IRPA 14
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PRACTISING RADIATION PROTECTION
sharing the experience | new challenges

IRPA

2015 IRPA survey of professionals on the new dose limit to the lens of the eye and wider issues associated with tissue reactions

Marie Claire Cantone, Merce Ginjaume, Saveta Miljanic , Colin J Martin, Keiichi Akahane, Louisa Mpete, Severino C Michelin, Cinthia M Flannery, Lawrence T Dauer, Stephen Balter

The IRPA TG phase 1, 2012-2013

- **An IRPA TG was established** to provide an assessment of the impact of the implementation of the ICRP revised dose limit for the eye lens, since there was significant interest and some concern by the RP professionals.

Chair: *John Broughton (SRP)*
Members: *Vice-Chair, Marie Claire Cantone (AIRP)*
Mercè Ginjaume (SEPR), Binika Shah (SRP)

- **A Report was approved by IRPA E.C. in July 2013**

- IRPA agreed to continue this work to ensure that the highlighted findings and concerns would be integrated into the ongoing international discussion on this matter.

The IRPA TG phase 2, 2015-2016

- **In January 2015 IRPA established a TG phase 2**
  http://www.irpa.net/page.asp?id=6

  - to create a positive and complete awareness about RP at the working places, with attention to exposure of the lens of the eye.
  - to report the evolution of the RP community after the first TG Report, 2013
  - to monitor how the RP community is taking into consideration the wider generic issue of tissue reactions.

IRPA TG

Chair: *Marie Claire Cantone (**AIRP, Italy**)*

Vice-Chair: *Mercè Ginjaume (**SEPR, Spain**)*

Members:

- *Saveta Miljanic (**CRPA, Croatia**)*
- *Colin J Martin (**SRP, UK**)*
- *Keiichi Akahane (**JHPS, Japan**)*
- *Louisa Mpete (**SARPA, South Africa**)*
- *Severino C Michelin (**SAR, Argentina**)*
- *Cynthia M Flannery (**HPS, US**)*
- *Lawrence T Dauer (**HPS, US**)*
- *Stephen Balter (**HPS, US**)*

Structure of the group, March 21th, 2015

A questionnaire sent to all the IRPA ASs

on April 23rd, 2015

International Radiation Protection Association

IRPA Task Group on the Impact of the Implementation of the Eye Dose Limits

Questionnaire

April 2015

This questionnaire is distributed to all the IRPA ASs with the objective to collect and report the evaluation of the IRPA community about: the best applied methods for monitoring dose to the lens of the eye; the methods of protection and the on ongoing path toward the implementation, at the legislative level, in the different countries. At the same time this is an opportunity to have the view of the professionals of the IRPA ASs about wider issues, including the issue of tissue reactions. In the compilation of the answers, please state specifically the scope to which you refer: medical applications (including radiology, interventional radiology and cardiology, nuclear medicine, etc.); nuclear applications and industrial applications in general.

Topic 1 Implications for Dosimetry:

This topic concerns the implications for monitoring and assessing dose to the lens of the eye and the interpretation of the results.

Q1. Since there is already a requirement to assess doses to the eye, what is/are the current best method(s) in use for the measurement of Hp(3)? Consider and specify in terms of the location, the types of dosimeters and the use of correction factors.

Q2. What systems under consideration or further development are you aware of or are you using for improved measurement of Hp(3)? Please consider and specify the different dosimetry methods: from the use of double dosimetry (over-apron at neck and under-apron at chest) to the use of a single collar dosimeter, outside apron, to obtain an indication of both eye lens and body doses, to the use of a supplementary dosimeter placed in a position adjacent to the eye. Consider both passive and active dosimeters. Provide cost implications where possible.

Q3. Are these measurement methods dependent (or likely to be dependent) on the level of the dose being measured on the type of work or on any other conditions?

A questionnaire sent to all the IRPA ASs

on April 23rd, 2015

Topic 1 Implications for Dosimetry

Q1 – Q8 - implications for monitoring and assessing dose to the lens of the eye and the interpretation of the results.

Topic 2 Implications for Methods of Protection

Q9 – Q12 - implications for methods (e.g., procedures or the design phase of equipment, facilities, and protective equipment) used to reduce dose to the eye, in the context of optimization of protection.

Topic 3 Wider Implications of Implementing the Revised Limit

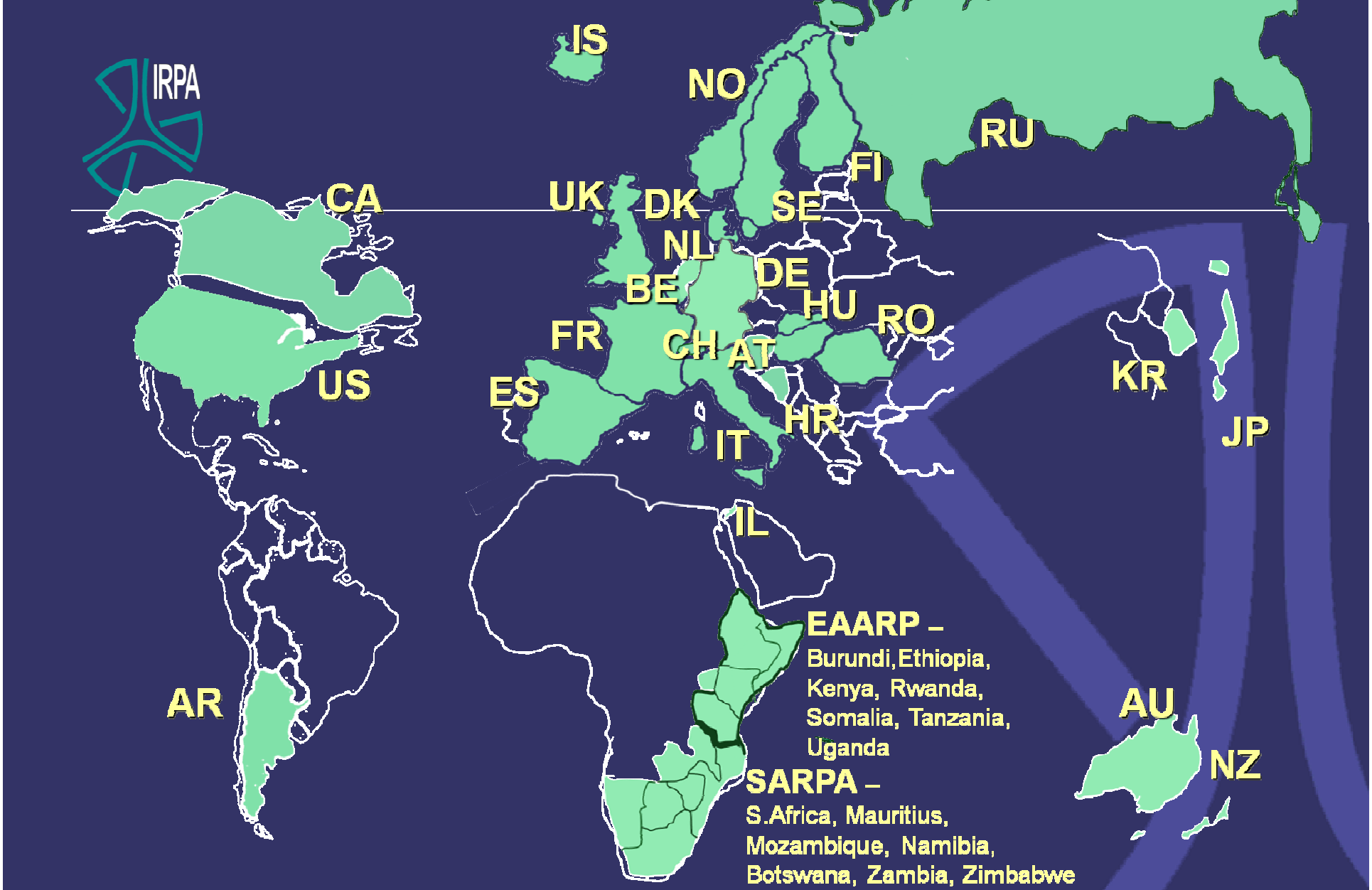
Q13 – Q18 - long term impact on working activities; - changes in Health surveillance; - more claims for compensation

Topic 4 Legislative and other general aspects

Q19 – Q22 - guidelines addressing monitoring related to new limit; -consultation for legislation; -wider issue of tissue reactions, also circulatory disease

22 IRPA ASs contributed actively in collecting views and comments from their professionals

1. Argentine
2. Australia-New Zealand
3. Austria
4. Belgium
5. Canada
6. Croatia
7. East Africa
8. France
9. German-Swiss
10. Hungary
11. Israel
12. Italy
13. Japan
14. Korea
15. Netherland
16. Nordic
17. Romania
18. Russia
19. South Africa
20. Spain
21. UK
22. US



Responses from 22 ASs, covering 40 countries reporting from Africa, North and South America, Asia, Australia, Europe

Conclusions from the survey

Direct implication in dosimetry and protection

- **ASs devoted most attention to the medical area,** non uniform exposure (interventional radiology and cardiology)
  - **A dosimeter measuring Hp(3) close to the eye** is considered the ideal method and used in pilot studies;
  - Because of the limited availability of Hp(3) dosimeters, **Hp(0.07) and Hp(10) are predominantly used**;
  - When use a dosimeter close to the eye → it should be on a head band, **suggestions on the position**: the side of the head, the eyebrow ridge, on the forehead, or attached into the protective glasses;

Conclusions from the survey

Direct implication in dosimetry and protection

- The dosimeter is **worn at the collar** outside the lead apron, but no correction factor is applied;
- **Protective systems are not always available** and used at different levels, hospital to hospital, even within the same country;

- **In nuclear installations**, shielding masks, glove-boxes and remote systems were in use before the introduction of the new dose limit, and no major changes are foreseen
- **Regardless of the area of use**, issues emerge, beside the economic ones, about the discomfort associated with using lead glasses, since they are heavy and not being suitably fitted for individuals.

Conclusions from the survey

Legislative processes regarding the new limits

- **The majority of the countries initiated the legislative processes** of considering the new limits;
- **Many ASs are directly involved** in the consultation process regarding the national legislation on RP;

- **A reduction of lens dose in two stages** is one example towards a new regulation: 50 mSv/y for 5 y followed by consideration of a further reduction;
- **In EU Member States the processes are well advanced**, since EURATOM 2013/59 has to be implemented by February 2018;
- **National guidelines are planned** or in the completion phase in the large majority of the countries.

Conclusions from the survey

Consideration on tissue effects other than eye lens effects

- **The IRPA ASs are informed about the wider issue** of tissue reactions, such as circulatory diseases and the related nominal threshold dose (0.5 Gy),
- **The large majority have not yet** taken into consideration this issue.

Views/reasons were expressed:

- the role of uncertainties in the available data supporting the question;
- the lack of resources available to the ASs to conduct independent research on the subject;
- the existence of many potential factors, other than radiation;
- the opportunity to first settle the aspects related to the lens dose and then move the attention on the wider issues

Recommendations from the IRPA ASs

Scientific and regulatory aspects

A number of ASs have concern about:

- the availability of suitable dosimeters ;
- the lack of established calibration facilities for Hp(3);
- the associated arrangements for regulatory approval.

Issues which need still to be addressed:

- harmonization of the approach to monitoring lens of the eye dose;
- agreement on the optimum location of dosimeters, i.e. the use of head dosimeters;
- consensus about suitable methods for evaluating the protection provided by lead glasses;

Recommendations from the IRPA ASs

Scientific and regulatory aspects

- agreement on the definition of a suitable category for eye doses to be recorded in the national dose register;
- definition of proper procedures to ensure that itinerant workers will have:- effective measures on the choice of the dosimeter and its positioning taken in cooperation among respective management teams;- efficient dose information sharing and recording procedures;
- an International Dose Passport for international workers, in addition to their National Dose Registers.

Recommendations from the IRPA ASs

Scientific and regulatory aspects

The survey revealed the need for international guidance on the wider issue of tissue reactions, specifically on the implication of **circulatory disease** in radiation risk and addressing the different areas of practice.

Research needs to continue towards a better understanding of the mechanism of circulatory diseases following exposure to low-moderate dose, and to examine the impact of possible confounding factors.

The need for good practice recommendations clearly emerges in the survey.

Recommendations from the IRPA ASs

Economic issues

- The application of **the new limit will generate additional costs** associated with method of protection, additional training, implementing additional dosimetry.
- **Any cost** involved in implementing arrangements may be **a further obstacle to implement** the dose new limits.

Proper **preventive risk assessment** and adequate **stratification of workers** are indeed recommended to reduce the cost of dosimetry to an acceptable level.

Particularly in the **European countries**, attention is given to possible reclassification of workers **from B to A on the basis of eye dose**, which will increase administrative activities and surveillance costs.

Recommendations from the IRPA ASs

Awareness and Culture

- **Awareness and culture** are integral components for the implementation of the new dose limits, and provide a great incentive to the best procedures for maintaining exposure to radiation ALARA.

- It is recognized that awareness among workers who may be exposed needs to be improved, by investing in their education and training and by obtaining further support from specialists such as radiation protection services.

The radiation protection community is facing a real challenge with the new dose limit and ASs should take charge and strongly promote developments in line with **'IRPA Guiding Principles for Establishing a Radiation Protection Culture'.**

This encompasses the development of a pattern of knowledge and behaviors as a combination of **science, values and ethics.**