Current & Planned NCRP Activities

David A. Schauer

Executive Director

National Council on Radiation Protection and Measurements

Bethesda, Maryland

Presentation at 2008 BWCHPS Annual Meeting*

May 15, 2008

Happy 50th – November 18, 1958 (date of formal certification as the first Chapter of the HPS)

Topics of Discussion

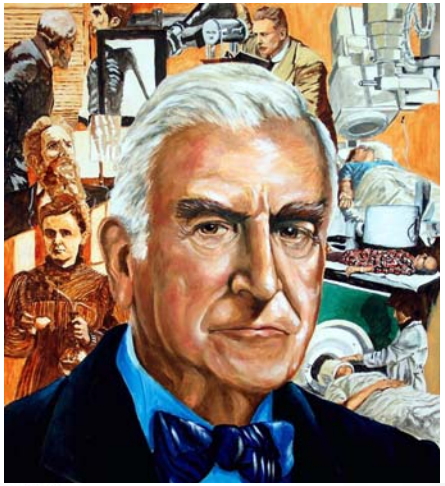
- NCRP's history & mission
- Overview of NCRP's contributions to radiation protection & measurements
  - Focus and titles of recent publications
- NCRP activities
  - Current scientific committees
  - Planned committees and meetings
    - NCRP Strategic Program Plan for 2008 to 2010

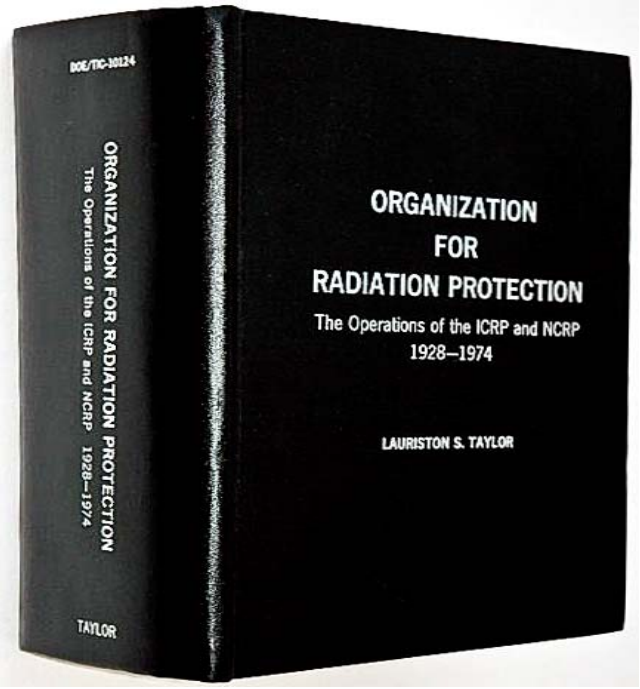
NCRP History

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

1946: U.S. National Committee on Radiation Protection

1964: National Council on Radiation Protection & 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. 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.

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

- Focus of recent reports:
  - environmental radiation
  - radiation protection in medicine
  - operational health physics
  - countermeasures to nuclear and radiological terrorism incidents

Recent NCRP Publications

- Titles (2006 & 2007):
  - **Report No. 154**: *Cesium in the Environment: Radioecology and Approaches to Assessment and Management*
  - **Report No. 155**: *Management of Radionuclide Therapy Patients*
  - **Report No. 156**: *Development of Biokinetic Model for Radionuclide-Contaminated Wounds and Procedures for Their Assessment, Dosimetry and Treatment*
  - **Report No. 157**: *Radiation Protection in Educational Institutions*
  - **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)]

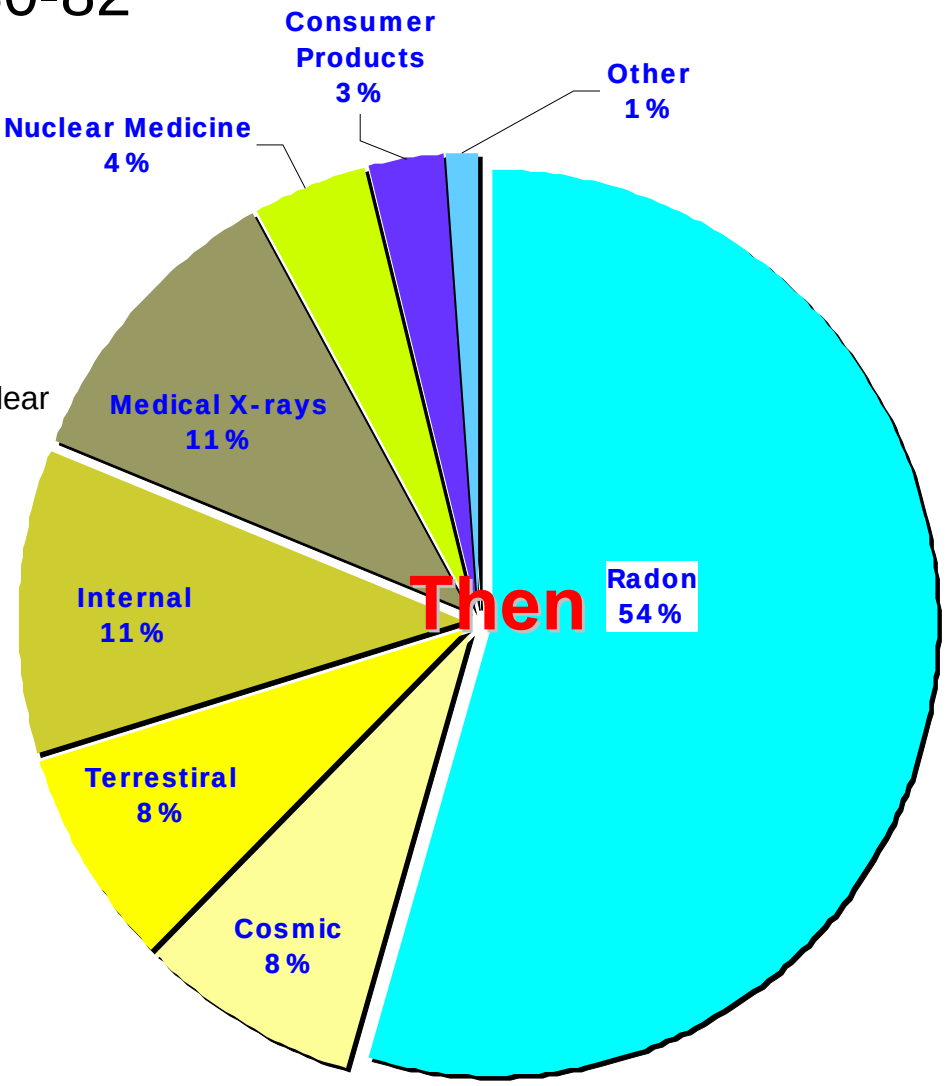
Current NCRP Activities

- Forthcoming NCRP publications (2008):
  - **Report No. 158**: *Uncertainties in the Measurement and Dosimetry of External Radiation Sources*
  - Report on *Risk to the Thyroid from Ionizing Radiation (Update of Report No. 80)*
  - 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)

NCRP Report No. 93*: Annual effective dose equivalent to US population circa 1980-82

- Natural Sources 3.0 mSv
  - Radon 2.0 mSv
  - Other 1.0 mSv
- Man-made Sources 0.6 mSv
  - Occupational, Consumer products, nuclear fuel cycle and other miscellaneous products 0.07 mSv
  - Medical 0.53 mSv
    - X-rays 0.39 mSv
    - NM 0.14 mSv

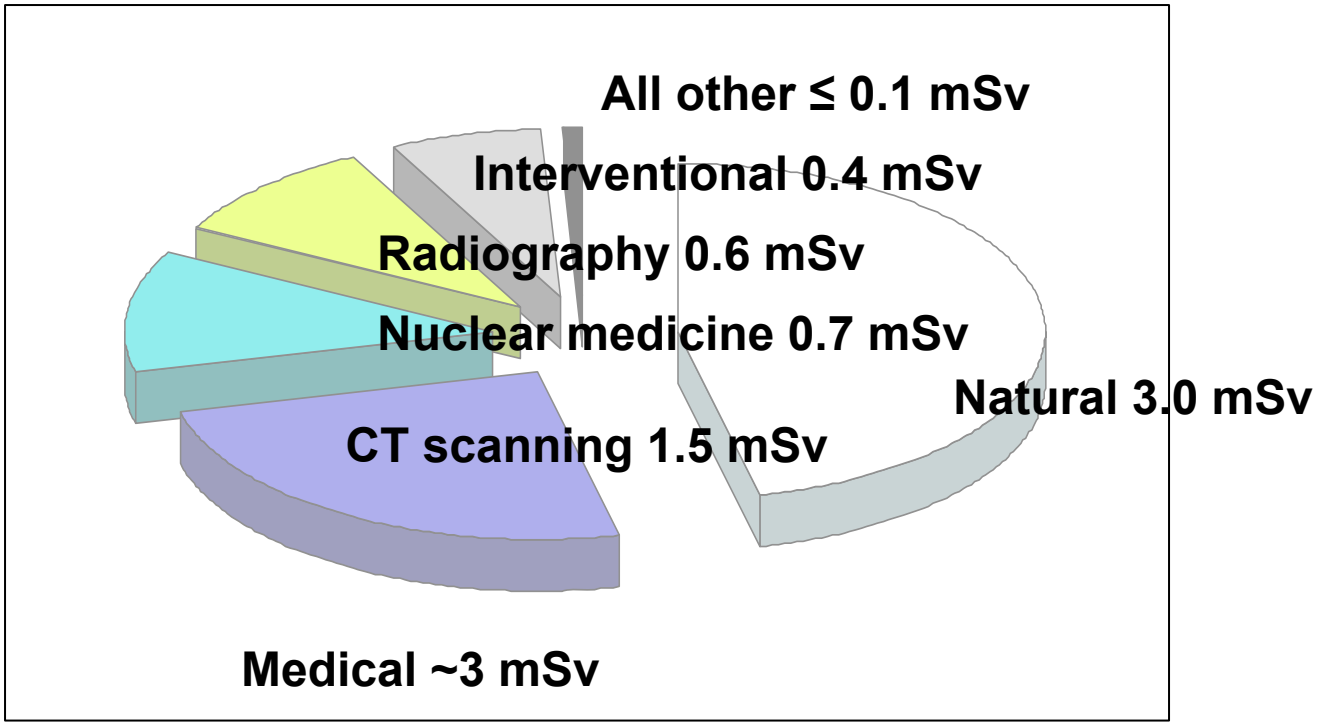
3.6 mSv y^{-1}



Natural	**82%**
Man-made	**18%**

*** Published in 1987**

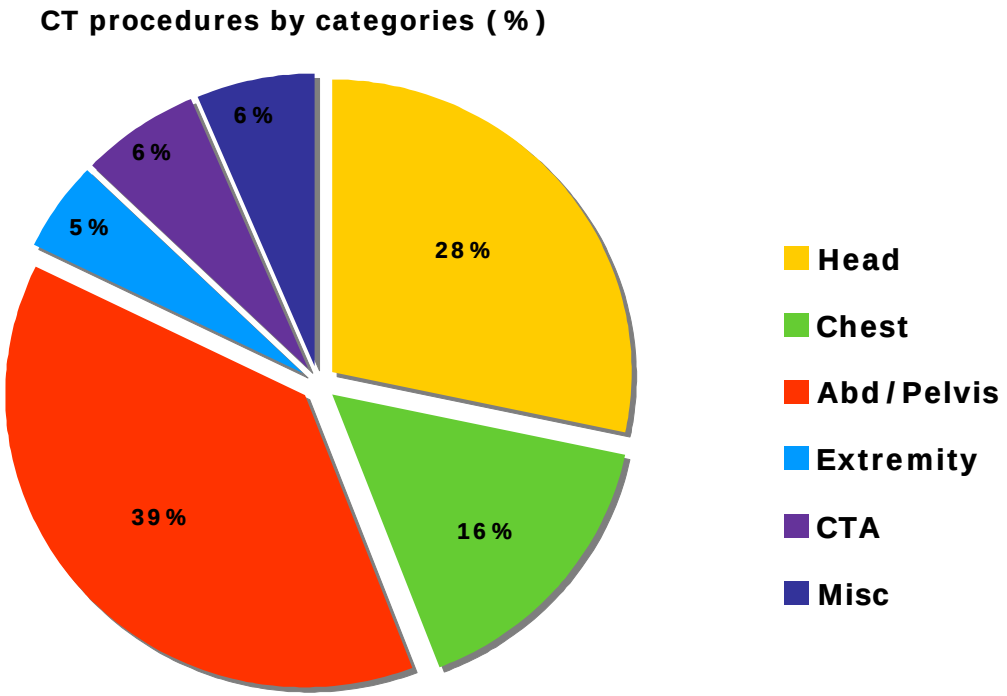
Preliminary Estimate of Sources of Radiation Exposures to U.S. Population in 2006

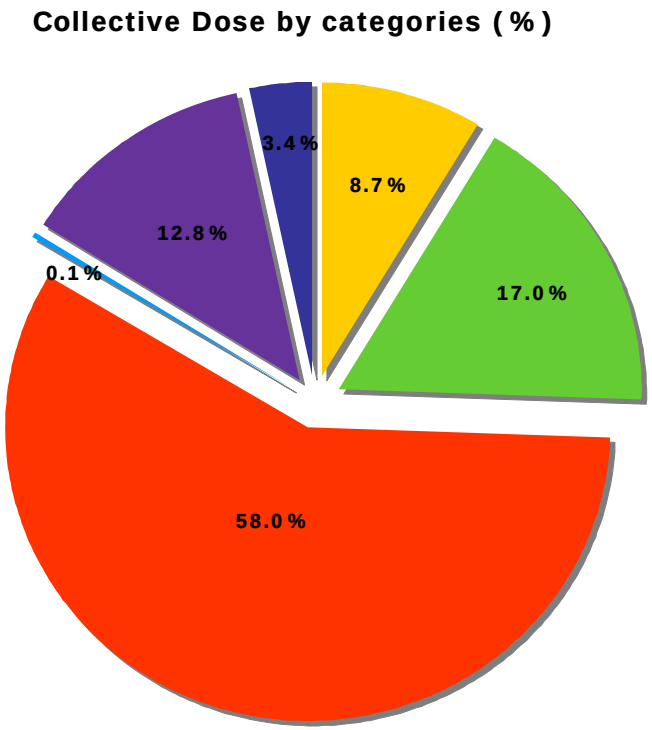


Total Average Annual Exposure ~ 6 mSv per capita

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

CT: Procedures & Collective Dose





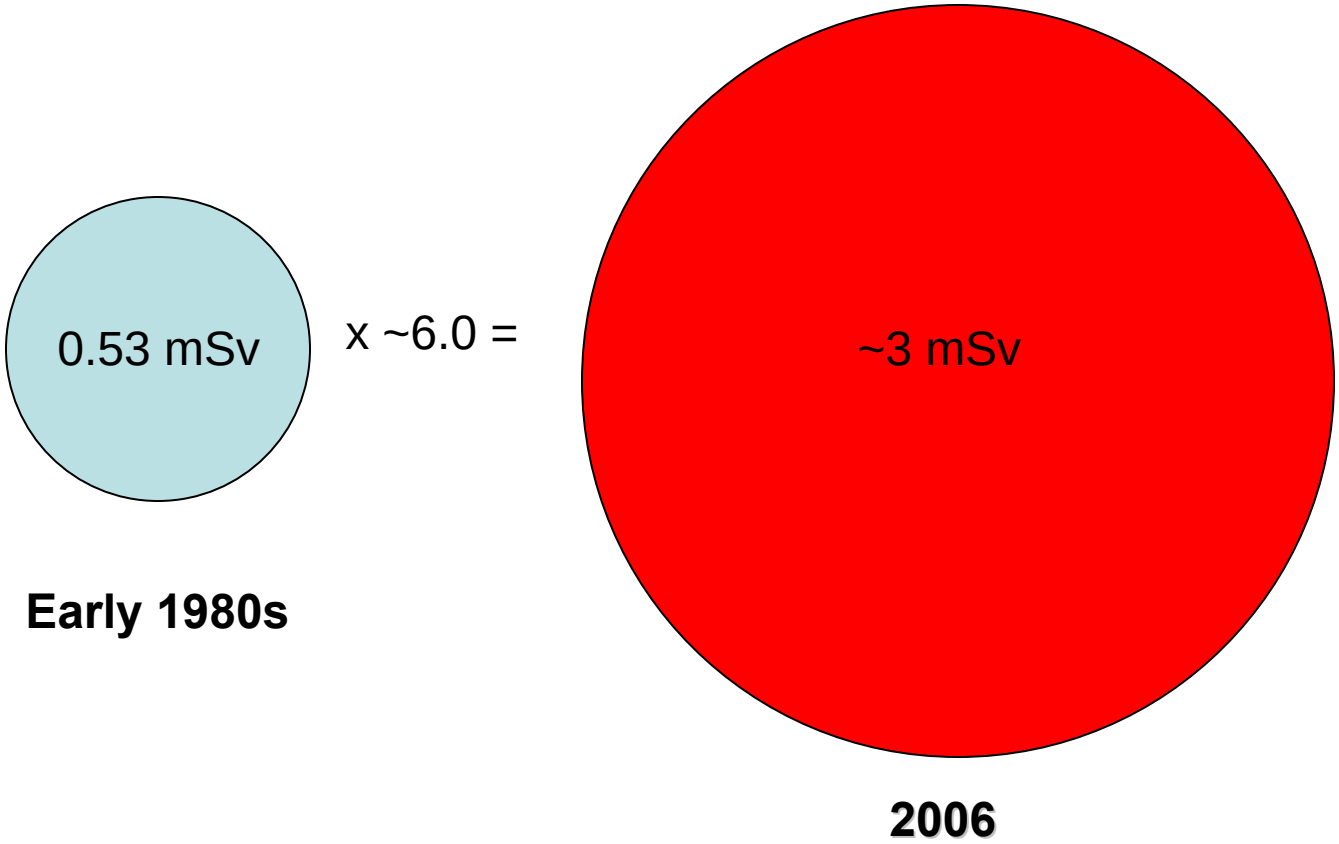
Collective dose **~438,000 person Sv**
Effective dose per capita **~1.5 mSv**

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

Current NCRP Activities

(Report on “Ionizing Radiation Exposure of the U.S. Population”)

Per capita radiation dose from medicine has increased by ~ 6x



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

Additional Thoughts Related to CT Use

- *Potential Impact of the American College of Radiology Appropriateness Criteria on CT for Trauma*
  [Hadley *et al*., AJR **186**, 937–942 (2006)]
  - **RESULTS.** A total of 660 CT examinations were performed for a total charge of $837,028. An estimated effective dose of 16 mSv was sustained by the typical patient in the study. **Overall, application of the ACR criteria was found to have the potential to reduce imaging costs by 39 % and the estimated radiation dose by 44 %.**
  - **CONCLUSION.** The ACR appropriateness criteria have the potential to have a strong positive impact on the overall cost of imaging and radiation dose received for patients in the setting of trauma. These criteria should be emphasized to clinicians to help guide their imaging decisions.
- *Quantitative Assessment of Diagnostic Radiation Doses in Adult Blunt Trauma Patients*
  [Winslow *et al*., Ann. Emerg. Med. (2008) in press]
  - Approaches to decreasing ionizing radiation exposure may include:
    - reducing repeated imaging studies;
    - using lower-dose radiologic imaging techniques;
    - using alternative imaging methods that do not use ionizing radiation (ultrasonography, magnetic resonance imaging); and
    - **returning to an increased reliance on clinical examinations.**

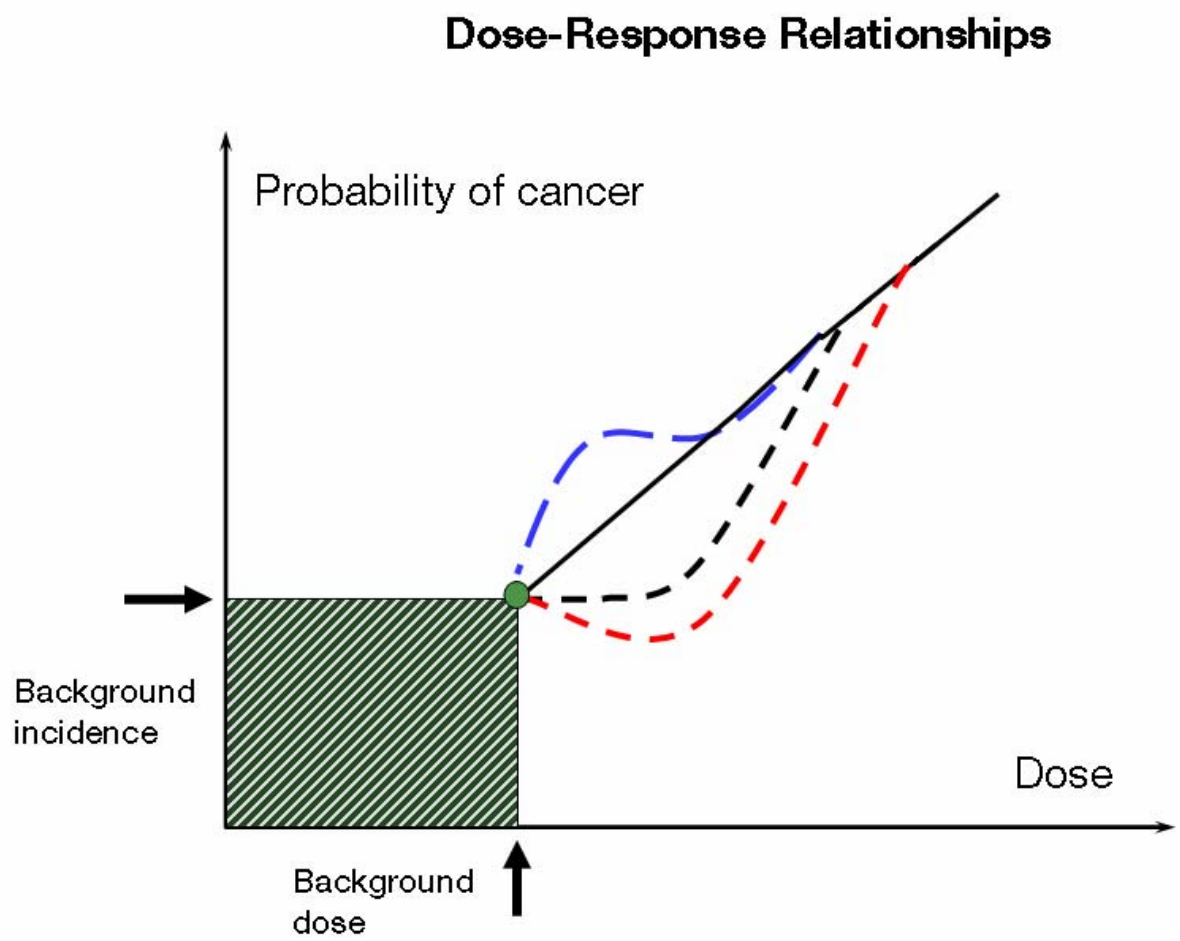
Other Important Collaborative Efforts Related to Radiation Protection in Medicine

- "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)

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 (2005) report, and the U.S. National Academy of Sciences (2006) BEIR VII report

Major Planned NCRP Activity



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

Major Planned NCRP Activity

- ICRP Publication 99 (2004)
  - while the existence of a low-dose threshold did not seem unlikely for radiation related cancers in certain tissues, the evidence did not favor the existence of a universal threshold.
  - 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 (2005) Report
  - 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 (2006) Report
  - objective of this study was to develop the best possible risk estimate for exposure to low-dose, low LET radiation in human subjects.
  - concluded that the available biological and biophysical data supports a 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.

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*
  - Report on *Risks of Radiation to the Developing Embryo, Fetus and Nursing Infant* (Update of Report No. 54)
  - Conference on *Control of CT Doses 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*

NCRP 2009 Annual Meeting

- *Future of Nuclear Power Worldwide: Safety, Health and Environment*
  - perspectives on growth in worldwide use of nuclear power
  - key issues to be addressed in the growth of nuclear power worldwide
    - safety and health of workers and members of the public
    - overview of potential environmental issues
  - will be held on March 2-3, 2009 at the Bethesda Hyatt Hotel

NCRP Publications

- NCRP reports and current activities are described on website http://NCRPonline.org
- Publications can be purchased at http://NCRPpublications.org
- BWCHPS online discount in the amount of 25 % is available through December 31, 2008 to all members:
  - **bwchps08**
- Institutional license agreements are now available through Knovel (http://www.Knovel.com) and NetLibrary (http://www.NetLibrary.com).

BWCHPS History

- April 1958 – First organizational meeting of the Baltimore-Washington Health Physics Association was held.
- Can you name one of the three organizers?