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Understanding Research Findings: A Lay Person's Approach... or  
Approaching the Lay Person with Research Findings

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**I. Presenting medical research findings to the public**

**A. In general**

- The public is hungry for this knowledge
- Some people are very sophisticated but many are not
- People are prone to leaping to conclusions about breakthroughs
- Researchers and institutions have an ethical obligation to present the best information possible, and to help correct misconceptions

**B. Special issues in presenting osteopathic research**

- Osteopathic manipulation as an alternative medicine therapy (associated with a positive image to some, negative image to others)
- Base of research evidence supporting osteopathic techniques lags behind base of research evidence for many conventional allopathic techniques

**C. What you can do in presenting information to the public and to patients**

- Learn to distinguish well done, convincing research from poor research (and choose to present good research, not poor research!)
- Help educate readers/patients about research methods
- Become comfortable with numbers
- Present some of the numerical evidence as well as the conclusion, and show how the evidence supports the conclusion
- Always place new research in context of previous work

**II. A few factors to consider in evaluating research**

1. Patients

-Is the study generalizable?

>Who are the patients in the study? Are they representative of the American public? Why or why not?

-How many patients are in the study?

>The treatment effect observed in a study can be considered an estimate of the effect that would occur if the treatment were made available to the entire American public. Estimates made from small studies are very imprecise, so if the study were repeated, the new estimate might be wildly different from the old one. But estimates made from larger groups are more precise and less likely to vary from study to study.

>Confidence intervals are a way of quantifying the precision of an estimate.

2. Is it a comparative or a descriptive study?

*>Most conditions get better over time. Simply observing an improvement from baseline does not demonstrate that the therapy was effective. To find out whether the therapy is effective, it must be compared to something; is the improvement larger or faster than the improvement in the comparison group?*

*-If it is a comparative study, what was the control therapy? Who were the control patients?*

*>If the controls are not similar to the cases, then the comparison is unfair.*

*>If the control therapy is specifically chosen to have a poor result, then the intervention will look great by comparison.*

*>If the controls were the rejects from the therapy group, they could have been doomed from the start.*

*>If the controls were "historical controls," then they could be affected by other factors that have changed in the interim.*

*>Choice of an appropriate control therapy is particularly problematic in "hands-on" techniques such as surgery or osteopathic manipulation.*

*>Choice of control therapy has an ethical dimension; it may not be ethical to withhold therapy that has proven effectiveness.*

3. Effect size

*-How big is the effect? Is it big enough to make a clinically meaningful difference to the patient?*

*>As an example, consider an intervention that improves educational test scores from 13.6/21 to 14.0/21. The intervention had an effect, but the effect was so small that it hardly seems worth it.*

*-Was there an attempt to assess the role of chance?*

*>Even if the study shows an effect, it is possible that the apparent effect was really caused by ordinary chance fluctuations. Hypothesis testing is a statistical method designed to compare the size of the effect with the size of the variations expected by chance alone. If the effect is much bigger than the expected chance variability, then we conclude that the effect is "statistically significant."*

*>The "P value" quantifies the result of hypothesis testing. If P is very small (usually smaller than 5% or 0.05), then the effect is much bigger than chance variability. Chance is considered an unlikely explanation for the result, and we conclude that there is a "statistically significant effect." However, if the P value is large, then we do not have much confidence that the effect is a real one that would be reproduced in future studies.*

*>Statistical testing is important, but never look at the P value in isolation. It is meaningless without simultaneous assessment of the clinical relevance of the effect.*

4. Was the study prospective or retrospective?

*>Retrospective studies can suffer from recall bias and unrecognized differences between the treatment and control groups.*

*>However, they are also valuable because they use available evidence, and may be more ethical than experimental studies.*

5. Was the study blinded?

>Blinding helps prevent bias in clinicians (who may treat patients differently if they know what group the patient is in), assessors (who may assess results differently if they know what group the patient is in), and patients (who may change their behavior, drop out of the study, or seek additional therapies if they know what group they are in).

>Blinding may also help prevent the placebo effect (in which patients feel better or report feeling better even when there's no physiological reason why they should).

>Single-blinding means that the patient was unaware of the assignment.

>Double-blinding means either (a) both the patient and the clinician were blinded or (b) both the patient and the person who assessed the patient's outcome were blinded.

>Triple-blinding means that all three parties were blinded.

>Blinding isn't always possible or ethical.

6. Was the study randomized?

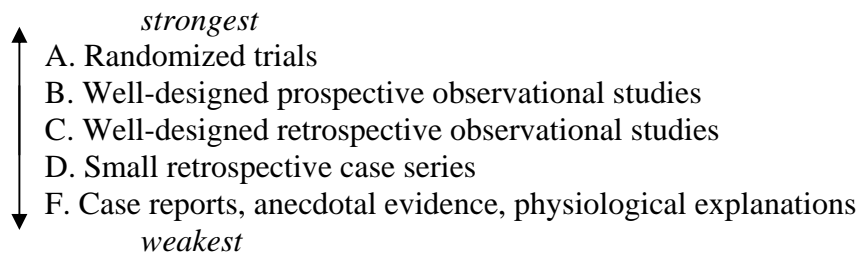
>Good clinicians try to steer patients toward the treatment that will benefit them, which can cause subtle or not-so-subtle biases in research. Randomization prevents this.

>Evidence is available to show that a poorly described randomization process is associated with a larger effect size. This has been interpreted to indicate that poorly described randomization is associated with shoddy research methods.

7. Are there other studies of the same thing? How consistent are their findings?

>If a variety of studies of the same intervention have contradictory results, then it's likely that (a) the studies haven't been designed consistently, so that they are really measuring different things, or that (b) the intervention has at best a very small effect.

“Hierarchy of evidence”



**III. Presenting numbers to the public**

**Absolute numbers and relative numbers**

>Medical research studies *OFTEN* present only relative differences. For example, a researcher might report that the intervention reduced cholesterol levels by 10%, or was associated with a relative risk of disease of 0.80.

>Relative comparisons are meaningless except in context of absolute numbers. For example, consider a toxin that doubles your risk of cancer. If the baseline frequency of this cancer is 1 in 10, then doubling the risk

*means that the risk is now 2 in 10, which is pretty serious. Exposure to this toxin would cause millions more people to get the disease. But if the baseline frequency is 1 in 10 million, then the doubled risk is only 2 in 10 million. It's still doubled, but it's not nearly as serious. Only a few people are likely to get the disease either way.*

*>Always present absolute numbers as well as the relative comparisons.*

### **Public perception of risks**

*Public perception of risks (and benefits) does not parallel expert perception. In general, experts tend to rate risks as less serious than laypeople do. These other factors can also inflate public perception of risks:*

#### ***Dread factors***

*beyond personal control*

*involuntary*

*inequitable*

*catastrophic*

*fatal*

*increasing over time*

#### ***Knowability factors***

*not observable*

*unknown to those exposed*

*new to science*

*delayed effect*

## **IV. Other resources**

### **Books and articles on epidemiology and medical research design**

- Gehlbach SH. *Interpreting the Medical Literature*. McGraw Hill, 1993.
- Grimes DA, Schulz KF. An overview of clinical research: the lay of the land. *Lancet* 2002 Jan 5; 359: 57-61.
- Grimes DA, Schulz KF. Bias and associations in observational research. *Lancet* 2002 Jan 19; 359: 248-52.
- Guyatt G, Rennie D, eds. *User's Guides to the Medical Literature: A manual for evidence-based clinical practice*. AMA Press, 2002.

### **Books on understanding basic statistics and data analysis**

- Lang T, Secic M. *How to Report Statistics in Medicine*. American College of Physicians, 1997.
- Riegelman RK, Hirsch RP. *Studying a Study and Testing a Test: How to read the health science literature*. Little, Brown, 1996.
- Rowntree D. *Statistics without Tears*. New York: Charles Scribner, 1981.

### **Professional training workshops in epidemiology, statistics, research**

- American Medical Writers Association ([www.amwa.org](http://www.amwa.org))

### **Risk perception**

- Slovic P. Perception of risk. *Science* 1987; 236(4799): 280-5.
- Plous S. *The Psychology of Judgment and Decision-Making*. McGraw Hill, 1993.