Radiation Related Second Cancers

Second cancers are the most common late effect among long-term cancer survivors. Radiation has been a known risk factor for cancer induction based on atomic bomb survivor follow-up as well as evidence from accidental and occupational exposures. Over the last few decades, there has also been increasing data on second cancers in medically exposed populations, particularly radiotherapy patients. As treatments become more successful and patients survive longer after treatment, long-term patient health considerations must play an increasing role in the selection of treatment. To this end, it is important that the field of medical physics become well educated in issues related to long-term radiotherapy sequelae, including second cancers.

This SAMS session will discuss the topic of radiation induced second cancers, including the information and limitations of the available literature. This will include the magnitude of risk of second cancers, including the impact of different demographics. It will also include etiological discussions, focusing on the risk attributable to radiation. This presentation will include the available data on the dose response of second cancers, including the large uncertainties inherent to both low and high dose regions. It will also highlight dosimetry for advanced radiotherapy techniques, and what associated doses might mean for the second cancer risk. Finally, the presentation will discuss examples of how second cancer risk can be reduced in routine clinical practice.

Learning objectives: increase the knowledge of clinical medical physicists regarding radiation-induced second cancers as well as stimulate further research in this broad and increasingly important area. There are five main learning objectives for this session:

a. To improve the understanding of the magnitude of the second cancer risk faced by radiotherapy patients.
b. To improve the understanding of the etiology of second cancers.
c. To present an overview of current knowledge on dose response for radiation induced second cancers.
d. To discuss the impact of advanced radiotherapy techniques on the risk of second cancers
e. To provide examples of how second cancer risk can be reduced in routine clinical practice.