GOV.UK

UK Health Security Agency (https://www.gov.uk/government/organisations/uk-health-security-agency)

Guidance

Ionising radiation: dose comparisons

Published 18 March 2011

This publication is available at https://www.gov.uk/government/publications/ionising-radiation-dose-comparisons/ionising-radiation-dose-comparisons

Ionising radiation has enough energy to cause damage to cells which can increase the risk of cancer later in life. However these risks to health are actually low and ionising radiation is widely used in cancer therapy. In general the health effects of ionising radiation are dependent on the dose received. While low doses increase the risk of cancer later in life, very high doses act like a poison and can be fatal.

In the UK, Public Health England calculated that on average people are exposed to about 2.7 millisieverts (mSv) of radiation a year. A millisievert is a measure of radiation dose which accounts for the fact that ionising radiation can affect different parts of the body to differing degrees. The millisievert dose also allows for the different effects of different types of radiation, x rays, gamma rays, neutrons, alpha particles and beta particles.

The 2.7 mSv dose that people in the UK are exposed to comes from a number of sources. Many building materials contain low degrees of natural radioactivity and radon gas seeps from the ground into all buildings, so the largest exposure is to naturally occurring radiation in homes and workplaces. There are also significant contributions from naturally occurring radioactivity in food and from medical exposures.

1. Comparison of doses from sources of exposure

Source of exposure	**Dose**
Dental x-ray	0.005 mSv
100g of Brazil nuts	0.01 mSv
Chest x-ray	0.014 mSv
Transatlantic flight	0.08 mSv
Nuclear power station worker average annual occupational exposure (2010)	0.18 mSv
UK annual average radon dose	1.3 mSv
CT scan of the head	1.4 mSv
UK average annual radiation dose	2.7 mSv
USA average annual radiation dose	6.2 mSv

Source of exposure	Dose
CT scan of the chest	6.6 mSv
Average annual radon dose to people in Cornwall	6.9 mSv
CT scan of the whole spine	10 mSv
Annual exposure limit for nuclear industry employees	20 mSv
Level at which changes in blood cells can be readily observed	100 mSv
Acute radiation effects including nausea and a reduction in white blood cell count	1000 mSv
Dose of radiation which would kill about half of those receiving it in a month	5000 mSv

↑ Back to top