

## BASIC FACTS

- » Not all imaging exams use radiation. MRI and ultrasound do not use radiation and therefore have no risk of causing cancer.
- » Coloradans are exposed to 4 milliSieverts (mSv) of natural background radiation each year due to altitude and local geology.
- » There is no evidence that radiation doses below 100 milliSieverts (mSv) cause cancer in adults.
- » All diagnostic imaging studies that use radiation have a radiation dose far less than 100 mSv.
- » 20% of Americans die from cancer where the cause of the cancer is unknown. If we assume that even small amounts of radiation can cause cancer, a chest CT scan would raise a patient's lifetime risk of dying from cancer from 20% to 20.03%.
- » It takes 10 to 15 years from the time of radiation exposure for most types of cancer to develop.
- » Because of the long delay between radiation exposure and the development of cancer, a patient's age plays a significant role in his or her individual risk of developing cancer from radiation exposure.
- » For significant clinical conditions, the risk of not performing a diagnostic imaging study far exceeds the potential risk associated with the study.



### Leaders in Radiation Safety

University of Colorado Hospital has full-time radiation safety specialists, imaging technologists, physicists, and radiologists, all of whom use the most current information and technology to ensure your safety and to provide the best health care to you and your family.

### What Can I Do To Minimize My Radiation Dose?

Being informed is always important. Before undergoing an imaging exam, be sure to discuss the following with your doctor:

1. Why do I need this exam?
2. How will this exam improve my health care?
3. Are there alternative imaging exams that don't use radiation?

If you have questions about Radiation Safety at the University of Colorado Hospital, please discuss your concerns with your physician or contact our Imaging Physicist at 720-848-6604.

### Resources for Additional Information

[www.radiologyinfo.org](http://www.radiologyinfo.org)  
[www.imagewisely.org](http://www.imagewisely.org)

# Facts About Radiation Exposure from Diagnostic Imaging Exams for Adults



Imaging exams can provide valuable information to your physician. Not receiving an imaging exam that is recommended by your physician may prevent accurate diagnosis of your condition, or it may prevent your condition from being treated in a timely and effective manner. There is a risk associated with not receiving a medically-necessary imaging exam.



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[WWW.UCH.EDU/RADIOLOGY](http://WWW.UCH.EDU/RADIOLOGY)

## Radiation Risk

Recent media reports have highlighted the risk of radiation in diagnostic imaging procedures, including X-ray, Nuclear Medicine, and Computerized Tomography (CT). University of Colorado Hospital has put together some information to help patients stay informed and involved in their health care.

X-ray, Nuclear Medicine, and CT scans are commonly-used procedures that utilize the benefits of radiation. The exact risk associated with these low levels of radiation is unknown. However, it is thought that the risk of developing cancer from these exams is either very low or non-existent.



There is no evidence that the radiation received from diagnostic imaging exams causes cancer in adults. However, out of an abundance of caution, the medical community uses the risk associated with higher levels of radiation and assumes a proportional risk for lower doses. For example, if a dose of 1000 mSv has been shown to increase the risk of developing cancer by 4%, it is assumed that a dose of 10 mSv increases the risk of developing cancer by 0.04%, or 1 in 2500.

The following information has been compiled by several national and international groups that study the effects of exposure to radiation.

## Your Radiation Dose

The values in the table show an average effective dose for various imaging exams in adults and are based on data acquired between 1990 and 2007. Modern imaging exams produce an even smaller dose. The exact dose you receive during your exam will depend on the specific needs of your exam and on your body size and anatomy.

### Average Annual Effective Dose from Natural Background Radiation

United States	3.1 mSv
State of Colorado	4.0 mSv

### Color Coded Risk Levels

Color Coded Risk Levels	Risk Level
Less than 1 in 1,000,000	Negligible
1 in 1,000,000 to 1 in 100,000	Minimal
1 in 100,000 to 1 in 10,000	Very Low
1 in 10,000 to 1 in 1,000	Low
1 in 1,000 to 1 in 500	Moderate
1 in 500 to 1 in 100	High

### Lifetime Chance of Death from:

Lightning Strike	1 in 100,000
Bicycle Accident	1 in 10,000
Drowning	1 in 1,000
Motor Vehicle Accident	1 in 100
Cancer (Natural Causes)	1 in 5

## Average Radiation Dose from Diagnostic Imaging Exams in Adults

Exam	Average Effective Dose	Estimated Increase in Lifetime Risk of Death from Cancer*
<b>General X-ray</b>		
Chest X-ray	0.02 mSv	1 in 1.2 million
Abdomen, Hip, or Pelvis X-ray	0.7 mSv	1 in 35,000
<b>CT</b>		
Head CT	2 mSv	1 in 12,000
Chest CT	7 mSv	1 in 3,500
Abdomen CT	8 mSv	1 in 3,000
<b>Mammography</b>		
Mammogram (both breasts)	0.48 mSv	1 in 125,000
<b>DEXA</b>		
Bone Density Scan	0.001 mSv	1 in 24 million
<b>Interventional Procedures</b>		
Head & Neck Angiography	5 mSv	1 in 5,000
Coronary Angioplasty, Stent Placement, or RF Ablation	15 mSv	1 in 1,600
<b>Nuclear Medicine</b>		
Thyroid Scan	1.9 mSv to 4.8 mSv	1 in 13,000 to 1 in 5,000
Bone Scan	6.3 mSv	1 in 4,000
PET	14.1 mSv	1 in 1,700
Cardiac Scan	9.4 to 11.4 mSv	1 in 2,600 to 1 in 2,100

\*These risk estimates are based on the effects of very high amounts of radiation and likely over-estimate the actual risk of an imaging exam causing a fatal cancer. There is no evidence that doses below 100 mSv increases your risk of developing cancer.