

# 8: Independent Samples

## Exercises

**8.1 Sampling designs.** Identify the sampling design of each of the following as single sample, paired samples, or independent samples.

- (A) A study compares the vaccination histories of 30 autistic boys and 30 non-autistic boys.
- (B) A study of health screening in married couples compares the prevalence of risk factors in men and women.
- (C) A study compares risk factors in a community survey to published estimates in NHANES. [NHANES stands for the National Health and Nutrition Examination Survey.]

**8.2 Sampling designs 2.** Identify each of the following studies as based on either a single sample, paired samples, or independent samples.

- (A) Exposures to blood and other body fluids presents an occupational hazard across a wide variety of health professions. The pathogens of primary concern are the human immunodeficiency virus and the hepatitis viruses. When a needle stick injury occurs, workers report incidents to their supervisor. Hospitals collect this information and forward it to a national authority (the CDC). A researcher at the CDC compares needle stick injuries based on these reports from community-based hospitals and from tertiary-care hospitals.
- (B) To check a new method for testing water safety, a public health technician obtains a reference specimen of known coliform concentration from the state lab. She takes 10 measurement of this specimen in her lab and compares the mean coliform level in her samples to the known concentration.
- (C) In a different study, a lab technician compares a new method of testing water to an established method by comparing 10 specimens using each method.

**8.3 Time spent standing or walking.** A study was undertaken to compare daily activity levels in lean (group 1) and obese (group 2) individuals (Levine et al., 2005). Sensors monitored the type and amount of routine daily activities in 20 individuals. Data (shown on the next page) are for average amounts of time standing or walk (minutes per day) for each of the 20 subjects.

- (A) Calculate the means and standard deviations for time spent standing or walking for each group.
- (B) Prepare side-by-side boxplots of the data. Show all work. Interpret your plot.
- (C) Calculate and interpret the point estimate for the mean difference.
- (D) Test the mean difference for significance. Show all NHST steps (null hypothesis, test statistic,  $P$  value, and narrative interpretation).

Data are shown on the next page and also appear [here](#).

**Table.** Amount of time spent standing or walking (minutes per day). Source: Levine et al., 2005. *Science*, 307(5709), 584-586. Dataset = LEVINE2005Stand

Rank/depth	Lean	Obese
1	319.2	456.6
2	374.8	463.3
3	504.7	567.6
4	511.1	567.6
5	543.4	572.8
6	555.7	578.7
7	578.9	591.4
8	584.6	621.3
9	607.9	646.2
10	677.2	646.3