Emerging challenges in the management of medical exposures

Views from PAHO, WHO, EC, IAEA


Pablo Jiménez
Regional Advisor in Radiological Health
Washington, DC. USA
Pan American Health Organization
WHAT IS MEDICAL EXPOSURE?
GLOBAL ANNUAL EFFECTIVE PER CAPUT DOSE (mSv). UNSCEAR

2000

Medical 0.4
Natural 2.4
All other 0.008

2007

Medical 0.52
Natural 2.4
Fallout 0.005
Temporal trends in the frequency per 1000 Population of diagnostic radiology examinations

Health Care Level

Source: UNSCEAR
FACTS

✓ The medical exposure is by far the largest radiation source other than natural background.

✓ The availability and use of medical radiation facilities varies widely around the world.

✓ In some industrialized countries medical exposure is already the largest source of exposure.

✓ Medical exposure is different from other uses of radiation: too little or too much dose is bad in both diagnosis and therapy.

✓ There is minimally trained staff causing unsafe radiation conditions for patients.

✓ Medical exposure is the less regulated type of exposure.
CHALLENGES

Technological
Regulatory
Application of the BSS

✓ Justification
✓ Optimization
✓ Dose limitation
PET/CT incorporation worldwide
Complex radiotherapy techniques: IMRT & IGRT
MDCT: 64, 128, 256...
Usage of CT for clinical and also for screening purposes
Image guided intervention procedures
Development of hybrid imaging modalities
Change in the pattern of usage: children & young
### DOSE TRENDS PER PROCEDURE

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<td>Chest radiography</td>
<td>0.25</td>
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<td>4.4</td>
<td>8.8</td>
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<td>12</td>
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*Average effective dose per examination (mSv)
Health care level I*

Source: UNSCEAR
APPLICATION OF BSS
Country status - example

Source: IAEA
EACH COUNTRY HAS DIFFERENT NEEDS FOR HARMONIZATION

Focus

Priority Country  Intermediate Country  Highly Developed Country

Addressing the pending issues  Protecting the achievements  Facing the new challenges

Source: PAHO
JUSTIFICATION

Generic justification: health authorities and medical professional societies

Individual justification: referring and radiological medical practitioner

• Particular attention to pregnant, breast-feeding and paediatric patients

Opportunistic screening:

– health authorities should be able control and influence the process through policies

– assure patient is informed about benefits, risks and limitations
OPTIMIZATION OF PROTECTION

- Calibration of equipments and performing the clinical dosimetry by a medical physicist.
- Implementing a QA program under the supervision of a medical physicist
- Performing QC tests at the time of acceptance & commissioning, periodically thereafter, and after any major maintenance that could affect patient safety
DOSE LIMITATION

Dose limits do not apply to medical exposures

There is need for the establishment of

✓ Diagnostic Reference Levels as dynamic values which are tools for optimization (not "limits");
✓ Dose constraints (not" limits") for carers and comforters as well as for volunteers in biomedical research
✓ In consultation between Health Authorities, medical professional societies and the Regulatory Body
CHALLENGES (I)

- New and rapidly evolving technologies raise new issues
- The implementation of QA programs to improve clinical outcome and assure radiation safety
- Qualified personnel, particularly of medical physicists
- Health professionals properly and regularly trained in radiation protection
CHALLENGES (II)

- Implementation of appropriate regulations
- **Health authorities** and medical professionals societies participation in the regulation of medical exposures
- Regulatory Body may mean *more than one body* each having different responsibilities
- Closer relationship between the Regulatory Body and Health Authorities
- Harmonization and better coordination among multiple stakeholders