

#### **Introduction – Stat 1000**



- Instructor
- Students



#### Introduction

- Syllabus
- Web page
- Class structure and expectations



#### Data Collection

Statistical techniques are being used in many aspects of our life.

- Surveys for elections, consumer reports, product satisfaction etc
- The effects of drugs
- Product quality
- Econometrics
- Sport

Definition?

 Statistics (Dictionary.com) – The mathematics of the collection, organization and interpretation of numerical data, especially the analysis of population characteristics by inference from sampling.

- There are many different definitions for statistics. Certain concepts appear in most definitions: variation, uncertainty, inference, science.
- In our daily life there are many examples for the use of Statistics:

Parents of a child with a genetic defect consider having another child. They will base their decision on the chance that the next child will have the same defect.

 To choose the best therapy, a doctor must choose between several possibilities.

 In an experiment to investigate whether a food additive is carcinogenic (enhances the chance for cancer), the USDA has animals treated with and without the additive.

In designing and planning medical care facilities, there is a need to take into account changing needs of medical care.



#### Basic concepts

- Population: The entire collection of subjects/items under investigation.
  - The number of subjects/items in the population is called the size of the population.

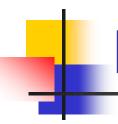


- A population parameter: is a numerical quantity that describes a characteristic of a population.
  - The true value of a population parameter can be known if and only if the outcome for every subject/item in the population is recorded.
  - The population parameter is considered to be an unknown constant.
  - The goal is to estimate population parameter value.



#### **Basic concepts**

- A sample: is a subset of the population selected for study in order to gain more information about the entire population.
  - The number of subjects/items in the sample is called the sample size.
  - Information collected on a sample is used to draw conclusions about the population parameter.
  - It is crucial that the sample will resemble the population



#### **Data Collection**

- For any type of research
  - First specify the objective of the study (Main question)
  - Define the population in mind and parameters of interest
  - What are the variables that will be collected?
  - What is the study design?
  - Data collection
  - Data analysis
  - Inference

## Assumptions



# Assumptions and expectations in every day life

- We make assumptions all the time
- Our life (many times) depend on these assumptions
  - crossing a street
  - sitting on a chair
  - cell phone
- We need to be aware of our assumptions



#### Science and measurement



#### Science and measurement

- Gravity
- Crops