The article EM9037 reprinted below contains information relevant to the articles reprinted as EM8803, EM8909 and EM9016.

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Spine-chilling to look at: another stat

SCIENCE

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IT is too late this year, but when Halloween rolls around again, I recommend that kids think about dressing up as something that really frightens adults: Statistics. Whooo – BELL CURVES. Whooo – DELTA FUNCTION.

The fact is that the misunderstanding of statistics continually guts grownups. We get led around by the nose and don't sense the "yeah, but what about these things" questions.

In this column, I am going to lead you through a couple of examples of statistical hamstringing and then pose a modest solution. Last week, speakers at a conference on gender bias in science attacked a 1988 study in the United States in which 20,000 men were tested to try to determine the effect that a small daily dosage of the active component in aspirin had on heart attacks.

The background document described it as a perfect example of how women are mindlessly excluded from biological testing – a situation that created the anomaly that "doctors could recommend the treatment for men and not for women." Not exactly right.

The first thing to understand was the sample. The "men" involved were in fact U.S. doctors. They were considered to be particularly good candidates because they were likely to take their daily medication and because they paid attention to their health. In 1983, when the mailings went out, there were approximately 450,000 registered male doctors to sample.

Because the incidence of heart disease rises with age, only the 261,248 men between 40 and 84 were contacted. Of those, 59,280 said they would participate. Adverse medical problems and a lack of real commitment reduced this to 22,071 men.

They were divided into two groups, one taking the aspirin and the other a placebo. At the end of a year, of all the non-fatal heart attacks that occurred in the two groups during that time, a third of those were suffered by aspirin-takers. Moreover, there were five heart attack deaths in that group compared with 18 in the control (placebo) group. It was, as they say, statistically significant.

However, if one were to get about the same answer in women, a sampling problem arose. Not only do women have half as many heart attacks percentage-wise and have them later than men but there were only roughly 70,000 women doctors in the United States.

No more than 28,000 of them met the age requirements. Assuming the same kind of patterns of response and health discrimination, more or less, 2,400 women doctors would have qualified. In a given year, on average, only two or three of them might have died from heart attacks. Obviously, this is too few for statistical significance.

Well, you say, maybe a different and larger group of women could have been sampled. That makes sense until one looks at the outcome of the supposedly sexist study. Yes, indeed aspirin did seem to reduce the number of heart attacks, but when the total number of deaths from cardiovascular disease was looked at – oh, statistical horror of horrors – the control group and the aspirin group both produced EXACTLY THE SAME number – 44.

The sadder-but-wiser statisticians concluded that even 22,000 male doctors weren't going to be a large enough group to prove conclusively that aspirin reduced heart attacks, at least when death was the criterion.

The second statistical boomerang involves the risk of AIDS to women. On October 19, a Toronto AIDS conference was told that women were "the fastest growing AIDS risk group" and women were the "last to accept they are at risk."

Evidence was presented suggesting 50 per cent of the women who are infected with AIDS through heterosexual intercourse. A breakout of AIDS among heterosexual women is something I have been closely looking for but just couldn't remember seeing. Therefore, I went to my collection of statistics produced by the Federal Centre for AIDS, and teased out the root of the misinformation. It was true that on Oct. 1, 1990, 127 out of 227 women with AIDS in Canada had gotten the disease heterosexually. However, nearly two-thirds (83) of these women were in a special risk sub-group. They were either Haitians or the wives and girl friends of Haitian men.

They were special, because, for some reason, AIDS is easily passed back and forth between men and women in Africa and the Caribbean but not in temperate climates. The best guess is that other untreated venereal diseases, different sex practices, fewer circumcisions and more penile and vaginal sores vastly increase the AIDS risks from heterosexual sex in the tropics.

What this all means is that in Canada since 1981 when the first cases of sexually transmitted AIDS were reported in women, only 44 non-Haitian-linked cases have appeared. Is even that rate increasing? Let the figures speak. In 1987, 25 women – Haitian connection and all – contracted AIDS through heterosexual intercourse. There were 28 in 1988 and 23 in 1989, although final numbers are not in.

Finally, though it will undoubtedly turn out to be a statistical fluke, of the 254 gender-classified cases of AIDS reported in 1990 so far, none, let me repeat, NONE of them has been in women through heterosexual intercourse. The moral of all this is: before giving algebra, geometry, calculus and trigonometry, Canadian schools should teach their students how to navigate the shoal-filled mathematics of everyday life.

As Ian Fleming might have put it: Statistics is forever.

The article EM9037 reprinted above is used on the overleaf side in Figure 9.16 of the STAT 220 Course Materials and in Chapter 1 of the STAT 231 Course Materials.