Mercy University Hospital:

Radiation doses received during medical procedures

X-ray

One x-ray has a very low dose of radiation.
They all use a radiation dose of less than 1 mSv.
There is almost no risk.

CT scans

The risks associated with a CT scan will vary depending on the radiation dose used.
The dose used depends on the area of the body involved and the type of CT that's done.
Here are some examples to help explain this.

Head, Chest or Abdomen CT scan

CT scans of the head, chest or abdomen involve a radiation dose of less than 10 mSv.
The radiation risk is minimal to very low.

CT-TAP scan

A CT-TAP scan is a scan of the thorax, abdomen and pelvis.
It involves a radiation dose of more than 10 mSv.
The radiation risk is low.

Nuclear medicine

If you have a nuclear medicine scan, your radiation risk is low.
But you should minimise your contact with other people. This is because you may be radioactive for at least 24 hours so you could expose people near you to radiation.
It is important to follow the advice you get when going home from the hospital.

Interventional radiology

The risk associated with interventional radiology procedures varies but it is low to moderate.
The level of risk depends on:

- the area of body exposed to radiation
- the type of procedure performed
- how long the procedure took

Note: *The health risk from a single diagnostic radiation procedure is generally very small and heavily outweighed by the medical benefit of getting an accurate diagnosis. Medical radiation is measured in millisieverts (mSv), which reflects how much radiation your body absorbs and how sensitive your organs are to it. To make these numbers easier to understand, doctors can compare medical doses to the natural "background radiation" we all get every single day from the environment around us (rocks, soil and outer space) as well as radiation received from Transatlantic flights.*

Dose bands for typical adult examinations (iRefer/ESR/ACR)

	NON IONISING RADIATION	☢ NEGLIGIBLE RISK	☢☢ MINIMAL RISK	☢☢☢ VERY LOW RISK	☢☢☢☢ LOW RISK	☢☢☢☢☢ MODERATE RISK Adopted from ACR/ESR referral guidelines to reflect certain procedures that may occasionally have a higher associated Radiation Dose than 30mSv
Examples (RCR,2017)	MRI US	Chest X-Ray Limb X-Ray Lumbar spine X-Ray Mammography	IVU Nuclear Medicine: Bone-scan CT Head	CT Chest CT abdomen	CT Thorax Abdomen Pelvis. Some Interventional cases Some Nuclear Medicine scans Some PET/CT scans	CTA Chest/Abdo/Pelvis with contrast. Interventional Radiology e.g. Transjugular Intrahepatic Portosystemic Shunt (TIPS)
Comparison to background radiation (4.03 mSv per year in Ireland RPII, 2014)	No known radiation risk	A few days worth	A few weeks worth	A few years worth	5-10 years worth	7.5 – 25 years worth
Lifetime additional Potential Risk of cancer/exam (RCR, 2017) (NCR, 2017)	No known radiation risk	Less than 1 in 20,000 chance of causing cancer	1 in 20,000 to 1 in 4,000 chance of causing cancer	1 in 4,000 to 1 in 2,000 chance of causing cancer	Less than 1 in 2000 chance of causing cancer	1 in 1,000 to 1 in 500
Typical effective doses (RCR, 2017)	0	0-1 mSv	1-5 mSv	5-10 mSv	10+ mSv	30mSv to 100mSv
Examples of Effective Doses (RCR, 2017)	0	Limbs < 0.01mSv Chest: 0.015mSv T-spine: 0.4mSv L-spine: 0.6mSv	Bone-scan: 3mSv Barium enema: 2.2mSv	CT chest: 6.6 mSv CT abdomen: 5.6 mSv	CT Thorax Abdomen Pelvis: 10mSv Whole body PET/ CT: 18mSv	TIPS: 70MSv
National DRL examples (HIQA, 2021)		Chest PA: 0.16 Gy.cm² T-spine (AP & Lat): 3 Gy.cm² L-spine(AP & Lat): 4.3 Gy.cm²	99m Tc Bone-scan: 600MBq Barium enema: 21 Gy.cm²	CT Thorax: 310 mGy.cm CT abdo/pelvis: 556 mGy.cm	CT Thorax Abdomen Pelvis: 770 mGy.cm Whole body PET/ CT: 380MBq (injected activity) + 770 mGy.cm CT TAP	(TIPS)/ Portal Hypertension: 186 Gy.cm²
Equivalent Chest X-Ray (RCR, 2017)	0	1 to 100	100 to 200	200 to 400	400 to 1200 +	2,000 to 6000+
Transatlantic Flight (One way) (1 transatlantic flight=0.08mSv, Public Health England, 2011)	0	0 -12.5	12.5 - 62.5	62.5 -125	125+	375-1,200

**Paediatric patients vary in size - dose and risk will vary significantly from those to adults*

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