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Why is CT Radiation Risk always in the News?

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It is difficult to find another example of a modality, at least in medical imaging, which has attracted as much media attention as Computed Tomography (CT). Interestingly, it is the radiation dose and risks from CT that have attracted most of the attention rather than the actual clinical utility of CT. But that is the way the media works. This article traces some of the events that have been responsible for the media attention.

Before 1998, there was little talk of radiation dose from CT, despite the fact that CT had been around since 1972. There was some talk about the supposed decline of CT once MRI began to emerge as a prominent imaging modality. However, CT survived and indeed thrived. Most of the industry's attention in the 1990's was on the development of faster CT machines and the competition was in scanning times, as users were more interested in quicker scans than reduced radiation dose. However, the International Commission on Radiological Protection (ICRP) foresaw the emerging applications of CT and [predicted that radiation doses from CT would become an important issue](#). The ICRP set up a task group under the my chairmanship, that resulted in the [Annals of ICRP Publication 87](#). To bring the issue to the attention of a wider audience, the authors published an [editorial in the British Medical Journal](#). That still did not attract enough media attention, although it did provide some initial background information. The impetus came from the publication of a [series of articles](#) in the February 2001 issue of the American Journal of Roentgenology with an editorial pointing out that in some hospitals in the USA the exposure factors used in CT of children were the same as those for adults, and [linking future cancers in children to CT scans](#). The impact was strong and led to the creation of the [Image Gently campaign](#) a few years later.

A number of government agencies and important organisations provided statements and information to ease any fears and create proper understanding. Some of these were:

[National Cancer Institute, USA](#)

[Cancer Research, UK](#)

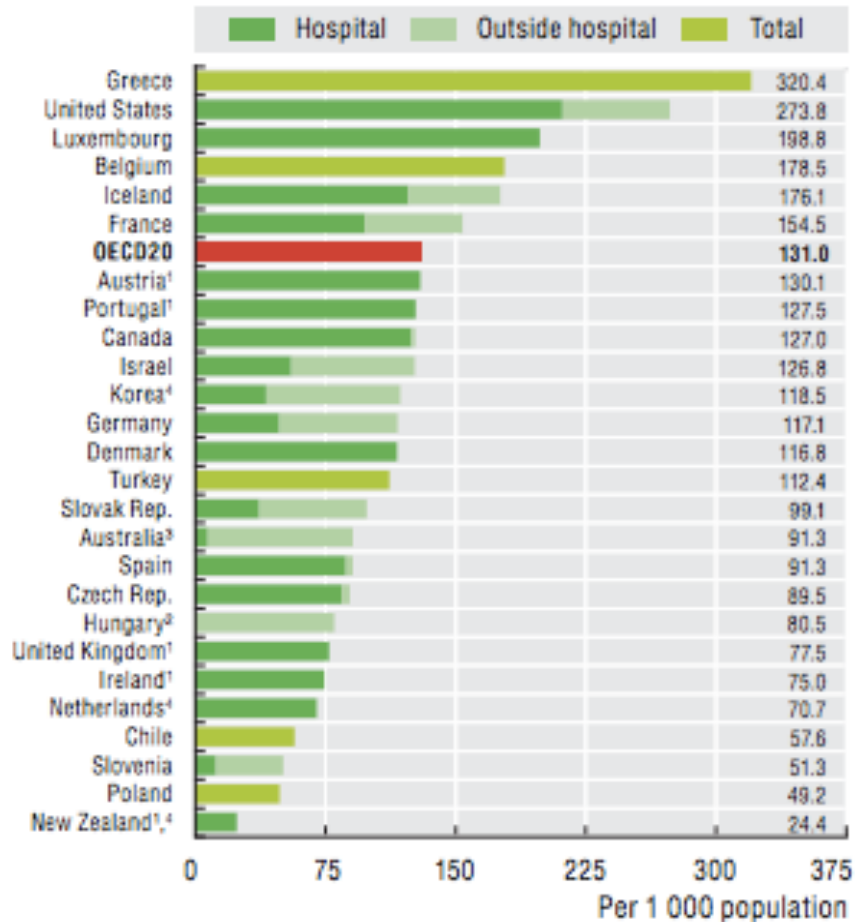
[FDA, USA](#)

[International Atomic Energy Agency \(IAEA\), Vienna](#)

[European Commission](#)

While organisations and professionals were grappling with the cancer risks from CT scans, another issue that sparked debate was the overuse of CT, and [in the USA there was a drive to address overutilisation](#).

The figures below show the number of CT scans per 1,000 population in different countries (data for 2011 or nearest taken from OECD report Health at a Glance 2013).



It was during the last decade that, for thousands of patients, radiation doses [began to exceed an effective dose of 100mSv](#). [A paper surveying 31,462 patients](#) who underwent diagnostic CT in 2007, and who had undergone 190,712 CT examinations over the previous 22 years, indicated that 33% of patients underwent five or more CT examinations during their lifetime, and 5% underwent between 22 and 132 examinations. Fifteen percent received estimated cumulative effective doses of more than 100mSv, and 4% received between 250 and 1,375mSv. Such doses to individual patients were not documented in earlier diagnostic

examinations. In the past, the focus was on CT as a higher contributor to collective dose to the population and a relatively high-dose examination as compared to the more common imaging technique of radiography. This resulted in the anticipation of increasing cumulative patient doses and the [need for a smartcard to track these](#). The [IAEA's smartcard project](#), which was [initiated in 2003](#) and [became public in 2009](#), received [widespread media attention](#), including [coverage by CNN](#) and a range of other media. A [joint position statement](#) on patient exposure tracking was issued by the IAEA in conjunction with the ESR.

Still to come were skin injuries to patients undergoing CT scans, something that was non-existent from 1972 to 2005. CT machines had been among the safest machines in the hands of operators until a case was brought to public attention by the media. It involved a technologist activating a [CT scan on the same area 151 times](#).

It was around the same time that Cedars-Sinai Medical Center in Los Angeles disclosed that it had mistakenly administered up to eight times the normal radiation dose to 206 possible stroke victims, over an 18-month period, during procedures to get clearer images of the brain. This led [state and federal health officials to investigate](#) the cause. By the end of October, 2010, the FDA was aware of approximately 385 patients from six hospitals who were exposed to excess radiation during brain-CT perfusion scans. Some patients reported obvious signs of excessive radiation exposure following their scans, such as hair loss or skin redness. The reputation of CT was dealt a major blow as cases of skin injuries were picked up by the media.

What can be expected in the coming years? The focus on safety in recent years is encouraging the industry to take steps in a competitive manner. Radiation dose display; dose recording, its inclusion in patient files; the ability to track the dose of individual patients; and dose management should, ultimately, make it a sub-mSv modality. While most of these positive developments are unlikely to make media headlines, there are going to be reports of cancer among patients who have undergone CT scans in the past. There are quite a number of ongoing studies on children who have undergone CT scans.

Thus the radiation risks from CT can still be expected to be in the news over the coming years.

