

Current and Planned NCRP Activities



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Topics of Discussion



- NCRP's history and mission
- Overview of NCRP's contributions to radiation protection & measurements
 - recent NCRP publications
- NCRP scientific activities
 - current committees
 - planned committees, workshops and meetings
 - NCRP Strategic Program Plan for 2008 - 2010

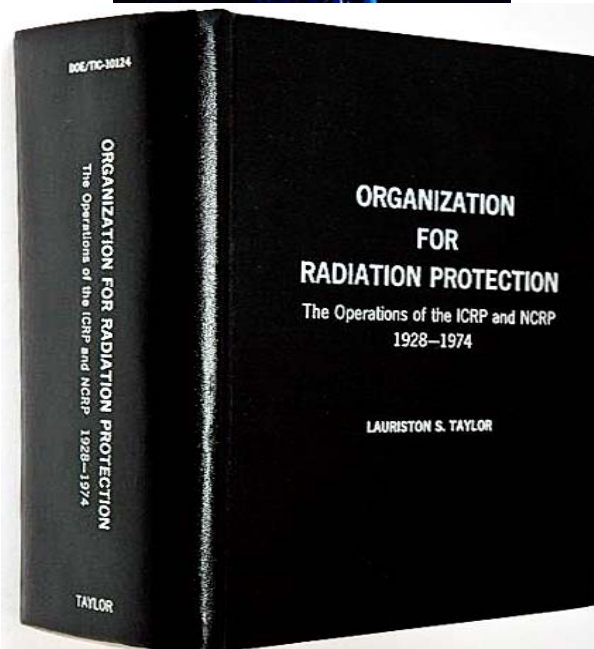
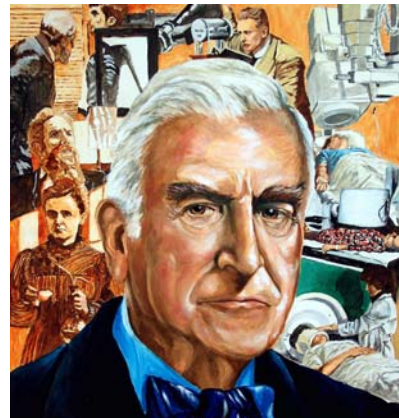
NCRP History



1929: U.S. Advisory Committee on X-ray and Radium Protection

1946: U.S. National Committee on Radiation Protection

1964: National Council on Radiation Protection and Measurements (NCRP) chartered by U.S. Congress (Public Law 88-376)



Key Elements of NCRP's Charter Under U.S. Public Law 88-376



- **Cornerstones of role in radiation health protection:**
 1. *Collect and analyze* information and recommendations in the public interest about:
 - protection against radiation; and
 - radiation measurements, quantities and units.
 2. *Develop* basic concepts of radiation protection;
 3. *Facilitate* effective use of combined resources of organizations concerned with radiation protection; and
 4. *Cooperate* with national and international governmental and private organizations; and
 5. *Disseminate* the Council's work.

Overview of NCRP's Contributions to Radiation Protection and Measurements



- Publication of 122 reports and 91 other documents (commentaries, statements, conference proceedings, Taylor lectures, President's reports)
- Significant contributions to radiation health protection in several major areas:
 - basic exposure criteria and scientific basis;
 - population exposures;
 - radiation protection practices in industry and medicine;
 - environmental radiation and radioactive waste issues; and
 - radiation measurements and dosimetry.

Recent NCRP Publications

- Selected Titles (2006 & 2007):
 - **Report No. 155**: *Management of Radionuclide Therapy Patients*
 - **Report No. 156**: *Development of a Biokinetic Model for Radionuclide-Contaminated Wounds and Procedures for Their Assessment, Dosimetry and Treatment*
 - **Report No. 157**: *Radiation Protection in Educational Institutions*
 - **Report No. 158**: *Uncertainties in the Measurement and Dosimetry of External Radiation Sources*
 - **Commentary No. 20**: *Radiation Protection and Measurement Issues Related to Cargo Scanning with Accelerator-Produced High-Energy X Rays*
 - **2006 Annual Meeting**: *Chernobyl at Twenty* [(Health Physics 93(5): 345-595 (2007)]



Recent NCRP Publications

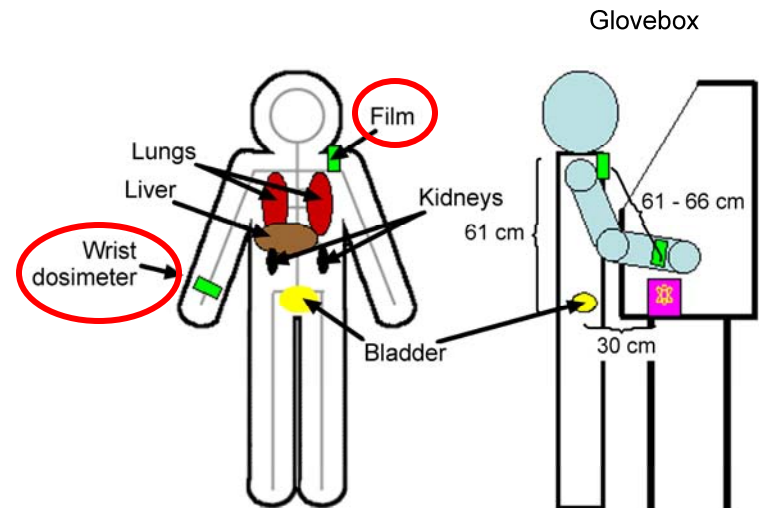
- **Report No. 158:** *Uncertainties in the Measurement and Dosimetry of External Radiation Sources* (Chairman, Harold Beck)



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NCRP REPORT No. 158

UNCERTAINTIES IN THE
MEASUREMENT AND
DOSIMETRY OF EXTERNAL
RADIATION



Recent NCRP Publications

- **Commentary No. 20:** *Radiation Protection and Measurement Issues Related to Cargo Scanning with Accelerator-Produced High-Energy X Rays* (Chairman, Les Braby)



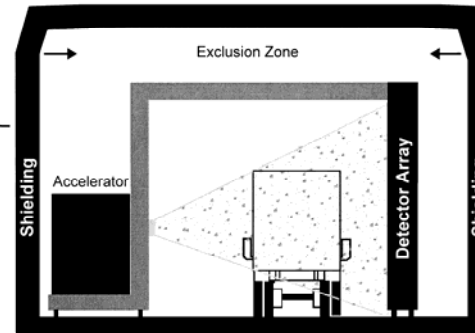
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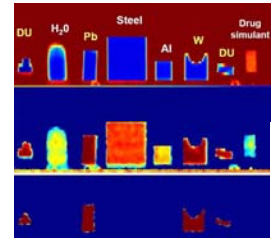
NCRP COMMENTARY No. 20

RADIATION PROTECTION
AND MEASUREMENT ISSUES
RELATED TO CARGO SCANNING
WITH ACCELERATOR-PRODUCED
HIGH-ENERGY X RAYS

$\leq 0.5 \mu\text{Sv}$
in an hour



$\leq 0.5 \mu\text{Sv}$
in an hour



National Council on Radiation Protection and Measurements



Current NCRP Activities

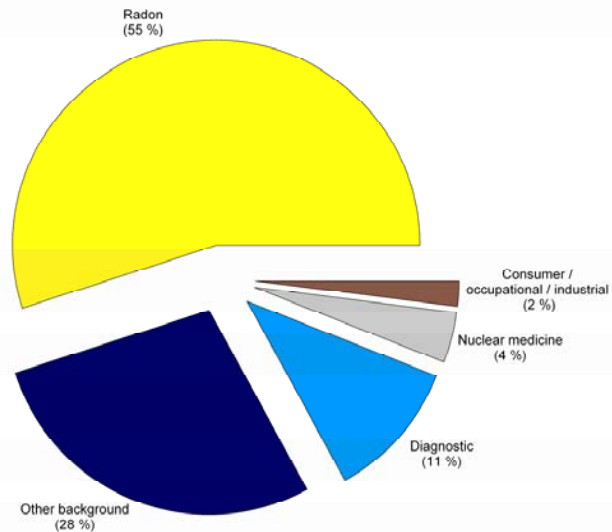


- Forthcoming NCRP publications (2008):
 - Report on *Risk to the Thyroid from Ionizing Radiation*
 - Report on *Management of Persons Contaminated with Radionuclides (Update of Report No. 65)*
 - Report on *Ionizing Radiation Exposure of the United States Population (Update of Report No. 93)*
 - Proceedings of 2007 NCRP Annual Meeting on *Advances in Radiation Protection in Medicine* (to be published in *Health Physics* in 2008)
- Selected Scientific Committees:
 - SC 2-2: “Key Decision Points and Information Needed by Decision Makers in the Aftermath of a Nuclear or Radiological Terrorism Incident”
 - SC 2-3: “Radiation Safety Issues for Image-Guided Interventional Medical Procedures”
 - SC 4-4: “Risks of Radiation to the Developing Embryo, Fetus and Nursing Infant” (Update of Report No. 54)

Preliminary Estimate of Changes in Radiation Exposure to US Population: All Exposures

US 1982*

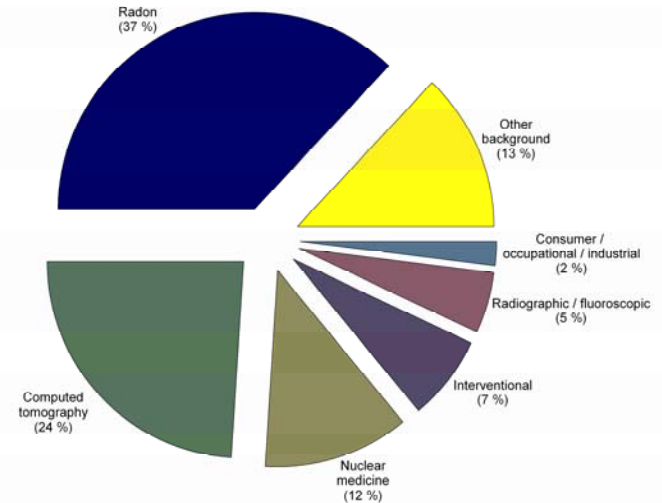
S or E_{US} (percent of total), early 1980s



Medical 0.53 mSv per capita
Total 3.6 mSv per capita

US 2006

S or E_{US} (percent of total), 2006



Medical ~3 mSv per capita
Total ~6 mSv per capita

These results have not been reviewed and approved by Council.
 Not to be disseminated or referenced

Preliminary Estimate of Radiation Exposure to US Population - Medical Exposures



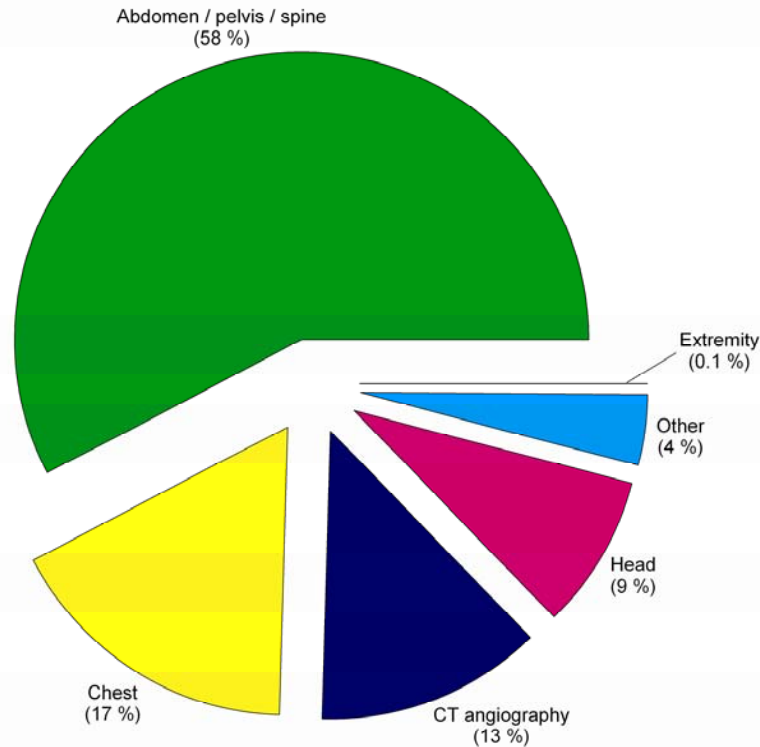
	Number of Procedures (millions)	%	Collective Effective Dose (person Sv)	%	E_{US} (mSv)
Computed Tomography	67	17	438,000	49	1.5
Nuclear Medicine	18	5	231,000	26	0.8
Interventional	17	4	128,000	14	0.4
Conventional Radiography & Fluoroscopy	292	74	99,000	11	0.3
TOTALS	426	100	898,000	100	~3

(600 % increase)

*Data in NCRP publications are considered preliminary until reviewed and approved by Council.

CT: Collective Dose

Computed Tomography
S (percent), 2006



Collective dose
Effective dose per capita

~438,000 person Sv
~1.5 mSv

These results have not been reviewed and approved by Council.
Not to be disseminated or referenced

Collaborative Efforts Related to Radiation Protection in Medicine



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- “American College of Radiology White Paper on Radiation Dose in Medicine,” *JACR* 4, 272-284 (2007).
- Medical Imaging and Technology Alliance. “How Innovations in Medical Imaging Have Reduced Radiation Dosage” (see www.medicalimaging.org)
- WHO Global Initiative on Radiation Safety in Health Care Settings
 - role of *justification* in medical imaging



World Health Organization

Global Initiative on Radiation Safety in Health Care Settings

Cross-cutting Issues:

Justification

- Referral guidelines
- Appropriateness criteria
- Benefit and Risk
- Role of radiological practitioners
- Levels - new technology and individual (patient)
- Opportunistic screening (self referral)
- “Defensive imaging” - potential benefit to the physician, not necessarily to the patient



Major Planned NCRP Activity



- Major report is planned on *Low Dose and Low Dose-Rate Biological Effects and Implications for Human Health*
 - will incorporate results of extensive research on low-dose biological interactions sponsored by U.S. Department of Energy and other organizations worldwide
 - will provide an extension of recently published analyses of low-dose radiation effects in ICRP Publication 99 (2004), the French Academy of Sciences report (2005), and the U.S. National Academy of Sciences BEIR VII report (2006)

Major Planned NCRP Activity

(Potential Effects of Low Dose and Dose-Rate Radiation)

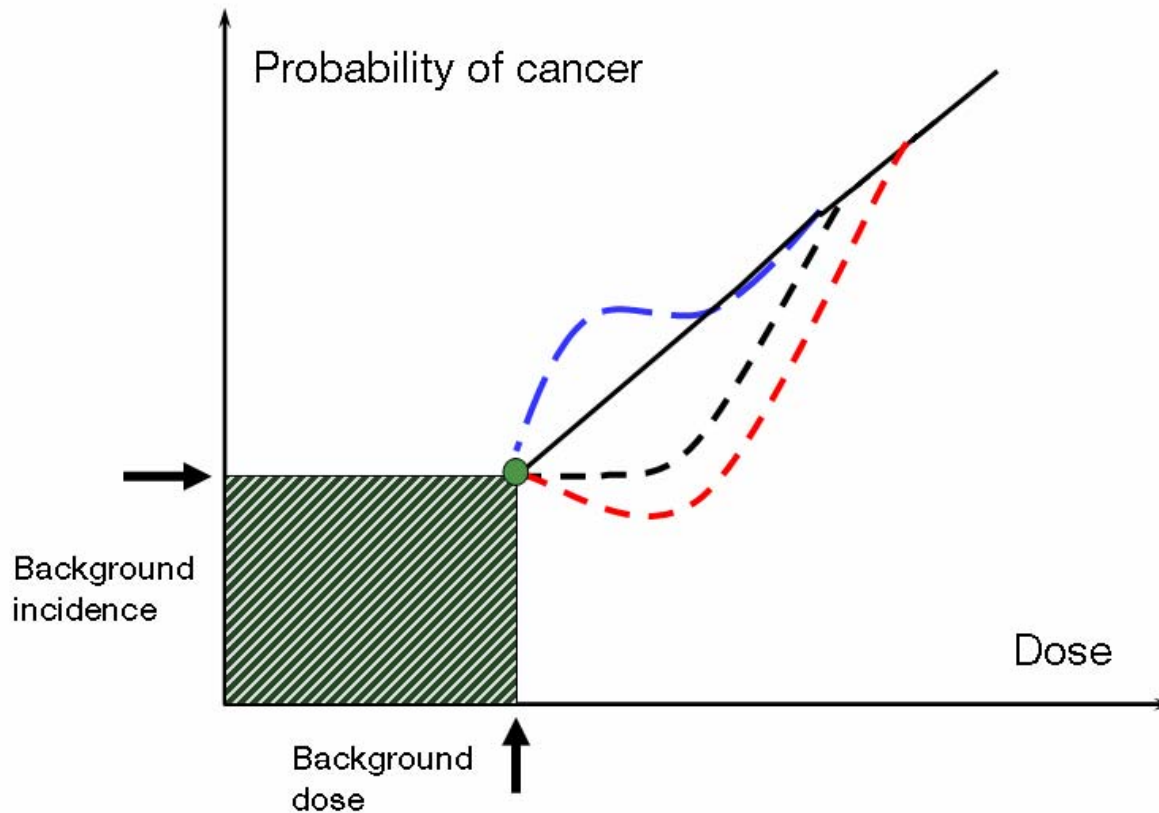


- ICRP Publication 99 (2004)
 - **the LNT hypothesis**, combined with an uncertain DDREF for extrapolation from high doses **remained a prudent basis for radiation protection at low doses and low dose rates.**
- French Academy of Sciences Report (2005)
 - **raised doubts about the validity of using LNT for evaluating carcinogenic risks at low doses.**
 - significant credence was given to cellular responses following irradiation including scavenging reactive oxygen species (ROS), activation of DNA repair systems, and the elimination of damaged cells by apoptosis or mitotic linked cell death.
- U.S. National Academy of Sciences Report (2006)
 - **concluded that the available biological and biophysical data support an LNT risk model (*i.e.*, that the risk of cancer proceeds in a linear fashion at lower doses without a threshold).**
 - thus the smallest dose of radiation has the potential to cause a small increase in risk to humans.

Major Planned NCRP Activity



Dose-Response Relationships



See NCRP Report No. 136 (2001) for a detailed description of the contrasting types of dose-response relationships.

Other Planned NCRP Activities



- Activities are planned to address the following:
 - Report on *Uncertainties in the Estimation of Radiation Risks and Probability of Disease Causation*
 - will include a critical assessment of the Interactive Radio-Epidemiological Program (IREP)
 - Workshop on *Control of CT Doses in Emergency Medicine*
 - collaborative effort supported by ACR, ACEP, AAPM, CDC, EPA and Landauer

2009 Annual Meeting



- *Future of Nuclear Power Worldwide: Safety, Health and Environment* (Chairman, Dr. Corradini, U. of Wisconsin, Madison)
 - key issues to be addressed in the growth of nuclear power worldwide
 - safety & health of workers and members of the public
 - overview of potential environmental issues
 - will be held on March 2-3, 2009 at Bethesda Hyatt
- Register online at:
<http://registration.ncrponline.org>

2010 Annual Meeting



- *Communication of Radiation Benefits and Risks in Decision Making* (Chairman, Dr. Locke, Johns Hopkins)
 - will build on topics discussed at previous NCRP annual meetings, *e.g.*,
 - role of justification in medical imaging
 - will be held on March 8-9, 2010 at Bethesda Hyatt

NCRP Publications



- NCRP reports and current activities are described online at <http://NCRPonline.org>
- Publications can be purchased online at <http://NCRPpublications.org>
- An online discount in the amount of 25 % is available through December 31, 2008 to all attendees of this conference:
 - **masrc08**
- Institutional license agreements are now available through:
 - **Knovel** (<http://www.Knovel.com>)
 - **NetLibrary** (<http://www.NetLibrary.com>)
 - **ebrary** (<http://www.ebrary.com>)