BIOSTATISTICS 740 (BIOS7400)
Clinical Trials

Lecture 1

Introduction, Overview, Historical Accounts

What is Clinical Trial?

- **Description:** a *prospective* study comparing the effect and value of *intervention(s)* against *a control* in *human beings*
- **Fundamental Point:** A properly planned and executed clinical trial is a powerful *experimental technique* for assessing the *effectiveness* of an *intervention*
- **Essential Points:**

(1) forms the basis for evidence-based medicine

(2) must be followed from a ***well-defined point in time***, which becomes ***time zero*** or ***baseline*** for the study

(3) must employ ***one or more intervention techniques***

(4) Early phase (e.g., Phase I and Phase II) studies may be *controlled or uncontrolled*, but the *ideal clinical trial* is *randomized controlled* and *double-blind*

(5) At ***baseline***, the *control* group must be *sufficiently similar* in relevant respects to *the intervention* group

(6) Unlike animal studies, in clinical trials the investigator *cannot* dictate what an individual should do

Notable Differences Between Randomized Clinical Trials and (NonranObservational Studies

Categories	Clinical Trials	Observational Studies
Setting	Standardized approach to treating patients may differ from common practice	Usual clinical practice
Ethics	Must meet ethical standards of human experimentation	Researcher does not offer intervention, which limits ethical concerns mainly to privacy issues
Cost of each study subject	High	Low
Subjects	Selection of patients based on strict inclusion and exclusion criteria that depend on ethics and feasibility	Can readily include all patients, a broad range of patients, or can apply specific inclusion or exclusion criteria
Exposure	Usually 1 or 2 interventions	No limit to the number of interventions or comparisons
Compliance	Can often be measured	More difficult to quantify directly
Confounding control	Randomization addresses known and unknown confounding	Known factors, if measured, can be controlled, but very difficult to control adequately for unmeasured factors
Outcome	1. Standardized measure of both surrogate, soft, and hard endpoints defined by the researcher 2. Blinding is possible	1. Based on routine restriction and mean by hard endpoints 2. No blinding
Rare outcome	Cost is too high for rare outcomes	Much more feasible for rare outcomes

Sørensen HT, Lash TL, Rothman KJ. Beyond randomized controlled trials: a critical comparison of trials with nonrandomized studies. Hepatology. 2006;44:1075-82. PMID: 17058242.