

Females Exposed to Nuclear Radiation are Far Likelier Than Males to Suffer Harm

Mary Olson – staff biologist at the Nuclear Information and Resource Service (www.nirs.org) and acting director of the Gender and Radiation Impact Project (www.genderandradiation.org)

July 2017

The nuclear weapons ban treaty recently adopted by the UN General Assembly arises from hope for our future. The negotiations for the treaty have elevated new information about the damage from ionizing radiation to the world stage. That is exactly where it needs to be heard.

More cancers are derived from radiation than national regulators now report. They may not be aware that both age-at-exposure and one's sex determine how much harm we suffer from radiation.

Women exposed to ionizing radiation during childhood suffer from cancer at a rate 10 times higher than predicted by traditional models used by the US Nuclear Regulatory Commission.

The models assume that "Reference Man" represents us all. Invented to simplify calculations, Reference Man is 25 to 30 years old, weighs 154 pounds, is 5 feet 6 inches tall, "Caucasian and has a Western European or North American" lifestyle.

There has never been a pause as more than 2,000 atomic tests since 1945 have been spreading radioactivity worldwide and hundreds of nuclear factories have proliferated. No one asked if Reference Man is an appropriate stand-in for all of humanity and radiation harm.

It turns out that adult males are hurt by radiation, but they are significantly more

resistant than their mothers, sisters, wives or daughters. Use of Reference Man masks gendered impacts and therefore systematically underreports radiation harm.

My first paper on radiation, published in 2011, "Atomic Radiation Is More Harmful to Women," answers a simple question from a woman who raised her hand at one of my public lectures in North Carolina a year earlier, asking, "Does radiation exposure harm me more than a man?" She did not mean in pregnancy; she meant her own body.

I was shocked. That was 2010; in decades of work on radioactive waste policy, I had never heard of gender as a factor in radiation harm. I could not even attempt an answer. When the literature yielded nothing, my mentor, Rosalie Bertell, suggested I look at the numbers myself. Bertell was a mathematician and a recipient of a Right Livelihood Award, which is called an alternative to the Nobel prizes. Bertell devoted her life to communities hurt by radiation, including the ones she pointed me to in order to examine the data.

Only one large data set includes all ages and both genders exposed together to a single flash of gamma and neutron radiation: the survivors of the US nuclear attacks on Hiroshima and Nagasaki in 1945. They survived in shelters or other

shielding amid the first horrific years. Sixty years of data on cancer incidences and fatality among the survivors – called the Hibakusha – was published by the US National Academy of Science in 2006.

I regret that this data even exists – it was my government that used the first nuclear bombs on cities full of people, and I certainly wish they had not. I nonetheless use the numbers. They hold a message for humanity: gender matters in the atomic age. That does not make it right.

The highest incidence of cancer, looking across 60 years, was among those who were children when they were exposed. This is not news. The surprise is that in this group, females suffered twice as much cancer across their lives than did males.

The difference between male and female, with males more resistant to radiation harm, is measurable in all the age-of-exposure cohorts, even into old age – the difference between genders is smaller when adults are exposed rather than when they are children.

For every two men exposed in adulthood who died of cancer, three women died of cancer. A 50% difference in the rate of cancer death from radiation exposure in adulthood is not insignificant to most female readers! Indeed, this finding is changing my own behavior in fieldwork.

The question, Why is gender a factor?, is waiting for researchers to tackle. A team lead by David Richardson in the Department of Epidemiology at the University of North Carolina, Chapel Hill, in 2016 showed that the A-bomb cancer data mirrors the outcomes of many smaller radiation exposures over time,

adding up to the same exposure level as the Japanese survivors. We are all getting these smaller radiation exposures.

The 10-females-to-1-male ratio cited here is the comparison of cancer outcomes from the youngest female survivors versus the 25- to 30-year-old males: the group that underpins Reference Man. This dramatic order-of-magnitude difference in biological research is like a siren blaring: pay attention!

It is time to retire Reference Man. Any level that is set for public exposure to radiation should be based on little girls. When we protect them, everyone is better protected. Unless we protect girls, our collective future is at stake.

The radiation and gender "siren" has not been heard widely, but it has been heard. In 2014, I was honored to present my findings at the Vienna Conference on the Humanitarian Consequences of Nuclear Weapons and exhilarated to read the draft treaty on the prohibition of nuclear weapons, where one basis for the need for the new treaty is the disproportionate harm to women and girls from ionizing radiation.

The treaty falls within the jurisdiction of humanitarian law, which includes the most human activity of all: making babies, from which flow future generations. For these countless people to come, I celebrate that the news on radiation has been heard at the UN as it takes the next vital step of voting on a new nuclear-ban treaty. It is a sturdy seedling of hope.

Reprinted from www.passblue.com/2017/07/05/females-exposed-to-nuclear-radiation-are-far-likelier-than-males-to-suffer-harm