Confounding

1. Study of new medical treatment,
   doctor assigns new treatment to healthier patients
   initial health of patient is *confounded* with treatment.
2. All girls in elementary school have gymnastics class while
   boys have soccer class.
   In study of fitness comparing boys to girls,
   PE class is confounded with gender.
3. From an observational study, it was found that Greeks, who use olive oil, have
   less heart disease than Americans.
   Confounders?

Bone Marrow Transplant and SCIDS

Babies with SCIDS

- can't produce T-cells that ward off infection,
- can die from a cold
- David, the Houston "Bubble Boy"

Of 89 infants who received transplants between 1982 and 1998,

72 (81 %) still alive three months to $16\frac{1}{2}$ years later!
Bone marrow transplant $\rightarrow$ long term survival

(Source: AP Feb 18)
Observational or experimental?

Lurking? Confounding variables? Treatment?

Restricted Blood Transfusions: Saves Lives or Just Money?

Red-cell transfusions are routine to fight anemia.

When to use? Slightly anemic? Severely anemic?

838 critically ill and anemic patients $\rightarrow$ 2 groups

$\rightarrow$ Liberal strategy group got an average of 5.6 units of blood apiece

$\rightarrow$ Restrictive group averaged 2.6 units - about 54 percent less. (1/3 got none.)

Young & less critically ill $\rightarrow$ less is better.

(Source: AP Feb 21)

Compare transfusion study to bone marrow study

- Which study makes a better comparison?
- Sources of bias? (How were the subjects selected?)
- What do we know about the precision of the results?

Randomized Experiments

- Hawthorne effect
- placebo
- establish causation
- cost
- ethics
- blinding
- ecological validity

Observational Studies

Statistical significance

Effect is larger than would happen by chance.

Comparing basketball free throw percentage of students by 201 section, you wouldn't believe there is a genuine relationship.

Many times we don't already know the answer
statistical methods can say whether differences
are attributable to chance

Compares effect to the natural variation

Statistical significance *does not* mean scientific significance!