

## Radiation from Diagnostic Medical Imaging Procedures

We can compare radiation exposure from each source below (in mSv) as equivalent to the amount of radiation exposure we get from natural background surroundings (in days).

Procedure	Effective radiation	Comparison to natural
<b>X-Rays</b>		
Skull	0.1 mSv	10 days
Chest	0.1 mSv	10 days
Lumbar Spine	1.5 mSv	Six months
Mammogram – two view	0.40 mSv	40 days
<b>CT Scan</b>		
Head	2 mSv	Eight months
Chest	7 mSv	Two and a half years
Pelvis	6 mSv	Two years
Chest, abdomen, pelvis	18 mSv	Six years
<b>Fluoroscopy</b>		
Barium swallow	6 mSv	Two years
Barium enema	8 mSv	Three years
<b>Nuclear Medicine</b>		
Bone density	0.04	Five days
Bone scan	6.3	Two and a half years
Cardiac perfusion (with Sestamibi)	9.40	Three years
Thyroid scan	4.8	16 months

## Radiation Safety Resources:

### Canadian Resources:

Patient safety – radiation exposure in X-Ray exams: [radiologyinfo.org/en/safety/index.cfm?pg=sfty\\_xray](http://radiologyinfo.org/en/safety/index.cfm?pg=sfty_xray)

X-rays and pregnancy: [hc-sc.gc.ca/hl-vs/iyh-vsv/med/xray-radiographie-eng.php](http://hc-sc.gc.ca/hl-vs/iyh-vsv/med/xray-radiographie-eng.php)

Health Canada – radiation: [hc-sc.gc.ca/ewh-semt/radiation/index-eng.php](http://hc-sc.gc.ca/ewh-semt/radiation/index-eng.php)

### Other Resources:

Society of Nuclear Medicine – what is nuclear medicine? [Interactive.snm.org/docs/whatisnucmed2.pdf](http://Interactive.snm.org/docs/whatisnucmed2.pdf)

Calculate your risk: [clinicalcorrelations.org/?p=1047](http://clinicalcorrelations.org/?p=1047)  
[Xrayrisk.com/index.php](http://Xrayrisk.com/index.php)

Radiation protection of patients (IAEA) – patient information: [rpop.iaea.org/RPOP/RPoP/Content/InformationFor/Patients/index.htm](http://rpop.iaea.org/RPOP/RPoP/Content/InformationFor/Patients/index.htm)

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## Radiation Safety



## Patient Information



## Radiant Energy Safety

Like many other medical procedures, diagnostic imaging examinations (X-ray, CT, nuclear medicine, MRI and ultrasound) are safe when used with care.

Radiologists and medical radiation technologists (MRTs) are licensed medical professionals who have been specially trained to use the minimum amount of ionizing radiation necessary to obtain images and a diagnosis. The primary safety concept of ALARA (as low as reasonably achievable) is always applied. The amount of ionizing radiation used in most diagnostic exams is very small and the benefits greatly outweigh the risk of harm.

### Why are MRIs and ultrasounds not a radiation concern?

Both MRIs and ultrasounds are forms of non-ionizing radiation. MRIs use magnets and radiofrequency to create images, while ultrasounds use sound waves. Unlike ionizing radiation, non-ionizing radiation is not strong enough to cause changes in cellular matter, or within your body.

Non-ionizing radiation sources are around us all of the time, including radio waves, visible light and microwaves.

### Measuring radiation dose

The scientific unit of measurement for radiation dose is the millisievert (mSv).

Different tissues and organs have varying sensitivities and react differently when exposed to radiation. Therefore, the actual dose to different parts of the body for a diagnostic imaging procedure with radiation also varies.

### Naturally occurring “background” radiation exposure

Exposure to ionizing radiation from natural sources occurs often. The average person receives a radiation exposure of about 3 mSv per year from naturally occurring radioactive sources and cosmic radiation from the sun and outer space. Small amounts of radiation exposure also comes from other humans, foods we eat, building materials and consumer products

### Why Minimizing Radiation Exposure from Medical Sources is Important

High levels of radiation can cause cellular damage in the body. The risks of later biological changes (i.e. cancer) occurring increases as radiation dose levels and exposure levels to radiation increase – this is known as a cumulative effect.

We know that medical imaging procedures using ionizing radiation are on the opposite spectrum of dose quality and radiation levels to historic events, such as Hiroshima. However, we want to limit our exposures to only what is necessary and apply the safety principles of ALARA.

### Minimizing your Risk

If you have concerns about the amount of radiation you will receive from diagnostic medical imaging, discuss these with your physician prior to your scheduled exam.

If you are pregnant or think you may be, tell your physician and the technologist before having any exam with radiation.

Keep records of medical imaging procedures with radiation that you have had. If necessary, discuss your exposure history with your physician.

If you have had similar medical imaging exams recently, tell your physician or technologist as you may not need to repeat them.