WG10- Retrospective dosimetry

Progress Report

EURADOS General Assembly
Karlsruhe, Germany
March 1st, 2017

C. Woda
### Task 10.6: Development of a common approach to uncertainty estimation (cnt’d)

- Paper
- Training course

### Task 10.7: Biodosimetry after internal contamination (cnt’d)

- Several case study sub-groups

### Task 10.8: Dose conversion coefficients for physical dosimetry

- Algorithms
- Dose quantities
- Data generation
- EPR, OSL, TL
- Bio-dosimetry

### Task 10.4: Intercomparison exercises

### Task 10.5:
- EURADOS report on intercomparisons (2018)
- Joint EURADOS/ICRU report
- SRA

**Completed**

**In progress**

**Future**
Tasks in progress
TG10.4 Intercomparison exercises

Task chairs: L. Ainsbury, C. Woda

Joint EURADOS/RENEB ILC in 2017:

- All biological assays, TL/OSL on phones, EPR separate ILC
- Different irradiation setup but same doses for biological and physical retrospective dosimetry, all irradiations done at IRSN (for biodosimetry carried out in January 2017)
- Use ISO norm for statistical analysis of all assays

Design of the ILC for TL/OSL:

- Three phones (high dose, low dose, sham irradiation). Labs provide own samples for sham and high dose, same model (bought) will be used for low dose.
10.4 Inter-laboratory comparison

Aims of the ILC for TL/OSL:

• Assessment and reduction of uncertainty for OSL method on resistors
• Validation of the TL protocol on resistors
• Validation of the TL method on display glass for arbitrary phone samples.

Timeline:
• April/May 2017: Irradiation & shipment of samples
• Discussion of results at fall meeting of WG
TG 10.5 – Joint ICRU/EURADOS report

Commission Sponsors:
• Søren Bentzen
• Elena Fantuzzi

Members:
• Stephen McKeever, Co-Chairman
• Clemens Woda, Co-Chairman (WG10)
• Paola Fattibene (WG 10)
• Alexander Romanyukha
• Horst Romm (WG 10), until Sept. 2016
• Antonella Testa (WG10), since Sept. 2016
• Steven Simon
• François Trompier (WG 10)
• Ruth Wilkins
• 1st Meeting: 27-29 January 2016 (Bethesda)
• 2nd Meeting: 26-28 September 2016 (Rome)
TG 10.5 – Joint ICRU/EURADOS report

• Title was modified following input from RC28:
  “Methods for Initial-Phase Assessment of Individual Doses following Acute Exposure to ionizing Radiation”
• Words “Emergency Decision Making” were removed from previous title
• “Initial phase” -> hours to weeks after the exposure (i.e. early-to-intermediate, but not years, which is the focus of ICRU 68).
• Only „dose“ will used in the title, as EPR and biodosimetry will be affected by both, external and internal sources.
• Focus of report on initial phase after incident with acute exposures, internal component is likely to be small
• Short section on bioassays will be included and on area dose mapping
• Main emphasis: biodosimetry, EPR, TL/OSL, experiences from accidents
• A first draft of approximately 1/2 of the report has been written
TG10.6
Development of common approach to uncertainty estimation

(TG chairs: F. Trompier; E. Ainsbury)

Aims:
To survey, compare and assess techniques of uncertainty analysis for physical and biological retrospective dosimetry

Deliverables:
• A paper surveying and comparing uncertainty evaluation methods used within WG10 members
• Organize a training school in uncertainty estimation (2017)

To date:
• Paper finalized. Sent for comments to WG members, will be submitted April 2017
• Successful application to CONCERT 2nd E&T Call for training school
• First version of software for uncertainty analysis (M. Marrale)
• General description of retrospective dosimetry

• General methodology

• Introduction to GUM, Monte Carlo and Bayesian statistics
  ▪ Methodology (including use of software)
  ▪ Strengths, weaknesses, main pitfalls
  ▪ Examples from participants and exercises

• Emphasis on practical sessions

Organizers: S. Ancelet (IRSN), F. Trompier (IRSN), L. Ainsbury (PHE)
TG 10.7
Biodosimetry in internal exposure scenarios

TG chair: H. Romm (until Sept. 2016). A. Testa

Aims

To establish the usefulness and limitations of cytogenetic dosimetry in cases of internal and mixed internal/external exposures

Deliverable:

Paper to a peer reviewed journal

To date:

• Joint meetings with WG 7 (2013-2017, 2 x per year).
• Agreement on organizing the work in case studies, agreement on the structure of the review
• Nomination of contact persons for each scenario /and each WG
Actual status and next steps

(1) Main focus on scenarios involving incorporation of single radionuclide (much easier to describe and to find correlation between biodosimetry and internal contamination data)

(2) and some case studies of complex scenarios involving more radionuclides.

(3) During this meeting ... decisions on:
   - which scenarios are consistent
   - how to make the presentation of data more homogeneous
   - collecting input from WG7 and WG10 colleagues

(4) Major part of the paper written (30+ pages)

(5) Foreseen submission end of 2017
TG10.8
Dose conversion coefficients for physical dosimetry

(TG chairs: J. Eakins; M. Discher)

• Cross-cutting activity with WG6

Aims:
To develop the means for relating the dose measured by a retrospective dosemeter to the detriment to the individual

Definition of three subtasks:
• Development of conversion algorithms for use in emergency / retrospective scenarios (webtool hosted at IRSN)
• Generation / harmonization of conversion data, plus associated limitations / uncertainties
• Exposition into the correct dose quantity for use in emergency scenarios
Travel grant

- Organ dose coefficients from Ir-192 point source

- Compares / validates method with measured results

- Investigates some parameters of CATO experiment (e.g. effects of limbs)

Conversion factors agreed well with measured results
10 - 15 m the “magical” distance: (i.e. roughly equivalent to a plane-parallel exposure)

- Cs-like source initially
- To be extended to Ir-192, Cs-137, Co-60 (+others?)
- Effects of ground scatter (concrete?, soil?)

Dose conversion coefficients for physical dosimetry

Ratio: (Mean organ dose per AK point) to (Mean organ dose per AK)
Dissemination

- SSD 18, 18th International Solid State Dosimetry Conference (Munich, July 2016)
  - Presentation of WG10/TG4 TL results (Michael Discher)
  - Presentation of EURADOS Grant results (Michael Discher)

- Publication forecast 2016/2017:
  - 2 MS on the intercomparison results 2015 and 2016 (10.4)
  - MS on the uncertainty assessment in retrospective dosimetry (10.6)
  - MS on biodosimetry after internal contamination (10.7)
  - Results of EURADOS Grant research (Voxel phantom calculations for emergency dosimetry, 10.8)