Addressing the Key Challenges in Radiological Protection

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Outline

• Challenges facing RP globally
• Challenges facing ICRP
• ICRP business update
Global RP Challenges

- Cardiovascular and non-cancer effects
- Low dose and low dose-rate effects
- Individual radiosensitivity
- Cancer epidemiology
Cardiovascular & non-cancer effects

- More scientific information required
- Define which cardiovascular diseases and outcomes
- Consideration of cardiovascular effects in calculation of detriment
Low dose and low dose-rate effects

• Quantification of low dose & low dose-rate exposure health risk (cancer, cardiovascular disease, cognitive & hereditary effects)

• Require studies of mechanisms of low dose effects at molecular, cellular and tissue levels with development of dose-response models
Individual radiosensitivity

• Individual genetic susceptibility with regard to mechanisms and effects
• Consideration of exposure of children
• Need biomarkers of specific health effects
• Relevance of variations in radiosensitivity for system of protection
Cancer epidemiology

• Continue follow-up of exposed cohorts, with regard to age and sex differences in sensitivity

• Study risks following protracted exposures to moderate doses

• Consider variations in cancer risk as some very low (small intestine, bone)
Global RP Challenges

- Communication of radiation risks, particularly with patients and public
- Writing plain-language RP documents
- Education of healthcare professionals
- Recruiting younger RP professionals
Communication risks

• Some progress

• Information required for:
  ➢ healthcare workers
  ➢ patients
  ➢ public
Plain-language documents

- Language of RP complex
- Many organisations working on this
- ICRP considering short plain-language summary for each publication
- ICRP preparing overview of the system of RP for its website
Educating healthcare professionals

- 130 hospital doctors 2 UK hospitals
- 0% knew dose from CXR or radiation units
- 97% marked underestimation of doses
- 5% thought US & 8% MRI uses ionising radiation

Shiralkar et al, BMJ 2003

- Doctors 3 university hospitals Turkey
- 93% marked underestimation of doses
- 4% thought US & 27% MRI, ionising radiation

Arslanoglu et al, Diagn Interv Radiol 2007
Educating healthcare professionals

- Doctors 14 Queensland hospitals
- 37% correctly estimated dose from CT
- 10% believed CT does not carry a cancer risk
- 35% thought NM does not use ionising radiation or gives a dose less than CXR

*Brown et al, J Med Imaging & Oncol, 2013*
Educating healthcare professionals

- Increase RP teaching in undergraduate courses
- Include regular RP sessions in continued professional development
- Ensure adequate human and financial resources to deliver training
Radiation Professionals

National Crisis: Where are the Radiation Professionals? (WARP)

Workshop July 2013
 Radiation Professionals

• Restore funding to increase and sustain credible workforce RP professionals

• Ensure student programmes resourced to support training and qualification

• Establish effective career development

• Monitor trends in supply & demand

NCRP Statement Dec 2015
ICRP Challenges

- An integrated system of radiological protection for both people & the environment
- Organisational restructure
- Identifying relevant areas of research
- Broadening awareness
- Financial
Protection of the Environment

- Committee 5 established in 2005
- Several publications trace development from initial framework to information for implementation
- Protection of the environment now needs to be fully integrated into the one system of RP
Organisational Restructure

• From beginning next term (1st July 2017), ICRP will operate as four committees

• Expertise from Committee 5 will be incorporated into other Committees

• New mandates for each Committee

• Veterinary medicine included in mandate of Committee 3
Identifying Areas of Research

• Assessing risks to human health from low dose and low dose-rate exposures

• Assessing risks to non-human fauna and flora

• Elaborating the ethical and social dimensions in the system of RP
Broadening Awareness

- Part of Strategic Plan
- Collaboration with liaison organisations
- Find new ways of reaching out e.g. social media
- Make more publications available free of charge
- Recruited Development and Communications Manager
Financial Challenges

• ICRP does not have large financial reserve

• Formal fundraising campaign initially with professional company

• Now continue campaign with new manager
System of Radiological Protection

- Last updated in *ICRP Publication 103* (2007)

- Based on science, ethical and social values, and experience

- Forms the basis of radiation safety standards, legislation, guidance, programmes, and practice worldwide
ICRP 103

- Long gestation, commencing 1998
- Technical discussion IRPA meetings 2000 & 2004
- Draft web consultations 2004 & 2006
- Two progress reports
- Publication in 2007
Writing New Recommendations
System of Radiological Protection

- 18 years since last major system review commenced
- Main Commission initiated further review May 2016
- System basically sound
- Recognise need for some clarification and explanation
ICRP not about to develop new fundamental recommendations

Will continue to review:

- exposure situations and categories of exposure
- current division of effects between stochastic effects and tissue reactions
- the basis of dose limits, especially those for protection against tissue reactions
Programme of work – new term

- Current TGs to continue if not completed by end of term
- Committee 1:
  - Monitor science in relation to individual radiosensitivity and cardiovascular disease
  - Ecosystem effects at low dose rates
  - Effects of ionising radiation on animals and plants at population not only individual organism level
Programme of work – new term

- Committee 2:
  - Review dosimetric issues in prevention of tissue reactions at high levels of exposure
  - Explanation of evolution of work on radon as plain-language summary
  - Address issues of dosimetry in non-human biota
Programme of work – new term

- Committee 3:
  - Patient dose monitoring and management
  - Impact of imaging dose in radiotherapy
  - Effect of high doses to lens of eye and cerebrovascular system in radiotherapy
  - RP in veterinary medicine
Programme of work – new term

- Committee 4:
  - Integration of protection of people and the environment
  - Consideration of radiological accidents (update of Pub 96)
  - Ethics in medical RP
  - Mobile high activity sources
ICRP Symposia

• New initiative in 2011

• Designed to strengthen relations and increase collaboration

• Aim for diverse global venue
  - Bethesda 2011
  - Abu Dhabi 2013
  - Seoul 2015
  - Paris 2017
ICRP 2017
ICRP 2017

• Held in conjunction with 2\textsuperscript{nd} European RP week
• In Europe to hopefully engage many RP professionals
• Will be relying on support of organisations with regard to participation and financial sponsorship
ICRP 2017

• Programme to include sessions on:
  - Effects, risks and detriment at low dose and low dose-rate
  - Advances in dose coefficients
  - Advanced radiotherapy
  - Post accident recovery
  - Integrated protection of people and the environment
Nominations for ICRP Committees

- 2013 Held open nominations for members with nearly 200 nominations
- Nearly 50% new membership (20% women)
- Call for nominations for next term ICRP to be released very shortly
Conclusions

• There are many key challenges facing radiological protection globally

ICRP:

- Faces these as well as internal challenges
- Will continue to review current science to provide relevant recommendations
- Is restructuring to evolve operations
- Looks forward to working with other organisations to address difficult issues