

FAQs*

Which patients can benefit from Gamma Knife radiosurgery?

Although the Gamma Knife is commonly used to treat brain metastases, it can also be used to treat other brain disorders when the location of the lesion, the age of the patient or other factors make traditional surgery not recommended.

Not all patients are good candidates for Gamma Knife surgery. Gamma Knife patients are chosen after thorough evaluation of patient history, medical records, X-rays and other diagnostic tests. The Gamma Knife team includes neurosurgeons, radiation oncologists, radiation physicists and nurses.

How does the Gamma Knife work?

The Gamma Knife utilises a technique called stereotactic radiosurgery, which uses multiple beams of radiation converging in three dimensions to focus precisely on a small volume, such as a tumour, permitting intense doses of radiation to be delivered to that volume safely. Current models of the Gamma Knife use advanced robotic technology to move the patient in submillimetre increments during treatment, to focus radiation successfully to all parts of the target. Gamma Knife treatments are typically given in a single session.

Under local anesthesia, a special rigid head frame incorporating a three-dimensional coordinate system is attached to the patient's skull with four screws. Imaging studies, such as magnetic resonance imaging (MRI), computed tomography (CT), or angiography are then obtained and the results are sent to the Gamma Knife's planning computer system. Together, physicians (radiation oncologists and neurosurgeons) and medical radiation physicists delineate targets and normal anatomical structures and use the planning computer to determine the exact relationship between them and the headframe and calculate Gamma Knife treatment parameters. Targets often are best treated during the treatment session with combinations of several successive aimings, commonly known as "shots." The physicians and physicists routinely consider numerous fine-tuning adjustments of treatment parameters until an optimal plan and dose are determined.

Using the three-dimensional coordinates determined in the planning process, the frame is then precisely attached to the Gamma Knife unit to guarantee that when the unit is activated, the target is placed exactly in the center of approximately 200 precision-aimed, converging beams of (Cobalt-60 generated) gamma radiation. Treatment takes anywhere from several minutes to a few hours to complete depending on the shape and size of the target, the number of "shots" and the dose required. Patients do not feel the radiation. Following treatment the headframe is removed and the patient may return to normal activity.

Gamma-knife radiosurgery doesn't have immediate results. Progress is monitored through follow-up imaging studies.

How established is Gamma Knife treatment?

The number of patients to undergo Gamma Knife surgery has risen from about 7,000 patients in 1991 to around half a million today. Correspondingly, the number of units installed globally over the last fifteen years has gone from 20 units in 1991, to over 250 units by 2007.

About Macquarie University Hospital

Macquarie University Hospital is Australia's first and only private university hospital and offers comprehensive services to patients, with a significant number of specialists, health care workers and researchers working collaboratively.

The co-location of the hospital and clinic with world-class research facilities and training programs based at the Australian School of Advanced Medicine (ASAM) brings clinical, academic and research excellence together in one facility.

While Macquarie University Hospital specialises in a number of areas, we have particular strengths in oncology and neuroscience. Specialists in key areas work together with allied health workers and researchers to provide the best possible patient outcomes. Because Macquarie University Hospital is a teaching hospital, scholars are exposed to the most recent and most innovative practice, which is also available to other medical staff as part of their ongoing professional development.

The hospital itself is a 183-bed facility that includes 120 in-patient beds, as well as a small number of VIP suites. It has 12 fully digital operating theatres. The latest technology that has been installed throughout the hospital also allows patients to enjoy digital bedside communications, entertainment and meal ordering.

About Genesis Cancer Care

Genesis Cancer Care will assist in the provision of Gamma Knife services on behalf of Macquarie University Hospital.

Genesis Care is a national network of comprehensive cancer centres across Australia. As a leader in cancer service provision Genesis Care is committed to improving outcomes and access for patients. Separately, Genesis Care also provides comprehensive cardiovascular treatment services Australia-wide. The organisation is expanding its presence nationally, having six comprehensive cancer centres and developing a further four centres in locations where patient access to quality care is currently very limited.

Comprising of a team of doctors, healthcare and management professionals working together, Genesis Care embraces an innovative spirit that encourages advancements in patient care. Genesis Care's commitment to service development, research and education is demonstrated through its partnership with Macquarie University Hospital and the Australian School of Advanced Medicine where they fund and support:

- The Genesis Care Chair of Cancer Research
- Two annual radiation oncology fellowships commencing 2011
- Two annual post graduate scholarships in applied physics
- The co-development of Australia's first Gamma Knife Program

*with acknowledgement to manufacturers Elekta, the American College of Radiology and the Radiological Society of North America, the Midwest Gamma Knife Center