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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 used in Chapter 1 of the STAT 231 Course Materials and in Statistical Highlight #92.