The use of intensity modulated radiation therapy (IMRT) has become an important research topic, however, clinical application of IMRT has been limited. This work reports more than four years of routine clinical use of multi-segment IMRT. To date, more than 340 patients have been treated with more than 475 unique multi-segment IMRT plans (2 to 6 MLC-shaped segments per field) using both automated and non-automated treatment delivery with MLC-equipped treatment machines. Multi-segment IMRT has been used to treat patients in a wide variety of clinical sites, including brain, orbit, head/neck, lung, prostate, liver, pancreas, breast, and other sites. Such multi-segment IMRT can be planned and optimized with relatively simple 3-D planning system tools, can significantly improve dose distributions, and can be delivered with relatively conventional conformal therapy treatment techniques. An analysis of the planning strategies used for the many patients treated to date is used to highlight various general IMRT and conformal therapy planning and optimization issues. Several treatment planning tools useful for IMRT planning will be described and used to illustrate multi-segment IMRT planning strategies which achieve improved dose distributions (methods to improve target volume coverage, to improve target volume dose uniformity, and/or to increase normal tissue sparing). Planning strategies which have proven useful for various clinical sites will be summarized and critiqued. Since multi-segment IMRT should be within the technical reach of many in the radiotherapy community, these results may be applicable in a large number of institutions. Work supported in part by NIH grant no. P01-CA59827.