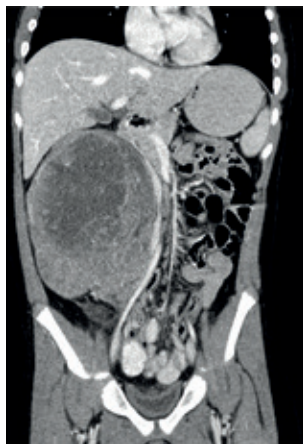


# Radiation benefits & risks of CT scans

CT is an extremely valuable tool in looking for illness and injury in children, often replacing less accurate or higher risk / more invasive procedures. CT quickly and reliably provides valuable and potentially life-saving information especially in the head, chest, abdomen/pelvis and bones. The radiation dose of a CT scan depends on the part of the body scanned, the reason for the exam and the size of the child. Good practice in all CT facilities is to reduce dose to the minimum required to obtain images with the quality needed for diagnosis.



CT Radiation Exposure at different ages compared with the equivalent period of exposure to natural radiation in our everyday environment

Type of CT	Newborn	5 year old	10 year old
Head CT	2.5 years	1.5 year	11 months
Chest CT	9 months	1.2 year	1.4 year
Abdominal CT	2.2 years	1.5 year	1.5 year

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

# 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 CT scan. Here are some examples of questions you might ask:

- ✓ IS THIS CT SCAN NEEDED?
- ✓ IS THE CT SCAN NEEDED NOW?
- ✓ CAN A PREVIOUS EXAM GIVE THE INFORMATION NEEDED?
- ✓ CAN ANOTHER EXAM BE DONE WHICH DOES NOT USE IONIZING RADIATION?
- ✓ HOW WILL THE CT SCAN HELP?
- ✓ WHAT ARE THE RISKS OF NOT HAVING THIS CT SCAN?
- ✓ WHAT ARE THE RISKS OF THIS CT SCAN AND HOW GREAT ARE THEY?
- ✓ HOW CAN THE RISKS BE MINIMIZED?
- ✓ HOW DOES THE IMAGING FACILITY ASSURE THAT THE RIGHT CT DOSE IS USED ACCORDING TO MY CHILD'S SIZE?

**Tell your doctor if your child has had CT scans before**

## Additional Resources



This leaflet was 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>

# COMPUTED TOMOGRAPHY (CT) IN CHILDREN



# What do we need to know?



## CT for Children

Computed tomography or CT scan is an exam that uses X-rays to create detailed images of the body. CT provides cross-sectional (2D) and 3D images showing organs and internal details which may not be seen on a standard X-ray. CT radiation doses are typically higher than for a standard X-ray. The decision to do the exam is based on the expectation that it will do more good than harm (known as “justification”). It is important to deliver the smallest amount of radiation needed to obtain images for the desired purpose (known as “optimization”). Both are part of responsible and ethical medical practice.

## 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 today.

## An important fact about radiation

There are two types of radiation that affect atoms differently: **ionizing** and **non-ionizing radiation**.

**Ionizing radiation** is a type of radiation that can remove electrons from atoms. CT exams use **ionizing radiation**.

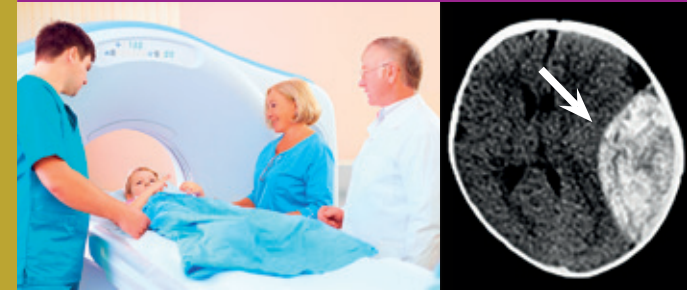
In contrast, **non-ionizing radiation** can make atoms vibrate, but does not have enough energy to remove electrons. Ultrasound and magnetic resonance imaging (MRI) are examples of exams that use **non-ionizing radiation**.

The level of risk associated with a CT scan is not only related to the level of radiation dose, but also to the child’s age and gender. In general risks are lower the older you are.

## Responding to radiation risk

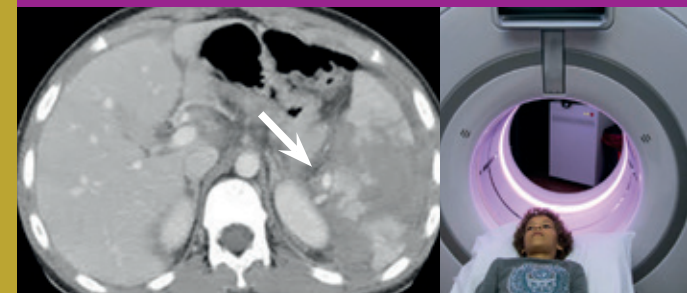
- The CT scan settings can be adapted for children (i.e. “child-sized”) to obtain the necessary information with the least amount of radiation .
- When its use is appropriate and the radiation dose is “child-sized” the benefit from a CT scan is much greater than the potential harm.
- There are many ways to lower the radiation dose and the associated risk in pediatric CT without lowering the value of the pictures (diagnostic quality).
- The imaging facility should use techniques adjusted for the size of your child (child-sized).

## CT is lifesaving



A boy had a head injury following a car accident. This CT provided quick and accurate diagnosis of a life-threatening, large area of bleeding around the brain (epidural hematoma: see arrow), which was removed with immediate surgery.

## CT helps make timely decisions about the need for surgery



This CT shows spleen injury (many spleen pieces) due to a car accident (see arrow). This helps doctors to make prompt decisions about the need for surgery, and in many cases may be lifesaving.