AbstractID: 9873 Title: Essentials of Bone Densitometry for the Medical Physicist

Osteoporosis causes over 1.5 million fractures each year resulting in medical care costs that exceed \$14 billion. Of the nearly 300,000 hip fractures, which occur annually the most serious outcome, is a 10% to 20% excess mortality within 1 year. Osteoporosis until recently has been under diagnosed and under treated, but with the development of bone densitometry early detection and treatment of osteoporosis are now possible. There are over 25,000 dual energy x-ray bone densitometers and a large number of computed tomography units capable of performing bone densitometry in the United States. It is important for the clinical medical physicist to possess a basic understanding of the operation and use of this technology.

This continuing education course will review the basic principles of single and dualenergy x-ray absorptiometry, quantitative computed tomography and quantitative ultrasonometry for bone densitometry. Equipment performance testing, quality control, patient and operator radiation dosimetry, definition of Z and T scores, and the importance of measurement precision in monitoring therapy will be discussed. Use of bone densitometry for the diagnosis and monitoring of treatment of osteoporosis will also be reviewed. The potential role of the medical physicist in certification and accreditation programs for bone densitometry will be touched upon.

Learning objectives are:

- 1. To learn the basic principles of single and dual-energy x-ray absorptiometry, quantitative computed tomography and ultrasonometry for bone densitometry.
- 2. To become familiar with the use of bone densitometry for the diagnosis and monitoring of treatment of osteoporosis.
- 3. To be able to evaluate a facility's bone densitometry quality control procedures and to recommend modifications if necessary.