

## Present and future of radiation oncology

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### **Abstract**

Modern advances in computers have allowed parallel advances in imaging technologies. The improvements in imaging have in turn resulted in a higher level of complexity being incorporated into radiotherapy treatment planning systems. As a result of these changes, the delivery of radiotherapy evolved from therapy designed on two dimensional x-ray images and hand calculations to three dimensional x-ray based images from computerized tomography (CT), incorporating increasingly complex computer algorithms reaching to intensity modulated radiation therapy (IMRT). The incorporation of multimodality imaging (MRI, MR spectroscopy, PET....) is increasingly used for radiotherapy planning. In addition, greater awareness of the challenges to the accuracy of the treatment planning process, such as problems with set-up error and organ movement, have begun to be systematically addressed, ushering in an era of so-called Four-Dimensional Radiotherapy. In this review, we will detail these advances, how they have changed the way cancers are treated now and will be treated in the near future.