Research Needs – The ICRP View

NEA Web Event

CRPPH Expert Group on the Dose Limit for the Lens of the Eye (EGDLE)
7 March, 2022

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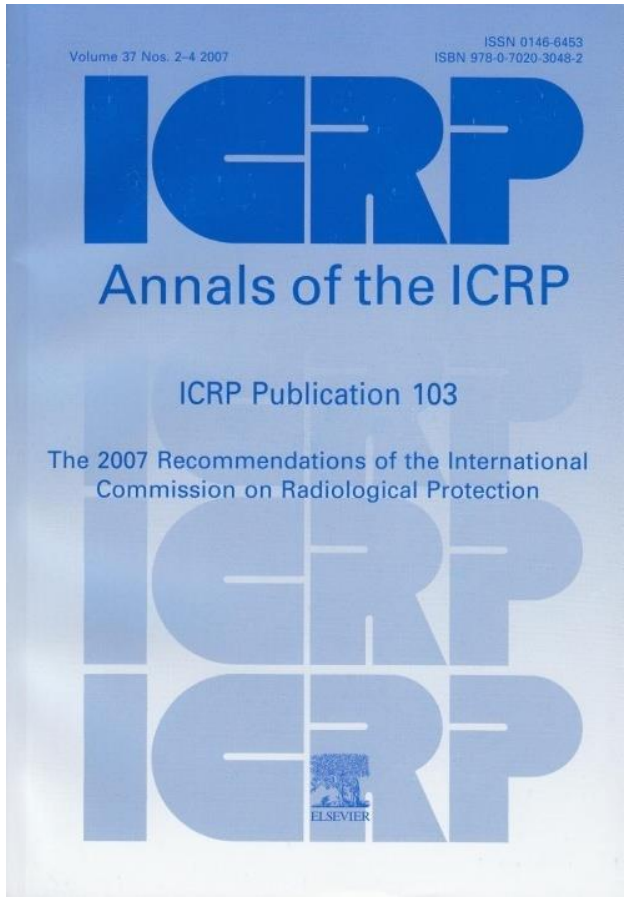
ICRP Chair

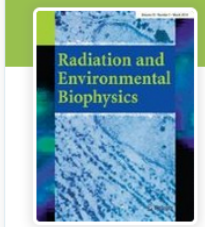
ICRP INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

System Review: The Next Decade



- Last general recommendations published in 2007
- Review and refinement needed
- Recognise gaps
- Consider needed updates
- Identify **building blocks**: essential work required for the next general recommendations

Areas of Research to Support the System of RP



Radiation and Environmental Biophysics

Review Paper

Area of Research to Support the System of Radiological Protection

D. Laurier, W. Rühm, F. Paquet, K. Applegate, D. Cool, C. Clement, on behalf of the International Commission on Radiological Protection (ICRP)

- Introduction
- Research to support radiation risk assessment
- Research to support dosimetry
- Research to support the application/implementation of the System of Radiological Protection
- Conclusions

http://link.springer.com/article/10.1007/s00411-021-00947-1

OPEN ACCESS!

No mention of the lens of the eye, but …

ICRP TASK Group 115

Task Group 115
Risk and Dose Assessment for Radiological Protection of Astronauts

A Task Group under Committee 1

Terms of Reference

- To develop a comprehensive framework for risk and dose assessment for radiological protection of astronauts, including
  - a review of effects and risks from space radiation
  - a broadly-applicable risk and dose assessment methodology
  - an assessment of risk as a radiological protection quantity.

Following a request of the International Systems Maturation Team (ISMT-Radiation)

This will include review of

- Cardiovascular disease
- Cancer
- Disease of the central nervous system
- **Occurrence and latency of lens opacification**

Literature review on effects to the lens of the eye

TG115 Literature survey since publication of ICRP Publication 118 (2012)

Studies on astronauts

- Cucinotta et al. (2001) Space radiation and cataracts in astronauts. Radiat.Res. 156, 460–466.
- Rastegar et al. (2002) Radiation-induced cataract in astronauts and cosmonauts. Graefes Arch. Clin. Exp. Ophthalmol. 240, 543–547.
- Chylack et al. (*2012*) NASCA Report 2: Longitudinal Study of Relationship of Exposure to Space Radiation and Risk of Lens Opacity. Radiat Res 178, 25-32.

Recent reviews of epidemiological studies

- Hammer et al. (2013) Occupational exposure to low doses of ionizing radiation and cataract development: a systematic literature review and perspectives on future studies. Radiat Environ Biophys 52(3):303–19.
- Little MP (2013) A review of non-cancer effects, especially circulatory and ocular diseases. Radiat Environ Biophys 52(4):435–49.
- EPRI 2014: In the text, we mentioned the EPRI meta-analysis.
- Shore (2016) Radiation and cataract risk: Impact of recent epidemiologic studies on ICRP judgments. Mutat. Res. 770, 231–237.
- Hamada et al. (2020) An update on effects of ionizing radiation exposure on the eye. Br J Radiol 2020; 93: 20190829.

Recent studies on single epidemiological cohorts

- Patty et al. (2012) Validity of self-reported eye disease and treatment in a population-based study: the Los Angels Latino Eye Study. Ophtalmol 119: 1725-1730.
- Azizova et al. (2016) Risk of Cataract Incidence in a Cohort of Mayak PA Workers following Chronic Occupational Radiation Exposure. PLoS ONE 11(10): e0164357.
- Wang et al. (2016) Survey of lens opacities of residents living in high radiation background area in Yangjiang, Guangdong province (in Chinese). China J Radiol Med Prot.
- Azizova et al. (2018) Risk of various types of cataracts in a cohort of Mayak workers following chronic occupational exposure to ionizing radiation. Eur J Epidemiol 33: 1193–204.
- Azizova et al. (2019) Risk of cataract removal surgery in Mayak PA workers occupationally exposed to ionizing radiation over prolonged periods. Radiat Environ Biophys 58:139–149
- Lian et al. (2015) Protracted low-dose radiation exposure and cataract in a cohort of Chinese industry radiographers. Occup Environ Med 72: 640-647
- Lin et al. (2016) Association between ^{131}I treatment for thyroid cancer and risk of receiving cataract surgery – a cohort study from Taiwan. J. Nucl. Med. 57(6): 836-841
- Little et al. (2018) Occupational radiation exposure and risk of cataract incidence in a cohort of US radiologic technologists. Eur J Epidemiol 2018; 33: 1179–91
- Azizova et al. (2022) The incidence risk for primary glaucoma and its subtypes following chronic exposure to ionizing radiation in the Russian cohort of Mayak nuclear workers. Cancers 2022, 14, 602.

THANK YOU!

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