EURADOS Task Group on New Operational Dose Quantities

Article 31 Group

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EURADOS

EURADOS Task on New Operational Quantities

Aims:

- **analysis**
- **recommendations on implementation**

- **Output: EURADOS Report, freely available on website**
- **Expected early 2022**

Benefits of the New Quantities

- **Improved estimation of risk**
- **Especially in**
  - low-energy photon fields
  - high-energy fields around accelerators
- **Switching to absorbed dose for tissue reactions looks sensible**
  - For eye lens, await current ICRP considerations on cataract formation

Main Conclusion 1 . . .

Most passive dosemeters and some instruments will need a measure of redesign, and in some cases this redesign will be radical and costly.

Main Conclusion 1, continued . . .

Possible adaptations

- some devices*: simple re-calibration
- other devices: design changes
- multi-filter passive dosemeters: combination of redesign + new algorithms
- single-filter passive dosemeters: depends on sensitive material – problems severe for some dosemeter types (including extremity/ skin)
- all: measurement uncertainties may increase

* Including active instruments and dosemeters, and passive dosemeters

Main Conclusion 1, continued . . .

Proposal: to spread the costs, changes to designs can be phased over a period of time.

This will work for some devices.

But if monitoring services have to run two systems in parallel, this increases:

- **the effort**
- **the risk of errors**

Therefore the phasing period should be short.

Main Conclusion 1, continued . . .

OTHER IMPLICATIONS

Large numbers of international standards need changing:

- **calibration**
- **type testing**
- **proficiency testing**
- **etc.**

Some requirements may need to be relaxed

Calibration laboratories: changed practices

Main Conclusion 2 . . .

Conversion coefficients for new quantities are markedly lower for photons at medical diagnostic / interventional energies.

Introduction of the new operational quantities will see a reduction in collective whole body doses. (This better represents the detriment.)

Main Conclusion 2, cont'd

If collective doses are reduced: take care!

Temptation to think "this is safer, I don't need so much shielding", or "my safety rules can be relaxed". Assess this formally.

Future reviews of risk factors will show a HIGHER detriment per unit dose. This doesn't mean the dose limits should be reduced.

Eye lens doses will not be reduced significantly → much more difficult to control eye lens by monitoring whole body dose.

Main Conclusion 3

ICRU Report 95 extends conversion coefficients to more radiation types and to higher energies.

Note that for aircrew dosimetry, the new operational quantities are of limited use. Dose calculations go directly to effective dose.

(The new quantities are not intended for use in space/ astronaut dosimetry.)

Recommendation 1

We echo ICRU's view that the process of adopting the new operational quantities should be carried out over a timescale of decades. This will allow for mature consideration of the changes and for account to be taken of the parallel development of new ICRP recommendations.

Recommendation 2

Stakeholders, including instrument suppliers, dosemeter suppliers, individual monitoring services and calibration laboratories, should begin work immediately to evaluate and plan for the change.

Recommendation 3

Authorities should be aware of the potential costs involved in changing to the new quantities. These costs should be evaluated at an early stage.