

ICRP DIGITAL WORKSHOP
THE FUTURE OF RADIOLOGICAL PROTECTION
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**Prospects on the ICRP Paradigm for
Protection against Ionizing Radiation**

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Introduction

The **paradigm** recommended by the **ICRP**

It is:

- found in uncompromising **ethical doctrines**,
- based on **solid science**,
- exceptionally **comprehensive**, and
- **internationally recognized**.

Thus,

This unique paradigm ought to be guarded!

Meddling with it should be prevented!

Nonetheless, the ICRP paradigm needs to be refreshed from time to time!

It should be kept abreast with, *inter alia*:

- any novel scientific consensus on the **epistemology of radiation effects**; and,
- contemporary social demands on **radiation protection.**

**Such updating would also permit the
incorporation of many lessons on the
application of ICRP recommendations
learned and reported in recent years
(e.g., from Fukushima!).**

**Within these constraints, what follows are
12 suggestions for updating the paradigm**

(They are not in logical order but rather in inverse order of their perceived importance)

**Suggestions for updating
the ICRP paradigm**

1. Social licensing

- New demands for ***social licensing*** of human endeavours involving radiation exposure should be assimilated specifically into the ICRP paradigm.
- The concept of ***tolerability***, as described by Jean-Francois Lecomte, is crucial



Social licensing should now be part of the radiation protection paradigm

2. Principles

- **The principle of 'dose limits' need deep revision.**
- **The paradigm must incorporate a 4rd principle on protection of future generations and their habitat**
(which is already established in the international fundamentals)
 - **It is not implicit into the traditional principles.**
 - **It has to be associated to the ethics of arête.**

The dose 'limits' confusion

- The dose 'limits' do not comply with definition and understanding of 'limit'
 - They are not a terminal point or boundary beyond which a personal dose must not pass.
- A deep revision of this concept, and also of the logic behind the 1mSv/y , is needed

Why are we permitted to receive 20 mSv/y after the accident if the dose 'limit' is 1mSv/y?



3. Ethics

- The **ethics of the paradigm** in specific fields, such as medicine, veterinary and the environment has to be explained as suggested by Martinez & Zölzer
- But, fundamentally, the **ethics of the principles** has to be described.

(ICRP Publication 138 is on **values** rather than **ethics**)

- The following association is suggested:

Teleological
(consequence)

*Mind the ends, which
justify the means*

Utilitarian
(utility)

*Do the greatest good
for the greatest
number of people*

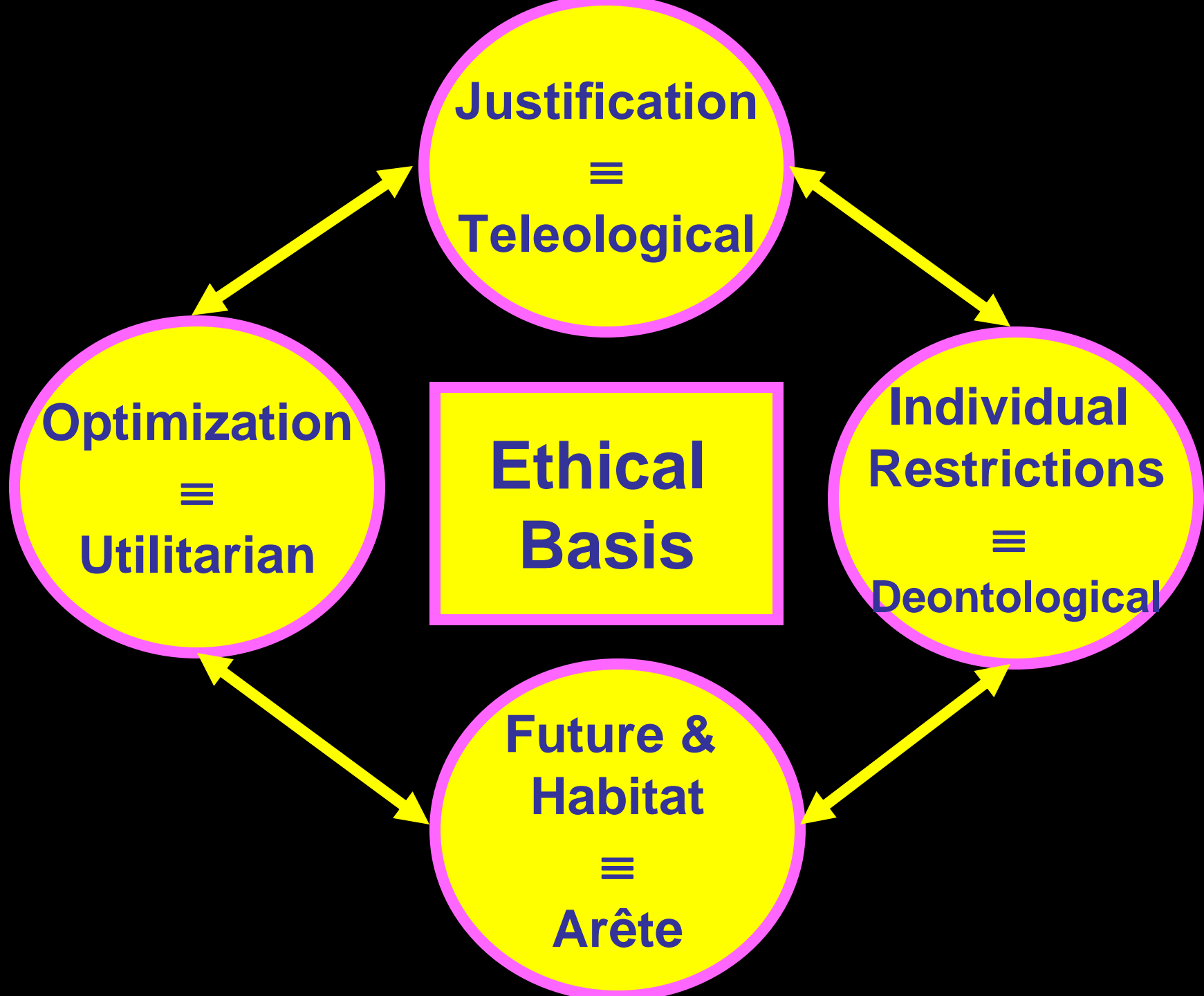
**Ethical
doctrines**

Deontological
(duty)

*Not do unto
others what they
should not do
unto you*

Arête
(virtue)

*Do good that will
not be returned*



4. Exposure situations

The transition between pre- and post-emergency situations need to be revised:

- by revisiting the old concepts of
 - **controlling** planned additional doses

versus

- **intervening** for averting extant doses; and,
- by differentiating between:
 - **'existing'** situations and
 - **'extant'** situations

5. Occupational exposure

- It should be revised, with ILO, to consider *inter alia* the application of the **graded approach** suggested by Sylvain Andresz and others..
- But primarily, it needs to address specifically:
 - **Natural radiation**
 - **No (radiation) workers**
 - **Volunteer workers**
 - **Responders**

6. Medical exposures

- Medical exposures must be **dissected**:
- Separate and divide **patient exposures** into :
 - **Patient diagnostic exposures, and**
 - **Patient treatment exposures**
(including addressing the issue of *adventitious exposure* and protection against *secondary malignancies*).
- Separate into independent categories:
 - **Exposure of comforters, and**
 - **Exposure of volunteers in medical research**

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Considerations on Potential Regulatory Actions for

Radiation Protection in Radiotherapy:

Monitoring Unwanted Radiation Exposure in Radiotherapy

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**Medical
exposure?**

....or....

conforter

with an

ad-hoc

paradigm

?

VOLUNTEERS NEEDED

for paid clinical research



Medical exposure?....or....*ad-hoc* paradigm

7. Quantities

- The new recommendations of ICRU+ICRP shall be incorporated into the paradigm.
- Including a better distinction between
 - **intensive quantities** (e.g., dose) and
 - **extensive quantities** (e.g. collective dose)
- ...but...other changes may be needed!

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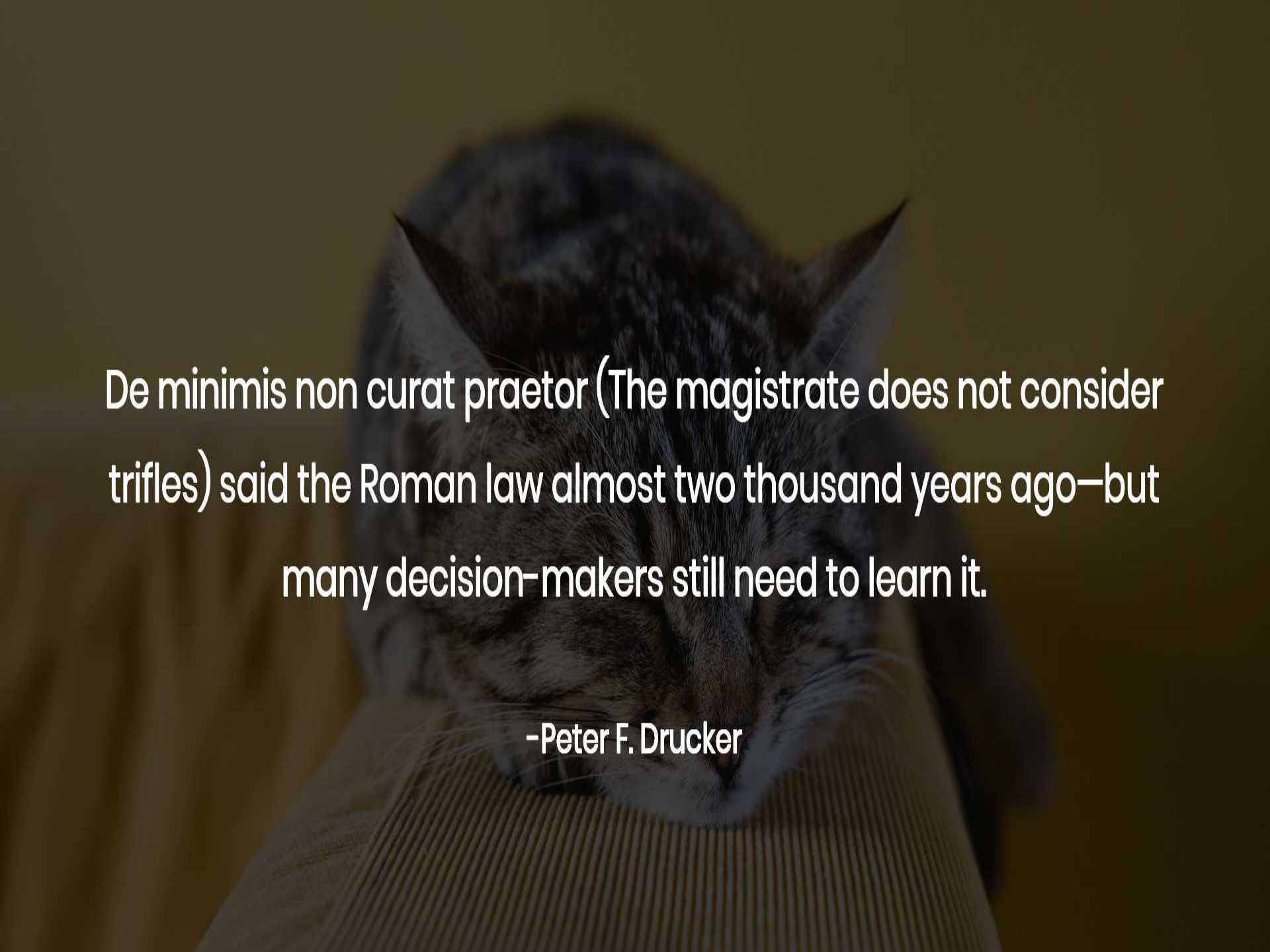
Emerging Challenges in the International System of Quantities and Units for Radiation Protection

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8. Scope

The scope of the paradigm has to be clarified:

- Describing exposures unamenable to protection, which are to be **excluded** from the paradigm
- Analysing exposure situations with protection already optimized, which are to be **exempted** from the paradigm.



De minimis non curat praetor (The magistrate does not consider trifles) said the Roman law almost two thousand years ago—but many decision-makers still need to learn it.

-Peter F. Drucker

9. Natural radiation

- **Natural radiation exposure was basically not considered when building the paradigm.**
- **This original lapse needs to be corrected**
- **NORMs will need special consideration.**

10. 'LNT'

The 'LNT' acronym describes different concepts:

- **A radiation protection model**: practical approach for managing radiation protection that consider the protection for additional doses regardless the level of accumulated dose.
- **An epidemiological conjecture**: the incidence of effects per unit dose at high doses (with epidemiological evidence) remain the same at low doses (no-epidemiological evidence).
- **A biological theory**: At low radiation doses a given increment in dose will produce a directly proportionate increment in the probability of incurring cancer or heritable effects attributable to radiation.

LNT HAS TO BE CLARIFIED!

11. 'Contamination'

Fear of 'contamination' has caused psychological harm and economic havoc

- **On land**
- **On residues**
- **On consumer goods**

The time is ripe for the ICRP paradigm to deal with these issues with clarity.

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Radioactivity in Goods

Supplied for Public Consumption or Use:

Towards an Internationally Harmonized

Regulatory Framework

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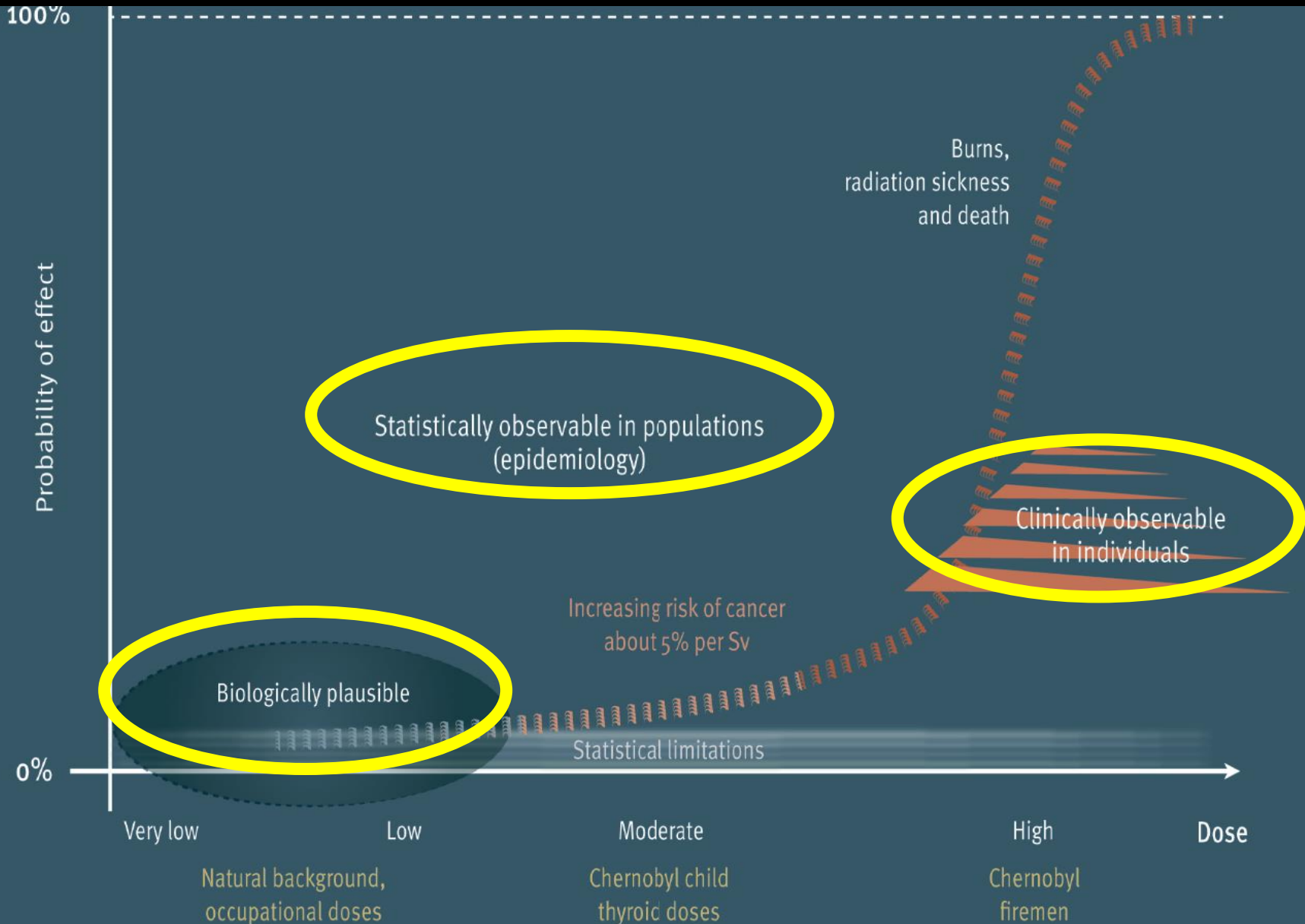
12. Epistemology

- Roger Coates has warned on the need to **review low-dose decision-making** in radiation protection.
- With that purpose in mind I would suggest that the revised paradigm must recognize the **epistemological constraints** of its scientific **basis!**

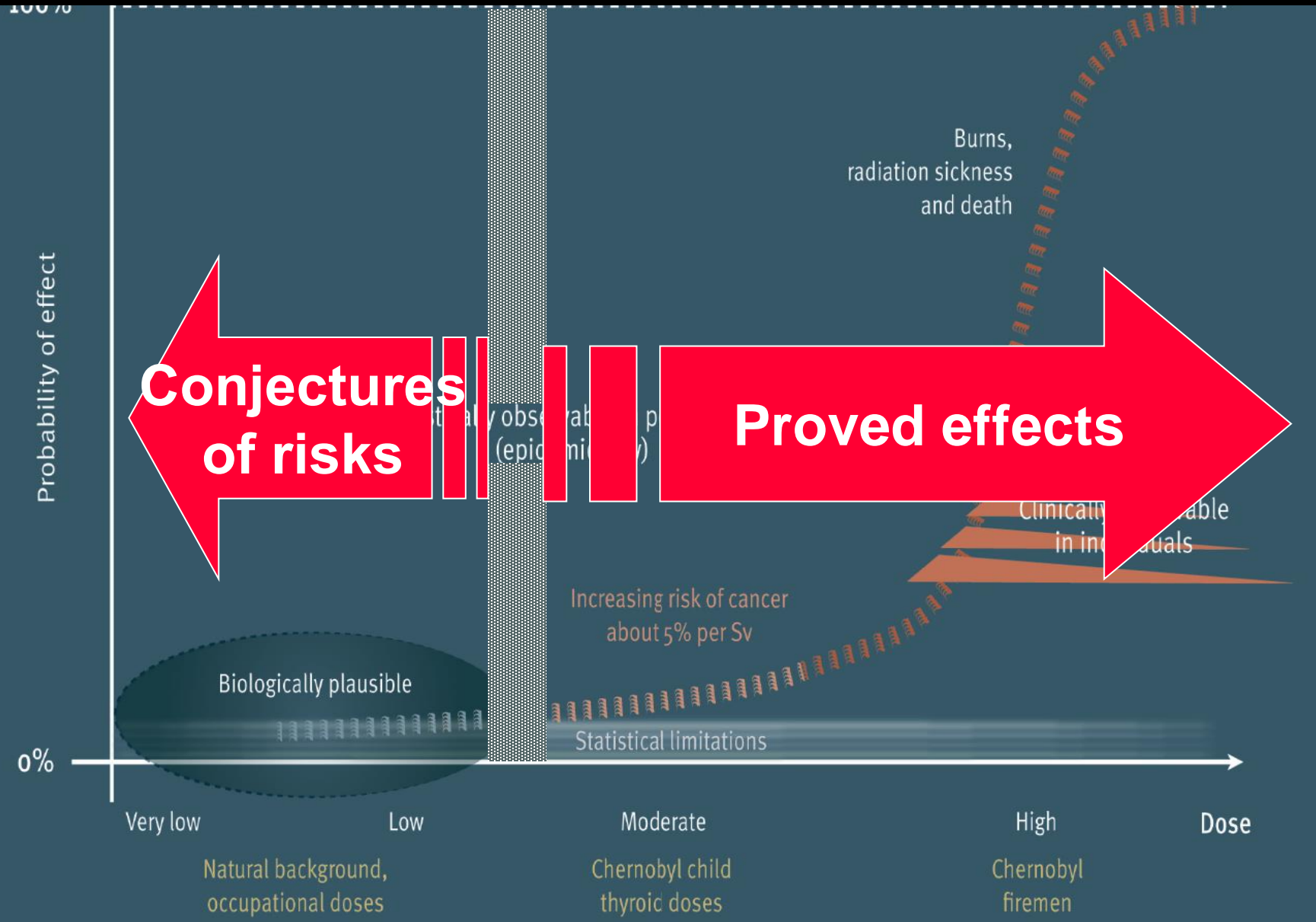
(By taking account of the UNSCEAR report on attribution of radiation effects and inference of radiation risk)

A clear distinction between effects:

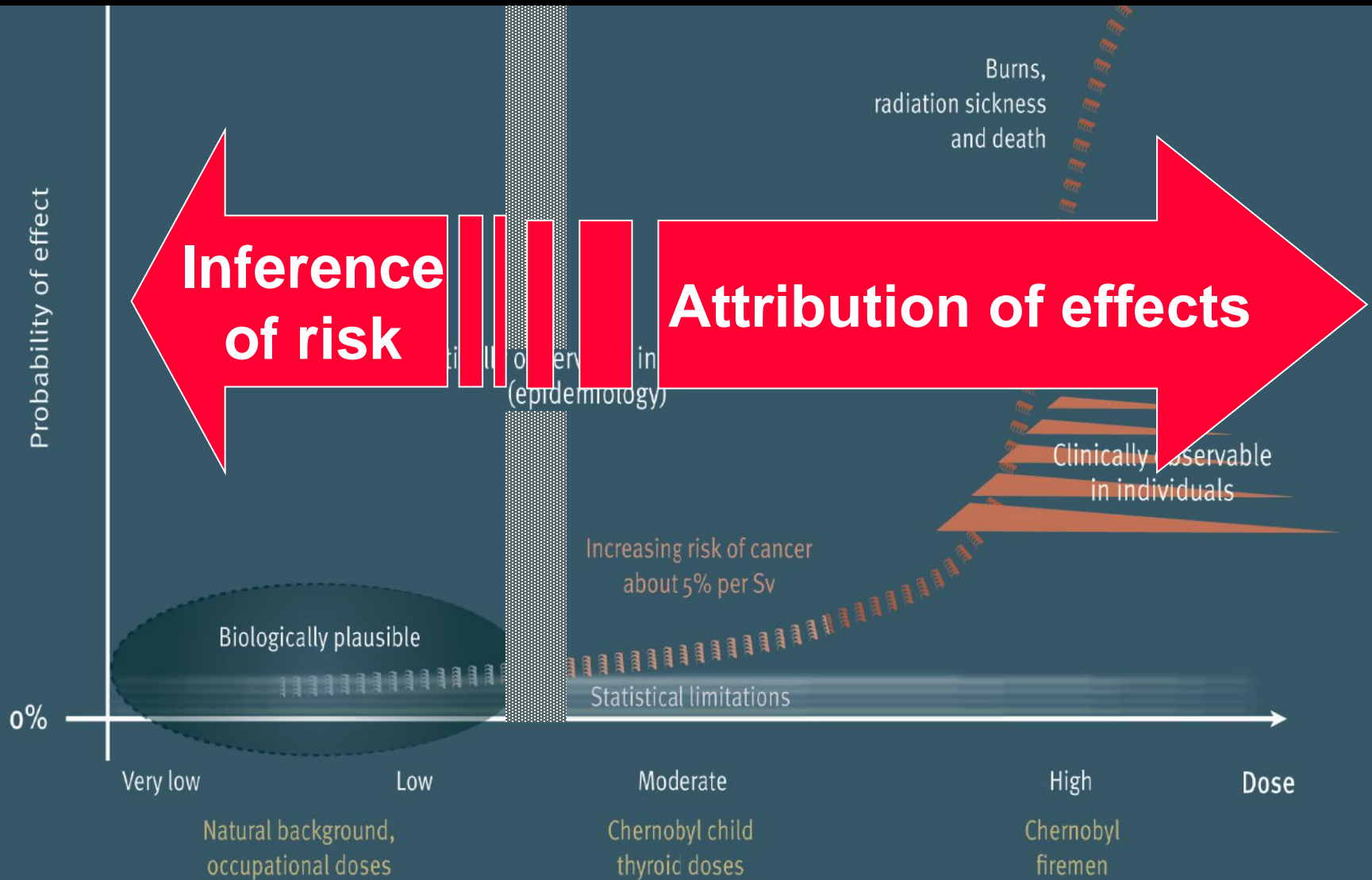
clinically observable, statistically observable and biologically plausible



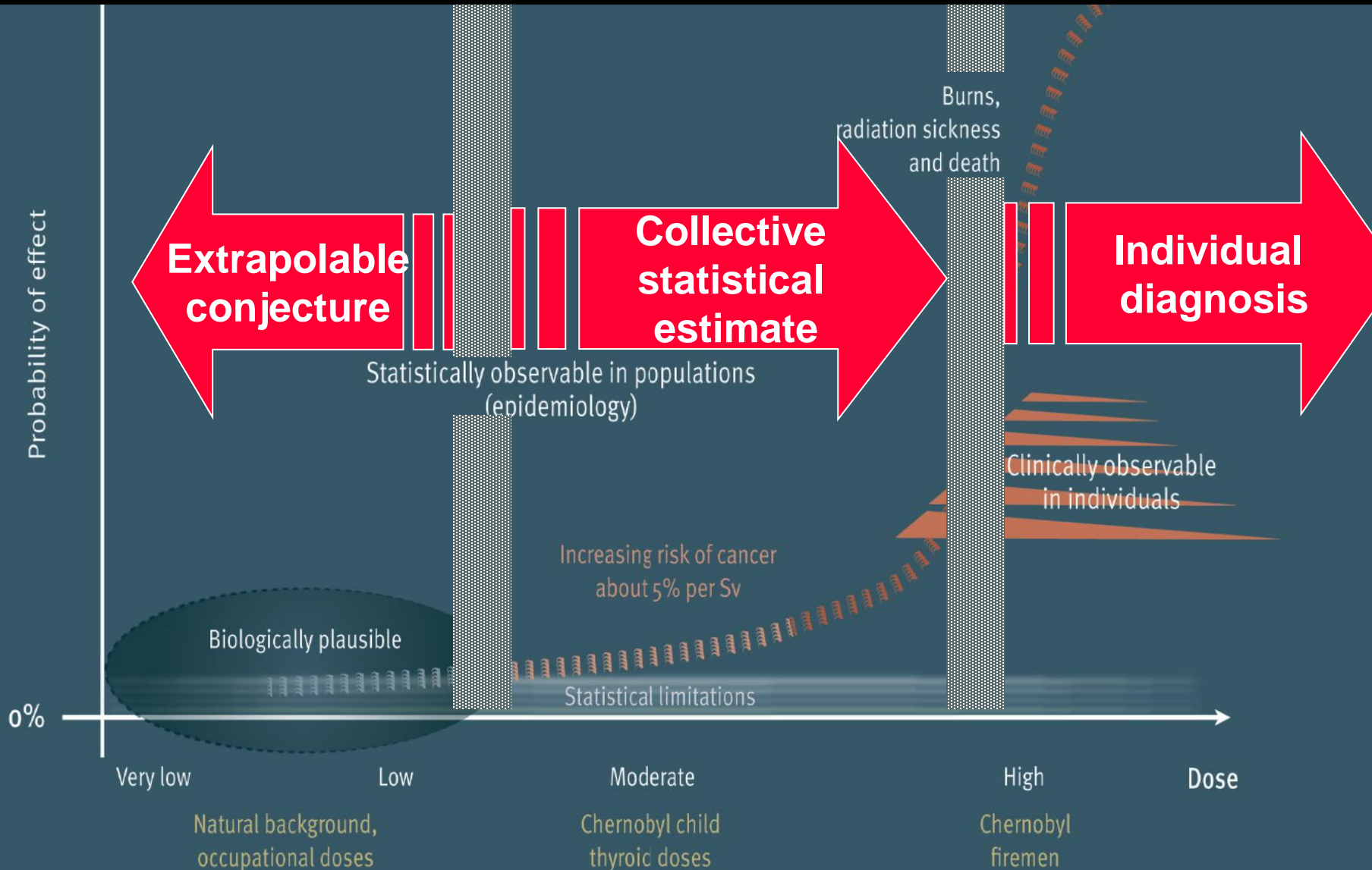
At moderate and high doses there are **proved** effects but at low doses there are **conjectures** of risks



At high and moderate doses the effects are **attributable** to the exposure, but at low doses there is just a subjective **inference** of radiation risk



At very high doses the effects are diagnosable in the exposed individual, at moderate doses they can be collectible estimated, at low doses they are just extrapolable



Epilogue

In sum:



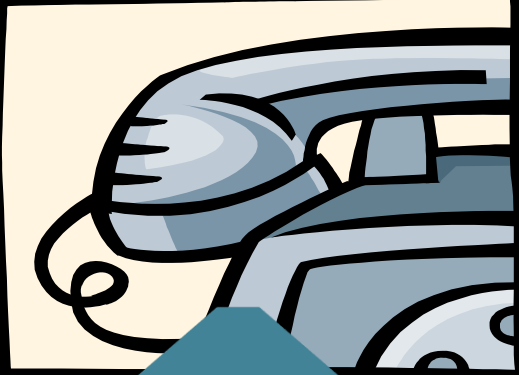
**Hopefully, the suggestions in this paper will
be helpful for the ICRP when developing its
future recommendations!**



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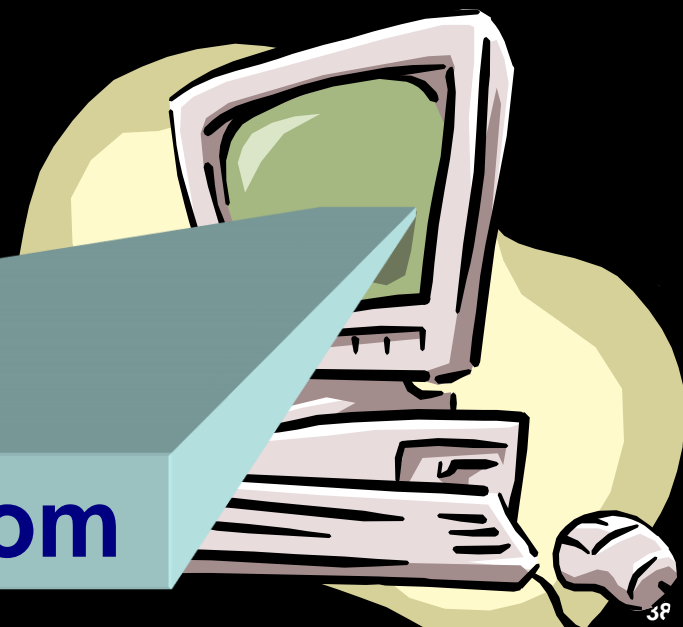


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Thank you!

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