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Childhood Leukemia Study

Death rates due to childhood leukemia near two nuclear generating stations in Ontario are 34% above the provincial average, but this result may still have been due to chance, says a recent study done for the AECB, and released at the end of June. Hugh Spence, a spokesperson for AECB, said "our people conclude that the rates ..... of leukemia around Canadian nuclear plants are no different from normal" and consequently the Control Board is not planning to adopt the study's recommendation that further investigation of leukemia is warranted.

Researchers expected to find 26 deaths due to leukemia among children aged one to fourteen who were born near Pickering and Bruce nuclear stations. Instead they found 36. In order to decide how significant this excess is, much mathematics is required. Norm Rubin, Energy Probe's Director of Nuclear Research, points out that the statistical analysis is nonetheless interesting, and could provide a much more definite answer than the authors cared to give.

One can always say, after doing a statistical study, "these results may be due to chance". The attempt is usually made, however, to calculate just how likely that is. Normally, one sees a concluding statement something like the following: "these results are expected to be accurate 19 times out of 20," or paraphrasing slightly: "we are 95% confident that these results are true and not due to chance."

This 95% confidence level is arbitrarily (but typically) chosen to discriminate between significant findings and those too likely to be due to random sampling error. For this study, the authors decided that being 95% confident of a true excess was not good enough, but that 97.5% was necessary. In any case, when the mathematics was done, the 10 excess deaths turned out to be significant at the 97% confidence level, just barely failing their test! One cannot help thinking that AECB's drive to justify their lax practices influenced the setting of the boundary between significant and insignificant.

The researchers' timid conclusion could quite validly be rewritten as "childhood leukemia deaths near the nuclear stations are much higher than average, and we are 97% certain that this is not just due to chance". These findings show the need to analyze the causes of the excess, and to reduce exposures to known carcinogens whenever possible.

The causes of childhood leukemia are not well understood, but the disease has been linked to radiation exposure, and a British study suggests that genetic damage to the sperm of fathers may be partly responsible.

Another study has been done, and is scheduled to be released in September by the AECB. We are proud that Norm Rubin was instrumental in getting the AECB to hire Health and Welfare Canada to do this study entitled "Tritium Releases from the Pickering Nuclear Generating Station and Birth Defects and Infant Mortality in Nearby Communities 1973-1988."

The article EM9109 reprinted above is used, together with EM9022, in Figure 12.2 of the STAT 221 Course Materials.

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