

BIOSECURITY COMMITTEE. FVM. UCM. REPORT ON STUDENT WELFARE, 2016

This report describes the activities carried out at the Faculty of Veterinary (UCM) in order to assure student welfare during training activities. This task has been based on the application of general guidelines according to current legislation and recommendations from prestigious institutions. The specific hazards (biological, physical, chemical, contusion and injuries, or others) present in each subject and the appropriateness of preventive measures were collected in a questionnaire and evaluated. The active role and responsibility of students has been encouraged by progressive learning, starting with a seminar devoted to students of first year and additional lectures on subsequent years.

Content

1. General guidelines and legal framework
2. Assessment of safety during training of subjects (questionnaire)
3. Seminars on prevention and biosafety
4. Additional student training on prevention and biosafety
5. Conclusions

1. General guidelines and legal framework

General guidelines and prevention measures are obtained from the following documents of Spanish Government and international institutions:

- Real Decreto 664/1997, BOE n. 124, 24 mayo 1997, *sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes biológicos durante el trabajo, y posterior modificación* (Royal Decree 664/1997, BOE n. 124, may 24 1997, about workers protection against exposure to biological agents at the work place, and subsequent amendment)
<http://www.boe.es/buscar/act.php?id=BOE-A-1997-11144>
- *Manual de Seguridad y Salud en Laboratorios* (Manual on safety and health in laboratories), (Mutua de Accidentes de Trabajo y Enfermedades Profesionales de la Seguridad Social, FREMAP).
<https://www.ucm.es/data/cont/docs/3-2014-11-19-MANUAL%20DE%20SEGURIDAD%20Y%20SALUD%20EN%20LABORATORIOS.pdf>
- Ministerio de Empleo y Seguridad Social, Instituto Nacional de Seguridad e Higiene en el Trabajo:
 - Portal de Riesgos biológicos
<http://www.insht.es/portal/site/RiesgosBiologicos/>
 - NTP 376: Exposición a agentes biológicos: seguridad y buenas prácticas de laboratorio.
http://www.insht.es/InshtWeb/Contenidos/Documentacion/FichasTecnicas/NTP/Ficheros/301a400/ntp_376.pdf
 - NTP 411: Zoonosis de origen laboral.
http://www.insht.es/InshtWeb/Contenidos/Documentacion/FichasTecnicas/NTP/Ficheros/401a500/ntp_411.pdf
 - Zoonosis laborales: riesgos de exposición a agentes biológicos en ganadería.
[http://www.insht.es/InshtWeb/Contenidos/Documentacion/PUBLICACIONES%20PERIODICAS/Rev_INSHT/2009/55/Zoonosis%20laborales%20riesgos%20de%20exposicion%](http://www.insht.es/InshtWeb/Contenidos/Documentacion/PUBLICACIONES%20PERIODICAS/Rev_INSHT/2009/55/Zoonosis%20laborales%20riesgos%20de%20exposicion%20)

- 20a%20agentes%20biologicos%20en%20ganaderia.pdf
- NTP 821: Centros veterinarios: exposición laboral a agentes biológicos
<http://www.insht.es/InshtWeb/Contenidos/Documentacion/FichasTecnicas/NTP/Ficheros/821a921/821%20web.pdf>
 - NTP 636: Ficha de datos de seguridad para agentes biológicos
http://www.insht.es/InshtWeb/Contenidos/Documentacion/FichasTecnicas/NTP/Ficheros/601a700/ntp_636.pdf
 - World Organisation for Animal Health, *Manual de las Pruebas de Diagnóstico y de las Vacunas para los Animales Terrestres, 2016, version online; Capítulo 1.1.4. Bioseguridad y bioprotección: norma para la gestión del riesgo biológico en el laboratorio veterinario y en las instalaciones de los animales, versión online, mayo de 2015* (Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2016, Chapter 1.1.4. Biosafety and biosecurity: Standard for managing biological risks in the veterinary laboratory and animal facilities, online version May 2015).
http://www.oie.int/fileadmin/Home/esp/Health_standards/tahm/1.01.4_BIOSAFETY_BIOSECURITY.pdf
http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/1.01.04_BIOSAFETY_BIOSECURITY.pdf
 - Laboratory Biosafety Manual, Third Edition. World Health Organisation, Geneva, 2004.
http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_CSR_LYO_2004_11/en/
 - Centers for Disease Control (USA).
<http://www.cdc.gov/biosafety/publications/index.htm>
 - Guidelines for Biosafety in Teaching Laboratories, American Society for Microbiology (USA), 2012.
https://www.asm.org/images/asm_biosafety_guidelines-FINAL.pdf

Scientific articles:

- Dowd K, Taylor M, Toribio JA, Hooker C, Dhand NK. 2013. Zoonotic disease risk perceptions and infection control practices of Australian veterinarians: Call for change in work culture. *Preventive Veterinary Medicine*. 111 (1-2): 17– 24.
- Elchos B, Scheftel J. 2008. Discussion of the Compendium of veterinary standard precautions: Preventing zoonotic disease transmission in veterinary personnel. *Zoonoses and Public Health*. 55(8-10):526–528.
- Epp T, Waldner C. 2012. Occupational health hazards in veterinary medicine: zoonoses and other biological hazards. *The Canadian Veterinary Journal*. 53(2): 144-150.
- Heinrich ERE, Kukanich KS, Davis E, White BJ. 2014. Public health campaign to promote hand hygiene before meals in a College of Veterinary Medicine. *Journal of Veterinary Medical Education*. 41(3):301-310.
- Jackson J, Villarroel A. 2012. A Survey of the risk of zoonoses for veterinarians: Zoonoses among veterinarians. *Zoonoses and Public Health*. 59(3):193-201.

- Shawna K. 2014. Chemotherapy Safety in Clinical Veterinary Oncology. *Veterinary Clinics of North America: Small Animals Practice*. 44(5):941–963.
- Wright JG, Jung S, Holman RC, Marano NN, McQuiston JH. 2008. Infection control practices and zoonotic disease risks among veterinarians in the United States. *Journal of the American Veterinary Medical Association*. 232(12):1863-72.

Information at UCM webpage

Staff and students can access specific information including legislation and recommendations regarding safety at the work place at UCM webpage: <http://veterinaria.ucm.es/bioseguridad>.

Biosecurity Committee

An ad-hoc committee is in charge of supervising all issues related to biosafety and biosecurity. It is made up of representatives of all sectors and current members are as follows:

- Dean (Dr. Pedro Luis Lorenzo González)
- Vicedean of Research and Transfer (Dr. Gustavo Domínguez Bernal)
- Teaching Farm Director (Dr. Beatriz Isabel Redondo)
- VTH Director (Dr. Consuelo Serres Dalmau)
- FPU Director (to be appointed)
- Head of the Department of Anatomy and Compared Pathology (Dr. Pilar Martínez Sainz)
- FVM Manager (D. Andrés Barrero Rodríguez, on behalf of Manager)
- VTH Manager (D^a Manuela Vázquez Pousa)
- A representative of academic staff, expert in biosecurity and animal health programmes (Dr. Alicia Aranaz Martín)
- A representative of support staff (D. Juan Martín Jiménez)
- A student representative (D^a. Sara Pomykol Cerezo Rubio)

Furthermore, if a serious accident, or a series of frequent minor accidents, occurs during training in a subject this committee is in charge to review the procedures and preventive measures in order to propose new effective strategies.

Insurances

Civil liability:

The UCM has an insurance that covers civil liability of all personnel groups (students, academic staff, administrative and technical support staff) in the whole world, except the USA and Canada: <https://www.ucm.es/seguro-de-responsabilidad-civil>

Currently, the insurance company is Mapfre Seguros de Empresas Compañía de Seguros y Reaseguros, S.A.; certificate number: 0961570027363, for the period July 1st, 2015 to July 1st, 2017 (web page accessed January 24th, 2017).

<https://www.ucm.es/data/cont/media/www/pag-82964/Certificado%20Mapfre%20Seguro%20Responsabilidad%20Civil.pdf>

Student health insurance:

Students of UCM under the age of 28 have, among others, the right to medical and

pharmaceutical benefits.

<https://www.ucm.es/seguro-escolar>

This insurance depends on the Instituto Nacional de la Seguridad Social and covers some benefits in case of accident, disease or family misfortune.

[http://www.seg-](http://www.seg-social.es/Internet_1/Masinformacion/TramitesyGestiones/Seguroescolar/index.htm)

[social.es/Internet_1/Masinformacion/TramitesyGestiones/Seguroescolar/index.htm](http://www.seg-social.es/Internet_1/Masinformacion/TramitesyGestiones/Seguroescolar/index.htm)

[https://www.ucm.es/data/cont/media/www/pag-](https://www.ucm.es/data/cont/media/www/pag-82963//Gu%C3%ADa%20del%20Seguro%20Escolar.pdf)

[82963//Gu%C3%ADa%20del%20Seguro%20Escolar.pdf](https://www.ucm.es/data/cont/media/www/pag-82963//Gu%C3%ADa%20del%20Seguro%20Escolar.pdf)

Both insurances are included in the registration fee, and cover all activities organized by the UCM that are held in the University premises or outside the campus.

Student vaccination

Spain is free from rabies; therefore, veterinarians and vet students do not need to receive prophylaxis vaccine. Students are advised to receive the vaccine doses before travelling to endemic areas for working with domestic or wild animals.

Rabies control is an area of competence of the Ministerio de Sanidad, Servicios Sociales e Igualdad (MSSSI). The disease requires compulsory notification and it is included in the *Red nacional de vigilancia epidemiológica* (Spanish network of epidemiological surveillance):

<http://www.madrid.org/cs/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobheadername1=Content-disposition&blobheadername2=cadena&blobheadervalue1=filename%3DRABIA.pdf&blobheadervalue2=language%3Des%26site%3DPortalSalud&blobkey=id&blobtable=MungoBlobs&blobwhere=1352862630754&ssbinary=true>

In case of a dog bite, a protocol from the MSSSI and the Comunidad de Madrid should be followed:

https://www.msssi.gob.es/profesionales/saludPublica/sanidadExterior/docs/protocoloActuacion_mordeduras_agresiones_animales_Junio2013.pdf

http://www.madrid.org/cs/Satellite?cid=1161273609795&language=es&pagename=PortalSalud%2FPagina%2FP TSA_pintarContenidoFinal&vest=1162312277040

General guidelines

General guidelines that apply while working in the laboratory and other training activities are as follows:

- Access to the laboratory, examination room or other facilities is restricted to authorised personnel only. Door should be kept closed while the laboratory is in session.
- Personnel should wear appropriate clothing, preferably that can cover the body, without loose sleeves; open shoes (sandals) should not be used, closed-toe shoes that cover the top of the foot should be used. Dangling jewelry should not be worn. Long hair should be tied (a pony-tail on the back).
- Use of contact lenses is discouraged if handling material that can create splash.

- Eating, drinking, or smoking is not allowed in the facilities. Food, gum, drinks (including water), or water bottles should not be brought into the laboratory.
- Touching the face, applying cosmetics, adjusting contact lenses, or biting nails should be avoided.
- Handling of personal items (cosmetics, cell phones, calculators, pens, pencils, etc.) while in the laboratory should be avoided. Biting pens should be avoided as well.
- Wash hands after entering and before exiting the laboratory, and also after touching a surface potentially contaminated. Soap and paper towel should be available.
- Students should be sure that they have understood the procedure before starting the training. Work should be done according to instructions and it should be carried under instructor supervision.
- Bench should be clean and organised. Disinfect bench before and after the laboratory session with a disinfectant known to kill the organisms handled. The disinfectant should be ready and at hand during the session (in case a spill can occur). A disinfectant such as Virkon^R can be used. Use disinfectants according to manufacturer instructions; and be sure that concentration and time of exposure is good enough.
- Mouth pipetting is strictly forbidden.
- Do not smell or taste any reagent or culture media.
- Test tube racks should be used for moving cultures in the laboratory. Leak-proof containers for storage and transport of infectious materials should be used.
- Use of sharps should be minimised. Use needles and scalpels according to appropriate guidelines and precautions. Recap needle (if required) following strict procedures.
- Broken glass should not be handled with fingers; use a dustpan and broom.
- Product labels should be read and students should get familiar with relevant hazard symbols.
- Protective personal equipment (PPE) should be wear according to the training and hazard.
- Use of laboratory coat is compulsory (except for informatics).
- Gloves should be worn when handling hazardous chemicals.
- Gloves should be worn when handling an infectious animal and when handling animal fluids (blood, urine, etc...).
- Safety goggles or face shields should be used when procedures may create a splash hazard that can affect eyes or face.
- Coverall, coat of mail gloves, rubber or special boots can be compulsory on special circumstances.

- Use of PPEs is forbidden outside training facilities and should not be worn at lectures room, canteen, library or outside the Faculty.
 - Once work is complete, material should be discarded adequately. Contaminated material should be decontaminated (i.e. autoclaving). Culture plates, tubes, sample container should be placed in adequate trays and autoclave bags; sharp material (slides, scalpel blades, needles) should be discarded into specific single-use containers. These bags and containers should have the international symbol for biohazard.
 - If autoclaving is not available, waste removal should be carried out with the licensed system in accordance with Comunidad de Madrid guidelines (contact FVM Manager Office for information).
 - Chemical reagents should be discarded according to product nature.
 - Immune-compromised students (including those who are pregnant or may become pregnant) should discuss the situation with the instructor. According to every situation, the participation in the training could be modified.
 - Notify instructor of all spills or injuries. Also notify if you feel weak, faint or uncomfortable. Inform of any disease that may arise after the training.
 - All injuries or subsequent diseases should be recorded; if cases are frequent or can represent a health issue, responsible staff at the Faculty should be informed. Specific risks should be evaluated to implement prevention measures.
- ✓ Additional guidelines to prevent specific hazards depending on training should be applied.

2. An assessment of prevention of potential hazards associated with practical training in subjects of the Degree in Veterinary Medicine (Questionnaire)

A questionnaire including different issues related to safety was designed and submitted as a template to subjects' coordinators. The target was to identify specific hazards that students can encounter during training in the laboratory, exploration room, teaching farm, etc., and to collect information about specific prevention measures which are implemented to limit these risks.

Specifically, the questionnaire included:

1. Brief description of activities carried out during the training.
2. Type of identified hazards.
 - a) Biological hazards
 - b) Physical and chemical hazards
 - c) Contusions and injuries
 - d) Others
3. Prevention measures.

General measures.

Presentation and discussion of these risks during a demo "0"?

Is there specific training during students work aiming at reduction of risks?

Are prevention measures writing down on a specific document?

Are prevention measures available at work place and accessible to students?

Adequacy to purpose of teaching facilities.

Specific prevention measures.

- a) Biological hazards
- b) Physical and chemical hazards
- c) Contusions and injuries
- d) Others

4. Accidents record.

Is there any accident record?

Has there been any accident during the last five years?

If yes, was the case followed up? Please, explain.

Any other comment.

Results.

The questionnaire responses give accurate information of the potential hazards and their prevention. As expected, in general terms these mimic those that can be found during professional practice. Overall, biohazards are linked with subjects related to "Microbiology and Immunology", "Infectious Diseases" and "Parasitic Diseases"; in these cases, pathogens are known (spiked samples in many cases) and are classified as type I or type II (according to Spanish legislation *Real Decreto* (Royal Decree) 664/1997, May 12, and subsequent amendment, about workers protection against exposure to biological agents at the work place. Some of these are considered as zoonoses. An adequate level of biocontainment is used in these subjects, and prevention measures implemented in these training are according to those requested in the *Real Decreto*. Biohazards could also be encountered during post-mortem analysis with "General Pathology", "Special Veterinary Pathology" and "Clinical Rotation" and, to a lesser extent, at dissection room with "Anatomy and Embryology I" and "Anatomy and Embryology II". In these cases, prevention measures include adequate protective personal equipment (PPE), in addition to laboratory coat which is compulsory during all trainings, except for informatics. Specific PPEs include boots, gloves, coverall, and masks if required. Occasional exposure that may occur through contact with other animals, such as laboratory mice or dogs with "Animal Physiology II", "Propaedeutics", "Obstetrics and Reproduction I" and "Breeding and Animal Science I" are controlled by checking animal health status and vaccination.

Chemical hazards are declared by many subjects, though in most cases these can be considered mild hazards. Prevention measures are widely used and wearing adequate PPE is included, as goggles when eyes could be compromised.

Many subjects also identify the possibility of burns (Bunsen/gas burner, muffle furnace), contusions, falls on slippery floors, back lesion for heavy loads, or wounds, needle punctures (which may include self-inoculation), cutting with surgery material or broken glass (broken slides) etc. In all cases, prevention measures and adequate training are implemented to reduce the risk.

Regarding general measures, all subjects which have identified any potential hazard/s have replied positively to one or more of the questions. A "demo 0" is widely in use; this consists of an explanation devoted to the understanding of hazards that can be encounter and the need to apply prevention measures, plus basic guidelines to work under good laboratory practices and use of safety equipment. This is valid to work with microorganisms such as during "Microbiology and Immunology", but also to subjects that may be concerned with other hazards. Most subjects apply specific training during students work aiming at reduction of risks; this is reasonable because a main part of training focus on acquiring adequate professional skills. Prevention measures are designed according to every type of training and

are usually included in the manual that is available in the laboratory, or on-line in many cases. This can be also posted on the room wall. In both cases, this means that these are easily accessible to students.

Students entering the practicum have acquired knowledge on biosafety and biosecurity at lectures. The clinical training is performed in farms and at the VTH; in both cases, they are always under direct supervision of instructors. At the farms, students are going to face same hazards that they will face in their professional careers; although we have the advantage that the visited farms are known by the associate teachers (who know the animal health status). At the VTH, students also receive hands-on training about use of adequate PPE and internal guidelines. Handling of animals is directly supervised by the instructor and restraint procedures (equipment or sedation) could be used if required. Animals which are infectious or are suspected of being infectious are isolated in separated facilities. Access to these facilities is only for authorized personnel because staff and authorized students follow specific hygiene and biosecurity measures. Students must strictly adhere to guidelines and procedures described at SOPs for VTH and Teaching Farm.

A limited number of subjects declared accidents in the last five years. These accidents were related to fainting at dissection room and necropsy room, usually of students from initial years, and at the beginning of the courses; unconsciousness was brief and none required medical attention. Other accidents are related to cutting, small injuries and laboratory animals (mice) bites; these were resolved with standard wound treatment and did not require follow up. Occasional accidents related to animal handling during "Clinical Propaedeutics" and "Clinical Rotation", were followed up by instructor. No other accidents have been reported.

Laboratories, dissection and necropsy rooms, and other facilities have been properly designed, are periodically maintained and are fitted with safety equipment such as ventilation, safety hoods, body showers, and eye-wash stations. Biological, and chemical wastes, and sharps containers are placed where needed. Premises are equipped with fire detection devices, exit signals and fire extinguishers.

In all circumstances students are accompanied by teaching staff which is competent to evaluate the situation and could decide to stop the training in case of an obvious danger.

A summary of main points identified in each subject is included in the following tables.

Subject^a	Laboratory/Room (location)	Questionnaire^b	Demo "0"^c	Specific considerations^d
Anatomía y Embriología I	Dissection room (Morphology, floor level)	Available	Yes	Chemical hazard Injuries Loads Use of PPEs (gloves, goggles, closed shoes)
Bases de Producción Animal I	Lecture room 10 (Animal Productions, level 0)	Not required	-	-
Bioquímica	Laboratory Biochemistry (central building, level 2)	Available	Yes	Chemical hazard PPEs (goggles)
Deontología y Medicina Legal	Informatics rooms (central building, level 0) Seminars room -2	Available Not required	-	-

	(central building, level -2)			
Epidemiología	Informatics rooms (central building, level 0)	Available Not required	-	-
Física y Bioestadística	Laboratory Physics (central building, level -2)	Available	Yes	Minor electrocution hazard Minor injuries
Fisiología I	Laboratory III (Morphology, level 2) Laboratory Physiology (central building, level 0) Informatics rooms (central building, level 0)	Available	No	Laboratory animals handling (bites ...)
Genética	Laboratory (central building, level -2) Laboratory III (Morphology, level 2) Informatics rooms (central building, level 0)	Available	Yes	Chemical hazard Mouse handling (bites ...) PPEs (gloves)
Histología	Room S093 HCVC (level -1)	Available	No	Small injuries
Química y Zoología	Laboratory Biochemistry (central building, level -2) Laboratory Zoology (central building, level -1)	Available	No	None

^a Complete subject name (ECTS):

Anatomía y Embriología I (9) - Anatomy and Embryology I

Bases de la Producción Animal I: Etnología, Etología, Bienestar Animal e Higiene Veterinarias (6) - Animal Science Bases I: Ethnology, Ethology, Animal Welfare And Veterinary Hygiene

Bioquímica Y Biología Molecular (8) - Biochemistry and Molecular Biology

Deontología, Medicina Legal Y Legislación (3) - Deontology, Legal Medicine and Legislation

Epidemiología (3) - Epidemiology

Física Y Bioestadística Aplicadas A La Veterinaria (6) - Physics and Biostatistics applied to Veterinary

Fisiología Veterinaria I (6) - Veterinary Physiology

Genética (6) - Genetics

Histología Veterinaria (7) - Veterinary Histology

Química, Zoología Y Botánica Aplicadas A La Veterinaria (6) - Chemistry, Zoology And Botany Applied to Veterinary

^b A questionnaire on specific measures is available

^c First demo based on safety measures

^d Topic subjected to specific considerations and/or follow up

Table 2. Specific precautions and training during practice demonstrations, Second year.

Subject ^a	Laboratory/Room (location)	Questionnaire ^b	Demo "0" ^c	Specific considerations ^d
Anatomía Patológica General	Laboratory Medicine and Surgery (HCVC, level -1) Necropsy room (HCVC, level 0) Informatics rooms (central building, level 0)	Available	No	Minor biological hazard Contusion and injuries Use of PPEs (boots, gloves)
Anatomía y Embriología II	Dissection room (Morphology, floor level)	Available	Yes	Chemical hazard Injuries Loads

				Use of PPEs (gloves, goggles, closed shoes)
Bases de Producción Animal II	Laboratory Animal Productions (Agronomy, central building, level 0)	Available	Yes	Exposure to chemical hazard Use of PPEs (goggles, gloves)
Fisiología Veterinaria II	Laboratory Physiology (central building, level 0) Informatics rooms (central building, level 0)	Available	No	Animal handling (bites)
Mejora Genética	Informatics rooms (central building, level 0)	Available	Not required	-
Microbiología e Inmunología	Laboratories Animal Health 1 and 4 (central building, level -3)	Available	Yes	Biological hazard (type II pathogens) Minor chemical hazard Burn hazard
Parasitología	Laboratories Animal Health 1 and 4 (central building, level -3)	Available	Not required	No specific hazard (inactivated parasites)
Patología General	Laboratory Bio-pathology (central building, level -2) (HCVC, level 0)	Available	Yes	Biological hazard (unexpected) Chemical hazard
Propedéutica Clínica	Horse examination room (HCVC, level 0) Exploration Lab (HCVC, level -1) Teaching Farm	Available	Yes	Animal handling (contusions, bites) Heavy loads Use of restraining devices

^a Complete subject name (ECTS):

Anatomía Patológica General (6) - General Pathology

Anatomía y Embriología II (8) - Anatomy and Embryology II

Bases de la Producción Animal II: Agronomía, Economía y Gestión de Empresas Veterinarias (6) - Animal Production Basis II: Agronomy, Economics And Veterinary Business Management

Fisiología Veterinaria II (6) - Animal Physiology II

Mejora Genética de los Animales de Interés Veterinario (6) - Animal Breeding in Species of Veterinary Interest

Microbiología e Inmunología (11) - Microbiology and Immunology

Parasitología (5) - Parasitology

Patología General (6)- Nosology and Physiopathology

Propedéutica Clínica (6) - Clinical Propaedeutics

^b A questionnaire on specific measures is available

^c First demo based on safety measures

^d Topic subjected to specific considerations and/or follow up

Table 3. Specific precautions and training during practice demonstrations, Third year.

Subject ^a	Laboratory/Room (location)	Questionnaire ^b	Demo "0" ^c	Specific considerations ^d
Cría y Producción I	Lecture room 10 (Animal Productions, level 0) Informatics rooms (central building, level 0) Laboratory Agriculture (central building, level 1)	Available	Yes	Minor biological hazard (dog pathogens) Dog bites and scratches Minor contusion

	Teaching Farm			Use of PPEs (goggles, gloves) Dog: health control, vaccines
Cría y Producción II	Lecture room 10 (Animal Productions, level 0) Laboratory Agriculture (central building, level 1) Laboratory Animal Nutrition (Animal Production, level 1) Teaching Farm	Available	Yes	Minor contusion (use of milking machine)
Farmacología Clínica	Laboratory Toxicology and Pharmacology (HCVC, level 0) Informatics rooms (central building, level 0)	Available Not required	-	-
Farmacología y Farmacia	Laboratory Toxicology and Pharmacology (HCVC, level 0) Informatics rooms (central building, level 0)	Available	No	Chemical hazard Use of PPEs (gloves, goggles, mask) if needed
Nutrición Animal	Laboratory Animal Nutrition (Animal Productions, level 1) Teaching Farm	Available	No	Contact with rabbit faeces Burns Use of PPEs (gloves, thermal gloves)
Obstetricia y Reproducción I	Obstetrics and Reproduction Service (HCVC, level 0/-1)	Available	No	Handling of liquid N ₂ Handling of animals (bites, ...) Minor biological hazard (bitch, mare pathogens) Use of PPEs (goggles, special gloves) Dog, horse: health control, vaccines
Tecnología de los Alimentos	Laboratories B4 (Food Science and Technology, level 0) Room A9 (Food Science and Technology, level 0) Pilot plant (central building, level -3)	Available	No	Chemical hazard Burn hazard Contusion and injuries PPEs (goggles, coat of mail gloves)
Toxicología	Laboratory Toxicology (central building, level -2) Seminars room -2 (central building, level -2) Informatics rooms (central building, level 0)	Available	Yes	Major Chemical hazard
Radiología	-	Not required	-	-

^a Complete subject name (ECTS):

Cría y Producción I (8) - Breeding and Animal Science I

Cría y Producción II (7) - Breeding and Animal Science II
 Farmacología Clínica y Farmacoterapéutica (4) - Clinical Pharmacology and Pharmacotherapeutics
 Farmacología y Farmacia (6) - Pharmacology and Pharmacy
 Nutrición Animal Veterinaria (6) - Veterinary Animal Nutrition
 Obstetricia y Reproducción I (7) - Obstetrics and Reproduction I
 Tecnología de los Alimentos (10) - Food Technology
 Toxicología (6) - Toxicology
 Radiología y diagnóstico por Imagen (6) - Radiology and Diagnostic Imaging

^b A questionnaire on specific measures is available
^c First demo based on safety measures
^d Topic subjected to specific considerations and/or follow up

Table 4. Specific precautions and training during practice demonstrations, Fourth year.

Subject ^a	Laboratory/Room (location)	Questionnaire ^b	Demo "0" ^c	Specific considerations ^d
Anatomía Patológica Especial	Necropsy room (HCVC, Level 0, B239) Laboratory Histology (HCVC, level 0, S 093) Large Seminars room (HCVC, level -1, S021) Meeting room (HCVC, level -1, S110)	Available	Yes	Biological hazard Contusion and injuries Chemical hazard Use of PPEs (boots, gloves, masks)
Cirugía General y Anestesia	Microsurgery room (HCVC, level 0) Induction room (HCVC, level -1) Large Seminars room (HCVC, level -1, S021) Meeting room (HCVC, level -1, S110)	Available	No	Anaesthesia products Small injuries (needle, scalpel blade) Active charcoal cartridges
Enfermedades Infecciosas	Central laboratory Animal Health (HCVC, level 0)	Available	Yes	Biological hazard (type II pathogens) Minor chemical hazard Burn hazard Needle injury
Enfermedades Parasitarias	Central laboratory Animal Health (HCVC, level 0) Laboratories Animal Health 1 and 4 (central building, level -3)	Available	No	Biological hazard (type II pathogens) Chemical hazard Minor injuries (cuts, broken glass) Use of PPE (gloves) Fume hood
Higiene, Inspección y Seguridad Alimentaria	Laboratories (Food Science and Technology, level 1) Room A9 (Food Science and Technology, level 0) Training visits	Available	Yes	Use of PPEs (gloves, boots) depending of type of visit Factories and companies have safety measures

	(several locations)			in place.
Medicina Interna	Room H3 (HCVC, level 1)	Not required	-	-
Obstetricia y Reproducción II	Obstetrics and Reproduction Service (HCVC, level 0/-1)	Available	No	Handling of liquid N ₂ Use of PPEs (goggles, special gloves)
<p>^a Complete subject name (ECTS): Anatomía Patológica Especial (8) - Special Veterinary Pathology Cirugía General y Anestesia (6) - General Surgery and Anaesthesia Enfermedades Infecciosas (12) - Infectious Diseases Enfermedades Parasitarias (9) - Parasitic Diseases Higiene, Inspección y Seguridad Alimentaria (14) - Food Hygiene and Inspection and Food Safety Medicina Interna I (6) - Large Animal Internal Medicine Obstetricia y Reproducción II (5) - Obstetrics and Reproduction II</p> <p>^b A questionnaire on specific measures is available ^c First demo based on safety measures ^d Topic subjected to specific considerations and/or follow up</p>				

Table 5. Specific precautions and training during practice demonstrations, Fifth year.				
Subject^a	Laboratory/Room (location)	Questionnaire^b	Demo "0"^c	Specific considerations^d
Medicina Interna II	Small animals exploration room (HCVC, Level -1)	Available	Not required	-
Cirugía Especial	Microsurgery room (HCVC, level 0) Small animals exploration room (HCVC, level -1) Small Seminars room (HCVC, level -1, S021)	Available	Yes	Anaesthesia products Animal handling (bites, scratches..) Small injuries (needle, drill bits, scalpel blade) Ventilation, equipment
Medicina Preventiva	Informatics rooms (central building, level 0) Main auditorium	Not required	-	-
Animales de Experimentación	Animal Testing Facilities (Physiology)	Not applicable		
Historia de la Veterinaria	Library (Animal Health, level 1) Informatics rooms (central building, level 0) Museum (HCVC, level -1) Library of the Faculty (central building, level -1)	Available	-	-
Clínica de los Animales Exóticos	Exotic pets consulting room (HCVC, level 0) Dissection room (Morphology, level 0)	Available	Yes	Biological hazard Animal handling (bites, scratches) Small injuries

	Informatics rooms (central building, level 0) Laboratory Pharmacology (central building, level 1) Informatics rooms (central building, level 0)			(needles, scalpel blades) Use of PPEs (gloves, masks, hand-sanitizer)
Diagnóstico Clínico Laboratorial	Laboratory Biopathology (HCVC, level -1, S091) Laboratories Animal Health (HCVC, level -1)	See Patología General, and Microbiología e Inmunología	-	-
Acuicultura e Ictiopatología	Laboratory Animal Health 3 (central building, level -3) Laboratory (Animal Production, level 1) Laboratory Zoology (central building, level -1) Laboratory microscopy (HCVC, level -1) Laboratory Toxicology (central building, level 1) Training visits	Available	Yes	Minor chemical hazard Small injuries(needles, scalpel blades) Use of PPEs (gloves)
Veterinaria y Medio Ambiente	Laboratory Zoology (central building, level -1) Informatics rooms (central building, level 0) Training visits	Available	Yes	Depending on activity Biological Hazard Use of PPEs (coverall, gloves, mask)
Prácticas externas	Training stage	-	-	Same as in professional practice
Rotatorio Clínico de Medicina, Cirugía y Sanidad Animal	HCVC Training visits	Available	No	Biological hazard Chemical hazard (cytotoxic drugs) Animal handling (bites, scratches) Use of PPEs (gloves, mask) Restraint devices PhaSeal™ System HCVC SOPs
Rotatorio de Higiene, Seguridad y Tecnología de los Alimentos	Training visits	See Higiene, Inspección y Seguridad Alimentaria, and Tecnología de los Alimentos	No	Chemical hazard Burn hazard Contusion Use of PPEs (gloves, mask, thermal gloves, metallic gloves, anti-slip boots)
Rotatorio Producción Animal	Laboratories (Animal Production) Informatics rooms (central building, level 0) Teaching Farm Training visits	Available	Yes	Biological hazard Allergen exposure Animal handling Minor chemical hazard Contusion, injuries, loads

				PPEs (goggle, gloves, coverall) Animal health control Teaching Farm SOP
Trabajo Fin de Grado	-	-	-	According to experimental work
^a Complete subject name (ECTS): Medicina Interna II (8) - Small Animal Internal Medicine Cirugía Especial (8) - Special Surgery Medicina Preventiva, Política Sanitaria y Salud Pública (8) - Preventive Medicine, Animal Health Policy, Zoonosis and Public Health Animales de experimentación (Opt.) (3) - Laboratory Animals (elective) Historia, Documentación y Teoría de la Veterinaria (Opt.) (3) - History, Documents and Theory of Veterinary (elective) Clínica de Animales Exóticos (Opt.) (3) - Clinical Medicine of Exotic Pets (elective) Diagnóstico Clínico Laboratorial (Opt.) (3) - Clinical Diagnosis by Laboratory (elective) Acuicultura e Ictiopatología (Opt.) (3) - Aquaculture and Fish Pathology (elective) Veterinaria y Medioambiente (Opt.) (3) Veterinary Sciences and Environment (elective) Prácticas Externas (3) - External Practice Rotatorio Clínico de Medicina, Cirugía y Sanidad Animal (15) - Clinical Veterinary Practicum Rotatorio de Higiene, Seguridad y Tecnología de los Alimentos (3) - Food Hygiene, Safety and Technology Practicum Rotatorio Producción Animal (3) - Animal Science Practicum Trabajo Fin de Grado (6) - End of Degree Project ^b A questionnaire on specific measures is available ^c First demo based on safety measures ^d Topic subjected to specific considerations and/or follow up				

Assessment of students

The awareness of students doing practice at the HCVC was evaluated with the collaboration of two students of fifth year (Antonio Mateos and Blanca Perez). The aim of this study was to test how VTH students perceive the risks of the profession, how they prevent them and how are they taught about zoonotic diseases. The evaluation was based on a set of 11 questions that were asked in a written and online questionnaire, which was answered by 51 of these students during the last course (2015-16), on a volunteer basis. These students were from third (13), fourth (20) and fifth (18) year. These questions addressed general hygiene measures, knowledge on zoonoses and opinion about the knowledge they had received throughout curriculum. 78.4% of students knows in deep different zoonoses (mainly mange, rabies, ringworm and *Giardia* infection), 23.5% declare to know human cases of infection, but 47.0% of students perceive the risk as low.

The study and results were presented as an oral presentation “Perception of biosecurity within partnership students of the Complutense Veterinary Clinical Hospital. Are veterinary students aware of profession’s risks?” at the XV *Congreso de Ciencias Veterinarias y Biomédicas*, 21-23 April, 2016.

The slides used in the presentation are attached (file: Students_seminar_perception.pdf).

3. Seminars for first-year student

A seminar called "Seminars on training and prevention of occupational risks and biosafety" is given annually to students of first year. These two-part seminars are intended to open their minds about the risks they are going to find not only at the Faculty, but also during their professional career. First part is devoted to general concepts, such as hazards and prevention, good laboratory practices, work with chemical reagents, etc.; and second part is related to biosafety and other hazards directly associated to veterinary work. To make sure of students participation, attendance to the seminar is compulsory and a short test (multiple-choice format) is added.

Specifically, the presentation on biosafety introduces new concepts to students such as the responsibility at the laboratory and potential hazards, occupational zoonoses, classification of biological agents, biosafety levels, etc. The basic rules for properly working in the lab in order to minimise the risks and the adequate use of basic PPEs are explained. Specific time is devoted to the simple and effective correct hand washing (and limited use of mobile phones). Regarding students health, there is not obligation for a specific vaccine program; Spain is free from rabies (as recognised by OIE) and the tetanus toxin is included in childhood program; anyway, the options for a future are explained. A warning for students in a situation which could affect immune response is also added and they are advised to directly contact the subject coordinator or the responsible staff at the FVM. The presentation ends with a recommendation of lifelong learning. Basic references (legislation and manuals) and short videos at internet are included.

The slides used in the presentations are attached (file: Students_introduction_biosafety.pdf).

The two videos recorded during the seminar of current year "Jornada de Formación y Prevención en Riesgos Laborales y Bioseguridad", 28 October 2016, are available on-line at the biosafety area of the Faculty webpage for further access:

<https://veterinaria.ucm.es/jornada-de-formacion-y-prevencion-en-riesgos-laborales>

4. Additional student training on biosafety

Student training has been designed to provide also progressive learning on biosafety and biosecurity. In addition to seminar to First Year students, and "demo 0" they attend in different subjects, this is formally presented during a lecture at "Microbiology and Immunology" (second year). This learning is also supported with the audiovisual material "Laboratorio virtual de Microbiología Veterinaria" (Editorial Complutense), developed by academic staff of the Department of Animal Health, available online for the students.

There is also a specific group of lectures on Zoonoses and Public Health at the end of topic "Preventive Medicine, Animal Health Policy, Zoonosis and Public Health" (fifth year). The topic "Zoonoses" is offered to students as an elective seminar in the latter subject; some students are specifically interested on occupational zoonoses.

During training visits (farms, slaughterhouses, etc), students are provided with disposable PPE (gloves, overboots, coverall, masks), as required according to specific hazards. These are used to protect students and also to reinforce the training on biosecurity measures to prevent introduction of infectious diseases in the farms. These have been explained specially on the subjects "Infectious Diseases" and "Preventive Medicine, Animal Health Policy, Zoonosis and Public Health".

Conclusions

In summary, great efforts have been directed to improve biosafety and prevention against hazards during practical training. Results based on questionnaire evaluation and limited number of accidents (all of mild characteristics) stress the fact that preventive measures have been adequate. However, a potential weakness of the system is a possibility of underreporting by students. A short term action will be to highlight the need of this feedback at the periodic meetings with students.

Despite safety and biosecurity problems are not a cause of concern based in conformity with prevention measures, training in some specific subjects may imply specific hazards, in case of non-compliance with preventive measures. Thus, the Committee is going to enhance the follow-up of students during training at "Infectious Diseases", "Parasitic Diseases", "General Pathology", "Special Veterinary Pathology", "General Surgery and Anaesthesia", and "Clinical Rotation".