



CT Imaging and Children

CT imaging (CT scanning) is an important medical diagnostic technique that is used on adults and children of all ages.

Introduction

CT imaging is used for its diagnostic accuracy and speed.

CT imaging has been linked statistically to small increases in the likelihood of cancer later in life. It is in widespread practice and is likely to remain a major diagnostic tool for the foreseeable future.

In general, CT scans are used to diagnose more serious health conditions, and if referred appropriately, the health risk of not having a CT scan is likely to be significantly higher than the risk of radiation exposure.

While the risk of cancers resulting from CT scans is small, radiation doses from CT scans should be kept as low as possible and alternative procedures that do not use ionising radiation should be considered where appropriate.

ARPANSA is working with medical, professional and regulatory bodies to minimise the risks and maximise the benefits to patients from CT scans.

What is Computed Tomography?

Computed tomography, also known as CT imaging or CT scanning, is a type of X-ray imaging procedure which generates a 3-dimensional image of the body which can be viewed from any angle. In a CT scan, the beam of X-rays moves in a circle around the body, providing different views of the same organ or tissue in much greater detail than a conventional X-ray examination.

Why use CT scanning for children?

- In children as well as adults, CT scanning may be preferred to the customary X-ray exam as it provides higher image quality and allows for better diagnosis. It may be performed in newborns and infants as well as older children and adolescents.
- A CT scan may be used to detect a wide range of abnormalities or diseases in any part of a child's body. Some of the more common reasons for CT scans are infectious or inflammatory disorders, abdominal pain, headaches, and injury-related changes. CT scans may also be used to negate the presence of disease, demonstrate birth defects, detect cancer, and to determine whether previously treated disease has recurred. It is not typically used for minor accidents or ailments.
- There are several epidemiological studies of the health impacts of paediatric CT scans being conducted worldwide. Results to date are broadly consistent with the scientific models that predict increased radiation risks to children.

Radiation risk from paediatric CT scans

- The largest dose of man-made radiation to the Australian population comes from diagnostic imaging procedures.
- CT scans are the largest contributor to radiation dose from diagnostic radiology.
- The principal risk from CT scanning is the higher dose of ionising radiation required compared to other imaging methods (see ARPANSA's Fact Sheet: *Ionising Radiation and Health*).
- Younger patients are at a greater risk of cancer development than older people due to greater cell proliferation and greater life expectancy.
- While more CT scans are being ordered in Australia each year, the rate of paediatric CT scanning has slowed in recent years and even demonstrates a reduction in some age brackets.
- The medical profession has stated that the risk associated with the radiation exposure from a CT scan is small compared with the risk of not having the scan and failing to diagnose disease.
- There are several epidemiological studies of the health impacts of paediatric CT scans being conducted worldwide. Results to date are broadly consistent with the scientific models that predict increased radiation risks to children.

Paediatric CT scans in Australia

In 2011, there were approximately 27 000 paediatric CT scans recorded by Medicare, however the estimated total number of CT scans on children Australia-wide is significantly larger.

ARPANSA's involvement

ARPANSA actively works with the medical profession to assure that diagnostic information is obtained for the minimum radiation risk.

ARPANSA advocates the use of diagnostic reference levels and has developed a Code of Practice (RPS 14) as a tool for optimisation. Optimisation should be done in collaboration with an accredited medical physicist.

Links

ARPANSA Ionising Radiation and Health Fact Sheet

www.arpansa.gov.au/RadiationProtection/factsheets/is_rad.cfm

Diagnostic Reference Levels Fact Sheet

www.arpansa.gov.au/services/ndrl/ndrlFactsheet.cfm

Radiation Protection Series (RPS) No. 14 *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (2008)*

www.arpansa.gov.au/publications/codes/rps14.cfm

Image Gently

<http://www.imagegently.org/>

Inside Radiology

www.insideradiology.com.au/

International Atomic Energy Agency Radiation Protection of Patients (RPOP)

https://rpop.iaea.org/RPOP/RPoP/Content/SpecialGroups/2_Children/index.htm

The Royal Australian & New Zealand College of Radiologists (RANZCR) CT Dose Optimisation Projects

www.ranzcr.edu.au/quality-a-safety/program/ctdose

U.S. Food and Drug Administration

www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/MedicalImaging/MedicalX-Rays/ucm115317.htm