Most statistical research is carried out with integrity and care. Nevertheless, statistical research is sufficiently complex that bias can arise in many different ways. We should always examine reports of statistical research carefully, looking for anything that might make us question the results.

**Guideline 1: Identify the Goal, Population, and the Type of Study**

What was the goal of the study?

What was the population under study? Was the population clearly and appropriately defined?

What type of study was used? Was the type appropriate for the goal?

**Guideline 2: Consider the Source**

Always be sure to consider the source of a study and evaluate the potential for biases that may invalidate its conclusion.

**Guideline 3: Look for Bias in the Sample**

**Selection bias** occurs whenever researchers select their sample in a way that tends to make it unrepresentative of the population. For example, a pre-election poll that surveys only registered Republicans has selection bias because it is unlikely to reflect the opinions of all voters.

**Participation bias** occurs primarily with surveys and polls; it arises whenever people choose to participate. Because people who feel strongly about an issue are more likely to participate, their opinions may not represent the larger population that is less emotional attached to the issue. Surveys or polls in which people choose whether to participate are often called *self-selected* or *voluntary response surveys*.

**Guideline 4: Look for Problems in Defining or Measuring the Variables of Interest.**

Variables of interest in a statistical study are the items or quantities that the study seeks to measure.

**Guideline 5: Watch Out for Confounding Variables**

Variables that are not intended to be part of the study can sometimes make it difficult to interpret results properly.

**Guideline 6: Consider the Setting and Wording in Surveys**

It is important to watch out for problems in the setting or wording that might produce inaccurate or dishonest responses.

**Guideline 7: Check That Results Are Presented Fairly**

Check for misrepresented in graphs or conclusion statements. Researchers may occasionally misinterpret the results of their own studies or jump to conclusions that are not supported by the results, particularly when they have personal biases toward certain interpretations.

**Guideline 8: Stand Back and Consider the Conclusions**

Even if a study seems reasonable according to all the previous guidelines, you should stand back and consider the conclusions.

Did the study achieve its goals?

Do the conclusions make sense?

Can you rule our alternative explanations for the results?

If the conclusions do make sense, do they have any practical significance?

**Homework: Review your Note.**