

The radiation dose can be adjusted based on the type of exam and the detail of the images needed. The exposure settings can be adapted for children (“child-sized”) to deliver the least amount of radiation for producing an image that shows the information the doctors need.

A CT scan gives a small amount of radiation to the patient, and conventional radiography can give a hundred times less. Chest X rays, for example, give about the same amount of radiation as we are exposed to just from several days’ worth of naturally occurring radiation in our everyday environment.

Paediatric exam	Equivalent period of exposure to natural radiation	Increase in the risk of cancer in the future
Dental intra-oral exam	< 1 day	Extremely small
Chest X-ray	3 days	Extremely small
Head CT scan	≈1 year	Minimal (very much less than 1%)
Abdominal CT scan	≈1,5 year	Very low (much less than 1%)
PET CT*	≈6 years	Low (less than 1%)

When these exams are needed, their benefit is very high, and much greater than the risks

\* Positron emission tomography with CT



### Do you need further information?

More specific leaflets on different types of imaging exams that use ionizing radiation are available.

## What questions might we ask?

You should feel confident that your referring physician or the imaging facility staff can provide information about your child’s X-ray exams. Here are some examples of questions you may ask:

- ✓ **IS THE EXAM NEEDED?**
- ✓ **IS THE EXAM NEEDED NOW?**
- ✓ **DO YOU KNOW IF THIS EXAM HAS BEEN DONE RECENTLY?**
- ✓ **CAN ANOTHER EXAM BE DONE WHICH DOES NOT USE IONIZING RADIATION?**
- ✓ **CAN AN EXAM THAT HAS BEEN ALREADY DONE GIVE THE INFORMATION NEEDED?**
- ✓ **HOW WILL THE EXAM HELP WITH MY CHILD’S CARE?**
- ✓ **WHAT ARE THE RISKS OF THIS EXAM?**
- ✓ **WHAT ARE THE RISKS OF NOT HAVING THIS EXAM?**
- ✓ **HOW DOES THE IMAGING FACILITY ASSURE THAT THE RIGHT RADIATION DOSE IS USED ACCORDING TO MY CHILD’S SIZE?**

### Additional Resources



This leaflet, as well as other more specific leaflets on different types of X-ray imaging exams, have been developed as a complementary tool to

the WHO report [Communicating Radiation Risks in Paediatric Imaging](#), where you can find more detailed information.

Further useful information is available at Image Gently <http://www.imagegentlyparents.org>

## X-RAY EXAMS IN CHILDREN



# What do we need to know?



World Health Organization

## X-rays for children: benefits and risks

On average, 1 in 3 people will develop cancer during their lifetime. X-ray exams may slightly increase this normal chance of developing cancer later in life. Children are especially vulnerable to the effects of radiation due to their growing tissues and their longer lifespan. When X-ray exams are needed for diagnosing an illness or injury in a child and they are performed with the proper technique, the benefits far outweigh the radiation risks.

## How much do you know about radiation?

Radiation is energy that travels in the form of waves or particles. Radiation is part of our everyday environment. People are exposed to cosmic radiation from outer space, as well as to natural radioactive materials found in the soil, water, food, air and also in the body. The use of radiation in medicine is the largest artificial source of radiation exposure.

## An important fact about radiation

There are two types of radiation: **ionizing** and **non-ionizing radiation**.

**Ionizing radiation** can remove electrons from atoms (ionize). Medical and dental conventional radiography, computed tomography (CT), nuclear medicine and fluoroscopy are examples of exams that use **ionizing radiation**.

In contrast, **non-ionizing radiation** can make atoms vibrate, but does not have enough energy to remove electrons. Ultrasound and magnetic resonance imaging (MRI) are examples of exams that use **non-ionizing radiation**.

## What exams use X-rays?

### Medical and dental conventional radiography

**Radiography** is the use of X-rays to visualize the internal organ and structures of the body including film-based techniques as well as digital technologies



### Computed Tomography



A **computed tomography** or CT scan is an exam that uses X-rays to get images of the body, showing detail of organs which is not available on conventional radiographs.

### Fluoroscopy and fluoroscopy-guided exams



**Fluoroscopy** is like a video which uses x-ray pulses to show organ motion within the body in real-time, and allows performing procedures involving small devices (e.g. catheters, needles, balloons).

## Imaging exams that do not use X-rays

### Ultrasound



### Magnetic Resonance Imaging (MRI)

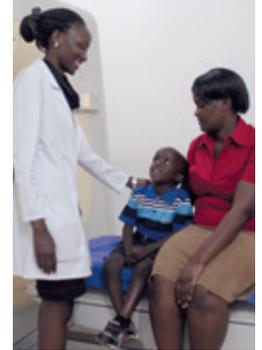


## What is the value of medical imaging in children?

Radiology is an essential part of pediatric health care. X-ray imaging exams can save lives and X-ray guided interventions may replace more invasive surgery.



The benefit of an X-ray exam should always outweigh the radiation risks. It is not certain that there is any risk at very low doses, and if there is, it is very small. Even so, your radiology team takes radiation protection in pediatric imaging seriously and uses the smallest amount of radiation necessary.



We should be sure that an imaging exam will do more good than harm (doctors call this “justification”). It is important to deliver the smallest amount of radiation needed to obtain images for the desired purpose (doctors call this “optimization”). Both are part of responsible and ethical medical practice.

**Tell your doctor if your child has had imaging exams before**