Cancer Causes and Control **13**: 975, 2002.

Letter to the Editor

Re: Diagnostic radiation and the risk of multiple myeloma (United States)

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Hatcher *et al.* [1] studied the relationships between exposure to diagnostic radiation and multiple myeloma mortality using data from a multi-center, population-based interview study. The authors acknowledge limitations to the study that result from low response rates for the questionnaire, the absence of information on time of exposure, and potential recall bias. The magnitude of exposure was estimated by the lifetime numbers of diagnostic X-rays of various types.

The mean values for lifetime numbers of X-rays for the cases (17.4) and controls (17.2) are surprisingly low when over 60% of the study population were age 60 or greater. According to Webster [2], the annual per-capita number of diagnostic X-ray procedures (excluding dental X-rays) increased from 0.47 in 1960 to greater than 1.1 in 1990. Even at 0.47 per year, considering the age of the population and the time of the study, a mean value near 30 would seem more valid. Perhaps respondents failed to recall more routine diagnostic X-rays such as work-related examinations as well as retakes.

The lifetime number of diagnostic X-rays to estimate exposure as used in the analysis presented in their Table 3 implies equivalent dose per examination. In general, bone marrow dose resulting from X-ray examinations conducted in the 1940s through the 1960s was much greater than that from more recent examinations [3]. The decrease in bone marrow dose resulted from advances in technology such as image intensifiers and faster film. The use of chest photofluorography for tuberculosis screening prior to the mid-1960s is a good example of decreased dose per procedure. This technology delivered doses to bone marrow about 100 times higher than current examinations [4–6].

Misclassification of dose is more readily apparent in Table 4. One can tell by the total numbers of cases and controls in each of the three groups of X-ray procedures that study participants were categorized regardless of doses from procedures in the other two groups. This means that the reference set in each of the three groups have bone marrow doses from untold numbers of procedures included in the other two groups. For the two highest dose groups the odds ratios decrease with increasing numbers of procedures, which implies that diagnostic X-rays associated with higher dose procedures provide protection from multiple myeloma.

The potential for dose misclassification in the study appears to be quite high. Based on all limitations the conclusions drawn may be questionable. Further etiologic studies of multiple myeloma should rely on much more precise measures of dose.

References

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