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Science for Public Consumption

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Lisa Schwartz and Steven Woloshin, a lively team of physician-scientists, presented case studies to show how statistics—although technically accurate—can be used to exaggerate research outcomes. The result, for the public, is often unnecessary anxiety and overexposure to medical care. Their prescription: “Take the mystery out of the numbers with straightforward data presentation.”

Race and Sex Discrimination—Really?
“Blacks and women with chest pain are 40% less likely than whites or men to be referred for cardiac catheterization.” The first question is “40% of what?” The authors presented odds ratios, which exaggerate relative risk when base rates are over 20%—and in this case, they were 91% for whites and 85% for blacks. Risk ratios would have been less shocking but more accurate.

The real message was that blacks or women were referred 7% less often than men or whites. Hardly sensational enough to seize the spotlight on “Nightline” or in the New York Times, as actually happened.

In reality, only black women had a lower referral rate—information that was obscured by how the methods were described in the original article, “Analysis of Race-Sex Interactions”. Woloshin and Schwartz suggested a “black-box” warning for analyses described in this way: “999 of 1000 readers may be intimidated”!

WHI Findings—Risky Business
The hormone-therapy findings of the Women’s Health Initiative have spawned intense mass-media attention. The problem with many of these mainstream media reports, Schwartz and Woloshin contend, is a lack of base rates. A 1.41 hazard ratio translates into a 41% increased relative risk. What we don’t know is 41% higher than what.

Relative-risk reduction appears more impressive than the corresponding absolute-risk reduction, especially when the risk is small. The New York Times tried to circumvent the problem this way: “The data indicate that if 10,000 women take the drugs for a year, 8 more will develop invasive breast cancer. . . .” But again, the question is “eight more than what?”

Expressing results as absolute event rates is better: Of 1000 postmenopausal women observed over a 5-year period, 15 of those 19 taking placebo will develop breast cancer, compared with 20 of those taking hormone therapy. Readers can then clearly judge the magnitude of the risk.

Treatment Cost-effectiveness: Putting the Cart before the Horse
Sometimes researchers create cost-effectiveness models before treatment effectiveness has been established. Woloshin and Schwartz suggest that journals consider not publishing such studies. If the findings are published, a caveat may lessen their prominence: “The effectiveness of this procedure [or test] has not been demonstrated. Therefore, the question of cost-effectiveness may be premature.”

New Alzheimer’s Drug: How Significant?
A clinical trial to study a new drug to treat Alzheimer disease reported statistically significant results. What wasn’t so clear was their clinical significance.

The article lacked a description of the clinical tests used to score patients’ functionality, so the results—an increase of 0.3 point on a 7-point scale—are meaningless. Unless findings can be related to patients’ ability to function, the reader cannot gauge the magnitude of improvement.

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