



## CHILDHOOD RADIATION

### Thyroid nodules and thyroid cancer in World War II atomic bombs survivors 60 years later

#### BACKGROUND

Ionizing radiation is a type of radiation that can result from many sources, including atomic (nuclear) bombs and nuclear accidents. Children exposed to ionizing radiation are at risk for developing thyroid cancer and thyroid nodules later in life. This study was done to see how the dose of radiation received may relate to the development of thyroid nodules and thyroid cancer. The study was done in Hiroshima and Nagasaki atomic bomb survivors who were younger than 10 years old at the time of the nuclear fallout in Japan nearly 60 years later after the radiation exposure.

#### THE FULL ARTICLE TITLE

Imaizumi M et al Association of Radiation Dose With Prevalence of Thyroid Nodules Among Atomic Bomb Survivors Exposed in Childhood (2007-2011). *JAMA Intern Med* 2014 Dec 29. [Epub ahead of print]

#### SUMMARY OF THE STUDY

The researchers studied 2,668 Hiroshima and Nagasaki atomic bomb survivors who were younger than 10 years of age during radiation exposure. Information the subjects provided regarding their location, body position, and any shielding or other protective measures employed were used to estimate how much radiation each person received. Over 17% were found to have significant thyroid nodules when imaged by ultrasound 60 years later, but less than

1% of all people were found to have a thyroid cancer after thyroid biopsy. The amount of radiation received was associated with a higher risk of having any thyroid nodule, whether the nodule was cancerous or not. Furthermore, the youngest children were those most likely to have a thyroid nodule and thyroid cancer.

#### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Other studies have previously shown that radiation exposure during childhood is a risk factor for thyroid cancer. This study supports this by showing that the dose received is also important, with children who were exposed to higher radiation amounts tending to have more thyroid nodules, including those which contain thyroid cancer, several decades later. Thus, the health risks of radiation can be long-lasting. This may be important for how children from the recent Fukushima nuclear accident are followed for the development of thyroid disease in the years ahead.

— Angela M. Leung, MD, MSc

#### ATA THYROID BROCHURE LINKS

Childhood Head and Neck Radiation: <http://www.thyroid.org/pediatric-endocrinology>

Thyroid Nodules: <http://www.thyroid.org/what-are-thyroid-nodules>

#### ABBREVIATIONS & DEFINITIONS

**Ionizing radiation:** radiation that can damage cells, causing cell death or mutation. It can originate from radioactive materials, x-ray tubes or specialized machines. It is invisible and not directly detectable by human senses.

**Thyroid nodule:** an abnormal growth of thyroid cells that forms a lump within the thyroid. While most thyroid nodules are non-cancerous (Benign), ~5% are cancerous.

**Thyroid fine needle aspiration biopsy (FNAB):** a simple procedure that is done in the doctor's office to determine if a thyroid nodule is benign (non-cancerous) or cancer. The doctor uses a very thin needle to withdraw cells from the thyroid nodule. Patients usually return home or to work after the biopsy without any ill effects.