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Killing the Unborn … With Radiation

By Washington's Blog
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Preface: I am not against all nuclear power, solely the unsafe type we have today.

The harmful affect of radiation on fetuses has been known for decades.

As nuclear expert Robert Alvarez – a senior U.S. Department of Energy official during the Clinton administration – and journalists Harvey Wasserman and Norman Solomon wrote in 1982 in a book called Killing Our Own:

> In recent years controversy has arisen over the particular vulnerability of infants in utero and small children to the ill-effects of radiation. Exposure of the fetus to radiation during all stages of pregnancy increases the chances of developing leukemia and childhood cancers. Because their cells are dividing so rapidly, and because there are relatively so few of them involved in the vital functions of the body in the early stages, embryos are most vulnerable to radiation in the first trimester–particularly in the first two weeks after conception. This period carries the highest risk of radiation-induced abortion and adverse changes in organ development. During this stage of development the tiny fetus can be fifteen times more sensitive to radiation-induced cancer than in its last trimester of development, and up to a thousand or more times more sensitive than an adult. In general it is believed that fetuses in the very early stages of development are most vulnerable to penetrating radiation such as X rays and gamma rays.
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> In all stages, they are vulnerable to emitting isotopes ingested by the mother. For example, if a pregnant mother inhales or ingests radioiodine, it can be carried through the placenta to the fetus, where it can lodge in the fetal thyroid and where its gamma and beta emissions can cause serious damage to the developing organ. Once the fetal thyroid is damaged, changes in the hormonal balance of the body may result in serious–possibly fatal–consequences for the development of the child through pregnancy, early childhood, and beyond. Such effects include underweight and premature birth, poorly developed lungs causing an inability to breathe upon delivery, mental retardation, and general ill-health.
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> Other emitters can lodge in other fetal organs. For example, yttrium-90, a decay product of strontium 90, can gravitate toward the pituitary gland. Overall, fetal irradiation during the second and third trimester has been linked to microcephaly (small head size), stunted growth and mental retardation, central nervous system defects, and behavioral changes. Exposure of the fetus to radiation during all stages of pregnancy increases the chances of developing leukemia and childhood cancers.
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> Young children also undergo more rapid cell division than adults, as do children in puberty. This rapid growth makes them very susceptible to radiation damage. Also at high risk are the elderly and chronically ill. These groups have weakened immune systems because of less active red bone marrow. Healthy

> immune systems can often isolate and remove damaged cells before malignancies develop. Older people generally have less vigorous immune systems; they have also generally experienced more radiation from both natural and human-made sources than young people, and thus may be more susceptible to additional exposure.
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> Women are also considered to be twice as sensitive to radiation as men because of their predominance in contracting breast and thyroid cancers.[However, radiation safety standards are set based on the assumption that everyone exposed is a healthy man in his 20s.]
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> Cancers shown to be initiated by radiation include leukemia, and cancers of the pancreas, lung, large intestine, thyroid, liver, and breast. Life-shortening anemia and other blood abnormalities, benign tumors, cataracts, and lowered fertility are other random effects attributed to radiation exposure.

I noted in 2009:

> An entire field of science called "epigenetics", which studies changes in phenotype (appearance) or gene expression caused by mechanisms other than changes in the underlying DNA sequence.
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> Epigeneticists say that genetic changes can be caused by interaction with the environment may last for multiple generations.

Brian Moench, MD, noted last month:

> Administration spokespeople continuously claim "no threat" from the radiation reaching the US from Japan, just as they did with oil hemorrhaging into the Gulf. Perhaps we should all whistle "Don't worry, be happy" in unison. A thorough review of the science, however, begs a second opinion.
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> That the radiation is being released 5,000 miles away isn't as comforting as it seems.... Every day, the jet stream carries pollution from Asian smoke stacks and dust from the Gobi Desert to our West Coast, contributing 10 to 60 percent of the total pollution breathed by Californians, depending on the time of year. Mercury is probably the second most toxic substance known after plutonium. Half the mercury in the atmosphere over the entire US originates in China. It, too, is 5,000 miles away. A week after a nuclear weapons test in China, iodine 131 could be detected in the thyroid glands of deer in Colorado, although it could not be detected in the air or in nearby vegetation.
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> The idea that a threshold exists or there is a safe level of radiation for human exposure began unraveling in the 1950s when research showed one pelvic x-ray in a pregnant woman could double the rate of childhood leukemia in an exposed baby. Furthermore, the risk was ten times higher if it occurred in the first three months of pregnancy than near the end. This became the stepping-stone to the understanding that the timing of exposure was even more critical than the dose. The earlier in embryonic development it occurred, the greater the risk.
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> A new medical concept has emerged, increasingly supported by the latest research, called "fetal origins of disease," that centers on the evidence that a multitude of chronic diseases, including cancer, often have their origins in the first few weeks after conception by environmental insults disturbing normal embryonic development. It is now established medical advice that pregnant

women should avoid any exposure to x-rays, medicines or chemicals when not absolutely necessary, no matter how small the dose, especially in the first three months.

"Epigenetics" is a term integral to fetal origins of disease, referring to chemical attachments to genes that turn them on or off inappropriately and have impacts functionally similar to broken genetic bonds. Epigenetic changes can be caused by unimaginably small doses – parts per trillion – be it chemicals, air pollution, cigarette smoke or radiation. Furthermore, these epigenetic changes can occur within minutes after exposure and may be passed on to subsequent generations.

The Endocrine Society, 14,000 researchers and medical specialists in more than 100 countries, warned that "even infinitesimally low levels of exposure to endocrine-disrupting chemicals, indeed, any level of exposure at all, may cause endocrine or reproductive abnormalities, particularly if exposure occurs during a critical developmental window. Surprisingly, low doses may even exert more potent effects than higher doses." If hormone-mimicking chemicals at any level are not safe for a fetus, then the concept is likely to be equally true of the even more intensely toxic radioactive elements drifting over from Japan, some of which may also act as endocrine disruptors.

Many epidemiologic studies show that extremely low doses of radiation increase the incidence of childhood cancers, low birth-weight babies, premature births, infant mortality, birth defects and even diminished intelligence. Just two abdominal x-rays delivered to a male can slightly increase the chance of his future children developing leukemia. By damaging proteins anywhere in a living cell, radiation can accelerate the aging process and diminish the function of any organ. Cells can repair themselves, but the rapidly growing cells in a fetus may divide before repair can occur, negating the body's defense mechanism and replicating the damage.

Comforting statements about the safety of low radiation are not even accurate for adults. Small increases in risk per individual have immense consequences in the aggregate. When low risk is accepted for billions of people, there will still be millions of victims. New research on risks of x-rays illustrate the point.

Radiation from CT coronary scans is considered low, but, statistically, it causes cancer in one of every 270 40-year-old women who receive the scan. Twenty year olds will have double that rate. Annually, 29,000 cancers are caused by the 70 million CT scans done in the US. Common, low-dose dental x-rays more than double the rate of thyroid cancer. Those exposed to repeated dental x-rays have an even higher risk of thyroid cancer.

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Beginning with Madam Curie, the story of nuclear power is one where key players have consistently miscalculated or misrepresented the risks of radiation. The victims include many of those who worked on the original Manhattan Project, the 200,000 soldiers who were assigned to eye witness our nuclear tests, the residents of the Western US who absorbed the lion's share of fallout from our nuclear testing in Nevada, the thousands of forgotten victims of Three Mile Island or the likely hundreds of thousands of casualties of Chernobyl. This could be the latest chapter in that long and tragic story when, once again, we were told not to worry.

And Dr. Moench writes today:

The official refrain, boldly repeated, is, “Not to worry, perfectly harmless, no health threat,” even though the six Fukushima reactors contain thousands of times more radioactivity than the bomb dropped over Hiroshima. Some of our best scientists of the previous century would be rolling over in their graves.

In the 1940s, many of the world’s premier nuclear scientists saw mounting evidence that there was no safe level of exposure to nuclear radiation. This led Robert Oppenheimer, the father of the atom bomb, to oppose development of the hydrogen bomb.[1] In the 1950s, Linus Pauling, the only two-time winner of the Nobel Prize, began warning the public about exposure to all radiation. His opinion, ultimately shared by thousands of scientists worldwide, led President Kennedy to sign the nuclear test-ban treaty.

In the 1960s, Drs. John Gofman, Arthur Tamplin, Alice Stewart, Thomas Mancuso and Karl Morgan, all researchers for the Atomic Energy Commission (AEC) or the Department of Energy (DOE), independently came to the conclusion that exposure to nuclear radiation was not safe at any level. The government terminated their services for coming up with what Gofman has called the “wrong answer” – that is, the opposite of what the AEC wanted to hear.[2] The top Russian nuclear physicist in the 1960s, Andrei Sakharov, also a Nobel Prize winner, and Vladimir Chernousenko, whom the Soviet Union placed in charge of the Chernobyl cleanup, are among other international experts who drew similar conclusions.

To put lipstick on the pig of radioactive fallout, we hear from nuclear cheerleaders that common activities like watching TV and airline travel also expose us to radiation. True enough, although they never mention that airline pilots and flight attendants do have higher rates of breast and skin cancer.[3] But equating those very different types of radiation is like equating the damage of being hit with ping pong balls (photons) with being hit by bullets (beta particles). Your TV doesn’t shoot bullets at you. Even if your TV was only shooting a few bullets per show, you probably wouldn’t watch much TV. Furthermore, the damage done by these radioactive “bullets” can vary tremendously depending on which organs are hit. To carry the analogy one step further: spraying a few bullets into a large crowd can hardly be considered safe for everyone in the crowd, even if the ratio of bullets per person is very low.

Bioaccumulation causes an increasing concentration of many contaminates as one moves up the food chain. That’s why beef is much higher in dioxins than cattle feed, tuna fish have much higher mercury than the water they swim in and fetal blood has higher mercury levels than maternal blood.[4] Radioactive iodine, cesium and strontium, all beta emitters, become concentrated in the food chain because of bioaccumulation. At the top of the food chain, of course, are humans, including fetuses and human breastmilk.

In 1963, one week after an atmospheric nuclear bomb test in Russia, our scientists demonstrated the power of bioaccumulation when they detected radioactive iodine in the thyroids of mammals in North America, even though, with 1963 methods, they could not detect smaller amounts in the air or on vegetation.[5]

Bioaccumulation is one reason why it is dishonest to equate the danger to humans living 5,000 miles away from Japan with the minute concentrations measured in our air. If we tried, we would now likely be able to measure radioactive iodine, cesium, and strontium bioaccumulating in human embryos in this country. Pregnant mothers, are you okay with that?

Hermann Muller, another Nobel Prize winner, is one of many scientists who would not have been okay with that. In a 1964 study, “Radiation and Heredity” [6], Mueller clearly spelled out the genetic damage of ionizing radiation on

humans. He predicted the gradual reduction of the survival of the human species as exposure to ionizing radiation steadily increased. Indeed, sperm counts, sperm viability and fertility rates worldwide have been dropping for decades.

These scientists and their warnings have never been refuted, but they are still widely ignored.

Moreover, radiation standards are up to a 1,000 times higher than is safe for human health. And Forbes' blogger Jeff McMahon and Truthout writer Mike Ludwig both note that FDA radiation standards for milk and other foods are 200 times higher than EPA standards for drinking water, and are based more on commercial than safety concerns.

And even with unreasonably lax standards, radiation exceeding government safety levels has been found in drinking water and milk throughout the United States. See this and this.

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