

Landmark Study: The Relation of Solar Radiation to Cancer Mortality in North America

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See related article by Apperly, *Cancer Res* 1941;1:191–5.

In 1941, Frank Apperly, a professor of Pathology at the Medical College of Virginia, published an elegant and important landmark study in *Cancer Research*. The purpose of this epidemiologic study was to "re-examine the relationship between skin cancers and other cancers" (1). The basis for this re-examination was the evidence produced by Peller (2) that populations in environments or occupations with a high incidence of skin cancer had a lower rate of other cancers. Peller then went so far to propose that using "light rays of suitable intensity to suitable surfaces, should be used to deliberately produce skin cancer, to reduce the number of other cancers!" These conclusions were derived from data obtained from the US Navy personnel, in which the skin cancer rate was 8 times men of the same age and of the general population, while the total death rate from other cancers was only two fifths expected from a comparable population (3).

In contrast, a study from England did not show an inverse relationship between cancer of the skin and total cancer mortality rates (4), and another study from England concluded that patients with skin cancer in fact had more systemic cancer than would be expected from the general population (5).

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Apperly used public health data from various states as well as from the general population and Canadian Provinces to determine the basis for the different conclusions of these studies. He compared mortality rates from skin cancer in farm worker populations from states where the average temperature was less than 42°F with the same population from states that had average temperatures of more than 42°F. He found that there was a higher incidence of deaths from skin cancer in the warmer states, but a lower incidence of other cancers; in the colder states and Canadian provinces, there was no decrease in other cancers in the population with mortality due to skin cancer. Furthermore, he was able to show a correlation between sun exposure (solar radiation index) to the skin cancer mortality rates. While he was unable to determine the reason for increased sun exposure as a protectant for other cancers, he concluded that one possibility was that it was "possibly brought about by some beneficial effect of solar radiation on the larger amount of food stuffs produced in those states."

Despite the limitations of this study, that is, using only mortality data that could reflect differences in care in various states, this study was a benchmark, in that it generated many other studies that explored the relationship of sun exposure to skin cancer and the protective effect of sunlight on preventing other cancers. His work explained the contradictory results of the previous studies and led to research that showed that the reason why sunlight protects patients from other cancers is in part a function of vitamin D intake and activation by sunlight.

In the Apperly study, "skin cancer" was not further defined, although we now know that sun exposure is also related to the development of melanoma of the skin (6).

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