The High-Level Group on Low-Dose Research (HLG-LDR)

Global Networking for Low Dose Research

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Presentation on behalf of the HLG-LDR

National Academies of Sciences, Engineering, Medicine
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September 24, 2021

Outlines

1. Introduction on the OECD Nuclear Energy Agency and its standing technical committee dedicated to radiological protection

2. The HLG-LDR : background, justification and vision

3. The HLG-LDR : from the vision to a 3-y work plan

4. HLG-LDR membership and governance

5. Perspectives within and beyond the HLG-LDR

1- The OECD Nuclear Energy Agency (1/2)

34 Countries Seeking Excellence in Nuclear Safety, Technology, and Policy

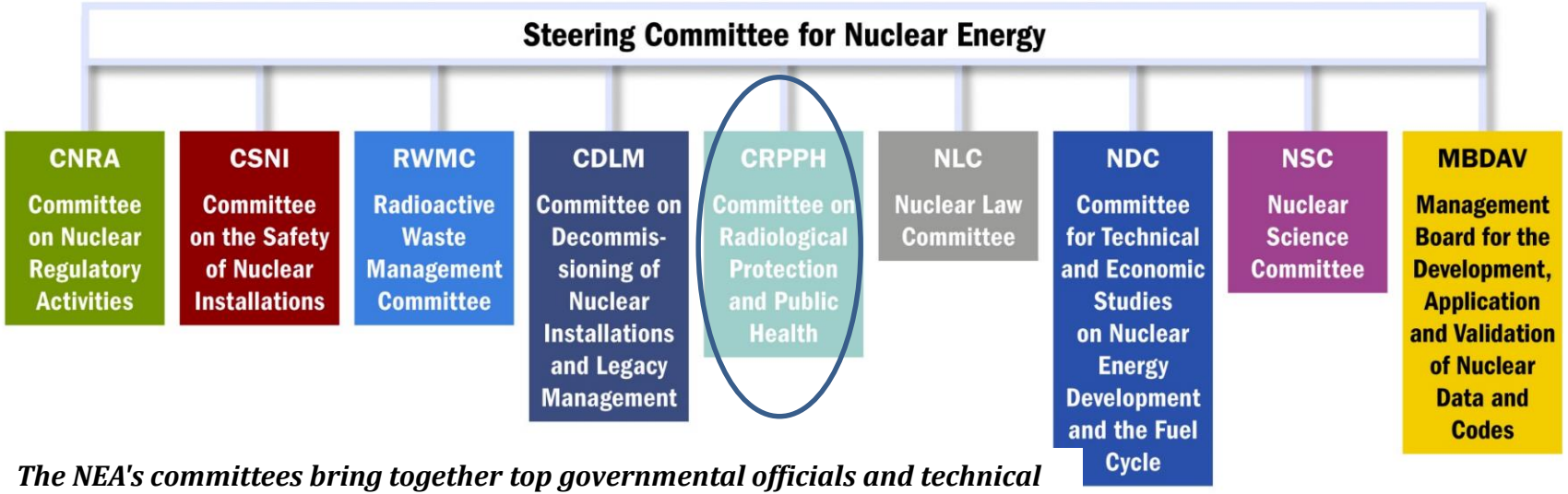
- 34 member countries + strategic partners (e.g., China and India).
- 8 standing committees and more than 80 working parties and expert groups.
- The NEA Data Bank - providing nuclear data, codes, and verification services.
- Growing global relationships with industry and universities.

Argentina	Australia	Austria	Belgium
Bulgaria	Canada	Czech Republic	Denmark
Finland	France	Germany	Greece
Hungary	Iceland	Ireland	Italy
Japan	Korea	Luxembourg	Mexico
Netherlands	Norway	Poland	Portugal
Romania	Russia	Slovak Republic	Slovenia
Spain	Sweden	Switzerland	Turkey
United Kingdom	United States		

NEA countries operate about 81% of the world's installed nuclear capacity

1- The OECD Nuclear Energy Agency (2/2)

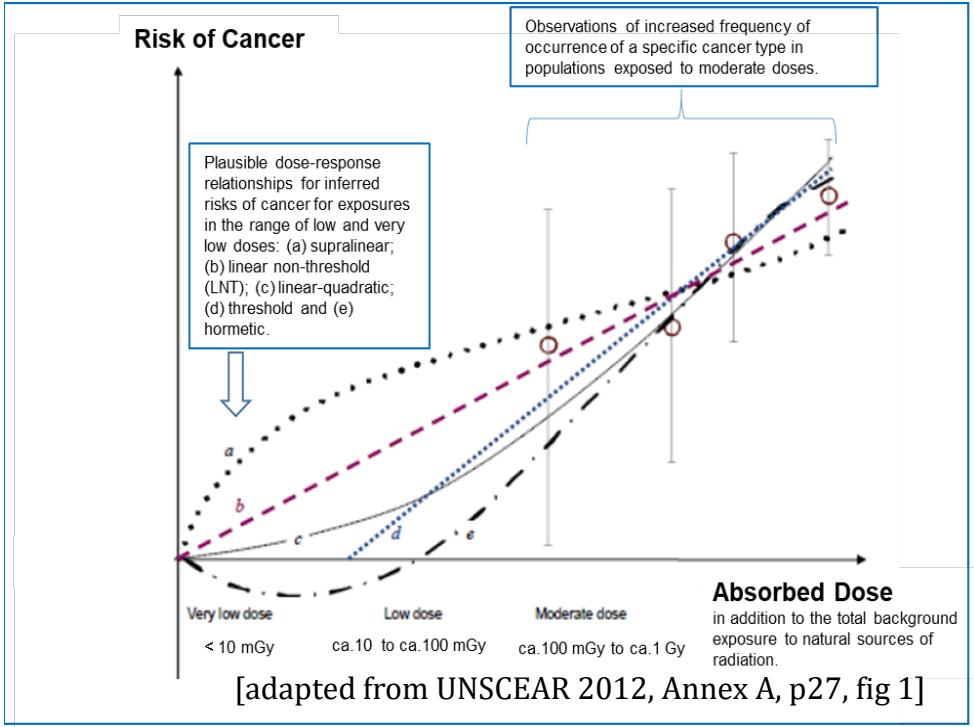
NEA Committee Structure



The NEA's committees bring together top governmental officials and technical specialists from NEA member countries and strategic partners to solve difficult problems, establish best practices and to promote international collaboration.

2 – The High-Level Group on Low Dose Research: Why ? (1/3)

Why is low-dose/low-dose rate research area critical for RP?



[adapted from UNSCEAR 2012, Annex A, p27, fig 1]

- Various plausible dose-response relationships for the risk of cancer in the ranges of very low, low and moderate doses
- Risks in the low dose (rate) range characterised by large uncertainties
- Assumption made for radiation protection is that, for low-dose (rate) exposures, stochastic effects (e.g. cancer risk) are assumed to follow a dose response with no threshold.
- The Linear Non-Threshold - LNT model remains still controversial due to uncertainties in the area of low dose/low dose rate health risks

2 – The High-Level Group on Low Dose Research- Why ? (2/3)

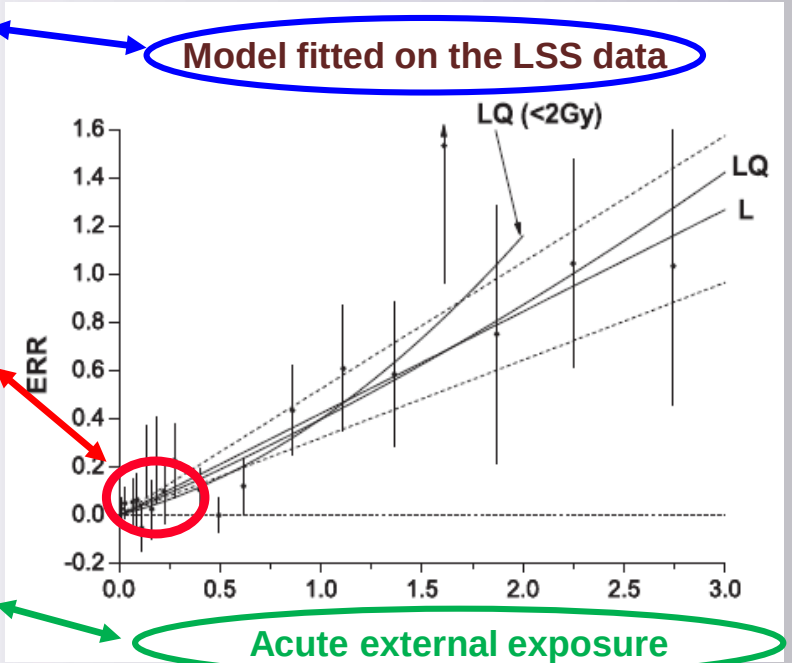
Assessment of radiation-induced risks at low dose: necessary assumptions

Transposition: application of the relationship to a population different from the one on which it was estimated

Extrapolation: application of the relationship below the dose range over which it has been estimated

Analogy: application of the relationship to exposure situations different from that of the population on which it was estimated.

Model fitted on the LSS data



Acute external exposure

2 – The High-Level Group on Low Dose Research – Why? (3/3)

Difficulties related to the scientific uncertainties in the low dose (rate) area

The problem in short

Lots of research have been done and are continuing in this area across the globe.
National or regional funding organisations are still giving high importance to this research area
But open questions still remain :

- Controversies on the extrapolation of risks at low doses and low dose rates
- Discrepancies between results from radiobiology and epidemiology
- Variation of risks according to individual characteristics
- Uncertainties for cancer risks as well as for some non-cancer effects (e.g. circulatory diseases, cognitive effects, lens opacities).

The impact of these uncertainties

- Uncertainties drive the way the optimisation of protection has been implemented for many years, very often interpreted as minimisation of radiological exposure
- Uncertainties make radiation risk communication to the public difficult
- Reducing this uncertainty would improve the robustness of the radiation protection system and should help to better structure and size radiological protection decisions.

2 – The High-Level Group on Low Dose Research – Why? (3/3)

The vision

Developed by a core group in 2019 to frame the mandate of the HLG-LDR, following a scoping meeting in 2018 where participants (35 delegates from 13 countries) recommended the establishment of a HLG to support the development of a global coordination initiative for low dose radiation research.

The HLG-LDR will **support radiological protection** policy, regulation and application choices by **improving the effectiveness and efficiency of research** through **global networking** for the coordination of ongoing and future low-dose research projects. The HLG-LDR will support the **communication of research project** objectives and results to stakeholders

3- From the vision to the work plan

The HLG-LDR will support radiation protection policy, regulation and application choices by

1- Increasing global networking

2- Better coordination of ongoing/future low dose research projects

3- Improving the effectiveness/efficiency of research for policy and regulation

- develop approaches and tools to share information on ongoing and planned research worldwide as well as to improve structuring the existing knowledge on radiation-induced effects on humans and non-human species;
- use them to identify research gaps, and develop mechanisms for prioritisation and coordination worldwide;
- share experience so that research results are efficiently communicated to stakeholders.

3- Activities: 3 topical groups

Implementation of three topical groups

- ❑ Creation of an online Low Dose Research Database
- ❑ Implementation of a Rad/Chem AOP joint group
- ❑ Development of a policy-oriented & promotional communication strategy

3- Activities: The Low Dose Research Database

A Low Dose Research Database is being developed to enhance visibility of ongoing and future research projects, promoting networking and collaboration worldwide

Main features/objectives

- A simple description of research projects, with keywords, main features, and links to contact the principal investigator and to access to additional information
- Broad coverage with a large diversity of research projects, including radiobiology, ecotoxicology, epidemiology, dosimetry, social sciences
- Focus on current and in-planning studies in the low dose (rates) range
- Serve as a user-friendly catalogue to search such projects worldwide
- Facilitate proactive networking and collaboration among researchers
- Keep governmental bodies (e.g., TSOs and regulators) informed on major advances
- Help decision making in funding research

3- Activities: The Low Dose Research Database

Ongoing and future work

- ❑ Elaborate the database structure
- ❑ Test the questionnaire through several examples from different fields of research
- ❑ Implement the database online
- ❑ Run the tool by the end of 2021
- ❑ Start collecting input data on research projects worldwide
- ❑ Ensure the maintenance and extension of the database, through the regular updating of data and the integration of new projects

3- Activities: Exploring the Adverse Outcome Pathway (AOP) Framework

A Rad/Chem AOP joint task group has been implemented to help advance radiological and chemical research using the AOP approach.

Vision: Facilitate collaboration and co-ordination between the chemical and radiation fields for effective uptake of the AOP framework in the low dose (rate) area.

Mission:

- ❑ Demonstrate efficiency of approach to identify knowledge gaps through better organization of data
- ❑ Advance understanding of health outcomes for human and non-human species
- ❑ Bringing together epidemiologists and biologists
- ❑ Demonstrate the value of collaborative studies
- ❑ Address questions on low dose effects in the context of human and ecosystem health
- ❑ Contribute to and advance the goals of the OECD AOP program towards non-chemical stressors

3- Activities: Horizon Scanning Exercise on the use of AOP in radiation research

"A means of systematically searching for and identifying emerging trends, opportunities, and limitations that might impact the future directions of a defined subject" Lalone et al. 2017

Sept 2021

Phase I

Key question solicitation

Oct to Dec 2021

Phase II

Sort all key questions

January 2022

Phase III

International survey to rank "top 30" questions

https://RadiationAOP.sawtoothsoftware.com/login.html

3- Activities: Develop a policy-oriented & promotional communication strategy

❑ Improving communication on low dose risks and uncertainties and adapt it to targeted audience

- Identify the issues of concern in the low-dose area that would deserve clearer communication: implication of the LNT, separation between science and judgement, bring in social dimension of risk (reasonableness, tolerability, acceptability)
- Identify the available data/tools that can help in making communication more efficient
- Exercise how to translate technical results into policy-oriented messages
- Create a fast track between research results and science-based policies and regulations.

❑ Promote engagement of funding organisations

- Identify a communication strategy for engaging national or regional funding organisations
- Develop strategies for identifying research gaps, using AOP and the low dose research database
- Promote multilateral collaboration to undertake joint research projects

4- Membership and governance

- **Current membership**
  - 59 experts from 13 countries
  - Invitees from international or regional associations depending on the agenda

Argentina	Australia ✓	Austria	Belgium ✓
Bulgaria ✓	Canada ✓	Czech Republic	Denmark
Finland ✓	France ✓	Germany ✓	Greece
Hungary ✓	Iceland	Ireland	Italy ✓
Japan ✓	Korea	Luxembourg	Mexico
Netherlands	Norway	Poland	Portugal
Romania	Russia	Slovak Republic	Slovenia
Spain	Sweden ✓	Switzerland	Turkey
United Kingdom ✓	United States ✓		

- **Governance of the HLG-LDR**
  - Chair: D. Laurier (IRSN, France)
  - NEA Sec.: J. Garnier-Laplace; J.H. Kruse

- **Coordination of the 3 topical groups**
  - LDR Database – Co-Chairs: Dmitry Klokov (IRSN), Nick Priest (UK)
  - Rad/Chem Joint AOP - Co-chairs: Vinita Chauhan (HC, Canada), Knut Erik Tollefsen (NIVA, Norway), with the assistance of: Danielle Beaton (CNL, Canada)
  - Policy-oriented Communication Strategy - Chair: Paul Locke (Johns Hopkins University, US)

5- Perspectives within and beyond the HLG-LDR

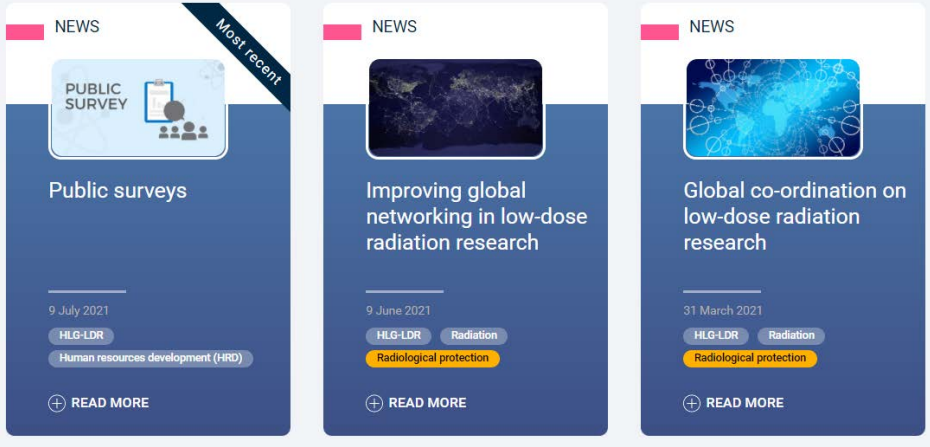
- **Options for enhancing coordination with DOE's research programme**
  - 7 US experts among HLG-LDR members
  - Low Dose Research Database; deliverables from the groups publicly available (e.g. AOP Questions - gaps; AOP development in liaison with OECD dedicated programme; communication tools; forum to exchange through events; liaison with UNSCEAR, ICRP…)
  - Facilitation of joint undertaking gathering private and public organisations from interested countries, including access to state-of-the-art facilities

- **Promotion of coordination across governments & academic researchers**
  - **NEST partnership** with member countries to help address important gaps in nuclear skills capacity building, knowledge transfer and technical innovation in an international context
    Nuclear Energy Agency (NEA) - Nuclear Education, Skills and Technology (NEST) Framework (oecd-nea.org)

- **Involvement of OECD NEA in professional radiation protection training**
  - **The International Radiological Protection School (IRPS)**
    Nuclear Energy Agency (NEA) - Preparing tomorrow's RP leaders (oecd-nea.org) –

Thank you for your attention!

https://www.oecd-nea.org/jcms/pl_58142/high-level-group-on-low-dose-research-hlg-ldr
https://www.oecd-nea.org/jcms/pl_59579/improving-global-networking-in-low-dose-radiation-research
https://www.oecd-nea.org/jcms/pl_60020/international-horizon-style-exercise-to-evolve-the-use-of-the-adverse-outcome-pathway-aop-framework-in-radiation-research-and-regulation



https://www.oecd-nea.org/jcms/fmb_7456/learning-and-tools