

SOME ETHICAL PROBLEMS IN RADIATION PROTECTION

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ABSTRACT

The paper is focussed on the work of international organisations to establish ethical principles for protection against ionizing radiation.

INTRODUCTION

The United Nations have devoted much efforts to the protection of man. Already in the Universal declaration of human rights adopted in 1948 (1), it was stated in article 3: "Everyone has the right to life, liberty and the security of person".

In the field of establishing ethical principles for radiation protection the work of the International Radiological Protection Commission (ICRP) has been of outmost importance (2).

The ethical issues in radiation protection are receiving an increased international interest (3). Several radiation protection recommendations of importance from an ethical perspective have been published since 1990 and a review is timely to summarize the present ethical issues in the radiation protection field.

INTERNATIONAL RADIATION PROTECTION STANDARDS IN AN ETHICAL PERSPECTIVE

ICRP Publication no. 60

The recommendations of ICRP have today a profound influence on radiation protection all over the world. The ICRP has in Publication no. 60 (2) elaborated a conceptual framework for radiation protection mainly of ethical nature but also based on experimental work and risk assessment. An important presumption of the ICRP conceptual framework is that even small radiation doses may produce some deleterious effects. The three main principles of ICRP for proposed or continuing practices are the following:

1. The justification of a practice,
2. The optimisation of protection (ALARA: As low as reasonable achievable radiation doses, considering economic and social factors),
3. Individual dose and risk limits.

Medical exposures are usually intended to provide a direct benefit to the exposed individual. If the practice is justified and the protection optimised, the dose in the patient will be as low as is compatible with the medical purposes. Any further application of limits might be to the patient's detriment. ICRP therefore recommends that the dose limits should not be applied to medical exposures.

The system of radiological protection recommended by ICRP for intervention is based on the following two principles:

1. The proposed intervention should do more good than harm,
2. The form, scale, and duration of intervention should be optimised (according to ALARA).

IAEA Fundamentals for radiation protection

The International Atomic Energy Agency has in 1995 adopted safety fundamentals relating to radiation protection and the safety of radiation sources (4). These fundamentals are mainly of ethical nature and they are partly based on the protection principles given in ICRP publication 60 (2).

According to IAEA the primary aim of radiation protection is to provide an appropriate standard of protection and safety for humans without unduly limiting the benefits of practices giving rise to radiation

as well (9).

ICRP in para. 16 in (2) believes that the standard of environmental control needed to protect man to the degree currently thought desirable will ensure that other species are not put at risk. The same idea is stated by IAEA in (5) in principle 2 (radioactive waste shall be managed in such a way as to provide an acceptable level of protection).

IAEA in (5) states in principle 4: Protection of future generations as follows: Radioactive waste should be managed in such a way that predicted impacts on the health of future generations will not be greater than relevant levels of impact that are acceptable today. This principle is derived from an ethical concern for the health of future generations. In the establishment of acceptable levels of protection the latest ICRP and IAEA should be taken into account.

The fact that ICRP does not happen to use the term precautionary principle does not mean that it does not use the concept, which, of course it does. In fact, the whole philosophy of ALARA and protection against stochastic effects is based on not proven assumptions on radiation harm (the hereditary harm from radiation has never been demonstrated in humans, nor has cancer at low doses), because these assumptions seem to be scientifically justified.

The substitution principle (to replace a harmful agent with a less harmful) is not used by ICRP but follows directly from ICRP's first principle for practices (justification). Inter alia ultrasound is today used for prenatal examinations instead of X-rays.

Some moral problems to be deliberated in the future are: Adaption to radiation, The existence in nature of higher doses than the established limits, and The variation of the radiation risk among individuals.

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exposure or incurring disproportionate costs in the case of intervention. This primary aim is expressed by the following specific protection and safety objectives:

Protection Objective: to prevent the occurrence of deterministic effects in individuals by keeping the doses below the relevant threshold and to ensure that all reasonable steps are taken to reduce the occurrence of stochastic effects in the population at present and in the future.

Safety Objective: to protect individuals, society and the environment from harm by establishing and maintaining effective defences against radiological hazards from sources.

These objectives are achieved by the application of eleven fundamental principles.

IAEA Fundamentals for radioactive waste

Many of the hazards associated with radioactive waste are similar to those associated with other toxic waste. However, the nature of radioactive waste implies the possibility of exposure to ionizing radiation. An acceptable level of protection therefore needs to be provided against radiation hazards as the main source of harm of radioactive waste. The principles of radiation waste management have thus a bearing on protection also against radiation.

The International Atomic Energy Agency has in 1995 adopted Safety fundamentals relating to radioactive waste management (5). These fundamentals are mainly of ethical nature and they are also as the IAEA Fundamentals for radiation partly based on the protection principles given in ICRP Publication no. 60 (2).

According to IAEA the *objective of radioactive waste management* is to deal with radioactive waste in a manner that protects human health and the environment now and in the future without imposing undue burdens on future generations. This objective is achieved by the application of eleven fundamental principles.

ILO Convention 115

There exist also some ethical principles in the International Labour Convention no. 115 concerning the protection of workers against ionizing radiations (6). This convention came into force in 1962. In article 5 of the Convention the main protective objective is formulated as follows: "Every effort shall be made to restrict the exposure of workers to ionizing to the lowest practicable level, and any unnecessary exposure shall be avoided by all parties concerned."

OTHER RECENT WORK ON ETHICAL ISSUES IN RADIATION PROTECTION

Ethical issues in radiation protection have since the latest ICRP recommendations in Publication no. 60 were adopted in 1990 (2) been dealt with by inter alia Silini (7), Prêtre in ref. (3), and Shrader-Frechette in ref. (8). Silini tries to answer the question if the present system of radiation protection was founded on sound ethical principles. His answer is yes but with some remarks. Clarifying the meaning of the principle of justification and including environment in addition to humans are improvements proposed. To protect individuals as human beings and not as workers or public is another suggestion. Prêtre attempts to connect the three ICRP protection principles with the four ethical principles: Responsibility, Respect of life, Justice, and Common good. He shows that, in general, all ethical aspects in some way or other flow into the ICRP principles of radiation protection. Shrader-Frechette studied risk and ethics in a radiation protection perspective. In her paper she argues that evaluation of radiation risk often include a spectrum of extreme and unrealistic views. Ethical analysis of risks in terms of uncertainty, equity, consent, and compensation can help to provide more just, moderate, and realistic evaluations.

DISCUSSION

The linear hypothesis of radiation protection and the ALARA principle are considered to be ethically acceptable guidelines and similar guidelines should influence our attitude toward exposures to harmful chemicals