Session 1

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Nemours Biomedical Research, 2013

Session 1

Introduction
Topics Covered

Break

Overview of probability and statistics
Assignment

Bio

Biostatistician, Nemours Biomedical Research, 2012-present

ScM Biostatistics, Johns Hopkins University School of Public Health, 2010-12

BS Neurobiology, Physiology & Behavior, University of California, Davis 2005-09

Topics Covered

Sessions 1 - 8:

Basic probability principles, experiment design, data structure, covariate selection, hypothesis formulation, sampling, data exploration and visualization, hypothesis testing, correlation, odds & odds ratios, overview of regression

Sessions 9 & 10:

Case study, critique of statistical analysis section of peer-reviewed publications

Logistics

10 * 1.5-hr sessions with 10-15 min breaks

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HW, attendance & other admin Qs please e-mail

Questions on analysis of specific data sets: please e-mail me to set up consultation appointments.

Goal

Probability Principles and Statistical Thinking so that you will be-

  Insightful data collectors

  Practical hypothesis generators

  Mindful data organizers

  Successful collaborators with statisticians

Topics to explore

Define--evidence, truth, science

Interpret--probability, belief

Justify--relation, causality, rarity, significance

Assess--randomization, assumptions & fitness of model, replicability/reproducibility of experiments

Defining the Straight-A Type of Analysis

"**Appropriate** interpretations of the **appropriate** measures of **appropriate** information **appropriately** justified under **appropriate** assumptions that are applied to the **appropriate** population."

We will explore each of these areas in the subsequent weeks

Now let's talk about data representation

The Art of Data Representation

An effortless smile produced without teeth clenching developed in four of the 10 patients by postoperative month 19 and was present in 75 percent of patients who were followed for 2 or more years (Table 1). No visible wasting of the

Also true: in the first follow-up year only 1 patient (20%) could produce effortless smile

Table 1. Summary of Patient Data

Patient	Age (yr)	Sex	Cause and Degree of Paralysis	Time Interval before Surgery (mo)	Onset Tone (mo)	Onset Motion (mo)	Commissure Excursion (cm)	Effort to Smile (Bite)	Follow-Up (mo)
1	13	M	Skull base fracture (complete)	11	4	5	1.4	No	84
2	18	M	Acoustic neuroma excision; neurofibromatosis type II (incomplete)	23	4	7	1.0	Yes	8
3	61	F	Bell palsy (incomplete)	19	Always present	6	1.2	No	11
4	66	F	Petrous apex; cholesterol granuloma (complete)	16	4	7	1.4	No	68
5	84	M	Chronic mastoiditis skull base osteomyelitis (complete)	5	6	8	1.7	Yes	19
6	7	F	Ruptured intracranial AVM (complete)	12	3	4	1.1	No	55
7	69	M	Skull base tumor (complete)	0	3	4	1.1	Yes	9
8	49	F	Cerebellopontine angle meningioma (complete)	2.5	3.5	4.5	1.3	Yes	27
9	25	F	Acoustic neuroma (complete)	15	3	4	1.2	Yes	9
10	7	M	Malignant schwannoma (complete)	17	2.5	3	1.0	Yes	7

M, male; F, female; AVM, arteriovenous malformation.