

Worrisome increase in some medical scans during pregnancy

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Use of medical imaging during pregnancy increased significantly in the United States, a new study has found, with nearly a four-fold rise over the last two decades in the number of women undergoing computed

tomography (CT) scans, which expose mothers and fetuses to radiation. Pregnant women are warned to minimize radiation exposure.

This is the first large, multi-center study to assess the amount of advanced imaging occurring during [pregnancy](#). The study, which included authors from UC San Francisco, UC Davis and Kaiser Permanente, published July 24, 2019, in *JAMA Network Open*.

Over the 21-year study period, rates of CT increased nearly four-fold in the United States, and doubled in Ontario, Canada.

"Most [pregnant women](#) get routine ultrasound to monitor fetal growth, which delivers no ionizing [radiation](#)," said co-lead author Diana L. Miglioretti, Ph.D., biostatistics professor at the UC Davis Department of Public Health Sciences and senior investigator with Kaiser Permanente Washington Health Research. "But occasionally, doctors may want to use advanced imaging to detect or rule out a serious medical condition of the expectant mother, most often pulmonary embolism, brain trauma or aneurysm, or appendicitis."

That imaging could include CT, which involves a large dose of ionizing radiation—many times more than a chest X-ray. Ionizing radiation carries potential health risks to the developing fetus, including congenital abnormalities, developmental delays, or cancer.

"Imaging can be helpful, but it can be overused," said senior author Rebecca Smith-Bindman, MD, a UCSF professor of radiology, epidemiology and biostatistics, and of obstetrics, gynecology and reproductive medicine. "Always, but especially if you're pregnant, you should ask whether it is really medically necessary to have any imaging test that involves ionizing radiation."

The researchers said alternative methods that do not use radiation should

be considered whenever possible to avoid unnecessary exposure of women and fetuses to imaging radiation.

"There's a tradeoff," Smith-Bindman said. "CT scans provide the clearest [images](#), they can be done quickly, and are less expensive and more widely available. However, CT scans have the most ionizing radiation and they are commonly done in places of the body where the fetus is exposed to the radiation."

The authors said that professional organizations have not consistently recommended minimizing medical imaging during pregnancy. Their research opens a new avenue of inquiry into the potential risks involved.

"This study has given us a chance to look more closely at the use of advanced imaging in pregnancy," said Marilyn L. Kwan, co-lead author and senior research scientist in the Kaiser Permanente Northern California Division of Research. "It's important to quantify exposure to ionizing radiation because it can cause cancer and birth defects, and should be kept to a minimum, especially during pregnancy."

For their study, which tracked the combined use of advanced medical imaging during pregnancy, the researchers analyzed more than 3.5 million pregnancies at six U.S. health systems and the provincial health system of Ontario, Canada, between January 1, 1996, and December 31, 2016. They reviewed the use of advanced imaging, including CT, magnetic resonance imaging (MRI), conventional radiography, angiography and nuclear medicine.

During the 21-year study, 5.3 percent of pregnant women at U.S. sites and 3.6 percent in Ontario underwent imaging with [ionizing radiation](#), the authors said. Rates of CT scanning during pregnancy in the U.S. started leveling off in 2007 and have been trending downward since 2010, the study found. Meanwhile, overall rates continued to climb in

Ontario, but in 2016, they were nonetheless 33 percent lower than in the U.S. They also found that Ontario utilized MRI, which doesn't use radiation, more often than CT, which does.

Altogether, nearly one in 100 pregnancies in the United States and approximately two-thirds in Canada involved CT in 2016, researchers found. Imaging rates during the course of the study were highest in women under 20 and over 40 years old, as well as those who delivered preterm or were black, Native American or Hispanic.

More information: Marilyn L. Kwan et al. Trends in Medical Imaging During Pregnancy in the United States and Ontario, Canada, 1996 to 2016, *JAMA Network Open* (2019). DOI: [10.1001/jamanetworkopen.2019.7249](https://doi.org/10.1001/jamanetworkopen.2019.7249)

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