Medical Informatics and Biostatistics

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OUTLINE

- PRESENTATION
- OBJECTIVES
- UNIVERSITY POLICY: RULES AND REGULATIONS
- ABOUT EXAM - EXAM POLICY
- SUBJECTS AND SCHEDULES
- WHAT ABOUT?

PRESENTATION

- Course: 1 hour / week
- Practical activities: 2 hours/week
- When ?: 1st semester
- Exam Sessions
  - 1st : January 21ST, 2013 – February 15th, 2013
  - 2nd: June 10th – July 5th, 2013
  - 1st Re-taken: July 15rd – July 19th, 2013
  - 2nd Re-taken : July 25th – July 31st, 2013

PRESENTATION

- Contact: sbolboaca@umfcluj.ro
- Preliminary conditions:
  - Arithmetic knowledge

    Gilmore CK, McCarthy SE, Spelke ES. Symbolic arithmetic knowledge without instruction. Nature 2007;447:589-591.
- Web pages:
  - http://sorana.academicdirect.ro/pages/students.php
  - http://www.info.umfcluj.ro/

PRESENTATION: Faculty of Dentistry

- Course: Monday 9-10
- Practical activities:

Group	Teacher?	When?
1	Sorana D. BOLBOACĂ	Monday 10-12
2	Sorana D. BOLBOACĂ	Monday 10-12
3	Cosmina I. BONDOR	Monday 12-14
4	Cosmina I. BONDOR	Monday 12-14

- Materials:
  - Courses presentations & Practical activities materials & SupplMat

PRESENTATION: Faculty of Medicine

- Course: Wednesday 8-9
- Practical activities:

Group	Whom?	When?
1	Sorana D. BOLBOACĂ	Wednesday 10-12
2	Mădălina A. VĂLEANU	Wednesday 10-12
3	Dan ISTRATE	Wednesday 10-12
4	Sorana D. BOLBOACĂ	Wednesday 10-12
5	Sorana D. BOLBOACĂ	Thursday 8-10
6	Mădălina A. VĂLEANU	Thursday 8-10
7	Dan ISTRATE	Thursday 10-12
8	Dan ISTRATE	Thursday 10-12

- Materials:
  - Courses presentations & Practical activities materials & SupplMat & Reading materials

General Goals

- To help students to gain
  - basic information about information technologies with applications in dentistry
  - basic methods of statistics in dental research and practice

THEORETICAL KNOWLEDGE
- What is need to know?

- Elements of information theory.
- Data structures. Models and systems for information management.
- Probabilities and their dental.
- Statistical methods and their applications.

SKILLS - What students know to do?

- Microsoft Word processing.
- Collecting data; data management with Microsoft Excel.
- Statistical analysis with Microsoft Excel & EpiInfo.
- Data communication using Microsoft PowerPoint and Microsoft Word.
- Searching and accessing information using Internet.

PRESENTATION: MATERIALS

- Courses presentations
- Practical activities materials
- SupplMat
- Reading materials
- Other bibliography:
  - Sorana BOLBOACĂ, Horaţiu COLOSI, Tudor DRUGAN, Andrei ACHIMAŞ, Ştefan ŢIGAN, Elements of Medical Informatics and Biostatistics, SRIMA Publishing House, Cluj-Napoca, Romania, 211 pages, 2003, ISBN 973-85285-0-X.
  - Bernard ROSNER, Fundamentals of Biostatistics, any edition.
  - Robert H. RIFFENBURGH, Statistics in Medicine, any edition.

UNIVERSITY POLICY

Art. 54 Frecvența la activitățile practice (stagii, lucrări practice, seminarii) este obligatorie.

Art. 56. Pentru a realiza integral numărul de credite aferent unei discipline de studiu, studenții au obligația să participe la minim 70 % din cursurile disciplinei respective.

Art. 57. (1) Absențele într-un cuantum mai mare de 30% din totalul orelor de curs atrag neadmiterea studentului la examen în sesiunea respectivă şi pierderea unei şanse de a susține examenul.

Art. 61. (1) Motivarea absențelor înregistrate la discipline se face de către conducerea facultății, pe baza actelor justificative şi a cererii individuale înregistrată la secretariatul facultății.

(2) Depunerea documentelor justificative la decanat trebuie realizată în termen de cel mult 10 (zece) zile lucrătoare de la reluarea activității didactice de către student.

(3) Motivările nedepuse la decanat în timpul sus menționat nu sunt luate în considerare, iar absențele aferente sunt considerate nemotivate.

http://www.umfcluj.ro/Document_Files/Noutati/00000586/oh4n5_21015%20ROL%20REGULAMENT%20ACTIVITATE%20DIDACTICA%20licenta%20.pdf

University Policy - Student Responsibilities

1. To carry out their obligations as stipulated in the curriculum.
2. To show respect towards the academic community (both within and outside the institution).
3. To pay their tuition fees as well as the other financial dues on time, in accordance with the Study Agreement.
4. To take good care of all the assets that are put at their disposal by the university - the student hostels, student cafeterias, laboratories, auditoriums, clinical hospitals -, and to be held responsible in case of damaging the above.
5. To observe the University Charter and the provisions of these Regulations.

University Policy - Attendance

- Attendance to practical activities (clinical practicum, practical courses, seminars) is 100% compulsory. Each undergraduate has to complete the entire practical activity programme.
- To complete the number of credits allotted to a subject matter, undergraduates must attend 70% of the courses of the respective subject matter. ~ 10
- A student is allowed to compensate up to 20% of the teaching activities in each subject matter. ~ 3
- The student will not be allowed to sit an exam until all missed practical course classes have been compensated for.

University Policy - Examinations

- Undergraduates' knowledge is tested through examinations. Students are assessed with scores from 1 to 10.
- The pass score is 5 out of 10.
- The final forms of testing are written theoretical examinations & practical examinations.

1. Evaluarea cunoștințelor studenților se face prin examene. Aprecierea cunoștințelor studenților se face cu note de la 1 la 10. Nota minimă de promovare este nota 5. Formele finale de examinare sunt reprezentate de: examenul teoretic și examenul practic. Disciplinele cărora, prin specific, nu le poate fi asociat un examen practic, vor desfășura, în locul acestuia, un colocviu de evaluare finală. Promovarea examenului final este condiționată de obținerea notei de promovare (minimum 5) la ambele forme de examinare (atât scris cât și practic). Prezentarea studenților la o singură probă se notează în catalog cu nota 4. La reexaminare studentul susține doar proba care nu a fost promovată.

UNIVERSITY POLICY - EXAMINATIONS

- Students are allowed to sit an examination only if they are listed in the official students' record issued by the Dean's Office of each faculty.
- In order to pass a year of study, at least 45 credit units out of the 60 credits allotted for a year of study must be obtained. A total of 15 credits can be transferred to a subsequent year of study.

2. Studenții nu vor fi admiși în examen decât pe baza catalogului emis de decanat, catalog prin care se atestă oficial calitatea de student și îndeplinirea la zi a obligațiilor financiare.
4. Promovarea unui an universitar necesită obținerea a minimum 45 de credite din totalul celor 60 de credite alocate unui an de studiu. Se pot transfera într-un an de studiu superior un număr de cel mult 15 credite. Pentru promovarea într-un an de învățământ superior este necesar ca suma creditelor transferate din anii inferiori să nu depășească 15 ECTS. În calculul unităților de credit obținute într-un an universitar nu sunt incluse unitățile de credit obținute în acel an din credite restante. Pentru creditele transferate se plătește o taxă conform Anexei "Taxe școlare" din Regulamentului didactic și de activitate profesională a studenților.

University Policy - Examinations

- In an academic year students can sit an examination three times at the most. The curriculum includes four examination sessions (the winter session, the summer session and two autumn sessions in the continual system).
- The third time a student sits the examination they have to pay as stipulated in the “Tuition Fees” chapter.
- In the last autumn session (the 4th examination session of the academic year) only students who have sat at least one of the previous examinations may sit another one.
- The dates for sitting the written examinations will be scheduled in agreement with the students’ representatives.
- Re-testing for a higher score is allowed only following the approval of the Faculty Council Board as follows: in the faculties of the university a maximum of 6 times during the university studies and not more than twice in one academic year.
- Fraud within examinations will be punished. The Faculty Council Board will receive proposals from departments in fraud cases. The proposals will be analyzed and sent to the Faculty Council for approval.

About Exam - Exam Policy

- Practical exam:
  - Solve tasks using computer
  - 14th January 2013 (Dentistry)
  - 16th January 2013 (Medicine – gr. 1-4)
  - 17th January 2013 (Medicine – gr. 5-8)
- Theoretical exam:
  - Multiple choice questions
    - Five possible response (A, B, C, D & E);
  - Number of questions: 35
  - To pass an exam: 13.75 points
  - Assessment method …

About Exam - Exam Policy

- Questions with one correct answer:
  - 5 concordances = 1 point
  - < 5 concordances = 0 point

8) * The following are days of incubation for a contagious disease: 7; 3; 4; 7; 6; 6; 4; 5; 3; 7; 5; 4; 7; 6; 2; 3; 5; and 6. Coefficient of variation is equal to:
a) 0.32
b) 0.23
c) 0.27
d) 0.29
e) Could not be calculated based on provided data

- Questions with 2 correct answers :
  - 5 concordances = 1 point
  - 4 concordances = 0.5 point
  - < 4 concordances = 0 point

16) Let be a statistical series with the following data: 40, 60, 20, 20, 60, 80, 80, 40, 60, and 80. The relative frequency of 0.3 corresponds to:
a) 20
b) 40
c) 60
d) 80
e) None is correct

About Exam - Exam Policy

- Questions with > 2 correct answers:
  - 5 concordances = 1 point
  - 4 concordances = 0.5 point
  - 3 concordances = 0.25 point
  - < 3 concordances = 0 point

7) The following data represent the age of first episode of myocardial infarction on a series of male patients: 38, 50, 23, 45, 70, 33, 25, 40, 50, 62, and 59. The values of quartiles are as follows: Q1 = 35.5, Q2 = 45 and Q3 = 54.5. The following statements are true:

a) Q2 - Q1 = 9.5

b) Q3 - Q2 = 9.5

c) Data are asymmetrical distributed

d) Data are symmetrical distributed

e) Data are approximately symmetrical distributed

SESSIONS: Academic year 2012-2013

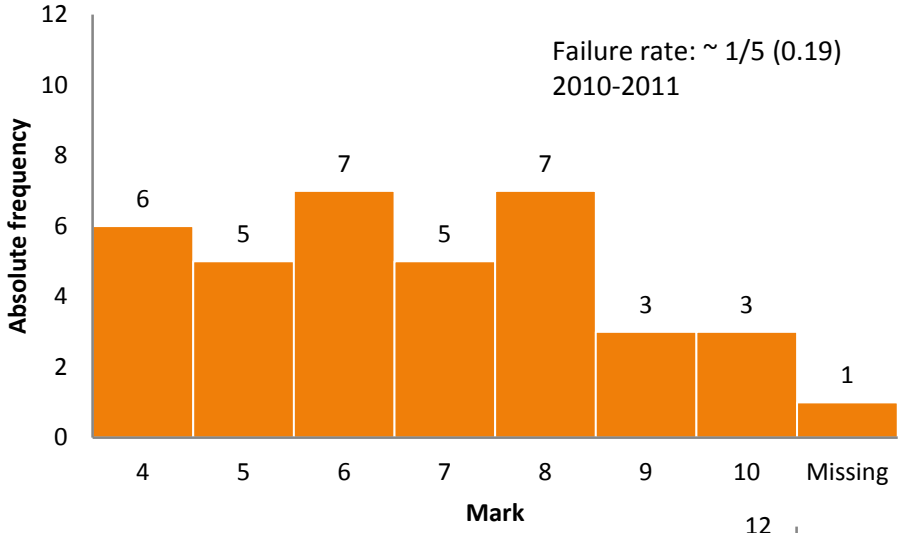
- Winter:
  - January 21ST, 2013 – February 15th, 2013
- Summer:
  - June 10th – June 5th, 2013
- 1st Re-taken:
  - July 15th – July 19th, 2013
- 2nd Re-taken :
  - July 25th – July 31st, 2013

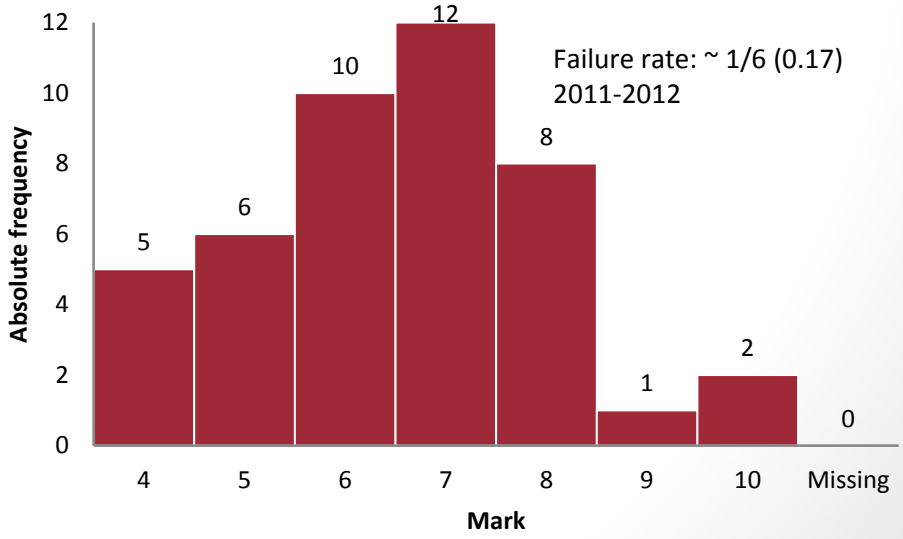
Winter					
Summer					
1st Re-Taken					
2nd Re-Taken					

HOLIDAYS

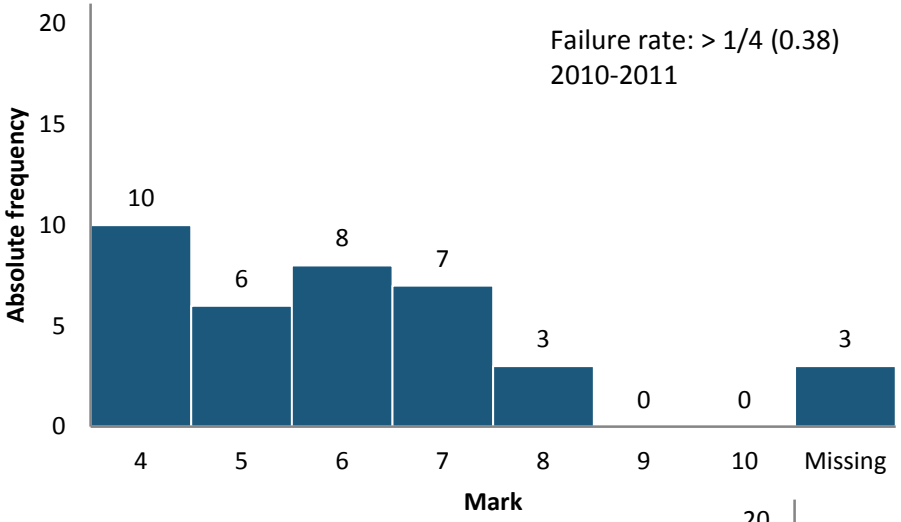
- 24th December , 2012 – 4th January, 2013
  - Christmas holiday
- 18th February, 2013 – 22th February, 2013
  - Winter holiday
- 5th August, 2013 – 30th September, 2013
  - Summer holiday

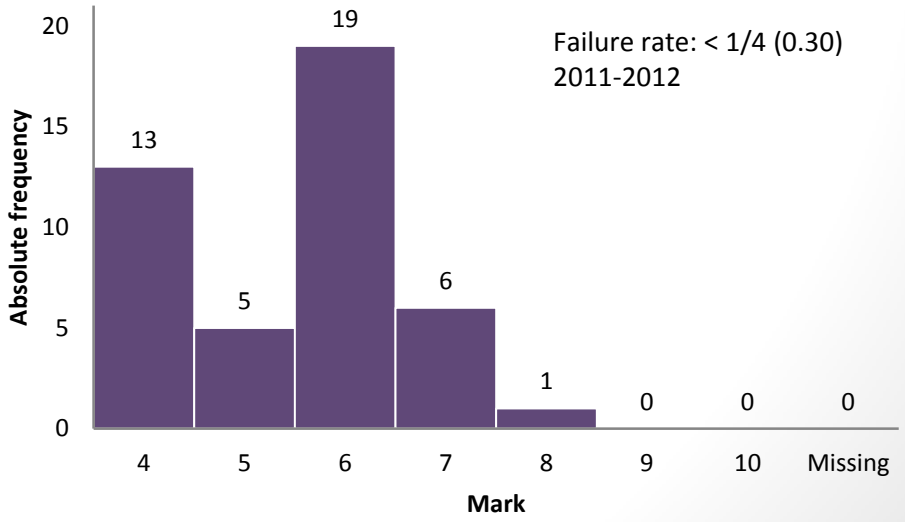
Past Experience:
Practical Exam - Dentistry



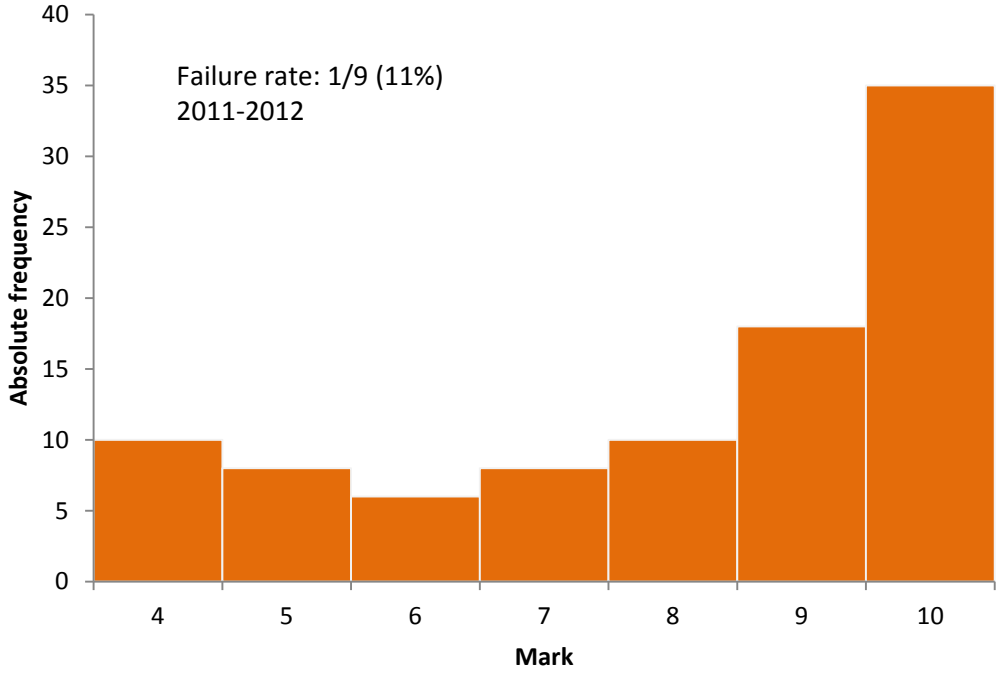


Past Experience: Final mark - Dentistry

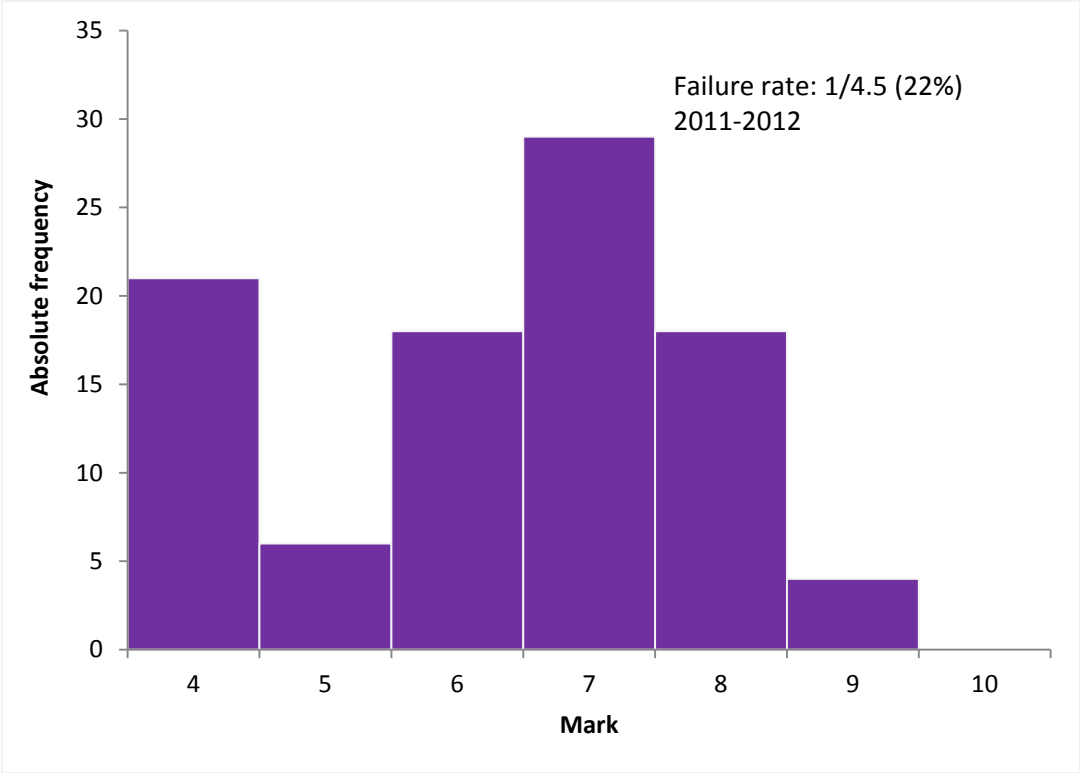




Past Experience:
Practical Exam - Medicine



Past Experience:
Final mark - Medicine



Previous Year Students Opinion: Teaching Improvement

- “Weekly tests: Would force students to read the slides.”
- “Maybe to give the students the homeworks from the website and to give a feedback to students.”
- “Less examples: Would allow for more time to speak about what we read in the slides.”
- “Getting some kinds of tests to estimate how much we've actually understood before the exam.”
- “Lectures for repeat the whole stuff before the exam.”
- “A book in english for us with all the lectures in details.”
- “A step to step guide of completing each example would be useful so you dont get lost.”

Previous Year Students Opinion: Teaching Improvement

- “Making students to participate more during the lectures.”
- “Some calculations were difficult to understand - these could be broken down into steps in order to understand them better.”
- “Use the white board more often to draw and explain.”
- “After each main topic or sub topic have some preset questions for the students to answer.”
- “I think if you prepare a list of all the terms in the informatik field with explanations it would be very helpful.”
- “More time.”

Medical Informatics

- Health informatics, Health care informatics or medical informatics is the intersection of information science, computer science, and health care.
  - Deals with the resources, devices, and methods required to *optimize the acquisition*, *storage*, *retrieval*, and *use* of **information** in health and biomedicine.
  - Health informatics tools:
    - Computers
    - Clinical guidelines
    - Formal medical terminologies
    - Information and communication systems.

Medical Informatics

- **Information science**: interdisciplinary science primarily concerned with the analysis, collection, classification, manipulation, storage, retrieval and dissemination of information.
- **Computer science**: study of the theoretical foundations of information and computation, and of practical techniques for their implementation and application in computer systems.

Medical Informatics

- **Health care**: refers to the treatment and management of illness, and the preservation of health through services offered by the medical, dental, complementary and alternative medicine, pharmaceutical, clinical laboratory sciences (in vitro diagnostics), nursing, and allied health professions. Health care embraces all the goods and services designed to promote health, including “preventive, curative and palliative interventions, whether directed to individuals or to populations”

Medical Informatics

- Electronic medical records
- Health information systems used for billing, scheduling, and research
- Decision support systems
- Standards (e.g. DICOM, HL7) - to facilitate the exchange of information between healthcare information systems
- Controlled medical vocabularies (CMVs):
  - Systematized Nomenclature of Medicine
  - Clinical Terms (SNOMED CT)
  - MEDCIN
  - Logical Observation Identifiers Names and Codes (LOINC)
  - MeSH

Medical Informatics

- European Federation for Medical Informatics
- Health informatics law:
  - legal principles as they apply to information technology in health-related fields
  - Addresses to:
    - Privacy
    - Ethical
    - operational issues
    - arises when electronic tools, information and media are used in health care delivery.
  - Applies to all matters that involve information technology, health care and the interaction of information.
  - It deals with the circumstances under which data and records are shared with other fields or areas that support and enhance patient care.

Medical Informatics

- **eHealth**: healthcare practice supported by electronic processes and communication.
  - Services:
    - Electronic Health Records: communication of patient data between different healthcare professionals (GPs, specialists, care team, pharmacy)
    - Telemedicine: physical and psychological measurements that do not require a patient to travel to a specialist.
    - Consumer Health Informatics: healthy individuals and patients want to be informed on medical topics.
    - Health knowledge management: e.g. in an overview of latest medical journals, best practice guidelines or epidemiological tracking.
    - Virtual healthcare teams: healthcare professionals who collaborate and share information on patients through digital equipment.

Medical Informatics

- **eHealth**: healthcare practice supported by electronic processes and communication.
  - Services:
    - mHealth or m-Health: use of mobile devices in collecting aggregate and patient level health data, providing healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vitals, and direct provision of care (via mobile telemedicine).
    - eHealth Grids: powerful computing and data management capabilities to handle large amounts of heterogeneous data.
    - Healthcare Information Systems: software solutions for appointment scheduling, patient data management, work schedule management and other administrative tasks surrounding health.

"*The purpose of statistical science is to provide an objective basis for the analysis of problems in which the data depart from the laws of exact causality. A general logical system of inductive reasoning has been devised that is applicable to data of this kind, and is now widely used in scientific research.*"

D. J. Finney

"We don't receive wisdom: we must discover it for ourselves after a journey that no one can take for us or spare us."

Marcel PROUST

Medical / Dentistry Statistics

- Definition: it is a mathematical science pertaining to the collection, analysis, interpretation or explanation, and presentation of ***data***
  - improve the quality of data
    - with the design of experiments
    - survey sampling
  - provides tools for prediction and forecasting using data and statistical models
- Branches:
  - Descriptive statistics
  - Inferential statistics

Medical / Dentistry Statistics

- Descriptive statistics:
  - Summarize or describe a collection of data
- Inferential statistics:
  - Used to draw inferences about a population from a sample:
    - Estimation: parameter and confidence interval
    - Hypothesis testing (null and alternative hypothesises): determine whether the data are strong enough to reject the null hypothesis

Tasks

- Why statistics is important for medicine / dentistry?
- How informatics reflects in medical / dentistry practice?

Reading test!