

One Health and Major and Endemic zoonosis

Organization: Universitat Autònoma de Barcelona

Teaching unit coordinator: Marga MARTIN

Position: Professor

Teaching unit outline (summary 5 to 10 lines with the main learning outcomes)

This module will start with a brief introduction to the most common epidemiological and risk assessment concepts and tools. Then, the general concepts of zoonosis and the evolutionary mechanisms of infectious agents for persisting despite the attack of the immune system and the current and future therapeutic agents or strategies will be introduced. The relevance and the final impact in the public health of these pathogens' escape and resistance mechanisms will be also evaluated. The biological, epidemiological, pathogenic, diagnose and control mechanisms of the most relevant zoonoses in the world will be presented from One Health concept perspective.

Topics addressed

Epidemiology: Basic epidemiological concepts, surveillance, risk assessment and geographic information systems.

Introduction to zoonoses and etiological agents: history of zoonoses; definitions, pathogens' mechanisms to avoid immune system.

Antimicrobial Resistance: multi-resistant zoonotic bacteria; use of antibiotics in animal production and MDR; consume and self-medication in human medicine and MDR; impact of multi-resistance in nosocomial infection; resistance against antiparasitic and antifungal products; new treatments and therapeutical approaches; the role of wild animals as reservoirs.

Major Bacterial Zoonoses: mycobacterias' molecular epidemiology; tuberculosis in humans and animals, new vaccine strategies and sanitation campaigns, control and communication; human and animal health actions against brucellosis; rickettsiosis; Lyme disease and other borrelias; Q fever; zoonoses of companion animals; tularaemia.

Major Viral Zoonoses: evaluation, control and communication of rabies; influenza A and the role of domestic and wild animals, the surveillance programme, antiviral resistances and new treatments; Coronavirus, MERSCo, SARS; research and communication skills in human outbreaks.

Major Parasitic and mycotic Zoonoses: Toxoplasmosis (control in cats, wild reservoirs, in pregnant women; leishmaniasis (in dog, in humans, new vaccines,); hydatidosis/ *Echinoccus multilocularis*; other parasitic zoonoses from companion animals; mycotic zoonoses in domestic animals.

Lab practices (Workshops): microbiological, immunological and molecular diagnostic tools and interpretation.

One health in emergent diseases and in special situations

Organization: Universitat Autònoma de Barcelona

Teaching unit coordinator: Laila DARWICH

Position: Professor

Teaching unit outline (summary 5 to 10 lines with the main learning outcomes)

The biology, epidemiology, pathology, diagnosis and control mechanisms of the exotic and emergent diseases and the zoonoses in special situations will be presented under the OH approach in monographic sessions and round tables or debates. These special situations comprise: HIV immunosuppressed populations, emergency sanitation and health system management in low-income countries. A One Health vision of the topics will be implemented and the particularities of tropical and subtropical ecosystems will be studied with special emphasis in the endemic zoonotic microorganisms' lifecycles and the importance of vectors and the globalization effect on OH (international human transits and animal-plant free trade).

Topics addressed

Emergent and re-emergent pathogens: Introduction and risk assessment in exotic and emergent zoonoses (effect of climatic change in vectors and diseases; arbovirosis ; entomology; surveillance systems and vector control; other viral zoonoses: ebola outbreaks ; hepatitis E ; *C difficile*, and tropical parasites (epidemiology, clinics, diagnose and treatment of malaria; helminths; neurocysticercosis; trypanosomiasis)

Veterinary Border control: role and mission of veterinary border inspection posts (BIPs)

Management of zoonoses in situations of public health alerts, threats or emergency sanitation: management of epidemics and public health crisis; risk communication in emergencies; risk assessment and contingency protocols.

Zoonoses in HIV and immunodeppressed population: VIH situation updates; role of pets and companion animals as a zoonotical risk; New therapies in immunosuppressed patients.

Control and management of zoonoses in low-income countries: public health, risk evaluation and communication in developing countries

Lab practices : entomology identification; parasitology

External visits: the Clinical Lab of Vall d'Hebron Hospital in Barcelona

Workshop : Health Emergency response (NGOs)

Module: One Health in Food Safety

Module coordinator: Artur Xavier Roig

Module outline

In this module, the fundamental elements of food safety and security will be taught under the One Health approach through theoretical and practical sessions or by doing practical cases. The main food borne zoonoses, the factors of its rise and the consequences in human health will be studied. The reservoirs, the most likely ways of contamination and its impact on the different types of food will also be presented. The main politics related to food safety will be discussed from national, European and global perspective. Finally, risk evaluation and contaminant detection from public health agents and food industry will be taught during the practices.

Topics

Evolution of management and communication politics in food safety and security: principles and proceedings for risk assessment in food safety; management and communication of risk in food safety; the concept of “Food defense” in food borne zoonoses.

Evolution of food borne zoonoses in Spain, Europe and World: effect of globalisation in food borne zoonoses; control tools in primary production; on-line tools for food-borne outbreaks information.

Food borne bacteria zoonoses: Salmonella spp., Campylobacter spp, *Yersinia enterocolitica*, *Listeria monocytogenes*, *Escherichia coli* VT, *S.aureus* and other coagulase-positive Staphylococcus; consume of toxins from *Clostridium botulinum*, *C. perfringens* and *Bacillus cereus*.

Food borne parasitistic zoonoses: protozoa; trematodes and cestodes; anisakiasis, trichinellosis and other zoonoses caused by nematodes.

Other and new food borne agents: virus like hepatitis A, calicivirus and noroviruses; prions; mycotoxicosis and other biotoxines.

The three pillars of Food Safety and Security: food availability; food access; food utility and stability.

Practical sessions in informatics: tertiary predictive models for process validation and risk assessment in zoonoses; data assessment from “challenge tests”

Practical sessions in laboratory: protocols for the evaluation of the presence of pathogenic microorganisms in food; use of microbiological biomarkers.

Learning : 6 ECTS

Lectures: 25h

Seminars: 10h

Practices: 5h

Independent work: 110h

Assessment

75% Resolution of practical exercises

25% Review of a research paper

Module: Biosafety and Biosecurity

Module coordinator: Xavier Abad

Module outline

In this module, students will be introduced to the concept of biosafety and biosecurity and will know the hazard criteria and the categorisation of most important disease agents. The risk assessment and the management and handling of human people and animals under biocontainment will be discussed. The characteristics and specifications of different biosafety laboratory levels will be presented. Students will be trained to work in the highest levels of biosafety laboratories and animal housing facilities (BSL3 and BSL4).

Topics

Hazard Criteria and Categorisation of Microbes

BSL3 and BSL4 Lab Technical specifications

Risk assessment procedures and Biosecurity

Experimental procedures with animals under biocontainment

Practices: how to move in and out of BSL3 lab, handling of virus, cell cultures and spore forming bacteria in BSL3, handling positive pressure masks.

Learning : 3 ECTS

Lectures: 20h

Practices: 20h

Independent work: 35h

Assessment

50% Evaluation of performance in the BSL-3 laboratory

50% Review of a research paper