

The need for robust justification for radiological protection recommendations

Essential Message

The World Nuclear Association (WNA) recognises the important role of the International Commission on Radiological Protection (ICRP) in setting standards designed to ensure the safety of individuals exposed to radiation. Publications/recommendations of the ICRP are invariably incorporated by countries into their systems of Radiological Protection, and should therefore be easily understood, have a firm scientific basis and be implementable. The WNA position is that further research and discussion is warranted with regard to non-cancer effects from radiation, particularly for cardiovascular diseases, before ICRP may consider proceeding with any further statement or recommendations relating to non-cancer risks and effects.

Discussion

Publications by the ICRP greatly impact radiological protection systems worldwide. More recently, the ICRP has revisited the issue of non-cancer risks. A draft report for what was to become ICRP Publication 118 (2012) was first issued in January 2011. This led to a Statement on Tissue Reactions issued in April 2011 that recommended lowering the threshold dose for the lens of the eye to 0.5 Gray, and made the radiological protection community aware that threshold doses for circulatory disease may also be as low as 0.5 Gray. These recommendations had an immediate influence on the IAEA Basic Safety Standards (BSS) for dose limits to the lens of the eye, which immediately incorporated them, but with limited consideration to the practicalities around implementation. This is a clear illustration of the impact of the ICRP reports to systems of radiation protection.

ICRP Publication 118 (2012) implies a linear dose-response relationship for risk of circulatory disease. However we believe that there is a general lack of information with regard to the biological mechanisms to suggest such a relationship; indeed, several epidemiological studies referenced in this publication acknowledge that assumptions regarding the shape of the dose-response curve below approximately 0.5 Gray are inconclusive. This is especially important as an assumed linear dose-

response could dictate a lowering of threshold limits for cardiovascular effects. Although ICRP Publication 118 suggests support of a linear dose-response for cardiovascular disease, findings from recent publications differ. The notable points for consideration are:

- The examination of subtypes of circulatory disease or even subtypes of cardiovascular disease versus analysis of non-cancer effects as a whole;
- The use of disease incidence data instead of (or in addition to) mortality data;

ICRP recommendations are often incorporated implicitly or explicitly into national policy, which can have significant socio-economic impacts for both the public and industries that use radiation. The recommendations are acceptable where there is suitable justification to safeguard the health of people and their environment. Due consideration should, however, be applied where there is insufficient scientific evidence for such recommendations, particularly where it could result in higher risk from external (non-radiological) hazards, and result in unnecessary public concern by inflating the perceived risk of exposure to low-level radiation. It could also result in an unnecessary substantial financial burden on industries using justified uses of radiation.

Conclusion

The WNA position is that further research and discussion is warranted with regard to non-cancer effects from radiation, particularly for cardiovascular diseases, before ICRP may consider proceeding with any further statement or recommendations relating to non-cancer risks and effects.

This statement sets the stage for discussion amongst radiological protection professionals in the nuclear and non-nuclear industries, academics, regulators and other scientific experts to ensure that ICRP recommendations are based on the best scientific evidence available, clearly demonstrate benefit and do not place unnecessary constraints on affected companies, with severe financial implications. As a Special Liaison Organisation to the ICRP and with an established Radiological Protection Working Group, the WNA is well placed to contribute to such a discussion.