

**NCRP Comments on ICRP 2007  
Recommendations and Ongoing and  
Planned NCRP Reports Related to  
Radiation Protection**



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and Measurements**

**Bethesda, Maryland**

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# Topics of Discussion

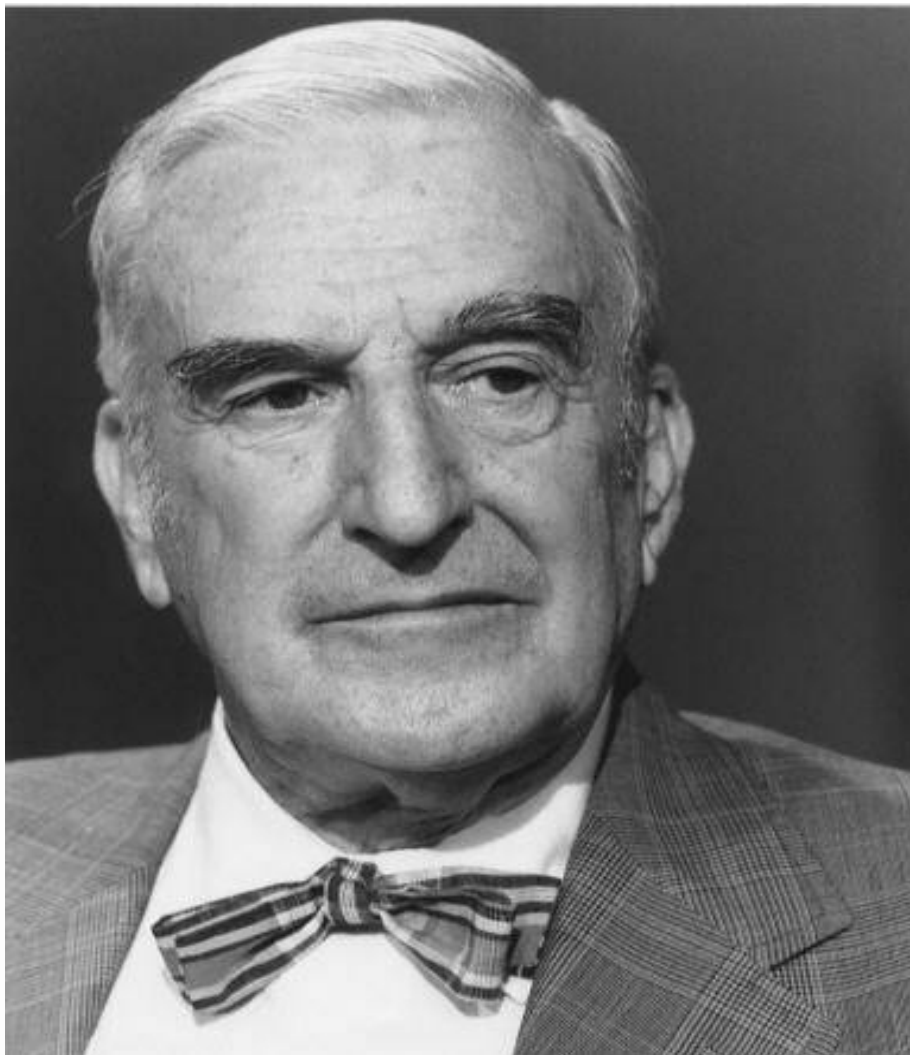


**NCRP**

- **NCRP's history and mission**
- **NCRP comments on updated ICRP 2007 Recommendations**
- **Current and planned NCRP reports related to radiation protection and measurements**



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**Lauriston Sale Taylor**  
**June 1, 1902 – Nov. 26, 2004**

## **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.**

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

- *Cornerstones of role in radiation health protection:*
  - 1) Provide information and recommendations in the public interest about:
    - a) protection against radiation; and
    - b) 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.**



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# NCRP's Contributions to Radiation Health Protection



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*NCRP has had four productive decades since being chartered by Congress in 1964 --*

- Publication of 126 reports and 97 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.**

# NCRP Comments on 2007 ICRP Recommendations



- ICRP is congratulated on a significant effort to update recommendations of Publication 60
- Improvements in clarity of exposure guidance and applications are notable
- Continued endorsement of three key principles of radiation protection is strongly supported by NCRP:
  - Principle of **justification** (benefit *versus* risk of exposure)
  - Principle of **optimization** of exposure (ALARA)
  - Principle of **limitation** of exposure to any person

# NCRP Comments on 2007 ICRP Recommendations (con't.)



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- Focus on **“optimization”** and **“limitation”** of exposure **for nominal individual** (“Reference Person”) in various specific exposure situations is considered appropriate
- Consideration of **exposure situations** (existing, planned, and emergency) is an advance over previous exposure categories of practices and interventions
- Recommended **use of effective dose as a radiation protection quantity** on the basis of reference values, and not for epidemiological evaluations or for retrospective investigations of individual exposure or risk, is considered appropriate

# NCRP Comments on 2007 ICRP Recommendations (con't.)



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- Application of **effective dose calculations only for optimization purposes**, and not for risk assessment, is strongly supported
- Reevaluation of **risks of breast cancer and heritable disease** is an advance, and the continued use of DDREF of 2 is supported; recommended changes in tissue weighting factors are appropriate
- NCRP strongly supports the need to evaluate the dose-response properties of **noncancer diseases**

# NCRP Comments on 2007 ICRP Recommendations (con't.)



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- Although revisions have been made in **radiation weighting factors for neutrons**, further work is needed in this area; similarly, evaluation of  $w_R$  for protons and low-energy photons needs to be continued
- Encouragement of efforts to **reduce uncertainties in dosimetry models** and to take individual variations (including fetal/embryo exposures) into account is strongly supported
- Continued use of the **linear non-threshold model** for estimation of risks and radiation protection guidance is considered to be appropriate, but in need of further evaluation based on new research results

# NCRP Comments on 2007 ICRP Recommendations (con't.)



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- The statement for need to **evaluate and control medical exposures** to radiation for diagnostic and therapeutic procedures is considered very appropriate
- The recommended use of **optimization strategies to control residual doses** in various exposure situations (*e.g.*, the cleanup of nuclear sites and recovery from events of nuclear or radiological terrorism) is viewed as essential

# NCRP Comments on 2007 ICRP Recommendations (con't.)



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- The recommendation of a continuing need to evaluate **exposure to natural sources** of radiation, and to implement the optimization principle in controlling exposure to natural sources of radiation such as radon and exposures during special circumstances such as air flight and astronaut space missions, is strongly supported
- The goal of ICRP in recommending a **framework for environmental protection** is admirable, but needs a more comprehensive definition and set of metrics for implementation

# NCRP Comments on 2007 ICRP Recommendations (con't.)



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- The use of **environmental protection guidance** is highly dependent upon the local environment and the range of sensitivity to radiation of local flora and fauna can vary by many orders of magnitude
- Protection of **natural ecosystems** should be based on a local or regional set of recommendations and guidance

# NCRP Reports and Annual Meetings on Radiation Protection and Measurements



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- There are many active NCRP areas of recent, ongoing and future reports and conferences related to radiation protection in occupational, medical, environmental, and public settings
- NCRP reports and current activities are described on website  
<http://NCRPonline.org>
- Publications can be purchased at  
<http://NCRPpublications.org>

# Focal Areas of NCRP Publications Since 2000



NCRP

<b>Topical Areas</b>	<b>Publications</b>
<b>Environmental Radioactive Waste Classification, Management, and Disposition</b>	<b>Reports No. 139, 141, 143, 146, 152, 154; Proceedings of 2005 Annual Meeting</b>
<b>Homeland Security and Management of Radiological Terrorism Incidents</b>	<b>Report 138, Commentaries 16, 17, 19, 20; Proceedings of 2004 Annual Meeting</b>
<b>Basic Radiobiology and Guidance on Exposure Limitations</b>	<b>Reports 131, 132, 135, 136, 137, 150, 153; Proceedings of 2002 and 2003 Annual Meetings; Statement No. 10</b>
<b>Operational Radiation Safety</b>	<b>Reports 134, 142, 144, 157</b>
<b>Radiation Protection in Medicine</b>	<b>Reports 133, 140, 145, 147, 148, 149, 151, 155, 156</b>

# NCRP's Ongoing and Planned Future Reports on Radiation Protection



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- *Focus of recent reports and ongoing preparation of new reports:*
  - radiation management in the environment
  - radiation protection in medicine
  - countermeasures to nuclear and radiological terrorism incidents
  - evaluation of uncertainties in estimation of external and internal radiation exposures
  - principles and practices in radiation dose assessment and reconstruction
  - characterization of population exposures

# NCRP's Ongoing and Planned Future Reports on Radiation Protection (con't.)



- ***Recent NCRP publications:***
  - **Report No. 154: Cesium in the Environment: Radioecology and Approaches to Assessment and Management (2006)**
  - **Report No. 155: Management of Radionuclide Therapy Patients (2006)**
  - **Report No. 156: Development of Biokinetic Model for Radionuclide-Contaminated Wounds and Procedures for Their Assessment, Dosimetry and Treatment (2006)**
  - **Proceedings of the 2006 NCRP Annual Meeting on “Chernobyl at Twenty” [published in *Health Physics* Vol. 93(5), 2007]**

# NCRP's Ongoing and Planned Future Reports on Radiation Protection (con't.)

- *Forthcoming NCRP reports:*

- Report No. 158 on “Uncertainties in the Measurement and Dosimetry of External Radiation Sources” (2007)
- Commentary No. 20: “Radiation Protection and Measurement Issues Related to Cargo Scanning with High-Energy X Rays Produced by Accelerators” (2007)
- Report on “Uncertainties in Internal Radiation Dosimetry”
- Report on “Principles and Practices in Radiation Dose Reconstruction”
- Report on “Risk to the Thyroid from Ionizing Radiation”
- Report on “Management of Persons Contaminated with Radionuclides”



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# NCRP's Ongoing and Planned Future Reports on Radiation Protection (con't.)



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- *Forthcoming NCRP reports (con't.):*
  - Report on “Population Monitoring and Decontamination Following a Nuclear or Radiological Incident”
  - Report on “Key Decision Points and Information Needed by Decision Makers in the Aftermath of a Nuclear or Radiological Terrorism Incident”
  - Proceedings of 2007 NCRP Annual Meeting on “Advances in Radiation Protection in Medicine” (to be published in *Health Physics* in 2008)
  - Report on “Ionizing Radiation Exposure of the United States Population”

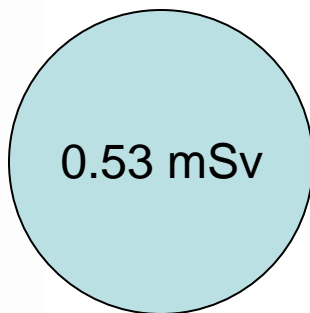
# NCRP's Ongoing and Planned Future Reports on Radiation Protection (con't.)

## Report on "Ionizing Radiation Exposure of the U.S. Population"

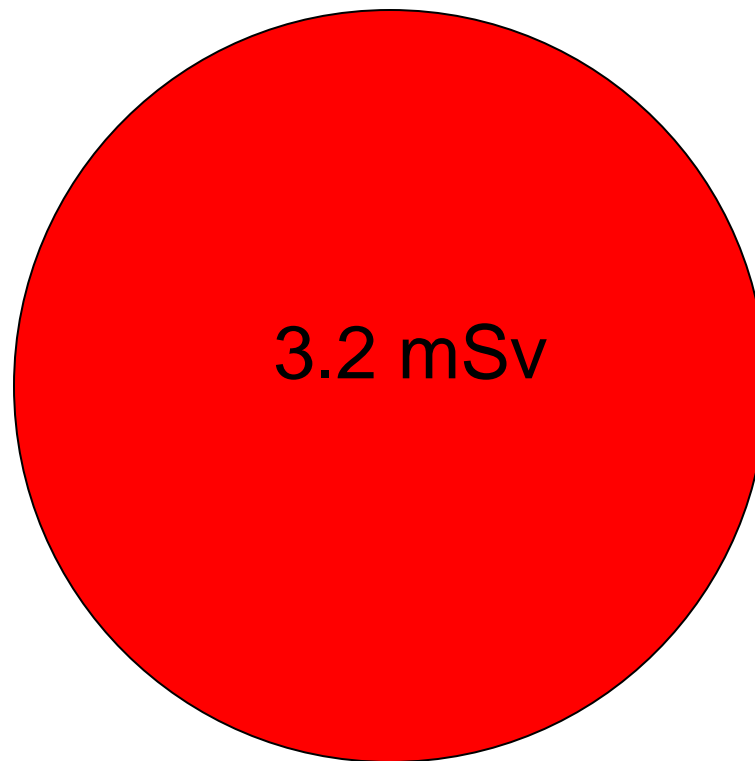
Per capita radiation dose from medicine has increased by ~ 6



**NCRP**



$\times 6.0 =$



**Early 1980s**

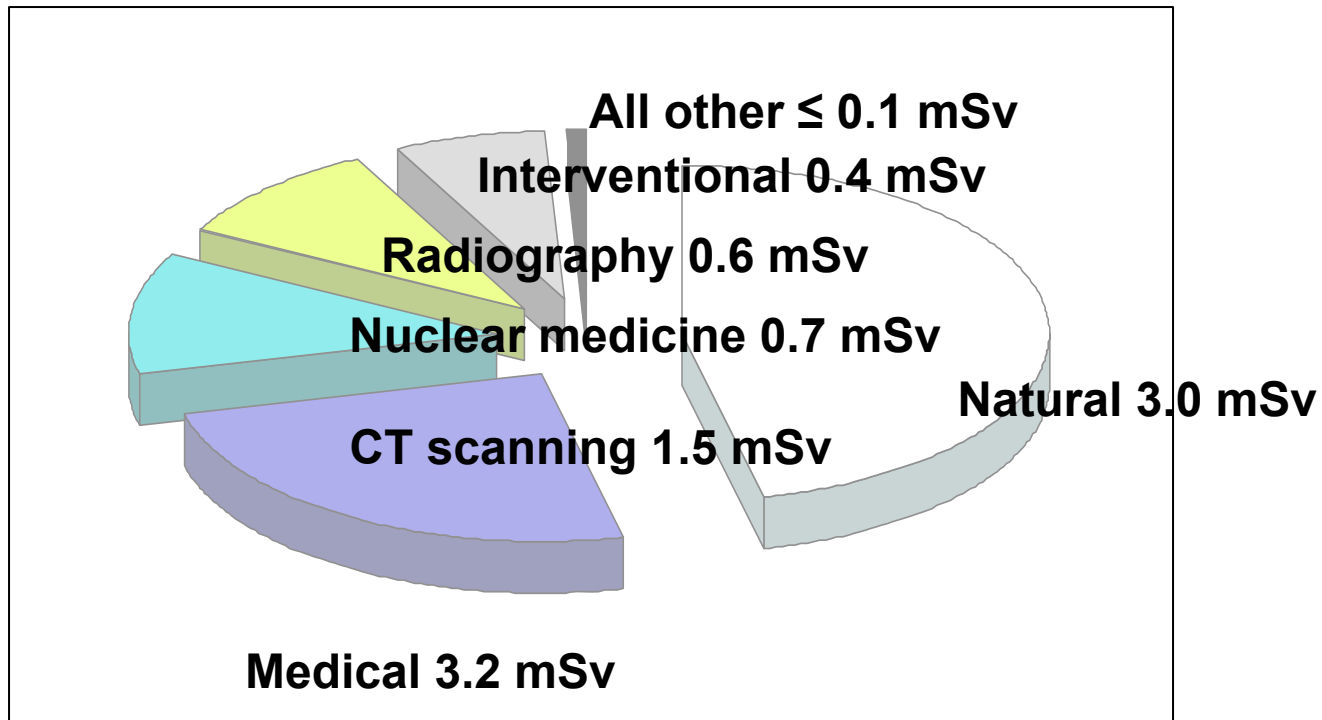
**2006**

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

# Preliminary Estimate of Sources of Radiation Exposures to U.S. Population in 2006



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**Total Average Annual Exposure ~ 6.3 mSv per capita**

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

# Focus of NCRP Plans for Future Conferences and Reports Related to Health Protection



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- **Next NCRP Annual Meeting will be held on April 14-15, 2008 at the North Bethesda Marriott Hotel on the subject “Low Dose and Low Dose-Rate Radiation Effects and Models” (see NCRP website at <http://NCRPonline.org> for meeting details)**
  - review of molecular, cellular, tissue and animal experiments involving low radiation doses**
  - epidemiological studies on human health effects of low radiation doses**
  - potential impacts of scientific findings on future regulatory guidance and public health policy on radiation exposure**

# Focus of NCRP Plans for Future Conferences and Reports Related to Health Protection (con't.)



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- 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 build on and extend analyses of low-dose radiation effects contained in ICRP Publication 99 (2004), the French Academy of Sciences report (2005), and the U.S. National Academy of Sciences BEIR VII report (2006)

# Focus of NCRP Plans for Future Conferences and Reports Related to Health Protection (con't.)



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- Report on *Uncertainties in the Estimation of Radiation Risks and Probability of Disease Causation*
- Report on *Risks of Radiation to the Developing Embryo, Fetus and Nursing Infant*
- Conference on *Control of CT Doses in Conventional Imaging and Applications in Emergency Medicine*
- Report on *Biological Effectiveness of Photons and Particle Radiations Over a Wide Range of Energies, Doses and Dose Rates*
- Report on *Approach to Optimizing Decision Making for Late Phase Recovery from Nuclear or Radiological Terrorism Incidents*

# Closing Remarks



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**On behalf of NCRP I thank the conference organizers for inviting me to present comments on the 2007 ICRP Recommendations and to discuss NCRP's related work and future plans**