

## ACTIVITY 5C: "OS COSTS: BANKING ON HEALTHY BONES" GAME

### OS COSTS: BANKING ON HEALTHY BONES TEACHER DIRECTIONS

The rate of bone loss increases as we age, which in turn increases our risk of fractures and osteoporosis. In this activity, players of the game, "Os Costs: Banking On Healthy Bones," will find that making good choices about bone health may significantly reduce the risk of osteoporosis. The goal is to obtain sufficient bone mass to build a reserve or "bone bank" of "osteocoins."

#### *Notes to the teacher:*

In this activity, students will play the game called "Os Costs: Banking on Healthy Bones." The players will simulate passing through a life span making choices that will result in the accumulation or loss of bone mass. In this game, bone mass will be symbolized with "Osteocoins." Bone loss increases as one ages. Excessive bone loss leads to increased risk of fractures and osteoporosis. Players will find making good choices about bone health may significantly reduce risk of osteoporosis. The goal of the game is for each player to obtain sufficient bone mass as early as possible during childhood, adolescence, and the young adult years to build a reserve. So, when they begin to lose bone after age 35, they will be able to cover bone losses. In mid-life, players should continue to preserve bone. In later life, measures can still be taken to prevent further bone loss and fractures. Information about the causes, treatment, and prevention of osteoporosis will be learned through the drawing of choice cards and fate cards during the game. Players will learn how nutrition, exercise, drug use (smoking and alcohol consumption), certain illnesses and drug therapy as well as genetic factors effect the risk of osteoporosis. These genetic factors include family history, gender, frame size, and ethnic background. This information is based on current research.

An "Os Costs Game Log" should be given to each player at the start of the game. Each player will record their responses to the colored cards drawn as "good" or "poor" choices and the points obtained. Any fate cards will be recorded as "good" or "poor." This log will be filled in throughout the game. At the end of the game, this log will be used in the discussion to allow students to process out what occurred during the game.

A complete game board is provided. Before playing the game with the students, read the rules to become familiar with the game. Notice the game board is divided into three color sections: green, yellow, and red. Each color represents a different stage in bone development as a person ages: the green section represents an overall increase in bone mass from infancy to 25 years old, the yellow section represents a maintenance period where increase in bone mass balances a decrease in bone mass from 26 to 40 years old, and the red section represents a gradual decrease in bone mass from 41 years old through 100 years old.

The game pieces are pictures of the most common fracture sites: the wrist, hip, and vertebrae. The players will roll a die to determine the number of spaces to move. Each space is numbered increasingly from 1 to 100. The space the player lands on shows the

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age of the player. After moving, the player will draw a card. If a 2, 3, 4, 5, or 6 is rolled, a choice card should be drawn. The color of the choice card drawn will depend on the color of the space the player landed on. If the number one is rolled, the player moves one space and draws a fate card. The fate cards contain events in life which contribute to osteoporosis or reduce risk of the disease.

The choice cards have questions that are appropriate for the age group the color represents. For example, the green cards (Go! Build bone mass) contain issues dealing with making good choices to maximize bone mass. The green cards will contain issues teenagers may begin to experience which could affect their bones such as eating disorders, poor eating habits, and drug use such as smoking or alcohol consumption. Correct responses which contribute greatly to increasing bone mass are rewarded with the high bone points paid in the form of "Osteo-coins." The greatest impact on your "bone bank" occurs from infancy to 25. Many questions on nutrition focus on the need for adequate calcium intake.

Correct responses with the yellow cards (Caution! Bone loss balances bone gain) receive fewer bone points since the correct responses concerning lifestyle have less impact between ages 25 to 35, up to age 40. But, it is still important to continue to make good choices to increase and maintain bone mass to reduce risk of fractures and osteoporosis.

The red (Stop! Bone loss occurs more than bone gain) cards require students to make correct lifestyle choices that are more pertinent to older people. In normal aging from 40 onward, bone loss occurs more than the bone mass increases. Thus the "Osteo-coin" payoff is not as high in this section, and in fact, may frequently result in paying out of the bone bank the students have been accumulating. Some of the questions may sound repetitive, but students will notice the payoff is different. This illustrates the fact that what is an appropriate choice in younger years may not be appropriate in later years, or vice versa. For example, forms of weight-bearing exercise appropriate for a teenager may not be appropriate for a 65 year old.

In all three sections correct responses are given value points awarded by the "Os Master" who acts as the bone banker who distributes "Osteo-coins." Poor responses result in the loss of "Osteo-coins" and the "Os Master" will collect any penalties that have to be paid.

The fate cards in each section have events that occur that are not related to choices one makes in life, but rather deal with the events that are beyond our control — those related to genetics, normal aging, or disease processes. Thus, the fate cards represent the things that increase or decrease the chances of developing osteoporosis. After reading the brief scenario on the fate cards, players may be able to add coins to their bank if the fate card has a positive effect on bone health. If the scenario has a negative effect on bone health, the players will be required to pay out!

The game will continue until all players move into any one of the spaces numbered 75, 80, 85, 90, 95, and 100 called "How Much Did your Os Cost?" This last landing space will be the age the player uses to assess their bone health. To make this assess-

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ment, all players will add up their “Osteo-coins.” This information will be used to determine which players are winners. Students will plot their position on the “ Bone Mass Across a Life Span” Graph located at the bottom of the game board at the finish. A player is a winner if they determine they stayed above the “fracture zone” or “fracture threshold.” Staying above this zone means the student made enough good choices to acquire and maintain adequate bone mass to cover bone losses, thus reducing the risk of fractures and osteoporosis.

The teacher should hold a class discussion after the game. Ask the students to share whether they remained above the fracture zone. Discuss how increased risk of fractures could affect the quality of living of a person as they age. Ask them to think about what it would be like to have a fracture after age 40. Explain that fractures due to low bone mass often cause older people to be immobile for a long period of time. This immobility and lack of independence can cause psychological problems in the elderly and can lead to other health problems. Often, the recuperation time will lengthen with the increasing age of the person.

Review the risk factors, treatments, and prevention for osteoporosis. Write the risk factors on the chalkboard into three areas: genetic (family background, ethnicity, gender, and frame size), lifestyle factors (nutrition, exercise, and drug use such as smoking and alcohol consumption), and diseases and drug therapy. Inform students most research agrees on the following ranking for risk of osteoporosis based on genetics information. The categories are listed from most at risk to least at risk: White female with a small frame, White male, Black female, and Black male. The cards dealing with nutrition were primarily emphasizing calcium since it is directly linked with bone mass increase. Remind students there are many nutrients that are important for a healthy diet. Also remind them that some foods that are calcium-rich may also be very high in cholesterol. Drive home the point that healthy eating needs to take into account all of the nutrients provided by a food source and that a balance of nutrients is imperative. The teacher may find the “Os Master” answer sheets helpful since it provides some additional information along with the correct responses.

Following the discussion, students will use their game logs to answer the processing out questions that accompany the log. Students will consider which choices helped build their bone banks (bone mass) and thereby reduced their risk of fracture and osteoporosis. They will also think about how they could have made better choices. They will want to examine how fate played a role in increasing or decreasing their risk of osteoporosis.

For student reference, a brief summary of the rules for “Os Cost” are compiled on the following pages.