

**Purpose:** To provide a practical overview on physics and dosimetry issues involved in stereotactic body radiotherapy (SBRT) and to introduce current approaches for SBRT.

**Introduction:** SBRT is a new and evolving treatment technique that was mainly designed for delivery of a highly focused and quick falloff dose distribution using large dose fractionation. Due to this feature, accuracy for the treatment delivery is required to be more stringent compared to conventional radiotherapy. Moreover, SBRT was developed to mimic intracranial stereotactic radiosurgery (SRS) for extracranial application. However, unlike the situation involving intracranial application in which sharp fixation of a patient's skull warrants tumor localization, extracranial targets are generally subject to respiratory and cardiovascular motions. This creates great challenges in treatment planning and treatment delivery for tumors in the extracranial regions, especially in the thorax and abdominal regions. In this presentation, we will discuss some of the unique physics and dosimetry issues and tasks involved in the SBRT approach. These issues/tasks include commissioning aspects of the treatment machines and accessories, the treatment planning aspect and quality assurance of the delivery. The treatment planning aspect concerns patient immobilization, imaging modalities for simulation, target motion accountability and management, block margin consideration, and planning strategies. The treatment delivery generally utilizes volumetric imaging guidance to improve dose delivery accuracy. Thus, advanced imaging guidance techniques will be reviewed and the benefits and disadvantages will be discussed during this presentation. We anticipate that, after the presentation, the audience will become familiar with the physics and dosimetry issues involved in establishing a SBRT program.

Learning objective:

1. Understand the differences between the SBRT approach and conventional RT.
2. Become familiar with the physics and dosimetric issues pertaining to the SBRT.
3. Become familiar with the general practical approaches used in SBRT.