There are important studies, and then there are damn important studies.

Centuries ago, before there were medical universities, the word *doctor* denoted a learned person or teacher. Nothing has changed. The chief duty of all modern-day clinicians remains that of an expert teacher. Yet if we are to teach we must know the facts.

This means knowing more than anatomy and physiology and what the guidelines say; it means knowing the actual benefits and harms of our interventions.

Do we?

**The Study**

A recently published systematic review suggests that clinicians’ knowledge of the benefits and harms of medical interventions is dubious.

Two researchers from Bond University in Queensland, Australia asked a simple but provocative question: Do clinicians have accurate expectations of the benefits and harms of medical treatments, screening, and diagnostic tests?[^1]

A total of 48 eligible studies that surveyed expectations of more than 13,000 clinicians were identified. Included studies covered a range of clinical topics such as cancer screening, fetal and maternal medicine, cardiovascular disease, surgery, and medications. They focused on an array of medical interventions that included treatments (n = 20), medical imaging (n = 20), and screening (n = 8).

**Estimating Benefit.** First the authors reported on expectations of benefits. Clinicians did poorly. In only three of the 28 outcomes assessed in the studies did clinicians pick the correct estimate of benefit more than 50% of the time. Most often, clinicians overestimated benefits, but underestimation also occurred in 9% of outcomes.

**Estimating Harm.** The researchers then reported expectations of harms, which were compared against the correct estimates in 26 studies for 69 outcomes. Again, clinicians performed poorly: in only nine of the 69 (13%) outcomes did more than 50% of clinicians correctly estimate harms. In this case, clinicians mostly underestimated harm with overestimation occurring in only three outcomes.

**Study Limitations**

We should start with the limitations. First, many of the reviewed studies were small and used unvalidated survey questions, which is important because risk-prediction accuracy can vary according to how it is assessed. Second, most of the harms from medical imaging that were measured were of cancers caused by radiation received during the imaging procedure, which is a hypothetical harm. Third, for each study included in the systematic review, the researchers accepted the study authors’ estimates of benefit and harm without verifying against the best evidence at the time.

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Some critics might also argue that it's hard to define ignorance—in a broad sense—in a rapidly changing healthcare environment. I don't buy that argument. It is not our job to be all-knowing; it's our job to know the published benefits and harms of the interventions we recommend.
Even with its limitations, this systematic review is shocking. And it's not just clinicians who have a knowledge deficit. These two authors have previously shown that patients, too, overestimate benefits and underestimate harms from medical actions.² That both parties participating in the medical decision are deluded in the same direction does not bode well for decision quality.

Possible Explanations

**It Just Makes Sense.** The authors offer several possible reasons for their findings. One is a preoccupation with empiric pathophysiologic mechanisms rather than actual trial data. A recent example of this kind of "it-makes-sense" thinking comes with the flop of bioresorbable coronary stents. These devices should have worked better than conventional metal stents because dissolving struts meant better artery mechanics and less nidus for clot in the future. The actual evidence, however, showed that the bioresorbable device was no better at delivering better mechanics,³ and it led to higher late stent thrombosis.⁴

A study published in 2013 by Prasad and colleagues reported on more than a hundred—146 to be exact—such medical reversals.⁵

**Bias.** Bias is another reason clinicians don't make accurate predictions of benefit and harm. Clinicians are human, and humans seek evidence that supports action they believe is beneficial. In prostate cancer care, for instance, radiation oncologists favor radiation while surgeons favor surgery⁶. In cardiology, little inference is needed to see bias in the discussion between interventionalists and surgeons on the merits of two recent trials of stents vs bypass surgery in patients with left main coronary artery disease.⁷,⁸

**Therapeutic Illusion.** The authors also suggest optimism and the therapeutic illusion as a possible source of overestimation of treatment benefits. They cited a beautiful paper: In 1978, British surgeon KB Thomas compared two strategies in patients with undiagnosed complaints. He either told these patients they had no disease and gave no treatment, or he diagnosed them with a condition and treated them.⁹ When he found equal outcomes with the two approaches—and that more than half the patients got better regardless of treatment—he concluded that "the results of this study support the belief that the patient who is made better with no treatment will also be made better with treatment. The danger is that the doctor may ascribe recovery to his treatment."

**Inherent Problems in Publishing.** The authors point to pitfalls in the medical literature, including "the misleading portrayal of intervention benefits and absence of harms in journal articles and information from commercial sources." I could support this statement of the obvious with many words and citations. Or we could just accept that slanted portrayals of evidence are not nefarious but normal operating procedure. Scientists aren't in the business of underselling their results.

**Decision Support as a Remedy?**

In medicine, it's okay to ask for help. Decision aids, which are easily derived from absolute event rates in clinical trials, can be used in real time in the exam room. There's ample evidence that decision aids improve decision quality from the patient perspective.¹⁰ Decision aids help you see what a 1% absolute risk reduction looks like. Namely, your eyes are drawn to the 99 of 100 people who get the same benefit with or without treatment—like Dr Thomas's revelation.

Decision support also helps give accurate accounts of harm. For instance, if you add up infection, bleeding, pneumothorax, and inappropriate shocks for the ICD group in the recently published DANISH trial, you find a 13% complication rate.¹¹ Although this estimate may be slightly high because some patients may have had two complications, double-digit ICD complication rates are not out of line with two other published studies.¹²,¹³ How many patients offered ICDs are given this information?

One vital warning about decision aids: these devices can be used to scare people into making the "right decision." An industry-sponsored abstract presented at the 2016 American Heart Association meeting found that perceptions of risk can be manipulated by how data are presented.¹⁴ In this case, showing people their lifetime cardiovascular risk rather than their 10-year risk made them more likely to engage in "prevention strategies." Guess what type of company sponsored this study?

**Conclusion**
If doctors want to continue in their roles as learned people and trusted teachers, our knowledge of the benefits and harms of medical action needs improvement. We should hurry because the digital era and its democracy of information is decreasing our asymmetry of knowledge.

### The digital era and its democracy of information is decreasing our asymmetry of knowledge.

It's time for a shift in culture. I think everyone in healthcare relies too much on guidelines. These documents paternalistically say "treatment X is recommended." The writers review the literature but they don't, in easily accessible ways, tell us the absolute benefits and harms of treatment X. Clinicians, therefore, get a sense that there are right and wrong therapies. Statins, ICDs, mammograms, annual physical exams, etc—all are "right." Thus, we needn't bother with their actual benefits and harms. This culture begins in training.

All medical action is a gamble. It's time that both patients and clinicians had the right odds. Shared decision making is a fantasy if neither participant in the decision has accurate expectations.

References


