One of the most valuable skills to develop is an ability to critically evaluate literature & critique a study.

**Understand the study**
- Main research question
- Study population
- Study design
- Sample selection
- The independent and dependent variables
  * What are they? How were they measured?
- Study results
- Authors’ interpretations and stated strength/limitations
The Body of a Research Article

- Abstract
- Introduction
- Methods
- Results
- Discussion
Critiquing an Article

* The title
  * Clear, readily understood, related to content

* Abstract
  * States problem; methodology described; results summarized; conclusions stated

* Problem
  * Problem statement is clear; hypothesis stated; can identify limitations and assumptions; significance of the problem discussed and research is justified
A well-written abstract should provide key highlights from each of the article sections:

- Main research question
- Study population and design
- Sample selection
- Primary exposure/treatment and outcomes
- Results
- Authors’ interpretations
Introduction

- Introduction often follow a general format
  - We know...
  - We don’t know....
  - We aim to find out...
- Delineates study objectives (and hypotheses)
  - e.g. Test whether vitamin D deficiency is associated with progression of disease in multiple sclerosis
Review of the Literature

- Literature review is pertinent to the problem
- Cited literature provides rationale for the research
- Relationship of problem to previous research is clear
- Conceptual framework/ rationale is clear
- Review concludes with brief summary of literature and implications to research problem
Methods

• Provides details on how study was actually conducted

★ Underlying population from which participants were drawn and how selected
★ Study design
★ Sample size
★ Exposures/Treatments (definitions, how measured)
★ Outcomes (definitions, how measured)
★ Analysis type used in the study
Methodology

* Subjects described
* Sampling method is described and justified
* Sample size sufficient to reduce type II error
* Protection of subjects discussed

* Data collection
  * Reliability and validity of instruments stated
  * Data collection methods appropriate

* Design
  * Appropriate to study hypothesis
  * Confounding variables identified
  * Design description explicit to permit replication
Results with descriptive details of the sample
★ Sample characteristics?
★ Response rate (Who enrolled?)
★ How many people were exposed overall? Had or developed outcome of interest?

Main association of interest described in detail
★ Associations (Odds Ratio, Risk Ratio)
★ Subgroup analyses
★ Adjusted associations
★ Graphs and tables
Analysis

- Information presented sufficient to answer research questions
- Statistical tests used are identified and obtained values are reported
- Reported stats are appropriate for hypothesis
- Tables and figures are easy to understand
Discussion

- Most important findings are typically outlined in first paragraphs, with scientific or public health implications
  - Placed in context of other studies (Consistent? Contradictory? Altogether new?)
  - Potential biological and social processes underlying the observed associations are considered
- Limitations of study are outlined and weighed
- Unanswered questions identified
Discussion

* Conclusions stated clearly
* Conclusions substantiated by evidence
* Methodological problems identified and discussed
* Findings related to theory
* Implications of findings discussed
* Results generalized only to population on which study is based
* Recommendations are made for further research
Form and Style

* Report is clearly written
* Report is logically organized
* Tone of report displays an unbiased, impartial, scientific attitude
* Strengths of study
* Limitations of study
Think on your own...

A LONGITUDINAL STUDY OF ABNORMALITIES ON MRI AND DISABILITY FROM MULTIPLE SCLEROSIS


- Main research question
- Study population and design
- Sample selection processes
- Primary exposures and outcomes
  - What are they?
  - How were they measured?
- Result, precision?
- Author’s interpretations