STATISTICS and STATISTICAL METHODS: *Dubious Data awards highlight ...*

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Dubious Data awards highlight statistical follies

Research group pokes fun at the way gullible journalists interpret scientific – and not-so-scientific – findings

BY STEPHEN STRAUSS
The Globe and Mail

There are lies, damn lies and the worst statistical follies, goofs and misstatements of 1995.

The Statistical Assessment Service, a research group based in Washington and dedicated to improving the public's understanding of scientific and statistical information, has just conferred its Dubious Data for 1995 prizes.

"These statsoids are selected based on a rigorous grading system that factored for newsworthiness, portentousness of pronouncement, and fundamental absurdity," the group said. "Bonus points were awarded for shamelessness and gratuitous interpretation."

The Too Bad To Be True Award went to a number of U.S. columnists who quoted a study that compared the top 10 problems in schools in the 1940s with the same problems today. A 1940s list that started with talking, chewing gum, making noise and running in the halls was set against a 1990s list that began with drugs, alcohol, pregnancy and guns.

When a Yale University researcher went back to find the original study, however, he discovered that the lists had been made up by a born-again Christian in Fort Worth, Tex.

"They weren't done from a scientific survey," the man told the Yale researcher. "How did I know what the offences were in the 1940s? I was there. How do I know what they are now? I read the newspapers."

The Globe and Mail was singled out for the International Mountains-from-Molehills Prize for a story it ran last January about a study commissioned by the Ontario Addiction Research Foundation. The study suggested that more than half the women attending Alcoholics Anonymous sessions in one Ontario city were not in fact alcoholics.

This finding was used by commentators to raise important questions about how available mental-health services were for women. But as it turned out, the study did not have any statistical teeth because it was based on personal interviews with just 25 women at AA meetings whom the researcher thought had interesting stories to tell.

"It's almost enough to drive one to drink," STATS quipped in response to how the finding had been blown up.

The U.S. Centers for Disease Control were given the Thank You, Professor Award for Outstanding Statement of the Obvious for a commentary on teen-age birth statistics. It warned, "if teen birth rates do not continue to decline, there will be a rise in the number of teen births over the next few years."

The Weatherman's Friend Award went, as it does every year, to "Killer Weather," the group said. Terrifying winter storms claim lives, as do summer heat waves. "Obviously the bigger the number, the bigger the story, so all manner of tangentially and tortuously related deaths get lumped in with those few poor souls who actually are killed in weather-related accidents," the statisticians wrote.

They advise meteorologists to take as their New Year's resolution the pledge to "stop criminalizing the weather."

The Serious Topics Undermined by Preposterous Numerical Claims was an announcement by the U.S. Justice Deparment that an FBI study showed that a woman was beaten up every 12 seconds. This turned out to be more often than another FBI estimate of how often a violent crime of any kind took place.

And the Thank You For Sharing Award – an award for misstatement as much as portentiousness – went to a University of Arizona scientist who developed a Commode-A-Graph that can identify the unique bacterial pattern left when someone sits on a toilet seat.

"If there is ever a crime committed in a toilet, I can tell you who did it," said Professor Charles Gerba of the University of Arizona, who invented the Commode-A-Graph.

And finally the group took the Associated Press to task for a December report that seemed to show that women on welfare in the United States were "just like everyone else." The data not only were different from what the story reported but, in fact, were the exact opposite, STATS said. "What the numbers revealed was that, statistically, welfare mothers most closely resembled the stereotypical portrait of ..... welfare mothers."

The article EM9601 reprinted above is also used in Chapter 4 of the STAT 231 Course Materials.

(*continued overleaf*)

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Science stories you should not believe

FOR 20 years I was a consumer-affairs reporter. Every week someone came to me suggesting stories about risks that "had to be exposed." I eagerly reported the dangers, illustrated with heart-wrenching testimony from victims.

The most compelling stories were those that warned of unusual dangers, such as Agent Orange, killer bees or flesh-eating bacteria. But did such stories really give an accurate picture of life's risks? Tylenol poionings were a huge story in 1982 – weeks of headlines and breathless news reports. Yet the poisonings killed only seven people while cars kill more than 100 Americans every day. Most car crashes aren't "news."

I'm embarrassed to admit that it took me years of reporting scares to realize that I was doing a disservice. The turning point came when a producer rushed into my office pushing a story on cigarette lighters. "Bic lighters are exploding," he said. "They've killed four people." But by then I had compiled a "death list," a morbid document based on data from government agencies and medical groups. The list provides invaluable perspective. Once you know that more people are killed by mundane things like beds and plastic bags, then it's harder to get hysterical about, say, Bic lighters.

Risk analysts measure the costs of accidents by how much each is likely to shorten the average life. So with the help of physicist Bernard Cohen, I drew up a comparison of risks the media have hyped, along with more mundane risks that you may not hear much about. I found that the media favourites – for example, toxic-waste sites – are among the least dangerous.

One big loser in the process of hyping scares is science. We in the media often find it effective to take an insignificant piece of information, or one sensational announcement, and run with it. The story often gets picked up by legislatures and courts.

Here are principles to keep in mind to avoid being misled by junk science:

- Association is not causation. Science author Michael Fumento points out that if we see fat people drinking diet soda, we shouldn't conclude that diet soda causes obesity. When trying to understand less familiar phenomena, we are more likely to see patterns where there are none. Consider silicone breast implants. If you know someone who was healthy before receiving implants but developed a crippling disease after surgery, it's natural to associate these events, but as the Oregon judge recognized, that does not mean that A caused B. About 10,000 women with breast implants have developed connective tissue disease, but that's no higher than the rate among the general population.
- Clusters often mean nothing. Similar events, such as people developing the same disease in the same place, often happen by chance. You can test this by repeatedly flipping a coin. Are five heads in a row big news? No, just a streak. We accept it with coins, but panic when it comes to something like cancer. Some communities have detected cancer clusters and attributed them to, say, a nearby factory or power lines. The power lines may look menacing, hut that doesn't make them the cause of tiny fluctuations in the rate of disease. We're all exposed to Earth's magnetic field, and it's hundreds of times greater than the energy from power lines.
- Natural isn't necessarily better. We fear DDT, but malarial mosquitoes are worse. We get queasy at the thought of silicone in the body, yet silicone is chemically very similar to our own carbon-based human physiology. Natural chemicals in food are often more toxic than synthetic pesticides.
- Chemicals that harm animals don't necessarily harm humans. The same chemicals can affect different species in very different way. Saccharine was once banned because it caused cancer in rats. We know now that saccharine causes cancer by interacting with rat urine in ways that do not apply to humans.
- Science is highly politicized. Fifteen years ago, the media used one small study of babies born of cocaine-addicted mothers to convince people that the children were handicapped for life. In fact, there is no proof that crack babies are fated to do worse than anyone else, yet the crack baby scare thrived because diverse constituencies found that it advanced their ideologies. Liberals pushed the story to justify government programs; conservatives used it to demonize cocaine users. Beware of science that feeds political agendas.
- Some babies are born deformed purely by chance. One in five pregnancies ends in miscarriage; 1 per cent to 3 per cent of all babies have an inexplicable birth defect. It's no one's fault yet about 80 per cent of U.S. obstetricians have been sued anyway.

People don't deliberately choose to make mental errors or remain ignorant. Too often, though, we seize the first plausible-sounding explanation that appears to cut through the confusion of life. Once we've formed a belief, we're inclined to dismiss contrary evidence.

We like to say we're superior to the people who burned witches centuries ago. People were often killed for no better reason than a neighbour experiencing crop failure or impotence. But we're still prone to the same basic mental errors that killed the witches: seeing patterns where there are none, finding causes where there is only coincidence, and turning scanty evidence into widespread panic.

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The article EM9702 reprinted above is also used in Chapter 1 of the STAT 231 Course Materials.