

# The Medical Implications of the 1986 Chernobyl Nuclear Disaster

Thirty Years Ago, April 1986

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*The following text by renowned scientist and physician **Dr. Helen Caldicott** on the impacts of the 1986 Chernobyl will be followed in a subsequent article by an analysis of the medical implications of the Fukushima disaster*

*The only on-site medical and epidemiological data gathered after Chernobyl was released in a report published by the New York Academy of Medicine in 2009 titled "Chernobyl - Consequences of the Catastrophe for People and the Environment," which was gleaned from over 5000 papers published largely in Russian and translated into English.*

*These studies were gathered mainly from populations residing in the heavily irradiated zones in the Ukraine, Belarus and European Russia. However the Russian government classified all the relevant medical data for 3 years.*



The Chernobyl 1986 catastrophe has turned into a new medical experiment conducted on millions of innocent people, much like the populations of Hiroshima and Nagasaki.

Because, the International Atomic Energy Agency, the United Nations Security Committee on the Effects of Atomic Radiation and the World Health Organisation never collected data

from real patients, instead to their discredit they estimated the number of potential diseases that they derived only from calculations of radioactive releases and extrapolated doses.

The nuclear reactor after the disaster. Reactor 4 (center). Turbine building (lower left). Reactor 3 (center right), source wikipedia.

Hence it is vitally important to scientifically and epidemiologically document the many illnesses which arose after the accident so that the medical profession can learn from these shocking accidents. These papers presented in the Chernobyl report by the NY Academy of Sciences attempt to do so. Some people say that they are not adequately peer reviewed so they should be ignored, however they are the only on-the-ground documentations of the many illnesses afflicting the irradiated populations

In essence 28 years after the accident, 50% of thirteen European countries are still contaminated by a variety of long-lived radioactive elements and the medical effects are severe in some areas. Before Chernobyl, 80% of the children in Belarus were healthy and now only 20% remain in good health.

Millions of people initially were exposed to very high radiation doses from short-lived radioactive elements so the initial radiation doses were thousands of times higher than doses received 3 years later.

### **Types of radioactive elements**

It is important to note that although the nuclear industry refers specifically to cesium 134, 137, strontium 90, and tritium releases, many other dangerous elements never mentioned include cobalt 60, technetium 132, plutonium 238, plutonium 239, and plutonium 241 which continue to contaminate soil and the food chain for tens to thousands of years.

Also plutonium 241 which lasts for 14320 years continually decays to americium 241, which is more soluble than its parent, readily incorporated into food and is highly carcinogenic. The contaminated areas in Europe will thus become increasingly radioactive over time.

Alarming radioactive elements are invisible because they are invisible, tasteless and odorless, and their carcinogenic impacts are slow to manifest.

### **The radioactive induction of cancer**

Cancer arises following the mutation of regulatory genes. The cell then sits silently for years until it starts to divide uncontrollably causing cancer. The incubation time is variable, thyroid cancers and leukemia often arise some 2 to 5 years post exposure, but solid cancers of other organs including lung, breast, bowel, kidneys take 15 to 80 years to develop post exposure.

### **Other diseases induced by radiation**

Cancer is not the only side effect of radiation exposure. Many diseases other than malignancies were documented in the exposed populations. including endocrine abnormalities

### **Initial symptoms and illnesses of contaminated and exposed children**

This is the list of maladies that affected the children of Belarus initially and many Japanese children have suffered similar complaints. These illnesses were experienced in the many parts of the Ukraine and Russia as well including aching joints and elevated blood pressure.

### **Premature aging**

Signs and symptoms of premature aging have occurred in children and also in Signs of premature aging are hair loss, heart attacks, strokes, senile eye changes - cataracts etc, osteoporosis, pancreatitis, arteriosclerosis, type 11 diabetes, and hearing and balance abnormalities.

### **Non Malignant Diseases post Chernobyl**

Because radiation causes a decrease in the immune system, a wide variety of infectious diseases occurred in the exposed populations in the months and years after the accident

### **Multiple Endocrine Abnormalities**

Cesium has been found to concentrate in endocrine glands such as the pituitary at the base of the brain which controls other endocrine glands. This element also concentrates in the thyroid, pancreas and heart muscle where it induced a variety of diseases in the Chernobyl survivors including cardiac arrhythmias, sudden heart attacks and type 11 diabetes. Radioactive iodine also concentrates in the thyroid gland and together they induced hypo and hyperthyroidism and thyroid tumors and cancers. Menstrual disorders were common, delayed puberty in women, increased testosterone in young women, infertility, increased abortion rates, premature births, decreased sperm counts and abnormal sperm, and sterility in the liquidators. Of course other radioactive elements which were inhaled or ingested almost certainly contributed to these pathologies.

### **Immuno-deficiencies and Infections**

Radiation depletes the immune system, and many abnormalities have been documented in immune indicators such as T and B lymphocytes and circulating immune-globulins. Because of this decreased immune response, many infections have been documented in the surviving populations, including viral, bacterial and fungal infections which manifested as pneumonia, tonsillitis, acute bronchitis, asthma, hepatitis B and C, herpes, parasitic diseases, tuberculosis, neonatal infections, ringworm, cryptosporidium and pneumocystis.

### **Bone and Muscle Pathology**

Many doctors reported people suffering from chronic joint pain, osteoporosis, osteochondritis, periodontal diseases including caries, and increased bone fractures. This could partly be explained by the fact that strontium 90 concentrates in bones and teeth as does plutonium.

### **Nervous System Diseases**

Because the fetal brain is very sensitive to the detrimental effects of radiation, children who were irradiated in utero have low IQs and borderline mental retardation - findings that were also demonstrated in Sweden. Increases were also documented in neonatal epilepsy, psychiatric mental disorders. Many children also had abnormal EEGs. Irradiation of the embryo and fetus caused dilatation of the cerebral ventricles, retarded neonatal

development, and attention deficit disorder. It is important to note that 45% of the babies in utero in Hiroshima and Nagasaki also experienced intellectual retardation.

## **Eyes**

The eye is developmentally part of the brain, so abnormalities which affected the nervous system in the newborn also affected the eyes included congenital cataracts, microphthalmia or small eyes, myopia, astigmatism, refraction abnormalities, and retinal pathology.

## **GI Tract**

An increase has been noted in populations in heavily irradiated areas of chronic gastritis, peptic ulcers, hepatitis B and C, cirrhosis of the liver, pancreatitis and cholecystitis.

## **Cancers**

### **Thyroid Cancer**

1. Amongst the Chernobyl contaminated populations thyroid cancer appeared earlier than in Hiroshima or Nagasaki 2 to 4 years compared with 15 years chart 6.9 P176
2. In Belarus, in children less than 18 years, thyroid cancer increased 200 fold, and by the year 2000, 7000 had thyroid cancer. Congenital thyroid cancer was also found in newborns
3. These cancers were more aggressive and invasive than normal thyroid cancers
4. Despite surgery 30% had already spread and metastasized
5. They affected both children and adults
6. Thyroid cancer morbidity was 5 times greater in women than in men
7. After thyroidectomies the patients were forever dependent on thyroid replacement hormones
8. For every case of thyroid cancer there were hundreds of other thyroid diseases - hypothyroidism or myxedema, hyperthyroidism, Hashimoto's syndrome and other autoimmune diseases of the thyroid
9. Thyroid cancer can be caused by iodine 131 and 129, technetium 132, rubidium 103, cesium 134 and 137.
10. The prevalence of thyroid cancer also increased in Italy, Greece, the UK - Cumbria, Czech Republic, Poland, Israel, Romania, Switzerland and the UA

### **Leukemia and other cancers**

1. In the Ukraine leukemia was first diagnosed in 1987, and the incidence peaked in 1996, and other cancers appeared in greater than normal numbers such as bladder, breast, prostate and brain tumors in children.
2. In Belarus from 1987 to 1999 26,000 radiation induced cancers had been diagnosed, including breast, stomach, colon, bladder, kidney, lung, pancreatic, intestinal, retinoblastoma. The incidence correlated with the radiological contamination.
3. In Russia these cancers were and are prevalent - leukemia, adrenal, melanoma, brain, pharyngeal, oral cavity, stomach, lung, breast, rectum, colon and leukemia in children table 6.18 P184
4. Leukemia also increased in Germany, the UK, Greece, Romania and Europe in

general.

## **Congenital Malformations, Chromosomal Mutations and Genetic changes**

The numbers of chromosomal aberrations were greatly increased in children in the highly radioactive areas which were detected in their blood cells.

There was also an increase in severe chromosomal induced illnesses including trisomy 13 - associated with severe mental retardation and congenital malformations, trisomy 18 with severe, often lethal deformities, and trisomy 21 - Downs syndrome

The incidence of Downs syndrome post Chernobyl increased by 49% in Belarus, 250% in Germany and 30% in Sweden.

Many of these genetic abnormalities and chromosomal aberrations will be passed down to future generations

Estimate of the number of congenital malformations range from 12,000 to 83,000. Homes are full of severely deformed children - a situation new in the history of pediatric medicine.

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