The use of conformal radiotherapy, especially with the IMRT technique, is a major departure from the way radiotherapy is currently delivered. Although the use of multileaf collimator (MLC) provides the possibility of achieving better dose distributions conformed to tumor targets, it also increases the treatment complexity. The sequences of leaf movement and their associated effects on the dose delivered to the patient may vary significantly depending on the accelerator and the MLC design. Accurate measurement of IMRT dose distributions in a clinical setting is not an easy task since many factors may affect the measurement results. In this presentation we will review various factors affecting IMRT dose distributions including the variation of the accelerator head scatter component in the MLC-collimated beam, the amount of photon leakage through the leaves, and the scatter from the leaf ends, the "tongue and groove" effect, and the effect of back-scattered photons from the moving jaws and MLC leaves on the monitor chamber signal. We will describe the use of different detectors commonly used for absolute and relative dose determination with both static and dynamic beam delivery. We will discuss the effects of electron disequilibrium, detector perturbation and patient heterogeneous anatomy on the measurement accuracy. Below are the educational objectives of this presentation:

1. Review dosimeters for absolute and relative IMRT dose measurements
2. Discuss the process for dose determination under electron disequilibrium conditions
3. Describe the use of Monte Carlo simulations to derive detector correction factors
4. Discuss major factors affecting IMRT dose measurement accuracy