

Radiation

By Dr. Harland Holman

I have a friend whose mother was a child in Japan near Hiroshima during the atomic bomb. After World War II, my friend's mother moved to the United States, married, and had 2 children. Her mother died when my friend was 5 years old. At that age, I didn't know what she died from, but we knew that it was the end result of radiation from the atomic bomb. Now, another nuclear tragedy has happened in Japan after the Earthquake and Tsunami damaged nuclear plants. With all the publicity, not many people need to be reminded of the dangers of radiation. Seeing people with astronaut-appearing suits approaching the nuclear reactors are plenty enough reminder. However, what do we know about radiation? Should we be just as afraid of the nuclear power plant, as the full body scanner at the airport? And what about radiation risk of the X-ray that your doctor ordered for you to get for that cough?

I will start with the disclaimer that I am not a nuclear physicist, nor a physician with a specialty in radiation medicine. However, I am a family doctor who cares about his patient's health, and I did my research to help find the best information. Radiation is unavoidable, and is necessary for life. Without the sun's radiation, Earth wouldn't be inhabitable by life. Simply, radiation is energy that travels in the form of waves and particles. Non-ionizing radiation, like heat and light, is not the type of radiation people worry about when talking about a radiation exposure. Ionizing radiation like x-rays and gamma rays are what people intend when talking about radiation like nuclear disasters. The average US citizen is exposed to 360 milli-rem (radiation units) per year. Most of which comes from naturally occurring radon in soil and water, or from our atmosphere.

While there may be ways to avoid radiation from the soil and sun, I really want to focus on the man made radiation sources for this article. Because the Japanese nuclear plants have been in the recent news, I thought we should discuss Michigan nuclear plants. There are 3 nuclear power plants in Michigan. The closest is the Palisades Plant in South Haven. In the small chance a disaster was to happen with radiation leakage from this plant, the government has enough potassium iodine on hand for home bound individuals that can't evacuate from neighboring counties. Allegan County is the closest county on the list, Ottawa and Muskegon aren't felt to be close enough. For non-home bound individuals, the recommendation is to evacuate. Officially, the government doesn't recommend stockpiling iodine at home. I will discuss the iodine issue in more detail later. There have been reports that small traces of radioactive iodine have shown up in California. So far, this radiation is much smaller than naturally occurring radiation. Prior to the Japan crisis, radiation was in the news for the new scanners at the airports. Medical radiation depends on the test being ordered: a chest X-ray has 10 milli-rem, head CAT scan has 150 milli-rem, and barium enema has

1,500 milli-rem. MRI scans don't emit any radiation. The scanners that you get in the airports are much less than a chest x-ray. Government authorities state you would have to pass through a scanner more than 500 times to equal the same amount of radiation as a chest x-ray. Actually we get much more radiation when flying up in the atmosphere than going through a scanner machine.

So now we know where we can get radiation, we need to discuss what that radiation can do to our health. Radiation affects our body's cells by changing the DNA bonds. This change in DNA mainly affects rapidly growing cells in our body like skin cells, blood cells, and cancer cells. That is why focused radiation can actually help treat cancer. However, too much radiation has been shown to cause cancer usually by making cells mutate. The evidence for harm from radiation comes from lessons learned at disaster sites such as Chernobyl, Hiroshima, and other industrial accidents. High doses over a short period of time can cause acute symptoms such as nausea early. With increased levels of radiation and exposure time without treatment: fatigue, hair loss, bleeding and eventually death may occur. Overall, children and fetuses are more sensitive than adults to these effects since their cells are more rapidly developing.

A long duration of exposure to high radiation levels has been known to increase levels of cancer since the early 1900s. It appears that some people are more susceptible to this increase depending on their own genetics. Also some radiation, can bind to specific organs in the body. Iodine binds to the thyroid. Potassium iodine prevents cancer from radioactive iodine by blocking radio-activated iodine from attaching to the thyroid. Likewise, Calcium, strontium, and radium all can collect in the bone and therefore lead to bone cancer.

The simplest way to prevent health effects of radiation is to try to avoid it. Depending on where you live or visit, this might be difficult. The distance from the radiation, time exposed to the radiation, and strength of radiation all are factors in the overall health effects of that radiation. Several federal agencies help protect people from radiation including the Environmental Protection Agency, Nuclear Regulatory Commission, and the Department of Energy. Currently none of these organizations are recommending routine use of potassium iodine. Potassium iodine can be bought at the pharmacy without a prescription. It treats exposure only to radioactive iodine by competing with radioactive iodine binding to the thyroid. Therefore, it helps to prevent the risk of thyroid cancer when there are high levels of radioactive iodine in the environment. While it is not recommended to take potassium iodine unless instructed by your physician or government agency, it is important to know there may be associated side effects. Over the counter potassium iodine has much more than the recommended daily amount and can cause stomach upset. It shouldn't be taken if you have thyroid disorders unless discussing with a physician and it may cause allergy symptoms if you are allergic to shellfish. It can also cause issues if you are on other medicines

that can increase potassium (often blood pressure or diabetes med), causing potential cardiac issues.

Perhaps you know of somebody personally touched with damage from radiation, or you have been worried about it from news on the television. I hope after reading this article you understand more about radiation. It is a complex issue that probably deserves more attention than can be given in this short article. I encourage you to talk with your physician if you have other concerns about the health effects of radiation on your personal well being. Given both the acute and long term problems with radiation, I pray for a speedy clean up in Japan and limited effect for the Japanese people. I am thankful that so far only small amounts have hit our west coast. I hope that this remains to be true.