Case Study 1

Group 1: Lindsey, Chris D, Wen, Chris H, Xin

Recap of Case Study

- Conduct a forest survey using 21 employees
  - 3 crews of 7
  - Crews of 6 data collectors and 1 data recorder go into the field for 5 days and return on weekends
  - Data collection is physically demanding; recording is less laborious

- Need crew assignments for nine weeks
  - Everyone needs a turn at data recording
  - Experience shows its best to mix the groups each week

Why is this a statistical problem?

- This is a sampling problem

- The assignment of the crew may be important in analyzing the data

Questions for Client

- What kind of data are being recorded and what will be done with it?

- Are there certain people we need to separate?

- Does everyone need to work with everyone?

- Are you interested in stratifying groups on certain characteristics (age/gender/experience)?

- Are there certain people who should get to be recorder more than once?

Suggestions for Client

- Depending on data use, it might be best to randomly assign all recorders rather than specifying certain ones

- Hire more people and utilize time off so no one is a recorder for more than 1 week and ensure balanced design

- Consider using only 3 recorders (working with a new group each week) in order to control error.

- Consider a random effects model to control for data recorder.

- Hire us to help with the forest survey analysis

Ideas for Analysis (Field Method)

- Recorder selection:
  1) Draw numbers 1-21 without replacement out of a hat to represent recorders. The first 3 correspond to the first week and so on.
  2) Once 21 are drawn, replace all numbers and draw 6 more to represent recorders for the last 2 weeks.

- Remaining group selection:
  1) Remove recorders from the 21 numbers and randomly draw out numbers remaining assigning 1st 6 drawn to 1st recorder, and so on.
  2) Repeat for each of the 9 weeks

Ideas for Analysis (Computing)

- Recorder selection

  1) Use a sampling without replacement with numbers assigned to each worker (1-21).

```
> sample(x,replace=T)
 [1]   3   2 19   4 20   7 16 15 16 12   4   2 20   8   9 20 19   3   9 19 13
```

  2) Replace numbers; sample 6/21 to get recorders for the last 2 weeks.

```
> sample(x,6,replace=T)
[1] 13   9   6 13 20   7
```

Ideas for Analysis (Computing)

- Remaining group selection:

  1) Remove the recorders from the 21 numbers and randomly draw out numbers remaining assigning 1st 6 drawn to 1st recorder, and so on.

```
> #First Week
> groups<-c(1,4:18,20:21)
> sample(groups,replace=F)
 [1] 14 17 20 11  7 16 18  1 13 12 10 21  9  5  4  8 15  6
```

  2) Repeat for each of the 9 weeks