

TG 127 : First proposals

IRPA 16

16th International congress

7-12 July 2024, Orlando,

Yann Billarand

TG 127 Chair

On the behalf of the TG

TOR TG 127

Task Group 127 Exposure Situations and Categories of Exposure

A Task Group under Committee 4

Started in January
2023

Integration of ICRP 103 recommendations into international standards and national regulations has posed some difficulties.

There is a need to understand how the current system has been implemented and how effective the implementation has been in improving radiation protection

- To review ICRP Publication 103 and subsequent Publications in terms of exposure situations and category of exposures
- To organise open workshops together with international organisations
- With special attention paid on existing exposure situations

Activities of TG 127

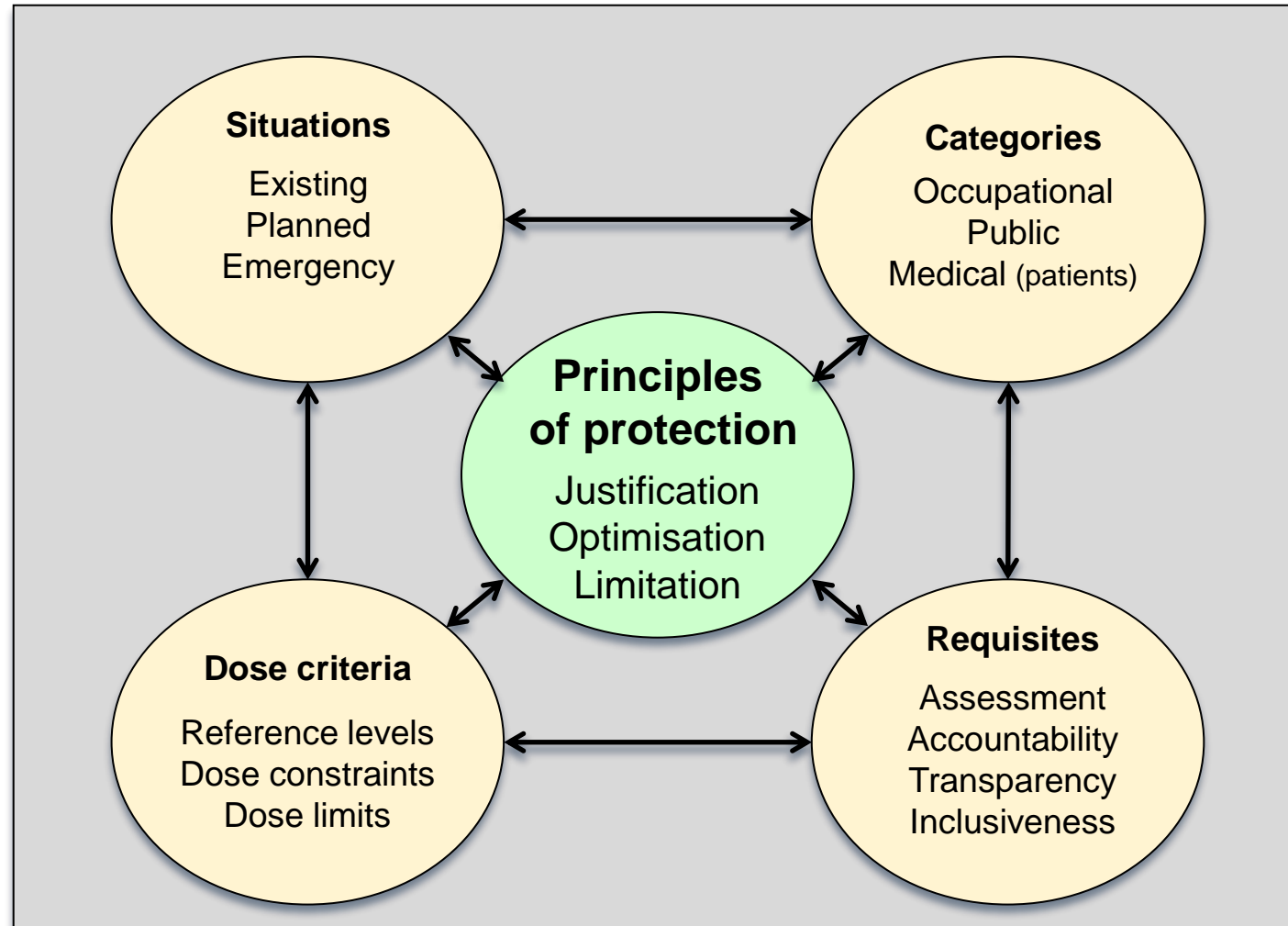
- **In person meeting in Paris 12-13th April 2023**
- **E-meeting 25th September 2023**
- **Hybrid meeting during this symposium (7th November 2023)**
- **E-meeting 26th of June 2024**

- **Yann BILLARAND (FR, C4 member))**
- Drew WATSON (AU)
- Lorenzo MAZZONI (IT)
- Kari TOEWS (CA)
- Ed WALLER(CA)
- Daniele GIUFFRIDA (FANR, C4 member)
- Shaheen DEWJI (US)
- Chris JONES (UK)
- Sylvain ANDRESZ (FR)
- Hiroko YOSHIDA (JP, C4 member)
- Jean-François LECOMTE
- Philip EGIDI (US)
- Chris MOGG (UK)
- Analia CANOBA (ARG, C4 member)
- Yahong MAO (CHINA, C4 member)
- Olvido GUZMAN-LOPEZ-OCON (IAEA)
- Shengli NIU (ILO)
- ICRP secretariat support: Abdulkadir AL AYDAROUS

System of Protection

2007

- ✓ **3 pillars:**
 - ✓ Science
 - ✓ Experience
 - ✓ Ethics



Fit for purpose to future changes, e.g. novel technologies, wide-scale decommissioning, societal changes, climate change ?

Consequences of progresses

✓ Pillar « science »:

- ✓ New phantoms and biokinetics models: new series of dose coefficients
- ✓ New studies on health effects and epidemiological studies; detriment calculation

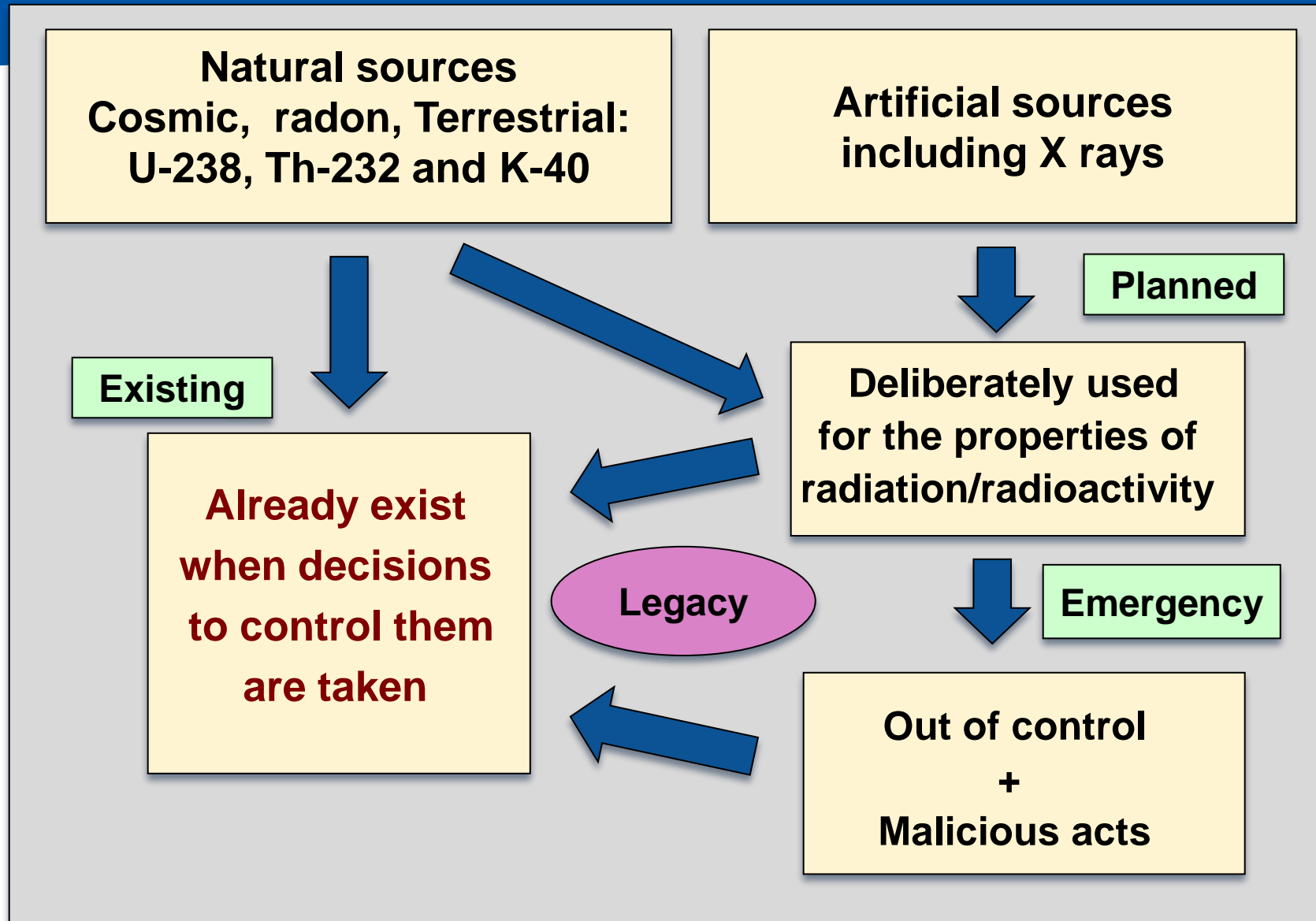
✓ Pillar «Experience »

- ✓ Fukushima accident: complexity of different situations at the same time; occupational exposure framework
- ✓ Transition between exposure situations
- ✓ How to handle new situations introduced in ICRP 103

✓ Pillar « Social and ethical values»

- ✓ Relationship between principles and ethical core values: ICRP pub 138
- ✓ Evolution of social aspects: views and concern of stakeholders
- ✓ Societal and ethical values are becoming increasingly more important: equity, Human rights, sustainability, autonomy, psychological distress, economic damage, health risk...


3 types of exposure situations and transitions



What is at stake in TG 127?

Is the system sufficiently understood?

✓ ICRP 103 clear for planned exposure situations

- 
- ✓ Give more details about existing exposure situations relying on recent ICRP publications (radon, NORM, cosmic, large nuclear accident (recovery phase), legacy sites)
 - ✓ Give guidance on the 3 principles according to the exposure situation (crosslink with TG 114 and TG 124)



Definition of existing exposure situation

Radiation is not deliberately introduced

Radiation is usually not the primary hazard

Characterization of exposures / low levels

Graded approach

The possibilities to manage the situation



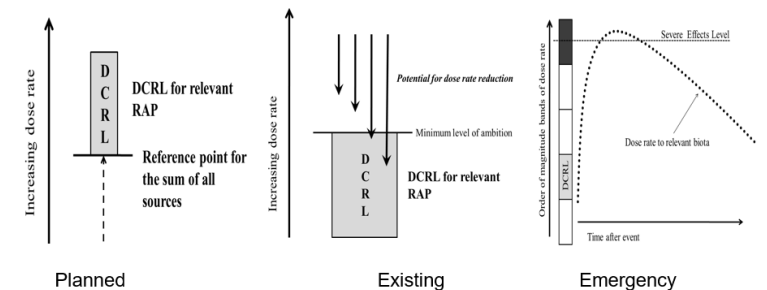
As soon as a EES is amenable to control, this situation becomes « planned »

What is at stake in TG 127?

- ✓ **To pool issues and draw conclusions from experience feedback in the implementation of the system applied to very diverse exposure situations**
 - ✓ Taking into account issues listed (IAEA regional workshops, SLOs feedback, issues raised by members of the TG according to their own experience)
 - ✓ To clarify the concepts of exposure situations and categories of exposure for an adequate implementation into national frameworks, including: definitions, transitions and application of limits, constraints and reference levels. Occupational exposure in EES.
 - ✓ Recommendations should be implementable in the regulatory framework in a reasonable way.

Main outcomes today

- ✓ **Consider the stability of the system must be supported (but need of clarifications)**
 - ✓ The TG support the system founded on the selection of a type of exposure situation first and then to consider categories of exposure
 - ✓ Consider an evolution of the system only if:
 - ✓ Resources may be less without any bad influence on RP
 - ✓ RP can be improved without undue burden
 - ✓ Implementation may be facilitated
- ✓ **The TG reached a consensus about the outline of the report**
 - ✓ The TG considers that the outline is able to embark all the issues raised during the preparatory work
- ✓ **The TG considers that there is enough material to analyse the inclusion of environment as a category of exposure in its own right**
- ✓ **The TG report shall not be considered as a definitive subpart of the next general recommendations of ICRP**

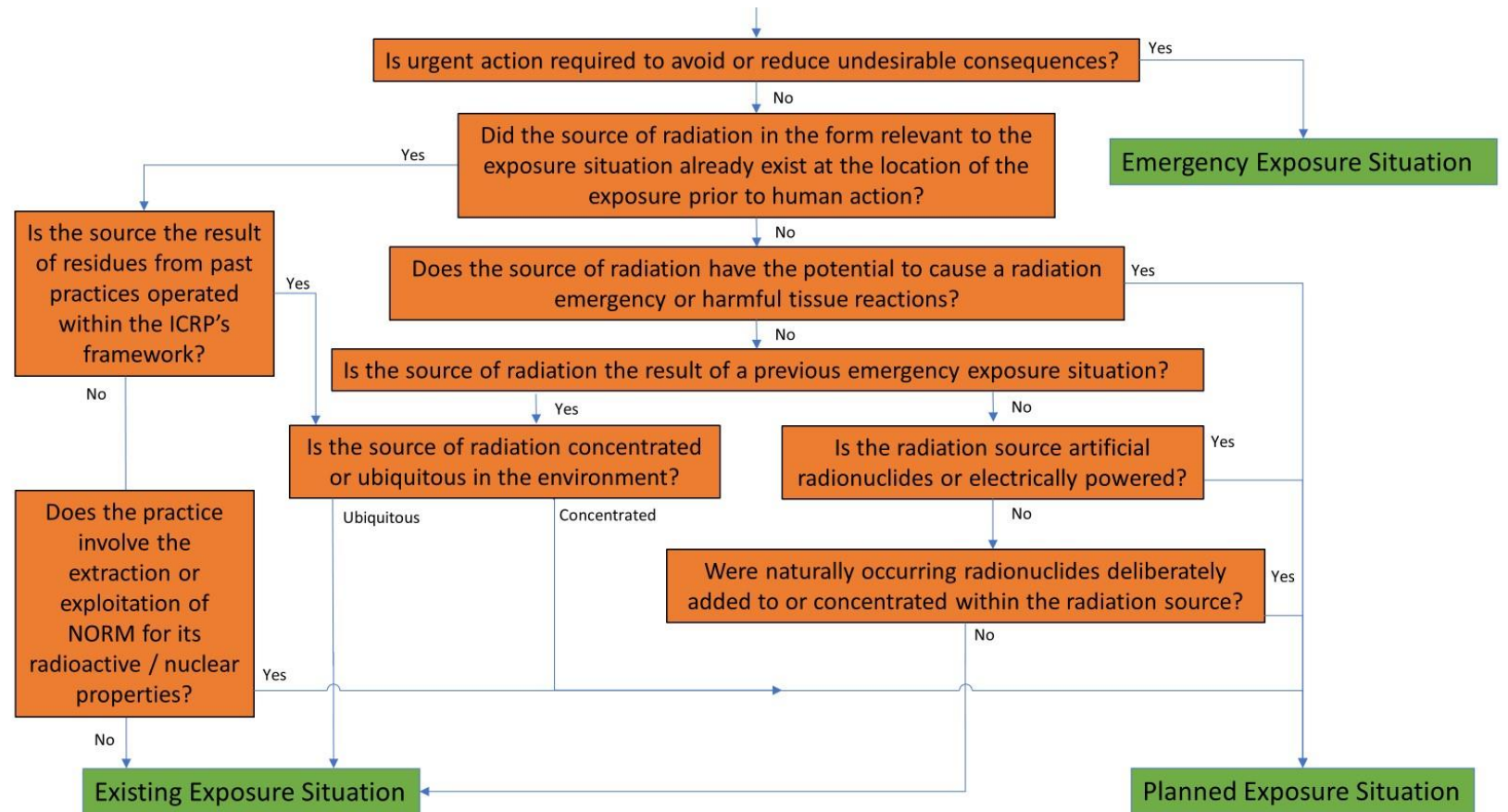


Outline of the report

- ✓ Introduction with a reminder of the TOR and emphasize the stability of the system is primarily sought
- ✓ **Section 1: exposure situations**
 - ✓ 1.1 Reminder about the uniqueness of the ICRP RP system
 - ✓ 1.2 The 3 exposure situations
 - ✓ 1.2.1 Planned exposure situations
 - ✓ 1.2.2 Emergency exposure situations
 - ✓ 1.2.3 Existing exposure situations
 - ✓ 1.3 Tools and Tips to help in the assignment of a type of exposure situation
 - ✓ 1.4 Transition from a exposure situation to another one
- ✓ **Section 2: current categories of exposure**
 - ✓ 2.1 occupational exposure
 - ✓ 2.2 public exposure
 - ✓ 2.3 medical exposure
- ✓ **Section 3: application of the 3 principles**
 - ✓ 3.1 Examination of the principle of justification (to be shared with TG 124)
 - ✓ 3.2 Examination of the principle of optimization (to be shared with TG 114)
 - ✓ 3.3 Examination of the principle of limitation
 - ✓ 3.4 Potential evolutions of the criteria/concepts used for the application of the principles
 - ✓ 3.4.1 Reference levels and Dose constraints
 - ✓ 3.4.2 Dose limits
 - ✓ 3.4.3 Exemption
- ✓ **Section 4: graded approach**
- ✓ **Section 5: a potential new category: environment (to be shared with TG 105)**

Tentative flowchart to help

- To be completed with:
 - Transitions
 - Categories of exposure



Thoughts about Dose constraints and Reference levels

- ✓ Basically RLs and DCs refer to a source
- ✓ Both tools support the optimization principle implementation
 - ✓ DCs in the framework of planned exposure situations
 - ✓ RLs in the framework of emergency exposure situations and existing exposure situations
- ✓ DCs are often used as a sub-limit
- ✓ RLs are often used as a border between exemption and the regulatory domain for EES
 - ✓ Raises the issue of the application of the concept of exemption to a existing exposure situation
- ✓ The body responsible for setting RLs and DCs may differ (operators vs public authorities) according to the exposure situation and the category of exposure



Proposal to merge the 2 criteria into a single one and to strengthen the explanation of the use of the remaining criteria

An attempt to make easier the drafting of the report

Use of AI (Copilot and ChatGPT)

(Human generated!) Text submitted to AI:

Optimization principle:

First of all, optimisation is a process more than a target.

In the unified system of radiation protection promoted by ICRP since the publication of ICRP-103 recommendations, optimization principle applies in the same way for the 3 categories of exposures (human beings). The implementation of the optimization principle for the 4th category of exposure (environment) is addressed in section 5.

In its new recommendations ICRP insist on the holistic approach in the implementation of the optimization principle. The holistic approach is to be understood as the consideration of the other risks than the radiological risk (ie. due to chemical substances, fall down from scaffolding, risk of deficiency in oxygen and so on). In addition, the holistic approach means also to pay attention to the transfer of exposure between categories of exposures as defined by ICRP in its radiation protection system. As an example, the more an operator asks for releases permission, the more the public is exposed. But if the operator fosters the management of useless radioactivity as waste, workers on the facility may see their exposure increase.

As ICRP is aware that of the economic burdens that protection of people and environment entail, ICRP promotes a graded approach for the implementation of the optimization principle. The provisions may be commensurate with the level of exposure, the process itself and the technical provisions as well. The commission believes that the holistic approach will help the graded approach.

ICRP states that regulations in the field of the radiological protection shouldn't hamper the deployment of the holistic approach.

Questions asked:

1. Do you know ICRP?
2. What kind of ICRP publications do you know?
3. Do you think the following text is valuable for ICRP?
4. Are you able to rewrite this text into ICRP style?
5. Do you think there is some breakthroughs in the text I propose that warrant to be highlighted

Answer to question 5 (ChatGPT): Certainly! Let's highlight the key breakthroughs in the proposed text:

1. **Holistic Approach:** The concept of considering risks beyond radiological ones (such as chemical hazards, physical risks, etc.) is a significant breakthrough. ICRP's emphasis on this holistic perspective acknowledges the interconnectedness of various risks and exposure scenarios.
2. **Economic Considerations and Graded Approach:** The recognition of economic burdens associated with protection efforts is noteworthy. ICRP's promotion of a graded approach—tailoring provisions based on exposure levels, processes, and technical feasibility—reflects a pragmatic and balanced approach.
3. **Avoiding Regulatory Hindrance:** The assertion that regulations should not hinder the deployment of the holistic approach is crucial. It underscores the need for regulations that facilitate effective protection without stifling practical implementation.

ICRP

THANK YOU!

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