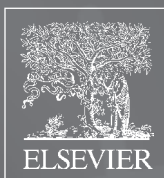


ICRP

INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

CATALOGUE OF PUBLICATIONS



Annals of the ICRP

The International Commission on Radiological Protection (ICRP) was founded in 1928 to advance, for the public benefit, the science of radiological protection. The ICRP provides recommendations and guidance on protection against the risks associated with ionising radiation, from artificial sources widely used in medicine, general industry and nuclear enterprises, and from naturally occurring sources. These reports and recommendations are published four times each year on behalf of the ICRP as the journal *Annals of the ICRP*. Each issue provides indepth coverage of a specific subject area.

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- Managing Patient Dose in Multi-Detector Computed Tomography

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ICRP Publication 100**▶ Human Alimentary Tract Model for Radiological Protection**

This report provides a Human Alimentary Tract Model (HATM) to complement the *Publication 66* Human Respiratory Tract Model (HRTM), published in 1994. Both models replace *Publication 30* (1979) models, which were developed specifically for the calculation of doses from occupational exposures to radionuclides. An important aspect of both the HATM and HRTM is their treatment of intakes by children as well as male and female adults and hence their applicability to environmental as well as occupational exposures. Another important development in both models is the specific calculation of doses to target regions containing cells considered to be susceptible to cancer induction.

0080450636 - 9780080450636 - 2006 - Paperback - 300 pages

ICRP Publication 99**▶ Low Dose Extrapolation of Radiation Related Cancer Risk**

This report considers the evidence relating to cancer risk associated with exposure to low doses of low-LET radiation, and particularly doses below current recommended limits for protection of radiation workers and the general public. It looks at the possibility of establishing a universal threshold dose below which there is no risk of radiation-related cancer. The focus is on evidence regarding linearity of dose response for all cancers considered as a group, but not necessarily individually, at low doses (the so-called linear, no-threshold (LNT) hypothesis). The report is organized by scientific discipline, and includes chapters on:

- Epidemiological studies of exposed human populations
- DNA damage, and cellular consequences of radiation-induced damage
- Experimental approaches using animal models
- Quantitative uncertainty analysis

The report concludes that while existence of a low-dose threshold does not seem unlikely for radiation-related cancers of certain tissues, it does not favour the existence of a universal threshold. The LNT hypothesis, combined with an uncertain dose and dose rate effectiveness factor (DDREF) for extrapolation from high doses, remains a prudent

basis for radiation protection at low doses and low dose rates.

0080449581 - 9780080449586 - 2006 - Paperback - 200 pages

ICRP Publication 98**▶ Radiation Safety Aspects of Brachytherapy for Prostate Cancer Using Permanently Implanted Sources**

The use of permanent radioactive implants (^{125}I or ^{103}Pd seeds) to treat selected localized prostate cancer patients has been rapidly increasing all over the world in the last fifteen years.

Today it is estimated that more than 50,000 patients are treated this way every year in the world, and this number is anticipated to increase in the near future.

Although no accident or adverse effects involving the medical staff and/or members of the patient family have been reported so far, this brachytherapy technique raises a number of radiation safety issues which need specific recommendations from ICRP.

The report considers the following issues:

- Dose to persons approaching the patient, in order to identify in which situations specific radioprotection steps should be considered.
- Management of expelled sources (although this occurrence is rare).
- Potential problems linked to the cremation of the patient's body (a major issue in some countries).
- Other complementary recommendations .

0080446590 - 9780080446592 - 2005 - Paperback - 50 pages

ICRP Publication 97**▶ Prevention of High-Dose-Rate Brachytherapy Accidents**

There has been a large increase over the last two decades in the use of automated remote High-Dose-Rate brachytherapy (HDR) techniques which involve a very high dose given over a short time period.

Radiation risks cover the full chain of procedures from source packing to the delivery of the therapeutic dose. Several hundred events have been reported of varying degrees of severity and there is probably much under-reporting of accidents. The reported cases not only involve mistakes that have lead to the treatment of a wrong patient, unwanted under- or over-dosage, or treatment of, or a wrong area but also exposures to

the public or to persons handling the sources. Utilization of HDR involves a currently estimated transport of over 10,000 high activity sources per year to over 1,500 machines located in more than 1,000 centres all over the world. These centres differ in the level of staff training and different clinical utilization.

The expected audience of this report includes those radiation safety personnel, administrators, technicians and radiation oncologists who engage in or are planning High-Dose-Rate brachytherapy (HDR). The report seeks to:

- Review typical reported accidents and the lessons learned
- Provide advice on measures to minimize the risk of untoward events.

0080446582 - 9780080446585 - 2005 - Paperback - 50 pages

ICRP Publication 96

▶ Protecting People Against Radiation Exposure in the Event of a Radiological Attack

In the wake of the terrorist attacks on the World Trade Center, transport systems in Spain, Japan and London, and on embassies, nightclubs and hotels, authorities have become acutely aware of a need to reassess existing emergency radiation planning and protection to better cope with terrorist events.

Previous radiation exposure plans were directed towards a single event, with a single hazardous material in a known environment, with known failure rates of components enabling us to predict the likelihood of an event. Recent events have forced authorities to think in terms of multiple, simultaneous and possibly suicidal attacks, perhaps using a combination of hazardous agents (chemical, biological and radiological) in a public, urban environment.

This report aims to provide radiological protection recommendations for protecting people's health in the aftermath of a radiological attack. One of the major points to emerge from this report is that prevention of exposure through shelter, control of the food chain and if necessary, evacuation is much more practical and effective than medical treatment post-exposure. The main aim must be to prevent immediate and acute health effects, and restrict later cancer and hereditary consequences, with first responders trained, equipped and able to identify radiation and radioactive contamination and deal with it appropriately. A supplementary aim is to minimise environmental contamination and general disruption, including

restoration and cleanup, management of resulting radioactive waste, management of corpses containing significant amounts of radioactive substances, and dealing with long-term exposure caused by remaining radioactive residues. This report also recognizes the psychological impact of terrorism combined with the fear of radiation, and the necessity to provide the public with timely and accurate information. It also considers the likely overwhelming of hospitals by the public wishing to be tested for contamination.

An important conclusion is that emergency planning cannot be static. As plans are developed for detection devices and stockpiles to neutralize biological and chemical threats, we must assume that the terrorists will simply move on to other ideas and we might expect the radiological threat grow. However, many potential scenarios clearly cannot induce immediate severe radiation injuries. In order to prevent over-reaction, response measures prepared in advance should reflect the real expected gravity of the various possible scenarios.

0080446256 - 9780080446257 - 2005 - Paperback - 110 pages

ICRP Publication 95

▶ Doses to Infants from Ingestion of Radionuclides in Mother's Milk

This publication on doses to infants from radionuclides in mothers' milk is the last in a series on doses to members of the public, although, together with its immediate predecessor on doses to the embryo and fetus, it is also applicable to occupational exposures. The series began in 1989 with Publication 56 which gave dose coefficients for a range of radionuclides ingested by members of the public, including infants and children, with subsequent reports giving values for other radionuclides and considering inhalation as well as ingestion (Publications 56, 67, 69, and 71). Publication 88 (2001) gave dose coefficients for the embryo, fetus and newborn child from intakes of radionuclides by the mother before or during pregnancy. The present report considers transfer of radionuclides to the infant in breast-milk for the intake times used in Publication 88 and additional times during lactation. It gives dose coefficients per unit intake (Sv/Bq) for infants following radionuclide intakes by their mothers, with values for members of the public in the main text and values for workers in an annex. The report considers radionuclides of 35 elements, including the same 31 elements as in previous reports in the series. The report also includes annexes that give examples of doses to maternal breast tissue occurring during radionuclide transfer

and external doses to the infant from radionuclides in the mother's body. A final annex gives dose coefficients for the fetus for some additional radionuclides not included in Publication 88.

0080446272 - 9780080446271 - 2005 - Paperback - 280 pages

ICRP Publication 94

► Release of Patients after Therapy with Unsealed Radionuclides

After some therapeutic nuclear medicine procedures with unsealed radionuclides, precautions may be needed to limit doses to others, but this is rarely the case after diagnostic procedures. Dose limits apply to the exposure of the public and medical staff from patients. Prior ICRP recommendations are that no dose limit but a source-related dose constraint for optimisation of a few mSv per episode applies to the family, visitors, and caregivers at home. Here, it is recommended that young children and infants, as well as visitors not engaged in direct care or comforting, be treated as members of the public.

Dose to adults from patients is mostly due to external exposure. Contamination of infants and children with saliva from a patient could result in significant doses to the child's thyroid. It is important to avoid contamination of children and pregnant women. After radioiodine therapy, mothers must discontinue breast-feeding of infants or children immediately. Many types of therapy with unsealed radionuclides are contraindicated in pregnant females. Women should not become pregnant for some time after radioisotope therapy. Radionuclides released into modern sewerage systems are likely to result in doses to workers or the public well below public dose limits.

The decision whether to hospitalise a patient should be individually determined. It should not be linked only to residual activity in the patient but take into account many factors. Hospitalisation will reduce public and family exposure but results in increased occupational exposure. Hospitalisation often involves a significant psychological burden as well as monetary and other costs that should be analysed and justified.

Environmental or other radiation detection devices are sensitive enough that they will usually detect patients who have had radioiodine therapy for a period of weeks. Personnel operating such detectors should be specifically trained to identify and deal with nuclear medicine patients. In the case of death of a patient who has had radiotherapy with unsealed radionuclides in the last several months, special precautions may be required.

0080445608 - 9780080445601 - 2005 - Paperback - 80 pages

ICRP Publication 93

► Managing Patient Dose in Digital Radiology

With digital techniques exist the potential to improve the practice of radiology but also the risk to overuse radiation. The main advantages of digital imaging: wide dynamic range, post-processing, multiple viewing options, electronic transfer and archiving possibilities, are clear but overexposures can occur without an adverse impact on image quality. In conventional radiography, excessive exposure produces a "black" film. In digital systems, good images are obtained for a large range of doses. With digital fluoroscopy systems it is very easy to obtain (and delete) images. There may be a tendency to obtain more images than necessary. In digital radiology, higher patient dose usually means improved image quality and thus a tendency to use higher patient doses than necessary could occur. Different medical imaging tasks require different levels of image quality and doses which have no additional benefit for the clinical purpose should be avoided. Image quality can be compromised by inappropriate levels of data compression and/or post-processing techniques and all these new challenges should be part of the optimization process and be included in the clinical and technical protocols. Local diagnostic reference levels should be reevaluated for digital imaging and patient dose parameters should be displayed at the operator console. Frequent patient dose audits should occur when digital techniques are introduced. Training in managing image quality and patient dose in digital radiology is necessary. Digital radiology will involve new regulations and invoke new challenges for practitioners. As digital-radiology images are easier to obtain and to transmit, the justification criteria should be reinforced. Commissioning of digital systems should involve clinical specialists, medical physicists and radiographers to ensure that imaging capability and radiation dose management are integrated. Quality control requires new procedures and protocols (visualization, transmission and archiving of the images).

0080444695 - 9780080444697 - 2004 - Paperback - 75 pages

► Draft Recommendations

The ICRP issue fundamental Recommendations approximately every 15 years, with the last one, *Publication 60*, in 1990. The new Recommendations

are in the process of being written, but in the meantime there has been much discussion of *Publication 60* and its updates. These discussions have resulted in the publication of a number of journal articles which are reproduced here.

[0080446167 - 9780080446165 - Paperback - 44 pages](#)

ICRP Publication 92

► Relative Biological Effectiveness (RBE), Quality Factor (Q), and Radiation Weighting Factor (w_R)

The report provides a scientific background and suggests how the ICRP might proceed with the derivation of w_R values ahead of its forthcoming recommendations. The effect of ionising radiation is influenced by the dose, the dose rate, and the quality of the radiation. Before 1990, dose-equivalent quantities were defined in terms of a quality factor, $Q(L)$, in order to take into account the differences in the effects of different types of radiation. In its 1990 recommendations, the ICRP introduced a modified concept. For radiological protection purposes, the absorbed dose is averaged over an organ or tissue, T , and this absorbed average dose is weighted for the radiation quality in terms of the radiation weighting factor, w_R , for the type and energy of radiation incident on the body. The values for w_R and $Q(L)$ in the 1990 recommendations were based on a review of the biological and other information available, but the underlying relative biological effectiveness (RBE) values and the choice of w_R values were not elaborated in detail. Since 1990, there have been substantial developments in biological and dosimetric knowledge that justify a re-appraisal of w_R values and how they may be derived. This re-appraisal is the principal objective of the present report.

[0080443117 - 9780080443119 - 2004 - Paperback - 120 pages](#)

ICRP Publication 91

► A Framework for Assessing the Impact of Ionising Radiation on Non-Human Species

In its 1990 Recommendations, the ICRP indicated that it believed that the standards of environmental control needed to protect man to the degree currently thought desirable would ensure that other species are not put at risk. The ICRP considers that its system of radiological protection has provided a fairly good indirect protection of the human habitat. However, no internationally agreed criteria or policies explicitly

address protection of the environment from ionising radiation, and it is difficult to determine or demonstrate whether or not the environment is adequately protected from potential impacts of radiation under different circumstances. The present report suggests a framework, based on scientific and ethical-philosophical principles, by which a policy for the protection of non-human species could be achieved. The primary purpose of developing such a framework is to fill a conceptual gap in radiological protection; it does not reflect any particular concern over environmental radiation hazards. The proposed framework is designed to harmonise with the ICRP's approach to the protection of human beings, but does not intend to set regulatory standards. Instead, the proposed framework is intended to be a practical tool to provide high-level advice and guidance for regulators and operators. An agreed set of quantities and units, a set of reference dose models, reference dose-per-unit-intake (or unit exposure), and reference fauna and flora are required to serve as a basis for the more fundamental understanding and interpretation of the relationships between exposure and dose and between dose and certain categories of effect, for a few, clearly defined types of animals and plants. As a first step, a small set of reference fauna and flora with supporting databases will be developed by the ICRP. Others can then develop more area- and situation-specific approaches to assess and manage risks to non-human species.

[0080443109 - 9780080443102 - 2004 - Paperback - 60 pages](#)

ICRP Publication 90

► Biological Effects after Prenatal Irradiation (Embryo and Fetus), 90

In its 1990 recommendations, the ICRP considered the radiation risks after radiation exposures during prenatal development. This report critically reviews new experimental animal data on biological effects and evaluations of human studies after prenatal radiation published since then. Thus, the report discusses radiation effects after exposure during preimplantation and developmental effects after irradiation during organogenesis and fetogenesis. The etiology of long-term effects during brain developments is discussed, as well as evidence from studies in man on the effects of in utero radiation exposure on neurological and mental processes. Assessments through animal studies of carcinogenic risk from in utero radiation are treated, and the epidemiology of childhood cancer is discussed; from this information the carcinogenic risk to man from in

utero radiation is assessed. Open questions and needs for future research are elaborated. The report reiterates that the mammalian embryo and fetus are very radiosensitive during prenatal development. The nature and sensitivity of induced biological effects depend upon dose and developmental stage at irradiation. The various effects, as studied in experimental systems and in man, are discussed in detail. It is concluded that the findings in the report strengthen and supplement the recommendations of the ICRP.

008044265X - 9780080442655 - 2004 - Paperback - 200 pages

ICRP Publication 89

► Basic Anatomical and Physiological Data for Use in Radiological Protection: Reference Values

This report presents detailed information on age- and gender-related differences in the anatomical and physiological characteristics of reference individuals. These reference values provide needed input to prospective dosimetry calculations for radiation protection purposes for both workers and members of the general public. The purpose of this report is to consolidate and unify in one publication, important new information on reference anatomical and physiological values that has become available since Publication 23 was published by the ICRP in 1975. There are two aspects of this work. The first is to revise and extend the information in Publication 23 as appropriate. The second is to provide additional information on individual variation among grossly normal individuals resulting from differences in age, gender, race, or other factors. This publication collects, unifies, and expands the updated ICRP reference values for the purpose of providing a comprehensive and consistent set of age- and gender-specific reference values for anatomical and physiological features of the human body pertinent to radiation dosimetry. The reference values given in this report are based on: (a) anatomical and physiological information not published before by the ICRP; (b) recent ICRP publications containing reference value information; and (c) information in Publication 23 that is still considered valid and appropriate for radiation-protection purposes. Moving from the past emphasis on 'Reference Man', the new report presents a series of reference values for both male and female subjects of six different ages: newborn, 1 year, 5 years, 10 years, 15 years, and adult.

In selecting reference values, the Commission has

used data on Western Europeans and North Americans because these populations have been well studied with respect to anatomy, body composition, and physiology. When appropriate, comparisons are made between the chosen reference values and data from several Asian populations.

0080442668 - 9780080442662 - 2003 - Paperback - 265 pages

ICRP Publication 88

► Doses to the Embryo and Fetus from Intakes of Radionuclides by the Mother

In its Publications 56, 67, 69, 71, and 72, ICRP provided age-specific biokinetic models and dose coefficients (dose per unit intake of radioactive substance) for members of the public. Committed effective doses for inhalation or ingestion of radionuclides by occupationally exposed workers were given in Publication 68. This complementary report addresses doses to the embryo/fetus after intakes by the mother before or during pregnancy. Selected radionuclides of 31 elements are considered. New biokinetic and dosimetric models for doses to the embryo/fetus are developed; they take account of transfer of radionuclides across the placenta, distribution and retention of radionuclides in fetal tissues, growth of the fetus, and photon irradiation from radionuclides in the placenta and maternal tissues. Human and animal data are used as available. Various intake scenarios are considered.

0080441416 - 9780080441412 - 2001 - Paperback - 520 pages

ICRP Supporting Guidance 2

► Radiation and Your Patient: A Guide for Medical Practitioners

There are obvious benefits to health from medical uses of radiation, in x-ray diagnostics, interventional radiology, nuclear medicine, and radiotherapy. However, there are well-established risks from high doses of radiation (radiotherapy, interventional radiology), particularly if improperly applied, and possible deleterious effects from small radiation doses (such as those used in diagnostics). For assessment of the risk, a quantitative measure of exposure is a necessary prerequisite; thus, dosimetric quantities are explained and defined (absorbed dose, effective dose) and basic facts are presented on mechanisms of action of ionising radiations on living matter. Data on the magnitude of threshold doses for cell killing effects are presented, and an assessment is made of the

probability with which cancers and hereditary mutations may be induced by doses of various magnitudes, most likely without a threshold dose (below which no effect would obtain). Information is given on strategies to minimise doses and therefore the risk from diagnostic uses of radiation. In addition, problems related to special protection of the embryo and fetus in the course of diagnostic and therapeutic uses of radiation are presented and practical solutions are recommended. A brief report concerning Diagnostic Reference Levels in Medical Imaging: Review and Additional Advice, is also included.

0080442110 - 9780080442112 - 2003 - Paperback - 50 pages

ICRP Supporting Guidance 3

▶ Guide for the Practical Application of the ICRP Human Respiratory Tract Model

The ICRP Publication 66 Human Respiratory Tract Model for Radiological Protection (HRTM) has been applied to calculate dose coefficients (doses per unit intake) and bioassay functions in ICRP Publications 68, 71, 72 and 78. For these purposes, ICRP assigned numerical values to a range of model parameters, such as the size of the inhaled particles and the breathing rate of the subjects. These are known as 'default' or 'reference' values, and were chosen to be typical, representative values. In any particular situation the actual values of many parameters can be considerably different from the reference values. Usually, doses from intakes of radionuclides are low compared with the relevant limit or constraint, and the resulting difference is unimportant. There are, however, circumstances where more reliable assessments of intake and dose are desirable. This Guidance Document therefore gives advice on applying specific information within the framework of the HRTM for assessing occupational and environmental exposures and for interpreting bioassay data. Chapters on each aspect of the model (morphometry, physiology, deposition, clearance, gases and vapours, dosimetry) provide: A summary of how the HRTM treats that topic; Information on the reference values of relevant parameters; Guidance on choosing between default values; Information on how doses and bioassay quantities (lung retention, urine, and faecal excretion) vary with the values of selected parameters, giving guidance on the importance of obtaining specific information; Simple examples of the use of specific information relating to the topic. Annexes give additional information for those directly involved in applying the HRTM to specific situations, including guidance on obtaining parameter values. A brief

overview is given of the deposition, characterisation, and sampling of aerosols, with references to further information, as there are relevant text books already available. Issues specific to radioactive aerosols, such as low particle number concentrations for high specific activity materials are, however, addressed. Guidance on obtaining information about absorption of inhaled radionuclides into blood is given in greater detail, because this is a topic on which ICRP has traditionally given guidance, and because a compilation of such information is not readily available elsewhere. Several detailed examples are also provided. One involves assessment of an individual's intake and committed dose from comprehensive bioassay monitoring data. The others deal with the derivation of HRTM absorption parameter values from experimental data, and their application, with additional information on e.g. size distribution, to calculate dose coefficients and interpret bioassay data.

0080442676 - 9780080442679 - 2003 - Paperback - 300 pages

ICRP Publication 87

▶ Managing Patient Dose in Computed Tomography

This report points out that the doses to tissues from computed tomography, CT, can often approach or exceed the levels known with certainty to increase the probability of cancer. Radiologists are responsible for managing the dose in collaboration with imaging staff and medical physicists. CT examinations are increasing in frequency, and newer CT techniques have often increased doses when compared to 'standard' CT. Referring physicians and radiologists should make sure that the examination is indicated. Many practical possibilities currently exist to manage dose. The most important one is reduction in mA. Paediatric patients should have specific protocols with lower exposure factors (especially mAs). Automatic exposure control would be the most helpful improvement in CT equipment for dose management.

0080440835 - 9780080440835 - 2001 - Paperback - 45 pages

ICRP Publication 86:

▶ Prevention of Accidents to Patients Undergoing Radiation Therapy

Over-dosage accidents in radiotherapy have often had devastating and sometimes fatal consequences. Under-dosage accidents causing inadequate tumour control also occur; they are difficult to detect clinically. Radiotherapy is increasing worldwide, and accidents

may be expected to increase in frequency unless preventive measures are taken. While a number of serious and fatal radiotherapy accidents have been reported, it is likely that many more have occurred but were not recognised or reported. Because of the complex equipment and techniques, accident prevention requires constant vigilance of the staff, adequate resources, a functional implemented quality assurance programme, good communication, and continuing education. Modern equipment and new technologies require more quality assurance and highly qualified maintenance. Proper commissioning of new equipment and proper decommissioning of old equipment and sources must be ensured.

0080440827 - 9780080440828 - 2001 - Paperback - 70 pages

ICRP Publication 85

➤ Avoidance of Radiation Injuries from Medical Interventional Procedures

Interventional radiology, i.e. fluoroscopically guided, techniques are being used by an increasing number of clinicians not adequately trained in radiation safety or radiobiology. Patients are suffering radiation-induced serious skin injuries due to unnecessarily high radiation doses. Younger patients may face an increased risk of future cancer. Many users of interventional radiology are unaware of the potential for injury or the simple methods for decreasing their incidence utilising dose control strategies. Many patients are not being counselled on the radiation risks, nor followed up for the onset of injury, when radiation doses from difficult procedures may be high. Physicians performing interventional radiology are having their practice limited or suffering injury, and are exposing their staff to high dose. Occupational doses can be reduced by reducing unnecessary patient doses and by the correct use and procurement of equipment (including shielding devices).

0080439756 - 9780080439754 - 2001 - Paperback - 70 pages

ICRP Publication 84

➤ Pregnancy and Medical Radiation

ICRP Publication 84 concerns the management of pregnant patients as well as pregnant workers in medical establishments where ionising radiation is used. Thousands of pregnant patients and medical radiation workers are exposed to radiation each year. Lack of knowledge is responsible for great anxiety and probably unnecessary termination of many pregnancies. This report discusses how to deal with these problems. It is written primarily for physicians, but will also be useful for medical and health physicists, nurses, technologists, and administrators. It is not intended as a complete reference work, but rather to provide a practical approach that can be used in varying situations.

0080439012 - 9780080439013 - 2000 - Paperback - 45 pages

ICRP Publication 83

➤ Risk Estimation for Multifactorial Diseases

ICRP Publication 83 reviews data on naturally occurring multifactorial diseases and develops a mathematical model to predict the impact of radiation-induced mutations on the frequencies of these diseases in the population. It provides a broad outline of the aetiological features and examples of multifactorial diseases. It considers the concepts and models used to explain their inheritance patterns, with particular emphasis on the Multifactorial Threshold Model. Conceptual differences from 'mendelian' diseases are discussed, and pertinent epidemiology is reviewed. Particular attention is paid to diabetes mellitus and to coronary heart disease. Mechanistic models in population genetics are considered. The concepts of liability, threshold, mutation-selection balance, and mutation component are integrated into a Finite Locus Threshold Model as a basis for risk estimation. The relevance of these findings for estimation of radiation risk of multifactorial diseases is discussed.

0080439004 - 9780080439006 - 2000 - Paperback - 150 pages

ICRP Publication 82**► Protection of the Public in Situations of Prolonged Radiation Exposure**

ICRP Publication 82 addresses the general application of the ICRP System of Protection to the control of prolonged exposures resulting from practices and to the undertaking of interventions in prolonged exposure situations. It also recommends generic reference levels for such interventions. The report considers some issues that have been of concern, including natural radiation sources that may cause high doses; restoration and rehabilitation of sites where radioactive substances have been handled or used; the return to 'normality' following an accident that has released radioactive substances; and the global marketing of commodities for public consumption that contain radioactive substances. Annexes provide some examples of prolonged exposure situations and describe the radiological protection quantities, radiation-induced health effects, and aspects of the ICRP System of Protection relevant to prolonged exposure.

0080438989 - 9780080438986 - 2000 - Paperback - 110 pages

ICRP Publication 81**► Radiation Protection Recommendations as Applied to the Disposal of Long-lived Solid Radioactive Waste**

ICRP Publication 81 deals with the radiological protection of members of the public following the disposal of long-lived solid radioactive waste using the 'concentrate and retain' strategy. It covers options including shallow land burial and deep geological disposal. Its recommendations apply to new disposal facilities. The report supplements, updates, and clarifies the material in ICRP Publication 46 from 1986, taking into account the most recent general recommendations of ICRP in Publication 60 and the general ICRP policy for disposal of all types of radioactive waste as described in Publication 77. It addresses the main protection issue: exposure that may or may not occur in the far future, and regards constrained optimisation as the central approach to evaluating radiological acceptability of a waste disposal system. In this context, optimisation is a judgmental, essentially qualitative process. Two categories of exposure situation are considered: natural processes and human intrusion.

0080438598 - 9780080438597 - 2000 - Paperback - 25 pages

ICRP Publication 80**► Radiation Dose to Patients from Radiopharmaceuticals (Addendum 2 to ICRP Publication 53)**

ICRP Publication 80 provides biokinetic models, absorbed doses, effective doses, using ICRP Publication 60 dosimetry, for 10 new radiopharmaceuticals. It also provides recalculated dose data for the 19 most frequently used radiopharmaceuticals from ICRP Publication 53, using ICRP Publication 60 dosimetry, and corrects various printing errors in ICRP Publication 53. Furthermore, the report reproduces with minor corrections and updates, and therefore supersedes, Addendum 1 to ICRP Publication 53. An integrated index to all radiopharmaceuticals treated in ICRP Publications so far includes a listing of effective doses per unit activity administered to adults. The report also includes an Addendum to ICRP Publication 72 concerning age-dependent doses to members of the public from intakes of radionuclides.

0080435734 - 9780080435732 - 1999 - Paperback

ICRP Publication 79**► Genetic Susceptibility to Cancer Description**

ICRP Publication 79 provides an extensive discussion of hereditary variations in the susceptibility to cancer, and includes a commentary on the possible implications of such susceptibility variations for radiological protection. Current ICRP recommendations are based essentially on the estimation of excess cancer risk after exposure of whole populations. Because of differences in genetic make-up between individuals, there is a strong expectation that the excess cancer risk per unit dose of radiation exposure will be non-uniform. The report seeks to review relevant data and make interim judgments on tumorigenic radiosensitivity in the genetic disorders of this type, and also on the likely contribution that genetic factors may make to radiation-induced cancer. Since directly informative epidemiological data on radiation effects under differing cancer predispositions are essentially lacking, emphasis is placed on experimental studies and clinical observations, on computational genetic models of cancer risk, and on possible research strategies for the future.

0080427529 - 9780080427522 - 1999 - Paperback - 168 pages

ICRP Publication 78**▶ Individual Monitoring for Internal Exposure of Workers**

ICRP Publication 78 replaces the previous ICRP Publication 54 on Individual monitoring programmes and the interpretation of results of measurements for intakes of radionuclides by workers. The updating was considered necessary because ICRP published new dose coefficients for intakes of radionuclides by workers in 1994 (ICRP Publication 68). Those new dose coefficients were based on the most recent general recommendations of the Commission (ICRP Publication 60). The present report uses this new information and takes account of the new principles for the radiological protection of workers provided in ICRP Publication 75. Thus, the report uses the revised models and the new dose coefficients to give guidance on monitoring programmes and interpretation of results for selected radionuclides of importance in occupational exposure.

0080427502 - 9780080427508 - 1998 - Paperback - 164 pages

ICRP Publication 77**▶ Radiological Protection Policy for the Disposal of Radioactive Waste**

ICRP Publication 77 reaffirms the Commission's current policy of radiological protection, in particular its policy on public exposure, and aims to clarify the practical application of that policy to the disposal of radioactive waste. It discusses the justification of a practice, the optimisation of protection, the use of collective dose assessed over long distances and times, the implications of potential exposure, and the distinction between practices and intervention. In particular, it explains why collective doses should not be ignored simply because the individual doses contributing to it are small. However, it also stresses that collective doses may need to be presented separated into blocks of limited ranges of dose and time, and forecasts of collective dose over long time should include a critical examination of their uncertainty. This report is expected to be important to anyone dealing with radiation protection policy, obviously in the context of waste disposal, but also in general because of the explanations of the Commission's policy concerning collective dose.

0080427499 - 9780080427492 - 1998 - Paperback - 19 pages

Publication 76**▶ Protection from Potential Exposures: Application to Selected Radiation Sources**

ICRP Publication 76 develops the principles outlined in ICRP Publication 60 and elaborates on the concepts in ICRP Publication 64 concerning protection from potential exposure. It deals with such potential exposure primarily affecting individuals who are also subject to exposures in normal practices, either occupationally, as members of the public, or as patients. Thus, in simple terms, it deals with 'common smaller accidents'. Such cases are conceptually less complicated than potential exposure affecting large numbers of people, such as nuclear disasters, or potential exposure that could occur far into the future, for instance from deep repositories for waste disposal. However, the problems discussed in the report need to be dealt with more frequently in practical situations and not least in optimisation. The report contains much 'hands-on' practical example material, and should be useful in all workplaces, where it can help bridge any gap between safety and protection.

0080427448 - 9780080427447 - 1997 - Paperback - 61 pages

ICRP Publication 75**▶ General Principles for the Radiation Protection of Workers**

ICRP Publication 75 reports comprehensively on the principles for the protection of workers from ionising radiation. It develops guidance on the implementation of the principles in the 1990 Recommendations of the ICRP (ICRP Publication 60), including the concepts of constraint and reference levels. The report discusses the management of occupational exposure in normal and emergency situations, in Industrial and medical contexts, and with respect to natural sources of radiation, including radon, at work. Health surveillance of workers and the management of overexposed individuals are considered. This report updates ICRP Publication 28 with respect to principles and procedures for handling emergency and accidental exposures of workers, and, by laying out the principles of monitoring for external radiation, completely replaces ICRP Publication 35. Monitoring for radionuclide contamination is also discussed. The report should also be of interest to a wide readership including all those responsible for occupational health, at operational and managerial levels, as well as regulatory bodies and professional organisations.

0080427413 - 9780080427416 - 1997 - Paperback - 61 pages

ICRP Publication 74**▶ Conversion Coefficients for use in Radiological Protection against External Radiation**

ICRP Publication 74 provides an extensive and authoritative set of data linking the operational quantities defined by ICRU with the dosimetric and protection quantities defined by ICRP. The operational quantities provide a satisfactory basis for most of the measurements for radiation protection against external radiations. In those cases where it is not so, the data given in the report provides a basis for designing special measurement programmes, properly interpreting their results and relating them to the protection quantities. The report should be useful to operational health physicists, medical physicists and those involved in the calibration of instruments and personal dosimetry.

0080427391 - 9780080427393 - 1996 - Paperback - 220 pages

ICRP Publication 73**▶ Radiological Protection and Safety in Medicine**

The purpose of ICRP Publication 73 is to clarify how the recommended system of radiological protection as described in the 1990 Recommendations of the International Commission on Radiological Protection should be applied in medicine. This report is addressed principally to physicians and physicists directly engaged in medical radiology, including diagnosis in medicine and dentistry, nuclear medicine and radiotherapy; to those responsible for the management of institutions operating in these fields; and to international regulatory and advisory bodies.

0080427383 - 9780080427386 - 1996 - Paperback - 50 pages

ICRP Publication 72**▶ Age-dependent Doses to the Members of the Public from Intake of Radionuclides: Part 5 - Compilation of Ingestion and Inhalation Coefficients**

The purpose of ICRP 72 is to summarise data on age-dependent committed effective dose coefficients for members of the public from intakes by ingestion and inhalation of radioisotopes of the 91 elements described in ICRP Publications 56, 67, 68, 69 and 71. These dose coefficients have been adopted in the International Atomic Energy Agency in their publication

on International Basic Safety Standards for Protection against Ionising Radiation, and in the Euratom Directive. The report does not give committed equivalent dose coefficients to tissues and organs. The report will be useful to operational health physicists and to regulatory and advisory bodies responsible for radiation protection.

0080427375 - 9780080427379 - 1996 - Paperback - 94 pages

ICRP Publication 71**▶ Age-dependent Doses to the Members of the Public from Intake of Radionuclides: Part 4 Inhalation Dose Coefficients**

An ongoing objective of ICRP is to evaluate dose coefficients (doses per unit intake) for members of the public. The purpose of ICRP Publication 71 is to provide updated inhalation dose coefficients for selected radioisotopes of hydrogen, carbon, sulphur, calcium, iron, cobalt, nickel, zinc, selenium, strontium, zirconium, niobium, molybdenum, technetium, ruthenium, silver, antimony, tellurium, iodine, caesium, barium, cerium, lead, polonium, radium, thorium, uranium, neptunium, plutonium, americium and curium. Age-dependent biokinetic models for calcium, curium and for decay products formed following the intake of lead, radium, tellurium, thorium and uranium are provided in annexes.

0080427367 - 9780080427362 - 1996 - Paperback - 410 pages

ICRP Publication 70**▶ Basic Anatomical & Physiological Data for use in Radiological Protection: The Skeleton
A report of a Task Group of Committee 2 of the International Commission on Radiological Protection**

The purpose of ICRP Publication 70 is to update information and reference values for the human skeleton. In keeping with the charge issued by Committee II in 1984 to update the original Reference Man (ICRP Publication 23), increased emphasis has been given to the normal biological variability among humans and to information on children. Also, an effort has been made here to provide a more extensive review of the literature on the skeleton, including the older literature, than was provided in the original document in 1975. An extensive review of the literature is to be distinguished from an exhaustive review, which is no longer a feasible task due mainly to the

considerable amount of work that has been done in recent years in the general area of bone physiology. Nevertheless, every effort has been made to provide a representative cross-section of the available information on the skeletal features considered in this publication.

0080428797 - 9780080428796 - 1995 - Paperback - 92 pages

ICRP Publication 69

➤ Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 3

Ingestion Dose Coefficients The present report on age-dependent dose coefficients to members of the public follows ICRP Publications 56 (ICRP, 1989) and 67 (ICRP, 1993). The following elements are covered: iron, selenium, antimony, thorium and uranium. This report gives parameters for the tissue distribution and retention of these elements together with data on urinary and faecal excretion. Dose coefficients have been calculated for radioisotopes of these elements which are expected to be released into the environment as a result of human activities and are considered to be of significance for environmental radiation protection purposes. The generic model structure for plutonium, americium and neptunium given in ICRP Publication 67 (ICRP, 1993) has been applied to thorium; the generic model structure for the alkaline earths given in ICRP Publication 67 has been applied to uranium. Where no clear evidence on age dependence of organ distribution and retention appeared to be available, the biokinetic data for adults were adopted for infants and children. This assumption was made in ICRP Publications 56 and 67, and is usually expected to lead to an overestimate of the dose coefficient. If no relevant biokinetic data were found for humans, appropriate data were based on animal experiments as far as possible.

0080426581 - 9780080426587 - 1995 - Paperback - 74 pages

ICRP Publication 68

➤ Dose Coefficients for Intakes of Radionuclides by Workers A report of a Task Group of Committee 2 of the International Commission on Radiological Protection Replacement of ICRP Publication 61

The Commission's 1990 recommendations on radiation protection standards in ICRP Publication 60 were

developed to take into account new biological information related to the detriment associated with radiation exposures and supercede the earlier recommendations in ICRP Publication 26. In order to permit immediate application of these new recommendations, revised values of the Annual Limits on Intake (ALIs) based on the methodology and biokinetic information and incorporating the new dose limits and tissue weighting factors, wT were issued as ICRP Publication 61. Since issuing ICRP Publication 61, ICRP has published a revised kinetic and dosimetric model of the respiratory tract. The main aim of the present report is to give values of dose coefficients for workers using this new model.

Reviews

Journal of Radiological Protection, G.M. Kendall, 6 January 1995 ...certainly in the UK, the ICRP recommendation is both sensible and practical.... However, ICRP have formulated a protection policy which is based on sound radiological protection principles but with enough pragmatism and room for national variations to make the recommendations of general applicability. ICRP Publication 65 is a milestone in the practical implementation of radon control within the Commission's general framework.

0080426514 - 9780080426518 - 1995 - Paperback - 110 pages

ICRP Publication 67

➤ Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 2 Ingestion Dose Coefficients A Report of a Task Group of Committee 2 of the International Commission on Radiological Protection

In March 1987 the International Commission on Radiological Protection established a Task Group of Committee 2 "to evaluate dose per unit intake for members of the public". In this, the second of two reports given by the Task Group, ingestion dose coefficients are given for isotopes of sulphur, cobalt, nickel, zinc, molybdenum, technetium, silver, tellurium and polonium using the new tissue weighting factors (wT) given by the Commission in its 1990 Recommendations. Revised ingestion dose coefficients are also included for the radioisotopes given in Part 1 using the new wT values. In addition, ingestion dose coefficients are given for further radioisotopes. A generic model for the biokinetics of lead and the alkaline earths strontium, barium and radium has been

introduced for calculating ingestion dose coefficients for radioisotopes of these elements. This model has been applied to the recalculation of the ingestion dose coefficients for ^{90}Sr , the only strontium isotope considered in Part 1.

The ICRP has now given new wT values for the urinary bladder and colon, and new information has become available on the biokinetics of plutonium, americium and neptunium in humans. As a result the Task Group considered it appropriate to revise the biokinetic models for these elements given in Part 1.

Reviews

Radiation Protection Dosimetry, D.M. Taylor, 1994 For those concerned with the radiological protection of the general public, this report provides a valuable compendium of dose coefficients.... A welcome feature of the report is its presentation in a format that contains all the biokinetic data that the reader would normally require.

008041155X - 9780080411552 - 1994 - Paperback - 168 pages

ICRP Publication 66

▶ Human Respiratory Tract Model for Radiological Protection

This report describes a revision of the model used in ICRP Publication 30 to calculate radiation doses to the respiratory tract of workers resulting from the intake of airborne radionuclides. This revision was motivated by the availability of increased knowledge of the anatomy and physiology of the respiratory tract and of the deposition, clearance, and biological effects of inhaled radioactive particles, and by greatly expanded dosimetry requirements. To meet fully the needs of radiation protection, a dosimetric model for the respiratory tract should:

- provide calculations of doses for individual members of the populations of all ethnic groups, in addition to workers;
- be useful for predictive and assessment purposes as well as for deriving limits on intakes;
- account for the influence of smoking, air pollutants, and respiratory tract diseases;
- provide for estimates of respiratory tract tissue doses from bioassay data; and
- be equally applicable to radioactive gases as well as to particles.

Addressing all of these requirements has resulted in a dosimetry model that is more complex than previous models.

0080411541 - 9780080411545 - 1994 - Paperback - 300 pages

ICRP Publication 65

▶ Protection Against Radon-222 at Home and at Work

The naturally radioactive noble gas radon, (^{222}Rn), is present in the air outdoors and in all buildings, including workplaces. It is thus an inescapable source of radiation exposure both at home and at work. High radon levels in air can occur in buildings, including workplaces, in some geographical locations. This applies particularly in workplaces such as underground mines, natural caves, tunnels, medical treatment areas in spas, and water supply facilities where ground water with a high radon concentration is treated or stored. This report summarises the extent of current knowledge about the health effects of inhaled radon and its progeny and makes recommendations for the control of this exposure in both dwellings and workplaces. It aims to give guidance to national advisory and regulatory agencies and to practitioners of radiological protection concerned with radon in dwellings and workplaces.

Once the decision to apply the Commission's system of protection is made, it becomes necessary to apply an exposure limit. This has been derived to correspond to the same level of detriment as that resulting from an effective dose equal to the Commission's recommended dose limit. Some additional guidance is given on practical control measures in workplaces. This publication includes a history of radon problems in mines and homes by Wolfgang Jacobi.

Reviews

Journal of Radiological Protection, G.M. Kendall, 6 January 1996

...certainly in the UK, the ICRP recommendation is both sensible and practical.... However, ICRP have formulated a protection policy which is based on sound radiological protection principles but with enough pragmatism and room for national variations to make the recommendations of general applicability. ICRP Publication 65 is a milestone in the practical implementation of radon control within the Commission's general framework.

0080424759 - 9780080424750 - 1994 - Paperback - 48 pages

ICRP Publication 64

➤ **Protection from Potential Exposure: A Conceptual Framework A Report of a Task Group of Committee 4 of the International Commission on Radiological Protection**

The ICRP, in its 1990 Recommendations, divided situations affecting radiation exposure of individuals into two broad categories: practices and intervention. The basic principles of radiation protection are applied to these categories in different ways. In the case of practices, the principles are applied to the addition of radiation risk caused by the introduction or modification of practices, whilst for intervention they are applied to the subtraction or reduction of pre-existing radiation exposure. Radiation exposure which might result from the introduction of a practice is also divided into two broad categories: normal exposure and potential exposure. Normal exposure is that exposure which can reasonably be expected to occur, i.e., the exposure is predicted to occur with a probability of one or near one, independent of the time when the exposure occurs. Potential exposure is exposure that, while not certain to occur, can be anticipated as a result of introducing or modifying a practice and to which a probability of occurrence can be assigned. The purpose of this report is to elaborate upon the principles and objectives of ICRP recommendations as they relate to potential exposure; explain basic concepts, terminology and methodologies associated with application of the recommendations; and to provide general guidance on its practical application. The report is intended to provide a basis for the preparation of more detailed guidance related to specific practices.

Reviews

Health Physics, Kenneth L. Mossman, February 1994
The report serves as an excellent summary of ICRP philosophy and approaches to protection against potential exposures.

0080422055 - 9780080422053 - 1993 - Paperback - 24 pages

ICRP Publication 63

➤ **Principles for Intervention for Protection of the Public in a Radiological Emergency A Report of a Task Group of Committee 4 of the International Commission on Radiological Protection**

The International Commission on Radiological

Protection first set out general principles for planning intervention after an accident over short times and generally near to accidents in ICRP Publication 40 (1984). This document updates and extends the earlier publication and includes quantitative guidance on intervention levels. This guidance covers the introduction of such protective actions over very short times, their introduction and continuation following periodic review over protracted timescales lasting perhaps years and intervention over larger areas. All accidents are different, as are the approaches of national organizations having responsibility for response to an accident. It is intended that these general guidelines should be translated into appropriate emergency response plans by competent national authorities.

Reviews

Health Physics, Kenneth L. Mossman, February 1994
...this report should be of great interest to individuals and regulatory bodies concerned with protection of the public in a radiological emergency.

0080422047 - 9780080422046 - 1993 - Paperback - 40 pages

ICRP Publication 62

➤ **Radiological Protection in Biomedical Research Also includes Addendum 1 to ICRP Publication 53, Radiation Dose to Patients from Radiopharmaceuticals, and a Summary of the current ICRP Principles for Protection of the Patient in Diagnostic Radiology A Report of Committee 3 adopted by the International Commission on Radiological Protection**

In recent years much progress has been made in radiological methods, in dosimetry, and in the knowledge of radiation effects. The ICRP has increased its risk estimates, and in addition, more extensive information has become available on the effect of age at exposure, on gender differences, on the magnitude of risk and on the consequences on in utero irradiation. The objective of Radiological Protection in Biomedical Research is to provide advice to individuals planning such research, those involved in issuing general rules of conduct, and those engaged in evaluation of specific research projects. The report should also be made available to those who may become the subject of investigations (patients, volunteers). Published with this report is a Summary of the current ICRP Principles for Protection of the Patient in Diagnostic Radiology. This has been

prepared to encourage medical professionals to become aware of and to utilise those basic principles, and is an update of a previous summary that appeared in ICRP Publication 57 (1989). Finally, the report includes Addendum 1 to ICRP Publication 53 on Radiation Dose to Patients from Radiopharmaceuticals; this part of the report however is superseded by ICRP Publication 80.

Reviews

A.G. Richards, *Radiation Protection Service, University of Leeds, 1993*

This latest publication by the ICRP is essential reading for all medical personnel undertaking research involving volunteers and patients using ionising radiations as well as consultants in primary care departments of Dental Institutes and Hospitals attached to Universities and Hospital Trusts.

0080422039 - 9780080422039 - 1993 - Paperback - 72 pages

ICRP Publication 60

► Recommendations ICRP (French Edition of ICRP 60, 1990 Recommendations) Translated by H.P Jamet, International Centre of Radiopathology, PO Box 34, 92260 Fontenay aux Roses, France

La Commission Internationale sur la Protection Radiologique a publié ses dernières recommandations en 1977. Ces recommandations sont utilisées dans le monde entier en vue de limiter l'exposition aux radiations ionisantes aux personnes habilitées aux zones radioactives et au public, en général. Depuis, des rapports complémentaires aux recommandations de 1977 ont été publiés et adoptés officiellement en 1990. En publiant ces recommandations, la Commission avait trois objectifs: tenir compte de nouvelles informations biologiques et tendances dans la mise en place de standards de sécurité améliorer la présentation des recommandations; maintenir un équilibre cohérent entre les recommandations et les nouvelles informations. Les recommandations figurent dans le texte principal, accompagné par des annexes. Toutes les recommandations sont contenues dans le texte et il y a suffisamment d'explications pour laisser apparaître le raisonnement des législateurs. Les annexes comprennent de plus amples renseignements sur des points particuliers et s'adressent aux spécialistes.

0080422756 - 9780080422756 - 1993 - Paperback - 221 pages

ICRP Publication 60

► 1990 Recommendations of the International Commission on Radiological Protection

The International Commission on Radiological Protection issued its last basic recommendations in 1977. The recommendations have been used widely throughout the world to limit exposure of both radiation workers and members of the public to ionising radiations. Supplementary statements to the 1977 recommendations were issued when necessary by the Commission, but developments in the last few years have made it necessary to issue a completely new set of recommendations, officially adopted in November 1990. In publishing these recommendations, the Commission has had three aims in mind: to take account of new biological information and of trends in the setting of safety standards; to improve the presentation of the recommendations; and to maintain as much stability in the recommendations as is consistent with the new information. The recommendations are set out in the form of a main text supported by annexes. The main text contains all the recommendations, together with sufficient explanatory material to make clear the underlying reasoning for policy makers. The supporting annexes contain more detailed scientific information on specific points for specialists.

Reviews

European Journal of Radiology, B Shapiro, Rotterdam, The Netherlands, 1992

...can be regarded as an indispensable desk reference for radiation protection officers and medical physicists International Digest of Health Legislation, Lars Persson, 1992 This publication will be of great importance for future legislative work in the field of radiation protection by all national health authorities.

0080411444 - 9780080411446 - 1991 - Paperback - 215 pages

ICRP Publication 59

► The Biological Basis for Dose Limitation in the Skin A Report of a Task Group of Committee 1 of the International Commission on Radiological Protection

Despite the increase in data and the understanding of both deterministic effects and cancer induction in the skin in recent years, many questions that are important for risk estimation remain. This report, adopted by the ICRP in November 1991, is the work of

a Task Group set up to consider the biological basis for dose limitation in the skin. The Task Group reviewed available dose-effect data for cancer induction and deterministic effects in the skin to estimate for these effects; it reviewed evidence concerning which cells are at risk, to determine at what depth dose measurements should be made, and reexamined dosimetry considerations and weighting factors for skin, with reference to the effects of 'hot particles' and ultraviolet radiation. The information collated in this report was used by the Commission to set dose limits and the weighting factor for skin in the 1990 Recommendations of the ICRP.

0080411436 - 9780080411439 - 1992 - Paperback - 112 pages

ICRP Supporting Guidance 1

➤ Risks Associated with Ionising Radiations Five papers prepared by a Task Group of Committee 1 of the International Commission on Radiological Protection

At its meeting in Como, Italy, in September of 1987 the Commission approved a proposal by its Committee 1 on Radiation Effects to set up a Task Group on Risk to evaluate the new estimates of cancer risk, genetic risk and the risk to the fetus that were being developed by committees such as United Nations Scientific Committee on the effects of Atomic Radiation (UNSCEAR) and U.S. National Academy of Sciences Committee on the Biological Effects of Ionizing Radiations (BEIR). Eventually as the programme of the Commission evolved in the preparation of new radiation protection recommendations (ICRP Publication 60, 1991), the work of this Task Group became part of the background on which Annex B, "Biological Effects of Ionising Radiation" in the new recommendations, was based.

0080418406 - 9780080418407 - 1992 - Paperback - 126 pages

ICRP Publication 58

➤ RBE for Deterministic Effects A Report of a Task Group of Committee 1 of the International Commission on Radiological Protection

This report investigates data on RBE - the Relative Biological Effectiveness - of various types of radiation to assess whether, for specific tissues, the present dose limits or annual limits of intake, based on Q values, and intended to limit the incidence of stochastic effects, are adequate to prevent

deterministic effects. The report addresses the problems of accidental exposures as well as chronic irradiation. Also included is the RBE values for the deterministic effects associated with alpha and beta emitting radionuclides in the lungs with particular reference to nuclides and irradiation times of interest for accidental conditions.

0080401732 - 9780080401737 - 1990 - Paperback - 64 pages

ICRP Publication 56

➤ Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 1

In March 1987 the International Commission on Radiological Protection established a Task Group which was requested "to evaluate dose per unit intake for members of the public." In Section I, this report incorporates age-dependent physical models and appropriate biokinetic information. Section II reports on doses per unit intake of isotopes of hydrogen, carbon, strontium, zirconium, niobium, ruthenium, iodine, caesium, cerium, plutonium, americium and neptunium. Detailed appendices give extensive information on bone models for actinides, and inhalation dose coefficients.

0080407633 - 9780080407630 - 1990 - Paperback - 134 pages

ICRP Publication 55

➤ Optimization and Decision-Making in Radiological Protection

The Task Group of Committee 4 was originally established to produce a report on methods of optimizing radiological protection other than cost-benefit analysis. As the work of the Task Group progressed, however, it became clear that it would be more useful to produce a report that considered all aspects of optimization, including cost-benefit. This report therefore considers various techniques and their application to problems at different levels of complexity.

0080373887 - 9780080373881 - 1989 - Paperback - 69 pages

ICRP Publication 53

▶ Radiation Dose to Patients from Radiopharmaceuticals A report of a Task Group of Committee 2 of the International Commission on Radiological Protection

This publication presents biokinetic models and best estimates of biokinetic data for some 120 individual radiopharmaceuticals, giving estimated absorbed doses, including the range of variation to be expected in pathological states, for adults, children and the fetus. Absorbed dose estimates are needed in clinical diagnostic work for judging the risk associated with the use of specific radiopharmaceuticals, both for comparison with the possible benefit of the investigation and to help in giving adequate information to the patient. These estimates provide guidance to ethics committees having to decide upon research projects involving the use of radioactive substances in volunteers who receive no individual benefit from the study. This report, while still an important source document, is supplemented and amended by ICRP Publication 80

0080355919 - 9780080355917 - 1988 - Hardbound - 388 pages

ICRP Publication 52

▶ Protection of the Patient in Nuclear Medicine

This publication is concerned with exposures of patients resulting from the administration of radiopharmaceuticals for diagnostic, therapeutic and research purposes, including some recommendations on protection of the patient's family. The report advises on the factors that influence absorbed doses (and hence radiation risks) to patients from different types of nuclear medicine examinations and indicates ways by which these risks can be minimized without detriment to intended medical benefits. This report supersedes ICRP publication 17 and, together with ICRP publications 34 and 44, completes a series of three reports dealing with protection of the patient exposed to ionizing radiation in medicine. It should be read in conjunction with ICRP Publication 53, Radiation Dose to Patients from Radiopharmaceuticals.

0080331882 - 9780080331881 - 1988 - Paperback - 46 pages

ICRP Publication 46

▶ Radiation Protection Principles for the Disposal of Solid Radioactive Waste

The application of the system of dose limitation recommended by the ICRP to the disposal of solid radioactive waste involves consideration of two special factors: the probabilistic nature of future exposures and the long timescales involved. This report takes into account the variable probabilities by generalising from a system of dose limitation to a system of risk limitation and showing how this can be applied. The long timescales involved in solid radioactive waste disposal are discussed in terms of truncation of calculations of collective dose equivalent, the weight to be assigned to future detriments and the use of utility values in quantifying the significance of exposures with a low probability of occurrence. The report also includes a discussion of exemption rules to be used in deciding whether a waste stream should be subject to control and of operational aspects of solid radioactive waste disposal. While still a basic source document, this report is supplemented and amended by ICRP Publications 77 and 81.

0080336663 - 9780080336664 - 1986 - Paperback - 35 pages

ICRP Publication 45

▶ Quantitative Bases for Developing a Unified Index of Harm

In 1977, the International Commission on Radiological Protection issued ICRP Publication 27, "Problems Involved in Developing an Index of Harm". That report discussed the difficulties of making an appropriate comparison of radiation and other effects and suggested a quantitative index to take account of the length of life or full activity lost as a result of occupational causes. This new report substantially extends the scope of ICRP Publication 27, by including new data on occupational accident risks as well as a consideration of radiation-induced non-fatal cancers, non-stochastic effects and hereditary detriment. An appendix discussing assessments of detriment in sections of the general public due to exposure to ionising radiation is also included.

0080336655 - 9780080336657 - 1986 - Paperback - 90 pages

ICRP Publication 44**> Protection of the Patient in Radiation Therapy**

Protection of the patient in radiotherapy requires, uniquely, not the avoidance of radiation exposure or even the avoidance of risk of severe damage to some tissues. Rather, it involves achieving the optimal balance between the efficacy of sterilising the malignant growth and the minimizing of treatment-related complications by keeping radiation doses as low as reasonably achievable. This report presents a broad overview which will be useful to all involved in the proper therapeutic application of radiation.

0080323367 - 9780080323367 - 1985 - Paperback - 58 pages

ICRP Publication 43**> Principles of Monitoring for the Radiation Protection of the Public**

Since the publication of the previous report dealing with environmental monitoring the commission has revised its basic recommendations and some aspects of its philosophy dealing with dose limitation. Although many of the previous recommendations are still relevant it was felt necessary to reassess the general principles on which monitoring programs should be based, to make the recommendations consistent with current radiation protection philosophy and to extend the scope to all types of monitoring outside the workplace. In this report all exposures are considered except occupational exposure and exposure to patients from medical uses of radiation.

0080323359 - 9780080323350 - 1984 - Paperback - 20 pages

ICRP Publication 41**> Nonstochastic Effects of Ionizing Radiation**

This report reviews nonstochastic biological and health effects of ionizing radiation, with particular reference to their implications for dose limits in radiation protection. It considers the definition of nonstochastic effects and the biology of the response, with particular emphasis on detriment and on differences between different tissues, so as to determine the compatibility between these factors and current understanding of ICRP recommendations. For each particular tissue, the phenomenon most relevant for radiation protection is determined, while the possible interaction of stochastic and nonstochastic

categories of response and its consequences for radiological protection is also considered.

0080323332 - 9780080323336 - 1984 - Paperback - 33 pages

ICRP Publication 38**> Radionuclide Transformations: Energy and Intensity of Emissions**

This major new reference work contains radioactive decay data on radionuclides with radioactive half-lives of more than ten minutes. For each radionuclide, the various emissions are tabulated by type, energy and yield. The tables have been designed to facilitate use of the book for dosimetric calculations and in the identification and assay of radionuclides in experimental studies and in monitoring. The nuclear data presented were used to compute the Annual Limits on Intake for workers given in ICRP Publication 30 and are complementary to that publication. Radionuclide Transformations avoids the major deficiency of previously published standard reference works on this subject by presenting the data for ease of use; for example, selfconsistent decay energies and yields are given for all emissions, and yields are specified in absolute terms, rather than relative to a particular strong emission. The data in this volume can consequently be applied directly to dosimetry or radionuclide assay.

0080307612 - 9780080307619 - 1983 - Paperback - 1200 pages

ICRP Publication 36**> Protection Against Ionizing Radiation in the Teaching of Science**

This report is a revision of ICRP Publication No 13. The recommendations it contains apply to the protection of pupils/students from ionizing radiation. They apply mainly to the teaching of natural science at secondary level, but they may be adapted to some forms of tertiary education.

0080298184 - 9780080298184 - 1983 - Paperback - 14 pages

ICRP Publication 34**▶ Protection of the Patient in Diagnostic Radiology**

This report is intended to guide radiologists and others concerned with diagnostic radiology with regard to the factors that influence radiation doses, and hence radiation risks, from different types of X-ray examination. It supersedes Publication Number 16 on the same subject.

0080297978 - 9780080297972 - 1983 - Paperback - 88 pages

ICRP Publication 30**▶ Limits for Intakes of Radionuclides by Workers: Part 4 (An Addendum)**

This addendum is concerned with the numerical value of the secondary limits, the Annual Limit on Intake (ALI) and the Derived Air Concentration (DAC) for certain radionuclides. It takes into account data from the 1986 review of Publication 19, which was published as Publication 48. Publication 48 paid specific attention to information regarding absorption from the gastrointestinal tract and distribution within, and retention within, the skeleton and liver. Dosimetric data for the radionuclides are given in an appendix.

0080368867 - 9780080368863 - 1989 - Paperback - 172 pages

ICRP Publication 30**▶ Limits for Intakes of Radionuclides by Workers: Index**

A subject index and a comprehensive index of radionuclides considered in all parts and supplements of ICRP Publication 30.

0080288847 - 9780080288840 - 1982 - Paperback - 73 pages

ICRP Publication 30**▶ Limits for Intakes of Radionuclides by Workers, Supplements A & B to Part 3**

One of a series of reports recommending Annual Limits for Intakes (ALI's) of radionuclides by workers. The data given in these supplements is intended to be used in conjunction with text and dosimetric models described in Part 3 of the ICRP Publication 30.

0080268358 - 9780080268354 - 1982 - Hardbound - 948 pages

ICRP Publication 30**▶ Limits for Intakes of Radionuclides by Workers, Part 3**

One of a series of reports recommending Annual Limits for Intakes (ALI's) of radionuclides by workers. The data given in this report is intended to be used in conjunction with text and dosimetric models described in Part 1 of the ICRP Publication 30

008026834X - 9780080268347 - 1982 - Paperback - 128 pages

ICRP Publication 30**▶ Limits for Intakes of Radionuclides by Workers, Part 2**

This part gives metabolic data for 30 further elements, including Annual Limits on Intakes (ALI's) for their isotopes. The data given in this report are intended to be used together with the text and dosimetric models described in ICRP Publication 30, Part 1.

0080268323 - 9780080268323 - 1980 - Paperback - 80 pages

ICRP Publication 30:**▶ Limits for Intake of Radionuclides by Workers, Supplement to Part 2**

This supplement gives relevant dosimetric data for radionuclides considered in ICRP Publication Number 30, Part 2.

0080268331 - 9780080268330 - 1980 - Hardbound - 751 pages

ICRP Publication 30**▶ Limits for Intakes of Radionuclides by Workers, Supplement to Part 1**

This supplement gives relevant dosimetric data for radionuclides considered in ICRP Publication 30, Part 1.

0080249418 - 9780080249414 - 1979 - Hardbound - 558 pages

ICRP Publication 30**▶ Limits for Intakes of Radionuclides by Workers, Part 1**

The first of a series of reports recommending Annual Limits for Intakes (ALI's) of radionuclides by workers. This report includes the main text for the whole series of Publication 30, and data on twentyone elements having radioisotopes that are of considerable

importance in radiological protection. The actual ALI values in ICRP Publication 30 have become obsolete with the newer dosimetry and dose limits of ICRP Publication 60, and at present the dose coefficients in ICRP Publications 68, 69, 71, and 72 should be used to determine ALI's. However, the vast body of biokinetic information in Publication 30 still forms the basis of much of the calculations underlying those later reports.

0080226388 - 9780080226385 - 1979 - Paperback - 124 pages

ICRP Publication 30

➤ Limits for Intakes of Radionuclides by Workers Complete boxed set of all 9 books as described above

See entries above for each book concerned.

008037364X - 9780080373645 - 1979-1989
Mixed: Paperback / hardbound - 2,834 pages

ICRP Publication 23

➤ Reference Man: Anatomical, Physiological and Metabolic Characteristics

A unique comprehensive work on the reference male and female, including data on mass of the various organs of the body, chemical composition of the body and various tissues and physiological data. While still the major source of reference data, this report is supplemented and amended by ICRP Publication 89.

0080170242 - 9780080170244 - 1975 - Hardbound - 512 pages

ICRP Publication 18

➤ The RBE for High-LET Radiations with Respect to Mutagenesis A report prepared by a Task Group of Committee 1 of the International Commission on Radiological Protection

The document attempts a wide-ranging comparative survey of scientific reports on high-LET mutagenesis. It considers the implication of this data for radiological protection. It includes information on the effects of high and low doses administered at high and low dose rates. The distinction between high- and low-LET radiation is also discussed.

0080170080 - 9780080170084 - 1972 - Paperback - 50 pages

Superseded or Out of Print ICRP Reports

These reports may be of interest for historical reasons and/or if read in conjunction with later reports. Most superseded and out-of-print reports are available for downloading in electronic format at www.sciencedirect.com/science/journal/01466453

ICRP Publication 1

➤ Recommendations of the International Commission on Radiological Protection (1959)

Superseded by ICRP Publications 6, 9, 26, and subsequently ICRP Publication 60.

ICRP Publication 2

➤ Report of Committee II on Permissible Dose for Internal Radiation (1960)

Superseded by ICRP Publication 30

ICRP Publication 3

➤ Report of Committee III on Protection against X-rays up to Energies of 3 MeV and Beta- and Gamma-rays from Sealed Sources (1960)

Superseded by ICRP Publication 60

ICRP Publication 4

➤ Report of Committee IV on Protection against Electromagnetic Radiation above 3 MeV and Electrons, Neutrons and Protons (1964)

Superseded by ICRP Publication 60

ICRP Publication 5

➤ Report of Committee V on the Handling and Disposal of radioactive Materials in Hospitals and Medical Research Establishments (1965)

Superseded by ICRP Publications 25, 57 and subsequently ICRP Publication 73.

ICRP Publication 6

➤ Recommendations of the ICRP (Revision of ICRP Publication 1)(1964)

Superseded by ICRP Publications 9, 26, and subsequently ICRP Publication 60.

ICRP Publication 7

➤ Principles of Environmental Monitoring Related to the Handling of Radioactive Materials (1966)

Superseded by ICRP Publication 43

ICRP Publication 8

➤ The Evaluation of Risks from Radiation (1966)

Superseded by Supporting Guidance 1 =Volume 22 issue 1

ICRP Publication 9➤ **Recommendations of the ICRP (Revision of ICRP Publication 6) (1966)**

Superseded by ICRP Publication 26 and subsequently ICRP Publication 60.

ICRP Publication 10➤ **Evaluation of Radiation Doses to Body Tissues from Internal Contamination due to Occupational Exposure (1968)**

Superseded by ICRP Publication 54 and subsequently ICRP Publication 78

ICRP Publication 10A➤ **The Assessment of Internal Contamination Resulting from Recurrent Prolonged Uptakes (1971)**

Superseded by ICRP Publication 54 and subsequently ICRP Publication 78.

ICRP Publication 11➤ **A Review of the Radiosensitivity of the Tissues in Bone (1971)***ICRP Publication 12*➤ **General Principles of Monitoring for Radiation Protection of Workers (1969)**

Superseded by ICRP Publication 35, then 75.

ICRP Publication 13➤ **Radiation Protection in Schools for Pupils up to the Age of 18 years (1970)**

Superseded by ICRP Publication 36

ICRP Publication 14➤ **Radiosensitivity and Spatial Distribution of Dose (1969)**

Superseded by ICRP Publication 60

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Superseded by ICRP Publication 60

ICRP Publication 16➤ **Protection of the Patient in X-ray Diagnosis (1970)**

Superseded by ICRP Publication 34

ICRP Publication 17➤ **Protection of the Patient in Radionuclide Investigations (1971)**

Superseded by ICRP Publication 52

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Superseded by ICRP Publication 48

ICRP Publication 20➤ **Alkaline Earth Metabolisms in Adult Man (1973)***ICRP Publication 21*➤ **Data for Protection against Ionizing Radiation from External Sources Supplement to ICRP Publication 15 (1973)**

Superseded by ICRP Publication 51 and subsequently ICRP Publication 74.

ICRP Publication 22➤ **Implication of Commission Recommendations that Doses be Kept as Low as Readily Achievable (1973)***ICRP Publication 24*➤ **Radiation Protection in Uranium and Other Mines (1977)**

Superseded by ICRP Publication 47

ICRP Publication 25➤ **Handling and Disposal of Radioactive Materials in Hospitals (1977)**

Superseded by ICRP Publication 57 and subsequently ICRP Publication 73

ICRP Publication 26➤ **Recommendations of the ICRP, 2nd Edition (1987)**

Superseded by ICRP Publication 60

ICRP Publication 27➤ **Problems involved in Developing an Index of Harm (1978)***ICRP Publication 28*➤ **The Principles and General Procedures for Handling Emergency and Accidental Exposure of Workers (1978)**

Superseded by ICRP Publication 75

ICRP Publication 29➤ **Radionuclide Release into the Environment - Assessment of Doses to Man (1979)**

Superseded by ICRP Publication 43

ICRP Publication 31➤ **Biological Effects of Inhaled Radionuclides (1980)**

ICRP Publication 32

- **Limits for Inhalation of Radon Daughters by Workers (1981)**

Superseded by ICRP Publications 65 and 75

ICRP Publication 33

- **Protection Against Ionizing Radiation from External Sources used in Medicine (1982)**

ICRP Publication 35

- **General Principles of Monitoring for Radiation Protection of Workers (1983)**

Superseded by ICRP Publication 75

ICRP Publication 37

- **Cost-Benefit Analysis in the Optimization of Radiation Protection (1983)**

ICRP Publication 39

- **Principles for Limiting Exposure of the Public to Natural Sources of Radiation (1984)**

Superseded by ICRP Publications 65 and 82

ICRP Publication 40

- **Protection of the Public in the Event of Major Radiation Accidents: Principles for Planning (1984)**

Superseded by ICRP Publication 63

ICRP Publication 42

- **A Compilation of the Major Concepts and Quantities in use by ICRP (1984)**

Superseded by ICRP Publication 60

ICRP Publication 47

- **Radiation Protection of Workers in Mines (1986)**

Superseded by ICRP Publications 65 and 75

ICRP Publication 48

- **The Metabolism of Plutonium and Related Elements (1986)**

ICRP Publication 49

- **Developmental Effects of Irradiation on the Brain of the Embryo and Fetus**

Superseded by ICRP Publication 90

ICRP Publication 50

- **Lung Cancer Risk from Indoor Exposures to Radon Daughters (1987)**

Superseded by ICRP Publication 65

ICRP Publication 51

- **Data for Use in Protection Against External Radiation (1988)**

Superseded by ICRP Publication 74

ICRP Publication 54

- **Individual Monitoring for Intakes of Radionuclides by Workers: Design and Interpretation (1991)**

Superseded by ICRP Publication 78

ICRP Publication 57

- **Radiological Protection of the Worker in Medicine and Dentistry (1990)**

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