

# THE CHERNOBYL DEATH TOLL

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Nuclear advocates often claim that just 30-60 people died as a result of the April 1986 Chernobyl nuclear disaster, comprising some highly-exposed emergency responders and a small percentage of those who suffered from thyroid cancers as a result of Chernobyl exposure. Such claims are ill-informed.

It is difficult for epidemiological (public health) studies to demonstrate statistically-significant increases in cancers or other diseases caused by Chernobyl fallout exposure for various reasons such as the relatively high incidence of the diseases, the latency period of cancers, and limited data on disease incidence. However, the difficulty of demonstrating the impacts is no reason to ignore them or to claim they don't exist.

Some of the difficulties are described by Dr Elizabeth Cardis (1996) from the International Agency for Research on Cancer (IARC): "Although some increases in the frequency of cancer in exposed populations have been reported, these results are difficult to interpret, mainly because of differences in the intensity and method of follow-up between exposed populations and the general population with which they are compared. ... The total lifetime numbers of excess cancers will be greatest among the 'liquidators' (emergency and recovery workers) and among the residents of 'contaminated' territories, of the order of 2000 to 4600 among each group (the size of the exposed populations is 200,000 liquidators and 6,800,000 residents of 'contaminated' areas). These increases would be difficult to detect epidemiologically against an expected background number of 41,500 and 800,000 cases of cancer respectively among the two groups."

Given the limitations of epidemiological studies, the only way to arrive at an estimate of the total numbers of cancers caused by the radioactive fallout from Chernobyl is to estimate the total collective radiation dose and to apply a risk estimate. The UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the International Commission on Radiological Protection recommend against using

collective dose figures and risk estimates to estimate total deaths. The problem with that recommendation is that there is simply no other way to arrive at an estimate of the death toll from Chernobyl (or Fukushima, or routine emissions from the nuclear fuel cycle, or weapons tests, or background radiation, etc).

Indeed UNSCEAR itself co-authored a report which cites an estimate based on collective dose figures and risk estimates of around 4,000 long-term cancer deaths among the people who received the highest radiation doses from Chernobyl (emergency workers from 1986-1987, evacuees and residents of the most contaminated areas). UN agencies estimated an additional 5,000 deaths among populations exposed to lower doses in Belarus, the Russian Federation and Ukraine. (Chernobyl Forum, 2005; WHO, 2006)

The estimated death toll rises further when populations beyond those three countries are included. For example, a study by Cardis et al (2006) published in the *International Journal of Cancer* estimates 16,000 deaths. Dr Cardis (2006b), head of the IARC Radiation Group, said: "By 2065 (i.e. in the eighty years following the accident), predictions based on these models indicate that about 16,000 cases of thyroid cancer and 25,000 cases of other cancers may be expected due to radiation from the accident and that about 16,000 deaths from these cancers may occur."

The International Atomic Energy Agency's (1996) estimate of a collective dose of 600,000 person-Sieverts over 50 years from Chernobyl fallout can be multiplied by a standard risk estimate of 0.10 fatal cancers per person-Sievert to give a total estimate of 60,000 fatal cancers. (The study by the US National Research Council (2005) lends weight to the Linear No Threshold model upon which the risk estimate of 0.10 is based.)

UK radiation scientists Dr Ian Fairlie and Dr David Sumner (2006) estimate 30,000 to 60,000 deaths. Dr Fairlie (2014) notes that statements by UNSCEAR indicate that it believes the whole-body collective

dose across Europe from Chernobyl was 320,000 to 480,000 person-Sieverts, from which an estimate of 32,000 to 48,000 fatal cancers can be deduced (using a risk estimate of 0.10).

A 2006 report commissioned by Greenpeace estimates a death toll of about 93,000. According to Greenpeace (2006): "Our report involved 52 respected scientists and includes information never before published in English. It challenges the UN International Atomic Energy Agency Chernobyl Forum report, which predicted 4,000 additional deaths attributable to the accident as a gross simplification of the real breadth of human suffering. The new data, based on Belarus national cancer statistics, predicts approximately 270,000 cancers and 93,000 fatal cancer cases caused by Chernobyl. The report also concludes that on the basis of demographic data, during the last 15 years, 60,000 people have additionally died in Russia because of the Chernobyl accident, and estimates of the total death toll for the Ukraine and Belarus could reach another 140,000."

Those are the credible estimates of the eventual death toll from Chernobyl. Another defensible position (or non-position) is that the long-term cancer death toll is unknown and unknowable because of the uncertainties associated with the science (the limitations of epidemiological studies, and uncertainties about dose estimates and risk estimates). The third of the two defensible positions, unqualified claims that the death toll was just 30-60, should be rejected as dishonest or uninformed spin from the nuclear industry and some of its scientifically-illiterate supporters ... and from every last one of the self-proclaimed pro-nuclear environmentalists – James Hansen, Patrick Moore, Mark Lynas, George Monbiot, James Lovelock, Barry Brook, Ben Heard, Michael Shellenberger, etc. (Green, 2016).

While the Chernobyl death toll is subject to uncertainty, the broader social impacts are all too clear, including those resulting from the permanent relocation of about 350,000 people. As the OECD's Nuclear Energy Agency (2002) notes, Chernobyl "had serious radiological, health and socio-economic consequences for the populations of Belarus, Ukraine

and Russia, which still suffer from these consequences."

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# CHERNOBYL'S HEALTH IMPACTS: THE 2016 TORCH REPORT

An updated dated version of an important report on the health impacts of the 1986 Chernobyl nuclear disaster was released in 2016. Written by radiation biologist Dr Ian Fairlie, the report incorporates the findings of many relevant studies produced in the 10 years since the original report was published.

The subject matter is inordinately complex but Fairlie explains a host of technicalities in language that anyone can understand. Thus the report is not only an up-to-date, expert report on the health effects of the Chernobyl disaster, but it also doubles as a primer on the radiation/health debates.

Dr Fairlie summarises the main impacts:

5 million people in Belarus, Ukraine and Russia still live in highly contaminated areas, and 400 million people in less contaminated areas.

37% of Chernobyl's fallout deposited on western Europe; 42% of western Europe contaminated.

Initially, about 116,000 people were evacuated, and later an additional 230,000 people were resettled.

40,000 fatal cancers predicted across Europe (based on an estimated collective dose of 400,000 person-Sieverts and a linear no-threshold derived risk estimate of 0.1 fatal cancers per person-Sievert). 6,000 thyroid cancer cases to date, 16,000 more expected.

Increased radiogenic thyroid cancers now seen in Austria: 8–41% of increased thyroid cancer cases after 1990 in Austria may be due to Chernobyl.

Increased incidences of leukemia well established among the clean-up workers in Ukraine and Russia with very high risk factors. Slightly lower leukemia risks were observed among residents of seriously contaminated areas in Ukraine and Belarus.

Increases in solid cancers were observed among clean-up workers in Belarus and Ukraine but their relative risks (20% to 50%) were considerably lower than the 700% increases observed for thyroid cancer, and the 200% to 500% increases observed for leukemia.

Several new studies have confirmed increased risks of cardiovascular disease and stroke after Chernobyl. It is recommended that further studies be funded and carried out on radiogenic cardiovascular diseases. As current radiation dose limits around the world are based on cancer risks alone, it is recommended that they should be tightened to take into account cardiovascular disease and stroke risks as well.

A recent very large study observed statistically significant increases in nervous system birth defects in highly contaminated areas in Russia, similar to the elevated rates of such birth defects observed in highly contaminated areas in Ukraine. The International Agency for Research on Cancer should be funded to carry out a comprehensive study of birth defects, particularly nervous system defects and Down Syndrome after Chernobyl.

*Ian Fairlie, March 2016, 'TORCH-2016: An independent scientific evaluation of the health-related effects of the Chernobyl nuclear disaster', [www.global2000.at/sites/global/files/GLOBAL\\_TORCH%202016\\_rz\\_WEB\\_KORR.pdf](http://www.global2000.at/sites/global/files/GLOBAL_TORCH%202016_rz_WEB_KORR.pdf)*