

Beebe Symposium Statement, Panel 2B  
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Thank you for this opportunity to share brief perspectives on (a) behalf of the International Council on Radiation Protection (ICRP), with particular attention to Committee 3 which I chair and (b) the Image Gently Campaign and Alliance.

So, first, the **ICRP** mission is to advance for the public benefit the science of radiological protection, in particular by providing recommendations and guidance on all aspects of protection against ionising radiation. Committee 3's specific mandate is guidance on the protection of persons and unborn children when ionising radiation is used in medical diagnosis, therapy, and biomedical research, as well as protection in veterinary medicine.

Founded 91 years ago, the ICRP is the oldest radiation protection organization. We provide professional societies, health ministries, regulators, and the public with guidance based on the best science available.

The System of Radiological Protection developed by ICRP is the basis of **standards, regulations, guidance, programmes, and practice worldwide**. Our goal is protecting patients, workers, the public, and the environment against detrimental effects of radiation exposure for human health. The science on low dose radiation is uncertain and requires continued study to answer the questions that medical practitioners and their patients demand. Guidance for workers, patients, and the public depend on the these results.

What I find interesting is how long we have known of the hazards and the potential benefits of radiation. From its immediate fluoroscopic and radiographic applications for human health benefit, ionizing radiation was within one year found to have tissue effects (skin burns). This ultimately led to the first radiation protection guidance from the ICRP. Later, Hermann J. Mueller raised concern about possible hazard from human diagnostic radiology doses in 1939 based on x-ray experiments in the fruit fly performed in 1927. While we have learned a great deal about genetics and x-rays, and set regulatory guidance worldwide since these early reports, we continue to lack many answers about low dose radiation effects in humans especially in the fetus and child over their lifespan.

Ionizing radiation research in humans and animals, and epidemiological studies have raised concerns about the cancer risk, cataract formation, cognitive effects, endocrine system and immune system effects at low level radiation and low dose rates. The NASA Twin Study raises additional concerns about radiation effects including DNA damage, telomere shortening, and gut microbiome changes.

Let's move on to the **Image Gently Alliance**. Founded in 2007 by a group of committed pediatric radiology volunteers, this alliance now represents over 100 medical and dental organizations and regulatory bodies with a shared mission that through advocacy, we will improve safe and effective imaging care of children worldwide. All stakeholders are represented, all educational materials are free,

and some are translated into multiple languages. We have published papers that document and address the sustained gaps in understanding radiation knowledge and radiation protection in medicine, in radiology, and by the public over the past decade. When we talk to our colleagues and patients, we speak of the benefit over risk (justification), and we believe in transparently communicating what we do not know—the uncertainty—about low dose radiation effects in accessible language. The most important learning is that over 30 years in my work in the medical and radiology communities, is that the questions—and the answers have not changed from clinical colleagues, from parents of children undergoing ionizing radiology imaging, and from patients. The fears and misunderstandings are real. And sadly, these may lead to bad decisions and delay in care. The use of ionizing radiation imaging has increased dramatically (and indeed exponentially) over my career; and I note with the promises of Precision Medicine and Artificial Intelligence (AI), we have enormous opportunity to use and explain technology appropriately. The scientific knowledge that we can provide colleagues, patients, and the public about the low dose radiation effects remains uncertain yet knowable. We need to move the science forward for everyone in a strategic and collaborative manner now. Thank you.

### References

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