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THE STORY OF SNAKE OIL

(Which Inspired the Book's Title)

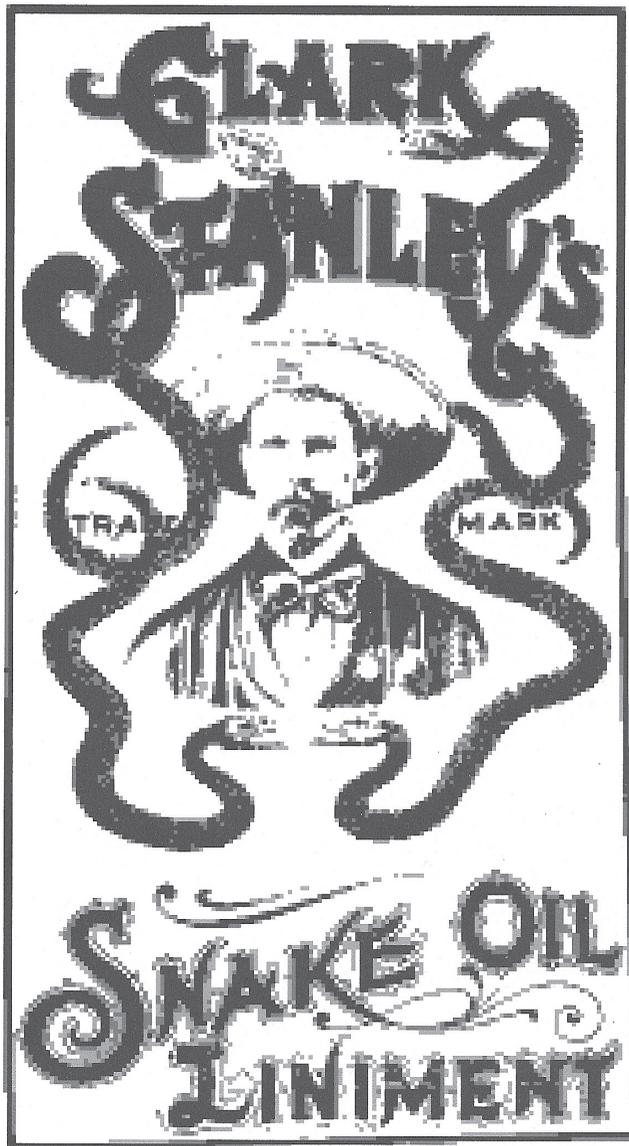
According to the dictionary, *snake oil* is “a worthless preparation that is fraudulently peddled as a cure for many ills.” But there are those who claim that snake oil should not be ridiculed and scorned.¹ Far from being humbug, they say, *real* snake oil is a cutting-edge treatment for a variety of conditions and can

- improve our cholesterol and triglycerides
- slow the growth of cancerous tumors
- cut our heart disease risk in half
- correct an irregular heartbeat
 - relieve our depression
 - ease arthritis pain.

It is hard to know which of these claims can be trusted. Anecdotes on the subject abound; scientific evidence is much harder to come by. And the same is true for all sorts of modern-day “prescriptions,” whether they are called *Celebrex* or *Tylenol*, involve *drug-coated stents* or the *Mediterranean diet*, entail the consumption of *pomegranate juice* or *coenzyme Q10*. Luckily, this book provides tools for tackling the uncertainties that are associated with all sorts of similar medical advice, but for now, let's just focus on the book's title and the story of snake oil itself.

A bit of history. In the 1860s, it seems, Chinese workers building the transcontinental railroad in the United States rubbed snake oil brought over from the old country onto their bodies to soothe painful joints. The snake in question was the Chinese water snake and laughing fellow workers, we are told, soon agreed that its oil did help with arthritis and muscle pain. The effect was not lost on traveling medicine salesmen. They couldn't get their hands on Chinese snakes, but soon concocted their own bogus versions, some of them containing rattlesnake oil or salmon oil or no oil at all, and peddled them to a gullible public at medicine shows.

Snake oil analyzed. By now, we know a bit more about *enhydis chinensis*, the Chinese water snake. Apparently, it is a rich source of *eicosapentaenoic acid (EPA)*, an omega-3 fatty acid, which the human body converts into natural pain killers, such as series 3 prostaglandins. If people don't have enough EPA, it is alleged, a host of inflammatory conditions develop, including arthritis and heart disease. By the same token, problems like arthritis are alleviated, we are told, when the real snake oil is rubbed on (and quickly absorbed through the skin).



A postscript. In 1917, the U.S. government actually tested one of the bogus potions sold by Clark Stanley, the “Rattlesnake King,” and called *Stanley’s Snake Oil*. It contained no EPA at all and consisted mostly of mineral oil and red pepper (with a tiny bit of beef fat, camphor, and turpentine thrown in), apparently similar to ingredients found in modern-day *capsaicin cream* that is also alleged to provide temporary arthritis relief. Interestingly, genuine snake oil is still sold in traditional Chinese pharmacy stores. A sample bought in San Francisco’s Chinatown in 1989 was found to contain 75% of carrier material, such as camphor, and 25% of oil from Chinese water snakes; some 20% of that oil, in turn, was EPA.²

WHAT THIS BOOK IS ABOUT

The headlines keep coming. Whether we read the local paper, turn the pages of our favorite magazine, surf the Internet, or tune our TV to the evening news, there are ever new stories relating to our health—hot new stories about prescription drugs, over-the-counter medications, medical devices and procedures, and others still that offer “crucial advice” on the lifestyle we should adopt, the foods we should eat or avoid, and the dietary supplements we should never do without. But oftentimes the news about alleged medical breakthroughs is contradictory and, as time passes, the very thing that was to improve our lives becomes a threat to it. Before long, we face dilemmas:¹

- Will fancy cholesterol drugs save us from heart attacks *or* will they destroy our liver?
- Is the once-a-day baby aspirin the “cure of the century” *or* a stroke-causing hoax?
- Do drug-coated stents reduce the risk of heart attacks *or* make them more likely?
- Will low-carb diets rob us of crucial nutrients *or* will high-carb diets give us diabetes?
- Will butter clog our arteries *or* will butter substitutes give us cancer?
- Can *echinacea* cure the common cold *or* is it voodoo medicine?

One thing is for sure. To find answers to questions such as these, and to sort out the veritable tsunami of health-related stories that inundates us, we cannot rely on the FDA. The Food and Drug Administration is *not* going to save us from confusion; it is not about to alert us to every bit of misinformation and just plain bunk that passes for groundbreaking medical news. We are on our own. And this brings us to the central idea of this book.

If we care to separate bogus claims from the real thing, we must adopt a special way of statistical thinking. This type of thought is routinely employed by the practitioners of *statistics*, a term that must not be confused with heaps of numbers but refers to the academic discipline that is central to modern scientific research. The introduction—ever so gently—of strange statistical concepts, like *random sampling* and *margins of error* or *confidence intervals* and *p-values* or *conditional probability* and *statistical significance*, is the single-most important feature of this book because it ultimately empowers us readers to distinguish between reliable and unreliable claims about our health and to do so on our own.

True enough, all of us may well dismiss some health-related news reports without a second thought. Anthrax cures cancer in hours? Mayonnaise prevents Alzheimer’s? Yogurt stops migraines? But what about more serious-sounding claims? Are they the gospel truth? Sad as it is, much of each day’s medical news, even if it appears in one of the most respected

medical journals, is embedded in the latest FDA release, or is found on a famous hospital's fancy web site, can easily be no better than snake oil!

Early on in this book, we learn how serious scientists can find the truth about health-related claims in one of two ways: by undertaking an *observational study* or a *controlled experiment* (also known as a *clinical trial*). We also learn how both of these procedures are subject to numerous potential errors or abuses. More importantly, as we become statistics-savvy, we learn to ask a series of tough statistical questions whenever we encounter a new health-related claim. And unless all of these questions are answered to our satisfaction, that claim should be dismissed—even if it makes headlines in *The New York Times*, is featured on *ABC World News*, and endorsed by Dr. Phil himself. A medical claim based on questionable statistical procedures is nothing else but a *snake oil* claim, this book asserts, akin to that charlatan's advice about eating plenty of mayonnaise to save us from Alzheimer's. True enough, questions about ACE inhibitors and beta blockers, Advil and Motrin, 64-slice CT scans and PSA tests, the AA 12-Step program and the DASH diet, citrus fruit and omega-3 fatty acids, or calcium and vitamin D may *appear* to be far removed from matters of snake oil, but, again, we should note: False claims about beta blockers or drug-coated stents are no less snake oil than are absurd and fantastic claims about echinacea, mayonnaise, and St. John's wort. And statistical thinking can help us expose the snake oil no matter what its disguise.

Here are some of the things we will understand by the time we have finished this book:

- Why “safe” medicines can harm us....
- Why “effective” medicines may not cure us...
- Why a “95 percent confidence interval” can be dead wrong...
- Why “statistically significant” results may be utterly unimportant...
- Why wrong research results have a greater chance to be published than correct results...
- Why we may only have an 8.7 percent chance of having a disease, even though a medical test says we *do* have the disease and the test is known to be 95 percent accurate if a person has the disease and 99 percent accurate if a person does not have it...

NOTES

The Story of Snake Oil

¹ See, for instance, Alan Inglis, “The Astonishing Healing Powers of Snake Oil...and other ‘ridiculous’ folk remedies that could actually *save your life!*” *America’s Country Doctor*, Special Report, Summer 2006, on whose discussion this section is partially based. Additional snake oil facts, including the accompanying reproduction of an old public domain poster, were gleaned from *Wikipedia*, the free online encyclopedia, accessed on 10/22/2009 at http://en.wikipedia.org/wiki/Snake_oil.

² Udo Erasmus, *Fats That Heal, Fats That Kill: The Complete Guide to Fats, Oils, Cholesterol and Human Health* (Alive Books, 1993).

What This Book Is About

¹ Some of the following dilemmas and more are discussed in The Institute for Cooperative Medicine’s *Urgent Health Alert*, Winter 2005.