NCRP REPORT No. 93. IONIZING RADIATION EXPOSURE OF THE POPULATION OF THE UNITED STATES.

Bethesda, NCRP Publishers, 1987, 87 pp, $15.00

This offering from the National Council on Radiation Protection is a timely overview and summary of ionizing radiation exposures to specific groups and average population exposures for the United States. Ionizing radiation exposure is classified into six areas and each is discussed separately before combining all in a summary chapter. The six sources of ionizing radiation exposure in the United States are natural background, occupational, nuclear power cycle, consumer products, miscellaneous environmental sources, and medical diagnosis and therapy.

Each source of ionizing radiation exposure is discussed from a historical perspective and any discrepancies from previous reports on magnitude of the estimates are highlighted. At the end of each chapter, recommendations are offered for further study, or whether efforts should be made to reduce this component of population exposure. This report is a summary of information from five dose assessment committees of the NCRP which will eventually produce complete reports on each topic.

Of all sources of ionizing radiation exposure to the population of the United States, natural sources are the greatest. Natural sources include: radon, cosmic rays, terrestrial radioactivity, and internal radioactivity. Man-made sources of ionizing radiation exposure are dominated by X-rays, nuclear medicine procedures, and consumer products. Estimates of doses from significant exposures are presented in units of average annual effective dose equivalent for the population that is exposed, annual collective effective dose equivalent, which is the product of the average annual effective dose equivalent, and the number of people exposed, and the average annual effective dose equivalent in the US population. This latter quantity is the collective effective dose equivalent divided by the US population. The genetically significant dose is also listed. The average annual effective dose equivalent from all sources in the US population is estimated at 360 mRem, ~1 mRem per day. This includes all sources except the dose to the lungs in smokers from ^{210}Po. The genetically significant dose for the US population is estimated at 130 mRem per year. Emphasis is placed on the major contribution by radon, the largest and the most variable component of natural background radiation.

The magnitude and variability of the different sources of ionizing radiation exposure are clearly outlined in this report. By using the effective dose equivalent it is possible to combine the exposures from all of the six sources to arrive at a dose which should be an overall index of somatic risk, as the genetic significant dose indicates overall genetic risk. This report from the NCRP is valuable as a reference for radiation workers who are called upon to put radiation doses in perspective.

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SAFETY AND EFFICACY OF RADIOPHARMACEUTICALS

Kristensen and Norbygaard, Eds. Martinus Nijhoff, 1987, 371 pp, $100.00

This book is a compilation of 27 review articles in 371 pages, divided into four major parts which give an up-to-date survey on safety and efficacy of radiopharmaceutics. The reviews contain 63 figures, 23 tables, and 576 references, emphasized on biological products, radiopharmacy, radiation hygiene, legal aspects of the introduction of new radiopharmaceutics, and some selected aspects of good radiopharmacy practice. The summaries of these four review papers were presented and discussed at the Third European Symposium on Radiopharmacy and Radiopharmaceuticals held in Elsinore, Denmark in May 1987.

The first part contains 13 articles which discuss the safety and efficacy of radiopharmaceutics in addition to some regulatory aspects. Methods of labeling with ^{99m}Tc, radioactive iodine and ^{111}In are also discussed along with animal models for the evaluation of radiopharmaceutics and models for safety testing of immunoreactive radiopharmaceutics. Other chapters discuss specifications and quality control methods for labeling proteins and cells, safety aspects of human use of labeled cells, and the basis for preliminary clinical trials of monoclonal antibodies.

The second part contains four chapters which discuss radiopharmacy and radiation hygiene. Topics reviewed are dose validation, daily practice of radiopharmacy, and waste disposal.

The third part includes five chapters which report on the legal aspects of the introduction of new radiopharmaceutics with specific discussions on the relationship between industry, hospitals, and authorities giving views from all three sides independently. Included in this part is a report on the WHO workshop for administrators in the field of radiopharmaceutics held in Copenhagen in April, 1987.

The fourth part contains five reviews on new developments in the design of a hospital system for production of radiopharmaceutics, laboratory facilities, product quality, and process validation. The last chapter is devoted to current trends in the training and education of radiopharmacy.

The book reflects an excellent effort to review and discuss the up-to-date developments in the general area of safety and efficacy of radiopharmaceutics with special emphasis on biological products such as monoclonal antibodies. The dynamic nature of the field in terms of introduction of new radiopharmaceutics and techniques makes this book a good start. Another significant addition is the discussion of those valuable personal references for scientists, radiopharmacists, and physicians concerned with the subject of safety and efficacy of biologic radiopharmaceutics. It may be of interest, also, to regulatory agencies. It certainly is a good library resource.

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