

# 임상연구 설계와 분석을 위한 통계 방법

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# Chapter I: Overview of Statistics and Study Design

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# What is Statistics?



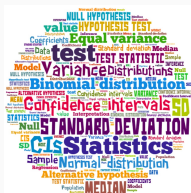
Most researchers or people think

Statistics makes us insane...

However

Statistics sometimes gives us very useful information from data!!

So then, what is statistics??



<sup>†</sup> Each wordcloud was cited from [Trident University International](#) and [Augusta University](#), respectively.

## 1. Data

- Investigation, experiment, and survey
- Gathering numbers (for quantitative analysis)

## 2. Description or Summarization

- Table, chart, and so on
- Based on summarized statistics (e.g. mean, standard deviation, median, ...)

## 3. Inference

- Numerous statistical tests and models based on probability theory
- e.g. two-sample t-test, ANOVA, ANCOVA, regression, and so on

## Type of Studies

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Study or trial?

## Study

자료의 수집과 분석 목적이 학술적 목적에 국한된 모든 종류의 연구 및 실험

## Trial

자료의 수집과 분석 목적이 이윤추구 또는 허가에 목적이 있는 임상시험

## Cross-sectional study (단면적 관찰연구)

1. prevalence study
2. Diagnostic test
3. Ecological study
4. Validity, Reliability, and agreement study

## Longitudinal study (종단적 관찰연구)

1. Prospective study
2. Retrospective study



Randomized controlled trial

Pilot study

Exploratory study

Confirmative study

## Type of outcome variables

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## Sample size calculation

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## Two approaches

1. Based on the marginal error rate  $\rightarrow$  population based observational study
2. Based on the effectiveness between concerning groups  $\rightarrow$  experimental study

Both approaches are based on previous studies

Is your study entirely new?





# Observational study: prevalence study



# Observational study: prevalence study





# $2 \times 2$ cross-over design





## Multiple comparison

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# What makes data significant?



1. Data themselves contain unexpected errors
2. Bias
3. Just coincidence
4. Our hypothesis is working





# Statistical Analysis

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1. Too easy, but very useful methodology for the comparison of sample means between two groups

# Analysis of Variance (ANOVA)





# Simple or multiple regression









Cohen's  $\kappa$

Cronbach's  $\alpha$

Intra Class Correlation (ICC)