Current and Planned NCRP Activities

David A. Schauer, Executive Director
National Council on Radiation Protection and Measurements
Bethesda, Maryland

Presentation at
2008 Mid-Atlantic States Radiation Conference
September 24 - 25, 2008
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. 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
Recent NCRP Publications

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

• Forthcoming NCRP publications (2008):
  – Report on *Risk to the Thyroid from Ionizing Radiation*

• 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 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*

Medical 0.53 mSv per capita
Total 3.6 mSv per capita

US 2006

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

* NCRP Report No. 93

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

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Number of Procedures (millions)</th>
<th>%</th>
<th>Collective Effective Dose (person Sv)</th>
<th>%</th>
<th>$E_{US}$ (mSv)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computed Tomography</td>
<td>67</td>
<td>17</td>
<td>438,000</td>
<td>49</td>
<td>1.5</td>
</tr>
<tr>
<td>Nuclear Medicine</td>
<td>18</td>
<td>5</td>
<td>231,000</td>
<td>26</td>
<td>0.8</td>
</tr>
<tr>
<td>Interventional</td>
<td>17</td>
<td>4</td>
<td>128,000</td>
<td>14</td>
<td>0.4</td>
</tr>
<tr>
<td>Conventional Radiography &amp; Fluoroscopy</td>
<td>292</td>
<td>74</td>
<td>99,000</td>
<td>11</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>426</td>
<td>100</td>
<td><strong>898,000</strong></td>
<td>100</td>
<td>~3</td>
</tr>
</tbody>
</table>

*(600 % increase)*

*Data in NCRP publications are considered preliminary until reviewed and approved by Council.*
CT: Collective Dose

Computed Tomography
S (percent), 2008

- Abdomen / pelvis / spine (58 %)
- Chest (17 %)
- Head (9 %)
- CT angiography (13 %)
- Extremity (0.1 %)
- Other (4 %)

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.
Collaborative Efforts Related to Radiation Protection in Medicine

- 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
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.

  – 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.
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:
  – ebrary (http://www.ebrary.com)