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Requirements for addressing respiratory motion in cooperative group clinical trials

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In mid-2006, the National Cancer Institute (NCI) published updated guidelines for the use of intensity-modulated radiation therapy (IMRT) on clinical trials, specifically when the target volume included the thoracic region or other areas in which respiratory motion could have a significant effect. In addition to requiring heterogeneity corrections, the NCI now requires that the clinical protocol address the localization and immobilization of both the patient and the tumor. Imaging must be performed in a manner that provides a representation of the target volume without motion artifact. Procedures must be defined to document reproducible daily position of the patient and target. Some form of credentialing is required.

The Radiological Physics Center (RPC) has been enlisted to participate in the credentialing process for institutions participating in certain cooperative group trials in which respiratory motion is an issue. To accomplish this, the RPC has constructed several phantoms that mimic the thoracic and abdominal region, and which can be placed on a moving platform to simulate respiratory motion. The combination of phantom and moving platform have been used to evaluate compensation techniques for respiratory motion at several institutions. The techniques employed and the results of these measurements will be described as well as those reported in the literature.

Learning objectives:
1. Review the structure supporting cooperative group clinical trials in the US.
2. Become familiar with the NCI guidelines for the use of IMRT in clinical trials.
3. Learn about the effects of respiratory motion during thoracic treatments.
4. Understand the information derived from the RPC's moving anthropomorphic phantoms.

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