veloped to measure and identify radioactivity in the body. In their first applications their high sensitivity made it possible to measure natural body levels of radioactivity as well as levels encountered in radiological health work where the activity acquired accidentally, as from radioactive fallout or nuclear accidents, was to be measured. Now their additional potential in medical diagnosis and research is beginning to be realized. Whole body counters offer the physician a more sensitive alternative to the classical balance-type study for turnover of such materials as calcium in normal and diseased states. They afford information on tissue distribution, kinetics, and body content of labeled materials.

Two important treatment techniques in nuclear medicine are teletherapy and brachytherapy. Teletherapy is the treatment of a disease with radiation (usually gamma radiation) from a source located at a distance from the patient. Oak Ridge Associated Universities had a major role in developing the use of cobalt-60 and cesium-137 teletherapy devices as a substitute for or supplement to high-voltage X-ray machines. Those who use these teletherapy machines claim excellent therapeutic results in the treatment of cancer. Today over 150,000 patients receive a total of almost two million teletherapy administrations during the course of a year.

Several unique radiation sources are under investigation as teletherapy tools. For example, at Lawrence Radiation Laboratory the 184-inch cyclotron has been used to produce high-energy particles (both alpha particles and protons) to destroy selectively pituitary tissue of patients with diabetic retinopathy or acromegaly, leading to marked improvements in the cases where the condition is related to pituitary function. At the Argonne Cancer Research Hospital, very high-energy electrons (40 Mev) from a linear accelerator are being used to treat deep-seated tumors.

In contrast to teletherapy, brachytherapy is the treatment of disease with sealed radioactive sources placed near or inserted directly into the diseased area.

An exciting new possibility for use in brachytherapy is californium-252, which has the useful property of emitting neutrons as part of its decay process. Neutrons may be more efficient in destroying oxygen-deficient cancer cells than are X rays and gamma rays. Needles containing californium-252 have been prepared at Savannah River Laboratory and are being evaluated in radiation experiments at Brookhaven National