Patient and employee safety is a critical concern in radiation oncology. All Radiation Oncology departments have a quality assurance program, most with an error reporting and analysis processes which are intended to monitor errors and modify treatment polices and procedures when necessary. Industry has been developing processes to improve quality and safety of their operations and products since the 1940s. These processes have become quite sophisticated and recently the AAPM has recognized that there is a need to develop such programs for radiation oncology QA programs. The AAPM subsequently formed TG-100, charged with developing a structured systematic quality assurance program approach that balances patient safety and quality versus commonly available resources while striking a balance between prescriptiveness and flexibility. Based on industrial standards, the AAPM TG-100 is going to provide examples and encourage the use of failure mode and effects analysis (FMEA) method for quality assurance management in radiation therapy. Briefly, FMEA is a risk assessment technique for systematically identifying potential failure modes in a process or a system. Failure mode refers to the ways in which something may fail while failures are any errors or defects and can be potential or actual. Effects analysis refers to studying the consequences of those failures. In FMEA, the failures are ranked according to the severity of their consequences, the frequency of occurrence, and the ease of detection.
This presentation provides an example of forthcoming TG-100 recommendations by applying FMEA methodology to IMRT treatment planning and delivery process. The example provides analysis of typical IMRT planning and delivery process and provides scores that have been developed by the TG-100.

Educational Objectives:

1) To describe development of an FMEA program
2) To provide an example of FMEA for IMRT planning and delivery process
3) To describe the process for scoring IMRT planning and delivery steps based on FMEA methods.