

## Of Good Samples and Bad

- ***Town Talk***: Louisiana newspaper in 1999 asked readers to call in to vote about whether an ambulance service should maintain its monopoly.
- **Automated system**: callers dialed one number for “Yes” and another for “No”
- **Got lots of response** – much of it from the offices/homes of the ambulance company employees!
- **Would the results be representative of the general town population opinion?**
- **Call-in polls tend to attract those who have *strongly held* views.**

***Biased sampling method:*** A sampling design that *systematically* favors certain outcomes.

## **Types of Biased Sampling Methods**

- ***Convenience sample:*** A sampling method which selects those who are easiest to reach.
- ***Voluntary response sample:*** When the individuals in the population themselves choose whether or not to include themselves in the sample.

***Note:*** Convenience samples and voluntary response samples are *very often* biased.

## Clicker Quiz 1

**A researcher wishes to determine the public's opinion about downloading music online. He stands inside a popular mall entrance and grabs a selection of people walking by to ask them survey questions.**

**What type of sample is this?**

- A. Convenience sample**
- B. Voluntary response sample**
- C. Unbiased sample**
- D. Census**

- **Which group(s) of people are more likely to be selected in the sample from the previous example?**
- **Which group(s) of people are less likely to be selected?**
- **Might this affect the study's conclusions?**
- **Sometimes doing a convenience sample may not affect conclusions too much (tennis ball example)**
- **In general, convenience samples are not recommended.**

## Clicker Quiz 2

**When customers check out at Home Depot, the cashiers mention a web address given on the receipt where customers can log on and answer questions about the quality of customer service. Home Depot hopes to monitor their customer population's opinion about the level of service. What type of sample is this?**

- A. Convenience sample**
- B. Voluntary response sample**
- C. Unbiased sample**
- D. Census**

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## A Good Sampling Method

- **Simple random sample (SRS):** A SRS of size, say, 20, is a sample of 20 individuals selected from the population such that *every possible set* of 20 individuals in the population has an *equal chance* of being the selected set.
- **A SRS is an *unbiased* sampling method:** No subset of the population is systematically favored in the selection.
- **A primitive way to get a SRS is to label all individuals in the population with identical bits of papers, mix the papers up in a hat, and select a certain number for the sample.**
- **Not too practical when you have a large population!**

## Implementing a Simple Random Sample

- Typically researchers identify a simple random sample by having a computer generate random digits.
- Each digit (or sequence of digits) identifies an individual to be selected from the population.
- *Table of random digits*: A low-tech version of a random number generator
- Table A in textbook is generated by computers so that each digit from 0 to 9 is equally likely to appear, and each part of the table is completely independent of other parts.



## Using Random Digit Table to Obtain a SRS

- **Label each individual in the population with a sequence of digits.**
- **If there are 235 individuals in the population, label individual with 3-digit sequences, say: 001 to 235.**
- **Begin looking in table in a *random spot* and read across by 3-digit sequences.**
- **If the sequence you read corresponds to a labeled individual, select it for the sample.**
- **If the sequence doesn't correspond to any label (or if the label has already been selected), then ignore it and read on.**
- **Stop when you have the needed number of individuals in the sample.**

## Clicker Quiz 3

**Your population of interest consists of 8230 individuals. To select a SRS using a random digit table, you should label the individuals with sequences of how many digits?**

- A. 1**
- B. 2**
- C. 3**
- D. 4**

## Clicker Quiz 4

**In the previous example, you labeled the individuals from 0001 to 8230. You enter the table at a random spot, at which point the listed digits begin as:**

87201 97245 . . .

**Which individual is the first one selected for your sample?**

- A. Individual 87**
- B. Individual 872**
- C. Individual 8720**
- D. individual 1972**

## Sample Type and Trust

- ***Key message:*** The type of sample a study used helps determine whether we can trust its conclusions.
- **A study reports:** “Based on a sample of 2400 U.S. adults, 40% of adults believe that music file sharing should be freely available at no cost.”
- **Can we trust that this is a reasonable reflection of the adult population’s beliefs?**

## Sample Type and Trust

- **A study reports: “Based on a sample of 2400 U.S. adults, 40% of adults believe that music file sharing should be freely available at no cost.”**
- **Can we trust that this is a reasonable reflection of the adult population’s beliefs?**
- **If the study used a convenience or voluntary response sample, then NO. The conclusions cannot be applied beyond the people in the sample.**
- **If the study used a simple random sample, then YES. The conclusions may be applied to the general U.S. adult population, with a certain margin of error which we can specify.**

## Clicker Quiz 5

**The Gallup organization polled people concerning the amount of sex/violence on network TV. They stated, “These results are based on telephone interviews with a randomly selected national sample of 1008 adults, 18 years and older, conducted Feb. 6-8, 2015.” Can we apply the sample results to a particular population?**

- A. No, because 1008 people is way too small relative to the total size of the U.S. population.**
- B. No, because the sample was a convenience sample.**
- C. Yes, we can apply the conclusions to the population of U.S. citizens.**
- D. Yes, we can apply the conclusions to the population of U.S. adults.**