Low-level radiation health risks smaller than obesity, researchers say

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The health risks from modern day life such as obesity, smoking and air pollution are higher than low-level radiation exposure a new study has found.

Human populations have always been exposed to ionizing radiation, and more so in modern life due to its use in medicine, such as x-ray machines, industry and the military. But whilst the risks to human health from medium- and high-level radiation are relatively well-understood, the risks at lower levels are debated. Mixed messages about the safety of low doses of radiation from different sources can create confusion for the public and policy makers.

Now a team of experts, including Professor Richard Wakeford from The University of Manchester's Centre for Occupational and Environmental Health, has compiled the evidence of the health risks from low-level ionizing radiation. The aim of the research is to better inform policy decisions and show where crucial gaps in knowledge lie.

Prof Wakeford said: "This was a very big review of the health effects of low-level radiation exposure by a team of international experts from various scientific disciplines. We found the overall risk to human health from low-level exposure to radiation, such as getting a CT scan at the hospital, is very small, particularly when compared with the risks posed by modern life such as obesity, smoking and air pollution."

The study, which was led by Professor Angela McLean of the University of Oxford and published today in the *Proceedings of the Royal Society B*, clarifies the scientific evidence available from a variety of sources.

Prof McLean added: "We know a great deal about the health risks from radiation thanks to exceptionally careful studies of groups of people exposed to different levels from nuclear bombs or accidents, medical exposure of patients, naturally occurring sources (such as radon), and workers in the nuclear industry and medicine. From these studies, it is clear that moderate and high doses of radiation increase the risk of developing some types of cancer."

To illustrate the size of this increase in risk, if 100 individuals were each briefly exposed to 100 mSv (millisievert is the measure of radiation dose), then, on average over a lifetime, one of them would be expected to develop a radiation-induced cancer, whereas 42 of them would be expected to develop cancer from other causes. To put 100 mSv in context, the low dose from a CT scan of the whole spine is 10 mSv, while the average dose from natural background radiation in the UK is 2.3 mSv each year.

"Despite the depth of our knowledge, there are still many unknowns." said Professor McLean. "Even the best designed epidemiological study finds it hard to distinguish between no extra risk and a small additional risk at low levels of exposure and we have to make some important assumptions

here, particularly for the purposes of radiation protection. For example, no human study has conclusively shown an increase in hereditary disease in the children of irradiated parents, but radiation protection calculations assume some risk is present because of evidence from large animal experiments."

More information: "A restatement of the natural science evidence base concerning the health effects of low-level ionizing radiation" *Proceedings of the Royal Society* rspb.royalsocietypublishing.or … .1098/rspb.2017.1070

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