According to the U.S. Food and Drug Administration, an estimated seven out of 10 Americans get a medical or dental X-ray each year, a procedure which, according to a number of recent studies, may not be particularly safe.

Scientists have known for some time that the radiation from X-rays can penetrate through cells and damage DNA. In some people, this can trigger cancer.

Last winter, scientists in Germany announced that they have found that having regular mammograms can increase the risk of breast cancer in young women who are genetically predisposed to breast tumors. Researchers from the University of Gottingen, led by Marlis Frankenberg-Schwager, found that the low-energy X-rays used were up to three times more likely to cause cancerous mutations as normal X-rays.

Earlier this year, a team of British researchers published the results of their study quantifying the cancer risk from diagnostic X-rays. Radiation from medical and dental scans, they found, causes about 700 cases of cancer per year in Britain and more than 5,600 cases in the United States. In percentage terms, the research indicates the cancer risk ranges from 0.6 to 3.2 per cent, depending on the frequency of tests. In Canada, the risk is estimated at 1.1 per cent, leading to nearly 800 cases of cancer every year.

While these studies may seem alarming, researchers have been expressing concern about the safety of low-level radiation for most of the past century, mostly without effect. Through a series of historical accidents, all of the major sources of ionizing radiation ended up under the jurisdiction of people and institutions who had no reason to want to explore the early knowledge that radiation was harmful. Indeed, the lack of attention to the dangers of X-rays and other types of radiation may well be one of the first examples of corporate greed overwhelming the public good.

Within a year of Wilhelm Roentgen’s discovery of X-rays in 1895, physicians discovered they could be harmful. There are accounts of doctors receiving burns that wouldn’t heal, requiring amputation of their fingers. In 1927, Hermann J. Muller demonstrated that X-rays caused inheritable genetic damage, and received a Nobel Prize for his work.

Nevertheless, the use of X-rays expanded and even in the mid-20th century, radiation was used to treat non-cancerous conditions ranging from ringworm to depression. Beauty shops even used X-ray equipment to remove unwanted facial and body hair! In some areas, in the 1950s, trucks fitted out with portable X-ray machines drove around to schools and gave kids chest X-rays. Many people may also recall the fluoroscopic (X-ray) shoe-fitting machines that were prevalent in shoe stores in the 1940s and 50s.

One of the best known critics of excessive exposure to X-rays is Dr. John Gofman, the first scientist to isolate plutonium and co-discoverer of uranium-233. Gofman has been publishing studies about the hazards of low-level radiation for over 20 years and believes that medical radiation is the principal cause of cancer mortality in the United States during the 20th century.

A medical doctor with a PhD in nuclear and physical chemistry, Gofman is Professor Emeritus of molecular and cell biology at the University of California. In the early 1960s, the Atomic Energy Commission asked him to develop a Biomedical Research Division at its Livermore National Laboratory. His funding was cut when he began speaking out on the dangers of radiation, so he authored a number of books on the dangers of radiation, including unnecessary exposure to X-rays, fluoroscopy and CT scans. He is especially concerned about the use of the technology for medical screening (as opposed to diagnosis).

Gofman acknowledges the value of X-rays in diagnosis and to monitor medical treatment. Nevertheless, he urges physicians to be careful of unnecessarily high doses of X-rays, to monitor the cumulative doses their patients receive, to use alternative methods (such as magnetic resonance imaging and ultrasound) where possible, and to advise patients of the pros and cons of X-rays, much as they alert patients to the possible side effects of drugs. He also urges radiologists to reduce radiation doses delivered in standard procedures, a practice already in place in some hospitals.
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