

The International Basic Safety Standards and their potential impact on radiation protection in medicine

International Conference on Radiation Protection in Medicine

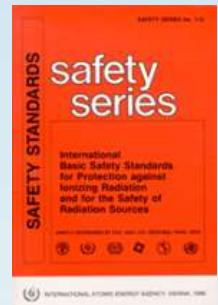
3-7 December 2012, Bonn, Germany

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International Safety Standards for radiation protection

- IAEA has a UN mandate that includes:
 - Developing international safety standards, and
 - Providing for their application
- One such safety standard is the so called “BSS”
 - The International Basic Safety Standards
 - Long pedigree, with the 1996 BSS arguably having the highest profile to-date
- BSS covers radiation protection in all uses of radiation, including uses in medicine



The BSS – the process of review & revision

1996



→ **Review**
2005 - 6

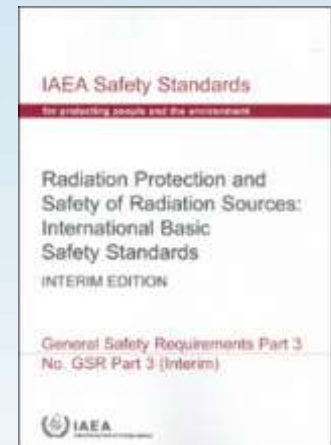
→ **Revision**
2007- 11

→ **IAEA approval**
2011

→ **Cosponsor approval**
2012

IAEA Member States

IAEA and other
Cosponsors:
FAO, ILO,
NEA/OECD, PAHO,
UNEP, WHO, EC



How might the new BSS impact on radiation protection in medicine?

- The BSS has an important role in many countries:
 - Compliance is mandatory for those countries receiving technical assistance from the IAEA
 - A template for national regulations

The next slides will discuss some aspects of how the new BSS should provide an adequate basis, for the next decade, for radiation protection in medicine:

- For the patient, and
- For personnel

Responsibilities for medical exposure

- Key persons for patient radiation protection
 - Radiological medical practitioner
 - Medical radiation technologist
 - Medical physicist
- Persons can act in these roles only if:
 - Specialized in the appropriate area
 - Meet the respective education, training and competence requirements in radiation protection
- Regulatory Body needs to ensure this happens

Appropriately trained personnel will continue to underpin radiation protection in medicine in the next decade

Justification of medical exposures in the BSS

- Follows ICRP recommendations
 - 3 levels of justification
- New BSS assigns responsibilities

Justification Level 3 – individual patients

- Who is responsible?
- 2 roles identified in the new BSS
 - Radiological medical practitioner
 - Referring medical practitioner

Responsibility for level 3 justification?

Referring medical practitioner

- Clinical context, medical history
- **Defensive medicine**

Radiological medical practitioner

- Knowledge about procedure – benefits, risks, limitations
- **Financial conflict of interest**



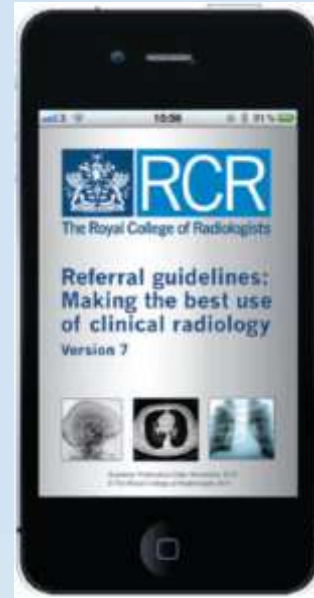
Referral guidelines / criteria of appropriateness

Justification through consultation between:

- the radiological medical practitioner, and
- the referring medical practitioner

The BSS – a basis for strengthening the implementation of justification

- Joint responsibility
- Development and use of referral guidelines or appropriateness criteria
 - Professional bodies
 - Software for referral
- Availability of relevant information from the patient's previous radiological procedures
 - Not new, but increasingly realisable



Information technology, hardware & software will provide tools to help with the implementation of justification

Asymptomatic individuals

- intended early detection of disease

- New for the BSS but a current and on-going issue
 - Interface between research programmes and established medical practice
 - Complicated by:
 - “Entrepreneurial” medicine
 - Self-presenting patients
- New BSS
 - Referring medical practitioner/Radiological medical practitioner
 - Professional body guidelines
 - Individual informed re benefits, risks and limitations

The BSS places an obligation on professional bodies to step up to the mark.
Also the patient is brought into the picture.

Optimization of protection & safety

- BSS requires the optimization of protection & safety for each and every medical exposure

Components to the process:

Design considerations

Operational considerations

Calibration

Patient dosimetry

DRLs

QA

Dose constraints

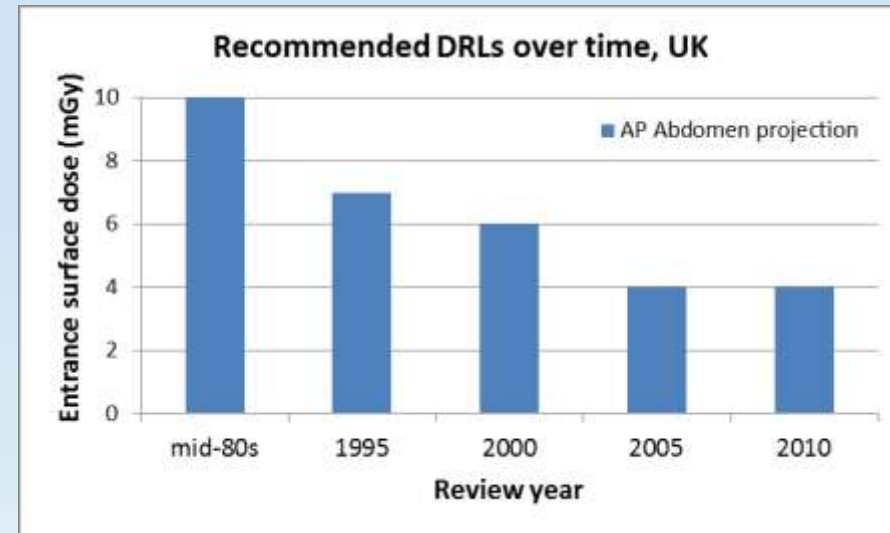
Optimization – Design considerations

- Two aspects in the new BSS:
 - Medical radiological equipment
 - Software that could influence the delivery of medical exposure
- Used only if conforms to applicable standards

The role of software will continue to become more and more important in the use of radiation in medicine

Diagnostic reference levels (DRLs)

- DRLs have an important role in the BSS for imaging, including image guided interventional procedures
- Clear evidence for their effectiveness



But level of implementation around the world remains poor
Challenge for the next decade is to improve this situation

Unintended & accidental medical exposures

- Sometimes things go awry
 - BSS places prime responsibility on the licensee (facility) to investigate & implement improvements
 - BSS stipulates the need for a safety culture
 - Learning from mistakes
 - Voluntary safety reporting systems

The BSS with its focus on improvement should facilitate participation in voluntary safety reporting systems



The screenshot shows the IAEA SAFRON website. The header includes the IAEA logo and the text "IAEA | SAFRON - Safety in Radiation Oncology". A navigation menu contains links for Home, Process Steps, Incident Reports, Documents and Links, Registrations, and Help. The main content area features a title "Safety Reporting and Learning System for Radiotherapy" and a brief description: "SAFRON is voluntary and aims to enable global shared learning from safety related events and safety analysis in order to improve the safe planning and delivery of radiotherapy. SAFRON is provided by the IAEA." Below this, there are three columns: "Actions" with links like "Browse Safety Info by Process Step" and "Submit Incident Report"; "Featured Incident Reports" with a report titled "Orthovoltage equipment not properly calibrated"; and "Featured Documents & Links".

Radiological reviews

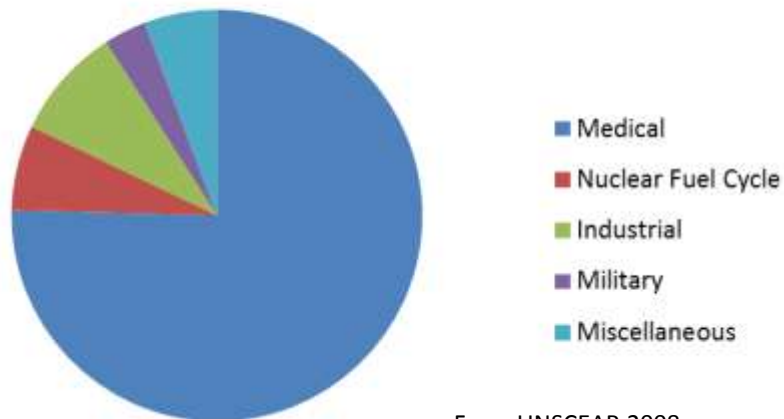
- A new requirement in the BSS:
- At each facility:
 - A periodic review of the current practical implementation of the radiation protection principles of justification and optimization in the facility
 - By the radiological medical practitioners, the medical radiation technologists and the medical physicists
 - “How are we really doing?”
 - “What can we do better?”

Continuous improvement in the implementation of radiation protection



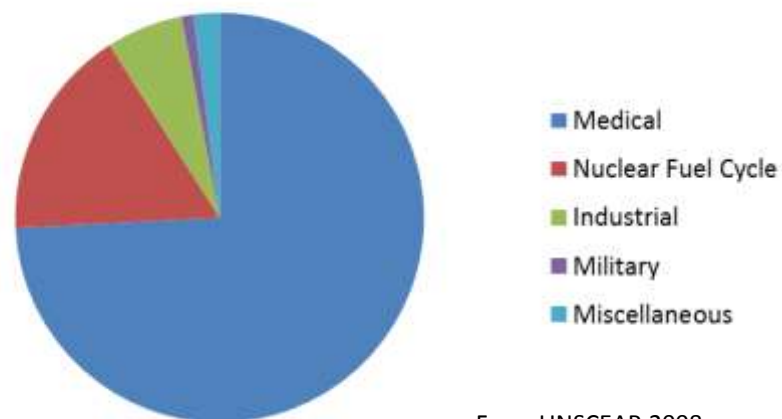
Not forgetting occupational exposure

Relative number of monitored workers



From UNSCEAR 2008

Relative collective effective dose



From UNSCEAR 2008

- Few changes with respect to occupational exposure in the new BSS

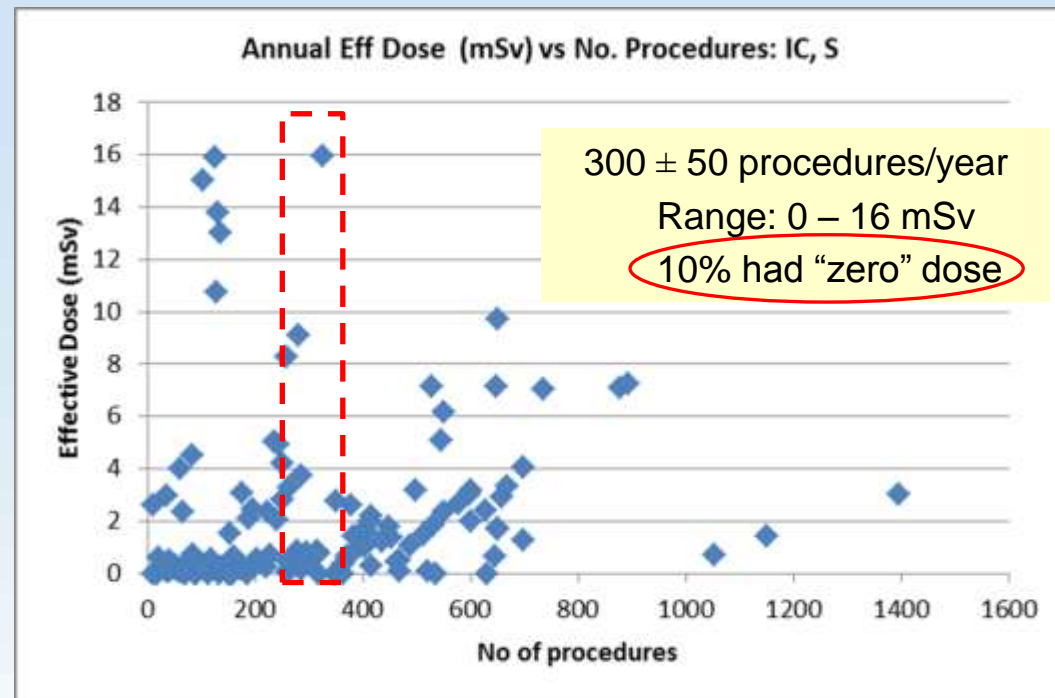
Next couple of slides will look at a few specific topics

Monitoring & optimization of occupational RP

BSS:

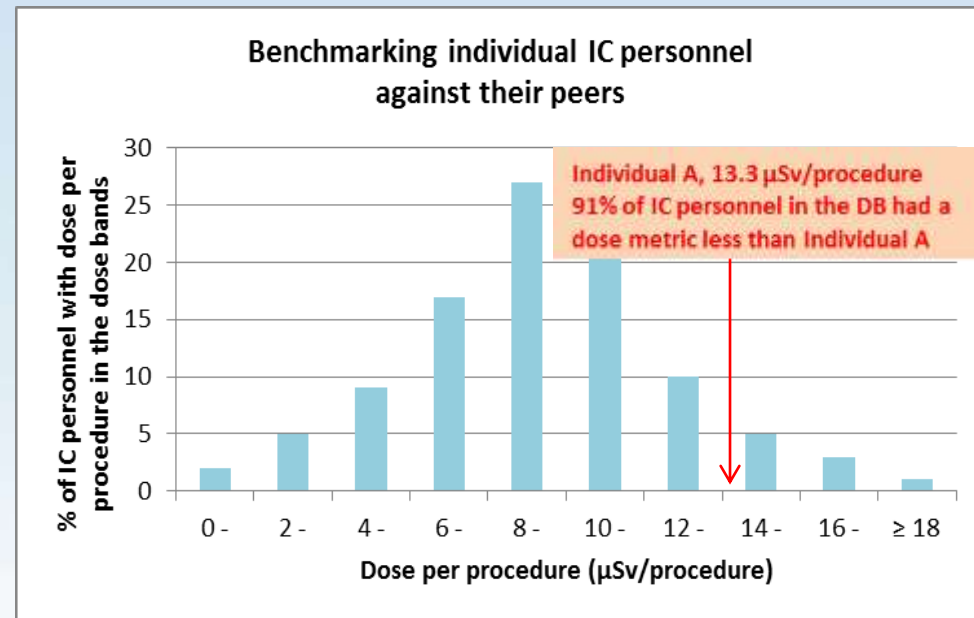
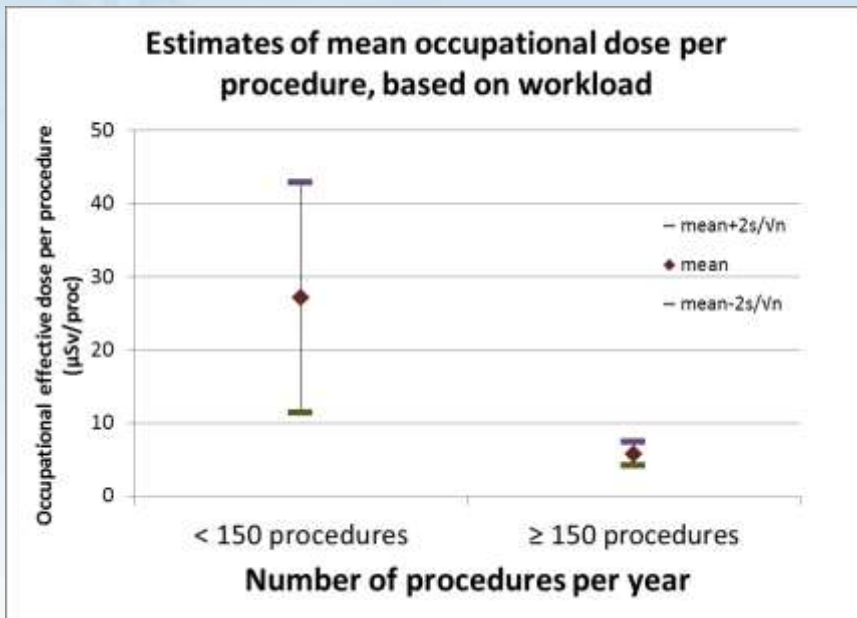
- Monitoring equipment must be provided
 - However, strong evidence that many professionals using radiation in medicine are not consistently monitored

Need to improve compliance
– monitoring must be seen
as adding value



Adding value to monitoring

- Using the results to improve occupational radiation protection in the facility
- For example, in Interventional Cardiology
 - ISEMIR international database
 - Statistical analysis & benchmarking to identify areas needing attention



Participation in such databases should add value to monitoring

New dose limit for the lens of the eye

- Without good radiation protection practice, some health professionals could easily exceed the new dose limit
- A need for:
 - Education and training
 - Provision of protective tools
 - Monitoring

These are all requirements in the BSS, but successful implementation needs to take place

Conclusion

- The new BSS should provide an effective regulatory basis for radiation protection in medicine for the next decade, but effective implementation is needed
- The BSS sets out the basic requirements, but it also enables further actions
- A new Safety Guide is being developed
 - “Radiation Safety in Medical Uses of Ionizing Radiation”
 - The results of this Conference will provide input into the Safety Guide

