

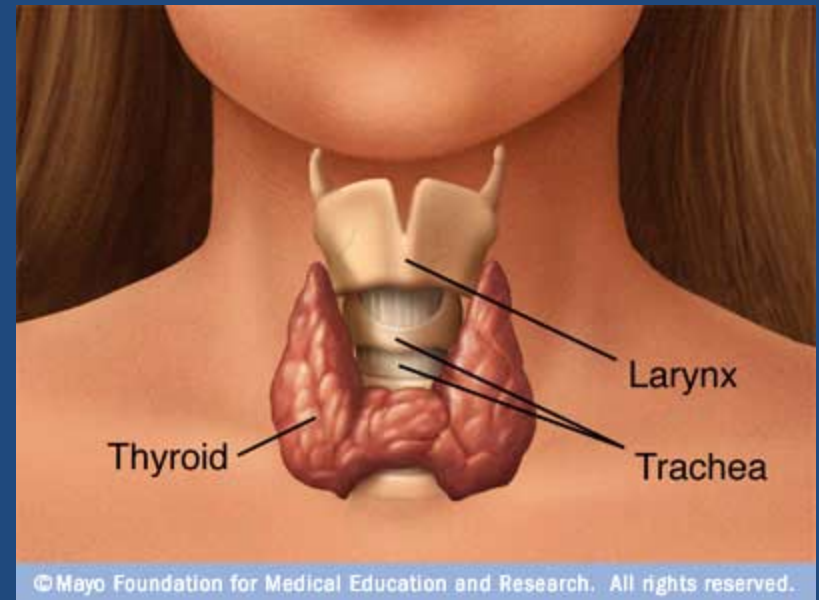
Long-term thyroid effects of cancer treatments

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Endocrine Service

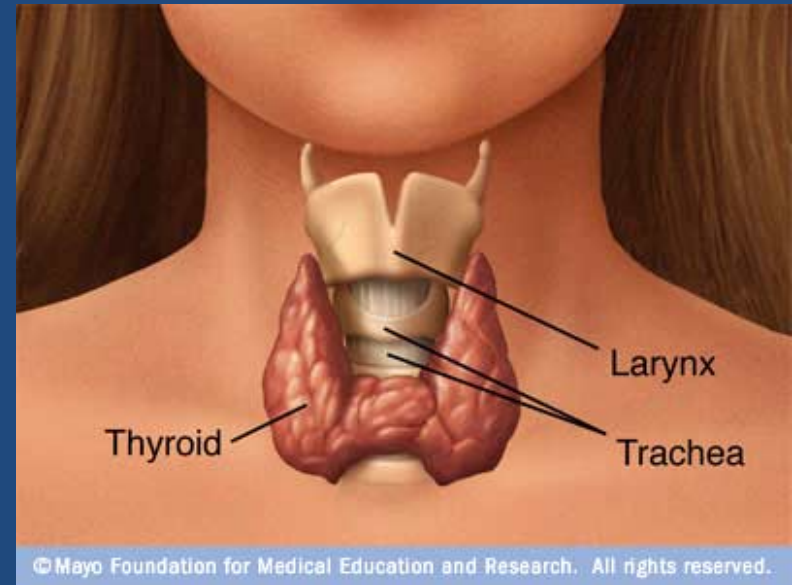
Thyroid effects of cancer treatments

- Hypothyroidism
- Benign and malignant thyroid nodules



Common symptoms of hypothyroidism

- Fatigue and weakness
- Cold intolerance
- Weight gain
- Constipation
- Dry skin



External neck irradiation and Hypothyroidism

- 25 Gy [2500 rads]
- Effect is dose-dependent
- Onset gradual

External neck irradiation and Hypothyroidism

- Develops at a median of 1.4 to 1.8 years (range 0.3 to 7.2 years)
- Many patients can have subclinical hypothyroidism for several years before developing overt disease

External neck irradiation and Hypothyroidism

- Study of patients with Hodgkin lymphoma
 - 1677 pts treated with neck RT
 - Followed for up to 20 years
 - **Cumulative incidence of hypothyroidism was 30 %**

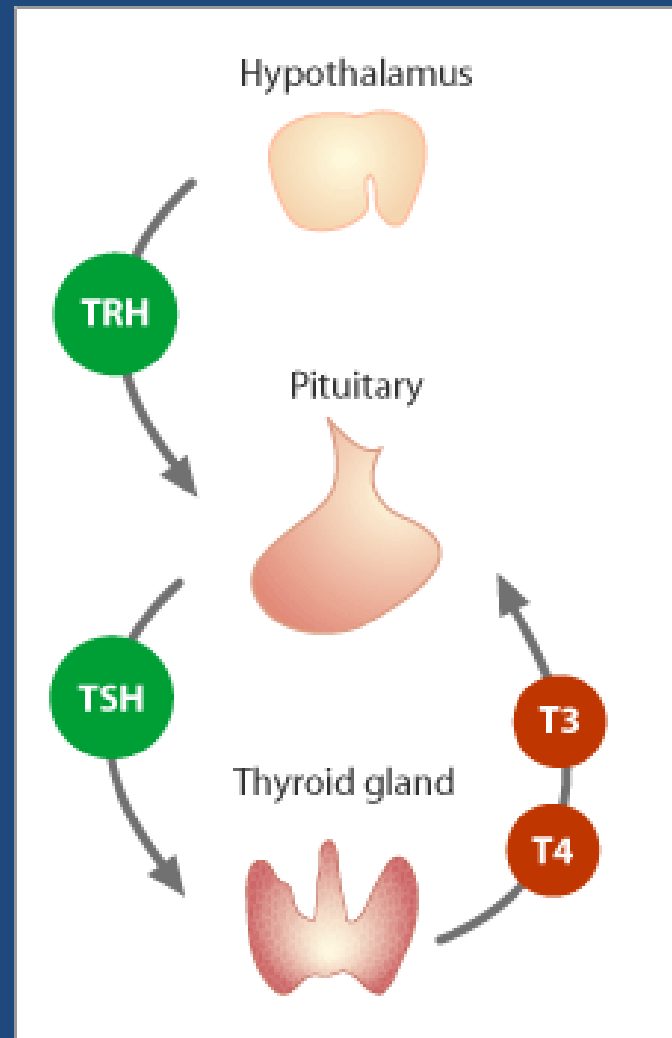
Total Body Irradiation and thyroid dysfunction

- TBI often used before BMT
- May also cause thyroid-destructive effect

Methods of screening for hypothyroidism

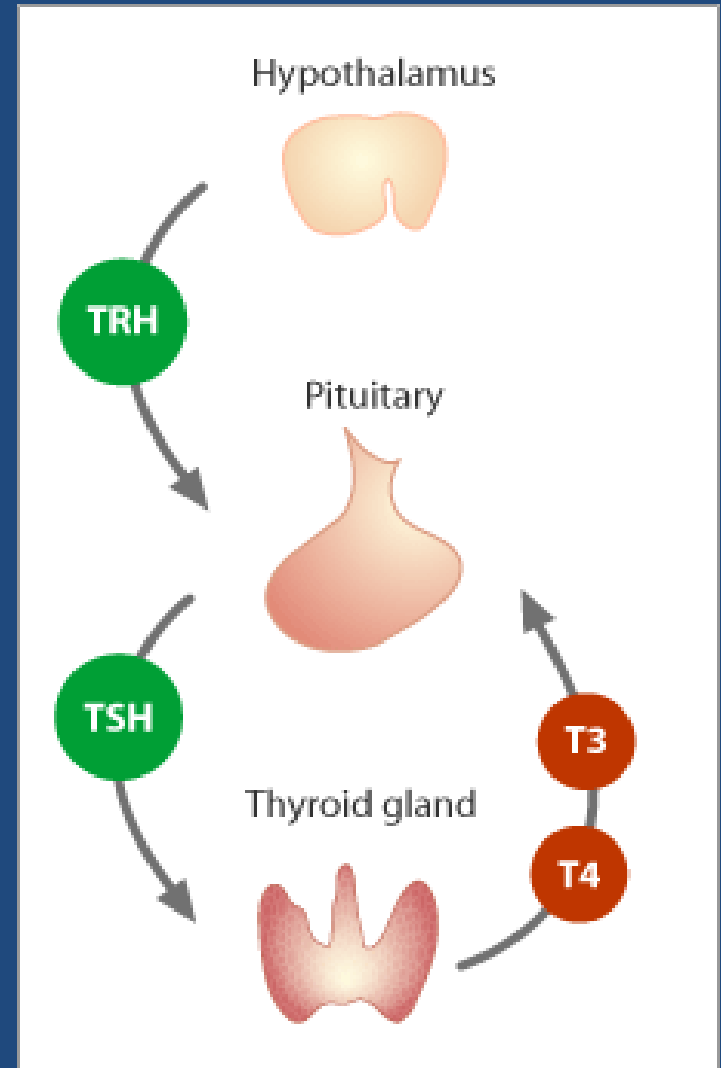
- TSH, FT4
- TSH most sensitive screen
- Pts with a high dose exposure can be screened with a yearly history, physical exam, free T4 and TSH.

Diagnosis of primary hypothyroidism



Diagnosis of primary hypothyroidism

- Hypothyroidism:
Elevated TSH, low FT4
- Subclinical
hypothyroidism:
Elevated TSH, FT4

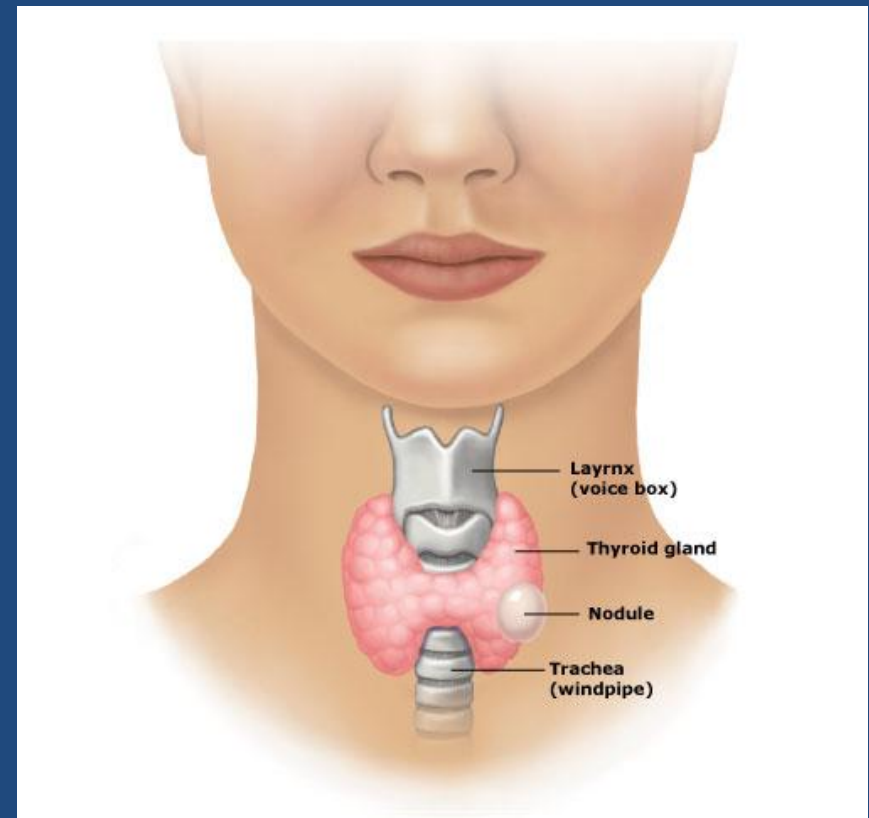


Management of hypothyroidism

- Thyroids hormone replacement (levothyroxine)
- Full replacement dose = 1.6 mcg/kg/day
- Start at a lower dose in older patients/patient with h/o CAD and titrate up to full replacement dose

External neck irradiation and benign and malignant thyroid nodules

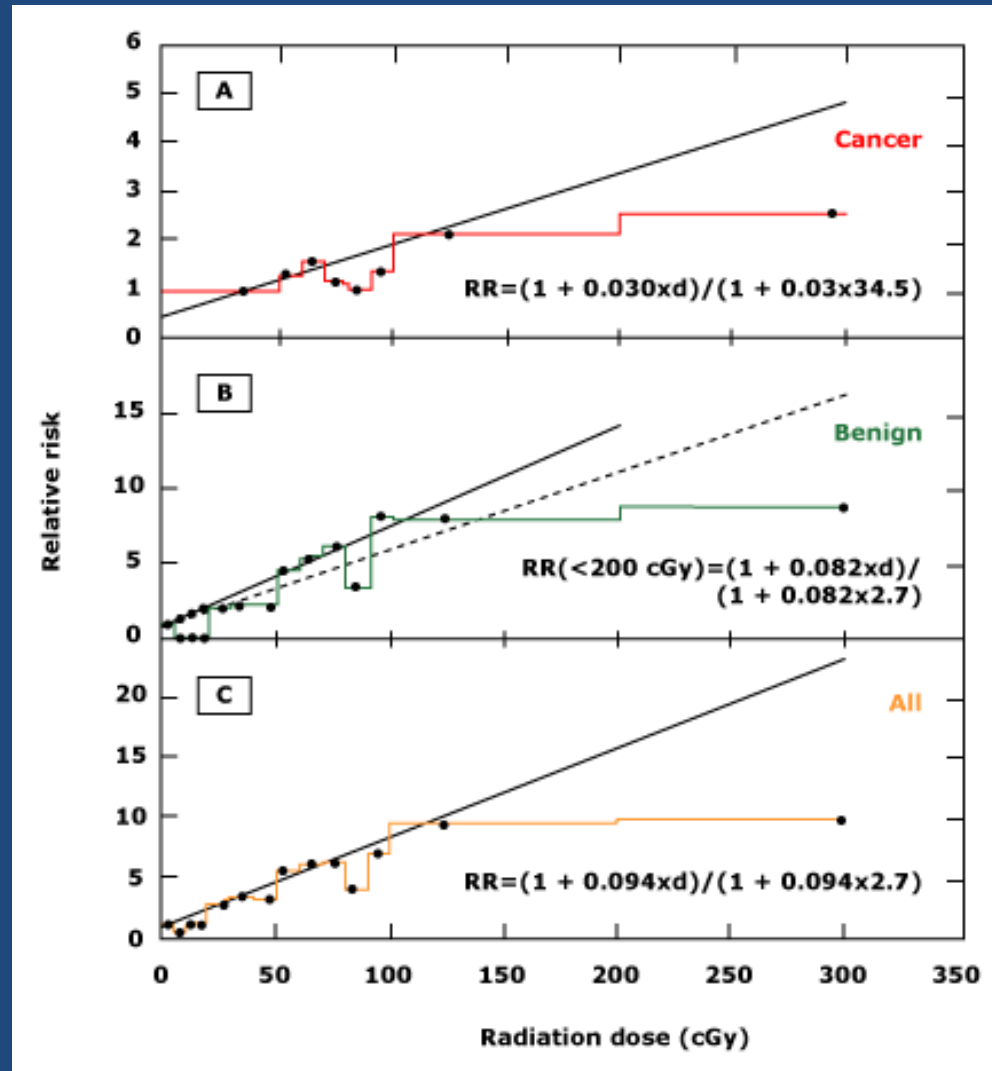
- **Radiation exposure of the thyroid during childhood** is the most clearly defined environmental factor associated with benign and malignant thyroid tumors



External neck irradiation and thyroid cancer

- Excess cancers can occur at doses as low as 10 cGy (centigray, 1 cGy = 1 rad)
- Highest risk at >200-300 cGy

External neck irradiation and thyroid cancer



External neck irradiation and thyroid cancer

- **Younger** the age at the time of radiation exposure the **higher the risk** (<15 yo)
- The effects of radiation persist for several decades and then eventually wane

External neck irradiation and thyroid cancer

- Increased risk of thyroid cancer resulting from XRT during childhood **persists for at least four decades**
- Thereafter, begins to decline, but does not reach baseline

Follow-up of patients with h/o external neck RT

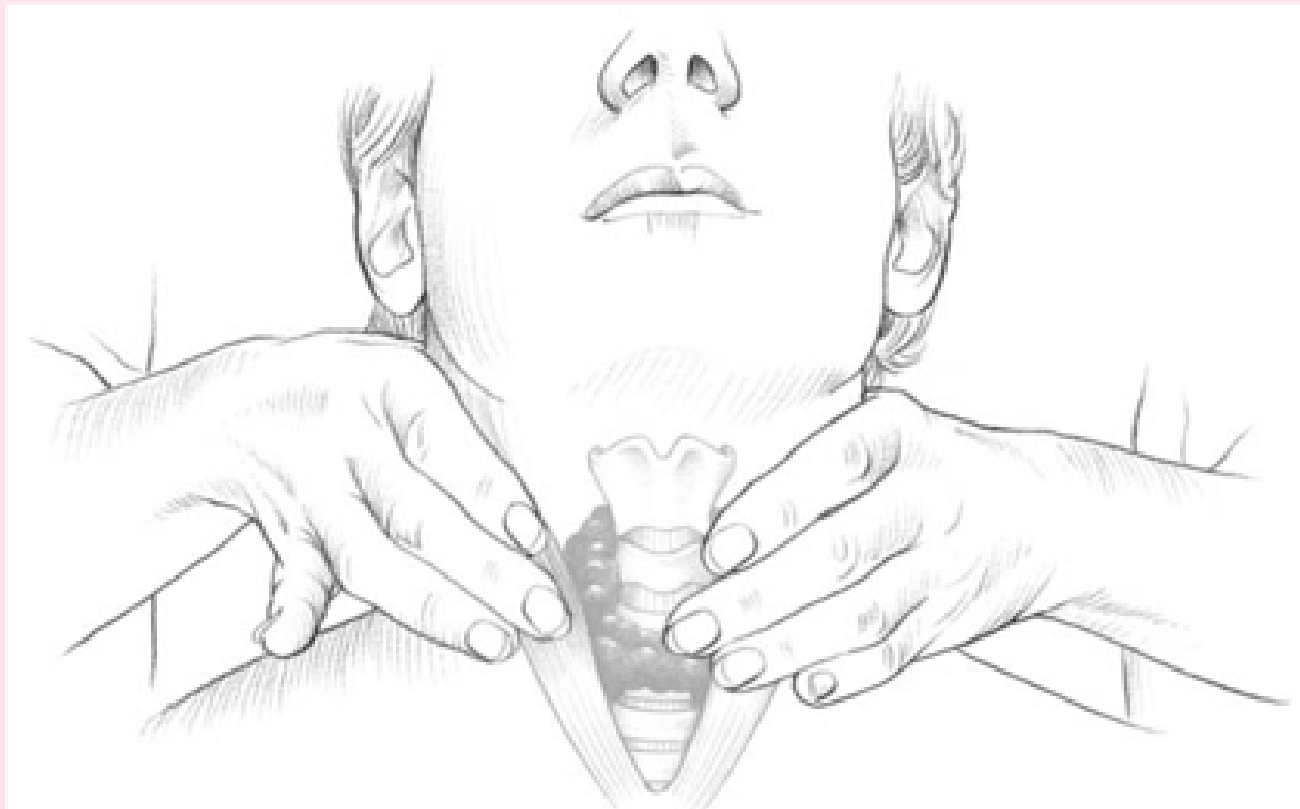
- If the initial examination is normal and the level of risk is low
 - annual or every other year palpation is reasonable

Follow-up of patients with h/o external neck RT

- If the risk is high (usually based on large dose exposure at a young age) or exam findings are not normal, then more careful follow-up is indicated
 - Annual palpation and serial thyroid ultrasonography

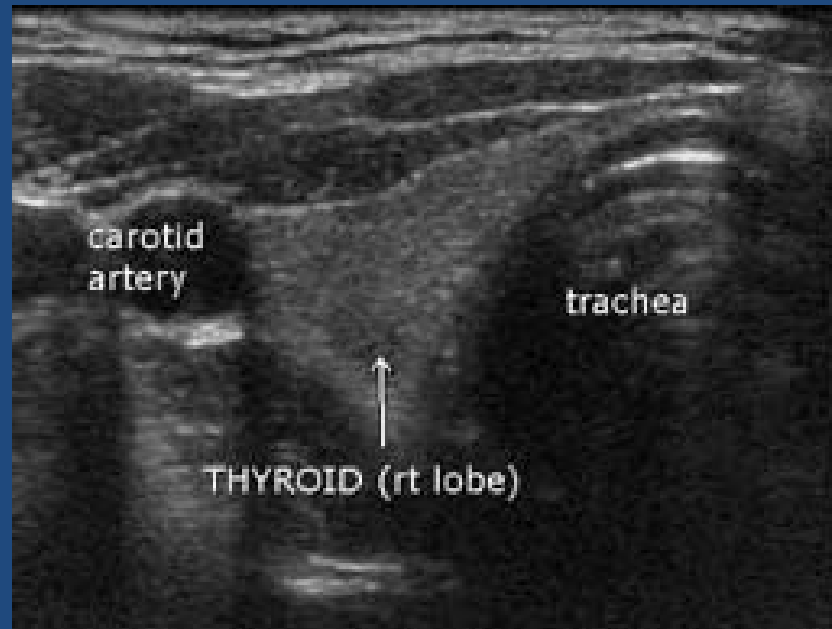
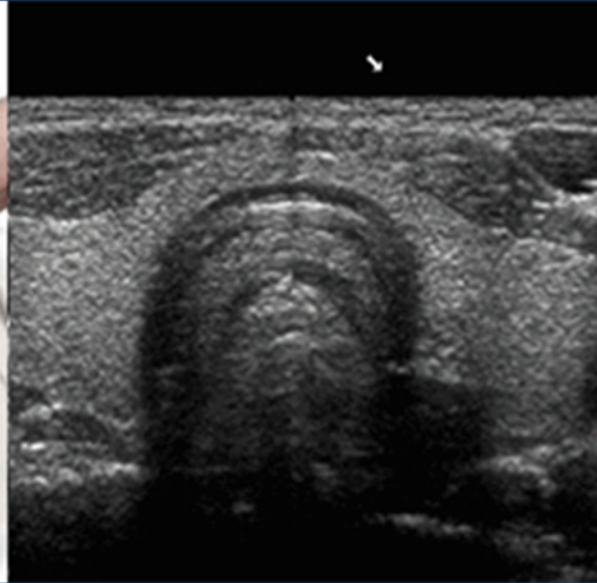
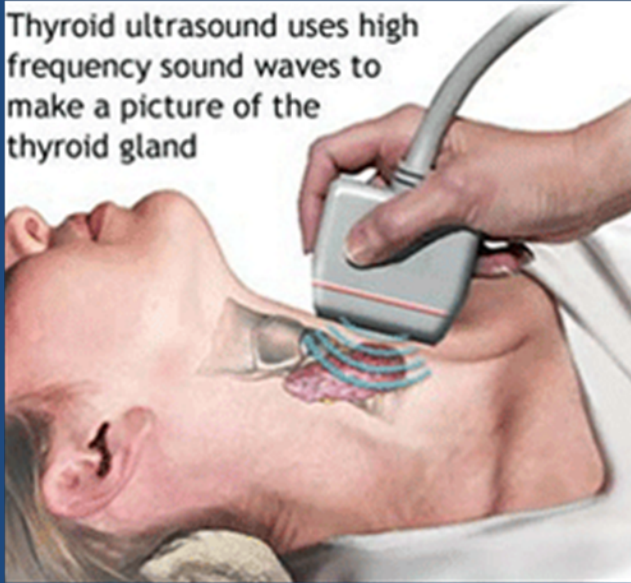
Palpating the thyroid gland

To palpate the thyroid gland, you'll need to stand behind the patient. Give the patient a cup of water, and have him extend his neck slightly. Place the fingers of both hands on the patient's neck, just below the cricoid cartilage and just lateral to the trachea. Tell the patient to take a sip of water and swallow. The thyroid gland should rise as he swallows. Use your fingers to palpate laterally and downward to feel the whole thyroid gland. Palpate over the midline to feel the isthmus of the thyroid.



Thyroid US

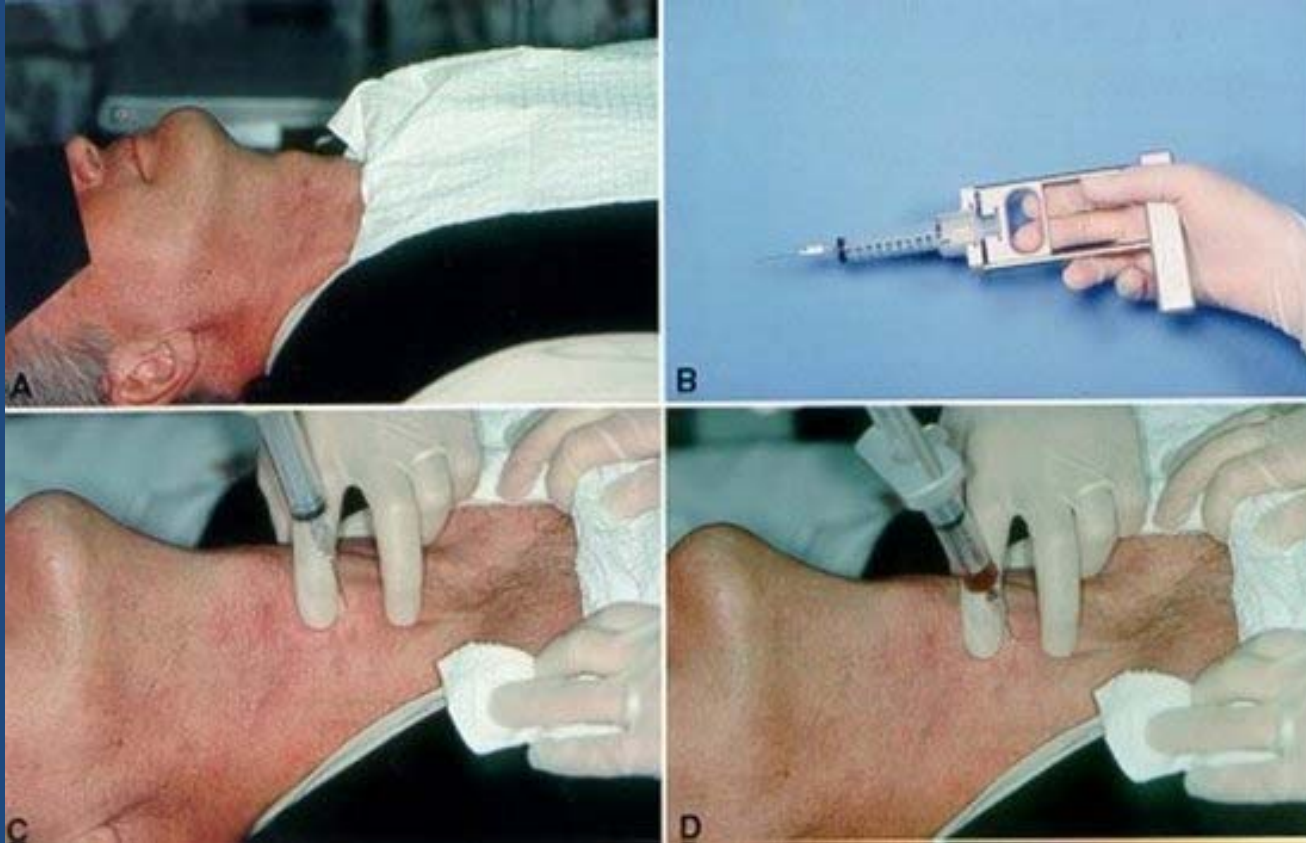
Thyroid ultrasound uses high frequency sound waves to make a picture of the thyroid gland



Thyroid Fine Needle Aspiration

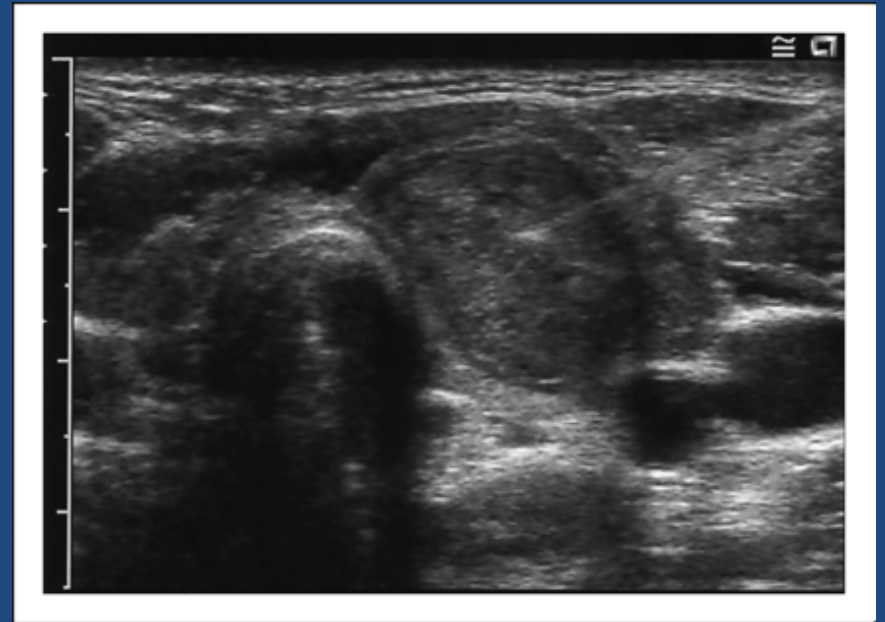
- Fine-needle-aspiration (FNA) biopsy is the **most informative method for characterizing thyroid nodules**
- **Accuracy of FNA** appears to be **similar** for nodules in the general population and **in patients exposed to radiation**

Thyroid FNA



US-guided FNA

- US-guided FNA often preferred
- Performed by the US radiologist at MSK



Thyroid FNA in patients with h/o XRT

- In irradiated patients:
 - **all accessible nodules** usually those larger than 1.0 to 1.5 cm **should be biopsied** whether they are palpable or detected by US alone

FNA

