



HEALTH  
PHYSICS  
SOCIETY

## COMPENSATION FOR DISEASES THAT MIGHT BE CAUSED BY RADIATION MUST CONSIDER THE DOSE

### POSITION STATEMENT OF THE HEALTH PHYSICS SOCIETY\*

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#### *Executive Summary*

*Based on the extensive knowledge of radiation health effects, the Health Physics Society believes that a person's radiation dose must be considered in determining whether to provide compensation for a disease that could have been caused by radiation. Further, there should be no compensation for persons whose lifetime doses are less than approximately 0.1 Sv.*

#### *Introduction*

Many workers and members of the general public who have actually, or possibly, been exposed to radiation since the widespread introduction of technologies using radiation or radioactivity are now at the age where they will be more likely to experience a variety of diseases. We know that some diseases may be caused by high doses of radiation. The most reliable studies of the effects of radiation exposure at the low levels received by occupational workers and members of the public have not been able to detect adverse health effects associated with their radiation exposure except at the higher doses, i.e., greater than approximately 0.1 Sv. Even at the higher doses, the studies are not all consistent. However, inherent limitations of these studies leave open the possibility there are small undetected risks at the low levels of exposure experienced in the workplace and in the environment.

Social values and conscience have evolved with the changing of national priorities since the 1940s and 1950s, resulting in the examination of yesterday's practices for radiation safety in light of today's political environment and knowledge. This has led to proposals for disease-compensation programs based on the presumption of causation of disease by low levels of radiation exposure. Presumption of causation means that a person with a disease could be compensated on the pure assumption that the disease was caused by radiation without evidence of receiving any radiation exposure or for receiving radiation exposure at levels not known to cause the disease.

## *Radiation and Disease*

Our knowledge about the potential health effects of ionizing radiation is extensive. It is known that radiation cannot cause all types of disease. It is also known that for those diseases observed to be caused by radiation, the likelihood that radiation will cause the disease increases as the dose increases. In other words, any particular disease's likelihood to have been caused by radiation is dependent on the dose to the individual. This relationship of increasing likelihood of disease with increasing dose has only been observed for doses greater than approximately 0.1 Sv. The likelihood of radiation-induced disease below this level, if it exists at all, is so small that it is not measurable, it is not a matter of scientific fact, and it can only be estimated utilizing hypothetical mathematical dose-response models.

Presumption of causation has no scientific or medical basis without consideration of dose. That is, the simple fact that some radiation exposure occurred is not a measure of hazard. The amount of exposure (i.e., the dose) is the only measure of the hazard and the only measure of the likelihood a disease or injury has been caused by radiation. In addition, everyone is exposed to natural sources of ionizing radiation every day without any observable effects. Therefore, exposures that are potentially hazardous, justifying consideration of compensation, must significantly exceed exposures from normal life activities.

## *Dose Determination*

Given the scientific knowledge that the relationship between ionizing radiation exposure and disease depends on the dose, the issue of disease causation often concentrates on the adequacy of knowing the actual, or possible, dose to the populations of interest.

Personnel dosimetry by use of film badges, and other detection devices, was well established by the early 1950s. When available, the results of personnel dosimetry devices provide an excellent basis for establishing doses to individuals. When personnel dosimetry results are not available, reconstruction of a dose, and in particular a range of doses, can reasonably be done. The dose to an individual from a specified source is a matter of physical and physiological parameters based on the radiation source and exposure mode. Given the identification of the radiation source and the exposure mode, dose reconstruction can provide a calculation of the dose and dose range that is adequate to support decisions on whether a selected population, or an individual having a disease or injury, may have been affected by that particular radiation exposure.

## *Compensation Programs*

The Health Physics Society strongly supports compensation for individuals who are injured, or wronged, by practices that have clearly caused them harm. However, the reason for allocating public funds to provide compensation to selected individuals should be clearly stated. If the reason is compensation for a disease or injury caused by exposure to an agent, like radiation, then the best scientific and medical knowledge, including dose-response considerations, should support the likelihood that the compensated disease could be caused by the measured or reconstructed exposure.

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\*The Health Physics Society is a nonprofit scientific professional organization whose mission is excellence in the science and practice of radiation safety. Since its formation in 1956, the Society has represented the largest radiation safety society in the world, with a membership that includes scientists, safety professionals, physicists, engineers, attorneys, and other professionals from academia, industry, medical institutions, state and federal government, the national laboratories, the military, and other organizations. Society activities include encouraging research in radiation science, developing standards, and disseminating radiation safety information. Society members are involved in understanding, evaluating, and controlling the potential risks from radiation relative to the benefits. Official position statements are prepared and adopted in accordance with standard policies and procedures of the Society. The Society may be contacted at 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101; phone: 703-790-1745; fax: 703-790-2672; email: [HPS@BurkInc.com](mailto:HPS@BurkInc.com).