfected immediately by staff members or students in charge of the patient. This is especially important for patients known or suspected of shedding infectious pathogens.
- Clean and disinfect all equipment (muzzles, specula, forceps, etc.) after use with a patient using the disinfectant available in various areas. Cleaned equipment is sterilized everyday in the oven or the sterilizer. Students are expected to bring some of their own equipment (e.g. scissors, clipper blades, thermometer, stethoscope, penlight and haemostat), and it is essential for these supplies to be routinely cleaned and disinfected.
- When fleas or ticks are found on a patient, clinicians must determine the most appropriate TTM.

6.2. General attire – BRRPZE clinic

- The FVM promotes the use of clinic-dedicated attire in order to decrease the risk of spreading infectious pathogens.
- All people working in the BRRPZE clinic are required to wear clean professional attire, clean protective outer garments, as well as clean and appropriate footwear at all times when working in outpatient areas.
- This attire should be appropriate to the job at hand (burgundy red or dark blue blouse for examinations and light blue scrub for surgeries). A name tag must be worn.
- Footwear: Dedicated clinic footwear that is closed, clean, and machine-washable must be worn at all times while working at the BRRPZE clinic.
- People must disinfect footwear while working, which provides a good check regarding suitability. Water-impervious footwear is strongly recommended to limit potential damage caused by foot mat solutions.

6.3. Cleaning and Disinfection

- Gloves and appropriate attire should be worn whenever using disinfectants: examination gloves or rubber cleaning gloves (worn during routine cleaning operations) provide adequate protection.
- Remove gross contamination prior to disinfection. Clean the material with water and detergent or soap; scrubbing or mechanical disruption is always needed to break down films and residual debris that prevent or inhibit the disinfection process. Thoroughly rinse the cleaned area to remove any detergent residue. Allow area to drain or dry as much as possible to prevent the dilution of disinfecting solutions.
- The disinfectant should remain in contact with surfaces according to the manufacturer's instructions (longer contact time for activity against non-enveloped viruses), particularly if an infectious pathogen

is suspected. Remove excess disinfectant with water. The disinfectant should be rinsed off all surfaces prior to housing a patient in a cage.

- After disinfection, remove the protective attire and wash your hands. For non-routine disinfection procedures (e.g. hydrogen peroxyde misting), only staff trained and approved to wear and use the required PPE will be allowed to access areas during the process.
- All areas where animals are examined or treated (examination rooms, etc.), should be tidy, cleaned and disinfected after use by staff or student responsible for the patient, regardless of its infectious status.

6.3.1. Correct cleaning - Procedure

- Examination tables are cleaned then disinfected after each patient.

6.3.2. General Disinfection Protocol

- Follow general guidelines.

6.3.3. Disinfectants

- In case of suspicion of Newcastle disease (NCD) or avian influenza (AI), all material and facilities will be disinfected with an agreed disinfectant for the control of NCD and/or AI (e.g. Virkon™S – Lanxess Deutschland).

6.3.4. Disinfection Protocol for Instruments and Equipment

- All instruments, equipment or other objects must be cleaned and disinfected or sterilized between uses on different patients. Materials must be cleaned with soap and water and disinfected with a 0.5% chlorhexidine solution after use on patients. Materials for necropsy are sterilized every day. First they are cleaned and disinfected, then rinsed and finally sterilised either in the oven or in the sterilizer, depending on the material.

6.3.5. Food and Beverages

- Food and drinks are strictly forbidden in the clinic. It is allowed to eat and drink in the kitchen and in staff offices.

6.4. Guidelines for Receiving and Managing BRRPZE patients

6.4.1. Outpatients

Consultations

- It is of major importance for people booking the appointment to reduce as much as possible the risk of introducing animals infected by several diseases in the clinic (see list of reportable diseases, section 1.6.6.). If such procedure was not respected or if the patient is already inside the clinic, the consultation can be performed following the recommendations hereafter:
  - It is strictly forbidden to enter a room when a consultation is ongoing.
  - It is strictly forbidden to bring a patient to a consultation room before cleaning and disinfection of tables and equipment by a staff member.
- Reception of the client and patient
- Fill in the client and consultation sheets (electronic form in the SAP system) before handling the animal, including date, owner's information and referring veterinarian if necessary.
- A complete physical and clinical description of the animal(s) is essential.
- For exotic animals, the genus and species (in Latin) must be recorded. When a reptile is presented for consultation, report to the specialized staff member who will determine the genus and species.

Introduction of venomous reptiles in the clinic is strictly forbidden. These patients will not be attended even in the absence of students.

- If a serious infectious and/or contagious condition is suspected, a staff member must be immediately informed.
- Companion birds must never and under any circumstances be taken out of their cage in the absence of a staff member. For other animals, if the physical state and/or level of stress or dangerousness make it possible, a complete general clinical examination may be performed. If the previous conditions are not fulfilled, a staff member must be called for handling and examinations.

Necropsy

- The BRRPZE animals received for *postmortem* examination must be considered as patients with a high risk of infectious disease. They cannot be taken out of their transport packaging in the BRRPZE clinic. Necropsies are performed in the FVM necropsy room, and following the Necropsy Biosecurity SOPs (refer to Chapter 12).

6.4.2. Inpatients

6.4.2.1. Small-size inpatients

6.4.2.1.1. Cage Assignment

- Cages for housing BRRPZE inpatients are assigned by the staff. It is required to check with the staff on day or night duty to find out where newly admitted inpatients will be housed.

6.4.2.1.2. Patient Records and Medications

- All the clinical data and medication administered during hospitalization must be recorded in the PetUniversal computer software using specific standardized sheets (log).

6.4.2.1.3. Feed and Water

- Only minimal amounts of bedding, forage, and grains should be stored in the BRRPZE clinic in order to decrease the likelihood of contamination.

6.4.2.1.4. Bedding

- The students responsible for inpatients are expected to maintain the cages in a perfect state of cleanliness on a daily basis. Cages are washed and disinfected with the available product, and with Virkon™S if necessary (reportable disease such as AI or NCD). All contaminated waste must be disposed of in yellow containers intended for biological waste.
- The students must change gloves and wash their hands between upkeep procedures on different animals. It is strictly forbidden to share material and equipment between cages. At the end of hospitalization, cages will be washed and disinfected following standard procedures before housing new patients.

6.4.2.1.5. Discharge

- Prior to discharge, clients must be instructed on infectious hazards associated with patients and recommendations on their control at home. Cages used to house patients with known or suspected contagious diseases should be marked with a sign '**DO NOT USE, SPECIAL CLEANING REQUIRED**'.
- The known or suspected pathogen must be marked on a white tape marker placed on the cage door until complete disinfection.

6.4.2.2. Large-size inpatients (except pet pigs)

- Large-size inpatients will be housed in one of the building of the Equine clinic (B41). These include, among others, ratites (e.g. emus), macropods and chamois.

- **PET PIGS ARE NOT CONCERNED BY THE FOLLOWING PROCEDURE**.
- **NO PATIENT SUSPECTED OF A REPORTABLE DISEASE (CF. HISTORY) WILL BE HOSPITALIZED IN THE EQUINE CLINIC.**
- The management of these patients will be ensured by the BRRPZE staff.

6.4.2.2.1. Stall Assignment

- BRRPZE patients that cannot fly nor jump can be housed in bloc #5, i.e. pony stalls of the Equine clinic (B41).
- BRRPZE patients able to fly or jump will be housed in a mare-foal stall located in bloc #3 or in bloc #4 of the Equine clinic (B41).
- Contact will be first taken with the equine internal medicine clinician via the emergency number (04 366 41 03) before receiving the BRRPZE patient, to check if these areas are available.

6.4.2.2.2. Stall preparation (before arrival of the BRRPZE patient)

- Contact the equine staff for straw supply in order to mulch the stall.
- Place the patient card on the stall door
  - Patient identification (species)
  - Identification of the BRRPZE referring clinician + contact number
  - Motive for hospitalization
- Place the entry restriction sign on the stall door: access only for BRRPZE staff and students
- Check that all necessary equipment and PPEs are available on site – provide a "BRRPZE box" to leave on site, with all the equipment and consumables dedicated to the patient (take only what is strictly necessary). The box will be identified with the patient's name and motive for hospitalization.
- Ensure that the necessary PPE is available on site, outside the stall. That PPE will be dedicated to the patient hospitalized in B41 and cannot be worn in the BRRPZE clinic.
- Ask the patient's owner to leave sufficient food for the patient.
- Provide a bucket for watering
- Place a foot mat at the entrance to the unit (see the Equine staff for the disinfecting solution) and a yellow B2 waste container in the facility.

6.4.2.2.3. Arrival of the patient and hospitalization

- The BRRPZE staff and students care for the patient and ensure that no contact with equine patients occur.
- Wear the dedicated PPE for the patient only.
- Get the **foal trolley**: make sure it has been cleaned and disinfected properly before use, otherwise, implement the procedure:
  - Contact the equine staff for equipment and products.
  - Pick up any residual organic matter (wet if necessary to facilitate the removal)
  - Prepare the detergent solution (Tornado), based on the manufacturer's instructions. For a regular cleaning (manual washing), dilute 50 ml in 5 L of cold water (consumption of 0.3 ml per m^2).
  - Rinse with clear water.
  - Leave to dry.
  - Disinfect with a 0.5% Umonium®38 Master solution (5 L can with pump) : add 25 ml (2 pushes on the pump) per 5 L of water and apply to surfaces previously cleaned with a brush, a sprayer, a mop or by soaking.
  - Leave the surfaces moist for 15 minutes.
  - Leave to dry without rinsing.
  - Return the trolley to its storage area.

- Place the patient on the foal trolley and bring it directly to the stall.
- After use, thoroughly clean and disinfect the foal trolley, according to the above procedure.
- On the hospitalization board of the BRRPZE clinic, report the presence of the patient in the Equine clinic along with all the necessary information, i.e. special precautions for handling, care and nutrition instructions.

6.4.2.2.4. Patient feeding, daily care and interim cleaning of the stall during hospitalization

- Moving the patient: only if necessary but reduced to the minimum required (e.g. follow-up examination, surgery) and in the foal trolley only. The trolley will be thoroughly cleaned and disinfected after use, according to the procedure in force.
- Feed will be distributed by the BRRPZE staff and students.
- If necessary during hospitalization, the stall cleaning will be ensured by the BRRPZE staff and students (ask equine grooms if straw is needed).
- In no way will the equine clinic staff and students be solicited for the BRRPZE patient, neither for containmentn or for medical care.
- Follow the medical care order : 1) patients hospitalized in the BRRPZE clinic and 2) patients hospitalized in the Equine clinic (B41).
- On the hospitalization board of the BRRPZE clinic, systematically report any relevant information or special needs in terms of consumable and PPE stocks on site (to avoid untimely roundtrips between the BRRPZE clinic and the equine clinic).
- Strictly comply with the biosecurity fules in force: wear PPE dedicated to the patient, hand hygiene, ad hoc behaviour, correct waste management, etc.

6.4.2.2.5. Complementary examinations and/or surgery

- If a complementary examination is required (e.g. : x-ray), prefer the large animal Imaging unit.
- If a surgery is required, it can be performed in the operating theatre of the equine clinic.
- The patient will only be moved on the foal trolley (that will be cleaned and disinfected after use)
- If possible, schedule the complementary examination and/or surgery at the end of the day, to avoid (in)direct contact with other patients.
- Thouroughly clean and disinfect the equipment and premises after use for a large BRRPZE patient.

6.4.2.2.6. Patient discharge

- Upon discharge, the patient will be transported on the foal trolly to exit the equine clinic. The trolley will be thouroughly cleaned and disinfected after use, following the procedure in force.
- The material and equipment used for the patient during its hospitalization, including the 'BRRPZE box', will undergo a first cleaning and disinfection on site (refer to the equine staff) then be brought back to the BRRPZE clinic in an airtight container that can be easily cleaned and disinfected. It will undergo a second cleaning and disinfection as per the usual procedure in force in the BRRPZE clinic.
- Stall cleaning and disinfection at patient's discharge will be in charge of the equine staff, according to the color coding in force in the equine clinic:
  - **Green**: inpatient with a class1-2 status
  - **Red** : animal coming out during the day – to be flipped in front of the box as soon as the news is known to avoid overstorage of the stall.
  - **Orange and grey**: suspected contagious status but confirmation awaited (e.g. fever, diarrhea, leukopenia, cough, nasal discharge).
  - **Grey and white**: confirmed infectious statut; the patient must be transferred to class 3 or 4 (according to the diagnosis) without delay. A special disinfection protocol must be implemented

in the stall. The plate will be flipped only after performing environmental sampling if applicable (e.g. salmonellosis).

6.5. Managing BRRPZE Patients with Suspicion of Contagious Disease

- Whenever possible, suspicions of respiratory, feather, neurological or gastrointestinal tract infectious diseases should be triaged upon client call or in the waiting room before admission.
- Personnel accessories (mobile phones, etc.) must not enter consultation and/or hospitalization rooms or animal holdings.
- It is forbidden to take anything out of the consultation or hospitalization room without formal approval by a staff member.
- Waste must be disposed of following the recommendations of Liège University: all contaminated waste must be disposed of in the special yellow waste containers, as recommended by the Department of Occupational Protection and Hygiene (SUPHT).
- It is strictly forbidden to take away feathers, beaks, skulls, etc. or any other part of animals presented at consultations or necropsied.
- For several diseases, specific precautions must be taken (see WOAH Terrestrial Animal Health Code: **https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/**)
  - NCD / highly pathogenic (HP) AI (high mortality rate and/or major neurological disorders and/or other alarming clinical signs) require the assistance of a staff member; nothing must be taken out of the room, soles of shoes must be disinfected, clothes washed and no contact with other birds is allowed during a 6 day-period.
  - Rabbit Haemorrhagic Disease (RHD): avoid contact with susceptible animals until soles of shoes have been disinfected and clothes washed.
  - Chlamydiosis (*Chlamydia psittaci*) : that zoonotic disease is frequent in psittaciforms. Consultations and examinations of such patients must be performed with gloves and wearing safety glasses except if the animal is confirmed as being chlamydiosis-free. A mask must be worn when handling patients suspected of chlamydiosis. If a flu-like syndrome develops 1 to 3 weeks post-examination of suspected birds, people must consult their general practitioner and inform of the possibility of psittacosis - in other doubtful cases: report to a staff member.
  - Encephalitozoonosis (*Encephalitozoon cuniculi*): may potentially give clinical signs in immunocompromised people. Rabbit bed pads are changed every 12 hours; cages are cleaned and disinfected with a suitable disinfectant. Furthermore, rabbits with compatible clinical signs are systematically screened (serology).
- BRRPZE consultation and hospitalisation rooms are equipped with laminar flow.
- Each cage of the avian hospitalisation room is equipped with an independent laminar flow which is also independent of the room ventilation system (clean exit in a ISO type garbage bin). This is important for:
  - Zoonotic diseases such as chlamydiosis and HPAI
  - Psittacine beak and feather disease (caused by PBFD circovirus)
  - Proventricular dilatation disease (caused by avian bornavirus)
  - Polyomavirus
  - Pacheco's disease (caused by Psittacid alphaherpesvirus 1)
  - Newastle disease

6.5.1. Movement of High Risk Patients

- Movements of animals suspected of NCD, HPAI or RHD are strictly forbidden. The rooms in which such patients were introduced must be closed until complete cleaning and disinfection has been achieved.

6.5.2. Diagnostic and Surgical Procedures on High Risk Patients

- Except mandatory sampling (legislation) and euthanasia, any other intervention on NCD and HPAI-infected animals is strictly forbidden.

6.5.3. Required Diagnostic Testing for Patients with Suspicion of Infectious Disease

- Any suspicion of infectious disease must be reported to the referring veterinarian or to the animal owner. The veterinarian or owner will be informed on the necessity of sampling to confirm/reject the suspicion.

6.5.4. Biological Samples from Patients Suspected or Confirmed as contagious

- Samples from animals suspected of HPAI or NCD will be processed following the legal recommendations. Samples from animals suspected of infectious disease must be wrapped in such a way as to prevent any form of contamination even in case of rupture of the primary wrapping (container, disinfected plastic bags, etc.). Double packaging is mandatory.

6.5.5. Reducing Biosecurity Precautions for a Patient

- Any adaptation of biosecurity measures will be done according to the specific context and MUST be approved by a clinician.

6.5.6. Disease Differentials for Which Testing is Mandatory in BRRPZE Patients

- If NCD or HPAI is suspected, the compulsory samples will be collected and transported, under the repsonsability of the BRRPZE clinic, to the Reference Laboratory, following the legal recommendations in force.

6.5.7. Management of Patients Infected or Colonized with (Multi)Drug-Resistant Bacteria

- Patients infected with MDR bacteria are a potential health hazard to FVM staff, students, clients, and other patients. As such, they are managed with increased biosecurity precautions intended to prevent their dissemination in the FVM.
- Administration of antibiotics to such patients is forbidden without performing an antibiogram, at the owner's expense. Administration of third generation-quinolones or antibiotics intended for human use is forbidden in the absence of a control antibiogram.

6.6. Isolation of BRRPZE Patients

- Small-size contagious BRRPZE patients will be hospitalized in the class 4 unit of the SAH.
- Large-size contagious BRRPZE patients (except pet pigs) will be hospitalized in the class 4/isolation unit for large animals (B41) – see chapter 2 for related procedures.
- Use heated isolation cages when possible.
- When the diagnosis of infectious disease is confirmed, it must be indicated directly on the animal cage/stall with a specific sheet.
- Visitors are strictly forbidden in the isolation area.
- The equipment used for these animals must be kept in a nominative plastic bag left next to the cage/stall. It can never be used for another patient until appropriate cleaning and disinfection (oven or autoclave).
- It is strictly forbidden to enter hospitalization/isolation areas without wearing overalls available in the anteroom. It is strictly forbidden to wear these overalls outside these areas.
- A sink is available in the anteroom. Hand washing and disinfection is compulsory upon entering and exiting hospitalization/isolation areas.

- At the end of hospitalization/isolation, animals are returned to their owners in their own transport cage. Beforehand, the transport cage must be cleaned and disinfected by the students responsible for the case.

6.6.1. Use of Ultrasonography, Radiography, or Electrocardiogram in BRRPZE Patients

- Ultrasonography, X-rays or electrocardiograms on animals suspected of infectious disease must be limited to patients in immediate life-threatening status.

6.6.2. Sampling of BRRPZE Isolated Patients

- Samples collected from high risk-patients should be correctly identified, then placed in Ziplock or Whirlpak bags (double packaging is mandatory).
- Avoid contaminating the outside of the first bag when incorporating samples in it.
- The suspected infectious disease should be clearly identified on all submission forms.

6.7. BRRPZE Surgery and Anaesthesia

- Surgeries of BRRPZE patients are performed in the operating theatre of the SAH. Refer to Chapter 5 for detailed procedures.

6.7.1. Hygiene for Perioperative Management of BRRPZE Patients

- High standards of cleanliness and hygiene must be maintained throughout the BRRPZE surgery. The surgical team and patient surgery site must be aseptically prepared. Aseptic technique must be maintained during the whole surgery. Non-essential persons are prohibited at all times and less than 3 students can attend the surgery at the same time. Staff and students must wear clean examination gloves before placing IV catheters or examining mucous membranes.

6.7.2. Guidelines for Perioperative Management of BRRPZE Patients

- Hands must be washed and sanitized after handling each patient, for hand hygiene and to prevent contamination of hand-contact surfaces (e.g. doors, counter tops, equipment, etc). Change gloves between patients, and systematically wash and disinfect your hands after disposing of gloves.
- Clean examination gloves must be worn whenever placing catheters or endotracheal tubes (ETs).
- Faecal material should be removed immediately from the anesthesia prep area or other areas of the surgical facility. Tables and equipment should be cleaned and disinfected between patients. If needed, floor should be cleaned and disinfected between two surgeries.
- Equipment such as hobbles, mouth syringes, ETs, etc. will be cleaned and disinfected between uses, with a chlorhexidine solution.
- Routine (e.g. daily) environmental cleaning and disinfection should be carried out rigorously and following prescribed protocols.

6.7.3. Anaesthesia Induction

- Anaesthesia request forms should be completed the day prior to procedures, whenever possible. Any known or suspected contagious disease should be clearly noted on the request form.
- Except in case of extreme emergency, no anaesthesia will be made on parrots suffering from dyspnoea or diarrhoea without prior testing for *Chlamydia* spp.
- Feathers will never be plucked off and animals will never be shaved without the express authorization of a staff member. Plucked feathers and shaved hair will be directly disposed of in the appropriate waste containers.

6.7.4. Postoperative Activities

- BRRPZE patients must be returned to their cages as soon as they have recovered from anaesthesia. All equipments and anaesthesia machines must be cleaned and disinfected as soon as surgical procedures are finished.

6.7.5. Management of Surgical Patients with Contagious Diseases

- At the exception of emergency surgical procedures (life-threatening status of the patient), no surgical procedure will be performed on a contagious patient.
- Once the final diagnosis is confirmed, surgical procedure will be performed at the discretion of the BRRPZE team who will apply appropriate and strict decontamination measures at the end of the procedure.

6.8. Visitors in the BRRPZE

- Visitors are only allowed under direct supervision of the BRRPZE team, and following instructions.

6.9. Children in the BRRPZE

- At the exception of pet owners' children, who may stay close to their animal under the supervision of an adult, children are forbidden in the BRRPZE facilities.

6.10. Pets in the BRRPZE

- Companion animals are stricly forbidden in the BRRPZE clinic.

Chapter 7.

FOOD SCIENCE BIOSECURITY SOP: *EXTRA MUROS* PRACTICAL WORKS

7. Food Science Biosecurity SOP: *extra muros* Practical Works

7.1. General introduction

7.1.1. For whom and for what

- This document aims at providing routine procedures to minimize:
  - The risk for FVM students and staff to transmit zoonotic pathogens originating from various facilities to livestock, poultry or foodstuffs.
  - The risk for them to be infected by zoonotic pathogens transmitted by animal and food products.
- Facilities include farms, dairies, swine premises, slaughterhouses, food-processing units and other facilities where there are animals, food products or unprocessed animal tissues, secretions or excretions (e.g. saliva), manure, urine, soiled feed, bedding, water, dirt and milk.

7.1.2. Applies to

7.1.2.1. Students of master's in veterinary medicine (MVM)

- Visits are organized each week for students of Blocks 1 (MVM 1) and 2 (MVM 2) of the master's degree.
- During their visit to the slaughterhouse, MVM 2 students examine more closely the inspection tasks carried out on the bovine slaughtering chains, while MVM 1 students only visit the facilities and have no direct contact with food products.
- Some MVM 3-students may perform inspection tasks with inspectors of the competent authority.

7.1.2.2. Advanced Master in Specialized Veterinary Medicine, major in Veterinary Public Health/ Food Science:

- Students are taken to several food industries in the context of practical training in relation with food quality and safety management.
- The programme differs each year.
- Students and staff receive specific instructions before each visit.

7.2. General principles of hygiene

7.2.1. Students' Medical history

- If a student is suffering from a contagious disease known to be potentially harmful to food products or live animals, he/she must inform the FVM assistant. The student will not be allowed to enter the production area.
- The persons in charge of the slaughterhouse should be aware of all zoonotic hazards that could be encountered in their facilities.
- If applicable, they will inform the FVM on the presence of such hazards, so that students will not be in contact with contaminated materials, e.g. animals, carcasses, tissues, secretions, excretions, etc.

7.2.2. General hygiene principles

- Students are given clear instructions on food hygiene matters to minimize the risk of food contamination. Besides, since most visited slaughterhouses / food industries are BRC- (British Retail Consortium), IFS- (International Featured Standard) or ISO-certified, and follow HACCP plans, students are requested to strictly follow their internal hygienic rules.
- They are also required to have a high degree of personal hygiene.

- The general hygienic rules are read by the FVM assistant; students are asked to sign a visitor's book, stating that they have understood the instructions. The book is filed by the slaughterhouse / food industry staff.
- During the whole visit of facilities, the FVM assistants make sure that students follow the hygienic rules. Students are asked not to touch the food products, except if they need to perform inspection (i.e. MVM 2 students). Clothing and shoes worn to visit farms in other countries should be cleaned and disinfected before use on Belgian facilities.
- Upon entering a facility, students need to inform the assistant about any livestock facilities visited within the previous 48 hours, including any animal containment or waste storage areas. It is strictly forbidden to bring and eat/drink any food/beverages in the slaughterhouse/food industry premises.
- Any hand injury should be covered (plaster or hand adhesive dressing).
- Furthermore, smoking and the possession and use of alcohol or drugs are strictly prohibited on the production sites. Wearing of jewellery is prohibited (except wedding rings), including watches, earrings, piercings and false nails are prohibited as well.

7.2.3. Hand washing

- Upon entering and leaving an animal or food facilities, after going to the bathroom and when visibly soiled, hands should be thoroughly washed and/or disinfected with antibacterial soap and water, antibacterial wipes or hydro-alcoholic solution.
- Disposable paper towels are used for hand drying and thrown away in a dedicated waste container. Disposable latex gloves may also be used but they are not a substitute for correct hand washing. Disposable gloves **MUST** be worn in case of hand injury (even if covered by a plaster or hand adhesive dressing).
- Hand washing protocol: refer to Chapter 1.
- Hands are washed at a knee-operated washbasin.

7.2.4. Student clothing

- Students are requested to wear clean clothes. When entering the facilities, they put on a single-use lab coat, a disposable mob cap or hairnet, a plastic safety helmet as well as clean white boots or disposable overshoes.

7.3. Aspects regarding the visited facilities

- The visit of facilities **MUST** start in the clean area to end in the dirty sectors (onward march), i.e. from the cutting plant to the slaughterhouse, through the meat processing plant, to minimize the risk of cross contamination. If it not the case, students and staff need to change entirely their cloths, wash their boots and follow biosecurity procedures in force.

7.3.1. Bovine and Porcine Slaughterhouses

- Upon arrival, the students go to the student meeting room located opposite to the slaughterhouse. They put on a clean coverall and clean white boots.
- At the entry to the slaughterhouse, they put on the personal protective equipment (PPE).
- The clean and dirty sectors are separated by a floor line.
- As far as possible, the onward march must be respected: students will start the visit in the clean sector and continues to the dirty sector.
- As much as possible, the visit ends in the cattle sheds and the site of *ante mortem* inspection.
- MVM 2 students observe meat inspection, next to a veterinary practitioner who performs inspection, on the bovine chain in slaughterhouse. In this perspective, they wear disposable PPE (overalls, mob cap, sleeves and gloves). Students also observe inspection tasks in the pig slaughterhouse; the procedure of access and hygienic rules are similar.

- In the event the student cuts/hurts him/herself, he/she immediately stops the inspection task, washes his/her hands to a knee-operated wash sink. The cut is disinfected with alcohol or another disinfectant (chlorhexidine or povidone iodine) in the student meeting room.

7.3.2. Visit of the meat cutting plant

- To get to the meat cutting plant, students must walk through the clean sector of the slaughterhouse.

7.3.3. Visit of the meat processing plant

- In the entry room of the meat processing plant, the students put on a new disposable lab coat, wash their boots and hands, and put on new and clean overshoes.
- At the exit, overshoes are removed and disposed of.

7.3.4. Poultry slaughterhouse

- General hygiene rules are applied in this slaughterhouse.

7.4. Washing and disinfection of equipment

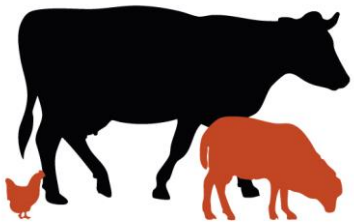
- The equipment (boots, helmets) used in the slaughterhouse is strictly dedicated to that slaughterhouse (and its satellite facilities) and cannot be used in other facilities.

7.4.1. Boots

- At each entry and exit of the slaughterhouse, boots are washed at the boot-washing station.
- Once a week, or more often, if necessary, the boots are disinfected by immersion in a warm disinfecting solution. They are then rinsed with clean water and air-dried.

7.4.2. Safety helmets

- Safety helmets are disinfected with water and antibacterial soap at each exit of the facilities.



Chapter 8.

EXPERIMENTAL FARM (FEPEX) BIOSECURITY SOP

8. Experimental Farm (FePEx) Biosecurity SOP

8.1. Introduction

- The Experimental Farm (CARE-FePEx, or Support Cell for Research and Education-Educational and Experimental Farm) is located 300 meters from the FVM. It counts a cattle herd, twelve French Texel ewes and fowls used for both teaching and research. The number of animals is stable, except variations due to the season or to ongoing experimental protocols.
- Animal resources:
  - Cattle: around 190 cattle heads
    - Dairy cows: 55
    - Belgian blue cows: 30
    - Highland cattle: 8
    - Cattle under 2 years of age: 100
  - Small ruminants
    - French Texel ewes: 12
    - Lambs: between 0 and 20, depending on the season
    - Goats: 3
    - Pet sheep: 3
  - Fowl: 20 to 150 laying hens.
- Cattle are kept under FASFC regulations as in a **commercial farm** where animals remain until retail, slaughtering or culling. They are therefore healthy animals.
- Other animals are housed in separate **buildings for experimental purpose**; additional specific biosecurity procedures are implemented (under the responsibility of the research promoters).

8.2. Possible access restrictions for people

- Pregnant women are not allowed on site due to the risk of Q fever.
- No access to the FePEx is allowed within 72 hours[7] after returning from a country applying restrictive measures in relation to foot-and-mouth disease.
- Students are only allowed to be in contact with poultry if they have a formal commitment to strictly comply with the following measures:
  - No direct or indirect contact with poultry and/or rabbits within the past 72 hours
  - No presence in the necropsy room or in one of the adjoining cold chambers within the past 72 hours
- After their activity at the FePEx, students are not allowed to visit a poultry farm within 72 hours.

8.3. Identification, registration and animal movements

- These points are relevant to the regulations set up in commercial farms:
  - **European Level**: the European regulatory framework significantly influences the Belgian legislation regarding animal identification:
    - **Regulation (EU) No 2016/429** ("Animal Health Law"): establishes general rules for the identification and traceability of animals.
    - **Implementing Regulation (EU) No 2019/2035**: specifies obligations for the identification and registration of terrestrial animals.
    - **Delegated Regulation (EU) No 2021/520**: specifically for sheep and goats.
    - **Regulation (EC) No 1760/2000**: rules concerning the identification of bovines and the labelling of beef.

[7] http://www.ejustice.just.fgov.be/mopdf/2005/10/17_1.pdf#Page9

- **Federal Level (Belgium):** animal identification is regulated by federal authorities through the Federal Agency for the Safety of the Food Chain (FASFC) and Sanitel, the national registration system. The main regulatory texts are as follows:
  - **Cattle**: **Royal Decree of 17 October 2002** on the identification and registration of cattle. Requirements: double ear tags, cattle passport, and registration in Sanitel.
  - **Sheep and Goats**: **Royal Decree of 10 February 2019** on the identification and registration of sheep and goats.
    Requirements: double identification (ear tags, electronic transponder) and registration in Sanitel
  - **Pigs**: **Royal Decree of 21 December 2006** on the identification and registration of pigs.
    Identification: marking via tattoo or ear tags, and registration of movements in Sanitel.
  - **Equids**: **Royal Decree of 16 February 2016** on the identification of equines.
    Requirements: equine passport and electronic microchip.
  - **Poultry**: **Royal Decree of 9 July 1999** on the registration of poultry establishments.

- The **cattle herd** registration number is 60015943-0101:
  - Each new-born calf is identified with two ear tags, no later than 7 days after birth, and always before leaving the herd. All animals have two ear tags. In case an ear tag is lost, another one, with the same number, is ordered from Arsia, so each animal keeps the same ear tag number throughout its whole life.
  - Each animal is recorded. An ID (passport) is established for each animal; an inventory is kept at the farm and managed by the Sanitel system (Arsia).
  - Any cattle movement (introduction in the herd, departure, transportation to the slaughterhouse or death) is reported to Arsia through a specific document.
  - The herd is tested annually for paratuberculosis. If testing positive, an animal is sold within 6 months. Regarding the IBR status, the herd is certified as IBR-free.
  - Animal purchases are limited. Only breeding bulls (usually one per year) or animals involved in experiments are purchased.
  - When a new animal is introduced in the herd, it is housed in a quarantine area. Its identity is checked, and clinical examination is carried out. Blood samples are taken and sent to Arsia for additional testing. These tests include IBR, paratuberculosis, neosporosis, salmonellosis, Q Fever, mycoplasmosis (*Mycoplasma bovis*) and leptospirosis.
  - The herd is officially free of brucellosis, tuberculosis and enzootic bovine leukosis. Furthermore, animals aimed at breeding are tested for IBR, BVD, paratuberculosis and neosporosis. The animal is only introduced into the herd if testing negative for all complementary examinations.

8.4. Epidemiological surveillance

- The responsible of the **cattle, small ruminant, and fowl herd** is Dr Ludovic Martinelle.
- The responsible veterinarian is Dr Ludovic Martinelle also. He is responsible for enforcing the laws on epidemiological surveillance, including purchases (see above) or suspicion of contagious disease.
- When an animal is purchased, he is called within 48 hours after acquisition. He examines the animal and takes a blood sample if the animal is over one year of age and not intended for fattening. Other samples will be taken depending on cattle destination or operation status (see above).
- If cattlemen or students notice one or more animals showing excessive salivation, they will immediately notify the responsible veterinarian who will examine these animals.
- If clinical examination does not allow discarding the suspicion of a reportable disease, the Liège ULC (FASFC) will be officially notified (☞ for reportable diseases, see section 1.6.6). If an infectious disease is suspected, cleaning and disinfection will be performed and movements, of animals, people and equipment will be restricted.

- Medications are stored in a specific room of the Farm under the responsibility of Dr Ludovic Martinelle (depot ID number: 6/4000/1218).

8.5. Staff

- Cattlemen wear coveralls, jackets and security boots that are specific and adapted to their work. Such attire is only worn in the farm and cleaned regularly.
- Staff members regularly wash their hands according to the procedures described in Chapter 1.
- If farm workers must visit other farms, they must use a different set of clothes (coveralls, jackets and boots).
- Showers, a cloakroom and a refectory are in the Farm administrative building.
- Drinking and eating are not allowed outside the administrative building.

8.6. Student activities at the FePEx

- Different types of activities are organised for students at the Farm: they follow practical works and are also involved in calving surveillance and treatment of individual animals.
- The content of such activities is well planned and determined beforehand. They consist mainly in prophylaxis (vaccination, blood sampling), hoof care and trimming, disbudding, rectal palpation, bolus application and primary care of newborn calves and lambs.
- Other departments of the FVM also organise several activities at the farm - more precisely:
  - **Cattle**:
    - Activities of the clinic of ruminants and practices of MVM 2 and MVM 3 students:
      - Examination of sick animals, diagnosis and treatments of these animals.
      - Reproduction monitoring (transrectal palpation and ultrasonography of targeted animals, treatments of hormonal pathologies)
      - Audit of several points of interest in the herd (MVM 3 students)
        - ✓ Calf management
        - ✓ Lameness in dairy cattle
        - ✓ Dry cow transition
        - ✓ Nutrition of dairy cattle
        - ✓ Milking machine evaluation
    - Biosecurity audits (MVM 2 paraclinical activities - Department of Infectious and Parasitic Diseases)
    - Auto control audits and QFL (*Qualité Filière Lait*, i.e. quality milk sector) specifications (Department of Food Science) (only 4-5 times per semester / 1 or 2 students at a time): students inspect all premises, equipment, animals and feed stocks, and fill preestablished checklists.
    - Feed recognition activities and visit of the farm for BVM students (Nutrition Department)
    - Calf 'sponsorship' (referral) for BVM students
  - **Sheep**: monitoring of lambing's (including shavings, vaccinations, etc.) and physiology practical works for BVM students
  - **Rabbits and guinea pigs**: physiology practical works for BVM students (reproduction and digestive) (only stay a semester on site)
  - **Pigeons**:
    - Limited participation to the consultations and follow-up of racing pigeons (MVM 2 students)
    - Visit of the different pigeon lofts located at the FePEx (racing pigeons, ornamental pigeons and meat pigeons).

8.7. Procedure for students

- Students must wear clean coveralls and rubber boots for activities at the farm (except for pigeon consultations => see section 8.7.4. below).
- If students' own boots are used at the FePEx, they must be clean and must have been disinfected after the last use.
- Students use their own thermometer and stethoscope for clinical activities. These materials must be regularly cleaned with soap and water and disinfected with hand sanitizer.
- When coming back from the stables, boots must be washed. Boot-washing stations are located at the entrance to the locker room, next to the administrative building and at the exit of stables.
- Students wash their hands with soap at the exit of stables or in the locker room, after the Farm visit, in accordance with the procedures described in Chapter 1.
- Hand sanitizers are also available on site for hand disinfection.

8.7.1. Specificities for activities with cattle

- Students use the coveralls and rubber boots of the FePEx, available in the locker room. They must cross the locker room before going in the farm and before leaving.
- FePEx coveralls and boots must only be worn in the FePEx and are not intended for use in the Clinic of Ruminants.
- Students must put them on in the locker room before going to the stables. Except in cases dully justified, personal boots must not be worn in the Farm for activities with cattle.
- One coverall can be used several times. It must be dropped in the container for dirty laundry when macroscopically dirty. Laundry is performed by an external company.
- Coveralls are picked up, washed and brought back once a week by an external company.

8.7.2. Specificities for activities with sheep, rabbits and guinea pigs

- Students wear their own clean PPE, i.e. reusable tissue coveralls and rubber boots.
- Long-sleeve gloves and examination gloves are available on site for animal care.
- Students use their own stethoscope for monitoring of lambing's. It must be regularly cleaned with soap and water and disinfected with hand sanitizer.
- When coming back from the stables, boots must be washed. Several boot-washing stations are located on site, i.e. at the exit of stables, at the entrance to the locker room, or next to the administrative building.
- Monitoring of lambing's:
  - BVM students are on duty to monitor lambing's during a specific period of the year.
  - While on duty, students have access to the kitchen and relaxing place of the administrative building (level +1). Nevertheless, as boots and coveralls are not allowed in the building, they should be removed before entering.

8.7.3. Specificities for activities organised by the Department of Food Science

- Students bring their own clean PPE, i.e. reusable tissue coveralls and rubber boots.

8.7.4. Specificities for consultations of racing pigeons

- The consultation room is in the administrative building.
- For pigeon consultations, students wear their own scrubs above city outfits. All behavioural guidelines in force in the clinics are also applicable to the activity, i.e. hair tied back, short nails, no jewellery, etc. (see chapter 1)
- Additional PPE is available on site, if necessary, i.e. disposable gloves and lab coats.

- Hand washing and sanitization are mandatory after each animal and upon leaving the consultation room.

8.8. Management of animal manure

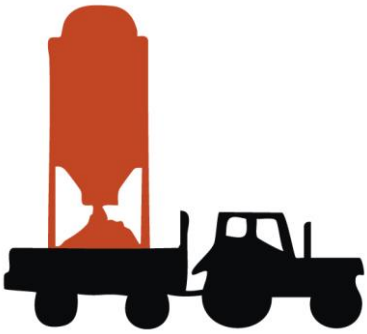
- Solid manure is temporarily stored in a specific area. This area is equipped with a tank for the juice of manure. Liquid manure is recovered in the slurry tank.
- Solid manure of large animals housed in the clinics (except the IU) and educational horses (housed in the FVM as well) are brought to the Farm manure storage area in sealed trays. Faeces of animals enrolled in experimental protocols are considered as B2 waste and are not brought to the Farm.
- Manure remains for about 1 month in the temporary storage area before evacuation by neighbour farmers, spreading on Farm pastures or storage on pasture to allow a proper composting. During storage, temperature increase helps killing most pathogens. Spreading on Farm pastures comply with the regulations of the Nitrate Directive for amount of spread and periods of application.

8.9. Calf Management

- Calves are housed individually from birth to 21 days of life. Calf boxes are completely cleaned and disinfected with an approved disinfectant, i.e. HypraDes K (Hypred) for regular disinfection and Keno™cox (Cid Lines) in case of coccidiosis/cryptosporidiosis.

8.10. Specific measures

- The Experimental Farm has developed activities such as 'petting zoo' for the public and especially children. These activities are held for small groups only, under the constant supervision of a competent member of the Pedagogical Farm staff.
- Visitors can only have contacts with healthy animals and cannot eat nor drink in the stables.
- As mentioned above, pregnant women are not allowed on site (risk of Q fever).
- Visitors must apply an appropriate level of biosecurity:
  - Use clean boots.
  - Wash their boots at the boot-washing station located at the entrance to the administrative building. This procedure is mandatory before entering animal facilities and at the end of activities.
  - Wash their hands especially at the end of activities.



Chapter 9.

VETERINARY MANAGEMENT OF ANIMAL RESOURCES (DRA) BIOSECURITY SOP

9. Veterinary Management of Animal Resources (DRA) Biosecurity SOP

9.1. Introduction

- The Department of Veterinary Management of Animal Resources organises several practical activities for students.
- These activities take place in healthy cattle herds:
  - At the FVM Experimental Farm => see chapter 8 of Biosecurity SOPs
  - At the Centre for Agricultural Technologies (CTA) located in Strée

9.2. *Extra muros* activities at the Centre for Agricultural Technologies (CTA)

- FMV MVM students often go to the CTA for practical activities. The farm has the status of Technical Centre of the Wallonia-Brussels Federation. The farm is dedicated, among others, to teaching agriculture technologies to college and higher-school students.
- Several departments of the FVM organise practical activities for MVM students, involving the cattle herd:
  - Reproduction monitoring and milking audits (Clinic of Ruminants)
  - Biosecurity audits (MVM 2 paraclinical activities – Department of Infectious and parasitic diseases).

9.2.1. Procedure for students

- Students and accompanying staff go to the site with a FVM vehicle dedicated to the transport of persons. No PPE is necessary as reusable PPE is provided on site, i.e. rubber boots and coveralls.
- Once at the CTA, students equip themselves in the anteroom.
- For reproduction monitoring and milking audits, a disposable gown is provided by the accompanying staff.
- Students are expected to bring their own equipment (thermometer, stethoscope, etc.).
- Foot baths must be used whenever encountered; a foot bath is located at the entrance to each animal facility.
- Hands will be thoroughly washed and disinfected when necessary.
- All instruments, including stomach tubes, mouth speculums, thermometers and CMT (California Mastitis Test) paddles, etc. should be cleaned and disinfected after each use.
- Students must disinfect their equipment after use, before leaving the stables, with hydro-alcoholic solution.
- Eating or drinking are **ONLY** allowed in the ambulatory vehicle or in a designated room of the farm.
- At the end of the visit:
  - Students' own equipment must be disinfected (hydro-alcoholic solution)
  - Boots will be washed (scrubbed and rinsed) at the anteroom boot washing station then left on site in the anteroom
  - Coveralls are removed and hanged back in the anteroom.
  - Hydroalcoholic solution is available in the anteroom for a first-hand decontamination
  - Before leaving the CTA, hands must be washed at the hand-washing station of the administrative building.

Chapter 10.

ANATOMY BIOSECURITY SOP

10. Anatomy Biosecurity SOP

10.1. Origin of Animals and General attire for Anatomy

- **Origin of animals:** all of them are healthy and clinically examined by the veterinary assistant before euthanasia.
  - Ponies and ruminants are provided by salesmen.
  - Rabbits and poultry come from breeding farms.
  - Dogs and cats come from pet rescue centres.
- **Body parts** such as limbs, trunks and heads of horses, ruminants, dogs and pigs are provided by the Necropsy Department. Only pieces certified as healthy by Dr De Meeûs d'Argenteuil, responsible of the Necropsy room, are used.
- Animals from salesmen or breeding farms are euthanized as soon as they arrive in the Anatomy facilities. Animals from the pet rescue centre are already dead upon arrival.
- One area of the Anatomy facilities is directly concerned with biosecurity measures (risk zone): it includes two dissection rooms, the euthanasia room, the cold chamber, the deep freeze and the maceration room. The other part is not at risk (clean zone) and includes the osteology room, the workroom, the storage room, offices, the laboratory, the museum and the secretariat. Hallways to the cold chamber and the deep freeze, as well as the entrance hall, are considered as transit zones.
- The front entrance hall is the access to Anatomy offices and laboratory but is also used by the B43 staff and students going to the histology laboratory. The back entrance gives students access to the changing room with lockers for practical activities in the dissection rooms.
- Dissections are organised per weeks. Students come with their own rubber boots and dissection toolkit. They will receive an apron and oversleeves at the beginning of the week. Examination gloves are available in the dissection rooms.
- Students must wear a blue plastic apron, oversleeves, disposable gloves and rubber boots as soon as they enter the dissection room; they must take them off as soon as they leave the risk area. After each dissection, they leave apron and oversleeves on the rack. Rubber boots and dissection instruments must be washed thoroughly and disinfected at the end of each session, before taken back home. Used scalpel blades must be disposed of, **UNWRAPPED**, in small yellow containers for sharps. Dirty gloves must be disposed of in yellow waste containers.
- At the end of the week, aprons will be collected by the technical staff and disposed of in a yellow waste container.
- Staff members must wear an apron and rubber boots (or shoes dedicated to Anatomy activities) as soon as they enter the risk zone. Rubber boots are stored in the cupboard next to the entrance hall.

10.2. General Cleanliness and Hygiene

10.2.1. General Disinfection Protocol

- Hand washing and disinfection are mandatory before leaving the risk zone (poster on the wall above the sink, in the disinfection area). The use of disposable gloves during the dissection is mandatory but does not exempt from hand washing and disinfection before leaving the risk area.
- If there is a suspicion of contagious disease, students will be asked to leave the dissection room, after disposing of gloves and aprons in a separate yellow container, washing and disinfecting hands, instruments and rubber boots. All the contaminated cadavers will be collected by the staff into a specific yellow waste container of the Necropsy room. Instruments, rubber boots and Staff special shoes, as well as tables and dissection rooms, will be washed thoroughly and disinfected.

10.2.2. Footbath

- Students must wear rubber boots as soon as they enter de dissection room, and these must be taken off as soon as they leave the risk area.
- Rubber boots must be scrubbed and disinfected in the disinfection area at the end of each dissection session before being taken back home.

10.2.3. Disinfection Protocol for Instruments and Equipment

- Students' dissection instruments must be washed thoroughly and disinfected at the end of each session before being taken back home.
- Used scalpel blades must be disposed of, **UNWRAPPED**, in specific yellow containers for sharps.
- Dirty gloves must be disposed of in yellow waste containers.
- Dissection instruments used by the staff must be washed every day and disinfected at the end of each dissection week.
- Dissection rooms will be washed with a rotary machine and industrial detergents at the end of each dissection week. Every day, dissection rooms will be swept, rinsed with water (garden hose) and scraped.
- Dissection tables will be washed everyday with industrial detergents and disinfected at the end of each dissection week.

10.2.4. Detergents and Disinfectants Approved for Use in the Anatomy Facilities

- **Tables and floor:**
  - Force 1 Savonet (Henrotte): scouring, skimming, and cleaning.
  - Techno dis ecocert (IPC): degreasing cleaner.
  - Vet-Clean (Ecuphar): cleaning and disinfection.
  - Virkon™ S (Lanxess Deutchland GMBH): disinfection in the event of a health crisis
- **Hand soaps and disinfectants:**
  - Baktolin® (Hartmann): hand soap
  - Sterillium® (Hartmann): hydro-alcoholic hand solution
- **Footbath:**
  - Hyprelva® (Hypred): disinfection
  - Virkon™ S (Lanxess Deutschland GMBH) in the event of a health crisis
- Students should be vaccinated for tetanus. If a student cuts herself/himself during dissection, she/he must immediately stop the dissection, call a staff member and wash her/his hands. The wound is inspected and disinfected with dermic povidone iodine.
- If the wound is deep, the ULiège emergency procedure should be followed, including the completion of the accident report form. If the wound is superficial, it is covered with band aid to prevent wound contamination.
- If a student is not immunized against tetanus, she/he requires hospital care, an anti-tetanus serum and a tetanus vaccine.
- **For dissection instruments:** students clean them after each dissection session (water and soap), then they disinfect with Sterillium®.

10.2.5. Food and Beverages

- It is strictly forbidden to drink or eat in the Anatomy facilities, except in offices and cafeteria.

10.2.6. Course notes

- All course material brought to the dissection room must be plasticized and cleaned after each dissection session (water and soap), then disinfected with Sterillium®.

10.3. Guidelines for Choosing and Receiving Cadavers

- Only healthy animals are acquired by the Anatomy service. Pieces coming from the necropsy room need to be certified as healthy by Dr De Meeûs d'Argenteuil responsible of the necropsy room, before use for anatomy dissection.

10.4. Storage of Cadavers and Anatomical Parts

- Cadavers are stored in the Anatomy cold chamber or deep freezer before use.
- They are stored in the cold chamber during the dissection week and eliminated directly at the end of the week in the necropsy room collecting pit.
- The cold chamber and deep freezer should be regularly cleaned and disinfected.

10.5. Breaking Transmission Cycles

10.5.1. Visitors in the Anatomy Facilities

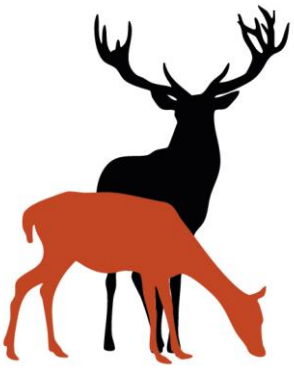
- Visitors are only allowed to walk along the corridors and in the clean zone.
- Floor lines were painted in specific areas of the Anatomy facilities (see Chapter 1) to clarify access possibilities for visitors.

10.5.2. Children in the Anatomy Facilities

- Children visiting the Anatomy facilities are only allowed to walk along the corridors and the clean zone, always under the supervision of an adult.

10.5.3. Companion animals in the Anatomy Facilities

- Neither the staff, nor the students are allowed to bring their companion animal in the Anatomy facilities.
- Access of any animal not used for anatomy purposes is strictly forbidden.



Chapter 11.

WILDFLIFE HEALTH AND PATHOLOGY BIOSECURITY SOP

11. Wildlife Health and Pathology Biosecurity SOP

11.1. Introduction

- The ULiège Wildlife Health and Pathology Unit oversees wildlife health surveillance in the Walloon Region[8]. Several diseases are monitored through:
  - Active surveillance: studies of presumed healthy animals slaughtered while hunting. Necropsies are performed in the field and different samples (serum, viscera, faeces) are taken.
  - Passive or continuous surveillance: necropsies of animals found dead or killed for sanitary reasons that are performed in the FVM necropsy room. Complementary analyses are carried out in various *ad hoc* labs.
- Infectious hazards that could affect native wild animals are multiple, the implementation of strict biosecurity procedures is thus essential for public health and to prevent the dissemination of epidemic diseases. A specific attention should be brought to zoonotic and/or notifiable pathogens, such as (non-exhaustive list gathering 'endemic' and 'exotic' diseases):
  - African swine fever (ASF) (wild boar)
  - Aujeszky disease (wild boar)
  - Avian influenza (wild birds)
  - Baylisascariasis (raccoons)
  - Bluetongue (cervids)
  - Brucellosis (wild boar, cervids, hares)
  - Classical swine fever (wild boar)
  - Echinococcosis, i.e. *Echinococcus multilocularis* (foxes)
  - Foot-and-mouth disease (wild boar, cervids)
  - *Mycobacterium bovis*-tuberculosis (badgers, wild boar, cervids)
  - Paratuberculosis (cervids)
  - Rabies (foxes, raccoons, bats, badgers)
  - Schmallenberg disease (cervids)
  - Toxocariasis, i.e. *Toxocara canis* (foxes)
  - Tularaemia (hares)
  - Trichinellosis (wild boar)

11.2. Activities in the FVM

- Parts of the Unit activities occur in the FVM and mainly consist in necropsies of wild animals.
- Wild animals (**EXCEPT WILD BOAR**) are transported to the FVM by agents of the Nature and Forests Department (DNF – Public Service of Wallonia) or hunters.
- The Unit staff and students are involved in necropsies.

11.2.1. Deposit of a wild animal found dead (except wild boar)

- The Unit must imperatively be contacted in advance (phone number: +32 366 40 62), as specified in the procedure[9].
- Cadavers must be deposited in the dedicated cold chamber (B43a building, route 12).
- **WILD BOAR MAY NOT BE TRANSPORTED TO THE FVM.**

[8] http://www.faunesauvage.be/faune-sauvage/?page_id=26
[9] http://www.faunesauvage.be/faune-sauvage/?page_id=3231

- When depositing an animal in the cold chamber, it is necessary to provide additional information, i.e. date of discovery/shooting, place of discovery/shooting and contact details, via the adequate form[10].
- Wear gloves when handling the cadaver, in the field and when leaving it in the cold chamber.
- The animal must be correctly wrapped in a waterproof bag.
- After handling, dispose of gloves in the yellow container for B2 waste available in the cold chamber and thoroughly disinfect anything that may have been in contact with the animal. Disinfect your hands with the hydro-alcoholic solution available on site.
- As much as possible, animals suspected of a reportable disease should not be accepted for necropsy at the FVM. If, for some reason, this cannot be avoided, students must be discarded from the necropsy, which will be performed late in the day, after all other necropsies; a minimum number of persons should be involved. If the suspicion is confirmed during the necropsy, refer to section 11.2.5. below for the procedure.

11.2.2. Necropsies of wild animals

11.2.2.1. Generalities

- Necropsies of wild animals take place exclusively in the small necropsy room (room -1/5A), equipped with class II biosafety cabinets (for necropsies of birds).
- Between 1,200 and 1,400 wild animals are necropsied every year, all species combined.
- Any person participating actively to necropsies of wild animals must wear the appropriate PPE:
  - Large animals: disposable white coveralls, long-sleeve disposable gloves, examination gloves and yellow boots (dedicated to the necropsy area)
  - Small animals: disposable calving gown (or disposable blue apron if not available), long-sleeve disposable gloves, examination gloves and yellow boots (dedicated to the necropsy area).
  - Additional PPE, i.e. safety goggles and facemask, is recommended when there is a risk of splashing and/or contact with zoonotic pathogens.
- **Entry procedure in the necropsy room** (refer to Chapter 12):
  - Students: the entrance to the necropsy anteroom is located on avenue de Cureghem. The access to the anteroom (women or men) is done through the turnstile upon badging (traceability of people, essential in case of epidemic or zoonotic infectious disease). The whole procedure is described in chapter 12.
  - Staff members: access is like the Pathology staff, i.e. via the anteroom located at B43, +3.
- **Exit procedure**: described in chapter 12 for both students and staff.

11.2.2.2. Necropsies of wild birds

- Necropsies of birds are systematically performed in a biosafety class II cabinet.
- Due to the 'at risk' context in terms of avian influenza, additional PPE should be worn, i.e. safety goggles and a respiratory mask.
- The cadaver must be placed in a clear plastic bag and the body unclogged in the bag itself to avoid a rapid fouling of the class II cabinet by aspirated feathers.
- Once the necropsy is complete, the body will be put back in the plastic bag with feathers and disposed of in a B2 yellow container.

11.2.2.3. Necropsies of foxes

- The risk of echinococcosis (*E. multilocularis*) being very high, additional PPE must be worn, i.e. safety goggles and a respiratory mask (given the zoonotic character).
- After performing the necropsy, the stainless-steel table will be cleaned according to the classical procedure then manually scrubbed with a detergent solution and rinsed.

[10] http://www.faunesauvage.be/faune-sauvage/wp-content/uploads/2022/01/Animal_trouve_mort.pdf (in French)

- After cleaning the table, it will be disinfected with a freshly prepared solution of sodium hypochlorite at a minimal concentration of 3.75%, respecting a one hour-contact time[11].
- All instruments and any material used during the necropsy will, after cleaning, be soaked 5 minutes in a sodium hypochlorite solution at a minimal 3.75% concentration.
- During the cleaning and disinfection procedure, the use of the appropriate PPE is essential to avoid contamination by potentially infectious aerosols.
- Before use, all samples will be kept at a temperature of -80°C, for at least 10 days, to inactivate the eggs.

11.2.2.4. Necropsies of raccoons

- The risk of carrying *Baylisascaris procyonis* is present in Belgian raccoons[12].
- The following additional PPE is strongly recommended for necropsy: protective goggles and respirator or visor, given the zoonotic risk.
- Raccoons are transported to the necropsy room in plastic bags (one animal per bag). They are removed from the bag and necropsied on stainless-steel tables.
- After the necropsy, raccoon cadavers are disposed of the container for rendering plant and the plastic bag is disposed of in a yellow waste container.

Cleaning and disinfection

- Extreme heat is the most effective option for destroying eggs.
- Cleaning and disinfection of the stainless-steel table consists in a first cleaning with water and the detergent available on site. The table is then rinsed with clear water and further disinfected with boiling water (at 100°C) (kettle available on site).
- The instruments used during the necropsy will be sterilized in boiling water at 100°C after cleaning.
- When cleaning and disinfecting, the wearing of the PPE is essential to avoid contamination by potentially infectious aerosols.

11.2.2. Management of Samples Taken in the Necropsy Room

- All samples taken in the necropsy room must imperatively be placed in a pot that will itself be placed in a plastic bag. This bag will then be placed in a sealed container, with absorbent paper (triple packaging - to compensate for any accidental spillage during transport). Before exiting the necropsy room, the outside of the container will be disinfected using the disinfectant spray available in the room. It can then be transported through the anteroom.
- After use, the transport container will be cleaned and disinfected according to the appropriate procedure (disinfectant spray available)
- If the container carried a fox sample => refer to section 11.2.2.3. (necropsies of foxes).
- If the container carried a raccoon sample => refer to section 11.2.2.4. (necropsies of raccoons).
- Any container must be returned to the service after cleaning and disinfection.

11.2.4. Cleaning and Disinfection of Equipment and Materials

11.2.4.1. Class II biosafety cabinets

- Surfaces of class II cabinets must be cleaned and disinfected after each use with the disinfecting solution available on site.
- The frequency of maintenance will depend on their fouling rate (cf. necropsies of birds).

---

11 https://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/protocols_guidelines/Management_of_EM_Infections_in_Animals_2019.pdf

12 https://www.wallonie.be/fr/actualites/premiers-cas-de-baylisascariose-chez-les-ratons-laveurs-en-belgique (in French)

- An annual control by a certified company is mandatory (filters are changed if necessary).

11.2.4.2. Stainless steel table

- After use, the tables will be cleared of all organic waste (disposed of in a B2 yellow container), cleaned with a detergent solution, rinsed, and dried.
- After cleaning, tables will be disinfected with the solution (spray) available on site.
- See sections 11.2.2.3 and 11.2.2.4. for the procedures following necropsies of foxes and raccoons.

11.2.5. If lesions are compatible with a reportable disease

- If lesions compatible with a reportable infectious disease are observed (e.g. ASF), the internal crisis plan will be activated and the procedure for exiting the anteroom is modified (e.g. chapter 17 for ASF).
- If a reportable and/or zoonotic disease is suspected, the FASFC[13] must be notified rapidly (see section 1.7.6. for the procedure).
- **If a reportable and/or zoonotic disease is suspected/confirmed, it must be relayed to the CFB as soon as possible (biosecurity-fmv@lists.uliege.be), so that they can assist in communication and evaluate if appropriate precautions are taken to house the animal.**
- The staff of the Pathology Unit will be informed immediately as well (phone number: +32 4 366 4074 during working hours and ULiège Central Alarm Station outside office hours)
- The ULiège Central Alarm Station must be informed immediately (phone number: +32 4 366 44 44) to advise the cleaning company not to intervene in the anteroom.
- The Occupational Health Doctor should be notified as rapidly as possible, if a zoonotic disease is suspected (COHEZIO – 04/344 62 62).
- A special decontamination procedure will be implemented in all areas (see chapter 12 for Necropsy activities)
- All students and staff members present in the room at the time of the necropsy or who have been in direct or indirect contact with the suspect cadaver will make themselves known to the Pathology Unit and follow the instructions.

11.3. Field Activities (necropsies)

11.3.1. Description of Activities

- Necropsies are performed in the field by the staff of the Wildlife Health and Pathology Unit. These activities are carried out on private or public hunting grounds and on presumed healthy animals (wild ungulates and birds) shot during hunting activities.

11.3.2. Personal Protective Equipment

- Any person who must perform the necropsy of a wild animal in the field (e.g. wild boar) must wear the appropriate PPE, i.e. disposable waterproof coveralls, examination gloves, boots or disposable cover-boots and safety goggles. A FFP3 mask should be worn when the risk of airborne contamination by a zoonotic pathogen is real (e.g. *Mycobacterium bovis* tuberculosis or brucellosis).
- All persons must be up to date with tetanus vaccination.

11.3.3. Management and Transport of Biological Samples

- Samples might be taken in the field and brought back to the FVM. Several precautions must be implemented to guarantee the biosafety of their transport, especially if staff members transport them in their own vehicles.
- In general, all necessary measures must be taken to prevent the spread of diseases transmissible to humans and/or animals during the transport of biological materials.

[13] https://www.favv-afsca.be/professionnels/notificationobligatoire/

- In all cases, to meet the requirements of the animal by-product regulations, each transport must be accompanied by at least one commercial document and a copy of the ULiège authorization for the use of animal sub-products for research and educational purposes.
- In addition, a label marked 'Research and diagnostic samples' must be visibly affixed to the transport container.
- Depending on the scenario, other specificities might be added:
    - **Organs and samples from presumably healthy wild animals (no suspicion of an infectious disease)**: may be transported by the staff members in their own vehicle (ADR[4] exemption). The same condition applies to waste resulting from these manipulations (disposable PPE, papers, scalpel blades, etc.). They must comply with the regulatory packaging material (see Annex 2) and be able to present a document in case of police control. Once in the lab, non-reusable waste and transport packaging must be disposed of in B2 yellow containers, as well as samples unless they are kept for reference purposes. Reusable containers must be cleaned and disinfected between uses to prevent contamination.
    - **Organs and samples from (suspected of being) infectious animals, but which do not meet the criteria for category A classification (as defined in ADR** ; see Annex 3**), or that are not affected by a disease reportable in Belgium**: may be transported by the staff members in their own vehicle transport without ADR prescription if packed according to packing instruction P650[14]. Waste resulting from these manipulations (disposable PPE, papers, scalpel blades, etc.) must be decontaminated in the field before being transported.
    - **If organs and samples are from (suspected of being) infectious animals and that the pathogen meets the criteria for category A classification (cf. ADR definition), or is responsible for a disease reportable in Belgium**, it is imperative to immediately notify the FASFC. No samples or organs may be taken without specific authorization from the FASFC.
    - **If organs and samples of wild boar are (suspected of being) infected by African or classical swine fever virus (category A classification**), a specific procedure allows samples to be transported directly to the National Reference Laboratory (Sciensano) via a shuttle service approved by the Public Service of Wallonia (SPW).
    - Annex 4 summarizes the classification of infectious materials for transport
- After use, the container must be completely cleaned and disinfected.

11.3.4. Waste Management

- All waste, i.e. organic and single-use PPE, must be disposed of in a B2 yellow container. After use, the container will be sealed, and its outside must be disinfected before being put in the vehicle.
- Sharps and needles must be disposed of in a dedicated small yellow container. Needles must not be recapped.

11.3.5. Transport and Disinfection of Re-usable PPE

- If used in the field, re-usable PPE must be transported in a specific closed and sealed bag, if possible, allowing disinfection. Boots must be cleaned and disinfected before being left in the vehicle, in the dedicated waterproof transport container.
- Re-usable PPE must be appropriately cleaned and disinfected after use – see chapter 14 (laundry SOP) for recommendations.

11.3.6. Cleaning and Disinfection of Equipment and Materials

- Necropsy materials are cleaned and disinfected (Aniospray Quick [Laboratoires Anios], storage 5°- 25° C) in the field and stored in a dedicated container in the back of the car.

[14] European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) United Nations (2022) ADR legislation – 2.2.62 Class 6.2. infectious materials (https://unece.org/sites/default/files/2023-01/ADR2023_Vol2e.pdf) (pp.118-119)

11.3.7. Cleaning and Disinfection of Vehicles

- Clean the vehicle regularly.
- Tires should be disinfected by spraying a disinfecting solution when leaving contaminated or areas at risk.
- Waterproof tarpaulin and/or holding tank to store material in the vehicle.

11.3.8. If Lesions are Compatible with a Zoonotic and/or Reportable Disease

- If a reportable disease is suspected, the FASFC must be notified rapidly (see procedure in section 1.7.6.).
- If a zoonotic disease is suspected, contact will be made promptly with the External Service for Protection and Prevention at work (COHEZIO): the occupational health doctor will assess the need to implement a surveillance and a screening if necessary (e.g. suspicion of *M. bovis* tuberculosis).

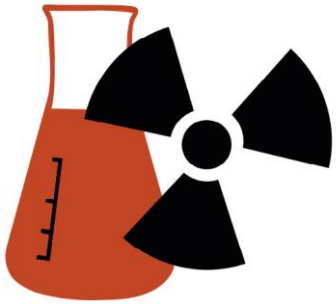
11.3.9. In case of Injury with a Sharp Object

- It is imperative to complete an accident report[15].
- Follow the recommendations to be applied in case of blood exposure[16].

11.4. Students' Paraclinical Activities in Wildlife Rehabilitation Centres

- Within the frameworks of paraclinical activities, MVM 2 students participate to a consultation in rehabilitation centres for native wildlife, with the aim to become familiar with restraint, first aid and sampling techniques.
- Prior to the consultation, students are given a seminar on the biosecurity measures to be followed.
- Students' contact details (name and cell phone number) are registered in case they must be contacted afterwards (e.g. based on *a posteriori* sanitary information).
- Appropriate PPE is made available and must be worn, i.e. examination gloves, disposable calving gown and safety goggles (protection towards scratches, peck lesions, etc.). Restraint gloves are also available if necessary.
- All disposable PPE (i.e. gloves and calving gowns) should be disposed of in the appropriate container, on site.
- If worn, reusable PPE should be transported in a specific closed plastic bag, cleaned and disinfected after use (see chapter 14 [laundry SOP] for recommendations.
- A correct hand hygiene is required after removing gloves, ideally hand washing with soap followed by disinfection with a hydro-alcoholic solution.

[15] https://my.servicejuridique.uliege.be/cms/c_12950234/fr/accident-du-travail/sur-le-chemin-du-travail (in French)
[16] https://my.supht.uliege.be/upload/docs/application/pdf/2021-02/supht_21_-_accident_par_exposition_au_sang.pdf (in French)



Chapter 12.

TEACHING LABORATORIES AND DIAGNOSTIC BIOSECURITY SOP

12. Teaching Laboratories and Diagnostic Biosecurity SOP

12.1. Biosafety Level 2 Teaching Laboratories

12.1.1. Introduction

- Teaching laboratories are mainly microbiology labs, i.e. Bacteriology, Food Science, Parasitology and Virology. They are organised in three different Biosafety Level 2 (BSL2) laboratories of the FVM (buildings B43a and B43bis). From Feb 2026, these activities will be moved to new BSL2 facilities built in building B44. Such practical activities allow the students to become familiar with diagnostic techniques performed in a microbiology laboratory.
- The pathogens handled in the BSL2 teaching labs are mainly risk level 1 and 2 microorganisms (according to the classification of pathogens – see Chapter 1), and many of them are even replaced by non-pathogenic strains. Nevertheless, risk level 3 non-airborne microorganisms (for humans and animals) could be handled in the lab, but this will concern mainly food-borne pathogens only (e.g. O157 *Escherichia coli*, *Echinococcus multilocularis*).

12.1.2. General attire for Microbiology Teaching Laboratories

- Long pants (ankle length) or other clothing covering exposed skin must be worn.
- Appropriate footwear should be worn, i.e. closed-toe shoes covering the top of feet.
- All people working in the laboratory are required to wear appropriate PPE:
  - **Lab coat**:
    - Bacteriology and Parasitology: white cotton lab coats are provided in the lab.
    - Food Science: white tissue lab coats are provided in the lab.
    - Virology: a single-use lab coat is provided in the lab.

    The lab coat must remain constantly buttoned up during the whole activity. The sleeves should completely cover the sleeves of street clothes.
  - Nitrile **disposable gloves** are available in the lab. Wearing gloves is mandatory for all procedures involving the manipulation of pathogens for which there is a risk of infection through direct contact with intact or wounded skin.
    - Bacteriology and Food Science: it is not advised to wear gloves when working with Bunsen burner.
    - Parasitology and Virology: wearing gloves is mandatory when handling biological material.
  - **Respiratory masks** are available, if necessary, in the bacteriology lab.
- Long hair must be tied back, and jewellery is prohibited (rings act as real germ factories!).
- No accessory (e.g. scarf) is allowed, to avoid contamination while putting it back in place with contaminated gloves.
- Personal belongings should be left in the anteroom/dedicated area before entering the lab.

12.1.3. Biological Materials

- Biological samples are the responsibility of the staff. Each Petri dish, bag or tube containing the biological material should be clearly labelled. Before and after the activity, biological samples should be stored in refrigerators/freezers dedicated to sample storage. Supervisors oversee preparing and tidying samples away.
- For Parasitology diagnostic activities, samples for analysis must be left in the dedicated refrigerator, located in the corridor in front of the BSL2 laboratory (samples should be clearly labelled with species and clinical suspicion). From Feb 2026, samples will be left in the BSL2 preparation room.
- Students are forbidden to bring material outside the lab.
- Handle seeded Petri dishes with care, this helps avoiding contamination of people and equipment; be careful of the possibility of splashes, spills, overflowing, etc.

12.1.4. Equipment and Materials

- Safety data sheets must be available in the lab for all chemicals.
- Biological class II safety cabinets should be tested and certified annually in accordance with EN12469.
- Virology: calculators are available in the lab, so no cell phone is allowed.
- Note-taking:
  - Pens and pencils are supplied in the labs.
  - If one must take note on personal sheets (that will further leave the lab), it should be performed as much as possible in a dedicated non-contaminated area of the lab and only after glove removal followed by hand washing and sanitization. Maximum precaution should be taken to avoid contaminating note-taking sheets.
  - As far as possible, practice sessions should be sequenced allowing notetaking before performing the practical activity.

12.1.5. Work Practices

12.1.5.1. General

- Storage and consumption of food and beverages are totally forbidden in the labs.
- Do not touch your face, hair, glasses or chew on pens/pencils while in the lab.
- It is strictly forbidden to use a cell phone while in the labs.
- The lab door must always remain closed during activities.
- Transport racks or secondary containers must be used to move samples in the lab.
- Mouth pipetting is totally prohibited; mechanical pipetting devices are used instead.
- The manipulation of sharp objects should be minimized.

12.1.5.2. In the biological Class II safety cabinet

- Ideally, all procedures that generate aerosols should be performed inside the biological safety cabinet or using appropriate engineering control. Students should be taught the appropriate technique to minimize the production of aerosols (when centrifuging, pipetting, sterilizing loop, etc.).
- The biological safety cabinet must be in operation during the whole manipulation, window down. Attention will be given to come closer to it and move hands towards the centre.
- Any manipulation in the biological safety cabinet is performed under the supervision of staff.

12.1.6. Procedures for Exiting the Lab

- At the end of the activity:
  1. The **lab coat** should be removed then:
     - Either put back, buttoned up, on a hanger on the rack (to prevent the contamination of the inside of neighbouring lab coats) if re-used by the same person the next time.
     - Or collected by the staff and sent to the external laundry service.
  2. **Gloves** should be disposed of in yellow B2 waste containers.
  3. **Hands** should be thoroughly washed then disinfected with hydro-alcoholic solution.
- Removing lab coat and gloves, followed by hand washing, should be applied every time one exits the lab; it is strictly forbidden to wear a lab coat and gloves outside the lab.

12.1.7. General Disinfection Protocol

12.1.7.1. Working surfaces

- Working surfaces should be cleaned and disinfected before and after use.
- Disinfectants used must be effective against pathogens handled in the labs. The following disinfectants are used in the FVM teaching BSL2 labs:

- Bacteriology, Food Science and Parasitology: Umonium®38 medical spray® (Huckert's International)
- Parasitology/Mycology: Aniospray (Laboratoires Anios)
- Virology: Clean'n easy disinfectant (Wecoline) and 70° ethanol

12.1.7.2. Equipment and materials

- The staff oversees disinfecting the equipment used for lab work.
- For activities in the Bacteriology lab, the platinum loop must be disinfected between uses.
- The surface of the biological safety cabinet is systematically disinfected between two groups and at the end of practical works by the supervising staff. The entire cabinet should be thoroughly cleaned at least once a month.

12.1.8. In the event of an accident

- **Eye projection**: eye-washing stations are available in each teaching lab.
- **Accidental contamination of work surfaces** (e.g. splash, spills, overflowing):
  1. Inform the supervisor and discard any people not involved in cleaning up the spill from the area.
  2. Cover the spill with paper towels or other absorbent material.
  3. Pour disinfectant around the edges of the spill and work inward to the centre.
  4. Allow the disinfectant to react for the minimum contact time, as recommended by the manufacturer.
  5. Lift the paper and dispose of it in the yellow waste container.
  6. After the procedure, remove your gloves then wash and disinfect your hands.
- **Burn** (e.g. using Bunsen burner): apply the cooling procedure (burned area at 20 cm under the tap, for 10 minutes, with a water at 20°C).
- **Fire outbreak in the Bacteriology lab:** close the valve of gas supply and follow the general emergency plan in case of fire.

12.1.9. Waste

- All solid biologically contaminated waste and small flasks of biologically contaminated liquid waste are disposed of in the yellow, sealable and rigid plastic containers (waste is packed and treated off site from the facility in accordance with the Belgian regional regulations).
- The coloured liquid waste (violet crystal) is disposed of in specific collectors for liquid chemicals.
- Biologically contaminated liquid waste is decontaminated (autoclaving) before disposal in specific collectors for chemicals.
- Paper from handwashing and all lab waste that is not biologically contaminated are disposed of in dedicated containers (B1 waste).

12.2. Necropsy Area Biosecurity SOP

12.2.1. Introduction

- Risks of infection are common in the necropsy facilities. FVM students and staff must be protected from infectious hazards in their working environment.
- The aim is to reduce the risk as much as possible, within the available resources, whilst teaching students and maintaining a service to clinicians, practitioners and owners.
- If a significant risk of human infection exists, protocols for prophylaxis, treatment and counselling are available in the nearby University Hospital.
- If a significant risk of animal disease transmission exists, protocols for minimizing the probability of microbe dissemination are implemented.
- The emphasis, here, is on risk assessment, establishment of protocols for dealing with anticipated circumstances, and raising the level of universal precautions.

12.2.2. Decision Criteria for Performing Necropsies in the FVM Necropsy Room

- The decision of performing a necropsy relies mainly on the **cadaver's history** and is taken by a senior clinician only. Several criteria can influence the decision of performing the necropsy or not.
- Suspicion of a **reportable disease** in the animal history: the senior clinician will collect additional information with the referring veterinary practitioner and decide the necropsy can be performed or not, and under which conditions. Two scenarios are possible:
  - In an **epidemic context**: the senior clinician will decide not to perform the necropsy (e.g. refuse the necropsy of pigs if they were not previously tested for African swine fever, in a context of an ongoing epidemics)
  - If the disease is still **exotic** to Belgium but cannot be ruled out of the differential diagnosis because of the clinical history: after collecting additional information, the senior clinician will decide the necropsy can be performed or not. In such scenario, the necropsy will be performed by the staff only (students will be discarded), outside students' attending hours, and additional protective measures can be implemented (e.g. wearing a respiratory mask, etc.).
- Suspicion of a **zoonotic** condition, and necropsies of non-human primates (e.g. risk of tuberculosis): necropsies are performed by the staff only and outside students' attending hours. Additional protective measures are implemented, i.e. safety goggles and a respiratory mask.
- The **origin of the cadaver** will also influence the decision. Indeed, special attention must be brought if the animal was recently imported from another country (Member State or Third country) with an at-risk epidemiological situation for some diseases exotic to Belgium (e.g. suspicion of anthrax in a horse recently imported from a country where the disease is still reported).
- If **rabies** is part of the differential diagnosis, the necropsy will only be performed after the suspicion is discarded (head sent to the Reference Laboratory for diagnosis).

12.2.3. Issues

- The issues addressed in these guidelines include:
  - The classification and stratification of hazardous infections that may be encountered
  - The development of standard protocols to minimize the risk of infection from cadavers
  - The development of protocols to deal with the most common infectious hazards, but also with rare but dangerous infections.
- There are other, non-infectious, risks to students and FVM staff in the necropsy suite; they include: electrical risks, handling of knives, blades, scissors and power bone saw, and the presence of hazardous chemicals. Chemical risks are regulated in standard university protocols and are not considered in these guidelines.

12.2.4. Human Contamination

- Infections in the necropsy room can be contracted through five pathways:
  - Percutaneous inoculation
  - Inhalation
  - Ingestion
  - Skin contamination without inoculation
  - Contamination of mucosal surfaces (eye, mouth, nose)
- The main infectious concerns when performing the necropsy of a small or food-producing animal are rabies virus, *Mycobacterium* spp., prions, *Salmonella* spp. and *Clostridium* spp. Regarding monkeys, the main hazards are blood-borne viruses and airborne pathogens such as *Mycobacterium tuberculosis*.

12.2.5. Classification of Pathogens

- The Sciensano Advisory Committee on dangerous pathogens categorised human and animal infectious microorganisms into four hazard groups (HG)[17].
- For FVM students and staff, the significant groups are HG#3 and 4 for human pathogens and HG#4 for animal pathogens.
- See Chapter 1 – section 1.2.1 for description.

12.2.5.1. Hazard Group (HG) 2 Human Pathogens

- The most likely route of transmission of such pathogens in the necropsy room is from hand to mouth. Good hygiene procedures, including proper hand washing and disinfection, should prevent their transmission.
- Inoculation is also possible but reduced to a minimum by standard modern universal precautions.
- Necropsies on animals presenting granulomatous lesions: the risk of inhalation during the procedure is low, thus, wearing a respiratory mask protecting from the risk of tuberculosis and tularaemia is sufficient. An additional antibiotic prophylaxis can be considered on a case-by-case basis.

12.2.5.2. Hazard Group (HG) 3 Human Pathogens

- These pathogens can cause a severe human disease and present a serious hazard to necropsy attendees; furthermore, it may spread within the community.
- In practice, situations generating such concerns are, for example, necropsies of primates. In such cases, students have no access to the necropsy room.
- Only skilled staff members, wearing adequate PPE, i.e. masks and eye protection, perform necropsies and sampling procedures.

12.2.5.3. Hazard Group (HG) 4 Animal Pathogens

- These pathogens can be responsible for economically devastating epidemics due to restriction of trade and stamping out procedures in affected areas.
- Whenever a suspect case is identified, in addition of all measures enforced by official sanitary authorities (FASFC), FVM students and staff attending the necropsy room are required to avoid any contact with food-producing animals, farms/farmers for a week.

12.2.5.4. Hazard Group (HG) 4 Human Pathogens

- This group includes the viral haemorrhagic fevers, for which there are no current vaccines: Marburg, Ebola, Lassa fever, Congo-Crimean haemorrhagic fever, and Nipah virus.
- These pathogens are still exotic to the EU by the time of writing Biosecurity SOPs.

[17] https://www.biosafety.be/content/tools-belgian-classification-micro-organisms-based-their-biological-risks

12.2.6. Standard Procedures for all Necropsies

- The last 25 years have seen an upward trend in the application of safety and hygiene precautions during all necropsy procedures. FVM students and staff are required to wear the following:
  - Water-resistant disposable coverall that completely protects the arms, chest and legs (e.g. Tyvek™).
  - Long-sleeve disposable gloves provide additional protection for arms
  - Nitrile gloves (worn over long-sleeve gloves)
  - Rubber boots with reinforced toecaps
  - Necropsies of small animals: reusable apron
  - Necropsies of large animals: rubber reusable, long-sleeve calving gown, worn above the coverall.
- Facemask and eye protection are also available if needed. These additional PPEs are strongly recommended when a zoonotic disease is suspected and when the risk of splash is present. Wearing a face shield is strongly recommended for any necropsy, especially of large animals (risk of splashes).
- Apart from protecting efficiently hands and the respiratory tract, these standards reduce to an acceptable level the risk of infection from cadavers with any of HG#2 and 3 infections.
- FVM pathologists are aware of their duty to minimize the risk to those who are involved in cadaver handling, during and after necropsy.
- A sign in/sign out register allows tracing movements of people in the necropsy room. Such implementation is essential in case of epidemics or if a zoonotic pathogen is suspected/confirmed.
- Six distinct areas are clearly demarcated in the necropsy facilities thanks to the installation of a new door, new railings and chains, the painting of red lines on the floor, the installation of a grid and of new shelters serving as changing room. These six distinct areas are the following:
  - Changing room
  - Anteroom with different entry and exit paths
  - Hall
  - Working area
  - Disinfection area
  - Dipping area
- A new changing room is now available for students. The user procedure is the following:
  - **Way in**:
    1. Students put their personal belongings in a locker and put their coveralls.
    2. Students put a disposable PPE and yellow boots on.
    3. Exit of the anteroom and walking through the foot bath.
    4. Entry in the working area where disposable gloves (long-sleeve and nitrile) and disinfected dissection equipment are available.
  - **Way out**:
    1. Disinfection area: students are requested to leave the dissection equipment, wash their boots, dispose of gloves and wash and disinfect their hands.
    2. Walking through the foot bath (dipping area).
    3. Back in the anteroom: taking off disposable PPE and boots yellow boots
    4. Additional hand washing and disinfection.
    5. Collection of personal belongings in the locker.
- FVM staff and students understand red lines, railings and chains cannot be crossed, except in case of emergency (fire). As the Pathology staff is not directly implicated in the necropsy room, their access to this room is thus totally forbidden.

12.2.7. Waterproof Transportation Container

- Transportation of cadavers in the FVM is achieved via a waterproof transportation container adapted to the Forklift.
- Cadavers must be dropped at the entrance to the necropsy room.
- Cadavers are further stored in the cold chamber by the technician responsible for the necropsy room.
- The container, as well as the Forklift tires, are then washed with hot water and disinfected with the high-pressure cleaner.
- The same procedure must be applied to the container and tires of the FVM truck used to collect cadavers outside the faculty.

12.2.8. Transport of samples collected in the necropsy room

- Any sample collected in the necropsy room and not intended to be analysed in the Pathology or in the Wildlife department must be placed in a pot that will itself be placed in a plastic bag. This bag will then be placed in a hermetically sealed and waterproof container, with absorbent paper (triple packaging, to compensate for any accidental spill during transport). Before leaving the necropsy room, the outside of the container will be disinfected with the disinfectant spray available on site. It can then be transported through the locker room.
- After use, the transport container will be cleaned and disinfected according to the appropriate procedure:
  - Disinfection with a disinfectant spray
  - If the container carried a sample of a fox or of a raccoon => see chapter 11 (Wildlife Health and Pathology)
- Any container must be returned to the service after cleaning and disinfection

12.2.9. Transport of anatomical waste

- During the necropsy, animal waste is disposed of in the metallic rolling containers.
- Once filled, these metallic containers are driven to the out-cold chamber for further collection by the rendering plant.

12.2.10. Cleaning and Disinfection of the Necropsy Room

- Every day, at the end of student activities, the necropsy room, and hallway to the back entrance are cleansed by the technical staff with a high-pressure cleaner.
- Once a week, the floor is disinfected with Virkon™ S (Lanxess Deutschland GMBH). The procedure is performed with a high-pressure cleaner containing the disinfecting solution The technical staff who performs the operation must wear the adequate PPE, to prevent the risk of exposure to chemicals and potentially aerosolised pathogens.
- Additional disinfection processes with Virkon™ S will be implemented in case of sanitary crisis (suspicion/confirmation of reportable and/or zoonotic disease).

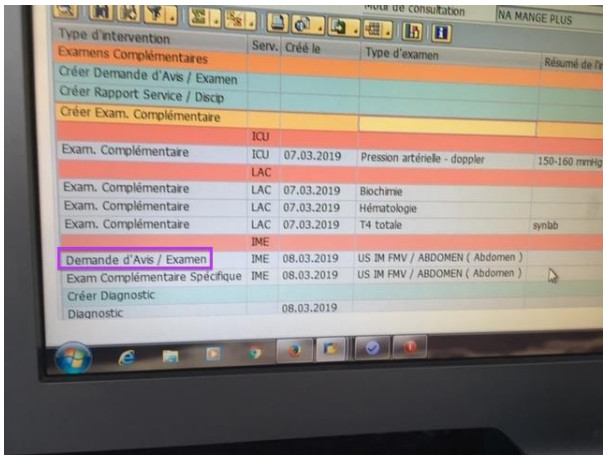
12.2.11. Procedures in Case of Suspected/Confirmed Epidemic Disease or Suspected/Confirmed Zoonotic Disease

- Conditions of concern: see Chapter 1 and the chapters dealing with the different clinics.
- Refer to Chapter 17 (crisis scenarios), according to the animal species.

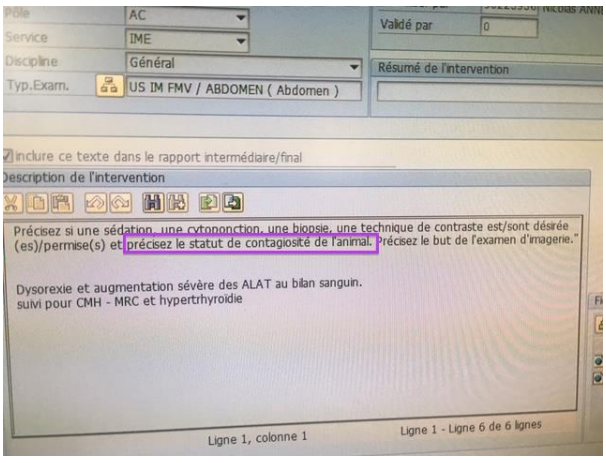
12.3. Diagnostic Imaging Biosecurity SOP

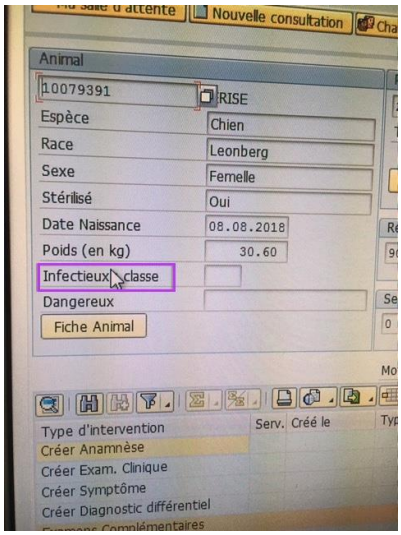
12.3.1. General Guidelines

- **Wash hands between cases regardless of the patient's infectious status.**
- Diagnostic imaging procedures or examinations should not be performed on animals with **suspected infectious diseases** unless required, and when possible, they should be scheduled at the **end of the day (**or less likely, just before lunch break or earlier if no other animals are scheduled later). If required before the end of the day (surgical option, etc.), the Diagnostic Imaging examination room and equipment must be cleaned and disinfected directly after examination, or the examination must be performed in the patient housing section with precaution.
- It is the **primary clinician's responsibility** to notify the Imaging Unit staff and to state procedures to be used to prevent the spread of infectious disease for animals with potential infectious hazards (particularly respiratory, gastrointestinal, and infections by multidrug resistant bacteria).
- Ensuring that staff and students involved in diagnostic imaging examinations of patients with increased contagious risks are informed, is ultimately the responsibility of the clinicians responsible for patient care. Hazards should be **clearly marked on the SAP request** form (see the picture below '*demande d'avis/examen*' for X-Ray, ultrasound, Computer Tomography [CT] scan or Magnetic Resonance Imaging consultation).



- The patient's status must also be stated in the 'animal' section of the SAP animal folder (see pictures below).





- It is the responsibility of the primary clinician to coordinate transport of the animal to the Imaging Unit (transport cage, gurney or carts when possible to minimize hospital contamination) or to organize the visit of a radiologist in the infectious unit if the patient cannot or should not be moved; at least one student responsible of the patient must follow the case in the Diagnostic Imaging Unit. If a contagious disease is suspected/confirmed, the patient should remain in its housing area until ready for diagnostic imaging and until the imaging unit is ready to proceed to examinations. The animal **must not stay/wait neither in the waiting room nor in the corridor**.
- It is the responsibility of the primary clinician to indicate barrier clothing (at least gowns, gloves) and procedures to be followed (including efficient disinfecting agent). Staff and students should wear disposable outerwear and gloves to handle the patient; masks and protective goggles should be available for specific zoonotic conditions.
- The number of people involved in examinations should be limited as much as possible.
- Following the procedure on a patient with suspected/confirmed infectious disease, the examination room should be closed. The facility and equipment must be cleaned and disinfected as soon as possible by the Imaging technicians with the help of students. Paper towels used to dry animals and to clean the equipment, gloves, disposable outerwear, urine and faeces should be disposed of in a yellow waste container. This **container is sealed** just after cleaning and disinfection.
- All individuals in contact with the patient must wash and disinfect hands carefully when the procedure is complete.

12.3.2. X-Ray Examinations

- The cassette/detector should be placed in a plastic bag if in contact with the patient.
- All staff and students must wear radiation protective clothing (lead or xenolite) in the radiology room and must wear dosimeter badges (aiming at measuring the radiation dose). Disposable outerwear should be worn **above** the lead apron when animals with known or suspected infectious disease are examined.
- A plastic bag and bed pads should cover the x-ray table for **small animals** with suspected/confirmed infectious diseases (class 3).
- Radiographs of **class 3 and 4 large animals** should be performed in the stall whenever possible. The portable x-ray generator should then be used. If technically not feasible, x-rays may be performed in the Diagnostic Imaging Unit but should then be scheduled at the end of the day. Indeed, thorough cleaning and disinfection of the rooms and material are required in the aftermath of exposure to such patients.
- Small ruminants that are suspected or confirmed as infectious and calves should be transported to the Imaging Unit in carts.
- Diagnostic imaging Staff and students entering the **Large Animal Clinics** should follow the clothing protocol appropriate for the area.
- See section 2.5.11. (Equine Hospital) and 3.5.3. (CRum) for information on examination of horses and cattle housed in the **large animal** isolation facility.

12.3.3. Ultrasound Examinations

- The ultrasound pillow used for **small animals** should be placed in a plastic bag and covered by a bed pad directly disposed of in a yellow waste container after use.
- The **probe** should be placed in a disposable protective glove at the discretion of the imaging clinician (e.g. multidrug resistant bacteria). The probe and the cable should be carefully disinfected after examination, with, respectively, Tristel Duo for Ultrasound® and Distel Wipes®.
- The ultrasound machine should be handled by the person realizing the ultrasound examination with her/his clean left hand (or opposite hand for some large animals' examinations) or by a different operator not handling the patient.

- The gel container should be handled by the person realizing the ultrasound examination with her/his clean left hand or by a different operator not handling the patient; the container cannot be left in contact with the animal. If the container has been in contact with the animal or if the hand has touched the animal, it must also be disinfected.
- For ultrasound examinations on **class 3 and 4** large animals, undertaken in respective housing areas of the hospital, the ultrasound machine should be kept in the corridor and not entered in the box; the **wheels should be carefully disinfected** after examination. Only the necessary material should be brought into the unit. Alcohol and gel for ultrasound exams should be available on site and not brought back to the Imaging unit.

12.3.4. Imaging Rooms and Equipment

- Spray or mop the floor with disinfectant after examination of a patient with a confirmed/suspected infectious disease.
- Lead aprons/gloves should be sprayed with disinfectant after use with a patient confirmed/suspected of infectious disease.
- Clean and disinfect lead ropes/head ropes weekly.
- Clean and disinfect all equipment daily.

Chapter 13.

PEST CONTROL SOP

13. Pest Control SOP

13.1. Arthropods of interest

- See Humblet et al. 2020a, b and c for detailed information.
- Many pathogens, zoonotic or not, are transmitted by arthropods, either mechanically or biologically. Vector-borne diseases are of main concern in Western Europe, it is thus essential to implement control measures to reduce the risk of transmission. In Belgium, the main **flying arthropods** of concern are:

13.1.1. Mosquitoes

- The main mosquito species of interest in Belgium are:
  - *Culex* spp.: vectors of canine dirofilariasis, West Nile fever, Rift Valley fever, equine encephalitis, etc. In Belgium, several species are endemic and the most prevalent is *Culex pipiens*.
  - *Aedes* spp.: vectors of canine dirofilariasis, Chikungunya, dengue, Japanese encephalitis, etc.; *Aedes albopictus*, *Ae. japonicus* and *Ae. koreicus*, have been spotted punctually in Belgium.
  - *Anopheles* spp.: potential vectors of *Plasmodium* spp. Several species are endemic to Europe (e.g. *An. atroparvus*, *An. labranchiae*, *An. plumbus* and *An. sacharovi*).

13.1.2. Biting midges

- Culicoides biting midges: involved in the transmission of bluetongue, Schmallenberg disease, Akabane disease, African horse sickness, epizootic haemorrhagic disease, etc.

13.1.3. Tabanids

- Tabanids (horse flies) are mostly mechanical vectors of pathogens. They can transmit viral diseases (e.g. infectious equine anaemia, classical swine fever and vesicular stomatitis), parasitic diseases (e.g. trypanosomasis, besnoitiosis, etc.) and bacterial diseases (anthrax, tularaemia, bovine anaplasmosis, Lyme disease, etc.).

13.1.4. Flies

- Flies are mostly involved in the mechanical transmission of various pathogens:
  - **Common house flies** (*Musca domestica*): mechanical transmission of more than 100 pathogens causing disease in animals and/or humans, e.g. *Bacillus anthracis,* classical swine fever virus, *Dermatophilus congolense, Escherichia coli,* Mycobacteria, *Salmonella* spp., *Shigella* spp., *Vibrio cholerae*, *Yersinia pseudotuberculosis,* PRRS virus, etc.
  - **Stable flies or stomoxes** (*Stomoxys calcitrans*): viruses (equine infectious anaemia virus, African and classical swine fevers viruses, West Nile virus, Rift valley fever virus and lumpy skin disease virus), bacteria (e.g. *Bacillus anthracis*, *Pasteurella multocida*, *Erysipelothrix rhusiopathiae*, *Francisella tularensis* or *Dermatophilus congolense*), rickettsia (e.g. *Anaplasma marginale) and parasites (Trypanosoma spp. and Besnoitia besnoiti, Habronema microstoma, etc.)*.
  - **Face flies** (*Musca autumnalis*): vectors of *Moraxella bovis*; they may transmit *Corynebacterium pyogenes* and are intermediate hosts for *Thelazia* spp. and *Parafilaria* spp.
  - **Horn flies** (*Haematobia irritans*): not reported as vectors of diseases but source of nuisance for animals.
  - **Black flies** (Genus *Simulium*): vectors of Eastern equine encephalomyelitis, vesicular stomatitis virus, onchocerciasis, avian leucocytozoonosis, mansonellosis, mechanical vectors of tularaemia, etc. Simulitoxicosis (attack in large numbers causing host intoxication in reaction to salivary contents [haemolytic toxin] has been described in Belgian cattle. Black flies lay eggs in

fast-flowing, oxygen-rich stream and river waters (aquatic or semi-aquatic habitats), and thus mainly bite along riverbanks.
  - **Sand flies** (*Phlebotomus* spp.): vectors of canine leishmaniosis in Europe; they are not problematic in Belgium to date.

13.1.5. Ticks

- The two important species of **ticks** found in Belgium are:
  - ***Ixodes ricinus**:* biological vector of, among others, Lyme disease, babesiosis, anaplasmosis, and tick-borne encephalitis.
  - ***Dermacentor reticulatus***: involved in the transmission of, among others, babesiosis, tularaemia and myxomatosis.
- Ticks are involved in the transmission of numerous pathogens:
  - Viruses such as Crimean-Congo haemorrhagic fever virus, Louping ill virus, myxoma virus and tick-borne encephalitis virus
  - Bacteria: *Anaplasma* spp., *Borrelia burgdorferi* (causing Lyme disease), *Ehrlichia canis*, *Francisella tularensis*, etc.
  - Protozans: *Babesia* spp., *Theileria equi*, etc.

13.1.6. Other arthropods of interest

- In addition to be a source of nuisance for dogs and cats, **fleas** are involved in the transmission of bacteria such as *Bartonella henselae* (cat-scratch disease in humans) and *Mycoplasma haemofelis* (feline infectious anaemia). Furthermore, they are hosts for *Dipylidium caninum* (helminth).
- Either sucking or chewing, **lice** are host specific. Sucking lice are those mainly involved in the transmission of pathogens, such as swine pox virus but also *Anaplasma* spp. and *Trichophyton verrucosum* in cattle.
- **Mites** feed on skin debris or lymph, and affect potentially all animal species; *Chorioptes* spp., *Psoroptes* spp. and *Demodex* spp. are usually host specific. *Sarcoptes scabiei* has several variants, which are more host-specific (var. *bovis*, var. *ovis*, var. *equi*, var. *canis*, var. *suis*, etc.).

13.2. On site monitoring of vector populations

13.2.1. Trapping of adult flying insects

- On-site monitoring relies mainly on **trapping of adult flying insects**. It allows:
  - Reduction of insect populations
  - Validation of control measures (and militates for the implementation of additional measures if necessary)
  - Detection of emergence of new species
  - Identification of breeding sites.
- Traps are adapted to the targeted species.

13.2.2. Direct observations/counts on animals

- **Poor skin/fur/wool/hair condition** often signs ectoparasite infestation.
- Direct weekly counts of **flies** on a minimum of 15 randomly selected hosts monitors their abundance:
  - **Stable flies**: observed on the outside of front leg nearest to the observer and the inside of the opposite front leg (threshold for economic impact on cattle = 5 stable flies per leg).
  - **Horn flies** and **face flies**: observed during mid-morning when horn flies are resting on the back and sides of cattle and face flies are actively feeding around eyes and face.

13.2.3. Animal behaviour

- The presence of flies (e.g. horn flies) increases tail flicks, bunching, etc. At lower stable fly abundance, the number of cattle tail flicks is a measure of fly activity: it should not be above the

economic threshold of 10 per animal within a 2-minute period (observation of 15 randomly selected animals).

13.3. Control of arthropods

- Regarding **flying insects**, the objective of control is to limit their populations to acceptable densities, to reduce the potential for disease transmission. Indeed, it is impossible to eliminate them completely. It is crucial to prevent their access to animal facilities, especially units hosting infectious/contagious patients, and minimise contacts with potential hosts.
- **Non-flying arthropods** (ticks, mites, lice and fleas) are mostly disseminated throughout facilities by movements of infested hosts, accidental transport by humans, and equipment sharing between animals (e.g. grooming material).
- The best approach for arthropod/vector control consists in combining several methods through an **integrated vector management program (IVMP)**, e.g. by simultaneous source reduction, use of pesticide against adults and environmental control. Biological control measures are not very applicable in the context of FVM facilities.

13.3.1. Physical control measures

- Doors should be kept always closed!
- Barriers can be installed at strategic locations (e.g. windows, ventilation system), to minimise the entry of flying insects, and prevent their exit, especially in the large animal isolation unit:
  - Screens: mesh size must be adapted to the size of targeted insects (see Tables VIII and IX).
  - Fans: not very appropriate in FVM premises housing large animals, for economic and safety reasons (even if proven to be efficient in chasing insects away).
  - Traps: see Table IX; traps should be installed at strategic locations

Class 4 for large animals: several levels of physical control reduce the risk of entry/exit of flying insects:

- Sealed windows
- Double door to access the anteroom for animals (classical folded door + fast gate)
- Anteroom for animals, delimited by two fast gates, working with an interlocking system.
- Two levels of screens, on the extraction path of the ventilation system:
  - One with regular mesh size (trapping of large insects such as mosquitoes, flies and tabanids) – the screening material is classical gaze.
  - The other level with mesh size smaller than 1 mm (located downstream of the larger mesh size screens), efficient against Culicoides biting midges (sand flies are not problematic in the FVM environment). The material used is galvanised steel (filters type IG G3).

13.3.2. Chemical control measures

- The use of chemical insecticides and acaricides should be combined with non-chemical methods. Indeed, the hazard to humans and animals is real, as they are not selective and toxic to most insects and can cause serious environmental damage. Furthermore, resistance to insecticides is increasing in insect populations.
- Two categories of chemicals exist:
  - Larvicides: used against species with well delimited and identified breeding sites (thus not for biting midges), and whom larval stage concentrates in a specific habitat. Critical sites such as manure storage tank and drainage grids must be treated regularly. Larvicides can be used on mosquito breeding sites that cannot be drained/filled and where other methods such as oils and monomolecular films cannot be used.
  - Adulticides: limited success in suppressing adults by application as mists/fogs in the evening hours, when insects are most active. It is essential not to use them too often (unsustainable and risks of developing resistance). Care must be given to minimise the impact on useful insects,

insect predators and environment. Alternating different classes of products is essential to avoid resistances.

- Different formulations exist such as residual sprays, toxic baits, aerial sprays/aerosols or fumigation. Area sprays are only acting 1 to 2 hours in the environment and should be applied at temperatures between 18°C and 32°C. Residual sprays can be applied on shaded fly-resting surfaces, e.g. barn walls, ceiling, rafters and calf hutches. The alternate use of area and residual sprays avoids the development of resistances.

13.3.3. Environmental control of breeding sites and larval habitats

- Environmental control relies on the prevention of insect breeding and elimination of breeding sites (Table VII).

Table VII: main breeding sites for flying insects of concern

Flying insects	Main breeding sites
Mosquitoes	*Culex* spp.: standing water *Aedes* spp.: natural temporary containers such as tree holes, buckets, tires, water-storage containers, pot plants, roof gutters, used cans, bottles, pet dishes, etc. *Anopheles* spp.: larval habitat associated with vegetation protruding from the water
Culicoides biting midges	Wet organic matter such as decaying leaf litter, manure and any decaying organic matter
Stable flies House flies	Wet (fermenting) organic matter; larva feed on a wide range of food sources: blood, flesh, carrion, faecal material, organic waste products, and decomposing vegetable matter
Horn flies Face flies	Faecal pads
Sand flies	Yard soil, animal burrows, forest litter and treetop epiphytes
Black flies	Running waters

- Controlling of egg laying sites is the best way to control adult **mosquitoes**:
  - Over a 1.5–2 km radius around facilities (maximum flight range for most mosquitoes)
  - Mosquitoes require water standing for more than 96 hours to lay eggs, it is thus essential to map risk areas.
- **Black flies** require running waters, the closest being the Ourthe river located at less than 1 km as the crow flies. If outbreaks should occur, a collaboration with the neighbouring municipality could be considered to act on larval breeding sites, along the sections of rivers and streams that can potentially produce outbreak populations, even though their complete eradication from a locality is quite unlikely (e.g. application of a larvicide made of *Bacillus thuringiensis israelensis)*.
- **Ticks**: environmental control relies on landscape management to make the environment less suitable for tick survival.
  - It is particularly in force for pasturing animals (FePEx) and for dogs walked in outdoor green yards.
  - Landscape management should be conducted in a sustainable way, to limit its potential negative impact on biodiversity, among others.

13.4. Integrated Vector Management Program (IVMP)

- An Integrated Vector Management Program (IVPM) involves the synergistic, ecosystem-based strategy focusing on long-term control of vector populations through the combination of several techniques such as:
  - **Surveillance** of species in specific areas (which can influence the control methods)
  - **Physical control and / or source reduction**
  - **Chemical control: adulticides and larvicides (if necessary)**
  - **Education: inform people on** potential breeding habitats and how they can be reduced/eliminated

- Measures applicable to the different facilities of the FVM are detailed below.

13.4.1. Large animal facilities (ruminants, swine and horses)

- Control and preventive measures specific to facilities housing large animals and insects/vectors of concern are detailed in Tables VIII and X.
- Physical control of flying insects, i.e. window screening and trapping, is essential. But first, doors must be kept closed as much as possible, especially those of buildings housing animals.
- Regarding **ectoparasites**, the separation/limitation of contacts between infested and free- animals, and the limitation of cattle movements among facilities helps reducing the transfer of ectoparasites.
- **Stable** and **house flies** should be targeted in confined systems. Immediate chemical control of adult flies is advised if their populations reach damaging levels and if sanitation measures fail. Residual insecticide such as pyrethroids can be sprayed on fly resting places (walls and structures). Nevertheless, it is necessary to prevent the emergence of resistances. Low toxicity-botanical extracts and essential oils have gained interest as repellents.
- The management of breeding sites is often difficult or impossible for ***Culicoides* biting midges**.
  - Insecticides or insect repellents directly applied to animals provide some level of protection but were not very successful in reducing virus transmission during the bluetongue epidemics in Europe.
  - Stabling animals indoors reduces biting by some Culicoides that are reluctant to enter structures.

13.4.1.1. Class 4 (isolation facility)

- Maintenance of screens/filters is essential as their presence reduces ventilation efficacy.
- They should be regularly inspected for any damage (holes, tears) and cleaned once a month in case of high case load.
- The small mesh size and the dusty environment contribute to a fast fouling, that could reinforce the impact on ventilation.

13.4.1.2. Experimental Farm (FePEx)

- Several management methods suggested in Table X to control permanent ectoparasites and ticks are of particular interest for the FePEx, i.e. landscape management and herd management.
- To improve tick control, combine landscape with targeted applications of least-toxic pesticides to high-risk tick habitat and restrict access of wild hosts to cattle pastures.
- In general, new animals should be quarantined, inspected and insecticide-treated prior to introduction to the herd.
- Regarding sheep:
  - Shearing sheep before lambing prevents fleece soiling prevents sheep ked and fly strike.
  - Clipping of fleece soiled by urine/faeces prevents sheep ked and fly strike.
  - Scheduling lambing for early spring, before flies are abundant, is strongly advised.

13.4.2. Small Animal Facilities

Control and preventive measures specific to the SAH and insects/vectors of concern are detailed in Tables IX and X.

Table VIII: Flying arthropods – control measures – large animal facilities

Measures	Mosquitoes	Culicoides biting midges	Tabanids (horse flies)	Flies*	Black flies	Sand flies
PHYSICAL MEASURES						
Keep doors always always closed	x	x	x	x	x	x
Double-doorway system	x	x	x	x		x
Window screens/nets – regular mesh size (≥ 1.5 mm) ** (regular maintenance)	x		x	x		
Window screens/nets – mesh size < 1mm** (regular maintenance)	x	x	x	x	x	x
Trapping						
- *CO_2-baited light trap*	x					
- *Onderstepoort Veterinary Institute (OVI) light traps*		x				
- *Sticky papers or traps*				x		x
- *Ultraviolet fly traps*				x		
- *Electric fly killers*				x		
- *Spot cards placed at fly resting sites*				x		
- *H-Trap*			x			
Pasture: shelter providing dark conditions					x	
CHEMICAL MEASURES						
Synthetic contact organic products						
- *Organophosphorus compounds*	x					
- *Carbamates*	x					
- *Pyrethroids*	x	x	x	x	x	x
- *Diethyltoluamide (DEET)*			x			
Insecticides on adult sick animals (treated ear tags, topical pour-on, sprays)	x	x	x	x	x	
Insecticides in the environment (e.g. room sprays, etc.)	x			x	x	
ENVIRONMENTAL MEASURES						
Avoid all factors favouring the presence and accumulation of standing water	x					
Control of moisture		x	x	x		
Reduce/eliminate emergent and unwanted vegetation	x					x
Pasture: make water fluctuate of 30-40 cm every 6 days in large reservoirs of drinking water	x					
Limit fly access to feed: grain stored in closed containers				x		
FePEx (Experimental Farm): silage well covered				x		
Strict hygiene (eliminate substrates such as faeces, silage and organic residues) and sanitation		x		x		
Avoid accumulation of organic debris (frequent inspection to remove)		x	x	x	x	
Disturb organic debris once a week (e.g. spilled feed, bedding, rotten vegetation, leaves)				x		
Remove detritus from nearby bodies of water					x	
Pasture – watering ponds						

- *Regular treatment with biological larvicide or introduction of insect-eating fishes is encouraged*	x					
- *Drainage/paving of the surrounding area (water-filled hoof prints act as breeding sites) and regular cleaning*	x					x
Tire storage (FePEx) – tires used to cover silage bunkers						
- *When not in use, stored under a roof or covered, on racks with the possibility of inspecting the separately*	x					
- *Holes pierced in tires (to avoid accumulation of water)*	x					
- *Weekly inspection and dumping out of any accumulated water*	x					
- *Prompt recycling if not used anymore*	x					
Trash cans (especially if they contain biologically contaminated waste such as blood)						
- *Weekly disposal and cleaning*	x			x		x
- *Keep trash cans covered (lids)*	x			x		x
Drainage system						
- *Rain gutters – periodic inspection and cleansing (leaves/debris)*	x					
- *Rain gutters – repair leaks by respecting a suitable gradient*	x					
- *Drains – keep drainage ditches free of excessive vegetation and debris*	x					
- *Drains – screen small drains and keep free of water and debris*	x					
Manure/faeces						
- *Store manure in a remote site, as much as possible, where it will not be rewetted*		x		x		
- *Daily removal*				x		
- *Scrap/harrow walls and floor regularly to break up any dry faecal accumulations in boxes/stalls*				x		
- *Disturb manure once a week to prevent hatching*				x		
- *Pasture (low cattle density): disturb freshly deposited cattle faecal pads*				x		

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

**double level of meshing – in force in the FMV isolation premises for large animals: one first level with regular mesh size (classical screening material, i.e. gaze) and second level with mesh size < 1 mm, located downstream of the first level (galvanised steel – filters type IG G3).

Table IX: Flying arthropods – control measures – small animal facilities

Measures	Mosquitoes	Common house flies	Sand flies
PHYSICAL MEASURES			
Keep doors always closed	x	x	x
Window screens/nets – regular mesh size (≥ 1.5 mm) * (regular maintenance)	x	x	
Window screens/nets – mesh size < 1mm* (regular maintenance)	x	x	x
Trapping			
- *CO_2-baited light trap*	x		
- *Light traps*		x	x
- *Bait traps*		x	x
- *Sticky traps*		x	x
- *Flight traps, ultraviolet electrocutor trap*		x	x
CHEMICAL CONTROL			
Synthetic contact organic products			
- *Organophosphorus compounds*	x		
- *Carbamates*	x		
- *Pyrethroids*	x	x	x
Insecticides on animals (impregnated collars, spot-on)			x
Insecticides in the environment (e.g. room sprays, etc.)	x	x	x
ENVIRONMENTAL CONTROL OF BREEDING SITES AND LARVAL HABITATS			
Avoid all factors favouring the presence and accumulation of standing water	x		
Reduce/eliminate emergent and unwanted vegetation	x		x
Trash cans			
- *Weekly disposal and cleaning*	x	x	x
- *Keep trash cans covered (lids)*	x	x	x
Drainage system			
- *Rain gutters – periodic inspection and cleansing (leaves/debris)*	x		
- *Rain gutters – repair leaks by respecting a suitable gradient*	x		
- *Drains – keep drainage ditches free of excessive vegetation and debris*	x		
- *Drains – screen small drains and keep free of water and debris*	x		
Strict hygiene (eliminate substrates such as faeces, and organic residues) and sanitation		x	x
Avoid accumulation of organic debris (frequent inspection to remove)		x	x
Disturb organic debris once a week (e.g. rotten vegetation, leaves)		x	x
Pick up pet droppings daily and change cat litter at least once a week		x	
Quickly dispose of small animal carcasses in yellow containers		x	
Fill in cracks and crevices of walls, ceilings, floors (adult resting sites)			x
Clearing and rolling, tamping or paving outdoor areas			x
Destruction of rodent habitat (reservoir hosts)			x
Keep dogs indoors at dusk and dawn during the risk season if leishmaniasis becomes established			x

Table X: control measures against ticks and permanent ectoparasites (small and large animals)

Measures	Ticks	Lice	Mites	Fleas
PHYSICAL CONTROL				
Separate/limit contacts (physical separation) between infested and free animals		x	x	x
Class 3 hospitalisation		x	x	
Avoid sharing equipment (grooming material, blankets, etc.)		x	x	x
Small animals: avoid tick habitat when walking dogs outside the clinic (edges of lawn and proximity of brushes)	x			
Limit movements of animals among facilities (to reduce transfer of ticks and ectoparasites)	x	x	x	x
Small animals: regular checking of patients – daily tick checks and removal	x			
Small animals: daily mechanical cleaning of cages and bedding areas – keep housing well swept and floors washed				x
Shearing/clipping if necessary (severe infestation)		x	x	x
CHEMICAL CONTROL – repellents / environment and patients				
Application of chemical treatment on animals	x	x	x	x
Herd management: ivermectin or related parasiticides; for lice, repeat the treatment 10 to 14 days apart – treat all animals	x	x	x	
Small animals: environment chemical treatment with insecticides	x	x	x	x
ENVIRONMENTAL CONTROL				
Landscape management				
- *Reduce ticks around buildings (most ticks are located within 3 yards of the lawn perimeter, along woodlands, stonewalls and ornamental plantings*	x			
- *Regular trim tree branches and shrubs around the lawn edge (to allow more sunlight in)*	x			
- *Regular mowing and removing of cover vegetation around buildings, especially in dog walking areas*	x			
- *Remove leaf litter, clear tall grasses and brush at the edge of pastures, around stonewalls (and wood piles)*	x			
- *Fencing (to exclude large wild hosts)*	x			
- *Management of rodent potential habitat (control vegetation around outdoor-stored items, seal stonewalls and small openings)*	x			
- *Pasture: 1 m-buffer area of wood chips/tree bark or gravel between pasture and woods (to restrict tick migration into pastures)*	x			
Control of rodents to minimise contacts with vectors	x			x

13.5. Rodents

13.5.1. Rodent Species of Concern

- Rodents of concern in the FVM are:
  - House mice (*Mus musculus*) nest in and around facilities; they are omnivorous and prefers food storage.
  - Black rats (*Rattus rattus)* prefer grains and fruits (not meat); they are excellent climbers.
  - Brown rats (*Rattus norvegicus*) eat everything and nest under surfaces; they are good swimmers.
  - Field mice (*Apodemus sylvaticus*) live in wooded areas, around houses, ruins, rocky zones, parks, etc.; they avoid opened grassland and are omnivorous
  - Voles:
    - Common voles (*Microtus arvalis*) live in opened and non-humid grassland, with short vegetation, cultured fields and gardens.
    - Bank voles (*Myodes glareolus*) live in deciduous woodlands, hedgerows, and overgrown ditches; they are omnivorous.
- Rats need water daily and are afraid of new objects. They are attracted by animal feed, bedding and animal waste.
- Voles and field mice will not be discussed as the FVM facilities are not a suitable habitat.

13.5.2. Nuisance Associated with Rodents

- **Transmission and spread of pathogens**: rodents carry about 35 pathogens and are a potential source of infections for both humans and animals, among others:
  - Bacteria: *Campylobacter* spp., *Salmonella* spp., *Yersinia pestis, Pasteurella* spp., *Leptospira* spp., *Brachyspira hyodysenteriae*, *Rickettsia typhi* (murine typhus, exotic to Belgium), etc.
  - Viruses: hepatitis E virus, encephalomyocarditis virus, porcine circovirus type 2, rabies virus, hantavirus, etc.
  - Parasites: *Trichinella* spp, *Toxoplasma* spp., *Cryptosporidium parvum, etc.*

  They can carry pathogens on their feet such as *Escherichia coli*, *Listeria* spp., *Mycobacterium* spp., *Brucella* spp., etc.
- Rodents can **contaminate feed** with faeces and urine, as well as other microbiological contaminants.
- Rodents can **damage feed, equipment and materials** by consuming feed and tearing apart sacks containing feed, etc. Furthermore, they destroy insulation materials, electric wires, plumbing and other building components.
- Rodents can be a source of **stress for animals**: they can scare off animals housed in the facilities, especially pigs, through their nocturnal activity.

13.5.3. Signs of Rodent Infestation

- Different signs confirm the presence of rodents:
  - Sounds (gnawing, squeaking and climbing noises)
  - Droppings (along walls, behind objects and near feed supplies)
    - Rat droppings: black, bean-sized, ≈ 10-12mm long, up to 5mm in diameter.
    - Mouse droppings: black, rice kernel size, ≈ 4mm long and much thinner (1mm).
  - Observation of rodent runs (dust-free areas along the walls)
  - Rat burrows
  - Gnawing marks => wood chips, torn areas in cereal bags, etc.
  - Smudge marks on pipes, etc. (greasy film from dirt and fur oil)
  - Odours (especially if rodent densities are high)
  - If food shortage, disturbance or heavy infestation, daytime sightings; there are about 25 mice/rats for every one seen.

13.5.4. Prevention of Rodent Infestation

- Preventive measures must limit the entrance and access of rodents to animal facilities and avoid conditions favouring nesting, feeding and reproduction.
  - **Avoid outdoor hiding places**:
    - Avoid equipment, weeds or waste piled up against walls
    - Building surroundings must be clean
  - **Limit the entrance of rodents:**
    - Keep doors closed! Doors must fit well (≤ 0.6 cm between bottom of the door and floor).
    - Seal openings > 0.6 cm with appropriate material that is not easily gnawed (avoid wood, rubber and plastic), with special attention to overhead and underground spaces around pipes, augers, electric cables (where they enter structures), etc.
    - Cover all edges subject to gnawing with sheet metal (24 gauge or heavier) or hardware cloth (19-gauge 1.27 x 1.27 cm mesh for rats, 26-gauge 0.6 x 0.6 cm for rats and mice) to prevent gnawing.
    - Implement a 1 m-wide gravel perimeter around buildings (rodent barrier).
    - Inspect buildings once a year to check for cracks around doorframes, under doors, broken windows, water and utility hook-ups, vents and holes surrounding feed augers, etc.
  - **Eliminate potential feed sources:**
    - Feed storage:
      - Store grain and pellets in sealed, rodent-proof, metallic containers (tight fitting lids).
      - Store only a minimum of feed and hay.
      - Clean feed storage area weekly.
      - Store hay and straw off the ground, on wooden pallets.
      - Clean any feed spillage as soon as possible.
      - Drain daily any area of standing water to eliminate drinking water for rodents.
  - **Proper storage and disposal of household garbage and dead animals:** prompt disposal of food waste and other material (e.g. faeces) that may attract rodents
  - **Avoid potential hiding and nesting places**:
    - All equipment (refrigerators, dishwashers, etc.) should be raised and easily movable, enabling cleaning underneath and behind them.
    - Store sacked feed on pallets with adequate space around and under them.

13.5.5. Rodent Control

- Both physical and chemical controls should be combined.
- Dead rodents should be looked for regularly, wearing protective gloves when handling them.
- Rodent control methods (e.g. traps) are also useful monitoring tools.

13.5.5.1. Physical Control (Trapping)

- Place traps in strategic points:
  - On rodent runs, close to walls, behind objects, in dark corners and other places of rodent activities such as feed storage facilities (not too close to feed), but not in patient-sensitive areas, such as operating rooms.
  - Two traps in a row to avoid rats jumping over.
  - Prefer plastic traps for easy cleaning and less rodent smell and avoid cages (scare off other rodents).
  - **DO NOT USE** (ultra)sound devices in animal facilities to avoid stressing patients.

13.5.5.2. Chemical Control

- The most frequently used rodenticides are **anticoagulants** (paraffin blocks, foam, gel, etc.). Two types of anticoagulants exist: (1) First generation – rodents must feed over several days – and (2) Second generation - only one feeding required.

  - Place baits along rodent runs (distance between baits: 1 to 2 m for mice and 7 to 10 m for rats) but not in patient-sensitive areas
  - Animals die 3 to 4 days after intake, usually far away from baits, so other rodents are not afraid of baits, and carcasses are not smelly.
  - Strictly follow instructions on the product label.
  - Baits should be fresh and tasty to remain attractive (dispose of non-consumed baits safely)
  - Inspect frequently to check for bait availability and removal of dead animals.
  - Record bait disappearance.
  - Put baits in a bait station, to make them unreachable to non-target animals and people and to avoid rodents to carry them away.
  - For rats, install the bait station 5 to 7 days before inserting the bait (for acceptance).
  - Lock the bait station to a fixed object.
- The most appropriate moment to control a severe rodent problem is when facilities are empty, after removing feed remains (no feed for rodents).
- The use of baits should not be the unique solution but part of an integrated control programme. If large quantities of alternative foods are available, long-term rodent control may best be achieved by improving hygiene.

13.6. Birds

- The bird species posing a biosecurity problem in the FVM by entering and nesting in large animal facilities are pigeons and swallows (*Hirundo rustica, Delichon urbicum*). Crows might be a problem in the FePEx. Swallows being a protected species, it is illegal to exterminate them or destroy the nests.
- **Pigeons** feed on grain and seed, but also garbage, insects, bread, and other handouts from people. They nest on building ledges, rafters, and beams. They can breed year-round, with peak production in spring and fall.
- **Swallows** feed mostly on flying insects and build their nest with mud.

13.6.1. Nuisance associated with birds in FVM large animal facilities

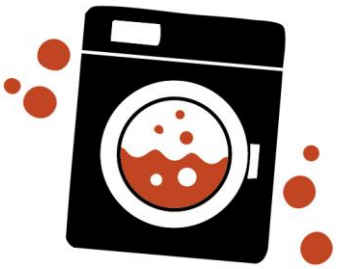
- Birds can generate several types of problems:
  - Consumption of feed and water
  - Transmission of diseases to animals, through contamination of feed and water: wild birds might carry *Salmonella* spp., West Nile virus, round worms, tapeworms, etc. Bacteria spread by birds include *Brachyspira hyodysenteriae*, *Salmonella* spp., *Escherichia coli*, *Campylobacter* spp., or *Listeria monocytogenes*.
  - Infrastructure problems:
    - Droppings corrode equipment
    - Nests might plug drains and gutters
    - Destruction of insulation

13.6.2. Avoid the presence of birds in large animal facilities

- The combination of techniques is required to **prevent entry of birds inside buildings**:
  - **KEEP DOORS AND WINDOWS CLOSED** (or screened).
  - Limit access to feed and water.
  - Store grain in closed, metallic containers with tight fitting lids, in closed rooms.
  - Clean up immediately any spilled grain and clean feed wastage around feeders everyday
  - Cover feeders whenever possible.
  - Eliminate access to food sources as much as possible.
  - Prevent the proliferation of insects.
- **Other bird exclusion-systems** can be implemented in closed buildings (thus, not the FePEx):

- Heavy plastic strips in doorways (especially in areas where doors cannot be kept closed).
- Close any opening larger than 1.3 cm (netting/mesh screens).
- Place metallic wire (or any material not easily pecked) or shelterbelts on windows and openings.
- Ensure that windows and screens fit tightly, repair broken windows as soon as possible.
- Place barriers (spikes, nets, etc.) at potential bird entries to prevent them from landing.
- Use scaring devices (rotation once a week as birds get used).

- **Reducing nesting and sitting opportunities**: install bird control spikes at nesting and sitting sites (more efficient for pigeons).
- **Reduce reproduction rate – pigeons (swallows are protected)**:
  - Destruction of eggs (hole poking): birds continue hatching instead of building a new nest.
  - Pigeon nests can be torn down at two-week intervals.
- **Swallows - installation of artificial nesting devices in non-sensitive areas**:
  - **MUST** be ready before spring – period swallows come back from migration (March-April).
  - For installation, strictly follow the manufacturer's recommendations to be efficient in attracting targeted species.



Chapter 14.

LAUNDRY SOP

14. Laundry SOP

14.1. General Introduction

- Numerous pathogens can be isolated from contaminated clothes (Dunn 2022), *Bacillus cereus* (Dohmae et al 2008, Cheng et al 2017), *Pseudomonas aeruginosa* (Panagea et al 2005), MRSA (Perry et al 2001).
- Direct contacts with infectious patients can result in bacterial contamination of clothes and concurrent spread to other patients as contaminated clothes play the role of fomites (Frosth et al 2018). Indeed, many pathogens can survive several hours to several days on fabrics, depending on the material: bacteria can survive up to 206 days at room temperature on polyester and up to 90 days for some species on cotton and mixed fibers (Kampf 2020). Most bacterial species survive better at elevated air humidity. The infectivity of viruses on textiles is lost much faster at room temperature, typically within 2-4 weeks (Kampf 2020).
- Hospital-acquired infections have been described through contaminated textiles (Fijan & Šostar Turk 2012), e.g. *Sarcoptes scabiei* (Thomas et al. 1987), *Microsporum canis* (Shah et al 1988), *Salmonella typhimurium* (Datta & Pridie, 1960), *Salmonella hadar* (Standaert et al 1994) and hepatitis A virus (Borg & Portelli 1999; Keeffe 2004). Indirect contact with staff clothing was found to be a route for cross-contamination of *Staphylococcus epidermidis* in a clinical setting (Hedin 1993).
- Professional attire and reusable PPE should ideally be made of a material that resists to high-temperature machine wash.
- All soiled healthcare textiles should be considered as contaminated and standard precautions always apply.
- The use of **disposable items** should be favoured as much as possible in areas where the biological risk is more important e.g. class 3 and class 4 housing areas.
- **Reusable PPE** is in force in several facilities of the FVM and a strict laundry procedure is implemented:
    - Pig Farm (healthy animals) and FePEx (Experimental Farm): cotton coveralls
    - Teaching microbiology labs: white cotton lab coats
    - Clinics (Equine, Ruminants and small animals): surgical scrubs, horse rest bands and blankets
    - Small Animal Hospital*: tissue blankets and towels (used for patients)
    - Drapes used for surgical procedures
- Many departments of the FVM do resort to an external professional laundry service, while the Clinic or Ruminants and the Pig Farm have their own laundry room. The SAH has its own laundry room, mainly for tissue blankets and towels used for patients.
- **Circuits for dirty laundry and clean laundry must be completely separated**:
    - Transport in different containers, ideally from different colours (e.g. red for contaminated linen and green for clean items)
    - Storage in well separated areas
    - Onward march principle in application: clean linen must be handled before the dirty one.
- **The laundry room**:
    - Should allow the onward march.
    - Walls and floors must be easy to clean (ideally, material supporting routine wet cleaning, and a hot and humid environment).
    - Ventilation should be optimal and the temperature below 20°C.
    - The room must be maintained as clean as possible (regular cleaning, especially dirty area).
    - The use of industrial equipment is strongly advised (to minimise the problems linked to machine failures).
    - A sink for hand washing must be available in the dirty area.
    - Both areas (dirty vs. clean) should be clearly labelled.
- The **laundry process** must be **standardised**, if no resort to an external company:

- The same person should oversee laundry, as much as possible.
- Any person involved in the collection, transport, sorting or washing of soiled linen must be appropriately trained.
- Written procedures must be posted in the laundry room.

14.2. Laundry Procedure

14.2.1. Collection of Potentially Contaminated Laundry

- The process of collecting dirty linen should minimise the risk of contamination for the person in charge, for the environment and for clean laundry. Several precautions must be taken:
  - Contaminated linen should not be agitated/handled too much, to avoid aerosolization of pathogens.
  - Remove carefully any residue of organic matter before processing (e.g. blankets in the SAH).
  - Avoid any contact between personal attire and dirty laundry.
  - Sector-specific attire should be worn (e.g. coveralls for ruminants) to avoid any contact of one's body part and personal clothing with dirty laundry. Specificities for **Class 3 and class 4 patients** are detailed in respective chapters.
  - Wear gloves when handling potentially contaminated laundry
  - Any exposed broken skin or lesions of the person in charge of laundry should be plastered.
- **Procedure:**
  1. Remove any non-laundry items from dirty linen, especially harmful objects. Be careful not to leave any sharps in pockets (e.g. scalpel blades, needles, etc.); they can cause injuries to staff handling the laundry and may also damage equipment.
  2. Put dirty linen in the dedicated container or in the dedicated bag if an external service oversees laundry. Containers/bags should not be overloaded.
  3. For external laundry service, bags must be clearly labelled and identified (or colour-specific).
  4. Dispose of gloves then wash and disinfect your hands immediately after handling any dirty linen.
- The rest of the procedure is worth for linen processed in the FVM. External companies have their own validated procedure.

14.2.2. Internal Transport of Dirty Linen to the Laundry Room

- As much as possible, containers should be transported on dedicated trolleys. Lids must remain closed all the time during transportation to prevent textiles from falling out.
- Trolleys used for the transportation of dirty linen must be easy to clean, and never be used to transport clean linen, unless completely cleaned and disinfected before.
- Trolleys used for the transportation of dirty linen should be cleaned and disinfected regularly.
- Several precautions allow minimising the risk of contamination while transporting dirty linen:
  - Minimise the handling of dirty linen; sorting must not be done in patient-care areas.
  - Dirty linen must never be transported around the care environment unless inside the container.
  - Upon arrival in the laundry room, sorting must be done in the dirty area.
  - Wear disposable gloves for sorting.
  - Sorting must minimize microbial contamination of air and staff handling the textiles. Several categories can be distinguished:
    - Normal process
    - Infectious: risk for workers, environment and other animals
    - Heat labile (e.g. blankets used in the SAH): likely to be damaged by the normal laundering process.

14.2.3. Washing and Disinfection Process

- Precautions:

- Do not overload the washing machine, as agitation (mechanical action) and detergent dispersion will be hampered.
- After loading the machine, single-use gloves and PPE should be disposed of in the dedicated yellow containers, and hands should be thoroughly cleaned and disinfected.

- The four basic interconnected factors of the laundering procedure are: duration, mechanical action, chemicals and temperature: If one of these factors is decreased such as for example temperature, then other factors such as chemicals, mechanical action or time must be increased to achieve the same laundering and disinfecting effect (Fijan et al 2012).
- The laundering process has several effects:
  - Mechanical: linen agitation
  - Thermal
  - Chemical: disinfectants; by suspending soils, soaps and detergents have some microbiocidal properties.
- Each **class** of linen (see section 14.2.2) shall have **standards** for:
  - Cycle time: pre-wash, wash, rinse, and final rinse times
  - Temperature: wash cycle, bleach cycle and rinse cycle temperatures
  - Chemicals – detergents and disinfectants: types and levels for each step in process.

  These standards must appear in the procedures posted in the laundry room.
- High temperature of the washing process ensures a disinfecting action. In general, temperatures ≥60°C are known to inactivate microorganisms and thus ensure a high level of hygiene in laundry (Bockmühl et al 2019). The microorganisms present will highly influence the microbial reduction, e.g. *Enterococcus faecium* needs high temperatures Bockmühl et al 2019).
- The following calculation estimates the duration of the process, according to the washing temperature:

  $$\mathbf{N_{minutes} \times Temperature_{(X°-\,55°)} > 250}$$ (X° = selected temperature of washing cycle)

  For example, hot water (71°C) for a minimum of 25 minutes is very effective in killing microorganisms.
- If it is not possible to reach such results, or if high temperatures are not advised, a **chemical disinfection** is possible. The following disinfectants are used in the FVM for laundry:
  - Sodium hypochlorite (bleach): in addition to its disinfecting action, it should be privileged for cotton lab coats, due to its whitening effect. Chlorine bleach is economical, broad-spectrum.
  - Umonium®38 Master (Huckert's): used at a 0.5% concentration, i.e. three 25ml doses for a 5kg capacity, and poured in the softening compartment.
  - Dettol®

  The manufacturer's recommendations for specific application for machine and detergent usage must be followed. Such products should not deteriorate linen nor generate skin irritation.

14.2.4. Drying

- After washing, linen handling must be minimised.
- The delay between washing and drying should be as short as possible.
- Do not leave damp textiles in machines overnight.
- Use preferably a dryer because it provides an additional pathogen-killing effect, and prefer high-heat cycles, if the material allows it.

14.2.5. Ironing and Folding process

- Temperatures reached during ironing provide additional significant microbicidal action.
- Ironing and folding textiles ensures cleanliness.
- If linen get soiled during the process, it shall be rewashed

14.2.6. Storage of clean linen

- Clean linen should be stored in a separate room or in the clean area of the laundry room, well separated from the dirty area. It is crucial to prevent re-contamination during storage.
- If stored in another room, the door must always remain closed.
- Clean linen must be transported in the dedicated container, as much as possible on a dedicated trolley. If the trolley is also used to transport containers of dirty linen, it must be completely cleaned and disinfected before transporting the clean laundry or whenever it appears soiled.
- The storage area should be clean and free from dust, with control of temperature and humidity to prevent bacterial growth on the laundered linen; avoid (cross)-contamination, especially if linen is stored on open shelving or carts.
- The storage room/area should only be accessible to limited personnel.
- Handle clean linen as little as possible and only after hand washing.
- If laundry is performed by an external service, upon returning, keep linen packed until use, and avoid storing it in a potentially contaminated area.

14.3. Specificities

14.3.1. Class 3 and Class 4 Patients

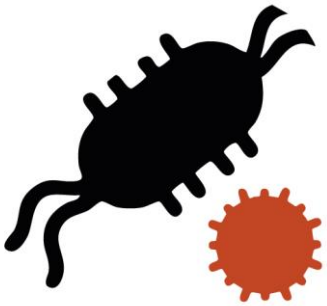
- The use of textile should be avoided as much as possible in areas housing class 3 and class 4 patients, prefer using disposable items. Nevertheless, if handling laundry from class 3 or class 4 patients is required, additional precautions must be considered.
- Wear additional PPE:
  - **Class 3**: disposable gown; a face mask and eye protection might be necessary is a zoonotic risk is assessed, e.g. handling a urine-soaked item from a leptospirosis-patient.
  - **Class 4**: wearing the same PPE as the one required for patient care might be necessary (see respective chapters of respective clinics). In the large animal class 4 IU, blankets, rest bands and sub-bands potentially used for hospitalised horses are soaked 24 hours in an Umonium®38 Master-based disinfecting solution before leaving the isolation facility.
- The patient class of risk should be labelled on the container.
- Wash laundry from infectious patients separately.
- *Cryptosporidium* sp. oocysts can attach to linen during machine washing. Thus, textiles should not be sorted but directly put in the washing machine.
- Parvovirus can resist temperatures of 80°C for at least an hour.

14.3.2. Surgery-related Linen

- Additional inspection for all tissue items used for surgery: any tear, (micro)holes, etc. must be detected before laundry; a hole ≥ 1µ will allow bacteria to penetrate.
- Record the number of cycles (from washing to sterilisation) supported by each item, to anticipate the loss of 'protective barrier' property, and the necessity to replace it.

14.3.3. Blankets and towels in the Small Animal Hospital (including BRRPZE area)

- Tissue blankets and towels should only be used for class 1-2 patients that do not present any wound.
- Class 3 and class 4 patients, as well as animals presenting a wound (whether surgical or not), should be bedded on disposable pads. Alternatives could be therapeutic beds or mattresses with removable cover. In all cases, they should be made of a material that can be easily cleaned and disinfected and quite resistant to the potential damage caused by animal claws.



Chapter 15.

ANTIMICROBIAL RESISTANCE SOP

15. Antimicrobial resistance SOP

15.1. Introduction

- Antimicrobial resistance is becoming a worrying threat in the field of veterinary medicine, in small animals, food-producing animals and horses. A reduction of antimicrobial use is thus essential and goes by disease prevention involving biosecurity.
- Within the frameworks of the "principles of practice of veterinary medicine" (VETE2067-1), a one-hour class on resistance to antibiotics (ATB) is taught by the AMCRA coordinator (Centrum of expertise for Antimicrobial Consumption and Resistance in Animals) to MVM students.

15.2. Use of antibiotics in the FVM clinics

- One of the duties of the FMV is to prevent the introduction of multidrug-resistant (MDR) bacteria in the FMV clinics, its further spread in the facilities and the contamination of environment.
- In Belgium, AMCRA has elaborated guidelines for each sector.
- The use of ATB in the FVM should strictly follow the **AMCRA guidelines**, available online at the following websites (in French or in Dutch):
    - Dogs: https://formularium.amcra.be/a/2
    - Cats: https://formularium.amcra.be/a/7
    - Horses: https://formularium.amcra.be/a/6
    - Poultry: https://formularium.amcra.be/a/5
    - Cattle: https://formularium.amcra.be/a/4
    - Swine: https://formularium.amcra.be/a/3
- An ATB TTM should be implemented only after diagnosis by a clinician, confirmed by a complementary examination (bacteriology or susceptibility to ATB).
- An antibiogram should be performed systematically, to ensure the molecule used is adequate. Such antibiogram is legally mandatory for critical use-ATB (3rd and 4th generation cephalosporins and fluoroquinolones) used in food-producing animals (except for horses and treatment of mastitis).
- Large-spectrum ATB must be used with caution, and the strongest molecules should only be used as a last resort.
- Since Sept 1st, 2024[18], it is mandatory to justify the use (administration, supply or prescription) of third and fourth generation quinolones and cephalosporins (critical antibiotics) for all animal species by means of a susceptibility test. Critical antibiotics can only be prescribed, supplied or administered if a sensitivity test (antibiogram) demonstrates that the infection to be treated is caused by a bacterial strain that is only susceptible to the critical antibiotic tested.

15.3. Surveillance of (multi)drug-resistance in the FVM clinics

- Environmental surveillance of MDR bacteria should be implemented every 6 months in the FVM clinics; MRSA and *Enterobacteriacea* are of particular concern.

15.3.1. *Salmonella* spp.

- Surveillance of *Salmonella* spp. is in force in both large animal clinics (see Equine biosecurity SOP – [chapter 2] and Ruminant biosecurity SOP [chapter 3]). After housing a *Salmonella*-positive patient, the housing stall is systematically cultured after routine cleaning and disinfection before being released for housing another patient. If cultures come back *Salmonella*-positive, the cleaning and disinfection procedure will be repeated. The stall cannot be used for housing another patient until cultures provide negative results.

[18] https://www.amcra.be/fr/nouvelles/belangrijke-communicatie-van-het-fagg/?lid=14308

- A mandatory surveillance of *Salmonella* spp. is in force in the FVM Pig Farm: every 4 months, serological ELISA tests are performed to detect anti-*Salmonella* spp. antibodies. Ideally, the mean s/p ratio must be below 0.6. Such objective is currently reached.

15.3.2. Short-term and/or targeted protocols

15.3.2.1. Methicillin-resistant *Staphylococcus aureus* in the Equine Clinic

- In 2018, the Equine Clinic reported several cases of (potentially hospital-acquired) infection by Methicillin-resistant *Staphylococcus aureus* (MRSA), under the form of surgical site and eye infections.
- A targeted one-month systematic monitoring of all patients was implemented and allowed identifying the source of infection.
- As a result, several procedures were adapted, e.g. improvement of building ventilation, better segregation of patients, attempt to minimize the period of hospitalisation for horses, additional cleaning and disinfection of nasogastric probes before sterilisation, centralization of entries and exits of horses and awareness campaign on hand hygiene.

15.3.2.2. (Multi) drug-resistant bacteria in the Small Animal hospital

- In 2015, the SAH faced a series of surgical sites infections in post-operative patients. A suspicion of hospital-acquired infection was suggested.
- A targeted environmental sampling protocol was implemented, in all rooms where a patient could potentially get contaminated, following the following the patient's journey from its arrival in the consultation room to post-operative hospitalization.
- The resistance profile of several *Enterobacteriaceae* isolated was of great concern.
- The protocol helped to identify the cause of nosocomial transmission: the laundry process applied for blankets used for hospitalised patients was not appropriate. Furthermore, numerous bacteria were isolated from hand-contact points such as door handles, computer mice, etc.
- Several points were highlighted and procedures adapted to solve the problem such as focus on the importance of hand hygiene (including information of staff and students), cleaning and disinfection of surfaces and at-risk equipment, replacement of blankets by single-use pads for class 3 and class 4 patients and improvement of the laundry process, from collection of dirty linen to storage of clean linen.

15.3.2.3. Study on the impact of disinfection procedures on the presence of (multi)drug-resistant *Enterococcus* spp. and *Escherichia coli* in the Small Animal hospital

- In August 2024, the SAH participated in a research project on (multi)drug resistance in dogs and cats, (project still going on by the time of writing) and targeting *Enterococcus* spp. and *Escherichia coli*.
- The study focuses on the impact of disinfection procedures on the presence of (multi)drug-resistant bacteria in vet clinics.
- Samples were collected on surfaces in different rooms (patient waiting rooms, consultation rooms, hospitalization area, etc.), i.e. two samples per room, before and after cleaning and disinfection.
- Results are not known to date.

Chapter 16.

QUALITY ASSURANCE AND BIOSECURITY IN THE FACULTY OF VETERINARY MEDICINE

16. Quality assurance and biosecurity in the FVM

- Quality assurance in Biosecurity is the responsibility of the CFB and is described in the following sections.
- The CFB works as follows: clinics and sectors concerned with biological risks linked to teaching activities submit any issue in relation with biosecurity to the CFB. With the help of the logistician in biosecurity, the CFB gathers information on the issue to build a case and discuss it during meetings. Solutions are proposed and transmitted to the applicant under the form of advice. As an example, the Clinic of Small Animals solicited the CFB for an issue of surgical site infections. An action plan was suggested by the CFB to the Clinic and was declined as follow: 1) audit of practices, 2) environmental sampling to validate the cleaning and disinfection protocols and 3) suggestions of improvements, based on the audit and the results of environmental sampling.

16.1. Biosecurity standard operating procedures applied to the Faculty of Veterinary Medicine, ULiège

- The present Biosecurity SOPs are implemented in the FVM since 2010 (https://www.fmv-biosecurite.ulg.ac.be/generale/medias/PDFs/Manuel_Bios_SOPs_Final.pdf).
- The current version was updated in 2025, with addition of new chapters, i.e. wildlife health and pathology activities, veterinary management of animal resources and two internal crisis scenarios.
- **Panels** are mounted on walls in the different clinics and laboratories housing teaching activities. These panels remind the top 10 biosecurity measures people, mainly students and staff, must comply with during their activities in the facilities. These measures were defined by the heads of clinics/laboratories/activities, in collaboration with the CFB.
- A system of **signposting** is implemented on doors and walls in the FVM facilities. Such system highlights the important measures and behaviours to comply with but also informs on the presence of specific hazards (biological, physical and chemical) and the mandatory PPE to be worn.
  - **Biosecurity signposting** is the responsibility of the head of clinic and laboratories, under the supervision of the CFB. For a question of standardisation, biosecurity signs are homogenised overall the FVM site. They were developed in collaboration with the FVM Multimedia Studio.
  - **Safety signs** (localisation of emergency exits, fire extinguishers, etc.) comply with the legislation in force and are the responsibility of the SUPHT.

16.2. Personal protective equipment

- Each year, since 2012, the CFB, through the Logistician in Biosecurity, performs the assessment of educational needs in terms of personal protective equipment (PPEs) for students within the frameworks of practical activities involving a biological risk.
- Based on an annual survey carried out with the heads of the different activities/clinics/laboratories, PPE needs are updated every year, according to the evolution of practical activities involving a biological risk, i.e. clinics, ambulatory activities and teaching laboratories.
- PPEs are then provided to the different Departments through a University budget (mean annual budget of ≈ 100.000 EUR).
- Such initiative allows offering the optimal protection for students and staff when performing activities at risk in the context of biological risks.

16.3. Biosecurity and student education

16.3.1. Course of veterinary epidemiology, risk analysis, biosecurity and good veterinary practice

- A course of biosecurity included in the course "Veterinary Epidemiology, risk analysis, biosecurity and good veterinary practice" (VETE2059-1) is taught to ULiège BMV3 students[19].
- Based on the ULiège development and experience, the same course is now taught in two other French-speaking universities, i.e. Namur (UNamur) and Louvain (UCLouvain), and will further be organised in Brussels (ULB) as well.
- The course is organised as follows:
  - 2 hours of theoretical introduction including some topics on Biosecurity Quality Assurance
  - 30 hours of e-learning, via the ULiège Ecampus platform and the companion website specifically dedicated to biosecurity in the FVM[20].
- Didactic materials include slides (theoretical course – in French), Biosecurity SOPs and the content of the Biosecurity website.
- Each chapter is related to a SOP and a formative evaluation is proposed to the students after each chapter. If the student gives correct responses to a short multiple-choice questionnaire, the following chapter becomes accessible.
- The final written exam consists in a multiple-choice questionnaire in ULiège, ULouvain and UNamur.

16.3.2. Paraclinical activities dedicated to biosecurity

- Paraclinical activities on biosecurity are organized (VETE2088-1) in GVM2 and include a preparation and the performance of a biosecurity audit using digital tools (via tabs) in a farm and a debriefing (2 x ½ day).

16.3.3. FVM biosecurity website

- Since 2012, in collaboration with the FVM Toolbox, the professor in charge of the above course, and the CFB through the logistician in biosecurity, developed a website dedicated to biosecurity within the frameworks of practical activities in FVM facilities.
- The bilingual website is available at: https://www.fmv-biosecurite.ulg.ac.be/generale/?langue=en
- All sectors are included.
- It is constantly updated, following the epidemiological context (e.g. reportable diseases or COVID-19) and disease status in the area and country, but also when infrastructures and activities are modified.

16.3.4. Continuing education

16.3.4.1. Biosecurity Day – continuing education for FVM staff

- An annual event, totally dedicated to Biosecurity, is co-organised every year by the CFB and the SUPHT, since 2013, in the FVM[21]. It is primarily aimed at the FVM staff, within the frameworks of continuing education, but also welcomes students and private practitioners.
- The average participation rate is 100 (between 90 and 140 participants).
- Topics differ every year and focus on practical biosecurity as implemented in the sectors of the FVM holding teaching activities, mainly clinics and microbiology labs. These topics are selected by the CFB, based on the suggestions of participants to the previous edition, to meet their expectations and needs.

[19] https://www.programmes.uliege.be/cocoon/20242025/en/cours/VETE2059-1.html
[20] https://www.fmv-biosecurite.ulg.ac.be/generale/?langue=en
[21] https://www.fmv-biosecurite.ulg.ac.be/generale/biosecurity-days.php

16.3.4.2. Biosecurity training for FVM technical staff and stablemen

- The project of biosecurity training sessions for technical staff and stablemen will be implemented once a year.
- All technical staff and stablemen working in areas housing teaching activities will be concerned.
- The mandatory training will be provided by the hierarchy, to ensure the respect of the line of authority, after validation of its content by the CFB.

16.3.5. Book on Veterinary Biosecurity

- Two members of the CFB wrote two chapters of a book dedicated to veterinary biosecurity. It is entitled 'Biosecurity in animal production and veterinary medicine: from principles to practice' (Eds J. Dewulf and F. Van Immerseel, Ghent University):
  - Chapter 14 – Transmission of cattle diseases and biosecurity in cattle farms (S. Sarrazin, B. Damiaans, V. Renault and C. Saegerman)
  - Chapter 17 – Biosecurity in veterinary practices and clinics (C. Saegerman and M.-F. Humblet)

16.3.6. Biosecurity research projects in Belgium

- **BOBIOSEC project** (Biosecurity Online Assessment tool for cattle farmers – 2015-2018)
  - Collaboration between the ULiège FVM and Ghent University, allowed the development of a risk-based quantitative biosecurity scoring system to ensure evaluation of biosecurity levels for cattle farms. It was added to the already existing Ghent 'Biocheck' online tool (http://www.biocheck.ugent.be/index.php).
  - Such a tool is accessible to farmers for swine, poultry and cattle, and allow them to compare their management to other holdings/farms and identify means to improve biosecurity on their premises.
- **COST** (European Cooperation in Science and Technology) **Action BETTER** (Biosecurity Enhanced Through Training Evaluation and Raising Awareness) **CA20103** (2021-2025), objectives:
  - To evaluate how biosecurity is currently used (participative approaches to understand motivators and barriers for biosecurity implementation)
  - To compare existing methods used to evaluate biosecurity.
  - To Identify training needs through the evaluation of existing training materials and develop new courses.
  - To recommend priority research areas for future biosecurity improvement in animal production systems.

16.4. Quality Assurance, Personal Safety, Quality Control, Research and Development

16.4.1. Quality Assurance and General Personal Safety

16.4.1.1. Visits of Workplaces (Internal and External Services for Prevention and Protection at Work)

- Every two years, each Department/Clinic of the FVM is visited by the Internal (level 2-Preventive Adviser of the SUPHT, ULiège) and External (Preventive Adviser-Occupational Health Doctor, COHEZIO) Services for Prevention and Protection at Work. The Logistician in Biosecurity also participates to visits in areas with a biological risk.
- The five domains of welfare at work are considered: health, safety, ergonomics, occupational hygiene and psychosocial aspects.
- A report is established and transmitted, among others, to the responsible of the Department/Clinic visited. The report includes recommendations for improving the situation and prevent potential risks.

16.4.1.2. Recording of accidents in the FVM

- When officially notified (following the ULiège procedure), occupational accidents occurring in the FVM and anywhere on the ULiège campus are recorded by the SUPHT.
- Data on accidents are available monthly and discussed in the context of the Consultative Committee for Prevention and Protection at Work (CCPPT). Such Committee is mandatory for any enterprise accounting with more than 50 workers. It includes representatives of the employer, workers and an internal prevention adviser. The Committee assesses and proposes all means aiming at improving workers' welfare.
- Through the relationship between the CFB and the SUPHT, the measures proposed by the CCPPT in the event of accidents involving a biological risk and severe accidents are discussed during CFB meetings.

16.4.1.3. Online reporting of adverse events

- An online reporting system of adverse events (of all types)[22] was implemented in the FVM in 2023.
- This tool allows the FVM security officers and the logistician in Biosecurity to collect statements made by ULiège staff members and students regarding incidents or accidents at the faculty.
- Such system allows the identification of areas/activities at risk, and the proposal of preventive actions, adaptations of infrastructures and procedures if necessary.
- The system is easy to use (smartphone application) and not time-consuming, thus motivating all people to use it.

16.4.2. Quality Control

16.4.2.1. Internal Biosecurity Audits

- Since 2014, internal biosecurity audits have been performed, at least once, in each sector of the FMV where activities including biological risk are held.
- Several criteria were included in the audit, developed as a checklist. That checklist was elaborated based on procedures detailed in the Manual of Biosecurity SOPs.
- For a question of standardisation, audits were performed by the logistician in Biosecurity. The objective was to develop a generic methodology, adaptable to each sector. The methodology will further be transmitted to the heads of the different sectors (clinics, teaching laboratories, etc.) after adequate training, with the aim of self-implementation. As such, a regular auto-control of biosecurity in the facilities and activities will be ensured. Results of auto-controls and follow-up will be systematically reported to the CFB.
- The logistician in biosecurity will keep on performing external independent audits, on a regular basis.

16.4.2.2. Unannounced inspections of infrastructures

- The CFB President and the Logistician in biosecurity perform unannounced inspections in the facilities housing teaching activities with a biological risk.
- Such inspections allow identifying deficiencies linked to infrastructures and advocating for financial means to overcome them (e.g. the replacement of tables and stools in the Anatomy dissection rooms, installation of sinks in the large animal clinics, etc.).

16.4.3. Quality Assurance – Research and Development

16.4.3.1. Students' works (3rd Master's in Veterinary Medicine)

- Pilot studies were conducted to improve the situation in the field of biosecurity, mainly under the form of students work:

[22] https://www.fmv-evenements-indesirables.uliege.be/intranet/ (in French)

- 2011-2012: Implementation of a quality approach regarding biosecurity within the ULiège Faculty of Veterinary Medicine (see published results in Humblet et al 2017)
- 2012-2013: Quality approach in terms of biosecurity linked to microbiological risks in the Faculty of Veterinary Medicine, University of Liège.
- 2015-2016: How to assess the biosecurity level in stud farms? Survey among 70 Belgian and French breeders (awarded)
- 2015-2016: How to restrict the incidence of nosocomial infections in the Intensive Care Unit of a Small Animal Hospital? (awarded)
- 2018-2019: African swine fever control plan for the pig farm of the ULiège FVM
- 2020-2021: Dogs' sense of smell to detect SARS-CoV-2 infection in humans: an effective method in Belgium?
- 2021-2022:
  - House call veterinarian for our pets: what are the epidemiological risks for transmission of zoonoses?
  - Study on the societal perception of SARS-CoV-2 virus in animals and comparison with scientific data
- 2023-2024:
  - Viruses Carried by European Bats: A Method for Prioritizing Zoonotic and Epidemic Risks in France and Belgium (awarded).
  - Invasive fungal infections emerging in Europe: epidemiology and management in veterinary practice

- These studies allow including students in the biosecurity approach.

16.4.3.2. PhDs and diplomate

- In 2021, a PhD in relation with biosecurity has been finalized "Biosecurity in Belgian cattle farms: strengths, weaknesses, determining factors and impacts". Currently, the same PhD finalizes the European College of Veterinary Public Health residency.

Chapter 17.

CRISIS SCENARIOS SOP

17. Crisis Scenarios SOP

17.1. Introduction and Context

- Once an epidemic and/or reportable disease affecting domestic animals (the Walloon Region overseeing wildlife) is suspected, the clinics must adhere to procedures described in the following scenarios. These are worth until the official sanitary authorities, i.e. FASFC, takes the lead in crisis management.
- Several 'model diseases' will be detailed, per species, either epidemic and/or zoonotic:
  - **Pigs**: African swine fever
  - **Ruminants** (and other cloven-hoofed species, i.e. ruminants, swine):
    - Epidemic disease: foot and mouth disease
    - Zoonotic disease: leptospirosis
  - **Small animals**:
    - Epidemic disease: feline hypervirulent calicivirus
    - Zoonotic disease: rabies
    - Highly pathogenic avian influenza
  - **Horses**:
    - Epidemic disease: equine influenza
    - Zoonotic disease: salmonellosis
  - **Necropsy**:
    - Epidemic disease: see scenarios concerning live animals
    - Zoonotic disease: tuberculosis

17.2. African Swine Fever / FVM operational scenario

17.2.1. African swine fever (ASF)

- Reminder concerning African swine fever, see:
  - FASFC website – ASF: https://favv-afsca.be/fr/themes/animaux/sante-animale/maladies-animales/peste-porcine-africaine [in French]
  - FASFC ASF technical card: https://favv-afsca.be/sites/default/files/2023-11/2014-09_FP_Pesteporcineafricaine_fr.pdf [in French]
- **Host spectrum**: pigs and boars
- **Infectious material**: blood +++, tissues, urine, faeces, secretions/excretions of infected animals (sick and dead)
- **Transmission**: contagiousness +++
- **Lesions** (See http://www.cfsph.iastate.edu/DiseaseInfo/clinical-signs-photos.php?name=african-swine-fever for pictures)
  - Per-acute form: often no visible lesion (sudden death)
  - Acute form: all lesions are not visible; lesions differ according to the strain:
    - Subcutaneous haemorrhages, cyanosis and skin reddening
    - Enlarged, oedematous, congestive or even haemorrhagic lymph nodes – especially gastro-hepatic and renal nodes
    - Splenomegaly
    - Petechiae on the renal capsule
    - Cavitary sero-haemorrhagic transudates (effusion) => hydropericardium, hydrothorax, hydroperitoneum
    - Epicardial petechiae, in the bladder and kidneys
    - Pulmonary congestion and oedema with petechiae
    - Petechiae/ecchymoses on serous and gastrointestinal mucosa walls with sometimes haemorrhagic content

    - Liver congestion and haemorrhages on the gallbladder serous
  - Subacute form:
    - Gallbladder and perirenal oedema
    - Enlarged and haemorrhagic spleen and lymph nodes
    - Renal haemorrhages +++
  - Chronic form:
    - Pulmonary caseous necrosis
    - Fibro-pericarditis
    - Oedematous lymph nodes (mainly mediastinal ones)
- **Persistence in the environment**:
  - Very resistant, especially in carcasses of dead animals, but also in soil contaminated with biological fluids (FASFC Scientific Committee, 2018):
    - Feces of infected wild boar => relatively short survival of the virus: 8.5 days if stored at 4°C and only 3.7 days if stored at 37°C (Davies et al 2017)
    - Urine of infected wild boar: 15.3 days at 4°C and 2.8 days at 37°C (Davies et al 2017)
  - The role of insects in viral transmission is still not well known (FASFC Scientific Committee, 2018b). Immature stages of necrophagous flies would not, however, play a relevant role as a mechanical reservoir or vector for the virus (Forth et al., 2017).
- Hypo-virulent forms have been described in the Eastern countries (Gallardo et al. 2018 & 2019), but in an endemic context (virus circulation for several years). At present, the risk of seeing such forms in Belgium is therefore low.

17.2.2. Epidemiological situation of the disease in 2025

- Disease reportable in Belgium and to the WOAH
- African swine fever (ASF) is reported in domestic pigs and wild boar across Europe[23] in 2025, e.g. in Germany, Italy and more eastern countries.
- Belgium has regained an officially free status since 2020, but due to the circulation of the virus in Germany and other European countries, the threat of reemergence is real.
- Follow the situation using interactive map: https://shiny-public.anses.fr/shiny-vsi/

17.2.3. Potential pathways of introduction in the FVM and associated risks

17.2.3.1. Location of pigs in the FVM

- There are two swine herds in the FVM:
  - B42 (bloc 5) – breeding-fattening (closed) herd with genetic status +++
    - No entry of live animals, only sperm from KI Bevel
    - Outgoing animals (transported in the Department trailer) are:
      - Boars for breeding
      - Weaned piglets to fatteners
      - Experimental pigs for B41
      - Dead pigs => refrigerated pit of B43a
      - Fattened pigs to slaughterhouse
    - Sperm is regularly sent to Gembloux Walloon Agricultural Research Centre (CRA-W) for testing.
  - B41 (bloc 4-local 0/55) – experimental animals for Anesthesiology
    - Animals are susceptible to come from 3 herds: B42 herd, INRAE (France) and Gembloux CRA-W.
    - After the experiment (even during the experiment), animals are euthanized => no outgoing of live animals from the FVM.

[23] https://www.plateforme-esa.fr/fr

- B67 (BRRPZE clinic): pet pigs sometimes come for consultations. Hospitalization of animals < 50 kg is rare.

17.2.3.2. Pathways of introduction in the FVM and associated risks

- Introduction through an **infected pet pig coming for consultation in the BRRPZE clinic**: low risk but not absent; indeed, these pigs are owned by individuals, and one cannot discard a high-risk contact with wild boars if pet pigs are walked in a wooden area.
- **Introduction in one of the two herds**:
  - Introduction of an infected domestic swine: very low risk as:
    - B42: closed herd, no entry of animals
    - B41: animals come from the B42 herd, Gembloux or INRAE, i.e. herds with high sanitary status.
  - Introduction in B42 herd through contaminated sperm: low risk - KI Bevel has a high sanitary status.
  - Introduction through contaminated breeding equipment: the risk is low but not null. Exceptionally, professionals visit the B42 herd as part of the «*Porc Fermier de Wallonie*» label (their technicians perform examinations themselves).
  - Introduction through contaminated material:
    - Intervention of ULiège technical services: risk not negligible even if procedures are in place (linked to the possibility that their equipment was used elsewhere, e.g. in the necropsy area) => ensure that cleaning/disinfection procedures have been applied before leaving the previous area. Technical services must contact the person in charge at least 24 hours before the intervention in the B42 building.
    - Pallet of feed: suppliers usually travel from farm to farm; the risk is not null.
  - Introduction through movements of people: significant risk despite the measures implemented[24] => access of people:
    - B41: authorized visitors are the health official, a stableman (Equine clinic) and the welfare responsible (log of entries)
    - B42: authorized visitors are the person in charge, stablemen, two MVM 3 students on duty for animal care (different students each week: rotations are organized as to avoid students going in a risk area before visiting a pig herd), the welfare responsible and exceptionally technical services but under conditions[1] (log of entries)
    - B67: clients with their own pet pig
    - Feed suppliers usually travel from farm to farm; the risk is not null.

    The risk of introduction through contaminated footwear is low despite the presence of wild boar in the surrounding areas; Indeed, before entering the FVM pig herds, (B41 or B42), shoes are left outside and boots dedicated to the premises are worn (even over-shoes). It is strictly forbidden to enter with booties.
  - Introduction via contaminated feeds:
    - B41: all feed originates from the Moulin Georges (certified GMP feed for animals – ISO9001)
    - B42: concentrated feeds and others originate from the SCAR, QUARTES and SCHIPPERS companies.

    The risk associated with the use of feed (e.g. maize) produced in contaminated areas is difficult to estimate at this time but may possibly pose a risk given the resistance of the virus in the environment, and if it comes from areas where the disease is present in wild boars.
  - Introduction via contaminated litter (straw): the straw is the same as for all animals in the FVM. It is delivered by an intermediary of Bastogne who buys it in France (Department of the Meuse).

[24] Visitors must be accompanied by a staff member. The visitor log must be filled in on that occasion. It is strictly forbidden to visit any other pig farm or have contact with pigs within 72 hours following any direct or indirect contact with wild boar. During the preceding 72 hours, as well as during the week spent in the B42 Pig farm, visits of other pig farms or of the necropsy room are not allowed. All contacts with wild boar must be avoided.

The risk is estimated to be low (no description of straw contamination reported in the literature). In addition, straw is less palatable to wild boars.

- **Introduction to the necropsy room:**
  - Epidemic context:
    - Necropsy of a domestic pig (frequency: not more than once a month); if the animal comes from outside the FVM, it will be necropsied based on its history and if it is certified PPA-free (cf. chapter 12 and criteria to perform a necropsy).
    - Necropsy of a pig from B42 herd: very low risk
    - Necropsy of a wild boar: very high risk – **SINCE THE 2018 PPA OUTBREAK IN BELGIUM, WILD BOARS ARE NOT ALLOWED IN THE FVM NECROPSY ROOM; THEY ARE NECROPSIED IN THE FIELD**.
    - Necropsy of a suid coming from a zoo (no history in the FVM): risk low if it had no contact with wildlife.
    - Deposit of an infected wild boar, either in the refrigerated pit or in a cold room or in the outside fridge: the animal will not be necropsied but directly handled by Rendac (rendering plant).
  - Officially ASF-free status in wild boar and domestic pigs.
    - Necropsy of a domestic pig: very low risk
    - Necropsy of a pig from B42 herd: very low risk
    - Necropsy of a wild boar: low risk
    - Necropsy of a suid coming from a zoo: very low risk
    - Deposit of an infected wild boar, either in the refrigerated pit or in a cold room or in the outside fridge: low risk

17.2.4. Definitions of suspect and confirmed cases

- Live animal:
  - Suspect case: suspect clinical cases in ≥ 1 animal in the herd (cf. section 17.2.1.1.)
  - Confirmed case: confirmed after a diagnostic test performed in Sciensano
- Infected cadaver:
  - Suspect case: lesions suspected of ASF on a cadaver in the necropsy room (cf. section 17.2.1.1.)
  - Confirmed case: confirmed after a diagnostic test performed in Sciensano

17.2.5. Immediate management plan

17.2.5.1. Clinical suspicion in a live suid

- 3 possible scenarios but reporting to the sanitary authorities is mandatory.
  - A veterinarian or a veterinary student (MVM 2 or MVM 3) observes suspicious clinical signs, or a non-veterinary staff member observes an abnormality(s) on one or more animals of the B42 herd: the person who observed these signs refers directly to the herd manager, Dr. Martine Laitat. If the clinical suspicion is assessed, she directly notifies the FASFC Liège ULC by phone. She will also formally inform Dr Sandersen, head of the B41 herd and the CFB (biosecurity-fmv@lists.uliege.be). The information is also communicated to the BRRPZE Clinic (B67) and the Responsible of the necropsy area.
  - If the groom in charge of pigs housed in B41 finds an anomaly on ≥1 animals, she informs directly the herd manager, Dr. Sandersen. If Dr Sandersen observes any suspicious clinical signs, she will contact Dr Laitat directly for advice. If the suspicion is confirmed, Dr. Sandersen informs directly the ULC by phone and the CFB (biosecurity-fmv@lists.uliege.be). In the absence of Dr. Laitat, Dr. Sandersen will contact the ULC directly. The information is also communicated to the BRRPZE Clinic (B67) and the Responsible of the necropsy area.
  - If suspicious clinical signs are observed by a veterinarian in a pet pig coming for consultation at the BRRPZE clinic (B67), the vet informs directly the ULC by phone and the CFB (biosecurity-fmv@lists.uliege.be). Dr Laitat (responsible for the B42 pig herd) and Dr Sandersen (head of the B41 herd) will be informed immediately as well.

Liège Unité Local de Contrôle (ULC):
Parc d'affaires Zénobe Gramme (Bât. I), Square des Conduites d'eau, 5
B-4020 LIEGE, Belgique.
Tél: +32 4 224 59 11
Fax: +32 4 224 59 01
Info.LIE@afsca.be
Head of ULC = Pierre DENIS
Head of Primary production = Alexandra SCIPIONI
For a mandatory notification:
Tél.: +32 4 224 59 11
Fax: +32 4 224 59 01
Notif.LIE@afsca.be
Cell phone: +32 478 87 62 13 (Only in case of extreme urgency outside duty hours)

- Both herds managers will remain at the FASFC disposal to follow the inspectors' instructions.
- Additional measures are immediately implemented in the suspected herd, upon detection of the suspicion. One must not wait for the arrival of FASFC inspectors. Once the latter are on site, it is important to follow their instructions.
  - Infrastructures:
    - No access to the building or premises: immediate lockout
    - Poster on the door of the building (or room), which includes the following message:

    - Foot bath: use a 1% Virkon™ S solution (storage in B42 - MF Humblet – 0477 96 08 52; mfhumblet@liege.be).
    - Provide a sprayer containing a 1% Virkon™ S solution for the disinfection of vehicle wheels and low body trays.
  - Movements
    - People: no person entering the building/room who is not "essential" to basic animal care, thus are only allowed: 1) for B42: Dr Laitat and two stablemen and 2) for B41: Dr Sandersen and one stablewoman. These people will have, respectively, no contact with the other FVM herd or any other animal species at the FVM.
      Strict wearing of PPE and respect of herd entry/exit procedures.
    - Animals: movements are forbidden (standstill) => no animal can enter or leave both herds.
    - BRRPZE Clinic:
      - No pet pig can leave the clinic if suspicion in the B41 or B42 herd.
      - No animal can leave the clinic if suspicion in a pet pig during a consultation.
    - Dead animals: no exit from the building/premises until clear instructions sent by FASFC
    - Animal products (e.g. sperm): no exit from the building/room
    - Material and equipment: nothing leaves the building/room
    - Solid manure: no exit of the building/room
    - Waste: no exit of the building/room until clear instructions sent by FASFC
  - Animal census and movement tracking over the last 3 weeks:
    - Animals: make available to the FASFC the entry-exit register, and all that is necessary for the census of animals
    - Persons: make the visitor register available to FASFC to trace movements of people

- At the FVM scale, if a herd is confirmed as infected and demarcation of a focus area:
    - Activities of the other pig herd:
        - Standstill and prohibition of all exits (animals, effluents, material, seed)
        - If the B41 herd is infected: activities and farm visits of the Porcine Clinic (B42) will be stopped.
    - BRRPZE clinic: cancellation of all planned consultations: no pig can be admitted in the clinic until further notice.
    - Access of vehicles:
        - Installation of wheel baths filled with a 1%-Virkon™ S disinfecting solution, for access to the two pig herds (entrance of the road to B42 courtyard and near the B41 roundabout)
        - Access to the B42 courtyard restricted to vehicles strictly necessary for the proper management of the clinic of ruminants, with mandatory passage through the wheel bath (e.g.: tractor for hay and straw supply).
        - Cleaning and disinfection (1%-Virkon™ S solution) of the wheels and underbody of any authorized vehicle and tractor after each passage in the yard (provide material/ equipment - sprayer).
    - Posting at the various entries of the FVM site: posters available at the secretariat of the Ruminants-Swine pole for the B42 herd and from C. Sandersen for the B41 herd.
    - Cleaning and disinfection of premises, after stamping out (if required): follow FASFC instructions

17.2.5.2. Presence of suspect lesions on a dead animal

- Presence of suspect lesions on a dead animal => mandatory reporting
    - Suspicious lesions in a wild boar in the necropsy room: **WILD BOARS ARE NO LONGER AUTHORIZED IN THE FVM NECROPSY ROOM. THEY ARE NECROPSIED DIRECTLY IN THE FIELD.**
    - Suspicious lesions in a domestic pig: if suspicious lesions are observed during the necropsy of a domestic pig, executives of the Pathology Department will be called for confirmation.
- Measures to be implemented immediately in the necropsy area: if the suspicion is assessed, the Liège ULC will be notified (see section17.2.1.5.). The staff will remain available to the inspectors (or will be recalled if necessary) and will comply with their instructions for decontamination of premises, and surroundings (external environment). The CFB will be immediately notified by email (biosecurity-fmv@lists.uliege.be). Dr Laitat (responsible for the B42 herd), and Dr Sandersen (head of the B41 herd) will be informed immediately as well as the BRRPZE Clinic (B67).
    - Infrastructures
        - Posting on doors accessing the necropsy room:

        - Demarcation of a buffer zone for the non-circulation of persons and vehicles around the rear area of B43a (demarcation by a tape), and areas potentially contaminated upon dead body deposit
        - Use of 1%-Virkon™ S solution in the foot bath.
    - Movements
        - Absolute restriction of all movements of people in the necropsy room, announcing a forecast duration of 96 hours by the Pathology executives.
        - The Department truck will be immobilized.

    - Rendac (rendering plant) will be immediately informed.
    - The access to the refrigerated pit, cold chambers et outside fridge box will be immediately prohibited to avoid the deposit of other dead animal bodies.
    - The list of people who took part in the necropsy and were in the necropsy room at the time of the animal's necropsy will be made available to FASFC (cf. register of entries/exits).
    - A spray containing 1%-Virkon™ S solution will be made available for the disinfection of wheels and lower parts of vehicles that are expected to leave the area.
- Equipment, material, other animal carcasses, various waste
    - **NOTHING** will be taken out of the necropsy room before the arrival of FASFC inspectors; everything is considered as potentially contaminated => follow FASFC instructions.
    - Single-use PPE will be disposed of in yellow waste containers that will be stored in the area until collection (post-decontamination of the outer part of the container via spraying with a 1%-Virkon S solution), according to FASFC instructions.
- Measures to be implemented in both pig herds of the FVM (B41 and B42): cf. section 17.3.5.1. for live pigs and follow FASFC instructions.
- Measures concerning the whole FVM
    - Any deposit of cadavers will be prohibited in the necropsy area (necropsy room, refrigerated pit, cold rooms and fridge box) until further notice (confirmation or not of suspicion).
    - If the suspicion is confirmed, the evacuation cadavers from the clinics will be considered as follows:
        - Large animals (horses, ruminants and large dogs):
            - Temporary storage in the B41 cold chamber then collection directly on site
            - Either solicitation of Arsia for collection of horses and ruminants
        - Small companion animals (small dogs, cats, exotic pets): evacuation in 60L-yellow waste containers.
    - Following the suspicion, the measures implemented at the FVM level will be communicated to the whole staff (email) by the CFB, as the procedure of carcass disposal will be impacted if the suspicion is in the necropsy room.

17.2.6. Communication

- Designation of a **reference point with the FASFC**:
    - Necropsy: Head of Pathology Department
    - B41 pig herd: C. Sandersen
    - B42 pig herd: M. Laitat
    - BRRPZE clinic: D. Alarcón
- Communication as soon as there is a **suspicion**:
    1) Immediate notification to the **CFB**: the person in charge of the infected herd/necropsy area will inform the CFB upon suspicion (biosecurity-fmv@lists.uliege.be) (logistician in biosecurity : 0477 96 08 52 - mfhumblet@uliege.be)
    2) The CFB will immediately notify other **FVM staff involved with pigs**, i.e. B41 and B42 pig herds and BRRPZE clinic (see above)
    3) The CFB will inform the following on the measures implemented after the suspicion (email):
        - FVM **staff and potentially concerned students**
        - ULiège technical services (**ARI**): the **PCA** (*poste central d'alarme* – Central Alarm – 94 366 44 44) will be informed as fast as possible. It will dispatch the information and alert the relevant ARI services (security, maintenance of premises and forest/streets).
- Once the **outbreak is confirmed**:
    - The President of the CFB will inform the whole **Faculty community** via *ad hoc* diffusion mailing lists. The email will specify: the reason for the measures, the different measures implemented in the whole FVM and the provisional duration of their implementation, and the point of reference (cf. above) for any question.

- If it is agreed that a **Crisis Cell** is set up in the FVM, this will have to bring together: the sector concerned (M. Laitat), the Dean, the CFB president, the biosecurity logistician, the president of the biosafety committee (lab aspects) and a ULiège person who makes the link with the institution's crisis-management unit. The CFB president is proposed as the local crisis manager.
- The CFB will inform **ULiège technical services** (see above).
- All interlocutors will follow the instructions of FASFC inspectors.

17.2.7. If a wild boar is found on or near the RFM site

- In the context of a non-officially free status, i.e. if outbreaks occur in wildlife and/or domestic pigs, the procedure related to the finding of a dead wild boar will be followed[25].
- Wild boars that would need to be euthanized (e.g. after a road accident) will be taken care of by a DNF agent who will perform euthanasia and then evacuate the carcass to the rendering enclosure following biosecurity instructions.

17.2.8. Final provisions

- This crisis scenario must be distributed to all potentially concerned staff and must be left in paper version at *ad hoc* strategic locations, among others: B42 anteroom, B41 anteroom, BRRPZ clinic (B67) and necropsy room (laminated form).
- Once the **suspicion** is **lifted**:
  - Additional measures in place will be withdrawn.
  - Communication: the same interlocutors will be informed of the lifting, i.e. all sectors working with pigs, FVM staff and students, as well as ULiège PCA (to communicate to technical services).

17.3. Foot and Mouth Disease

Currently under preparation

17.4. Leptospirosis

Currently under preparation

17.5. Feline Hypervirulent Calicivirosis - FVM operational scenario

17.5.1. Virulent systemic feline calicivirus (VS-FCV)

- **Virus**: calicivirus, family *Caliciviridae*, genus *Vesivirus*; non-enveloped mRNA virus => systemic virulent form (systemic feline virulent calicivirus or VS-FCV). The disease is caused by variants of classical FCV (different strains – mutations specific to each outbreak)
- **Host spectrum**: cats and other felids
- **Geographical distribution**: worldwide
- **Incubation:** 1 to 12 days (Hurley & Sykes 2003). Incubation is generally short, between 2 and 5 days. However, incubation periods of up to 12 days are reported. After nosocomial exposure, incubation time is usually 1-5 days (Hurley and Sykes, 2003).
- **Infectious material**: oral, nasal and ocular secretions. The virus is also excreted from skin lesions and can be detected in blood, urine and faeces. After recovery, many cats continue to excrete the virus, on average for 30 days post-infection, sometimes even several years! (Wardley 1976). Aerosol spread was highlighted in rooms housing excretory cats (Spiri et al 2019).
- **Modes of contamination**: direct or indirect contact (environment, equipment, health care personnel [hands, clothing], etc.) with secretions from acutely infected cats or chronic carriers.

[25] https://www.wallonie.be/fr/peste-porcine-africaine# (in French)

- **Virus entry routes**: nasal, oral or conjunctival mucous membranes
- **Transmission**: contagiousness +++
- **Survival outside the host**:
  - The virus survives in the environment and remains infectious for up to 1 month on dry surfaces, at room temperature (20°C), or even longer under colder conditions (Doultree et al 1999; Duizer et al 2004; Clay et al 2006).
  - The virus can remain infectious for up to 8 days in flea droppings (Mencke et al 2009).
- **Resistance to physical agents**: heat resistant – inactivated by heating to 60°C for 30 minutes.
- **Susceptibility to chemicals and disinfectants**:
  - Resistant to many conventional disinfectants, i.e. chlorhexidine, QAC's (quaternary ammonium compounds)
  - Inactivated by 5% sodium hypochlorite (bleach) and pentapotassium bis(peroxymonosulphate) bis(sulphate) (Virkon™ S) as well as 7% hydrogen peroxide vapour (Zonta, 2016)
  - Disinfection of potentially contaminated clothing:
    - Machine-wash at 60°C for at least 1 hour
    - Adding bleach instead of fabric softener for any garment that does not support a T°C of 60°C
- **Pathogenesis**: VS-FCV is responsible for a systemic disease, with severe systemic inflammatory syndrome, disseminated intravascular coagulation and multi-visceral failure with frequent mortality (Radford et al 2009).
- **Clinical signs:**
  - Classical FCV infection
    - **Acute** clinical signs of upper respiratory tract and oral cavity involvement
      - Oral ulcerations [especially tongue], sneezing and serous nasal ejection [Gaskell et al., 2006],
      - Fever, anorexia (sometimes hypersalivation)
      - Sometimes pneumonia in severe cases (especially young kittens) => dyspnea, cough, fever and depression are possible.
      - Sometimes transient acute lameness with possible fever, usually a few days/weeks after acute oral or respiratory signs (Pedersen et al., 1983; Bennett et al., 1989; Ter Wee et al., 1997).
    - Signs of **chronic** infection: chronic stomatitis (virus isolated from almost all cats with the chronic gingivitis/lymphoplasmocytis stomatitis complex => severe proliferative/ulcerative infection of the back of the throat [exact roles of FCV?])
  - Systemic feline calicivirosis (VS-FCV) ~ haemorrhagic fever (Pedersen et al, 2000; Schorr-Evans et al., 2003) with variable clinical signs
    - Early signs are often typical of acute upper respiratory disease.
    - General signs: depression, anorexia and hyperthermia
    - Characteristic signs (Hurley and Sykes 2003; Coyne et al. 2006):
      - Skin oedema – especially head and paws
      - Ulcerative lesions of skin and paws
      - Possible lesions, ulcers and alopecia on the nose, lips and ears, around the eyes and on the pads + oral
      - Common jaundice (liver necrosis) (Coyne et al 2006a; Meyer et al 2011; Reynolds et al 2009), whether associated with anaemia (Battilani et al 2013; Meyer et al 2011)
      - Sometimes severe respiratory distress (pulmonary oedema)
      - Thromboembolism and coagulopathy (disseminated intravascular coagulation) possible => petechiae, bruises, epistaxis and bloody faeces
      - Signs of vasculitis
- **Epidemiology**:
  - At-risk populations: groups of cats housed together (Radford et al 2009)
  - More severe disease in adults than in kittens

- High lethality => up to 67% (Radford et al 2009; Pedersen et al 2000; Hurley and Sykes, 2003; Schorr-Evans et al 2003; Coyne et al 2006; Foley et al 2006)
- Vaccination is not protective (Hurley and Sykes, 2003)

- **Lesions**:
  - Ulcers:
    - Oral cavity: especially dorsal face of the tongue > hard palate and gums > nasal cavity, ear pavilions and non-glabrous skin
    - Cutaneous
    - Legs: circumferential hyperaemia at the junction between non-glabrous skin and pads or ulcers on the entire pad.
  - Subcutaneous oedema, especially in the face and limbs (Hurley et al 2004; Meyer et al 2011; Pedersen et al 2000)
  - Hepatomegaly (Stévenin, 2009)
  - Necrosis in liver, spleen, pancreas and endothelial cells (Jolivet 2017).
  - Haemorrhagic foci in many organs and tissues: per-pancreatic fat (Pedersen et al 2000), pancreas (Meyer et al 2011), pulmonary alveoli (Coyne et al 2006a), sub-capsular spleen and kidneys (Schulz et al 2011) and even brain (Battilani et al 2013)
  - Vascular lesions predominantly in lung, spleen and pancreas
  - Pulmonary oedema (Pesavento et al 2004), congestion and atelectasis (Pedersen et al 2000; Reynolds et al 2009)
  - Pleural, abdominal (and sometimes pericardial) sero-haemorrhagic effusion (Pesavento et al 2004; Hurley et al 2004; Pedersen et al 2000; Reynolds et al 2009; Schulz et al 2011, Battilani et al 2013; Meyer et al 2011)
- **Diagnostic**:
  - No specific signature of the VS-FCV => blood collection (PS) on an EDTA tube in at least 3 animals => if all have a 'calicivirus' viraemia associated with systemic virulence and a corresponding clinical picture, it is very suggestive of a VS-FCV.
  - Couple to mouthwash swabs (additional information but not sufficient).
  - Only confirmation by laboratory diagnosis: sending samples to the Pathology laboratory (M.-M. Garigliany) for sequencing of the hypervariable zone of the gene coding for the viral capsid => it will be called an epidemic if there is analogy in at least 3 animals.

  The diagnostic of virulent systemic feline calicivirosis relies on the combination of:
  - Clinical signs typical of a virulent systemic disease including a systemic infection and the involvement of several organs.
  - Occurrence in a "feline community" (cohabitation of several cats)
  - High contagiousness – epidemic dissemination
  - High lethality rate
  - Isolation of the same FCV strain from blood sample, oropharyngeal swabs or cutaneous scraping of ulcerative lesions in several cats established by sequencing hypervariable regions of the gene coding for the capsid.
- Effectiveness of vaccination:
  - Reduces or prevents clinical expression of the chronic form, but does not prevent infection, carry or excretion of the virus (Coyne et al 2006; Schorr-Evans et al 2003).
  - Vaccines: either live attenuated or inactivated adjuvanted
  - No effect on VS-FCV
  - The oldness of the strain and the number of strains used influence efficacy.

17.5.2. Epidemiological situation of the disease in 2025

- Regular epidemics are reported worldwide, for example in the USA (Pedersen et al 2000; Hurley and Sykes 2003; Schorr-Evans et al 2003; Hurley et al 2004; Pesavento et al 2004), in Europe (UK [Coyne et al., 2006], France [Reynolds et al. 2009; Deschamps et al. 2015], Germany [Schulz et al. 2011],

Italy [Battilani et al. 2013; Caringella et al. 2019; Lanave et al. 2023], Spain [Velasco et al. 2013], Belgium (Billen, personal communication), Republic of Ireland [Duclos et al 2024]), as well as in Australia (Bordicchia et al 2021) and China (Wang et al 2021).

17.5.3. Potential pathways of introduction in the Small Animal hospital and associated risks

- **Via an excreting feline patient** (patient with clinical signs or asymptomatic carrier): risk of introduction of VS-FCV impossible to estimate; vaccination against conventional FCV is not protective. An epidemiological context at risk and a patient living in a community (e.g. shelter) represent a risk.
- **Through indirect contact - via the introduction of equipment/clothing contaminated with infective secretions from an excretory cat (e.g. shelter, etc.)**: information must be provided on the risk associated with the introduction of contaminated material (clothing, etc.) for any staff member/student who has (a) cat(s) at home and has been in a clinic or shelter
  For SAH clients/cat owners: the risk is higher if the cat comes from a community.
- **By indirect contact - after autopsy of an excretory cat**: for example, a student gets infected during the necropsy of a cat and is thereafter in contact with a cat in the SAH => very low risk given the use of single-use PPE when performing necropsies and hand hygiene procedures to be followed upon leaving.

17.5.4. Crisis management

- Adapted from Olivier (2017).
- Three steps:
  - Epidemic-clinical surveillance
  - Crisis:
    - Pre-alert = suspicion
    - Alert = case confirmation

17.5.4.1. Epidemic-clinical surveillance

- Continuous and permanent health surveillance to detect signs of a contagious disease (staff and students!) – on what basis?
- Clinical picture:
  - Most suggestive clinical signs:
    - Inflammatory oedema of the face and limbs
    - Acute ulcerative dermatitis followed by crusting and alopecia of the face (nasal planum, lips, periocular region and ears) and limbs (in relation to oedema areas and on the pads).
  - Other atypical signs: dyspnoea, vomiting, jaundice, diarrhoea and bleeding, vasculitis, pancreatitis, liver necrosis and pneumonia
  - If fever: severe and general condition strongly altered
  - Sometimes rhinitis and erosions/ulcerations of mucous membranes
- Epidemiological context at risk: direct or indirect contact with an environment prompt to the emergence of VS-FCV => shelter and animal protection activity involving cats, free cat colonies, veterinary structures and activities, etc.

17.5.4.2. Suspicion (pre-alert)

- If a cat presents the following clinical signs, i.e. fever, oedema of face and limbs, coryza-like respiratory signs or jaundice, and/or epidemiological (see section 17.5.4.1.), the veterinarian or the student responsible for the patient informs immediately the responsible clinician.
- To avoid any risk of contamination:

- Bring the suspect patient directly into the class 4 isolation unit (UI) (direct access from outside or "IN" anteroom), after the owner presents at the reception desk **WITHOUT** the patient (remaining in the vehicle), to prevent them from transiting through the entire building.
- **Restriction of the suspect animal's movements**: if the cat's general condition allows it, the owner returns home with it; otherwise, IU and class 4 measures.
- In the consultation room: **blood sampling** (EDTA tube) sent to Pathology as soon as possible for virus screening by PCR and sequencing (notify the department in advance of sample arrival) – analysis at owner's expense.
- According to **clinical examination**:
  - 1st option: the cat goes back home with the owner => home containment for 12 days, absolutely no contact with other cats + no contact of the owner with another cat.
  - 2nd option: hospitalization of the cat required => IU (class 4):
    - Poster on the cage "*Suspicion of VS-Feline calicivirus*" (Appendix 5)
    - Adapted PPE, foot mat, restriction of people movements, designation and information of students in charge of the patient.
- **Decontamination of staff** who has been **in contact** with the suspect patient (discard single-use PPE in yellow containers for B2 waste followed by hand washing and disinfection + care of potentially contaminated laundry (recommendations in section 17.5.1.)
- **Identification of potentially contaminated areas** (route taken by the patient since its arrival) => identification and display on the premises concerned ('*areas to be decontaminated – suspected case of systemic feline virus calicivirus infection*' - Appendix 6)
- **Preventive decontamination** by technical staff of **potentially contaminated areas** – give preference to bleach or Virkon™ S (Appendices 7-9). The FVM stock of Virkon™ S is located at B42:
  - MF Humblet - 0477 96 08 52; mfhumblet@liege.be or
  - FVM logistical unit – Nicolas Ochelen – 4111 / nochelen@uliege.be – or Carmelo Zicari – 3179 / czicari@uliege.be) – general email address : cellule.logistique.fmv@uliege.be
- **Internal information** within the SAH and to students who have been in contact with the patient (see message template in Appendix 10), by copying the **CFB** (email sent to: biosecurity-fmv@lists.uliege.be) (Biosecurity Logistician: 0477 96 08 52 - mfhumblet@uliege.be) + explain the next steps.
- **Census of the cats that have frequented the SAH** since the arrival of the suspect cat (if it is necessary to contact all owners of cats who have an epidemiological link [potential secondary cases]).

- PCR result:
  - Positive => confirmation phase
  - Negative:
    - If the responsible clinician confirms there is no infection, suspicion is lifted
    - If the responsible clinician maintains the suspicion, the cat will remain in the IU (class 4) with reinforced health surveillance (especially for animals that came to the SAH during the period of risk).

17.5.4.3. Confirmation of the case (alert)

- Maintenance of preventive measures and management of potential secondary cases:
  - **Inform the cat's owner** of the result
  - If the patient is hospitalized, adapt the **signage on the isolation cage** => '*Confirmed case of VS-FCV infection or clinical signs strongly suggestive EXCLUSIVELY*' (Appendix 11)
  - **Internal communication within the SAH** and to **students** who have been in contact with the patient, with a copy to the **CFB** (email sent to: biosecurity-fmv@lists.uliege.be) (Logistician in Biosecurity: 0477 96 08 52 - mfhumblet@uliege.be).
  - **Individual email sent to the owners of exposed cats** (list established during the suspicion phase) (Appendices 12a and 12b) by the SAH secretariat; these are the cats that attended the

SAH between the arrival of the primary case and the disinfection measures, either hospitalized or seen in consultation (outpatients). This letter states:
    - Diagnostic of a contagious viral disease in cats only
    - How to contact the SAH if the owner observes unusual signs in his/her animal
    - Suggestive clinical signs
- Activation of a **phone line** dedicated to the owners (04 242 75 23 [9:00 to 17:00] and organization of a rotation for the handling of calls.
- **Other hospitalized patients**:
    - Return to home as soon as possible for feline patients who have had no contact (direct or indirect[26]) with patient 0, with information to owners: containment for 12 days and no contact with other cats. The owner will avoid all contacts with other cats.
    - Health surveillance of other hospitalized cats, if their condition does not allow them to return home.
    - Importance of care order ('*marche en avant*') => sick cats will be treated the last.
- If an owner detects any **suspicious clinical signs** in her/his cat, she/he will be called for examination in a room dedicated to suspicions.
- Opening of a **consultation room dedicated to suspicions** (located in the BRRPZE area of the hospital, close to the IU), for examination of any outpatient with suspicious clinical signs:
    - Notice on door: '*Consultations of suspicions of Feline Calicivirus EXCLUSIVELY*' (Appendix 13).
    - Systematic blood sampling for PCR (costs covered by the SAH) and sequencing at the Pathology department (contact: M.-M. Garigliany)
    - Equipment used in the room deposited in a specific container for strict cleaning and disinfection
    - Consumables disposed of in a yellow container for B2 waste
    - After clinical examination, and based on the opinion of the responsible clinician
        - Either the patient returns home
        - Either the patient is hospitalized (at the expense of the SAH)
            - ✓ In the IU + posting on the cage of the 'suspect' status ('*Strong suspicion of infection by Virulent systemic feline calicivirus*') (Appendix 14)
            - ✓ In cages located in medium care (absence of cats and separation is easy) – posting: '*Suspicion of infection by virulent systemic feline calicivirus EXCLUSIVELY*' (Appendix 15)
- Reinforcement of disinfection activities with registering of operations (paper format)
- Information to SAH staff members, students and CFB on the new suspicion (email sent to biosecurity-fmv@lists.uliege.be) (Logistician in Biosecurity: 0477 96 08 52 - mfhumblet@uliege.be).
- Information to the referring veterinarian, if necessary, and to the surrounding veterinary structures.

- If secondary cases are confirmed, and on the advice of the ICU head clinician (currently K. Gommeren) (depending on their number and the level of virus pathogenicity), feline consultations may be ordered to stop. In this case:
    - Communication to the SAH, students and CFB (email sent to: biosecurity-fmv@lists.uliege.be) + information on the evolution of the situation.
    - Cancellation of appointments, individually, by the secretariat (for a minimum of 12 days for confirmed cases, or until confirmation/invalidation of suspected cases if tests are performed)
    - Feline emergencies: managed on a case-by-case basis, as advised by the clinician in charge.

[26] No direct or indirect contact: no crossing of traffic flows, no attendance of the same premises, patients housed in a different unit, not the same people in contact and no material sharing)

- Airborne decontamination with hydrogen peroxide – Nocospray® [Medtradex]) – of potentially contaminated premises => contact SUPHT (04 366 22 47; supht@uliege.be).

17.5.4.4. End of the crisis

- The crisis is over from the date when the following 3 elements are met:
  - No contaminated animals present in the hospital
  - Disinfection completed
  - The maximum incubation time (12 days) of the last infected animal in the SAH is over

17.5.5. Definition of cases – suspected – confirmed – epidemic

- Suspected case = cat for which blood is sent to the lab for PCR.
- Confirmed case = evocating clinical and/or biological signs + viraemia (positive RT-PCR)
- Outbreak/Epidemic = positive RT-PCR + analogy when sequencing the hypervariable region of the gene coding for viral capsid **in AT LEAST 3 cats**

17.5.6. Communication

17.5.6.1. Designation of a reference point for the CFB

- Head of Emergency and ICU (Dr Kris Gommeren – phone: +32 4 366 42 00 - kris.gommeren@uliege.be)

17.5.6.2. Notification to the Faculty Biosecurity Unit (CFB)

- The clinician responsible informs the CFB (biosecurity-fmv@lists.uliege.be) (Logistician in Biosecurity: 0477 96 08 52 - mfhumblet@uliege.be):
  - On suspicion
  - Upon confirmation/removal of suspicion
  - Upon suspicion of secondary cases
  - Upon confirmation of secondary cases and the decision to stop feline consultations
  - As soon as the crisis is over, and when feline consultations reopen.

17.5.6.3. Communication with the Small Animal Hospital community (staff and students)

- Once the case has been confirmed, the clinician in charge of ICU (currently K. Gommeren) will inform all those concerned via the *ad hoc* mailing lists. This email will specify:
  - The reason for implementing measures
  - The different measures applicable to the whole SAH (or even FVM), and the provisional duration of their implementation
  - The contact person (cf. above) for any questions

17.5.7. Final dispositions

- This crisis scenario must have been distributed to all potentially affected staff members and must be printed and left in the *ad hoc* strategic locations of the SAH (B67), including:
  - Anteroom of the SAH class 4 isolation unit
  - SAH Reception desk
- As soon as the suspicion is lifted, the additional measures in place will also be lifted.

17.6. Rabies

Currently under preparation

17.7. Highly pathogenic avian influenza (HPAI)

Currently under preparation

17.8. Equine influenza

Currently under preparation

17.9. Salmonellosis

Currently under preparation

17.10. Necropsy Room –Tuberculosis

Currently under preparation

Chapter 18.

FUTURE TASKS OF THE BIOSECURITY UNIT (CFB)

18. Future tasks of the Biosecurity Unit (CFB)

- The future tasks of the CFB will be the following:
  - Maintain the organization of 3 to 4 meetings per year
  - Implement a teaching programme on biosecurity in the FVM (technical staff and workers, etc.)
  - The implementation of Biosecurity SOPs applied to the FVM
  - The update of Biosecurity SOPs applied to the FVM
  - The organization of scheduled controls of hygiene in the clinics and isolation units (audits)
  - The evaluation of antibiotic use in the different clinics and bacterial resistance patterns over the years
  - The assessment of resistance to substances other than antibiotics, i.e. acaricides and pesticides
  - The consideration of new governmental laws
  - The consideration of new emerging infectious diseases in Europe and their impact on the Biosecurity SOPs applied to the FVM
  - The establishment of additional crisis scenarios for containment of reportable epidemic and/or zoonotic diseases

References

Abramides et al (2011) Effectiveness of a multiple intervention strategy for the control of the tiger mosquito (*Aedes albopictus*) in Spain. Trans R Soc Trop Med Hyg 105:281-8.

Alberta Ministry of Agriculture and Forestry (Canada), Expert Committee on Arthropod Pests of Animals (1993) Black Fly Control. Available at: http://www1.agric.gov.ab.ca/%24department/deptdocs.nsf/all/agdex3321.

Alphey et al (2010) Sterile-insect methods for control of mosquito-borne diseases: an analysis. Vector Borne Zoonotic Dis 10:295-311.

Amass & Baysinger (2006) Swine disease transmission and prevention. In: Straw, Zimmerman, D'Allaire & Taylor, Eds. Diseases of Swine, Ames, Iowa, USA. Blackwell Publishing, pp. 1075-1098.

American Mosquito Control Association (AMCA) (2017) Best practices for integrated mosquito management: a focused update. 60 pp.

American National Standards Institute Inc. / Association for the Advancement of Medical Instrumentation (2009) ANSI/AAMI ST65:2008/(R) 2013 – Processing of reusable surgical textiles for use in healthcare facilities.

Anonymous (1994) Decree of the Walloon Government on bird protection in Wallonia. Available at: https://www.aves.be/index.php?id=1923.

Anonymous (2002) Decree of the Walloon Government determining sectorial conditions relative to contained use of genetically modified organisms or pathogens. Available at: https://www.biosafety.be/sites/default/files/rw_cu_2002.pdf.

Anonymous (2004) March 19, 2004 – Royal Decree on the control of African swine fever. Available at: http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&table_name=loi&cn=2004031939 [in French].

Anonymous (2014) February 3, 2014 – Royal Decree designating the animal diseases subject to the application of chapter III of the law of 24 March 1987 on animal health and regulating the compulsory declaration (http://www.etaamb.be/fr/arrete-royal-du-03-fevrier-2014_n2014024064.html) [in French]

Ansari et al (2014) Insecticides: impact on the environment and human health. In: Malik, Grohmann & Akhtar, Eds. Environmental deterioration and human health – natural and anthropogenic determinants. Springer Ed., pp. 99-123.

Apperson & Waldvogel (2005) Black flies and their control. NC State Extension Publications. Available at: https://content.ces.ncsu.edu/black-flies-and-their-control.

Armed Forces Pest Management Board (2016) Pest Management Operations in Medical Treatment Facilities – Technical Guide No.20. Available at: https://www.acq.osd.mil/eie/afpmb/docs/techguides/tg20.pdf.

Avian Enterprises (2019) How to Protect Your Farm Buildings From Birds? Available at: https://aviancontrolinc.com/how-to-get-birds-out-of-farm-buildings/.

Backhans & Fellström (2012) Rodents on pig and chicken farms – a potential threat to human and animal health. Infect Ecol Epidemiol 2 doi:10.3402/iee.v2i0.17093.

Baker et al (1997) Rodent-Proof Construction and Exclusion Methods – the handbook prevention and control of wildlife damage. 27, B137-B150. Available at: https://digitalcommons.unl.edu/cgi/viewcontent.cgi?referer=https://www.google.be/&httpsredir=1&article=1025&context=icwdmhandbook.

Baldacchino et al (2013) Transmission of pathogens by *Stomoxys* flies (Diptera, Muscidae): a review. Parasite 20:26.

Battilani et al (2013) Virulent feline calicivirus disease in a shelter in Italy: A case description. Research in Veterinary Science 95 (2013) 283–290. doi: 10.1016/j.rvsc.2013.01.025.

Becker, Petric', Zgomba, Boase, Dahl, Madon & Kaiser, Eds (2010) Mosquitoes and their Control – 2nd Edition. Ed. Springer-Verlag Berlin Heidelberg, 577 pp.

Belgian Biosafety Server (2024) Safety measures for the transport of GMOs and/or pathogens. Available at: https://www.biosafety.be/content/safety-measures-transport-gmos-andor-pathogens

Bennett et al (1989) Detection of feline calicivirus antigens in the joints of infected cats. Vet Rec 124(13), 329-332. doi: 10.1136/vr.124.13.329.

Bergmann et al (2019) Antibody response to feline calicivirus vaccination in healthy adult cats. Viruses 11(8): 702. doi: 10.3390/v11080702.

Bissinger & Roe (2010) Tick repellents: past, present and future. Pesticide Biochemistry and Physiology 96:63-79.

Bitam et al (2010) Fleas and flea-borne diseases. Int J Infect Dis 14:e667-76.

Black & Krafsur (1985). Use of sticky traps to investigate seasonal trends in the spatial distribution of house flies and stable flies (Diptera: Muscidae). J Med Entomol 22:550–557.

Bockmühl et al (2019) Laundry and textile hygiene in healthcare and beyond. Microb Cell 6(7):299-306. doi: 10.15698/mic2019.07.682.

Boland et al (2008) Case Study: impact of horn flies, *Haematobia irritans* (L.) (Diptera: Muscidae), on the behavior of beef steers. The Professional Animal Scientist 24:656-60.

Bordicchia et al (2021) Feline Calicivirus Virulent Systemic Disease: Clinical Epidemiology, Analysis of Viral Isolates and In Vitro Efficacy of Novel Antivirals in Australian Outbreaks. Viruses 13(10):2040. doi: 10.3390/v13102040.

Borg & Portelli (1999) Hospital laundry workers—An at-risk group for hepatitis A? Occup. Med. 49:448–450.

Boukraa et al (2013) Reintroduction of the invasive mosquito species *Aedes albopictus* in Belgium in July 2013. Parasite 20:1-3.

British Retail Consortium (2008) Best practice guideline – pest control. Available at: https://www.brcgs.com/media/638461/brc-bpg-pest-control-english-text.pdf

Brittingham & Falker (1999) Wildlife Damage Control: Controlling birds around farm buildings. Available at: https://extension.psu.edu/controlling-birds-around-farm-buildings.

Canada Plan Service. Rodent and Bird Control in Farm Buildings – Complete instructions. Available at : http://ablamb.ca/producer_mgmt/Setting-It-Up-Sheep-Infrastructure/3-Buildings-and-Penning/Other-Building-Considerations/3-13-Rodent-and-Bird-Control-in-Farm-Buildings-Plan.pdf.

Caringella et al (2019) Feline calicivirus infection in cats with virulent systemic disease, Italy. Res Vet Sci 12446-51. doi: 10.1016/j.rvsc.2019.02.008.

Caron & Losson (2014) Attaques massives de simulies et mort brutale [in French]. Veterinaria 3:34-36.

Carpenter et al (2008) Control techniques for Culicoides biting midges and their application in the U.K. and Northwestern Palaearctic. Med Vet Entomology 22:175-87.

Caveney, Jones & Ellis, Eds (2011) Chapter 13 – surgical textiles, linens and laundry. In Veterinary Infection Prevention and Control. John Wiley & Sons Livre 298 pp.

Centers for Disease Control and Prevention (2003) Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR 52 (No. RR-10):1-48. Available at: https://www.cdc.gov/infection-control/media/pdfs/Guideline-Environmental-H.pdf.

Centers for Disease Control and Prevention (CDC) (2017) Diseases directly transmitted by rodents. Available at: https://www.cdc.gov/rodents/diseases/direct.html.

Centers for Disease Control and Prevention (CDC) (2019) Preventing ticks in the yard. Available at: https://www.cdc.gov/ticks/avoid/in_the_yard.html.

Center for Food Security and Public Health (CFSPH) – Iowa State University (2023) Antimicrobial Spectrum of Disinfectant Classes. Available at: https://www.cfsph.iastate.edu/Disinfection/Assets/characteristics-of-selected-disinfectants.pdf

Center for Food Security and Public Health (CFSPH) – Iowa State University. Bird and rodent control measures. Available at: http://www.cfsph.iastate.edu/Infection_Control/Routes/English/general_bird_rodent_control.pdf.

Center for Food Security and Public Health (CFSPH) – Iowa State University. Biting midges control measures. Available at: http://www.cfsph.iastate.edu/Infection_Control/Routes/English/biting_midge_control.pdf.

Center for Food Security and Public Health (CFSPH) – Iowa State University. Fly control measures. Available at: http://www.cfsph.iastate.edu/BRMForProducers/English/RouteSpecificInformation/fly_control.pdf.

Center for Food Security and Public Health (CFSPH) – Iowa State University. Mosquito Control Measures. Available at http://www.cfsph.iastate.edu/Infection_Control/Routes/English/general_mosquito_control.pdf.

Cheng et al (2017) Seasonal Outbreak of Bacillus Bacteremia Associated With Contaminated Linen in Hong Kong. Clin Infect Dis 64(suppl_2):S91-S97. doi: 10.1093/cid/cix044.

Clay et al (2006) Survival on uncommon fomites of feline calicivirus, a surrogate of noroviruses. Am J Infect Control 34, 41-43. doi: 10.1016/j.ajic.2005.05.013.

College of Veterinary Medicine and Biomedical Sciences (Colorado State University) (2008) Biosecurity standard operation procedures (SOP). Available at: http://csuvets.colostate.edu/biosecurity/biosecurity_sop.pdf.

Conseil Supérieur d'Hygiène (2005) Recommandations en matière de traitement du linge des institutions de soins Available at: http://www.md.ucl.ac.be/didac/hosp/cours/linge2005.pdf.

Conseil Supérieur de la Santé (2018) CSS 9444 : recommandations en matière de gestion du textile dans les institutions de soins – révision des recommandations en matière de traitement du linge des institutions de soins aigus (CSS 8075). Available at: https://www.hgr-css.be/file/download/ba7ac2c8-8c61-4370-8c9f-5de5f771c8ed/Com4k2jXeJNHKY62Slcuda2nTUyNJv3zBmGGDbBE3Q3d.pdf).

Constable, Hinchlcliff, Done & Gruenberg, Eds (2016) Veterinary Medicine – a textbook of the diseases of cattle, horses, sheep, pigs and goats, 11th edition. Ed Saunders Ltd, 2278 pp.

Coyne et al (2006) Lethal outbreak of a disease associated with feline calicivirus infection in cats. Vet Rec 158, 544-550. doi: 10.1136/vr.158.16.544.

Damani (2012) Support services. In: Manual of infection prevention and control. 3rd edition. Oxford (United Kingdom): Oxford University Press; p. 327–47. Chapter 18.

Damiens et al (2014) Invasive process and repeated cross-sectional surveys of the mosquito *Aedes japonicus* japonicus establishment in Belgium. PLoS One 9:e89358. doi: 10.1371/journal.pone.0089358.

Dancer (2008) Importance of the environment in meticillin-resistant *Staphylococcus aureus* acquisition: the case for hospital cleaning. Lancet Infect Dis 8(2):101-13. doi: 10.1016/S1473-3099(07)70241-4.

Datta & Pridie (1960) An outbreak of infection with *Salmonella typhimurium* in a general hospital. J. Hyg. (London) 58:229–240.

Davies et al (2017) Survival of African swine fever in excretions from pigs experimentally infected with Georgia 2007/1 isolate. Transbound. Emerg. Dis. 64, 425-431. doi: 10.1111/tbed.12381.

Dawson et al (2001) A field trial to assess the effect of vaccination against feline herpesvirus, feline calicivirus and feline panleukopenia virus in 6-week-old kittens. J Feline Med Surg 3, 17-22. doi: 10.1053/jfms.2000.0154.

De Raat et al (2008) The effect of a topical insecticide containing permethrin on the number of Culicoides midges caught near horses with and without insect bite hypersensitivity in the Netherlands. Tijdschr Diergeneeskd 133:838-42.

Demeulemeester et al (2014) First interception of *Aedes* (Stegomyia) *albopictus* in Lucky bamboo shipments in Belgium. Journal of the European Mosquito Control Association 32:14-16.

Deschamps et al (2015) Nosocomial feline calicivirus-associated virulent systemic disease in a veterinary emergency and critical care unit in France. JFMS Open Rep 1(2):2055116915621581. doi: 10.1177/2055116915621581.

Dewulf & Van Immerseel, Eds (2018) Biosecurity in animal production and veterinary medicine: from principles to practice. Uitgeverij Acco, Leuven, Belgium. 528 pp.

Dohmae et al (2008) *Bacillus cereus* nosocomial infection from reused towels in Japan. J Hosp Infect 69:361-7. doi:10.1016/j.jhin.2008.04.014.

Doultree et al (1999) Inactivation of feline calicivirus, a Norwalk virus surrogate. J Hosp Infect 41, 51-57. doi: 10.1016/s0195-6701(99)90037-3.

Duclos et al (2024) Virulent systemic feline calicivirus infection: a case report and first description in Ireland. Ir Vet J 77(1):1. doi: 10.1186/s13620-024-00262-3.

Duizer et al (2004) Inactivation of caliciviruses. Appl Environ Microbiol 70, 4538-4543. doi: 10.1128/AEM.70.8.4538-4543.2004.

Dunn (2022) Linen: The New Frontier in Infection Control and Prevention. AORN J 115(4):310-324. doi: 10.1002/aorn.13643.

Durand et al. (2013) Identification of hotspots in the European Union for the introduction of four zoonotic arboviroses by live animal trade. PLoS One 8:e70000. doi: 10.1371/journal.pone.0070000.

Dvorak – Center for Food Security and Public Health, Iowa State University (2008) Disinfection 101. Available at: http://www.cfsph.iastate.edu/Disinfection/Assets/Disinfection101.pdf.

European Advisory Board on Cat Diseases (2009) Infection des voies respiratoires supérieures par le calicivirus félin – fiche maladie. Available at: https://www.abcdcatsvets.org/wp-content/uploads/2022/11/FACTSHEET_FCV_Feline_calicivirus_upper_respiratory_infection_2017_FR.pdf).

European Advisory Board on Cat Diseases (2017) ABCD Guidelines – Feline calicivirus infection. Available at: http://www.abcdcatsvets.org/feline-calicivirus-infection-2012-edition/.

European Scientific Counsel Companion Animal Parasites (ESCCAP) (2024) Control of Vector-Borne Diseases in Dogs and Cats – ESCCAP Guideline 05 Fifth Edition; 44 pp. Available at: https://www.esccap.org/uploads/docs/32ir16g1_0775_ESCCAP_Guideline_GL5_20241203_1p.pdf.

European Scientific Counsel Companion Animal Parasites (ESCCAP) France. *Dermacentor reticulatus*. Available at: https://www.esccap.fr/recherche-avancee/dermacentor-reticulatus.html.

European Centre for Disease Prevention and Control (ECDC) (2018) *Dermacentor reticulatus* – current known distribution: January 2018. Available at: https://ecdc.europa.eu/en/publications-data/dermacentor-reticulatus-current-known-distribution-january-2018.

European Centre for Disease Prevention and Control (ECDC) (2018) *Ixodes ricinus* – current know distribution: January 2018. Available at: https://ecdc.europa.eu/en/publications-data/ixodes-ricinus-current-known-distribution-january-2018.

Federal Agency for the Safety of the Food Chain (FASFC) (2018) African swine fever – technical card. Available at: https://favv-afsca.be/sites/default/files/2023-11/2014-09_FP_Pesteporcineafricaine_fr.pdf [in French]

FASFC Scientific Committee (2018) Rapid advice 16-2018 – Risk of spreading of African Swine Fever virus in wildlife and of introduction and spread in the Belgian pig farms. Available at: https://scicom.favv-afsca.be/comitescientifique/avis/2018/_documents/Avisrapide16-2018_SciCom2018-15_ASF.pdf [in French]

FASFC Scientific Committee (2019) Rapid advice 10-2019 – African swine fever: additional evaluation of the risk of introduction of ASF virus in pig holdings associated with the reopening of forest roads to hikers in zone II (wildlife infected by ASF) and evaluation of the measures implemented for the depopulation of wild boars. Available at: https://scicom.favv-afsca.be/comitescientifique/avis/2019/_documents/Avisrapide10-2019_SciCom2019-09_ASFsentiersforestiersetdepopulation.pdf [in French].

Fijan & Šostar Turk (2012) Hospital Textiles, Are They a Possible Vehicle for Healthcare-Associated Infections? Int. J. Environ. Res. Public Health 9: 3330-3343; doi:10.3390/ijerph9093330.

Foil & Hogsette (1994) Biology and control of tabanids, stable flies and horn flies. Rev Sci Tech OIE 13:1125-1158.

Foley et al (2006) Virulent systemic feline calicivirus infection: local cytokine modulation and contribution of viral mutants. J Feline Med Surg 8, 55-61. doi: 10.1016/j.jfms.2005.08.002.

Forth et al. (2017) Evaluation of blowfly larvae (Diptera: Calliphoridae) as possible reservoirs and mechanical vectors of African swine fever virus. Transbound Emerg Dis 65: e210-e213.

Friedman et al (2008) *Lawsonia intracellularis* in rodents from pig farms with the occurrence of porcine proliferative enteropathy. Lett Appl Microbiol 47:117-121. doi: 10.1111/j.1472-765X.2008.02394.x.

Frosth et al (2018) Potential Transmission of Bacteria, Including *Streptococcus equi* spp., between Stables via Visitors' Clothes. J Equine Vet Sci 71:71-74. doi:10.1016/j.jevs.2018.10.002.

Gallardo et al. (2018) Evolution in Europe of African swine fever genotype II viruses from highly to moderately virulent. Vet Microbiol 219:70-79. doi: 10.1016/j.vetmic.2018.04.001.

Gallardo et al (2019) Attenuated and non-haemadsorbing (non-HAD) genotype II African swine fever virus (ASFV) isolated in Europe, Latvia 2017. Transbound Emerg Dis doi: 10.1111/tbed.13132.

Garigliany et al (2019) Phylogeographic Analysis of African Swine Fever Virus, Western Europe, 2018. Emerg Infect Dis. 25:184-186. doi: 10.3201/eid2501.181535.

Gaskell & Dawson (1998) Feline respiratory disease. In: Infectious diseases of the dog and cat, Greene CE (Ed), WB Saunders Company, Philadelphia (USA), 97-106.

Gaskell et al (2006): Feline respiratory disease. In: Infectious diseases of the dog and cat, Greene CE (Ed), Saunders Elsevier, 145-154.

Gerba and Kennedy (2007) Enteric virus survival during household laundering and impact of disinfection with sodium hypochlorite. Appl Environ Microbiol 73:4425–4428. doi: 10.1128/AEM.00688-07.

Gerry et al (2011) Evaluation of surveillance methods for monitoring house fly abundance and activity on large commercial dairy operations. J Econ Entomol 104:1093-102. doi: 10.1603/ec10393.

Gibson & Torr (1999) Visual and olfactory responses of haematophagous Diptera to host stimuli. Med Vet Entomol 13:2–23.

Griffioen et al (2011) Culicoides species associated with sheep in the Netherlands and the effect of a permethrin insecticide. Vet J 190:230-5. doi: 10.1016/j.tvjl.2010.10.016.

Groupe de Travail Hirondelles (GTH) – Natagora (2018) '*Ici niche l'hirondelle rustique*' [in French] Available at : https://fileadmin.natagora.be/fileadmin/Hirondelles/pdf/panneau_hirondelle_rustique.pdf.

Hedin (1993) *Staphylococcus epidermidis* – Hospital epidemiology and the detection of methicillin resistance. Scand J Inf Dis 90:1-59.

Hofman-Lehmann et al (2022) Calicivirus Infection in Cats. Viruses 14(5):937. doi: 10.3390/v14050937.

Honisch et al (2014) Impact of wash cycle time, temperature and detergent formulation on the hygiene effectiveness of domestic laundering. J Appl Microbiol 117:1787–1797. doi: 10.1111/jam.12647.

Humblet et al (2017) Observations as a way to assess the compliance of veterinary students with biosecurity procedures. Rev Sci Tech. 36:767-777. doi: 10.20506/rst.36.3.2712.

Humblet et al (2020a) Integrated management of blood-feeding arthropods in veterinary teaching facilities - Part 1: overview of haematophagous arthropods of interest in North-western Europe. Rev Sci Tech 39(3):737-756. doi: 10.20506/rst.39.3.3175.

Humblet et al (2020b) Integrated management of blood-feeding arthropods in veterinary teaching facilities - Part 2: overview of control methods against adults and immature stages. Rev Sci Tech 39(3):757-777. doi: 10.20506/rst.39.3.3176.

Humblet et al (2020c) Integrated management of blood-feeding arthropods in veterinary teaching facilities - Part 3: proposal for a coherent and affordable control plan. Rev Sci Tech 39(3):779-793. doi: 10.20506/rst.39.3.3177.

Hurley & Sykes (2003) Update on feline calicivirus: new trends. Vet Clin Small Animal 33, 759–772. doi: 10.1016/s0195-5616(03)00025-1.

Hurley et al (2004) An outbreak of virulent systemic feline calicivirus disease. J Am Vet Med Assoc 224 : 241-9. doi: 10.2460/javma.2004.224.241.

Jolivet (2017) Calicivirus félin et immunité : intérêt et perspectives d'une vaccination muqueuse. Thèse. Available at: http://oatao.univ-toulouse.fr/19720/1/Jolivet_19720.pdf)

Jones (2007) Wild Bird Control – Why and how? Available at: http://www.thepoultrysite.com/articles/802/wild-bird-control-why-and-how/

Kampf (2020) How long can nosocomial pathogens survive on textiles? A systematic review. GMS Hyg Infect Control 15: Doc10. doi: 10.3205/dgkh000345.

Keeffe (2004) Occupational risk for hepatitis A: A literature-based analysis. J. Clin. Gastroenterol 38:440–448. doi: 10.1097/00004836-200405000-00010.

Keiding (1999) Review of the global status and recent development of insecticide resistance in field populations of the house fly, *Musca domestica* (Diptera: Muscidae). Bull Entomol Res 89 (Suppl. 1): S9-S67

Krinsky (1976) Animal disease agents transmitted by horse flies and deer flies (Diptera: Tabanidae) J Medical Entomol 13:225–275.

Lanave et al (2023) An Outbreak of Limping Syndrome Associated with Feline Calicivirus. Animals (Basel) 13(11):1778. doi: 10.3390/ani13111778.

Lang et al (2013) Rodent Control in Livestock and Poultry facilities, Ontario Ministry of agriculture, food and rural affairs. Available at: http://www.omafra.gov.on.ca/english/livestock/dairy/facts/13-057.htm.

Lappin et al (2002) Use of serologic tests to predict resistance to feline herpesvirus 1, feline calicivirus, and feline parvovirus infection in cats. J Am Vet Med Assoc 220 (1), 38-42. doi: 10.2460/javma.2002.220.38.

Lapuz et al (2008) The role of roof rats (Rattus rattus) in the spread of *Salmonella* Enteritidis and *Salmonella* Infantis contamination in layer farms in easter Japan. Epidemiol Infect 136:1235-1243. doi: 10.1017/S095026880700948X.

Lapuz et al (2012) Comparison of the prevalence of Samonella infection in layer hens from commercial layer farms with high and low rodent densities. Avian Dis. 56:29-34. doi: 10.1637/9704-030711-Reg.1.

Lawler & Lanzaro (Dept. of Entomology, UCLA) (2005) Managing mosquitoes on the farm. ANR (Division of Agriculture and Natural Resources) Publication 8158, 19 pp. Available at: https://anrcatalog.ucanr.edu/pdf/8158.pdf.

Linton et al (1987) Disinfection in veterinary and farm practice. Blackwell Scientific Publications: Oxford, 179 p.

Lysyk (1995) Temperature and population density effects on feeding activity of *Stomoxys calcitrans* (Diptera: Muscidae) on cattle. J Med Entomol. 32:508-14.

McLean (1994) Wildlife diseases and humans. The Handbook: Prevention and Control of Wildlife Damage. Available at: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1036&context=icwdmhandbook.

Mahnel (1977) Studies on inactivation of viruses in drinking and surface water. A contribution to the decontamination of water by field methods [author's translation]. Zentralbl Bakteriol Orig B 1165:527-538.

Marsilio et al (2005) A novel nested PCR for the diagnosis of calicivirus infections in the cat. Vet Microbiol 105, 1-7. doi: 10.1016/j.vetmic.2004.09.017.

Maurice (2015) Les caliciviroses hypervirulentes : étude épidémiologique, clinique et virologique chez le chat et le lapin. Thèse ENVA. Available at: https://theses.vet-alfort.fr/telecharger.php?id=1904).

Medlock et al (2012) A review of the invasive mosquitoes in Europe: ecology, public health risks, and control options. Vector-borne and zoonotic diseases 12:435-447.

Meiswinkel et al (2000) Stabling and the protection of horses from Culicoides bolitinos (Diptera: Ceratopogonidae), a recently identified vector of African horse sickness. Bull Entomol Res 90:509-15. doi: 10.1017/s0007485300000626.

Mellor et al (2000) Culicoides biting midges: their role as arbovirus vectors. Annu. Rev. Entomol. 45:307-40.

Mencke et al (2009) Transmission of feline calicivirus via the cat flea (Ctenocephalides felis). Parasitol Res 105(1), 185-189. doi: 10.1007/s00436-009-1381-5.

Meyer et al (2011) Feline calicivirus-associated virulent systemic disease: not necessarily a local epizootic problem. Vet Rec 168:589. doi: 10.1136/vr.d160.

Morley et al (2015) Infection Control and Biosecurity Standard Operation Procedures (SOP) James L. Voss Veterinary Teaching Hospital (JLV-VTH); Available at: http://csu-cvmbs.colostate.edu/Documents/biosecurity-sop.pdf.

Mullen & Durden, Eds (2009) Medical and Veterinary Entomology – 2nd Edition. Academic Press, Elsevier Inc. All, 637 pp.

Mullens et al (2001) Failure of a permethrin treatment regime to protect cattle against bluetongue virus. J Med Entomol 38:760-2. doi: 10.1603/0022-2585-38.5.760.

Mullens et al (2006) Behavioural responses of dairy cattle to the stable fly, *Stomoxys calcitrans*, in an open field environment. Med Vet Entomol 20: 122-37. doi: 10.1111/j.1365-2915.2006.00608.x.

Mullens et al (2010) Field studies on Culicoides (Diptera: Ceratopogonidae) activity and response to deltamethrin applications to sheep in northeastern Spain. J Med Entomol 47:106-10. doi: 10.1603/033.047.0115.

Mullens et al (2017) Field trials of fatty acids and geraniol applied to cattle for suppression of horn flies, Haematobia irritans (Diptera: Muscidae), with observations on fly defensive behaviors. Vet Parasitol 245:14-28. doi: 10.1016/j.vetpar.2017.08.005.

Natagora. *Nos hirondelles et martinets* [in French]. Available at: https://www.natagora.be/download/39252.

O'Toole et al (2009) Transfer rates of enteric microorganisms in recycled water during machine clothes washing. Appl Environ Microbiol 75:1256–1263. doi: 10.1128/AEM.01923-08.

OIE Animal Production Food Safety Working Group (2006) Guide to good farming practices for animal production food safety. Rev Sci Tech OIE 25:823-836.

Olivier (2017) Etude rétrospective des cas de calicivirose féline systémique à l'Ecole Nationale Vétérinaire de Toulouse. Thèse. Available at: http://oatao.univ-toulouse.fr/17465/1/Olivier_17465.pdf.

Otake et al (2003) Evaluation of mosquitoes, *Aedes vexans*, as biological vectors of porcine reproductive and respiratory syndrome virus. Can J Vet Res 67:265-70.

Otranto (2018) Arthropod-borne pathogens of dogs and cats: from pathways and times of transmission to disease control. Vet Parasitol 251:68-77. doi: 10.1016/j.vetpar.2017.12.021.

Owen & Laird (2020) The role of textiles as fomites in the healthcare environment: a review of the infection control risk. Peer J 25:8:e9790. doi: 10.7717/peerj.9790.

Page et al (2009) Duration of repellency of N,N-diethyl-3-methylbenzamide, citronella oil and cypermethrin against Culicoides species when applied to polyester mesh. Vet Parasitol 163: 105-9. doi: 10.1016/j.vetpar.2009.03.055.

Panagea et al (2005) Environmental contamination with an epidemic strain of *Pseudomonas aeruginosa* in a Liverpool cystic fibrosis centre, and study of its survival on dry surfaces. J Hosp Infect 59(2):102-7. doi: 10.1016/j.jhin.2004.09.018.

Panther Pest Control (2019) Pest Control Methods – Chapter 4 – Bird Control Methods. Available at: https://www.pantherpestcontrol.co.uk/news/bird-control-methods/.

Pedersen et al (1983) A transient febrile "limping" syndrome of kittens caused by two different strains of feline calicivirus. Feline Practice 13, 26-35.

Pedersen et al (2000) An isolated epizootic of hemorrhagic-like fever in cats caused by a novel and highly virulent strain of feline calicivirus. Vet Microbiol 73, 281-300. doi: 10.1016/s0378-1135(00)00183-8.

Perry et al (2001) Bacterial contamination of uniforms. J Hosp Infect 2001; 48: 238–41. doi: 10.1053/jhin.2001.0962

Pesavento et al (2004) Pathologic, immunohistochemical, and electron microscopic findings in naturally occurring virulent systemic feline calicivirus infection in cats. Vet Pathol 41:257-63. doi: 10.1354/vp.41-3-257.

Petersen et al (2008). Maddie's infection control: manual for animal shelters for veterinary personnel. Iowa State University, Center for Food Security and Public Health: Ames, 136 p. Available at: https://www.cfsph.iastate.edu/product/maddies-infection-control-manual-for-animal-shelters/.

Phillips (2009) A review of mulesing and other methods to control flystrike (cutnaeous myiasis) in sheep. Animal Welfare 18:113-121.

Pinheiro et al (2013) Verification of natural infection of peridomestic rodents by PCV2 on commercial swine farms. Res Vet Sci 94: 764-68. doi: 10.1016/j.rvsc.2012.10.006.

Pitzer et al (2011) Seasonal abundance of stable flies and filth fly pupal parasitoids (Hymenoptera: Pteromalidae) at Florida equine facilities. J Econ Entomol. 104:1108-15. doi: 10.1603/ec10227.

Portail environnement Wallonie – la biodiversité en Wallonie : Campagnol des champs (*Microtus arvalis*) [in French]. Available at: http://biodiversite.wallonie.be/fr/microtus-arvalis.html?IDD=50333798&IDC=327.

Quinn & Markey (2000). Disinfection and disease prevention in veterinary medicine. *In*: Block S. (Ed.), Disinfection, Sterilization, and Prevention. 5th ed. Lippincott Williams & Wilkins: Philadelphia, 1069-1103.

Radford et al (2009) Feline calicivirus infection – ABCD guidelines on prevention and management. Journal of Feline Medicine and Surgery 11, 556-564. doi: 10.1016/j.jfms.2009.05.004.

Ready (2013) Biology of phlebotomine sand flies as vectors of disease agents. Annu. Rev. Entomol. 58:227–50.

Reynolds et al (2009) A nosocomial outbreak of feline calicivirus associated virulent systemic disease in France. Journal of Feline Medicine and Surgery 11, 633-644. doi: 10.1016/j.jfms.2008.12.005.

Royal College of Pathologists (2002) Guidelines on autopsy practice: report of a working group of The Royal College of Pathologists. Royal College of Pathologists: London. Available at: http://www.rcpath.org/resources/pdf/main_document.pdf.

Rozendaal – World Health Organisation (1997) Vector control – Methods for use by individuals and communities. Ed WHO Library Cataloguing in Publication Data, 424 pp.

Ruch-Gallie et al (2011) Results of molecular diagnostic assays targeting feline herpesvirus-1 and feline calicivirus in adult cats administered modified live vaccines. J Feline Med Surg 13(8), 541-545. doi: 10.1016/j.jfms.2010.12.010.

Sacramento-Yolo Mosquito and Vector control (2008) Mosquito reduction best management practices. 40 pp. Available at: https://www.fightthebite.net/download/ecomanagement/SYMVCD_BMP_Manual.pdf.

Saegeman et al (2024) Contamination of hospital linen in critical care wards: still a hazard? J Hosp Infect 145:140-141. doi: 10.1016/j.jhin.2024.01.004

Saegerman et al (2023) Evaluation Survey on Agreement with Existing Definitions of Biosecurity with a Focus on Livestock. Animals (Basel) 13(9):1518. doi: 10.3390/ani13091518.

Saegerman et al (2012) Reducing hazards for humans from animals: emerging zoonoses. Ital J Publ Health 9(2):13-24. doi: 10.2427/6336.

Sánchez et al (2022) Transport of High-Risk Infectious Substances: Packaging for the Transport of Category A Infectious Specimens in Spain. Int. J. Environ. Res. Public Health 19(20), 12989 doi:10.3390/ijerph192012989 (https://www.mdpi.com/1660-4601/19/20/12989).

Sanders et al (2023) Incorporating structured linen oversight into an infection prevention program. Am J Infect Control 51(3):343-345. doi: 10.1016/j.ajic.2022.07.017.

Schorr-Evans et al (2003) An epizootic of highly virulent feline calicivirus disease in a hospital setting in New England. Journal of Feline Medicine and Surgery 5, 217–226. doi: 10.1016/S1098-612X(03)00008-1.

Schulz et al (2011) Two outbreaks of virulent systemic feline calicivirus infection in cats in Germany. Berl Munch Tierarztl Wochenschr. 124(5-6),186-93.

Scott & Geissinger (1997) Duration of immunity in cats vaccinated with an inactivated feline panleukopenia, herpesvirus and calicivirus vaccine. Feline Practice 25, 12-19.

Scott & Geissinger (1999) Long-term immunity in cats vaccinated with an inactivated trivalent vaccine. Am J Vet Res 60, 652-658.

Scott et al (2013) Insecticide resistance in house flies from the United States: resistance levels and frequency of pyrethroid resistance alleles. Pesticide Biochemistry and Physiology 107:377-84.

School of Veterinary Sciences, University of Queensland (2010) Biosecurity, Hygiene and Infection Control Manual. Available at: https://gatton.uq.edu.au/files/2839/School%20of%20Veterinary%20Science%20Infection%20Control%20Manual_V9_2010pdf.pdf

Shah et al (1988) *Tinea corporis* caused my *Microsporum canis*: Report of a nosocomial outbreak. Eur. J. Epidemiol. 4:33–38.

Showler (2017) Botanically Based Repellent and Insecticidal Effects against Horn Flies and Stable Flies (Diptera: Muscidae). J Integrated Pest Management 8:15.

Siegel et al, and the Healthcare Infection Control Practices Advisory Committee (2007) Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Available at: https://www.cdc.gov/infectioncontrol/pdf/guidelines/isolation-guidelines.pdf.

Smeets et al. Les culicoides – importants vecteurs de maladies du bétail [in French]. Available at: https://hdl.handle.net/2268/138203.

Spiri et al (2019) Environmental Contamination and Hygienic Measures After Feline Calicivirus Field Strain Infections of Cats in a Research Facility. Viruses 11(10). doi: 10.3390/v11100958.

Stafford III - The Connecticut Agricultural Experiment Station (2004) Tick Management handbook. 71 pp.

Standaert et al (1994) WA Nosocomial transmission of Salmonella gastroenteritis to laundry workers in a nursing home. Infect. Control Hospl. Epidem. 15:22–26.

Stévenin (2009) Etude d'une série d'infections nosocomiales par une souche hypervirulente de calicivirus félin. Ecole Nationale Vétérinaire de Toulouse, 77 p. Available at : http://oatao.univ-toulouse.fr/2847/1/celdran_2847.pdf).

Su & D'Souza (2012) Inactivation of human norovirus surrogates by benzalkonium chloride, potassium peroxymonosulfate, tannic acid, and gallic acid. Foodborne Pathog Dis 9(9):829-34. doi: 10.1089/fpd.2012.1155.

Sykes et al (1998) Detection and strain differentiation of feline calicivirus in conjunctival swabs by RT-PCR of the hypervariable region of the capsid protein gene. Arch Virol 147(7), 1321-1334. doi: 10.1007/s007050050378.

Talley et al (2009) Association of *Escherichia coli* O157:H7 with filth flies (Muscidae and Calliphoridae) captured in leafy greens fields and experimental transmission of *E. coli* O157:H7 to spinach leaves by house flies (Diptera: Muscidae). J Food Prot 72:1547-52. doi: 10.4315/0362-028x-72.7.1547.

Ter Wee et al (1997) Comparison of the primary signs induced by experimental exposure to either a pneumotrophic or a 'limping' strain of feline calicivirus. Vet Microbiol 56, 33-45. doi: 10.1016/S0378-1135(96)01344-2.

The Pig site (2012) Bird Control and Prevention. Available at: http://www.thepigsite.com/articles/3936/bird-control-and-prevention

Thiry (2015) Virologie clinique du chien et du chat, 2ème édition. Editions du Point Vétérinaire.

Thiry. Maladies virales animales - Maladies virales émergentes chez les animaux de compagnie (chapitre 13) Available at: http://www.dmipfmv.ulg.ac.be/virovet/m/GMV1/MVA-13-maladiesemergentes.pdf.

Thomas et al (1987) An outbreak of scabies among employees in a hospital-associated commercial laundry. Infect. Control 8:427–429.

Thomas & Jespersen (1994) Non-biting Muscidae and control methods. Rev Sci Tech OIE 13:1159-1173.

Traverse and Aceto (2015) Environmental cleaning and disinfection. Vet Clin North Am Small Anim Pract 45:299-330. doi: 10.1016/j.cvsm.2014.11.011.

Tucker Sadler Architects (2018) Animal waste, fly and vector control plan - for the Helen Woodward Animal Center (Permit No. P04-059. Available at: https://www.sandiegocounty.gov/dplu/docs/081017/P04059-VECTOR.pdf.

UMass Amherts Outreach - UMass Extension Crops, Dairy, Livestock, Equine (...) Rodent control on farms. CDLE Pub. 08-44. Available at: https://ag.umass.edu/sites/ag.umass.edu/files/fact-sheets/pdf/RodentControl08-44.pdf.

United Nations (2022) European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR legislation) – 2.2.62 Class 6.2. infectious materials.

Vector Disease Control International (2015) The key components of an integrated mosquito management program. Available at: http://www.vdci.net/blog/the-key-components-of-an-integrated-mosquito-management-program-0

Velasco et al (2013) Feline calicivirus associated virulent systemic disease (FCV-VSD): Report on the first confirmed case in Madrid (Spain). J Fel Med & Surg 15:818-828.

Versteirt et al (2009) Introduction and establishment of the exotic mosquito species *Aedes japonicus* japonicus (Diptera: Culicidae) in Belgium. J Med Entomol 46:1464-7.

Versteirt et al (2012) Bionomics of the established exotic mosquito species *Aedes koreicus* in Belgium, Europe. J Med Entomol 49:1226-32.

Wang et al (2021) Isolation and phylogenetic analysis of strains of feline calicivirus in Beijing, China. Arch Virol 166(9):2521-2527. doi: 10.1007/s00705-021-05163-2.

Wardley (1976) Feline calicivirus carrier state. A study of host/virus relationship. Arch Virol 52:243-249. doi: 10.1007/BF01348021.

Wheeler Aceto & Dallap Schar (2008). Biosecurity for equine hospitals: protecting the patient and the hospital. In: Corley K, Stephen J (Eds), The Equine Hospital Manual. Blackwell Publishing: Oxford, 180-200.

Whitehead & McCue (2010) Virucidal efficacy of disinfectant actives against feline calicivirus, a surrogate for norovirus, in a short contact time. Am J Infect Control 38(1):26-30. doi: 10.1016/j.ajic.2009.03.015.

World Animal Health Information and Analysis Department (2019) African Swine Fever (ASF) Report N° 9: January 18 -31, 2019.

World Organization for Animal Health (WOHA) (2019) African Swine Fever – Technical card. Available at: https://www.woah.org/app/uploads/2021/03/a-african-swine-fever-v2-0.pdf

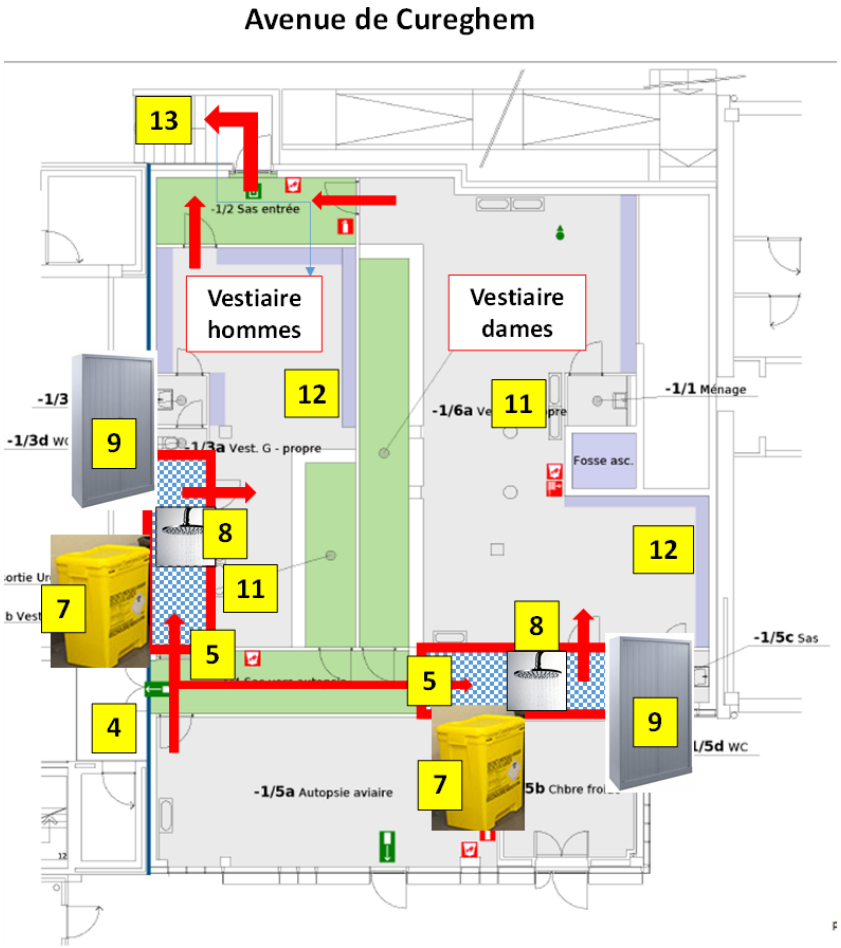
Wright (1985) Arthropod pests of beef cattle on pasture or range land. In Williams RE, Hall RD, Broce AB & Scholl PJ, Eds. Livestock entomology. John Wiley & Sons, New York, 335 pp. pp. 191-206.

Zonta et al (2016) Virucidal efficacy of a hydrogen peroxide nebulization against murine norovirus and feline calicivirus, two surrogates of human norovirus. Food and Environmental Virology 8:275-82. doi: 10.1007/s12560-016-9253-5.

Appendices

<u>Appendix 1</u>: Exit procedure of the necropsy area in case of reportable and/or zoonotic disease

If lesions suspected of a reportable and/or a zoonotic disease are observed during the necropsy (e.g. African swine fever, foot-and-mouth disease, *Mycobacterium bovis* tuberculosis, bovine brucellosis, etc.), the crisis plan will be activated and the procedure for leaving the necropsy room will be as follows:



1. Dispose of examination gloves, long-sleeve gloves, calving gown/blue apron/white overalls in the yellow waste container of the necropsy room.
2. Wash your hands at the sink of the room then disinfect them.
3. Wash your boots at the boot washer; vigorously rub the top of the boots with the brush available.
4. Leave the necropsy room and walk through the foot bath (total immersion of feet is necessary)
5. Then take the emergency exit and lock the door.
6. Remove the necropsy boots and leave them along the wall
7. Remove your clothes and put them in the yellow waste container
8. Shower completely (soap available on site) and dry (towels available in the closet)
9. Take a clean disposable overall in the closet and put on a pair of over-shoes
10. Dispose of the over-shoes in the container provided for this purpose after putting back clean socks and shoes
11. Wash again your hands then disinfect them.
12. Slip on the change of clothes, if available, and collect your personal belongings from the locker

<u>Appendix 2</u>: packaging instructions for organs and samples from presumably healthy wild animals (no suspicion of an infectious disease) (European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) United Nations (2022) - section 2.2.62.1.5.8)

Animal samples that present a minimal risk of containing pathogens are not subject to the ADR legislation if transported in a leak-proof packaging marked "Sample exempt from contamination".

- It is made of 3 elements:
    - One or more primary waterproof container
    - A secondary waterproof packaging
    - An outer packaging sufficiently robust in view of its capacity, mass and intended use, with at least one side measuring at least 100 mm x 100 mm
- In the case of liquids, sufficient material to absorb the entire contents is placed between the primary container(s) and the secondary packaging so that, during transport, any liquid spillage or leakage does not reach the outer packaging and does not affect the integrity of the padding material.
- In the case of multiple fragile primary containers placed in a single secondary packaging, these are either individually packaged or separated to avoid any contact between them.

In addition, a label with the words “Research and Diagnostic Samples” must be visibly affixed to the transport container.

Appendix 3: Classification of infectious material for transport (class 6.2) (European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) United Nations (2022) – 2.2.62.1.4)

Category A: infectious substances that are carried in a form that may cause permanent disability or fatal or life-threatening disease in previously healthy humans or animals upon exposure => assigned the appropriate UN number for transportation, depending on whether the specimens contain human pathogens, animal pathogens, or clinical wastes. Category A pathogens are listed in Chapter 2.2.62 of the ADR (https://www.biosafety.be/content/transport-annexes#3) (non-exhaustive list : these are indicative examples of infectious substances included in category A in any form unless otherwise indicated)

UN Number and proper shipping name: **UN 2814 Infectious substance, affecting humans:**

- *Bacillus anthracis* (cultures only)
- *Brucella abortus* (cultures only), *Brucella melitensis* (cultures only), *Brucella suis* (cultures only)
- *Burkholderia mallei - Pseudomonas mallei* – Glanders (cultures only), *Burkholderia pseudomallei – Pseudomonas pseudomallei* (cultures only)
- *Chlamydia psittaci* - avian strains (cultures only)
- *Clostridium botulinum* (cultures only)
- *Coccidioides immitis* (cultures only)
- *Coxiella burnetii* (cultures only)
- Crimean-Congo hemorrhagic fever virus
- Dengue virus (cultures only)
- Eastern equine encephalitis virus (cultures only)
- *Escherichia coli*, verotoxigenic (cultures only) *
- Ebola virus
- Flexal virus
- *Francisella tularensis* (cultures only)
- Guanarito virus
- Hantaan virus
- Hantaviruses causing haemorrhagic fever with renal syndrome
- Hendra virus
- Hepatitis B virus (cultures only)
- Herpes B virus (cultures only)
- Human immunodeficiency virus (cultures only)
- Highly pathogenic avian influenza virus (cultures only)
- Japanese Encephalitis virus (cultures only)
- Junin virus
- Kyasanur Forest disease virus
- Lassa virus
- Machupo virus
- Marburg virus
- Monkeypox virus
- *Mycobacterium tuberculosis* (cultures only) *
- Nipah virus
- Omsk hemorrhagic fever virus
- Poliovirus (cultures only)
- Rabies virus (cultures only)
- *Rickettsia prowazekii* (cultures only), *Rickettsia rickettsii* (cultures only)
- Rift Valley fever virus (cultures only)
- Russian spring-summer encephalitis virus (cultures only)
- Sabia virus
- *Shigella dysenteriae* type 1 (cultures only) *
- Tick-borne encephalitis virus (cultures only)
- Variola virus

- Venezuelan equine encephalitis virus (cultures only)
- West Nile virus (cultures only)
- Yellow fever virus (cultures only)
- *Yersinia pestis (cultures only)*

UN Number and proper shipping name: **UN 2900 Infectious substance, affecting animals only:**

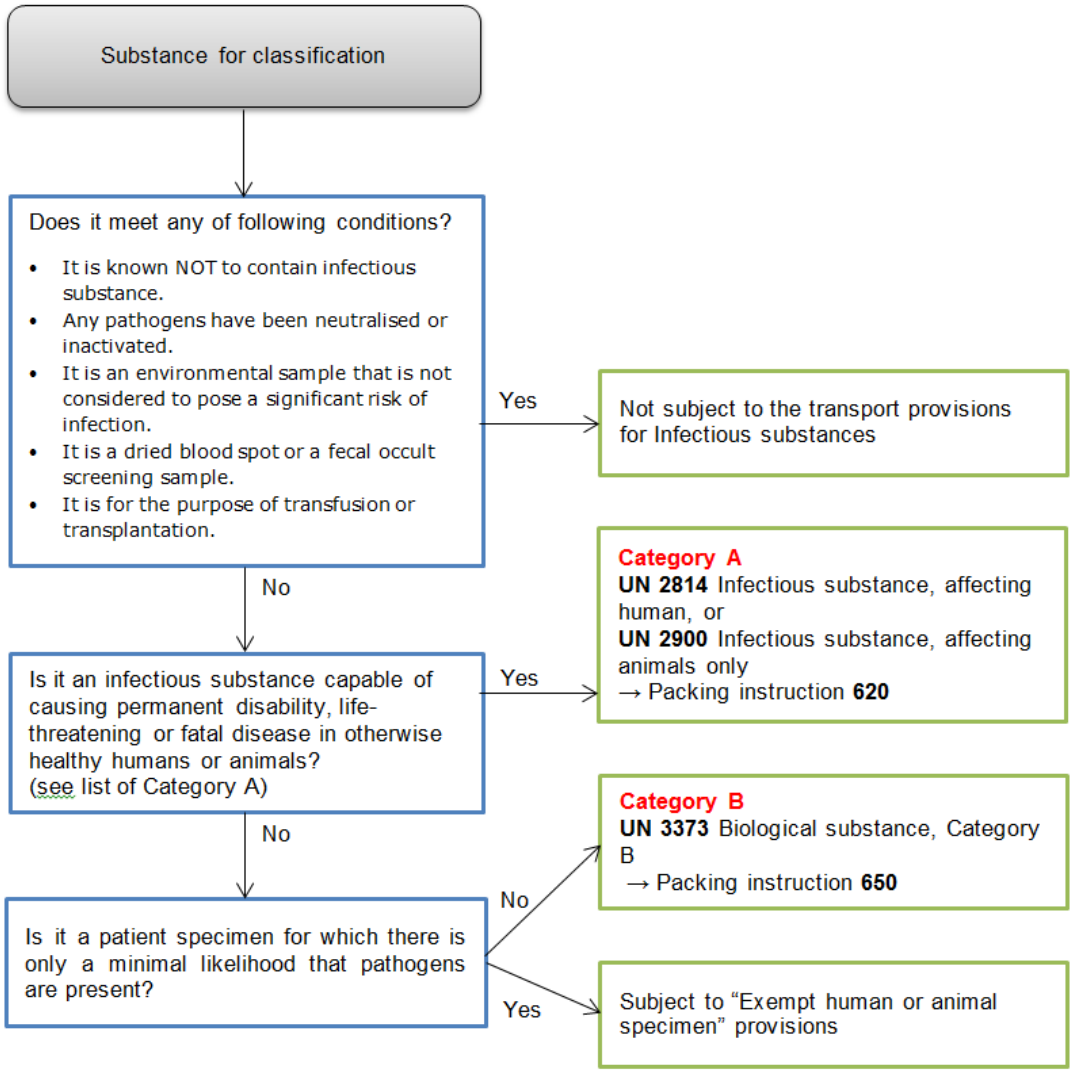
- African swine fever virus (cultures only)
- Avian paramyxovirus Type 1 – velogenic Newcastle disease virus (cultures only)
- Bluetongue virus (on the indicative list in ADR but not IATA. However, since all shipments involve road transport it should always be classified and transported as category A infectious substance)
- Classical swine fever virus (cultures only)
- Foot and mouth disease virus (cultures only)
- Lumpy skin disease virus (cultures only)
- *Mycoplasma mycoides* - Contagious bovine pleuropneumonia (cultures only)
- Peste des petits ruminants virus (cultures only)
- Rinderpest virus (cultures only)
- Sheep-pox virus (cultures only)
- Goatpox virus (cultures only)
- Swine vesicular disease virus (cultures only)
- Vesicular stomatitis virus (cultures only)

Notes:

* For surface transport (ADR) nevertheless, when the cultures are intended for diagnostic or clinical purposes, they may be classified as infectious substances of Category B.

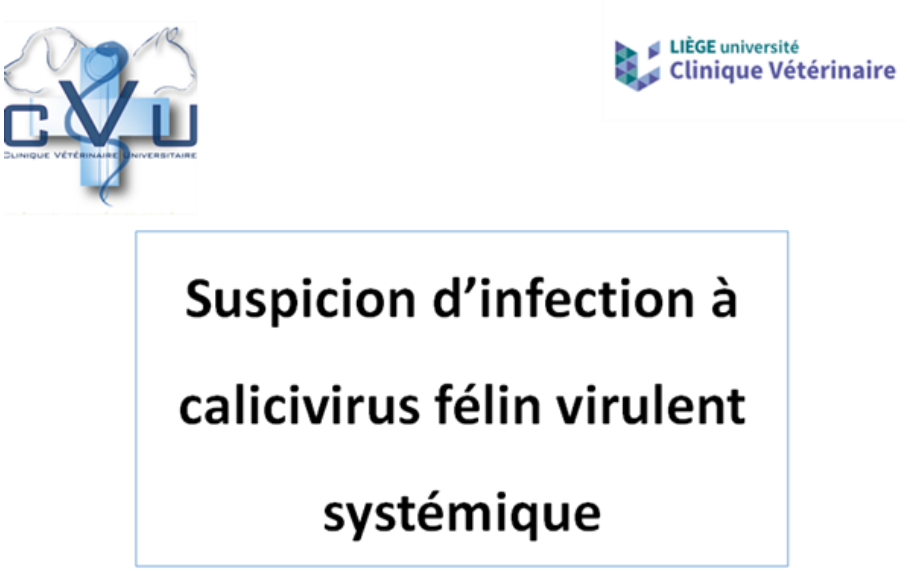
Category B: infectious substances, samples, or wastes that do not meet the criteria for Category A, and includes those substances that may cause disease but do not pose a threat to human or animal life

<u>Appendix 4</u> : summary flowchart for the classification of infectious materials for transport[27]
(https://www.biosecurite.be/content/mesures-de-precaution-lors-du-transport-dogm-etou-de-pathogenes)

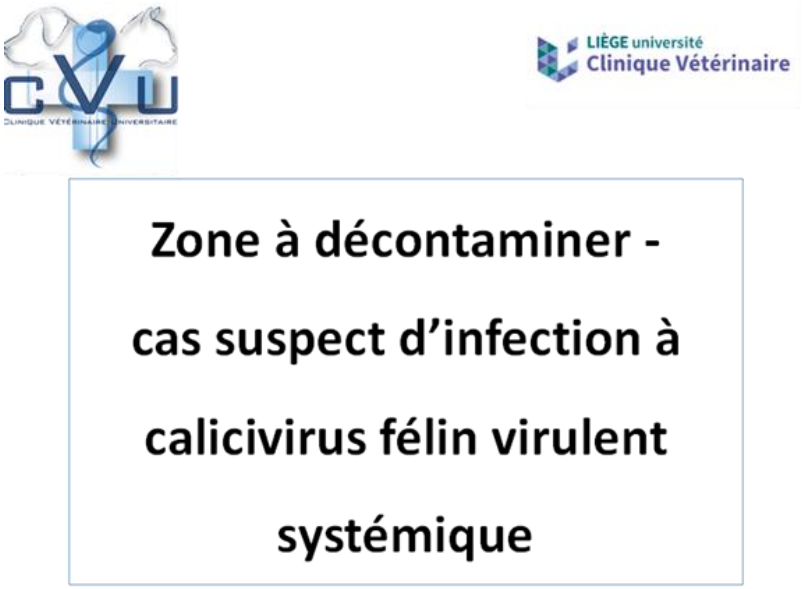


[27] https://www.biosecurite.be/content/mesures-de-precaution-lors-du-transport-dogm-etou-de-pathogenes

<u>Appendix 5</u>: Poster to affix in hospitalization on suspicion (to be placed on IU door and on the cage) (VS-FCV)



<u>Appendix 6</u>: Poster to affix on the doors of premises to be disinfected (VS-FCV)



<u>Appendix 7</u>: Procedure for cleaning and disinfecting potentially contaminated premises (VS-FCV)

- 1st step: to list the areas to be disinfected (Excel file compiling room numbers and use)
- Two disinfectants might be used (see appendices 3a and 3b for detailed protocols)

	Super Javel LODA 8° ¥	**Virkon™ S***
Active ingredient	Sodium hypochlorite ≤ 3 % (bleach)	Pentapotassium bis(peroxymonosulphate) bis(sulphate)
Concentration	2.700 ppm concentration = 120 ml javel 8° (=2,4%) added to 880 ml cold water	Minimum 1%
Water temperature	Cold water	< 30°C
Time to use after preparation	Rapid utilisation after preparation (lifetime = 4h)	Rapid utilisation after preparation
Minimum contact time	1 minute (Whitehead and McCue, 2010)	30 minutes
Precautions	Necessity to rinse for oxidizable surfaces (especially metal)	Wet the surface with enough liquid to allow the required contact time
Application	Wetting (be careful – toxic for users)	Wetting or spraying
Advantages	Cheap	Preferred because low toxic, does not stain and does not irritate

*Preferred; ¥ https://www.loda.be/fr/produits/eau-de-javel/super-javel-loda-8-5l

- Surfaces to disinfect:
  - Suspicion: surfaces directly in contact with the suspect animal (consultation table, mattress, cages), small reusable equipment (thermometers, stethoscope, ultrasound probe)
  - Confirmation: all surfaces of the rooms in which the animal has transited, except ceilings and walls
- Once the room is disinfected, change the posting on the door => room disinfected (green)
- Recording of the procedure: the person who has disinfected a room indicates on the diagram 'Areas to disinfect and registration of disinfection' her/his initials, date and time of operations.
- In the event of an outbreak, the use of hydrogen peroxide spray (Nocospray) may be considered, as the tool is available at SUPHT (04 366 22 47; supht@uliege.be)

Appendix 8: cleaning and disinfection procedure with bleach (VS-FCV)

Cleaning and disinfection protocol

BLEACH (= sodium hypochlorite)

H315 : causes skin irritation
H318 : causes serious eye damage
H410 : very toxic to aquatic life with long lasting effects

WEAR A PPE !!

P280 : wear protective gloves/protective clothing/eye protection/face protection
P264 : wash your hands thoroughly after handling
P302 + P352 : IF ON SKIN: wash with plenty of water and soap

1. Prepare the solution of bleach **in a ventilated room !!!** *(everything is in the hospit stock):*

   ALWAYS ADD BLEACH TO WATER AND NOT THE OPPOSITE !!!

   - 1.000 ppm classical dilution : add 40 ml bleach 8° (= 2,4%) to 960 ml cold water (bleach inactivated by warm/hot water)
   - 2.700 ppm dilution (disinfection before fallowing) : add 120 ml bleach 8° to 880 ml cold water

2. Clean with Mr Propre then rinse correctly to remove any residue
3. Dry
4. Disinfection: apply the solution of bleach and leave for at least 20 minutes – ventilate the room if necessary
5. Rinse with clear water
6. Dry
7. Empty the contents of the baths in the sink

CHARACTERISTICS OF BLEACH	
	Production of toxic vapor if mixed with warm/hot water (evaporation of chlorine)
Stability of the solution	**4 hours !!**
Inactivated by	Quaternary ammonium compounds (e.g.: Umonium®38) Organic matter Sunlight
Incompatible materials	Corrosive for metals (e.g. : silver, aluminum) – but ok for stainless steel Oxidizing materials
Storage	Do not store with acid Protected from light

Appendix 9: cleaning and disinfection procedure with Virkon™ S

Cleaning and disinfection protocol
Virkon™ S

H315 : causes skin irritation
H318 : causes serious eye damage
H412 : harmful to aquatic life with long lasting effects.

WEAR A PPE !!

Eye protection | Gloves | **Coton** lab coat

P264 : wash your hands thoroughly after handling.
P273 : avoid release to the environment
P280 : wear protective gloves/protective clothing/eye protection/face protection
P302 + P352 : **IF ON SKIN**: wash with plenty of water
P305 + P351 + P338 + P310 : **IF IN EYES**: rinse cautiously with water for several minutes (après after removing contact lenses, if present and easy to do)
P332 + P313 : if skin irritation occurs, get medical advice/attention
P362 + P364 : take off contaminated clothes and wash them before next use
P501 : dispose of contents/container in an approved waste disposal facility

1. Virkon™ S is stored in the Faculty stock => contact the FVM logistical unit (N. Ochelen [4111] or C. Zicari [3179])
2. Prepare the Virkon™ S solution (10 g dose in the jar) using water at 10°C

	cc	Preparation of the solution	Contact time
Common use*	1 %	10 g (1 dose) in 990 ml water	10-20 min
Yeasticidal activity	1,5 %	15 g in 985 ml water	30 min
Aspergillus spp.	2 to 4 %	20 to 40 g in 980 or 960 ml water	30 min
Mycobacterium spp.	3 %	30 g in 970 ml water	30 min

*virucidal and bactericidal effect

3. Clean with Mr Propre then rinse correctly to remove any residue
4. Drying
5. Disinfection : apply the Virkon™ S solution and leave on for 10 minutes or more if necessary – allow to dry/wipe or rinse as needed

CHARACTERISTICS OF VIRKON™ S	
Advantages	Colour indicator of disinfectant effectiveness Stable in the presence of organic matter Effective on porous surfaces, hard water and at low T°C Environment friendly: 90% biodegradable
	Incompatible with strong acids, strong bases, metal salts and halides
Stability	In adequate storage conditions, solution is stable for 5 days
Incompatible materials	Corrosive action => do not soak items and instruments in the solution for a long period of time
Storage	Store in a dry and cool place (not at too low or too high temperatures)

<u>Appendix 10</u>: Template of message for internal suspicion (SAH + students + CFB) (VS-FCV)

- List of recipients:
  - SAH Manager
  - SAH Secretariat (contact.ac.cvu@uliege.be)
  - Staff of the SAH, interns, residents (mail sent by the secretariat)
  - Students (email sent by the secretariat to Master 2 and Master 3 students concerned
- Message to be sent:

> *Hello,*
> *I inform you of a suspicion today of systemic virulent calicivirus in a cat hospitalized at the SAH. This cat is now placed in the isolation unit.*
> *Owner:*
> *Animal:*
> *Date of first clinical signs:*
> *Date of first admission to the SAH:*
> *Time of admission to the SAH:*
> *Reason for consultation:*
> *Consultation service:*
> *Samples have just been taken and are being transferred to the analysis laboratory for PCR. The result is expected by .....*
> *Due to the low/high risk level, feline consultations are maintained/stopped until the result of the analysis is received.*
> *I will keep you informed of the follow-up to these results and the follow-up that will be given.*
> *Sincerely,*
> *Xxxxxxx*

<u>Appendix 11</u>: poster hospitalization on confirmation (to be placed on the door of the IU access) (VS-FCV)

Cas d'infection à calicivirus félin virulent systémique confirmés ou fortement évocateurs

<u>EXCLUSIVEMENT</u>

<u>Appendix 12a</u>: Template for individual post mail and/or email to be sent to owners of cats who have been hospitalized (in French)

Clinique Vétérinaire Universitaire
Pôle des Animaux de Compagnie

Liège, le 12 mars 2019

Madame, Monsieur,

Votre chat a été admis dans notre clinique entre le 8 et le 11 mars 2019. Durant cette période, nous avons diagnostiqué une maladie virale potentiellement contagieuse chez un autre chat traité dans notre clinique. Le principe de précaution nous conduit à vous adresser ce courrier, votre chat ayant pu être indirectement exposé à ce virus malgré toutes les mesures d'hygiène mises en oeuvre systématiquement dans nos locaux.

Tous les chats hospitalisés sont désormais placés en quarantaine et ne pourront quitter la clinique qu'à partir du lundi 18 mars à condition que leur maladie évolue favorablement ET qu'ils n'aient montré aucun symptôme de la maladie contagieuse.
Une sortie plus précoce est envisageable uniquement si vous répondez aux critères suivants :
-vous n'avez pas d'autres chats à votre domicile qui pourraient rentrer en contact avec votre chat convalescent
-votre chat ne sortira pas de la maison au minimum jusqu'au 24 mars 2019 afin de ne pas contaminer un chat du voisinage
-vous ne serez pas en contact, vous-même, avec d'autres chats sains jusqu'au 24 mars 2019.

Ce virus ne concerne que les chats et ne peut pas infecter l'homme ni d'autres espèces animales, pour qui il ne présente donc aucun risque. A ce jour, aucun autre cas n'a été identifié et il n'y a pas de raison de vous alarmer pour la santé de votre chat.

Nous avons toutefois souhaité vous permettre de nous contacter facilement si vous aviez des questions par téléphone (entre 9 h et 17 h du lundi au vendredi) au 04 242 75 23, ou par mail : mipa.cvu@uliege.be.

La période d'incubation (délai entre le contact avec le virus et l'apparition des premiers symptômes) étant courte, toute contagion pourra être définitivement exclue si aucune anomalie n'est apparue chez votre chat d'ici au 24 mars 2019.

En espérant que cette démarche traduisant l'importance que nous accordons à la santé de votre chat répondra à vos attentes, nous vous prions d'agréer, Madame, Monsieur, nos salutations distinguées.

La direction de la clinique vétérinaire universitaire des animaux de compagnie.

B44, Avenue de Cureghem 3, Quartier Vallée 2, Sart Tilman, 4000 Liège, Belgique
Tél. : + 32 4 366 42 00
Email : fbillen@ulg.ac.be

<u>Appendix 12b</u>: Template for individual post mail and/or email to be sent to owners of cats who have transited by the SAH as outpatients (in French)

Clinique Vétérinaire Universitaire
Pôle des Animaux de Compagnie

Liège, le 12 mars 2019

Madame, Monsieur,

Votre chat a été admis dans notre clinique entre le 8 et le 11 mars 2019. Durant cette période, nous avons diagnostiqué une maladie virale potentiellement contagieuse chez un autre chat traité dans notre clinique. Le principe de précaution nous conduit à vous adresser ce courrier, votre chat ayant pu être indirectement exposé à ce virus malgré toutes les mesures d'hygiène mises en oeuvre systématiquement dans nos locaux.

Ce virus ne concerne que les chats et ne peut pas infecter l'homme ni d'autres espèces animales, pour qui il ne présente donc aucun risque. A ce jour, aucun autre cas n'a été identifié et il n'y a pas de raison de vous alarmer pour la santé de votre chat. Nous avons toutefois souhaité vous permettre de nous contacter facilement si vous aviez constaté ou constatiez des signes inhabituels chez votre chat dans les jours qui ont suivi son passage dans notre clinique (fièvre, abattement, oedème/gonflement des membres ou de la face, lésions cutanées (ulcères), jaunisse, symptômes de Coryza (écoulement nasal et/ou oculaire, salivation)

Vous pouvez dans ce cas nous téléphoner (entre 9 h et 17 h du lundi au vendredi) au 04 242 75 23 ou nous envoyer un mail : mipa.cvu@uliege.be.
La conduite à tenir vous sera indiquée et un vétérinaire pourra répondre à vos questions.

La période d'incubation (délai entre le contact avec le virus et l'apparition des premiers symptômes) étant courte, toute contagion pourra être définitivement exclue si aucune anomalie n'est apparue chez votre chat d'ici au 24 mars 2019.

En espérant que cette démarche traduisant l'importance que nous accordons à la santé de votre chat répondra à vos attentes, nous vous prions d'agréer, Madame, Monsieur, nos salutations distinguées.

La direction de la clinique vétérinaire universitaire des animaux de compagnie.

B44, Boulevard de Colonster, Sart Tilman, 4000 Liège, Belgique
Tél. : + 32 4 366 42 00 Fax : + 32 4 366 42 41
Email : fbillen@ulg.ac.be

<u>Appendix 13</u>: Poster to be affixed on the door of the consultation room dedicated to suspicions (sector BRRPZE) (in French)

Consultations des suspicions de calicivirus félin EXCLUSIVEMENT

<u>Appendix 14</u>: Poster to be affixed on the cage of a suspect case (in French)

Forte suspicion d'infection à calicivirus félin virulent systémique <u>EXCLUSIVEMENT</u>

<u>Appendix 15</u>: Poster to be affixed on the cage of a cat with low suspect status (in French)

Cas d'infection à calicivirus félin virulent systémique suspects faiblement évocateurs

<u>EXCLUSIVEMENT</u>