

**Epidemiology and Statistics**

Code: 102643  
ECTS Credits: 6

Degree	Type	Year	Semester
2502445 Veterinary Medicine	OB	2	1

**Contact**

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**Use of Languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: No  
Some groups entirely in Spanish: No

**Teachers**

Jordi Casal Fàbrega  
Lluís Quer Roca

**Prerequisites**

It is highly recommended to have adequate knowledge of mathematics.

**Objectives and Contextualisation**

The Epidemiology and Statistics course is of the second year and is a compulsory subject of the degree of Veterinary studies. The subject introduces in the bases of the application of the statistics to the veterinary sciences and in the basic concepts of epidemiology that allow to understand the evolution of the diseases in the populations.

The objective of the subject is that the student knows the terminology and the methods used in statistics and in epidemiology.

The specific objectives are that the student knows:

- What are the basic statistical tests and in what situations can they be used.
- Apply the basic statistical tests and interpret the numerical results.
- Know the behavior of diseases and infections in animal populations.
- Design and carry out simple epidemiological studies.
- Apply the most appropriate study and epidemiological methods in each case.
- Develop the analytical and critical capabilities of an epidemiological study.

**Competences**

- Analyse, synthesise and resolve problems and make decisions.
- Apply scientific method to professional practice, including medicine
- Apply the basics governing the transmission and maintenance of diseases in animal populations.
- Assess and undertake epidemiological studies and therapeutic and preventive programs in accordance with the standards of animal welfare, animal health and public health.
- Demonstrate knowledge and use of statistical concepts and methods applicable to veterinary science.
- Diagnose different individual and collective animal diseases, and know about prevention measures, with emphasis on zoonoses and notifiable disease.
- Value and interpret the production and health parameters of one animal group, considering the economic and welfare aspects.

## Learning Outcomes

1. Analyse, synthesise and resolve problems and make decisions.
2. Apply appropriate statistical methods to different types of epidemiological studies.
3. Apply concepts related with the transmission and maintenance of diseases in populations to the analysis of real-life situations.
4. Apply scientific method to professional practice, including medicine
5. Apply the concepts of statistics and epidemiology to the analysis of production and health parameters.
6. Calculate and interpret measures of position and dispersion applicable to a data series.
7. Define the epidemiological and statistical bases of evidence-based medicine.
8. Describe the basic foundations of disease prevention programs.
9. Design and perform simple epidemiological studies, selecting the most suitable for each case.
10. Develop the capacity for critical appraisal of epidemiological studies.
11. Distinguish the different types of epidemiological studies and their utility.
12. Explain the evolution of diseases in populations and the factors that determine the same.
13. Identify the pathways and methods for transmitting diseases.
14. Properly evaluate the efficiency of a diagnostic test in terms of its application to a population.
15. Recognise and describe basic causality and causal inference, and their relationship with statistics.
16. Recognise the statistical distributions of a variable.
17. Select, apply and interpret the most commonly used parametric and non-parametric statistical methods in veterinary science.

## Content

Lectures (34h)

Presentation and introduction (1h)

Block 1: Basic concepts in epidemiology and statistics (12h)

Methods of transmission and maintenance of the infection (1h)

Determinants of illness (1h)

Measures of frequency of illnesses (2h)

Temporary and spatial distribution of the disease (1h)

Descriptive statistics (2 h)

Probability and random variables (3h)

Diagnostic tests (2h)

Block 2: Epidemiological studies (18h)

Epidemiological Surveys (1h)

Population and sample, parameters and estimators. Interval of trust (3h)

Sampling (3h)

Types of epidemiological studies (1h)

Measures of association and impact (1h)

Sampling in epidemiological studies (1h)

Bias, interaction and confusion (2h)

Introduction to hypothesis contrast and value-p (1h)

Analysis of variance (2h)

Chi-square test (1h)

Linear Regression (2h)

Block 3: Economy and disease control (3h)

Basic rate of reproduction of the disease and characteristics of the host and the agent that can affect the same (1h)

Technical bases for the control of diseases (1h)

Disease economy (1h)

Computer Practices: (10h)

Introduction to the program R. Descriptive statistics (2h)

Assessment of diagnostic methods and rates (2h)

Hypothesis tests and ANOVA (2 h)

Chi-square test and regression (2h)

Analysis and interpretation of data in the context of an epidemiological study (2h)

Debate in the classroom (6h)

Statistical problems (2h)

Design of epidemiological studies (2h)

Analysis and interpretation of data in the context of an epidemiological study (2h)

Non-presential: 95h

Self study: 65h

Development of works:30h

Preparation of exposure on epidemiological study design (10h)

Preparation of exposure on analysis and interpretation of data in the context of an epidemiological study (20h)

## Methodology

Teaching methodology will involve classes of theory that we will try to make as many participants as possible.

We will also do practical classes in the computer room in which students will have to obtain the statistical and epidemiological parameters of different databases.

At the same time, students will have to prepare problems that will be discussed later in class and solve any possible doubts that may arise.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Computer work	10	0.4	1, 4, 5, 2, 6, 9, 15, 16, 17
Debate at class	6	0.24	
Lectures	34	1.36	4, 5, 2, 8, 10, 11, 12, 13, 15, 16, 17
Type: Supervised			
Development of works	30	1.2	1, 4, 5, 3, 2, 6, 8, 10, 9, 12, 13, 15, 16, 17
Type: Autonomous			
Self study	65	2.6	4, 3, 8, 10, 9, 11, 12, 13, 15, 16

## Assessment

Attendance at the practical classes is mandatory to pass the subject.

The final grade is calculated based on:

- Statistical exam (30% of the note). The exam will be of short questions and problems.
- Epidemiology exam (40% of the note). The exam will be of test and short questions.
- 3 exercises (30% of the note).
- . Assistance and deliveries of the statistical practices (5% of the note)
- . Oral presentation on design of epidemiological studies (10% of the note)
- . Oral presentation on analysis and interpretation of data in the context of an epidemiological study (15% of the note)

To approve, you need to take a minimum of 5 of each one of the exams. The last week the exam and the two analysis works of a database can be retrieved. If you have to go to recovery, the student must be examined of the part that is below 5. Students who have approved and want to raise their note should keep in mind that only the final exam will be considered.

## Assessment Activities

Title	Weighting	Hours	ECTS	Outcomes
Assistance and deliverables of statistical practices	0,05	0	0	1, 4, 3, 2, 6, 10, 11, 12, 13, 15, 16, 17, 14
Epidemiology exam	0,4	1.5	0.06	1, 3, 2, 7, 8, 10, 9, 11, 12, 13, 15, 14
Oral presentation on analysis and interpretation of data in the context of an epidemiological study	0,15	2	0.08	1, 4, 5, 3, 2, 7, 8, 10, 9, 11, 12, 13
Oral presentation on design of epidemiological studies	0,1	0	0	1, 4, 5, 3, 7, 10, 9, 11, 12, 13
Statistical exam	0,3	1.5	0.06	1, 5, 2, 6, 15, 16, 17

## Bibliography

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Petrie A.Watson P., Statistics for Veterinary and Animal Science (3d. ed.) Wiley-Blackwell, 2013.

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<http://www.vetmed.wisc.edu/education/courses/epi/Pfeiffer.pdf>

Stevenson M. (2011). An Introduction to Veterinary Epidemiology.  
[http://epicentre.massey.ac.nz/Portals/0/EpiCentre/Downloads/Education/227-407/Stevenson\\_intro\\_epidemiology](http://epicentre.massey.ac.nz/Portals/0/EpiCentre/Downloads/Education/227-407/Stevenson_intro_epidemiology).

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