

Measuring radiation dosage

The scientific unit of measurement for radiation dose, commonly referred to as effective dose, is the [millisievert \(mSv\)](#). Other radiation dose measurement units include rad, rem, Roentgen, Sievert, and Gray.

Because different tissues and organs have varying sensitivity to radiation exposure, the actual radiation risk to different parts of the body from an x-ray procedure varies. The term effective dose is used when referring to the radiation risk averaged over the entire body.

The effective dose accounts for the relative sensitivities of the different tissues exposed. More importantly, it allows for quantification of risk and comparison to more familiar sources of exposure that range from natural background radiation to radiographic medical procedures.

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Naturally-occurring "background" radiation exposure

We are exposed to radiation from natural sources all the time. According to recent estimates, the average person in the U.S. receives an effective dose of about 3 [mSv](#) per year from naturally occurring radioactive materials and cosmic radiation from outer space. These natural "background" doses vary throughout the country.

People living in the plateaus of Colorado or New Mexico receive about 1.5 mSv more per year than those living near sea level. The added dose from cosmic rays during a coast-to-coast round trip flight in a commercial airplane is about 0.03 mSv. Altitude plays a big role, but the largest source of background radiation comes from radon gas in our homes (about 2 mSv per year). Like other sources of background radiation, exposure to radon varies widely from one part of the country to another.

To explain it in simple terms, we can compare the radiation exposure from one chest x-ray as equivalent to the amount of radiation exposure one experiences from our natural surroundings in 10 days.

Following are comparisons of effective radiation dose with background radiation exposure for several radiological procedures described within this website:

| For this procedure: | * Your approximate effective radiation dose is: | Comparable to natural background radiation for: | ** Additional lifetime risk of fatal cancer from examination: |
|--|---|---|---|
| ABDOMINAL REGION: | | | |
| Computed Tomography (CT)-Abdomen and Pelvis | 15 mSv | 5 years | Low |
| Computed Tomography (CT)-Abdomen and Pelvis, repeated with and without contrast material | 30 mSv | 10 years | Moderate |
| Computed Tomography (CT)-Colonography | 10 mSv | 3 years | Low |
| Intravenous Pyelogram (IVP) | 3 mSv | 1 year | Low |
| Radiography (X-ray)-Lower GI Tract | 8 mSv | 3 years | Low |
| Radiography (X-ray)-Upper GI Tract | 6 mSv | 2 years | Low |
| BONE: | | | |
| Radiography (X-ray)-Spine | 1.5 mSv | 6 months | Very Low |
| Radiography (X-ray)-Extremity | 0.001 mSv | 3 hours | Negligible |
| CENTRAL NERVOUS SYSTEM: | | | |
| Computed Tomography (CT)-Head | 2 mSv | 8 months | Very Low |
| Computed Tomography (CT)-Head, repeated with and without contrast material | 4 mSv | 16 months | Low |
| Computed Tomography (CT)-Spine | 6 mSv | 2 years | Low |
| CHEST: | | | |
| Computed Tomography (CT)-Chest | 7 mSv | 2 years | Low |

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| Computed Tomography (CT)-Chest Low Dose | 1.5 mSv | 6 months | Very Low |
| Radiography-Chest | 0.1 mSv | 10 days | Minimal |
| DENTAL: | | | |
| Intraoral X-ray | 0.005 mSv | 1 day | Negligible |
| HEART: | | | |
| Coronary Computed Tomography Angiography (CTA) | 16 mSv | 5 years | Low |
| Cardiac CT for Calcium Scoring | 3 mSv | 1 year | Low |
| MEN'S IMAGING: | | | |
| Bone Densitometry (DEXA) | 0.001 mSv | 3 hours | Negligible |
| WOMEN'S IMAGING: | | | |
| Bone Densitometry (DEXA) | 0.001 mSv | 3 hours | Negligible |
| Mammography | 0.4 mSv | 7 weeks | Very Low |



Note for pediatric patients: Pediatric patients vary in size. Doses given to pediatric patients will vary significantly from those given to adults.

* The effective doses are typical values for an average-sized adult. The actual dose can vary substantially, depending on a person's size as well as on differences in imaging practices.** **Legend:**

| Risk Level | Approximate additional risk of fatal cancer for an adult from examination: |
|--|--|
| Negligible: | less than 1 in 1,000,000 |
| Minimal: | 1 in 1,000,000 to 1 in 100,000 |
| Very Low: | 1 in 100,000 to 1 in 10,000 |
| Low: | 1 in 10,000 to 1 in 1000 |
| Moderate: | 1 in 1000 to 1 in 500 |
| Note: These risk levels represent very small additions to the 1 in 5 chance we all have of dying from cancer. | |

