We all live with low-level radiation; how harmful is it?

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Don't worry too much about the hint of radiation reaching U.S. shores from the damaged nuclear reactors in Japan, experts say.

So far, it's much less than we'd get from a chest X-ray.

But consider this: Every day, all day long, we're bathed in low levels of radiation - cosmic rays from outer space, radon in our houses, uranium deposits in the soil, radio signals from every AM and FM station in range, airport full-body scanners, dental X-rays, cellphones, even tiny hints lingering from the A-bomb tests of the 1940s and '50s.

And remember that radiation is cumulative. Most scientists agree there's no such thing as a harmless dose.

Now relax. It's less scary than it sounds.

"It's absolutely true there's no safe dose. But we're likely to be OK if we remain vigilant," says Dr. Nagy Elsayyad, a radiation oncology expert at the University of Miami Sylvester Comprehensive Cancer Center.

Not all radiation is equal. What comes from medical X-rays, airport scanners, leaking nuclear plants and similar sources is ionizing radiation - the dangerous kind, capable of causing cancer, increasingly so as time and dosage increase. But much of the radiation around us, from radio waves to cellphone signals to leaky microwave ovens, is the non-ionizing type never proven to cause illness, say scientists - well, most scientists.

World War II newsreel footage from Hiroshima and Nagasaki shows the doomsday effects of nuclear bombs exploding over cities, killing hundreds of thousands from the immediate blast and tens of thousands more later on, from high-dose radiation poisoning. And the current nuclear crisis in Japan has prompted new fears of radiation contamination.

But lower, everyday levels we experience routinely are less easy to grasp. For example, the U.S. Federal Aviation Administration estimates an airline pilot spending a 25-year career flying at 30,000 feet between Chicago and New York will experience enough extra cosmic radiation through the thinner atmosphere to increase his or her cancer risk by about 0.3 percent.

Another natural source, radon, is an invisible, odorless, radioactive gas emitted from soil.

About one home out of seven in Florida has an elevated level of radon, according to the Miami-Dade Health Department. South Floridians do get one break, though. Since they live at sea level, protected by the entire depth of earth's atmosphere, residents get only about half the cosmic radiation from outer space as does mile-high Denver.

In all, natural sources expose the average earthling to about 6.2 millisieverts (mSv) of radiation annually. The millisievert is the common unit for measuring radiation exposure; one millisievert equals about 10 chest X-rays. There are other ways of measuring radiation, but the millisievert is the most widely used.

The trick is to limit our exposure to ionizing radiation above that universal 6.2 mSv, Elsayyad says. The National Council on Radiation Protection recommends we get no more than one additional unit per year.

To put it in perspective, measuring in millisieverts, a chest X-ray adds 0.1, a mammogram adds 0.7, a high-altitude, cross-country airplane flight adds 0.05 and a medical CAT scan adds 10. The new full-body scanners at airports may be intrusive, but their radiation level is low - far less than 0.1 mSv, according to the American Cancer Society.

For some workers, exposure is unavoidable. Mandated limits are higher for workers in industries that expose them to radiation - for example, the U.S. Food and Drug Administration limits nuclear industry workers and airline crews to 20 mSv a year. One exception: A pregnant flight attendant may get no more than 1 mSv during her pregnancy.

Although scientists differ on the effects of low-level exposure to ionizing radiation, most believe no dose is safe.

"There is no safe level of exposure, whether from food, water or other sources. Period," said Jeffrey Patterson, immediate past president of Physicians for Social Responsibility, in a statement calling for a nationwide moratorium on new nuclear reactors in the United States following the incidents in Japan.

A few differ: "There is no way to determine precisely the risks of low-level radiation," writes Kenneth Strubler, director of medical physics at the Greater Baltimore Medical Center, in the online journal radiologynursing.org. "To date, no proven body of evidence has established an increase in human disease as a consequence of radiation rates comparable to those of earth's natural background - or even 10 times higher."

U.S. Environmental Protection Agency scientists say there's no practical way to measure the risk of lifetime chronic exposure to low levels of radiation. But they can measure the effects of extremely high doses. So they extrapolate backward to create very rough estimates of low-level

risks. Their conclusion: A person exposed to 10 extra millisieverts of radiation, the equivalent of about 100 chest X-rays, in small doses over a lifetime, would have a 0.3 percent greater chance of dying from radiation.

Studies of the body's reaction to low levels of radiation have shown that as exposure increases, it causes the same cancers as very high doses although in far smaller numbers.

Thyroid cancer and leukemia can follow after years of chronic over-exposure. Later, in 10 or 15 years, come lung cancer, skin cancer, multiple myeloma and cancers of the breast and stomach, according to the American Cancer Society. And children are at much higher risk from exposure to radioactivity, the ACS says, because their tissue is growing faster and because they have longer life expectancy during which cancers can develop.

Avoiding unneeded radiation involves tradeoffs. Because of the soaring use of CAT scans and other diagnostic tools, the amount of medical radiation received by the average person has increased by more than 600 percent since the early 1980s, Elsayyad says.

"Doctors often have no idea how much radiation they're exposing their patients to," he says.

He's not against such procedures, agreeing they're often necessary.

"If I had angina and I needed a stent, I would want it done, and I wouldn't worry about the radiation," he said. "But doctors must be sure it needs to be done, and it isn't just a fishing expedition."

In studying how radiation harms the body, scientists have learned much from catastrophic events including Hiroshima and Nagasaki in 1945 and

the nuclear reactor explosion in Chernobyl in 1986.

In Hiroshima and Nagasaki, the atomic bombs instantly killed 120,000, with another 65,000 dying from injuries and acute radiation poisoning, the Japanese government says. The EPA later created a chilling chart tracing the effects of acute, high-level radiation poisoning. At 500 mSv it produces nausea within hours, at 750 mSv it triggers hair loss within weeks and at 4,000 mSv, death is likely in a month or two.

Longer-term effects in Hiroshima included thyroid cancer, birth defects and an epidemic of leukemia that began about two years after the blast and peaked about six years later. Tumors appeared when radiation victims reached their 60s and 70s at a higher-than-normal rate, U.S. studies said.

But to the surprise of many, the atomic bombs' long-term genetic effects turned out to be smaller than expected. Children born to mothers exposed during pregnancy often had defects, but children born to mothers who got pregnant after exposure were normal.

In Chernobyl, where a nuclear reactor and its entire radioactive core blew up in 1986, more than 600 on-site workers were exposed to sky-high radiation levels, and 28 were dead within three months.

Workers who came to rescue victims and shut down the plant received 123 mSv of radiation, and those who survived still are being monitored for late cancers. Children in surrounding areas of Ukraine, Belarus and the Russian Federation drank milk contaminated by radioactive iodine falling on grass; 6,000 developed thyroid cancer, with nine dying. In all, about 4,000 died at Chernobyl.

But there, too, long-term consequences were less than expected.

"Apart from this increase (the cases listed above), there is no evidence of a major public health impact attributable to radiation exposure two decades after the accident," a United Nations Chernobyl study panel concluded.

High-level winds blew Chernobyl's radiation around the Northern Hemisphere, creating doses of 1.2 mSv in southeastern Europe, 1.0 in the rest of Europe, 0.2 in Southeast Asia and well below 0.1 mSv in North America. The study called the levels "not of great magnitude."