

# ICRP

## An Introduction to the Ethical Foundations of the Radiological Protection System

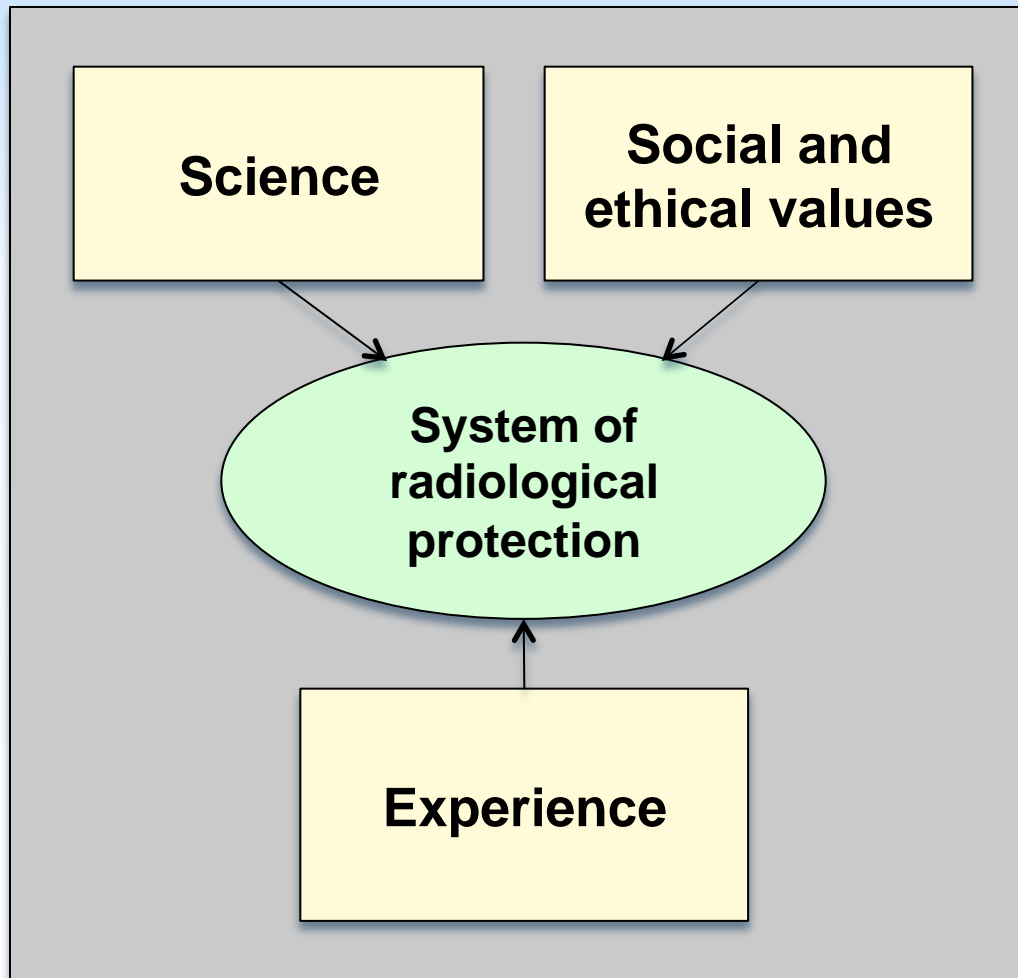
**Jacques LOCHARD**  
Vice-Chair of ICRP



First IRPA North American Workshop on the  
Ethics of Radiological Protection  
Baltimore, Maryland, USA  
17-18 July 2014

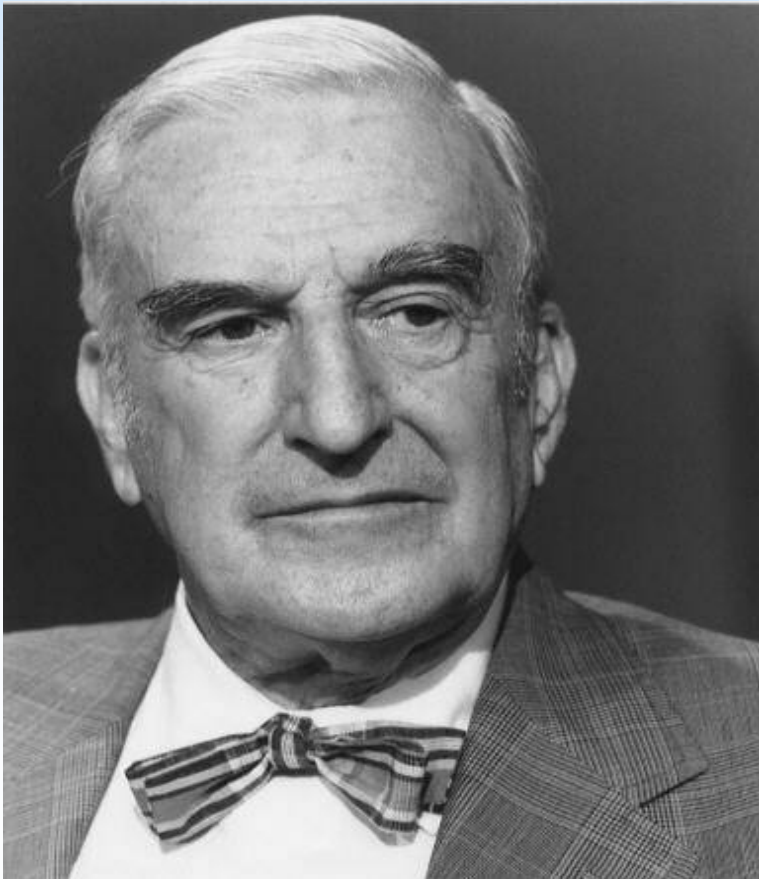
*This presentation has neither been approved nor endorsed by ICRP*

# The three pillars of the system of radiological protection



# Science and ethics in radiological protection

## - A long tradition -



"Radiation protection is not only a matter for science. It is a problem of philosophy, and morality, and the utmost **wisdom.**"

**Lauriston S. Taylor** (1902 – 2004)

The Philosophy Underlying  
Radiation Protection

Am. J. Roent. Vol. 77, N° 5,  
914-919, 1957

From address on 7 Nov. 1956

# Wisdom

- A basic definition of wisdom is the quality of having **experience, knowledge, and good judgement** (Oxford dictionary)
- In its popular sense, wisdom is attributed to a person who takes **reasonable** decisions
- As a **virtue** wisdom is the disposition to perform actions with the highest degree of adequacy under any given circumstances

# The ICRP initiative on ethics (1)

- ICRP **Committee 4** (C4) established a **Working Party** (WP) to reflect on the ethics of radiological protection at the general meeting of the Commission in Porto in November 2009
- The WP reviewed the ethical theories and concluded that the system of radiological protection is rooted in the 3 major theories of ethics: **virtue, deontological and utilitarian ethics**
- The WP also recognized the importance for ICRP to adopt a **“cross cultural”** approach as international recommendations must be broadly applicable worldwide

# The theories of normative ethics

- **Virtue ethics:** is moral what is perfecting human beings as virtuous agents

**Emphasize on the personality traits driving behaviour**

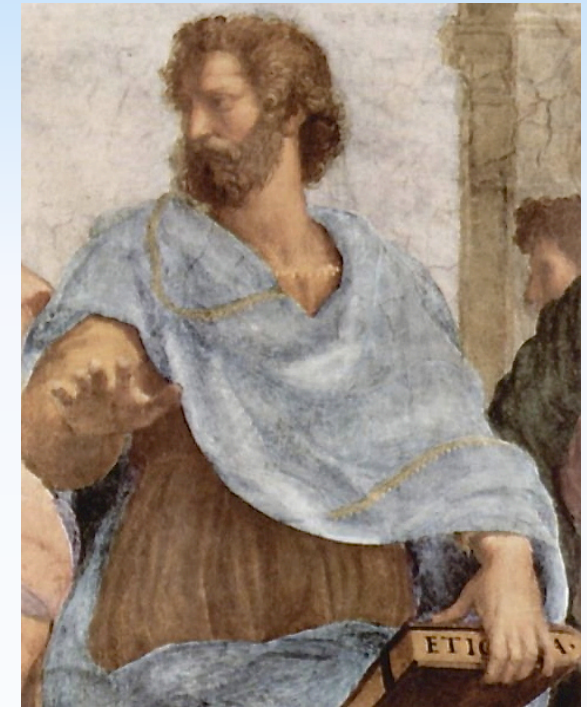
- **Deontological ethics:** is moral what is accomplished according duties and rules whatever the consequences

**Emphasize on duties and rules**

- **Teleological ethics** (also called **consequentialist ethics**), is moral what is promoting common good. What really matters are the consequences of human actions or action rules on the well being of people. **Utilitarianism** ethics is the most well known variant of consequentialism. Its generic principle states that is moral any action or rule which is leading to the largest increase of social welfare among several alternatives

**Emphasize on the consequences of actions**

# Are the ethical values of radiological protection common to the different cultures?



The “common morality“ cannot be found by a universal opinion poll but by **study of the oral and written traditions** which have guided people in different cultures over the ages (Friedo Zoelzer, 2011)

## The ICRP initiative on ethics (2)

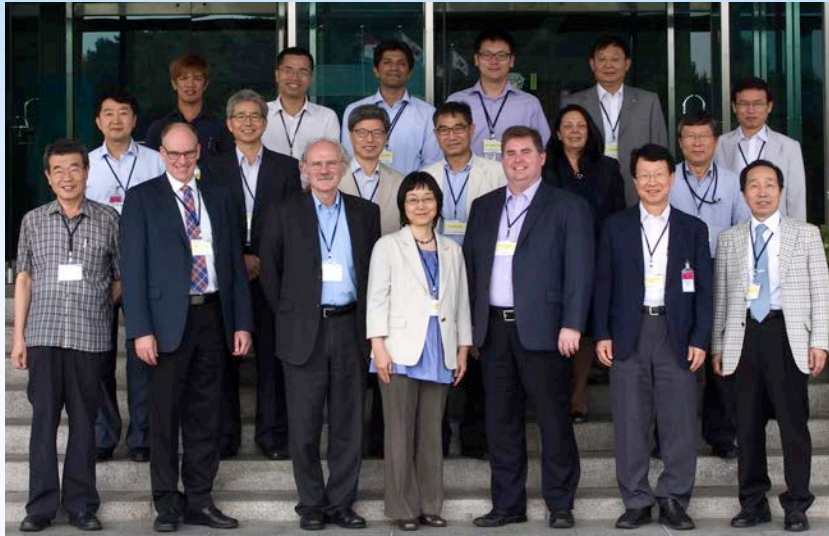
- In autumn 2012 in Fukushima, Japan, the ICRP **Main Commission** (MC) endorsed the C4 proposal :
  - to prepare the **Terms of Reference** for a **Task Group** on the ethics of radiological protection and also
  - to develop the work in close **cooperation with specialists of ethics and radiation professionals** through IRPA Associate Societies in the different regions of the world
- A cooperation proposal was sent to **IRPA** late 2012 and an agreement was established between ICRP and IRPA early 2013
- The MC approved the creation of **Task Group 94** on the ethics of radiological protection in Abu Dhabi in October 2013



# Terms of Reference of Task Group 94 on the ethics of radiological protection

- “ The Task Group will develop an ICRP Publication presenting the ethical foundations of the system of radiological protection recommended by the Commission.” The purpose of this Publication is to:
  - **Consolidate** the Recommendations
  - **Improve** the understanding of the system
  - **Provide a basis for communication** on radiation risk and its perception.”
- “ The Task Group will develop its work in close **cooperation** with... **radiation protection professionals** and **specialists of ethics** in the different regions of the world.”
- Chair of the Task Group: **Deborah Oughton**, University of life sciences, Norway

# The first workshops on the ethical dimensions of the radiological protection system



**Daejeon, Korea, August 2013**



**Milan, Italy, December 2013**



**London,  
United Kingdom,  
June 2014**

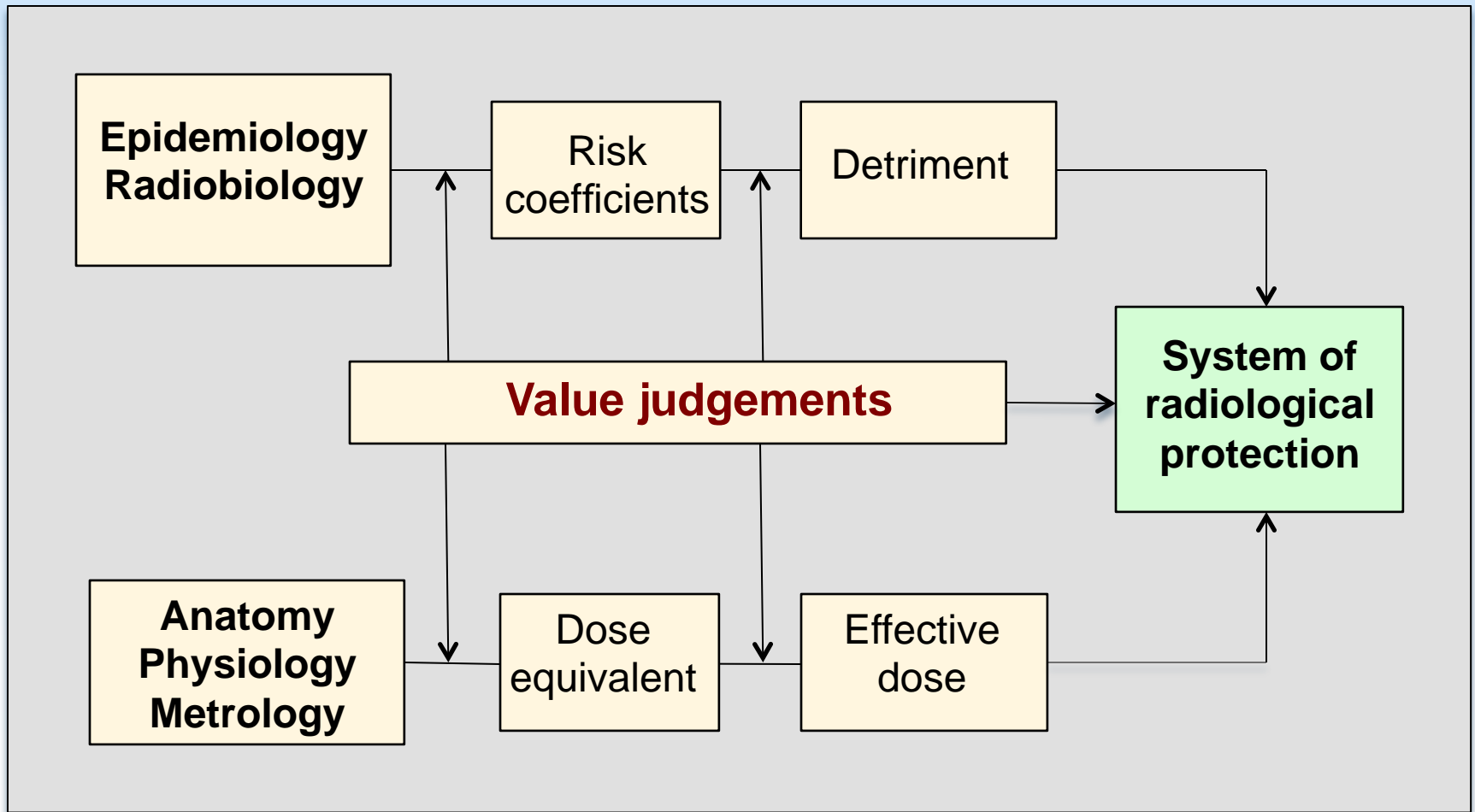
# 2<sup>nd</sup> International symposium on ethics of environmental health 15-19 June 2014, Budweis, Czech Republic



# The aims of the system of radiological protection

- “... to contribute to an appropriate level of protection against the **detrimental effects** of ionising radiation exposure without unduly limiting the **benefits** associated with the use of radiation.” ICRP 103, § 26
- “... to manage and control exposures to ionizing radiation so that deterministic effects are **prevented**, and the risks of stochastic effects are **reduced to the extent reasonably achievable.**” ICRP 103, § 29
- Balancing benefits and risk is one of the **most common ethical dilemmas**. The potential benefits of any decision must outweigh the risks in order for the associated action to be ethical

# The scientific basis of the system of radiological protection



## A key value judgement: prudence

- « It is **prudent** to take uncertainties in the current estimates of thresholds for **deterministic effects** into account... Consequently, annual doses rising towards 100 mSv will almost always justify the introduction of protective actions ». ICRP 103, § 35
- « At radiation doses below around 100 mSv in a year, the increase in the incidence of **stochastic effects** is assumed by the Commission to occur with a small probability and in proportion to the increase in radiation dose... The Commission considers that the LNT model remains a **prudent** basis for radiological protection at low doses and low dose rates. » ICRP 103, § 36
- « There continues to be no direct evidence that exposure of parents to radiation leads to excess heritable disease in offspring. However, the Commission judges that there is compelling evidence that radiation causes **heritable effects** in experimental animals. Therefore, the Commission **prudently** continues to include the risk of heritable effects in its system of radiological protection.» ICRP 103, § 74

# Prudence

- **Long tradition in ethics:** Aristotle, Buddhist tradition, Confucianism, the ancient people of Oceania and America
- Prudence is a **virtue**: how to behave without the full knowledge of the consequences of our actions?
- The object of prudence is the **contingent** i.e. what can happen or not happen, what is occasional, accidental, uncertain?
- Prudence is the virtue of **deliberation and judgement** in order to make **choices**. It is the disposition to choose and act on what is in our power to do and not to do. Prudence is related **to action**

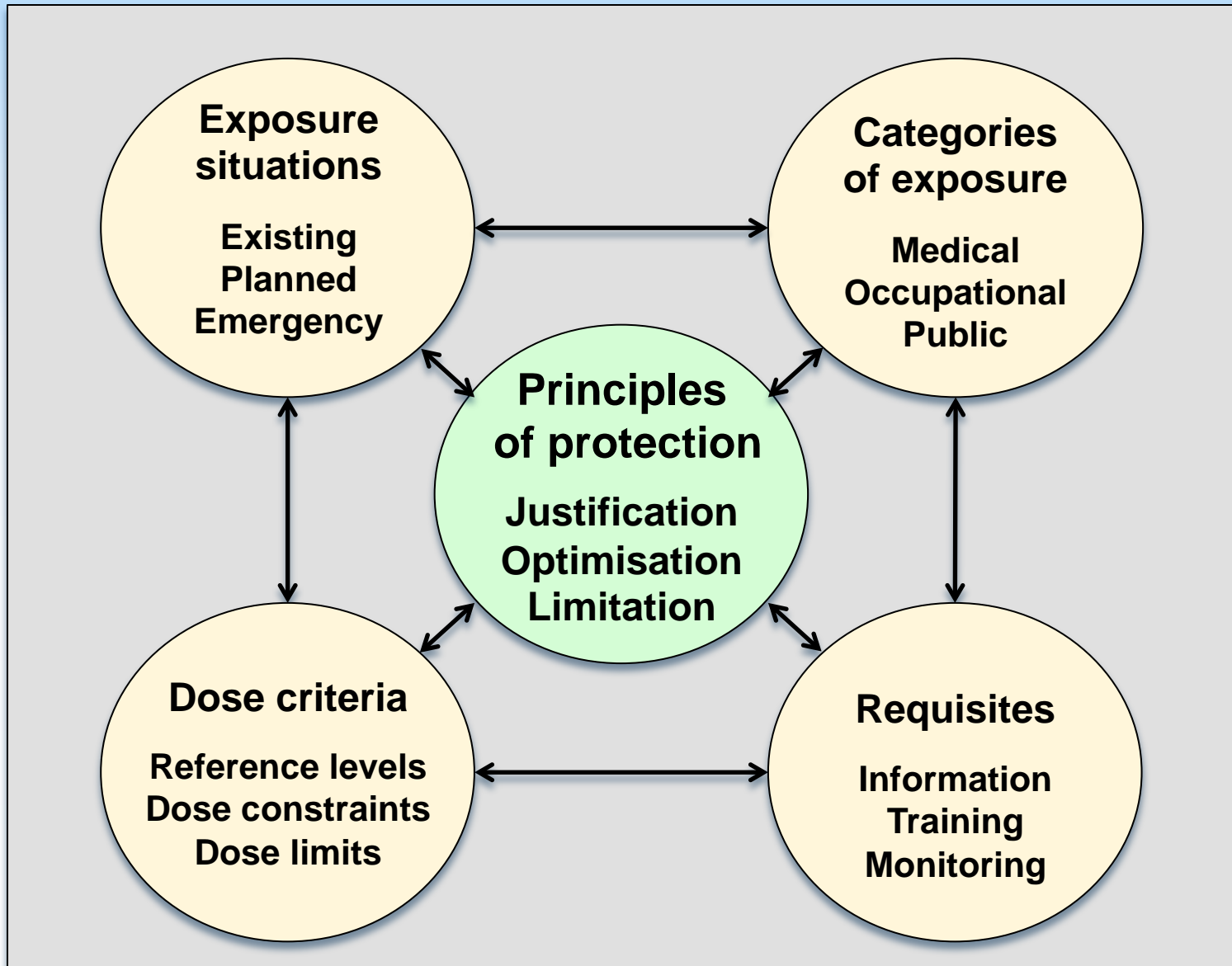
# The implications of prudence for the management of stochastic effects

- Assuming the LNT model implies that:
  - Maintaining exposures below a limit is not a **guarantee** of absence of risk
  - Exposing individuals is **justified** only if there is a benefit in return
  - Exposures must be kept **as low as reasonably achievable**
  - Prudence implies a duty of vigilance : to **monitor exposure and and health** of exposed populations and to relentlessly pursue **research in the fields of epidemiology and radiobiology**

The value of prudence is the **cornerstone of the system of protection**: it allows to take into account the inevitable uncertainties of radiation science and to **act judiciously and reasonably**



# The system of radiological protection



# The principles of radiological protection

- **The principle of justification.** Any decision that alters the radiation exposure situation should **do more good than harm**
- **The principle of optimisation of protection.** All exposures should be kept **as low as reasonably achievable**, taking into account economic and societal factors with restrictions on individual exposure to **avoid inequities** between individuals

*The principles of justification and optimisation apply universally*

- **The principle of application of dose limits.** The total dose to any individual from deliberately introduced sources other than medical exposure of patients should **not exceed the appropriate limits** recommended by the Commission

*The principle of dose limitation applies only to planned exposure situations*

## Justification: « do more good than harm »

- « *This means that, by introducing a new radiation source, or by reducing existing exposure..., one should achieve **sufficient individual or societal benefit to offset the detriment** it causes. » ICRP 103, § 203*
- Actions taken to help prevent or remove harms are called **beneficent** actions in ethics and those taken to avoid to do harms are called **non-maleficent**
- The values of **beneficence** and **non-maleficence** are strongly tied to the **utilitarian theory of ethics**. They concern **human welfare** with the objective to reduce the harms and optimise the benefit of social practices

# Optimisation: « keep exposures as low as reasonably achievable and restrict inequities between individual exposures »

- As already mentioned **reasonableness** is closely related to **prudence**
- *“Optimisation of protection may introduce a substantial **inequity** between one individual and another. This inequity can be limited by incorporating source-related **restrictions on individual dose** into the process of optimization.”* ICRP 103, § 232
- **Inequity/equity** is related to the **ethical concept of distributive justice**. It refers to **social fairness** i.e. how burdens and benefits, goods, services, jobs and salaries, but also risks are distributed within a society

# The quest for reasonableness

- Recognition of uncertainties about the effects at low doses, **prudent attitude**, assumption of no-threshold - As Low As Possible - ALAP (1950)
- If an activity is justified, how far to reduce the risk without endanger the activity? - As Low as **Reasonably Achievable** - ALARA (1958)
  - "As Low as" is the echo of the no-threshold assumption and "Reasonably Achievable" of the idea of avoiding carelessness and paralysis in front of the risk suspicion
- Attempt to found the reasonableness on the economic science: the **cost-benefit model** (1973)
- Combining **collective and individual** protection : the "beta value" (1988), pragmatism : **the ALARA procedure** (1999) and **democratic rights**: stakeholder involvement (2007)

## Limitation : «ensure that no individual is exposed to unacceptable radiation risks in planned exposure situations»

- In order to prevent excessive individual risk in planned exposure situations the Commission is recommending the use of dose limits
- “**Dose limits** are aimed at ensuring that no individual is exposed to radiation risks that are judged to be **unacceptable** in any normal circumstances.” ICRP 60, § 112
- The limitation principle recognizes that each exposed individual has the **right** that the risk she /he is subjected do not exceed a level **judged socially unacceptable**
- This position is consistent with the ethical **principle of egalitarian justice** which states that in similar situations individuals should be treated the same

# The quest for tolerableness

- **Publication 26 (1977)** : the risk associated with dose limits compared with safe occupation for occupational exposures and risk regularly accepted in everyday life (e.g. public transport) for public exposures
- **Publication 60 (1990)**: introduction of the tolerability of risk model: difference between unacceptable, tolerable and acceptable. Use of a multi-criteria approach for the occupational dose limit and reference to the natural background for the public dose limit
- **ICRP Committee 4** is currently considering the implications of the situation–based approach introduced in **Publication 103** with regard to the tolerability of risk model

# Stakeholder engagement

- ICRP mentions, “**for the first time, the need to account for the views and concerns of stakeholders when optimising protection**” in its 2007 recommendation (Pub 103, Editorial; see also § 224 in section 5.8 on optimisation)
- **Why to engage stakeholders?**
  - To take into account more effectively their **concerns and expectations** as well as the prevailing circumstances of the exposure situation
  - To adopt more **effective** and **fairer** protection actions
  - To favour their **empowerment** and **autonomy** i.e to promote their **dignity**
  - To maintain their **vigilance**



# Dignity

- **Dignity is an attribute of the human condition** : idea that something is due to the human being because she/he is human. This means that every individual deserves unconditional respect, whatever her/his age, sex, health, social condition, ethnic origin and religion
- **Dignity of individuals is the corollary of autonomy**: idea that individuals have the capacity to act morally. Autonomy implies **freedom** and the **capacity to deliberate, decide and act**
- Dignity means to treat individuals as **subjects** and not as **objects**
- Article 1 of the Universal declaration of human rights adopted by the UN General Assembly on 10 December 1948 :« All human beings are born **free and equal in dignity and rights** »

## How the system is promoting dignity ?

- **Right to know:** refers to the type of information that affected persons should receive to make informed and effective decisions
- **Informed consent:** the process for getting permission before conducting a healthcare intervention on a patient
- **Self-help protection:** the capacity of individuals facing a risk to protect themselves
- **Practical radiation protection culture:** the knowledge and skills enabling citizens to make choices and behave wisely in situations involving potential or actual exposure to ionizing radiation

## A first reference of stakeholder involvement in radiological protection

“Aside from our experienced scientists, trained in radiation protection, where do we look further for our supply of **wisdom**? Personally, I feel strongly that we must turn to the much larger group of citizens generally, most of whom have to be regarded **as well-meaning and sincere**, but rarely well-informed about the radiation problems that they have to deal with. **Nevertheless, collectively or as individuals, they can be of great value ... in developing our total radiation protection philosophy.**”

**Lauriston Taylor, Sievert Lecture, IRPA 5 Congress, Jerusalem, 1980**

## In summary

- The system of radiological protection is rooted in the 3 major theories of ethics. It combines the duty to act **wisely and reasonably** (**virtue ethics**) at the same time respecting both **individual rights** (**deontological ethics**) and the pursuit of **collective interest** (**utilitarian ethics**)
- **Beneficence, justice, prudence and dignity** are the cardinal values of the system
- **Reasonableness** and **tolerableness** are key values for the practical implementation of the system
- The series of meetings organized in conjunction with the ICRP Initiative on the ethical dimensions of radiological protection have shown that these cardinal values are **widely shared across cultures**

## Next steps

- Analyse in greater depth the values and ethical procedures that structure the **different components of the system** of radiological protection
  - Types of exposure situations
  - Categories of exposure
  - Dose criteria
  - Requisites
- Elucidate the ethical dimensions of the ICRP Recommendations in the **different domains of practical implementation** of the system
  - Occupational health
  - Medicine
  - Environment
  - Radioactive waste management

## Forthcoming meetings

- Second European Workshop on the Ethical Dimensions of the Radiological Protection System, **Madrid, Spain, 4-6 February 2015** organized by the Spanish Society of Radiation Protection (**SEPR**) in cooperation with the Italian (**AIRP**), the French, (**SFRP**) and the UK (**SRP**) Societies of Radiation Protection
- SRP Annual General Meeting on the topic of “Radiation Protection Culture and Ethics”, **Eastbourne, England, 19-21 May 2015**
- Second Asian Workshop in Summer or Autumn 2015 (In discussion)

# ICRP

[www.icrp.org](http://www.icrp.org)