## Faculty of Medecine

| ESP3420 | Statistique médicale |
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[22.5h+7.5h exercises] 3 credits

**Teacher(s):**     Annie Robert
Language:           French
Level:              Third cycle

## Aims

To propose to the student the procedure to follow in the analysis and the interpretation of the data collected during a medical study.
At the end of the course, the student should be able to identify the type of medical study, the health indices which can be estimated and the potential bias, together with the necessary size to conduct the study. In a specific problem, he or she should be able (1) to set the research hypothesis in scientific terms, (2) to describe adequately the numerical data of the problem, (3) to formulate the research question in statistical terms of a hypothesis test, (4) to select a decision level, (5) to choice a statistics for testing, appropriate to the sample and to the type of data for calculating a p-value, (6) to draw a conclusion on the statistical signification and (7) to draw a conclusion on the clinical signification and causality.

## Main themes

The tools of the formation are (1) the designs of medical investigations according to a time scale, a regrouping and a pragmatic or explanatory aim, (2) absolute health indices like mortality, incidence, prevalence, and odds and relative health indices like risks ratio or the odds ratio, (3) descriptive statistics in samples and the basics for data transformations, (4) statistical estimation with standard error and confidence interval, in peculiar the one of a sensitivity or specificity of a diagnostic criterion and the one of absolute or relative health indices, (5) the procedure for testing a statistical hypothesis and the meaning of a p-value, (6) the basic statistical analyses : to compare a continuous or a discrete variable between two paired or parallel groups and to establish a statistical association between two continuous or discrete variables in a cohort and (7) the assessment of a potential confounder or of a potential modifier in the estimation of an effect.
The conception of a protocol for a medical study and multivariate methods are not part of this course.

## Content and teaching methods

Content: studies classification, epidemiologic indices, systematic biases, statistical descriptive analysis and one dimension parametric inference: to compare a variable between two groups or to establish a relation between two variables in one group.
Method: The formation method is an apprenticeship by problems targeting the knowledge of statistics tools and their applications, the analysis and the synthesis of a problem by using statistical tools. At the beginning of the formation, each student receives a medical problem that he or she will progressively analyse, together with teacher's progressive lectures. There is only one course statement for all the students but their associated data are individual.
A lecture and exercises sessions (EXO) are held each week, during 7 weeks. During the lecture, the tools are extracted from a specific concrete case, interpreted in the case context and transferred in an abstracted statement. During the EXO's in the computers room, an assistant will guide the problems resolution, using a student version of SPSS statistical software.

## Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Pre-required:
MED2430 formation, "Basics for Medical statistics", is required. Any student can follow it during the 7 weeks preceding the beginning of ESP3420.
Evaluation:
Half of the evaluation is based on an examination with open books, focusing mainly on the identification, interpretation and validity of tools. The second half of the evaluation is based on the submitted synthesis report on the health problem given to the student at the beginning of the formation.
Supporting tools:
A syllabus and an exercises book are available from the commencement of the formation. The student can acquire personally a Student SPSS software version (http://eibr.sgsi.ucl.ac.be/spss/spss.etudiants.html) or can access it for free in the computers room of the Faculty of Medicine, providing he or she is enlisted in the course.
A book is strongly recommended: Motulsky H. Intuitive Biostatistics. OUP Ed (1995) in English and de Boeck Ed (2002) in French.
Teaching team:
Assistants lead 40 hours of practical exercises. There are 5 groups of 30 to 40 students and 8 hours per group. Two hours a week, the teacher and assistants will be available for explanations for the students who request it.

## Other credits in programs

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| **ESP3DS/HA** | Diplôme d'études spécialisées en santé publique (Administration hospitalière) | | |
| **ESP3DS/PP** | Diplôme d'études spécialisées en santé publique (santé au travail - pathologie professionnelle) | | Mandatory |
| **ESP3DS/TI** | Diplôme d'études spécialisées en santé publique (santé au travail - toxicologie industrielle) | | |
| **HONU22/G** | Deuxième licence en sciences de la santé publique (gestion des institutions de soins, gestion hospitalière) | | Mandatory |
| **HONU22/N** | Deuxième licence en sciences de la santé publique (gestion des institutions de soins, admini. soins infirmiers) | | Mandatory |
| **MD3DA/MO** | Diplôme d'études approfondies en sciences de la santé (sciences de la motricité) | | Mandatory |
| **MDTR21MC** | Première année du master complémentaire en médecine du travail | (3 credits) | Mandatory |
| **SBIM13BA** | Troisième année de bachelier en sciences biomédicales | (3 credits) | Mandatory |
| **SBIM1PM** | Année d'études préparatoires au master en sciences biomédicales | (3 credits) | Mandatory |
| **SCOM21** | Première licence en sciences de la santé publique (Promotion de la santé, programmes et services de santé communautaire) | | Mandatory |
| **STAT3DA/B** | diplôme d'études approfondies en statistique (biostatistique et épidémiologie) | (3 credits) | Mandatory |