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Cost-Effectiveness of Reducing Radon in Homes

TO THE EDITOR: In the article on Indoor Radon in the Newsline Section of your July 1987 issue (*1*), there is a call for a cost-benefit analysis of radon activities. Let me offer one here: At least one out of ten houses has a radon level above 4 pCi/L, and the average level in these houses is ~8 pCi/l. Finding this one high radon house would require ten tests costing ~$120; confirming and discarding false-positives would raise this cost to ~$200. Reducing the radon level by 4 pCi/L (say from 8–4 pCi/L) costs an average of ~$1,200, bringing the total cost to $1,400.

Reducing radon levels in a house by 4 pCi/l reduces the mortality risk for each inhabitant by at least 1% (*1*); if we assume six inhabitants per house, there is a 6% probability that this $1,400 will save a life, which gives a cost of $1,400/0.06 equaling $23,000 per life saved.

Typical costs (*2,3*) for cancer screening and highway safety programs are ~$100,000 per life saved. Protecting the public from radiation in other contexts is much less cost effective—the "$1,000/man-rem" rule on routine emissions corresponds to $8 million per life saved, removing natural radium from drinking water according to EPA requirements costs $5 million per life saved, and radioactive waste management and nuclear power plant safety are costing billions of dollars per life saved (*2,3*).

With this perspective, it is difficult to see how one can question the cost-effectiveness of the $23,000 per life saved being spent on the problem of indoor radon in homes.

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REPLY: Dr. Cohen's figures are most interesting and his point is well made. Unfortunately, there is some resistance in the public sector to programs of radon detection and remediation. One of the major causes is the fear among home owners that something expensive will be found. The calculations clearly illustrate a societal benefit to such a systematic approach, but are of much less comfort to the individual home owner potentially faced with having to pay $1,400 to reduce the levels of radon in his basement to levels considered acceptable by EPA.

The figure of $1,400 is an average. Radon can never be completely eliminated, but the point should be made that, in many homes, major reductions can be achieved with little inconvenience and far less expense. Cohen (*1*) himself has calculated the multiplicative effects of insulation, etc., on radon levels. It is possible to use his concept in reverse. Concentration of radon depends on rates of ventilation and replenishment. By doubling the rate of air exchange, say by a small exhaust fan, one could reduce levels by 50%. Further, by retarding ingress of radon by 3.8 days (the physical half-life of radon-222), a similar halving should occur. This can often be accomplished by very simple means such as covering holes or sealing porous foundations with a heavy latex paint, repairs easily and inexpensively performable by the home owner himself.

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Thyroid Cancers in Atomic Bomb Survivors Exposed in Youth: 30-Year Follow-up Study

TO THE EDITOR I read with interest the article (*1*) by Morimoto et al., and would like to know the clinical courses of the well-differentiated thyroid cancers detected in the eight females of Nagasaki and Hiroshima, because we know from a previous study that despite the high prevalence of occult thyroid cancer the Japanese have a very low incidence and death rate of thyroid cancer (*2*). Further, they quoted the carcinogenic radiation dose range as 6.5–1,000 rad, whereas recent reports of thyroid cancers follow high dose radiation, e.g., Kaplan (*3*) treated two patients of thyroid cancer, one of which occurred six years after cervical irradiation of 5,000 rad for upper mediastinal Hodgkin's disease and the second, 20 years after neck irradiation of 6,000 rad for a parotid tumor.

We are also interested to know whether the reported differences in the serum thyroglobulin levels (higher in Nagasaki than in Hiroshima) could be explained by dietary factors e.g., iodine nutrition, as it is known that iodide excess may predispose to papillary thyroid cancer (*4*).

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