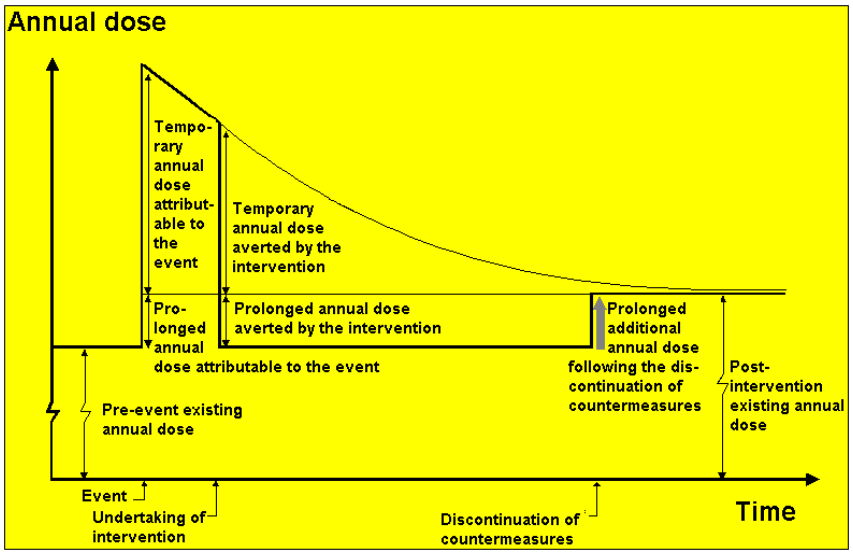
2000 Annual Report
of the
International Commission on Radiological Protection



ICRP Annual Report on 2000
2001-08-01
ICRP Reg. No. 52/261/01

Cover diagram: Evolution of the existing annual dose after an accident, followed by intervention and, eventually, the discontinuation of protective actions.
From ICRP Publication 82 on prolonged exposures; Fig. 9.

Our Mission Statement

**The International Commission on Radiological Protection, ICRP,
is an independent Registered Charity,
established to advance for the public benefit
the science of radiological protection,
in particular by providing recommendations and guidance
on all aspects of protection against ionising radiation.**

Progress in 2000 in a Nutshell

The present report begins with a brief description of ICRP and its procedures, serving as a platform providing a logical structure for the report.

The primary product of ICRP activities is its Publications. Four reports were printed in the *Annals of the ICRP* in 2000: *Publication 81* on 'Radiation Protection Recommendations as Applied to the Disposal of Long-lived Solid Radioactive Waste'; *Publication 82* on 'Protection of the Public in Situations of Prolonged Radiation Exposure'; *Publication 83* on 'Risk Estimation for Multifactorial Diseases'; and *Publication 84* on 'Pregnancy and Medical Radiation'.

In the year 2000, the Main Commission also approved three further reports for publication. All of those reports concern radiological protection in medicine: one on 'Avoidance of Radiation Injuries from Medical Interventional Procedures', to become ICRP *Publication 85*; one on 'Prevention of Accidents to Patients Undergoing Radiation Therapy', to be printed in 2001 as ICRP *Publication 86*; and one on 'Managing Patient Dose in Computed Tomography', to be printed in 2001 as ICRP *Publication 87*. In line with what has now been established as standard ICRP procedure, the reports had been subjected to extensive international consultation before ICRP approval.

The Commission also reviewed progress reports from its Committees and Task Groups. Drafting continued on numerous further reports, some of them intended to be produced partly or entirely in CD ROM format.

Two new Task Groups were established by the Main Commission in 2000. The first one of these is intended to review the Commission's policy on Protection of the Environment. The second Task Group will take forward the development of the next fundamental recommendations of the Commission, which are expected to be adopted in 2005.

Elections were held for members to be invited to serve for the 2001-2005 term. Five of the twelve members of the Main Commission retired and were replaced by newly elected experts, and about a third of the Committee members were similarly replaced.

Meetings were held in 2000 with the Main Commission jointly with the four Committees, and with each one of 13 Task Groups; and the Secretariat undertook various actions to support these activities.

The International Commission on Radiological Protection

The primary body in radiological protection is ICRP. It was formed in 1928 as the 'International X-ray and Radium Committee', but adopted its present name in 1950 to reflect its growing involvement in areas outside that of occupational exposure in medicine, where it originated.

Broad structure

ICRP consists of the Main Commission, Committee 1 (Radiation Effects), Committee 2 (Doses from Radiation Exposure), Committee 3 (Protection in Medicine), Committee 4 (Application of ICRP Recommendations), *ad hoc* Task Groups and Working Parties, and the Scientific Secretariat.

Membership

The Main Commission consists of twelve members and a Chairman, while the Committees contain between 15 and 20 members each. The Commission and its Committees run for four-year periods, from 1 July. On each occasion of a new period, at least three, and not more than five, members of the Commission must be changed. A similar rate of renewal is sought for the Committees. Such a new period began 1 July 1997, and the autumn 2000 meetings of the Commission and its Committees were the last time that the members of the 1997 – 2001 term met.

Meetings

The Commission meets once or twice a year. Each Committee meets once a year. Twice in each four-year period, the annual meeting of the Committees is conducted jointly and together with the Commission. These meetings are funded as necessary from monies available to ICRP.

Financing

The activities of ICRP are financed mainly by voluntary contributions from national and international bodies with an interest in radiological protection. (A list of the bodies providing such contributions in 2000 is appended at the end of this report). Some additional funds accrue from royalties on ICRP *Publications*. Members' institutions also provide support to ICRP by making the members' time available without charge and, in many cases, contributing to their costs of attending meetings.

Mode of operation

The Commission uses Task Groups and Working Parties to deal with specific areas. Task Groups are formally appointed by the Commission to perform a defined task, usually the preparation of a draft report. A Task Group usually contains a majority of specialists from outside the Commission's structure. It is funded as necessary from monies available to ICRP.

Working Parties are set up by Committees to develop ideas, sometimes leading to the establishment of a Task Group. The membership of a Working Party is usually limited to Committee members. Working Parties receive no funding of their own, *i.e.* they operate primarily by correspondence and by meetings in direct conjunction with meetings of the Committee concerned.

These activities are co-ordinated with a minimum of bureaucracy by a Scientific Secretary, ensuring that ICRP recommendations are promulgated.

Thus, ICRP is an independent international network of specialists in various fields of radiological protection. At any one time, about one hundred eminent scientists are actively involved in the work of ICRP. The four-tier structure described provides a rigorous Quality Management system of peer review for the production of ICRP Publications.

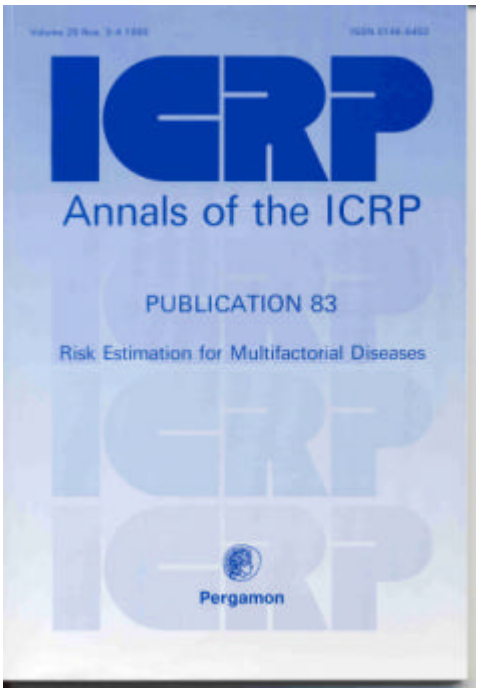
Furthermore, before draft ICRP reports are approved for publication, they are regularly circulated to a number of bodies and individual experts, and posted for public consultation on the Internet.

Objective

In preparing its recommendations, the Commission considers the fundamental principles and quantitative bases on which appropriate radiation protection measures can be established, while leaving to the various national protection bodies the responsibility of formulating the specific advice, codes of practice, or regulations that are best suited to the needs of their individual countries.

The aim of the recommendations of ICRP is to

- *provide an appropriate standard of protection for mankind from sources of ionising radiation, without unduly limiting beneficial practices that give rise to exposure to radiation.*



The recommendations and guidance of ICRP are published in our own journal, the Annals of the ICRP.

The Main Commission:

The Commission is an independent Registered Charity, established to advance for the public benefit the science of radiological protection, in particular by providing recommendations and guidance on all aspects of protection against ionising radiation.

Four reports, all previously approved by the Main Commission of ICRP, were printed in 2000. The Main Commission met with its four Standing Committees in the United States in October 2000. At the meeting, the Main Commission

- *approved two new ICRP reports for publication (a third one had been approved by postal ballot before the meeting);*
- *reviewed several other reports for future approval;*
- *reviewed the continuing work of its four Committees;*
- *elected five new members to the Commission for its next, 2001 – 2005 term;*
- *appointed 20 new members to the four Committees for the next term;*
- *reviewed reactions of the international radiation protection community to initial proposals concerning new ICRP recommendations;*
- *launched a formal Task Group on New Recommendations in order to start comprehensive work on these, taking account of the consultation results;*
- *gave advice to its recently launched Task Group on Protection of the Natural Environment.*

Four reports were published in the *Annals of the ICRP* in the year 2000. The first one of these, *Publication 81*, is the report from a Committee 4 Task Group on **Radiation Protection Recommendations as Applied to the Disposal of Long-lived Solid Radioactive Waste.** The report reviews 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.

The second report, *Publication 82*, is from a Task Group of Committee 4 on **Protection of the Public in Situations of Prolonged Radiation Exposure.** This report 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.

The third report, *Publication 83*, from a Task Group of Committee 1 reviews **Risk Estimation for Multifactorial Diseases.** This report analyses 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, and the preliminary conclusion is that radiation-induced mutations at low doses are not likely to significantly influence the incidence of the commonly-occurring multifactorial diseases.

The fourth and final report printed in 2000, *Publication 84*, begins a series of topically focused and straightforward medically oriented reports from Committee 3, in this case on **Pregnancy and Medical Radiation.** This report 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. The 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.

A report which had been approved for publication by the Commission already in 1998 was the subject of final preparation for printing during all of 2000, due to painstaking QA procedures. This report, on **Age-dependent Doses to Members of the Public from Intakes of Radionuclides, Part 6. Embryo and Foetus,** will cover intakes by the mother before and during pregnancy for selected radioisotopes of the 31 elements for which age-dependent biokinetic models have been given in recent publications.

In the year 2000, the Commission approved three new reports from Committee 3 for publication. One of these, which was approved by postal ballot in the summer of 2000, concerns **Avoidance of Radiation Injuries from Medical Interventional Procedures**. The reason for providing this report is that 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.

The second and third draft reports were approved when the Main Commission met with its four standing Committees at Leesburg, Virginia, USA, and then in Bethesda, Maryland, in October 2000. This was the last meeting for the 1997 - 2001 term. One of these reports addresses **Prevention of Accidents to Patients Undergoing Radiation Therapy**. This report stresses that over-dosage accidents in radiotherapy have often had devastating and sometimes fatal consequences. Under-dosage accidents causing inadequate tumour control also occur. 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. This publication focuses on measures required to ensure accident prevention.

The final report that was approved in 2000 deals with **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. The report underscores the many practical possibilities that currently exist to manage dose.

During its Bethesda meeting, the Commission also reviewed current progress and plans in each of its four Committees, including brief reviews of several draft reports in preparation. The Commission also made its annual formal survey of its financial and administrative matters.

At the meeting, elections were held for members to be invited to serve for the 2001-2005 term. There were five retirements from the Commission, D Beninson, C Meinhold, H Matsudaira, J-C Nénot, and L Ilyin. Those elected were G J Dicus (USA), Y Sasaki (Japan), A Sugier (France), R Alexhakin (Russia), and A González (Argentina). The final member-ship of the Main Commission and all of those appointed to the four Committees is shown in Table 2 at the end of this Annual Report.

The most recent fundamental recommendations of ICRP, *Publication 60*, date from 1990 (published in 1991). The Commission plans to recapitulate and consolidate these ICRP recommendations, aiming at publishing an updated set of recommendations around the year 2005. An initial conceptual overview of possible ways forward was circulated world-wide for consultation in 1999, with the collaboration of IRPA, the International Radiation Protection Association.

At its October 2000 meeting, the Commission established a Task Group to take forward the development of the next recommendations of the Commission. It will be chaired by the Chairman of the Commission and consist of the Vice-Chairman and four Committee Chairmen from the 2001–2005 term. The Commission reviewed the comments received at the IRPA 10 meeting held in Hiroshima during May 2000, together with those offered by the four Committees. It was agreed that there should be an open literature publication to describe the progress made and the issues to be addressed in the next stage of the preparation of the Recommendations. The timescale for their production is the term of the new Commission and Committees.

In 2000, the Main Commission also established another Task Group. This is chaired by Lars-Erik Holm and is concerned with Protection of the Environment. It is intended to review the Commission's current Policy, which is essentially that if humans are protected to the degree thought necessary, then other species are adequately protected. At the October 2000 meeting, the Commission heard an initial report on the plans of the Task Group and provided some directions and advice for its future work.

The 1997 - 2001 Main Commission. Front row from left, D Beninson, J Valentin (Scientific Secretary), R H Clarke (Chairman), C B Meinhold (Vice-Chairman); standing from left J-C Nénot, L-E Holm, B Winkler, R Cox, F A Mettler, H Matsudaira, A Kaul, L Ilyin, Z Pan, J D Boice.

Committee 1 (Radiation Effects):

Committee 1 considers the risk of induction of cancer and heritable disease (stochastic effects) together with the underlying mechanisms of radiation action; also, the risks, severity, and mechanism of induction of tissue/organ damage and developmental defects (deterministic effects).

Three Task Groups of Committee 1 were in operation in 2000: Low dose risks, effects on embryo/fetus, and radiation quality effects.

This Committee had three active Task Groups in operation in 2000, all of which continue in 2001 and 2002.

The first one of these concerns Extrapolation of Cancer Risks to Low Doses. Its work draws on and complements other work in the same area. Factors contributing to uncertainty in risk estimation, and the importance of 'new' mechanisms and phenomena in carcinogenesis, are among the focal topics for this Task Group.

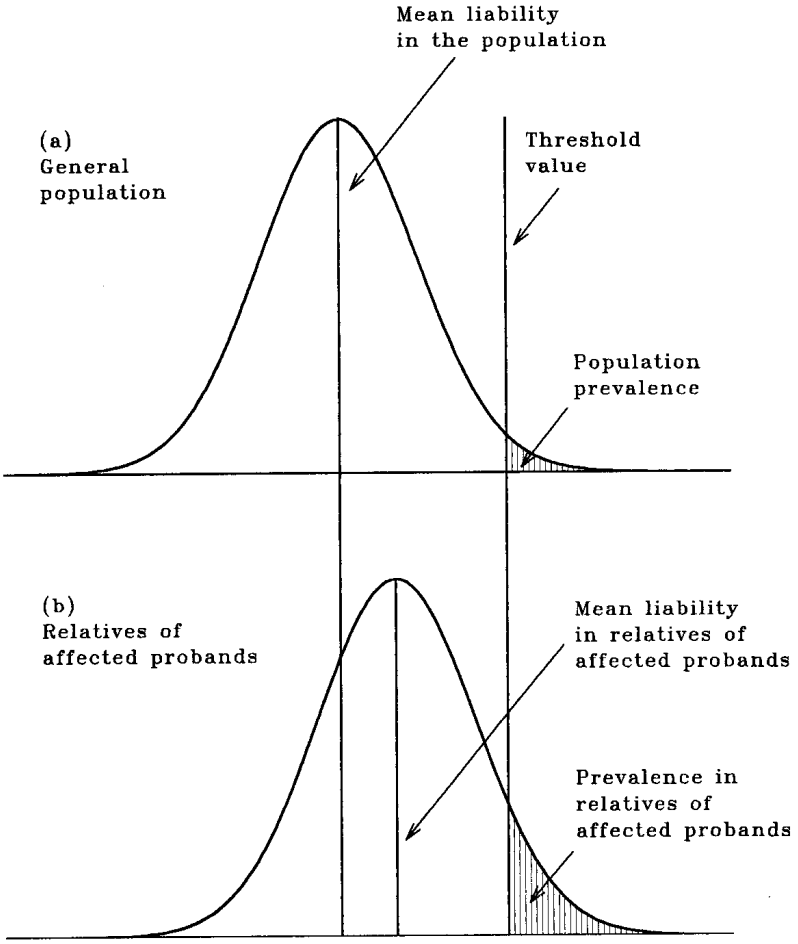
The second Task Group addresses Radiation Effects on the Developing Embryo/Fetus. It studies, among other topics, radiatin cancer risk in utero, deterministic and developmetal effects, issues concerning mental retardation, and intercomparison of data from studies on prenatal x rays and from the atomic bomb survivors. A draft report from this Task Group for possible approval is expected in 2002.

The third Task Group is devoted to Radiation Quality Effects in Radiological Protection. This studies data on RBE and discusses consequences of the change from the Quality factor, Q, used in earlier reports to the Radiation weighting factors, w_R, used in the 1990 Recommendations of ICRP, and possible amendments required in this context. A draft report from the Task Group for possible approval is expected in 2002.

In addition, Committee 1 has Working Parties covering:

- developments in epidemiology,
- animal carcinogenesis,
- cell and molecular biology,
- dosimetry and biophysics,
- radiation vs. chemical carcinogenesis,
- deterministic effects and effects on the developing brain, and
- human and animal genetics.

These Working Parties will continue to uphold their watching brief in the areas mentioned.



Distribution of liability to a multifactorially determined condition or disease according to the Multifactorial Threshold Model. ICRP Publication 83 ,prepared by a Task Group of Committee 1 and printed in 2000, develops this model further to discuss the relevance for radiological protection.
From ICRP Publication 83, Figure 3.1.

Committee 2 (Doses from Radiation Exposures):

Committee 2 is concerned with the development of dose coefficients for the assessment of internal and external radiation exposure, development of reference biokinetic and dosimetric models, and reference data for workers and members of the public.

Committee 2 has two standing Task Groups, on internal dosimetry and on dose calculation, liaises with Committee 3 on a standing Task Group on radiopharmaceuticals, and also had Task Groups on the human alimentary tract and on 'Reference Man' in operation in 2000.

The Task Group structure of Committee 2 is somewhat different from that of the other Committees in that there are two standing Task Groups, INDOS on Internal Dosimetry and DOCAL on Dose Calculations, that collaborate closely on a series of different documents.

In addition, there are Task Groups on the Human Alimentary Tract (HAT) and Reference Man (REM), and special liaison with the Committee 3 standing Task Group on Doses to Patients from Radiopharmaceuticals.

In 2000, an INDOS Manual on the Human Respiratory Tract was approved for publication in the *Annals of the ICRP* as a Committee 2 Technical Document. This manual will help users of ICRP *Publication 66* in practical applications of the 'ICRP Lung Model'. After final QA review, it is expected to be printed around New Year 2002.

A joint INDOS - DOCAL effort, a report on Dose Coefficients for the Embryo and Fetus (after intakes of radionuclides by the mother), had already been approved by the Commission. Some final amendments to the document (which will be printed in 2001) were reported to the Committee.

INDOS - DOCAL work in progress included a document on Transfer of Radionuclides to Breast Milk, a topic that is also of importance in the context of radiopharmaceuticals. A first draft of this report was planned for 2001. On a longer time-scale, a full revision of ICRP *Publications 30, 54, 68,* and *78*, relating doses to intakes of radionuclides for workers and members of the public, is scheduled for completion in connection with the consolidated ICRP Recommendations around 2005.

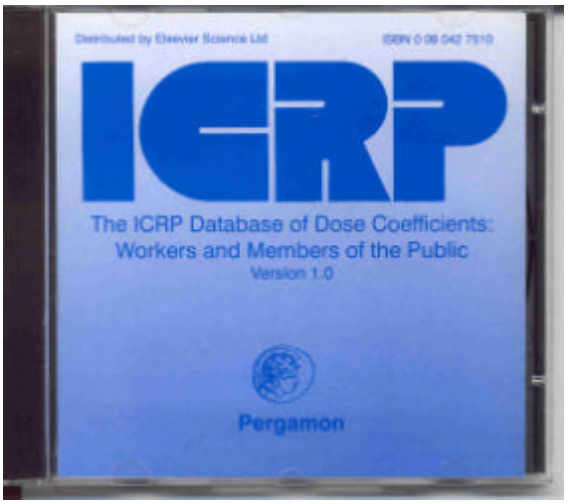
A draft report from the REM Task Group on Basic Anatomical and Physiological Data for Use in Radiological Protection was reviewed. This report will focus on anatomy, physiology, and elemental composition, thus complementing ICRP *Publication 70* (on the skeleton) in supplanting ICRP *Publication 23* on Reference Man. It is scheduled for Main Commission approval in 2001.

The Committee also reviewed a draft report from the HAT Task Group, which will provide dosimetric models and specific transfer values for particular regions such as mouth or stomach. This report will be reviewed again in 2001, if possible with a view to approval at that time.

Furthermore, the DOCAL Task Group presented its discussions on the development of Phantoms for Internal and

External Dosimetry, scheduled to result in a report in 2004, and on Doses from External Exposure, with a similar schedule.

A standing Task Group on 'Radiation doses to patients from radiopharmaceuticals' is operated jointly with Committee 3 and will be discussed under that heading below.



Libraries of dose coefficients for conversion of intake activity to equivalent and effective doses are prepared jointly by the Committee 2 Task Groups DOCAL and INDOS. Electronic availability of such libraries is particularly useful; ICRP CD-ROM 1 with dose coefficients for workers and members of the public (prepared primarily by DOCAL) proved very popular among users in 2000.

Committee 3 (Protection in Medicine):

Committee 3 is concerned with protection of persons and unborn children when ionising radiation is used for medical diagnosis, therapy, or for biomedical research; also, assessment of the medical consequences of accidental exposures.

Committee 3 has a standing Task Group on radiopharmaceuticals, and also had Task Groups on accident prevention in radiotherapy, on dose management in computed tomography, and on release of patients after therapy with unsealed radioisotopes in operation in 2000.

This Committee has initiated a series of reports aimed specifically at medically oriented readers and focusing on practical application rather than physical detail. A first report in this series, providing advice on Pregnancy and Medical Irradiation, was in press at the time of the 2000 joint ICRP meetings as ICRP *Publication 84*.

A second report, on Avoidance of Radiation Injuries from Medical Interventional Procedures, had been approved by postal ballot just before the meeting, and will appear in print in 2001.

A further Task Group report in this series concerned Accident Prevention in Radiation Therapy. This was reviewed in detail and prepared for final review by the Main Commission where it was approved as proposed by the Committee. It will be printed in 2001.

A Task Group draft report on Dose Reduction in Computed Tomography was also reviewed in detail. This was found to be in such a good shape that it was referred to the Main Commission, ahead of schedule, and indeed approved as proposed. This report is also expected to be printed in 2001.

The standing Task Group on Radiation Dose from Radiopharmaceuticals presented data for three new pharmaceuticals. The Committee endorsed putting this information onto the ICRP web site, pending accumulation of enough new data to merit a new printed report. Further data of this kind will also be shown on the ICRP web site until there is a sufficient number of new radiopharmaceuticals for a printed publication.

A Task Group on Release of Patients after Therapy with Unsealed Radioisotopes provided an initial draft report for review. A final draft is expected in 2002.

Working Party projects included:

- Principles of Radiological Protection for GPs and Medical Students,
- Radiation Protection in Paediatrics,
- Reference Levels for X-Ray Examinations,
- Genetic Susceptibility to Radiation, and
- Scoring of Radiotherapy Accidents.

Several further topics for possible future inclusion in the Committee's Work-plan were mentioned.

A Committee 3 Task Group on avoidance of radiation injuries from medical interventional procedures pointed out that many clinicians utilising interventional radiology are not aware of the potential for injury from such procedures or the simple methods for decreasing their incidence through dose control strategies. This patient was subjected to coronary angiography and two angioplasty procedures with an assessed cumulative dose of 15,000 to 20,000 mGy 21 months before the photo was taken.

From ICRP Publication 85, frontispiece Figure 1.

Committee 4 (Application of the Commission's Recommendations):

Committee 4 is concerned with providing advice on the application of the recommended system of protection in all its facets for occupational and public exposure. It also acts as the major point of contact with other international organisations and professional societies concerned with protection against ionising radiation.

In 2000, Committee 4 had Working Parties on the control of radiation doses (consolidation of ICRP recommendations), on the ICRP position concerning protection of the environment, and on cosmic ray exposure in aircraft and space flight.

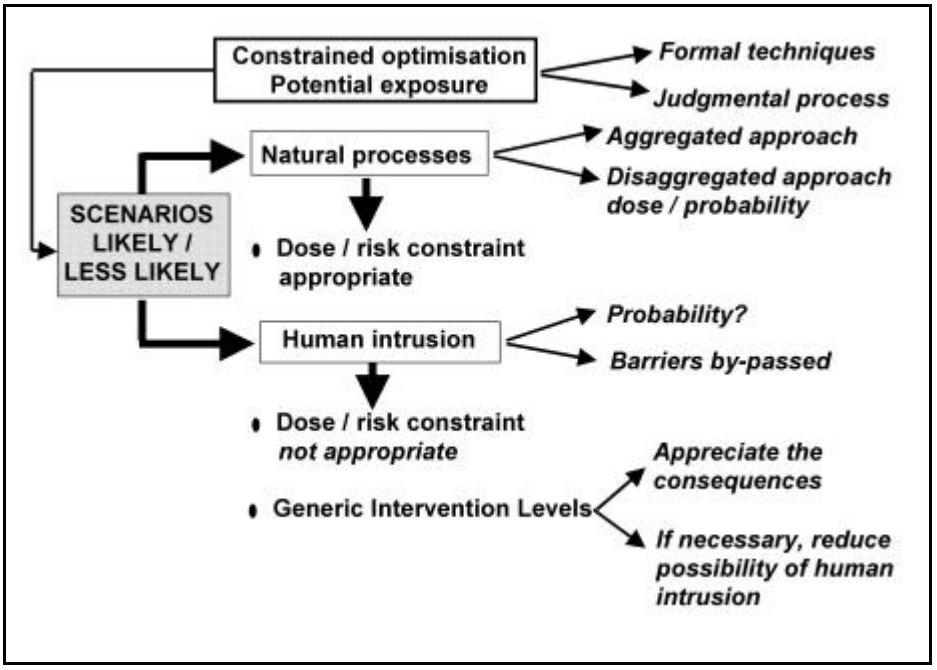
In addition to the general discussion on new ICRP Recommendations held by all Committees, Committee 4 specifically discussed the report of its Working Party on the Control of Radiation Doses. That report, intended as an input to the deliberations on consolidated Recommendations, provided detailed comments on the concepts of:

- justification,
- optimisation,
- limitation,
- collective dose,
- critical group and reference individuals,
- categories of exposure, and
- practices and intervention.

A Working Party of Committee 4 provided a final report concerning the Commission's statement (in ICRP *Publication 60*) on Protection of the Environment. This discussed possible aims for protection of the environment, possible criteria, and the interpretation of terms such as biodiversity. Since the Main Commission had now launched a Task Group on this topic, with the Working Party chairman as one of its members, the Working Party was disbanded and its report was forwarded as input to the Task Group.

Another Working Party had studied Cosmic Ray Exposure in Aircraft and Space Flight, and delivered a final report that provided a host of observations and issues that should be addressed in this context.

The Committee felt that exposure in aircraft and in space flight should be treated separately, and requested that before dissolving, the Working Party would prepare a proposal for a Task Group on Radiation Exposure in Space Flight (to be considered at the 2001 meeting of ICRP).



The disposal of long-lived solid radioactive waste, a major issue in contemporary radiological protection, is discussed in ICRP Publication 81. This report, prepared by a Committee 4 Task Group, was printed in 2000. The figure above identifies the various possible methodological options to be considered when the radiological acceptability of a waste disposal option is evaluated through constrained optimisation.

From ICRP Publication 81,, figure 2.

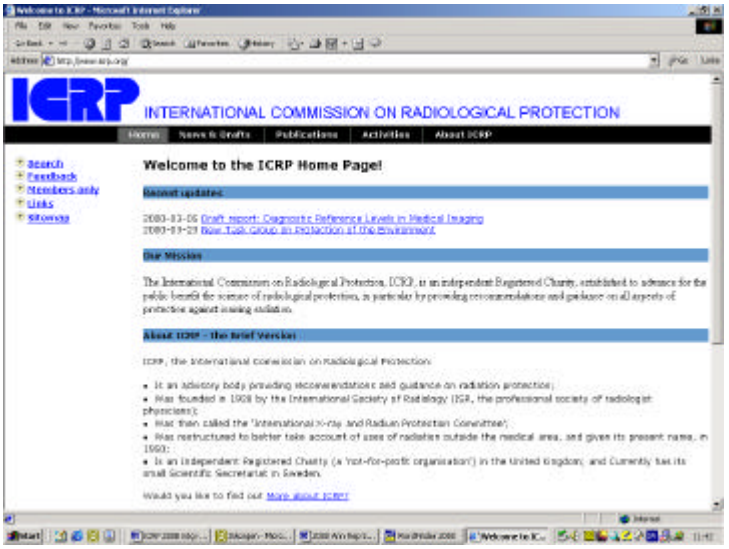
The Scientific Secretariat

The Scientific Secretariat is currently situated in Stockholm, Sweden. The seat of ICRP remains in the United Kingdom where ICRP is a Registered Independent Charity.

Tasks of the Secretariat include preparations for and organisation of meetings, final editing of reports for publication in the *Annals of the ICRP*, maintenance of contacts with all collaborating organisations, and administrative issues.

In 2000, 319 different new matters were filed for action in the Commission's computerised document filing system, an increase by 20% compared to 1999 reflecting the increased accessibility of ICRP through its Internet presence. 32 matters that had been filed but not completed in 1999 were also settled. Of the 319 new matters, 13 concerned the Main Commission, 28, 33, 38, and 29 matters concerned Committees 1, 2, 3, and 4 and their Task Groups, and the remaining 258 concerned the Scientific Secretariat. Of the latter, 55 were to do with ICRP Publications (mostly, requests for permission to translate and/or publish ICRP material). 175 were general enquiries to ICRP including 8 draft documents sent to us for consultation, and 28 file items concerned economical matters. 301 of these 319 actions were completed in 2000.

The Secretariat also devoted an increasing part of its efforts to running the ICRP Internet web site. Apart from providing general information about ICRP, the web site has proved particularly useful when ICRP wants to consult on its own draft documents. A drawback was that the resources of the Secretariat were not always quite commensurate with the demand for information and assistance generated through the web site, so that at times, considerable delays in attending to queries from the public were inevitable.



The ICRP web site at www.icrp.org *provides an opportunity to disseminate information about ICRP activities and at the same time to receive comments and questions from interested organisations and persons.*

Contacts, Meetings, etc.

As usual, numerous different contacts were maintained, formally and informally, during the year.

The Chairman, Professor R H Clarke, was invited to a number of occasions and venues, including a meeting with the Korean Minister for Science and Technology and lectures at the Korean Institute of Nuclear Safety (KINS), an International Atomic Energy Agency (IAEA) Conference on the Safety of radioactive waste management and subsequently a scientific forum at the 44th General Conference of IAEA on the same topic and a seminar for IAEA staff, and a special meeting organised by the Committee for Radiation Protection and Public Health of the OECD Nuclear Energy Agency.

Furthermore, the Chairman participated in the annual meeting of the US National Council on Radiation Protection and Measurements, in meetings with the German Commission for Radiological Protection (SSK) and with the Swedish Radiation Protection Authority (SSI) as well as in meetings with officials from US regulatory authorities including the Nuclear Regulatory Commission (NRC), the Environmental Protection Agency (EPA), and the Department of Energy (DoE), as well as meetings with the Swiss-German Fachverband für Strahlenschutz (FS) and with the US Health Physics Society (HPS).

In addition, the Vice-Chairman, Professor Meinhold, the Scientific Secretary, Dr Valentin, and members of the Commission represented ICRP in meetings of various kinds with IAEA, the International Commission on Radiation Units and Measurements (ICRU), the International Radiation Protection Association (IRPA), the International Society for Radiology, the OECD Nuclear Energy Agency, the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the World Congress on Medical Physics and Biomedical Engineering and the European Congress on Medical Physics, and the World Health Organization (WHO).

They also took part in many meetings with national regulatory organisations, research establishments, and professional societies, particularly in the United States where the annual meeting of ICRP was held in Leesburg, VA and Bethesda, MD. US contacts included NRC, EPA, DoE, and the Center for Devices and Radiological Health of the Food and Drug Administration (FDA/CDRH), as well as the National Cancer Institute (NCI), NCRP, and HPS (where the Scientific Secretary was the R S Landauer awardee).

In line with standard ICRP procedure, ICRP also invited representatives of authorities, professional societies, and other bodies interested in radiological protection to a briefing session in connection with the annual ICRP meeting. The overwhelming turnout, on a Friday afternoon immediately preceding a long weekend holiday, and the many questions, comments, and suggestions during the session again proved that such contact opportunities are highly appreciated and useful.

ICRP also continued its relationship with the International Electrotechnical Commission (IEC) and the International Standards Organization (ISO), primarily through exchange of draft reports and information. On a number of occasions when ICRP was unable to send a formal representative, we arranged to obtain observers' reports so as to keep abreast with developments.

There was also a brisk demand for informal enlightenment and information via telephone, e-mail, and regular mail to the Secretariat.

ICRP Publications, etc., printed in 2000

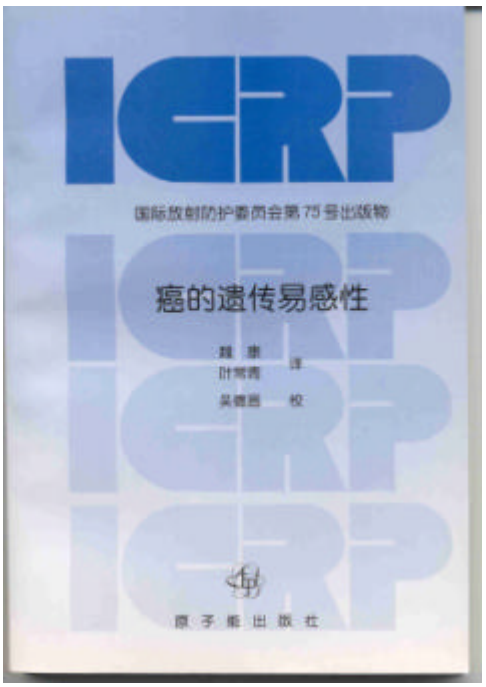
ICRP. Radiation protection recommendations as applied to the disposal of long-lived solid radioactive waste. ICRP Publication 81. *Annals of the ICRP* 28 (4), Pergamon Press, Oxford, UK.

ICRP. Protection of the public in situations of prolonged radiation exposure. The application of the Commission's system of radiological protection to controllable radiation exposure due to natural sources and long-lived radioactive residures. ICRP Publication 82. *Annals of the ICRP* 29 (1-2), Pergamon Press, Oxford, UK.

ICRP. Risk estimation for multifactorial diseases. ICRP Publication 83. *Annals of the ICRP* 29 (3-4), Pergamon Press, Oxford, UK.

ICRP. Pregnancy and medical radiation. ICRP Publication 84. *Annals of the ICRP* 30 (1), Pergamon Press, Oxford, UK.

Through the kind assistance of the French Institut de Protection et de Sûreté Nucléaire, IPSN, the ICRP booklet on the Commission's history, policy, and procedures was translated into French in 2000 and is available from IPSN or ICRP as 'ICRP: Historique, politiques et methods de la CIPR'.



Most ICRP reports are translated into Chinese and Japanese and selected reports are also translated into a multitude of other languages .The Chinese version of ICRP Publication 79, above, was printed in 2000.

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Restricted funds, USD 30 000, in support of the 2000 annual meeting of ICRP, were received from US DoE and US NRC.

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Table 1 cont'd: 1997-2001 members

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