Abstract:
This directed case study focuses on the physiology of bone homeostasis and methods of prevention and treatment of osteoporosis. One of the overall purposes of the case is to show students that osteoporosis is not simply a disease that afflicts elderly women. Instead, students learn about Marissa, a petite 15-year-old who has just learned that her 55-year-old grandmother has osteoporosis; Jeremy, a lanky 19-year-old college sophomore who recently has become interested in weight-lifting and is thinking about using steroids to bulk up; and Eleanor, a 45-year-old woman considering hormone replacement therapy mainly to prevent osteoporosis. The case is appropriate for use in an introductory nutrition course, physiology course, pathophysiology course, or general education course focusing on the human body and disease.

Objectives:
- Define osteoporosis and list risk factors for it.
- Describe the roles of osteoblasts and osteoclasts in bones.
- Understand basic bone physiology and the concept of peak bone mass.
- Explain how hormones (specifically, PTH, calcitonin, and estrogen) affect bone and blood calcium levels.
- Understand that bones serve as calcium reservoirs.
- Explain why calcium is vital to bone health.
- Explain how vitamin D, sodium, caffeine, and alcohol affect calcium levels in the body.
- List the best sources of calcium in addition to dairy products and calcium supplements.
- Explain how weight-bearing and/or resistance exercises protect and strengthen bones.
- Understand how long-term use of glucocorticoids can increase the risk of developing osteoporosis.
- Understand how hormone replacement therapy (HRT) can treat and/or prevent osteoporosis.
- Know the pros and cons of HRT as well as options other than HRT for the treatment of osteoporosis.

Keywords: Osteoporosis; calcitonin; calcium; bone; homeostasis; hormone replacement therapy; HRT; parathyroid hormone; PTH; endocrine system