NCRP PAC 4: Radiation Protection in Medicine

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Overview

- NCRP and PAC 4
- Recent PAC 4 publications
- Reports in preparation

NCRP and PAC 4
Program Area Committees (PACs)

- PAC 1  Basic Criteria, Epidemiology, Radiobiology, and Risk
- PAC 2  Operational Radiation Safety
- PAC 3  Nuclear/Radiological Security and Safety
- **PAC 4  Radiation Protection in Medicine**

Program Area Committees (PACs)

- PAC 5  Environmental Radiation and Radioactive Waste Issues
- PAC 6  Radiation Measurements and Dosimetry
- PAC 7  Radiation Education, Risk Communication, Outreach, and Policy

PAC 4 Responsibilities

Radiation protection in medicine

- Radiation protection of patients in medical, dental, and chiropractic practice
- Examining and evaluating techniques and procedures to eliminate unnecessary radiation exposure to the patient
- Examining and evaluating training of medical personnel in radiation protection
PAC 4

25 members:
- Radiology
  - Diagnostic radiology
  - Interventional radiology
  - Pediatric radiology
  - Nuclear medicine
- Medical physics
- Health physics
- Radiation oncology
- Cardiology
  - Interventional cardiology
  - Nuclear cardiology
- Dentistry
- Occupational and environmental medicine

Recent PAC 4 publications
Report No. 172 (2012)

• Reference Levels and Achievable Doses in Medical and Dental Imaging: Recommendations for the United States
• Defines purposes and values of Diagnostic Reference Levels (DRL) and Achievable Doses (AD)
• Provides numerical values for U.S. DRLs and ADs

Diagnostic Reference Level

• QA/QI tool for controlling radiation dose
• Designed to reduce the risk of stochastic effects
• DRL value = 75th percentile of survey data
• When doses exceed the DRL value the reasons should be investigated.

Diagnostic Reference Levels

• DRL values are not:
  – An indicator of optimum performance
  – Dose limits
  – Regulatory (use of the DRL process may be)
• DRL values do not apply to individual patients or individual cases
Achievable Dose

- A dose that serves as a goal for optimization efforts and is achievable with standard techniques and technologies in widespread use, while maintaining clinical image quality adequate for the diagnostic purpose.
- AD value = 50th percentile of survey data (median)


- Preconception and Prenatal Radiation Exposure: Health Effects and Protective Guidance
- General misconception that any amount of ionizing radiation is much more detrimental to the embryo or fetus than is actually the case
- Diagnostic radiological procedures necessary for the care of the mother, embryo, or fetus can be performed at any time during pregnancy

Report No. 174

- Increased risks to the embryo or fetus have not been observed below a weighted uterine dose of 0.1 Gy for
  - mental retardation
  - birth defects
  - growth retardation
  - neurobehavioral effects
  - impaired school performance
  - convulsive disorders
  - embryonic or fetal death
Statement No. 11 (2014)

- Outline of Administrative Policies for Quality Assurance and Peer Review of Tissue Reactions Associated with Fluoroscopically-Guided Interventions
- Structured recommendations for QA processes for review of radiation use in fluoroscopically-guided interventional (FGI) procedures

Statement No. 11

- Provides Tables that summarize
  - Model policies and processes for the management of radiation dose for FGI procedures
  - Essential elements of a QA-peer review program
  - Criteria for evaluation of tissue reactions relative to recognized practice parameters
  - Outcomes and actions after QA-peer review evaluation of a clinically important tissue reaction.

Reports in Preparation
Scientific Committee 4-5, Chairs: Alan Lurie and Mel Kantor. *Radiation Protection in Dentistry*

Scientific Committee 4-7, Chair: Julie Timins. *Evaluating and Communicating Radiation Risks for Studies Involving Human Subjects: Guidance for Researchers and Reviewing Bodies*

Scientific Committee 4-8, Chair: Manudeep Kalra. *Improving Patient Dose Utilization in Computed Tomography*

Radiation Protection in Dentistry

- Intended as comprehensive, self-contained guide for dental facilities
- New material: cone beam CT, digital radiography, hand-held dental radiography devices
- Data from 2014-2015 NEXT dental survey

Radiation Risks: Guidance for Researchers and IRBs

- Guidance for researchers and IRBs in preparing and reviewing research protocols that include radiation exposure to human subjects
- Cites relevant regulatory requirements
- Discusses estimation of radiation dose and risk in research protocols
Radiation Risks: Guidance for Researchers and IRBs

• Discusses the ethical considerations involved in human studies research
• Provides advice on presenting radiation risk information to subjects as part of the informed consent process

Improving Patient Dose Utilization in CT

• Integrated set of recommendations for CT radiation dose optimization and error prevention
• Intended audience: practicing physicians and other healthcare providers, physicists and technologists

Possible Future Topics

• Program Components for Error Prevention in Radiation Therapy
• Radiation Effects on Implantable and Other Medical Devices
• Radiation Protection for PET-CT and other Multimodality Imaging Systems
Summary

• In NCRP, PAC 4 has oversight of activities in the field of radiation protection in medicine
• 25 members, with diverse areas of expertise, including medical physics
• Three recent publications of interest:
  – Diagnostic Reference Levels and Achievable Doses
  – Preconception and Prenatal Radiation Exposure
  – QA and Peer Review of Tissue Reactions Associated with FGI

Work in progress:
  – Radiation Protection in Dentistry
  – Improving Patient Dose Utilization in Computed Tomography
• Several possible topics for future reports
Thank You!

Questions?

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