



Non-medical human imaging

Improving radiation protection in practice

Non-medical human imaging is the intentional exposure of individuals to radiation for purposes other than medical diagnosis, medical treatment or biomedical research.

These practices are widely used in society, but the public may not always be aware that they involve the use of radiation. Some of these practices are associated with national security measures.

Procedures involving non-medical human imaging are often used to:



screen passengers at airports for security reasons.



detect items being smuggled into prisons.



detect drugs being smuggled inside the body.



enhance security at major sports events worldwide.



determine the age of those individuals who may have no identity papers.



identify the potential, such as muscle development or height, for certain sports at an early age.



underpin insurance, such as contracts for professional sportsmen and sportswomen.

What do the IAEA Safety Standards say?

In 2014, the IAEA has published the *General Safety Requirements Part 3: Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards*. This is often referred to simply as the BSS. The BSS is jointly sponsored by eight international organizations with responsibilities in various areas of radiation protection.

The requirements in the BSS take account of the most recent scientific evidence relating to exposure due to radiation. The BSS is used by many States as the basis for their national regulations dealing with radiation protection and safety.

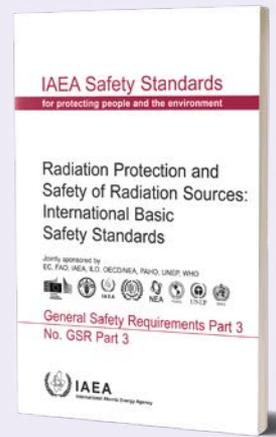
The BSS states that non-medical human imaging is normally deemed not to be justified. However, in exceptional circumstances the government or regulatory body may decide that that the justification of human imaging for specific practices can be considered, subject to such exposures being managed as part of the system of radiation protection and safety. In practice, this means that such practices must firstly be justified, and

if deemed to be justified they must be regulated appropriately.

Guidance on the procedures to be followed in reaching a decision on whether or not a particular practice is justified can be found in the *IAEA Safety Guide: Justification of Practices, Including Non-Medical Human Imaging (GSG-5)*.

In the case of practices involving non-medical human imaging deemed to be justified, further guidance can be found in the *IAEA Safety Guide: Radiation Safety of X-ray Generators and Other Radiation Sources Used for Inspection Purposes and for Non-Medical Human Imaging (SSG-55)*.

In addition to the IAEA, the BSS is jointly sponsored by the European Commission, the Food and Agriculture Organization of the United Nations, the International Labour Organization, the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development, the Pan American Health Organization, the United Nations Environment Programme and the World Health Organization.



Challenges



Non-medical human imaging is managed as a planned exposure situation. This means that radiation protection measures can be planned in advance, before exposures occur.

Such imaging therefore needs to be justified, in terms of there being an overall net benefit. In addition, protection and safety needs to be optimized and dose limitation needs to be applied for both workers and the exposed individual.

The dose limit for exposed individuals is the same as that for members of the public (i.e. 1 mSv in a



year) but this is often exceeded, for example in the case of a computed tomography (CT) scan of the abdomen of a suspected drug courier.

Non-medical human imaging throws up many challenges for regulatory bodies in terms of both justification and regulation. But there are wider challenges that go beyond radiation protection: ethical principles and values that underpin how our society functions are brought into question and these need to be addressed in a way that takes the various and sometimes conflicting issues into account.



- While the use of human imaging for theft detection is always deemed not to be justified, this is still widely used around the world, for example to prevent the theft of valuable gemstones during mining operations. On the other hand, such imaging reduces the potential for employees to be coerced by criminals into stealing gemstones on their behalf.
- The principle of justification requires us to balance benefits and risks and, in approving a procedure, to ensure that there is an overall net benefit. Benefits and risks can be to individuals or to society and are often subjective. While most people would accept there is a societal benefit to security-screening of passengers at airports, the argument to allow such screening of airport staff, perhaps several times per day, has raised concerns.



seekers, for whom there would be significant advantage if they were declared to be minors. This assessment is generally carried out by either dental or skeletal examination using radiation. While the associated radiation doses are normally low, ethical issues may arise in relation to (the absence of) parental consent for these exposures. This may be exacerbated when language barriers exist between the authorities and the asylum seekers.

Ethical considerations



Ethical considerations are particularly relevant for those procedures that mirror those carried out on patients.

The right to information and of informed consent are embedded in medical practice. It is difficult to apply that in the case of potential drug couriers who do not speak your language but whose life is potentially at risk. This can be further complicated if, for example, the potential drug courier is pregnant.

Another application of non-medical human imaging is in the assessment of the age of asylum

How does the IAEA support Member States?



The IAEA supports its Member States in the implementation of all aspects of the Safety Standards through the organization of national and regional workshops and other training events. [Online webinars](#) are also regularly organized.

