



Societal Benefits of Radiation

Position Statement

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The American Nuclear Society (ANS) believes that the benefits to the public of uses of radiation greatly overbalance the risks.

Radioisotopes and other radiation sources are more widespread and important in the U.S. economy than is generally understood. Ionizing radiation (alpha, beta, X, and gamma) is ubiquitous and indispensable in diagnostic and therapeutic medicine, averaging more than three procedures per year for every American.^a Many of the supplies used in hospitals are sterilized with gamma rays from radioactive sources or accelerators. Radiation is widely employed in the American economy, for example, in gauging and imaging sheet steel and paper in factories and for inspecting welds and airline baggage. Smoke detectors using radioisotopes are in nearly every home, and radioactive decay provides power for illuminated signs and space probes. In research, radioisotope tracers are indispensable tools in biology and medicine, and neutron activation analysis is an important tool in understanding the behavior of trace elements in the environment and human nutrition.

All these benefits are delivered routinely and safely. Except in diagnostic and therapeutic medical procedures where radiation is deliberately administered, the dose to the general public from all other applications of radiation is less than that from cosmic radiation and natural radioactivity. The ANS is concerned that the benefits of radiation are often overshadowed by fears resulting from misunderstanding and misinformation and consequently urges improved education and discussion of the technical and policy issues involved in the productive and safe uses of this indispensable technology.

^aAggregated claims data from Medicare enrollees for all radiology procedures and from the Medical Expenditure Panel Survey, a nationally representative survey of almost 25 000 Americans, for some radiology procedures, were used to calculate population-based utilization for the relevant age groups. In 2001, 4176 diagnostic and 274 therapeutic radiology procedures were performed per 1000 Medicare non-managed-care enrollees. Nearly one-half of diagnostic procedures (2057) involved radiography. The other half involved computed tomography (391), magnetic resonance imaging (114), ultrasonography (921), interventional radiology (215), mammography (221), and nuclear medicine (249). [The numbers in bold-faced print are the individual doses from different medical procedures that use radiation. The sum of these individual doses (total ionizing) is 3133 per 1000 population. (The U.S. population in 1999 was 273 million.)] [From M. Bhargavan and J. H. Sunshine, "Utilization of Radiology Services in the United States: Levels and Trends in Modalities, Regions, and Populations," *Radiology*, Vol. 234, p. 824 (2005)]

The American Nuclear Society, founded in 1954, is a not-for-profit scientific and educational society of over 11,000 scientists, engineers, and educators from universities, government and private laboratories, and industry.

Position Statements are the considered opinions and judgments of the Society in matters related to nuclear science and technology. They are intended to provide an objective basis for weighing the facts in reaching decisions on important national issues.