EM9117: The Globe and Mail, December 7, 1991, page D10

MIND AND MATTER

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Relax Chicken Little. It's statistics, not the sky, that we should be questioning

TODAY I run the gamut of science from A to A – that is, from AIDS to asteroids.

What links two such seemingly disparate subjects is the way in which they spew up an iconic numerology in their wake. By iconic I mean that once a figure, suitably cosseted in qualifications, appears in print, everyone and his dog pick up on the number and make it gospel.

Consider the thesis that over the next 50 years North Americans have a one-in-6,000 risk of being killed by an asteroid. In June, The New York Times published the fright/scare/risk number and it immediately began appearing everywhere – including, in somewhat different forms, twice in this newspaper.

It's terrifying because it projects death by asteroid as a much greater risk than from tornadoes (one in 50,000), airplane crashes (one in 20,000) and just a bit lower than by electrocution (one in 5,000).

Of a population of about 280 million people in the U.S. and Canada, it seems that over a span of 50 years about 5,600 will be killed by tornadoes, 14,000 by airplane crashes – but more than 46,000 will expire after being bonked by space rocks.

Cover your heads, Chicken Littles.

Or should you?

"Ask what's the most likely number of people who will be killed by asteroids in the next two centuries and the answer is zero," admits Clark Chapman, a planetary scientist in Tucson, Ariz., who with his colleague David Morrison originated the Times' figures.

What the pair worked from are estimates that a large asteroid (about 1.25 kilometres across) has struck Earth on average every 300,000 years. They then factored in a hypothetical death toll from the collision.

The assumption is that it isn't being struck on the head that will kill people but the collateral effects – tidal waves and planet-cooling dust clouds. For their analysis, the scientists assumed that every living human on the face of the planet met his or her maker on asteroid-impact day. Thus, their one-in-6,000 figure arises simply by dividing 50 years into a 300,000-year possible arrival time and assuming total destruction.

'Ask what's the most likely number of people who will be killed by asteroids in the next two centuries and the answer is zero'

It sounds so neat, but sit on the numbers just a little and they squish all over the place. There has been no discernible cycle to asteroid collisions.

"You might not have anything that size for five million years and then three in a day," comments Richard Grieve, a geophysicist with the Department of Energy, Mines and Resources in Ottawa.

Equally murky is what a real death toll might be. Various estimates included in a table of a paper Dr. Chapman presented in October show that while some have predicted a total kill-off, the scientific consensus forecasts somewhere between 10 and 20 million fatalities worldwide. If North America got its roughly one-million share then the risk of being killed by an asteroid in the next 50 years shrinks to one-in-1.6 million. This is, on a risk-analysis basis, less than the likelihood of being killed by fireworks.

All of which leads me to doubt the wisdom of using any iconic asteroid number. All that can be sensibly said about the risk of the sky falling on us is this: If a rock, the diameter of two CN Towers laid end to end, does hit the earth, a lot of you are likely to die. But in the meantime, all potential Chicken Littles should throw out their moldy salmon, stop smoking and fasten those seat belts.

And now to AIDS. One of the questions continually asked after the basketball star Magic Johnson was diagnosed as being infected with the HIV virus was when Magic or anyone else in his position will come down with AIDS proper. The most common, but unfortunately wrong, answer was 10 years.

What a variety of studies do suggest is that somewhere between 10 and 11 years after they were infected, *half* the people observed had full-blown cases of AIDS. When will all HIV-positive people get AIDS? Maybe very much later, and maybe, just maybe, never.

The cause for some optimism is an ongoing study of 524 gay men in San Francisco. The study began in 1978 to document the spread of the sexually transmitted hepatitis B virus: AIDS researchers have been able to make use of blood samples which were frozen after the original hepatitis analysis.

This has allowed them to identify men who were or became HIV positive in the period 1978-191. As might be suspected, most – 361 – men have come down with full-blown AIDS. Another 116 show some signs of immune damage associated with the syndrome. But 47 men, 9 per cent of the original group, are perfectly healthy.

And of that number, 31 men have taken none of the anti-viral drugs that are given to HIV-positive people to ward off the onset of the disease. Their bodies, for reasons that the San Francisco researchers suspect may be linked to a genetic predisposition, are just better at fighting off AIDS.

"We don't know how long they will take to progress to AIDS or even if they will progress," says Susan Buchbinder, a doctor with the San Francisco Department of Public Health, which is conducting the study.

I hope the latter is so because this is a disease where even a scintilla of statistical hope looms large over a field so littered with the dead and dying.

The article EM9117 reprinted above is used, together with EM9013 and EM9210, in Figure 7.2 of the STAT 220 Course Materials.