

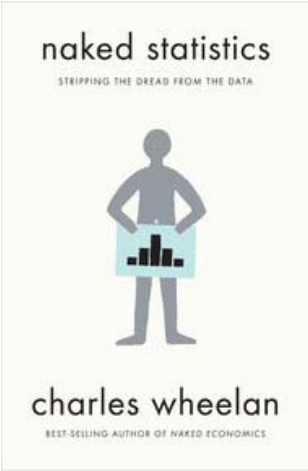
BOOKS

A Crash Course in Playing the Numbers

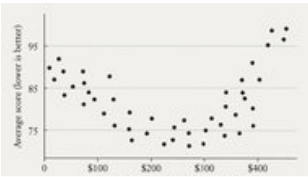
By ABIGAIL ZUGER, M.D.
Published: January 28, 2013

The chances are that you turn to this part of the newspaper in search of some reliable tools for optimizing your health. The chances are that you periodically visit a doctor for the same reason.

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Graphic
Money spent on lessons per month
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Read an excerpt of “Naked Statistics: Stripping the Dread from the Data” (pdf)

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Alas, what you seek cannot be found in either place, not if it's certitude you're after. Whether you are healthy, moribund or traversing the stages of decrepitude in between, every morsel of medical advice you receive is pure conjecture — educated guesswork perhaps, but guesswork nonetheless. Your health care provider and your favorite columnist are both mere croupiers, enablers for your health gambling habit.

Staying well is all about probability and risk. So is the interpretation of medical tests, and so are all treatments for all illnesses, dire and trivial alike. Health has nothing in common with the laws of physics and everything in common with lottery cards, mutual funds and tomorrow's weather forecast.

Thus, no matter how many vitamin-based, colon-cleansing, fat-busting diet and exercise books show up in 2013, the most important health book of the year is likely to remain Charles Wheelan's sparkling and intensely readable “Naked Statistics,” even though it's not primarily about health.

A professor of public policy and economics at Dartmouth, Mr. Wheelan earned journalism credentials writing for The Economist and has previously drawn on both careers to produce “[Naked Economics](#)” (2002), an accessible guide for the lay reader. “Naked Statistics” is similar, a riff on basic statistics that is neither textbook nor essay but a happy amalgam of the two.

It is not the place to learn for the first time about medians and means, but definitely the place to remember what you were once supposed to know about these and other key concepts — and, more important, why you were supposed to know them.

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And that means you. While a great measure of the book's appeal comes from Mr. Wheelan's fluent style — a natural comedian, he is truly the Dave Barry of the coin toss set — the rest comes from his multiple real world examples illustrating exactly why even the most reluctant mathophobe is well advised to achieve a personal understanding of the statistical underpinnings of life, whether that individual is watching football on the couch, picking a school for the children or jiggling anxiously in a hospital admitting office.

Are you a fan of those handy ranking systems based on performance data, guaranteed to steer you to the best surgeons in town? If so, you are up to your armpits in descriptive statistics, and Mr. Wheelan has some advice for you: beware. The easiest way for doctors to game those numbers is by avoiding the sickest patients.

Has a diagnosis of [cancer](#) in the family sent you fishing around for information on average survival? You would be well advised to figure out if it is mean or median survival you're looking at.

Mr. Wheelan pays homage to Stephen Jay Gould's classic essay on prognosis, "[The Median Isn't the Message](#)," in which Dr. Gould uses his own cancer diagnosis to illustrate how misleading median-survival data can be. (Told he had a malignancy with a median survival of eight months, Dr. Gould died of an unrelated cancer two decades later.)

Are you impressed with studies showing that people who take Vitamin X or perform Exercise Y live longer? Remember, correlation does not imply causation. Do you obsess over studies claiming to show that various dietary patterns cause cancer? In fact, Mr. Wheelan points out, this kind of research examines not so much how diet affects the likelihood of cancer as how getting cancer affects people's memory of what they used to eat.

And while we're talking about bias, let's not forget publication bias: studies that show a drug works get published, but those showing a drug does nothing tend to disappear.

Do you think you need a yearly PET scan to check for rare diseases? Mr. Wheelan has you contemplate the spam filter on your e-mail program. Set too low, it feeds a lot of garbage into your in-box; set too high, it will make you miss the important messages. The same trade-off applies to the interpretation of medical tests. Unproven disease screens are likely to do little but feed lots of costly, anxiety-producing garbage into your medical record.

Mr. Wheelan deftly whisks you through mean distributions and standard errors, and before you know it you have plunged into the dense thickets of regression analysis, a tool for separating out many different strands of cause and effect. With the aid of a long shaggy-dog story involving a group of whippet-thin marathon runners and a handful of considerably plumper delegates to an International Festival of Sausage, you will undoubtedly get closer than ever to understanding the powerful technique he calls "the hydrogen bomb of statistics."

Regression analysis is the engine that drives the giant randomized controlled studies that increasingly inform every medical decision anyone makes for you these days. It can be a force for good or for ill, and Mr. Wheelan aptly demonstrates how it can succeed and how it can fail (note, for instance, the recent gigantic flip-flops on [estrogen](#) prescribing).

If you want to eat sausage and survive, you should know what goes on in the factory. That dictum — one of only a few certainties in an uncertain world — most definitely



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applies to the statistical sausage factory where medical data is ground into advice. Mr. Wheelan has propped the factory gates wide open. Take his tour.

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