

Accelerators in medicine

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Modern radiotherapy is built on the shoulders of medicine and has a rich and fascinating history.

The first linear accelerator came into clinical use at the Hammersmith in London in 1953. During 1956, linear accelerators were commissioned at the Peter Mac and at the Royal Brisbane Hospital and the first patient was treated at the Royal Brisbane later that year.

Since 1956 linacs have been the workhorse of modern radiotherapy departments. Although the principles of linear acceleration remain, the capacity to shape and drive the beams during the delivery of treatment has evolved greatly and is now extraordinarily sophisticated. This has been enabled by three critical elements – the development of multi-leaf collimators, computers and major advances in imaging, particularly CT.

The technical developments have been paralleled by our increasing understanding of radiobiology and by the appropriate integration of radiation treatment into the overall management of people affected by cancer.

The evidence base for the use of radiation treatment is extremely robust and approximately 50% of patients diagnosed with cancer would benefit from radiation treatment, mostly by contributing to cure.

The principles of maximally treating cancer tissue while maximally protecting surrounding normal tissue have driven all of the developments in radiation treatment. The aim is to achieve maximal local cure or palliation along with minimal collateral damage. This requires constant refinement and a major team effort from all of us involved in radiation oncology.