

**Ten questions to answer in a *five-minute* presentation of a contemporary journal article:**

1. What kind of study is this (therapy, diagnostic test, exposure/risk/harm, natural history of disease, meta-analysis, etc) and what is the study design (RCT, retrospective/controlled, etc)?
2. Does it study an important question? Briefly state why or why not.
3. To whom does it apply, and to whom does it not apply?
4. Describe the study methods; anything to “watch out for” as you read the results based on these methods?
5. Did the authors clearly state hypotheses or clearly testable research purposes (either is fine, but vague statements, eg “we wished to evaluate the outcomes of...” make it harder to understand what the study really was about)?
6. Describe briefly the key results; are there any really counterintuitive findings?
7. What are the strengths of this study? (Our curriculum will cover ways to determine.)
8. What are the weaknesses of this study? (Our curriculum will cover ways to analyze.)
9. How does this work fit into what is known, and what key questions remain?
10. Would the results of this study change how you practice? Why or why not?

## Two more things to think about as you read: Validity and bias

**1. Validity.** There are two types, both of which are important to think about in every study you evaluate:

- A. Internal validity:
  - i. The methods are sound, the interpretations are supported by data.
  - ii. Within the confines and limitations of the study, the conclusions appear reasonable.
  - iii. Criteria vary based on study type (diagnostic test, natural history, therapy, etc).
  - iv. “Users guides” and course help you decide whether study is internally valid.
- B. External validity:
  - i. Synonym: “Generalizability”
  - ii. Can you apply the results of a study with good internal validity to YOUR practice?
  - iii. Depends on inclusion criteria and factors relating to surgeon, technology, and study site.
  - iv. Elements of external validity are generally similar across most study designs.

**IMPORTANT CONCEPT:** Internal validity often comes at the expense of external validity, and vice-versa. Why? How does this affect your ability to use research?

**2. Bias.** There are many types of bias, some of which the critical reader can detect. Examples include:

- A. *Susceptibility bias:* Comparing results between prognostically dissimilar groups. (Improved by randomization; stratified randomization even better.)
- B. *Performance bias:* Dissimilar levels of surgeon skill or confounding by “co-procedures.”(Single- or expert-surgeon series, and studies with historical controls are very vulnerable.)
- C. *Detection bias:* Using non-standardized or inconsistent study endpoints. (Improved by blinding, independent examiners, and validated outcomes instruments.)
- D. *Transfer bias:* Differential loss to follow-up or excessive loss to follow-up.

Some bias cannot be detected by the reader—even a good reader. For example, *Publication bias*, the disproportionate publication of work based on non-scientific factors, is difficult to detect. Outcome bias and investigator/study-site preference are two well-studied examples of publication bias. Publication bias can be hard to eliminate and may only be detectable to the reviewer when large numbers of papers are read or when the process itself is audited.