

Ethics in radiation protection

Healthcare Ethics 2ETZE

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INTRODUCTION

Ethical principles for healthcare professionals are very important rules that everyone must learn for themselves. Healthcare workers deal with people who depend on them in times of illness, when they are very sensitive and highly perceptive. Any badly given information can have a completely negative effect on their psyche. Healthcare professionals have the opportunity to become familiar with these ethical principles during their professional training and and/or in courses focused on these issues. If they are not familiarized with them and then do not apply them in practice, they cannot become a good worker with a professional attitude.

The essay discusses ethics in radiation protection. The first chapter deals with the description of the four basic principles of radiation protection, which are important for the definition of the three ethical principles in radiation protection described in the second chapter. Three subchapters dealing with process ethical values are presented within the second chapter.

Established essay objectives:

1. Principles of radiation protection
2. Ethical principles in radiation protection

1 PRINCIPLES IN RADIATION PROTECTION

The International Commission on Radiological Protection was established at the Second International Congress of Radiology in 1928 in response to the growing public concern about the effects of ionizing radiation observed in the medical community at the time. The original name of the commission was the "International X-ray and Radium Protection Committee", which was used until 1950.

In the second half of the 1970s, the International Commission on Radiological Protection established three basic principles of radiation protection, including the principles of justification, optimization and observance of established limits. In the Czech Republic, according to the third part of Decree No. 422/2016 Coll., on radiation protection, the principles include ensuring the safety of sources of ionising radiation. This requirement was first stated in the Basic Safety Standards issued by the International Atomic Energy Agency (IAEA) in 1996. (International Commission on Radiological Protection)

1.1 The principle of justification

This principle states that anyone carrying out activities leading to exposure must ensure that the activity is justified by some benefit that outweighs the risks involved. In healthcare this means that if a patient undergoes a procedure using ionising radiation that causes them some harm, there should also be some benefit to the patient from that procedure, for example in the form of an improvement of their health condition. This principle is based on ethics in the ethical values of beneficence and non-maleficence, which are explained below. (Völkle, Michel and Lorenz, 2021)

1.2 The principle of optimization

The principle of optimisation, sometimes called the ALARA principle, states that anyone carrying out an activity leading to radiation exposure is obliged to maintain a level of radiation protection such that the risk to the health of people and the environment is as low as reasonably achievable, taking into account economic and societal considerations. (Völkle, Michel and Lorenz, 2021)

1.3 The principle of limitation

The principle states that anyone who carries out an activity leading to exposure is obliged to limit the exposure of persons so that the total exposure does not exceed the limits set in the aggregate. (IRCP Publication 122, 2018)

1.4 The principle of resource security

This is the physical security of ionising radiation sources, which includes theft prevention, permanent monitoring of the source and reporting its possible loss to the competent authorities, and periodic inventory of mobile ionising radiation sources. (IRCP Publication 122, 2018)

2 ETHICS IN RADIATION PROTECTION

Medicine currently faces many challenges, both organisational and economic. Despite these challenges, patient's welfare should not be neglected. The patient's benefit should always be a priority and it is therefore essential to respect the basic ethical principles based on the two fundamental rules. "Primum non nocere" **first, do no harm** and "Salus aegroti-suprema lex" **The patient's health should be the supreme law.** (Hansson, 2007)

In the introduction to its Publication no. 138, the International Commission on Radiological Protection called ethical values one of the three pillars of the radiation protection system, with scientific knowledge and experience gained through practice being the other two pillars. In its Publication, the Commission distinguishes four core ethical values that have had a major influence on the development of the Commission's recommendations. These values are beneficence and non-maleficence, prudence, justice and dignity. Beneficence, non-maleficence and justice are also considered to be core values of medical ethics as well. The relationship between the four ethical values and the three basic principles of radiation protection is not entirely direct, on the contrary, they are intertwined and the values and principles are combined in various ways. The principle of justification, however, is based mostly on the value of beneficence and non-maleficence. The other two principles, namely optimisation and limitation, are based on different combinations of the basic ethical values. (ICRP Publication 138, 2018)

2.1 Charity and harmlessness

The meanings of these words are in a general sense well known and intelligible. By benevolence one imagines a kind of incitement or direct doing of good, and by harmlessness such conduct as seeks to avoid any harm to the patient. (Lindell, 2001)

These values are put into practice in the form of the basic objective of radiation protection, namely to prevent the occurrence of deterministic radiation effects (which are those that occur after the so-called threshold dose has been exceeded) and to reduce the probability of stochastic effects to an acceptable level. In the field of radiation protection, beneficence can be understood as the consideration of the direct benefits of the use of ionising radiation for individuals, society and the environment. On the other hand, benignity is closely linked to prevention and thus risk reduction. (Lindell, 2001)

In health care, radiation is generally used to improve the health of an individual.

2.2 Caution

Caution or prudence is the knowledge, experience and good judgment to make good decisions and behave appropriately to the circumstances. Prudence in practice is the principle of optimising radiation protection. In the Publications of the International Commission on Radiological Protection, the term has been applied to various effects of radiation on the body. For deterministic effects, it is prudent to take into account the uncertainty of the thresholds. In various publications, a threshold of 0, 7 Gy, 0, 8 Gy or also 1, 0 Gy for whole-body irradiation is given. In the context of stochastic effects, in general the Commission considers that the linear threshold-free model remains a prudent basis for radiation protection for low doses. The likelihood of such effects is low at doses below 100 mSv per year and has not been demonstrated to date. Even so, a finite risk of death must be assumed, corresponding to about 1% at a dose of 100 mSv. If this level of risk can be considered small, it becomes an ethical question itself. (Lindell, 2001)

2.3 Justice

From the point of view of medical ethics, justice means the obligation of medical personnel to provide professional care to all persons regardless of their age, health status, gender and nationality, i.e. to give each patient the same treatment. (Lindell, 2001)

Justice has a dual role in terms of radiation protection. The first is the intention to reduce inequalities in the distribution of exposure during situations where some individuals might be exposed to significantly higher doses than others. This is achieved through a system of reference levels applicable to existing and accidental exposure situations. The second role of the protection criteria is to ensure that no exposure exceeds levels that would mean that the risk is already considered unacceptable. Therefore, radiation protection principles are applied in all workplaces, both for radiation workers and patients. Lab technicians wear personal dosimeters at a reference point on their left lapel and these are evaluated once a month when the old ones are sent to the laboratories of the National Personal Dosimetry Service. Patients are protected by the use of protective lead aprons. (Lindell, 2001)

2.4 Dignity

It is a human quality that means that every individual deserves respect, which does not depend on characteristics such as race, gender or religion. (Lindell, 2001)

In radiation protection, the preservation of dignity is ensured in the form of informed consent of persons who are to undergo examinations using ionising radiation. This consent gives the person the right to decide freely and voluntarily whether to accept or refuse the procedure. Everyone has the right to know, to be given full and truthful information and then to decide. (Lindell, 2001)

2.5 Process ethical values

The following ethical values are important for putting the recommendations of the International Commission on Radiological Protection into practice. These requirements relate to procedural and organisational aspects of the radiation protection system. (IRCP Publication 138, 2018)

2.5.1 Responsibility

Every person who makes decisions must be accountable for their actions to all those potentially affected by them. Among other things, the International Commission addresses the responsibility of the present generation towards the future generation. In its Publication no. 122 it states that it is the responsibility of the present generation to pass onto future generations knowledge regarding safety and security, but also knowledge and resources. (IRCP Publication 122, 2018)

2.5.2 Transparency

Transparency is defined as openness about decisions and actions that affect society, the economy and the environment and a willingness to communicate them in a clear and honest way. In a narrow sense, transparency is linked to the process of optimisation. In this process it is necessary to have all data, parameters and input values clearly defined. This ensures that all parties are informed and that their decision-making process is properly documented. In practice, this concept can be encountered in the context of radiation worker training and informed consent for patients. (IRCP Publication 122, 2018)

2.5.3 Inclusivity

The inclusion or participation of stakeholders is indicative of how this value is used in the practice of the radiation protection system. This implies that all parties affected by the decision must be involved in the decision-making process. By being inclusive, not only experts but also other stakeholders can easily understand exposure situations. (IRCP Publication 122, 2018)

This approach has succeeded in keeping occupational exposures in health care and other sectors that use ionising radiation to the lowest tolerable level. In the field of radiation protection, stakeholder involvement was first used in the 1980s to address the exposures of the public, but also the environment, in areas contaminated after the Chernobyl nuclear power plant accident. This inclusiveness is linked to the two core ethical values outlined above. These are justice and dignity. In order for negotiations to take place between experts, groups of exposed persons and other stakeholders, it is a necessary condition that all are treated fairly and with dignity. (IRCP Publication 138, 2018)

CONCLUSION

The moral conduct of any health professional can only be achieved if he or she has a healthy conscience embedded in him or her, which helps him or her to manage professional conduct according to ethical standards. The issue of ethical principles in radiation protection is timeless and it is very important that this issue is addressed by Czech organisations, authorities and individual workplaces using ionising radiation. It is essential that up-to-date information is obtained and subsequently presented to the public. In conclusion, I would like to say that compliance with and management of ethical principles is one of the most serious problems in contemporary healthcare.

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