OSTEOPOROSIS

WHAT IS IT?
Osteoporosis is a disease that causes a significant loss in bone mass. This means that the inside of bones becomes weak and porous, making them more likely to break. Even minor trauma can cause a fracture. Fractures can result in loss of function, pain, and deformity, as well as life-threatening conditions, such as pneumonia and blood clots. Hip fractures in older adults can cause permanent disability and even death.

Bone mass is normally maintained by the balanced activity of 2 types of cells: osteoclasts, which break down old bone, and osteoblasts, which build new bone. 85-90% of adult bone mass is acquired by the late teens. After bone mass peaks around age 35, all adults start to lose bone mass because more bone is destroyed than replaced.

Women are at higher risk for osteoporosis because they have a lower peak bone mass than men. In addition, once a woman reaches menopause and estrogen levels fall, the rate of bone loss increases even further. This is because estrogen is needed to promote bone growth. Women can lose up to 20% of their bone mass in the first 5-7 years after menopause.

WHO GETS IT?
In the United States, approximately 10 million people have osteoporosis. Another 34 million have low bone mass, which puts them at risk for developing osteoporosis. 80% of adults with osteoporosis are women. While osteoporosis is most commonly found in post-menopausal women, it can affect young women with eating disorders and women who menstruate infrequently.

Risk factors for osteoporosis
Certain genetic and environmental factors are clearly associated with the development of osteoporosis. They include the following:
- Caucasian or Asian race
- Low body weight or small frame
- Family history of osteoporosis
- Early menopause (before age 48)
- Surgery removing the ovaries before menopause
- Infrequent or absent menstrual periods before menopause
- Low testosterone levels (in men)
- Lack of regular weight-bearing exercise
- Smoking
- High alcohol intake
- Low calcium intake
- Hyperthyroidism
- Long-term use of oral steroids and some anticonvulsants

WHAT ARE THE SYMPTOMS?
Osteoporosis does not cause any symptoms until a fracture develops from weakened bones. In the United States, 1 in 2 women and 1 in 4 men over the age of 50 will have an osteoporosis-related fracture. Fractures most commonly occur in the hip, wrist, or spine. Fractured vertebrae in the spine can lead to a hunch-back appearance or persistent back pain.

HOW IS IT DIAGNOSED?
Unfortunately, by the time osteoporosis causes symptoms, a significant amount of bone loss has already occurred. Regular x-rays do not reveal changes in bones until 20-50% of bone mass has been lost. Therefore, it is important for women at risk for osteoporosis to consider getting screened with a bone density test before symptoms develop.

Bone density is measured using a dual energy x-ray absorptiometry (DEXA) scan. This test measures bone density in the hip, wrist, and lower spine. If bone mass is low but not severe enough to be classified as osteoporosis, it is called osteopenia.

WHAT CAN BE DONE TO PREVENT IT?
Building strong bones in childhood and adolescence can prevent osteoporosis later in life. The following suggestions will help you improve peak bone mass, as well as decrease bone loss as you age.
- **Engage in regular weight-bearing exercises.** This means exercises that involve gravity and muscle tension on the bone. Most activities are weight-bearing, except for swimming. Try to exercise for at least 30 minutes most days of the week.
- **Avoid smoking.** Recent studies have shown a direct relationship between smoking and decreased bone density. Smoking may increase the risk of fractures, as well as decrease estrogen levels.
- **Limit alcohol consumption to 1 drink per day.** One drink is equivalent to 12 oz of beer, 5 oz of wine, or 1.5 oz of liquor. Excess alcohol use can interfere with the absorption of nutrients needed for healthy bones.
- **Get enough calcium and vitamin D.** Calcium is needed for bone growth, and your body cannot absorb calcium without sufficient vitamin D. It is best to consume these nutrients from food, but supplements are available if needed.
- **Avoid consuming large amounts of sodium, caffeine, and protein.** Higher levels of these substances can lead to greater loss of calcium through the urine.
- **See your health care provider if you are premenopausal and having infrequent menstrual periods.** Your estrogen level may be low, thereby increasing your risk of developing osteoporosis.
- **Consider medication.** If a DEXA scan reveals osteopenia (low bone mass not severe enough to be classified as osteoporosis), your health care provider may recommend starting medication to prevent further bone loss.
CALCIUM
The average American consumes only 500 mg of calcium in their diet. This is less than the daily calcium requirements listed below. Please refer to the table below for a list of the calcium content of common foods.

<table>
<thead>
<tr>
<th>RECOMMENDED DAILY CALCIUM INTAKE</th>
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</thead>
<tbody>
<tr>
<td><strong>SOURCE: NIH OFFICE OF DIETARY SUPPLEMENTS</strong></td>
</tr>
<tr>
<td>Young Adults</td>
</tr>
<tr>
<td>Adults</td>
</tr>
<tr>
<td>Pregnant and breastfeeding women</td>
</tr>
</tbody>
</table>

Which calcium supplements are preferred?

- **Calcium carbonate** (Tums, Caltrate, Os-Cal) contains the most elemental calcium per tablet and is the least expensive. Elemental calcium is the actual amount of calcium in each supplement. Because calcium carbonate requires stomach acid for absorption, it is best to take this form of calcium with food.
- **Calcium citrate** (Citracal) and calcium gluconate are more easily absorbed and can be taken on an empty stomach. They are also preferable if you are taking an acid-blocking medication (eg. Zantac, Prilosec, Nexium). However, they contain less elemental calcium than calcium carbonate.

Tips on taking calcium

- Calcium is best absorbed when no more than 500 mg is taken at one time. Taking calcium supplements with meals, lactose (eg. a sip of milk), or vitamin D (also in fortified milk) enhances their absorption.
- Consult your health care provider prior to increasing your calcium intake if your family has a history of calcium-containing kidney stones.
- Do not exceed 2000 mg/day of calcium as high doses may damage the kidneys.

VITAMIN D

- Experts recommend that all adults consume at least 800 IU of vitamin D per day. Some experts recommend 1000-2000 IU per day.
- Vitamin D is made naturally by the skin after exposure to sunlight. However, vitamin D production by the skin decreases with age. In addition, people with darker skin need more sun exposure to produce adequate amounts of vitamin D.
- The best source of dietary vitamin D is fortified cow's milk, which contains approximately 100 IU per cup. Vitamin D is also found in egg yolks, saltwater fish, and fortified cereals and dairy products.
- Supplements are often recommended, and most multivitamins contain 400 IU per dose.
- Do not consume more than the dose recommended by your health care provider, as high doses of vitamin D can be harmful to the body.

WHAT ARE THE TREATMENTS?

Although there is no cure, several medications are available for the treatment and prevention of osteoporosis. Research is ongoing. Even if you are on medication, it is important to continue adequate calcium and vitamin D intake, as well as the other lifestyle changes reviewed above. Consult your health care provider for more information.

<table>
<thead>
<tr>
<th>400 MG CALCIUM</th>
<th>300 MG CALCIUM</th>
<th>200 MG CALCIUM</th>
<th>150 MG CALCIUM</th>
<th>100 MG CALCIUM</th>
<th>50 MG CALCIUM</th>
<th>25 MG CALCIUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yogurt (plain, nonfat, low fat), 1 cup</td>
<td>Milk (nonfat, low fat, lactose-reduced, whole, goat's milk), 1 cup</td>
<td>Figs (dried), 10</td>
<td>Oatmeal (instant), 1 packet</td>
<td>Soybeans (cooked), 1 cup</td>
<td>Orange juice, 6 oz</td>
<td>Refined beans, ½ cup</td>
</tr>
<tr>
<td>Evaporated skim milk, ½ cup</td>
<td>Grated parmesan Cheese, 1 oz</td>
<td>Tofu, 1 cup</td>
<td>Bok choy, 1 cup</td>
<td>Tumip greens (frozen, cooked), ½ cup</td>
<td>Broccoli, ¼ cup</td>
<td>Raisins, ½ cup</td>
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<tr>
<td>Nonfat dry milk powder, ¼ cup</td>
<td>Macaroni and Cheese, ½ cup</td>
<td>Burrito (chicken or beef with cheese and beans), 1</td>
<td>Rhubarb (frozen, cooked), ½ cup</td>
<td>Almonds (shelled), 1.5 oz</td>
<td>Kale, mustard greens (frozen, cooked)</td>
<td>Whole wheat or white bread, 1 slice</td>
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<tr>
<td>Mackerel (canned), 5 oz</td>
<td>Ricotta cheese (part-skim, nonfat), ½ cup</td>
<td>Enchilada with cheese and beans, 1</td>
<td>Nachos with cheese and beans, 4</td>
<td>Cheese pizza, 1 slice</td>
<td>Ice cream, ice milk, frozen yogurt, ½ cup</td>
<td>Baked beans, ½ cup</td>
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<tr>
<td>Sardines in oil, 4 oz</td>
<td>Swiss and Gruyere Cheese, 1.5 oz</td>
<td>Collard greens (frozen, cooked), 1 cup</td>
<td>Spinach, ½ cup</td>
<td>Egg (hard boiled), 1</td>
<td>English muffin, 1</td>
<td>Tortilla chips, 10</td>
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<td></td>
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<td>Fish (baked, Broiled), 6 oz</td>
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<td>Cottage cheese, ½ cup</td>
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