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Fractured: A Special Report on Osteoporosis

Osteoporosis medication is supposed to prevent bone breaks. But if it's taken too long, the opposite can happen. What you need about osteoporosis meds, eating for strong bones, bone density screenings, and how to stay healthy

By Susan Ince



Shortly before 8 A.M. on a sunny spring morning in Rome, GA, Jeanne Mathews stepped outside to retrieve her newspaper from the driveway. It was Mother's Day 2009, and Mathews was looking forward to attending church with her mom, her adult children, and her grandchildren, then having lunch with the family. But when her foot landed on the first brick step, her thighbone snapped completely in two, the jagged ends pointing in opposite directions. Mathews, sprawled in agony across the steps, hadn't even tripped.

She cried out for help, and eventually a neighbor — one she'd never met but now will never forget — found her and called 911. It took 45 minutes, and a lot of morphine, to ease Mathews into the ambulance while she clung to her leg bones so they wouldn't pop through the skin.

Dana Gallagher At the hospital, surgeons inserted a rod into Mathews's broken thighbone. But a year later, she was still in pain and unable to walk normally.

Last November, doctors inserted a new rod and started her on daily injections of bone-building teriparatide (brand name: Forteo).

Mathews, who is assistant vice president of public relations and marketing at Berry College in nearby Mount Berry, was dumbfounded by what had happened. About four months before the break, she had started having pain in that thigh. She'd tried seven different office chairs, put heat on the leg at night, and finally consulted an orthopedist, who X-rayed her hip for arthritis and found nothing. He had prescribed rigorous physical therapy, but all the pushing and pulling was probably the worst thing Mathews could have done, her surgeon later said. Her pain, it turned out, stemmed from an undiagnosed stress fracture, not visible on a regular X-ray, that finally cracked the bone clear through.

Usually, it takes severe trauma, like a car crash, to break the femur, the body's longest and strongest bone. So why would Mathews's thighbone have snapped like that, especially since she had taken medication — alendronate (Fosamax) and then ibandronate (Boniva) — for almost six years to reduce her fracture risk?

Mathews wasn't the only one asking that question. She learned of a support group whose members had stories that were remarkably similar to hers — largely women who'd broken a thighbone when they were in their 50s and 60s while they were walking or bending to pick up something or simply rolling over in bed. Some of the members had osteoporosis, but others, like Mathews, then 57, had been perfectly healthy. (That was the case, too, with the group's founder, Jennifer Schneider, M.D., a physician whose thighbone broke when, at age 59, she was jolted on a New York City subway.) Most had been told they had osteopenia, or low bone density, after a routine scan and, like Mathews, had been prescribed bisphosphonates, a class of drugs that includes Fosamax, Boniva, Actonel (risedronate), and the once-yearly infusion, Reclast (zoledronic acid). In fact, the common denominator for all the women in the group was that they had been taking one of these drugs.

For nearly a decade, federal guidelines have called for physicians to offer bone-density testing to all women age 65 and older. But no doctor had ever suggested it to Peggy Keenan, although she had regular medical visits to monitor her blood pressure, cholesterol, and other vital stats. And Keenan, who was on her feet all day as a beautician in Grand Rapids, MI, and was a regular on the treadmill and weight machines at the gym, never worried about her bones or asked about a screening. Then, in 2006, at age 72, while walking her shih tzu, she slipped on an icy patch and went down hard, breaking her shoulder.

Next: More on Peggy Keenan's story, and the American approach to bone health



Courtesy of Peggy Keenan

Keenan has nothing but praise for the doctor who treated her fracture without surgery and got her back to exercising right away. Still, he never brought up the possibility of osteoporosis, and it didn't occur to her to ask. *With that fall, anyone would have broken something*, she thought.

But then, two years later at a family picnic, Keenan broke two bones in her wrist when she fell while climbing down from a tree house with her grandson Mitchell. This time, a hand specialist recommended she have a bone-density scan immediately, and Keenan learned she had severe osteoporosis. Now 76, she took Forteo injections for two years and has just started on Reclast. "I tell Mitchell, 'If it hadn't been for you, I wouldn't have found out I have osteoporosis and gotten treated,'" Keenan says. Still, she's angry at herself for not having been a better advocate for her own health. And she also wonders about her medical care. "I'm not blaming my doctor, but he dropped the ball where I'm concerned," she observes.

Jeanne Mathews and Peggy Keenan: two women, two very different stories — and textbook examples of how dangerously skewed the American approach to bone health has become. Pharmaceutical companies have spent millions trying to persuade midlife women (and their doctors) that they need to protect themselves against broken bones. Meanwhile, older women, who are at the greatest risk, are often overlooked. Even when a 65- or 75-year-old woman breaks a hip or sustains a fracture after a low-impact fall — in medical-speak, a "fragility fracture" — as few as one in five are evaluated for osteoporosis or started on treatment. "We have women in their 40s and 50s taking pills they really don't need, and at the same time, we have women in their 60s and 70s who have had a fracture and no one has paid attention to why it happened," says Anna Tosteson, Sc.D., professor of medicine and an expert in bone-health policy issues at the Dartmouth Institute for Health Policy & Clinical Practice.

As late as the 1980s, osteoporosis was a relatively neglected disease. Diagnosis was after the fact: If you were elderly and broke a hip, you had it — and you faced up to a 25% chance of dying from complications within the next year. It wasn't until 1992 that a group of experts met in Rome under the auspices of the World Health Organization (WHO) to consider ways to best identify women at risk *before* a fracture. A significant part of the discussion focused on how to use the amount of mineral in bones to identify fracture-prone people (X-ray machines that could measure bone-mineral density had been developed, though they were expensive and relatively few medical centers had them). "We had to draw the line somewhere," says Tosteson, who participated in the meeting. "There's a discussion like this in every field. To prevent heart attacks, for example, you have to ask, 'At what point does higher blood pressure become hypertension?'"

The doctors were grappling with fracture risk, trying to set thresholds of density scores to identify the group at higher risk. Finally, they settled on the T-score, a commonly used statistical calculation. (See "[The Scorecard.](#)") In this case, the T-score indicates how an individual's bone density compares with that of a young, healthy adult woman, whose bones should be at their peak density and strength. A score could fall into one of several categories: normal, osteoporosis (or severe osteoporosis), or a middle range between osteoporosis and normal that has caused untold difficulties. "We could have simply called that middle range 'low bone density,' but we gave it the name 'osteopenia,'" Tosteson recalls.

Next: A new disease, and new drugs to treat it



Courtesy of Denise Boba

It was a decision she and other experts now deem "unfortunate," because in the minds of many physicians and patients, the designation of osteopenia (literally, "deficiency of bone") created a new disease — and ultimately new drugs to treat it. The purpose of the T-score cutoffs set at the WHO meeting was simply to help investigators conducting prevention studies to compare groups with regard to bone density. "None of the people in those studies would know what category they were in," says Nelson Watts, M.D., director of the University of Cincinnati Bone Health and Osteoporosis Center.

What they were *not* trying to do, stresses Tosteson, was suggest who needed drugs. But soon, that's exactly how the new classifications would be used.

Three years after the WHO meeting, in 1995, anticipating FDA approval of its drug Fosamax, Merck prepared for the launch of what would be the first nonhormonal treatment OK'd for

osteoporosis. The company established a nonprofit Bone Measurement Institute to encourage screening. To make scans more widely available, it promoted doing the procedure in doctors' offices, working with manufacturers to help physicians afford the machines. Many of these were low-end scanners. Unlike the pricey models that measure density in the hips or spine, these cheaper scanners examine the heel, forearm, or wrist, providing results that don't always reflect what's going on in the areas of biggest fracture concern.

The marketing worked: Women got tested, and often their bone-density reports displayed where they fell in the WHO classifications — normal, osteopenia, or osteoporosis — sometimes even color-coded in green, yellow, or red to drive home the point. And soon, Fosamax was a big seller for Merck.

It was about to become even bigger. In 1997, the drug company submitted studies to the FDA in support of marketing a lower-dose version of Fosamax as a *preventive* drug for postmenopausal women at risk of osteoporosis — and got approval. Now there was a huge new market for the drug: middle-aged women at increased fracture risk because of family history, small size, lifestyle (smoking, excess drinking), medications, or certain diseases — or often just because they had received an osteopenia rating on a bone-density scan. Osteoporosis affects more than 10 million people in the U.S., but osteopenia occurs in more than three times as many — 34 million.

One major problem: An osteopenia "score," because of its wide range, can mean anything from close to normal to just shy of osteoporosis. Take Denise Boba, a magazine circulation specialist in Bloomingdale, IL, who scored a —1.1 in one hip on a bone-density test in 2009. Although Boba was only 48 and followed a healthy diet, exercised, and took vitamins, her physician, knowing her mother had osteoporosis, immediately prescribed Fosamax. "The doctors make you so frightened about brittle bones," says Boba.

And if doctors weren't scaring women, promotions for Fosamax drove the message home, targeting *all* women at menopause — or at least trying to until the FDA stepped in. For example, in a patient brochure that Merck produced in 1997, one headline read: "Menopause is the single most important cause of osteoporosis." The FDA, calling the statement "false" and "misleading," told Merck to stop distributing brochures containing that headline. At the same time, observes Susan Ott, M.D., a bone-health expert and professor of medicine at the University of Washington, "You never saw ads for women who were bent over with osteoporosis and truly needed the drug."

By 2005, Fosamax sales reached almost \$3.2 billion. The company had gotten the word out. But too often, it was to the wrong women.

Next: What are the risks of bisphosphonates?



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New Worries

No matter what your age, no one disputes the benefits of bone-smart choices in diet, exercise, and medical care. But bisphosphonates have some experts wondering whether the drugs have become this generation's hormone therapy: Women start on them as a menopausal rite of passage and then, after millions of patients have been popping them for years, the pills are found to pose frightening risks.

All drugs have downsides, of course. But, says Dr. Ott, women with osteopenia get the risks of treatment without evidence that it reduces fractures. In fact, many women with osteopenia have a very low fracture risk. The average age for breaking a hip is about 80, and no research shows that starting bisphosphonates at 50 will help keep a bone from breaking 30 years later — or even after 10. The best fracture prevention, she adds, is achieved when women only take the drugs if they develop osteoporosis (though she

and other doctors might advise going on them if your T-scores are near the cutoff and you have significant risk factors).

Meanwhile, as many women will attest, the side effects of bisphosphonates can be miserable. Stomach pain and heartburn are major complaints. When Boba, who had doubts that she needed to be on medication, started taking Fosamax, she was ultracareful to try to avoid the digestive

problems that had plagued her mother. After taking a pill, she waited 60 minutes rather than the prescribed 30 before eating anything or lying down. Still, she developed heartburn, acid reflux, and stomach pains. After eight weeks, her doctor sent her to a gastroenterologist to look for any unrelated cause for her symptoms. The specialist didn't find anything, but did note that she was seeing at least one new bisphosphonate user each week. Boba's doctor prescribed once-a-month Boniva instead, but for now, Boba's not taking any medication for her barely-below-normal bone density.

Beyond heartburn and other GI problems, side effects of bisphosphonates include severe muscle and joint pains. And now that the drugs have been in use for over a decade, new problems have begun to emerge that have some experts very worried.

Esophageal Cancer

Comparing bisphosphonate use in some 93,000 patients, British researchers found that taking the drugs for three to five years roughly doubled the risk of esophageal cancer — from about one in 1,000 to two in 1,000. Although that's still rare, researchers are worried that they don't know enough about what these drugs could do after that time. "We're particularly concerned about women after menopause who are at risk of a fracture. In the past, they would have been given hormone therapy; now they're being put on bisphosphonates, and we don't know what the long-term effects will be," says lead author Jane Green, M.D., Ph.D., of the University of Oxford.

Next: More risks associated with bisphosphonates



Courtesy of Jeanne Mathews

Fractured Femurs

Jeanne Mathews's orthopedic surgeon had no doubt that her unusual fracture had resulted from using osteoporosis drugs. Bisphosphonates work by reducing the activity of cells called osteoclasts, which normally break down bone. But suppressing the bone's normal cycle of breakdown and buildup may not be healthy in the long run. The tiny areas that are damaged in daily life may never get repaired, and accumulated minerals can make the bone abnormal and more prone to breaking. "There's good evidence that with the drugs, your bones become stronger for five years, but we're really worried that after 10 years, they will get more brittle," says Dr. Ott.

It's been understandably tough to establish direct cause and effect in a group of patients already considered more likely to suffer a bone break. But last October, after patients passionately argued for a strong warning and the American Society for Bone Mineral Research weighed in with its data,

the FDA acknowledged the connection and issued a warning to physicians and patients about the possible risk. As is standard, the agency left prescribing decisions up to doctors.

And then in May, Swedish researchers reported the clearest link yet between the drugs and thigh fractures: In a review of data on 1.52 million women, 78% of those who'd had unusual thigh fractures like Mathews's (admittedly rare) were taking bisphosphonates. Only 10% of the women with ordinary thigh breaks were on the drugs. Those taking bisphosphonates the longest had the highest risk.

Women on these drugs need to be vigilant about stress fractures, advises the National Osteoporosis Foundation. "If you're taking bisphosphonates and develop pain in your muscles or bones, you need to be checked for stress fractures," says Robert R. Recker, M.D., president of the foundation. "That means a nuclear bone scan — stress fractures won't show up on a regular X-ray." And if you have one? "You should switch from bisphosphonates to a medication that stimulates bone formation — Forteo — and seriously limit physical activity till you heal."

Infected Jaws

In a University of Southern California dental program where the tough cases are treated, Parish Sedghizadeh, D.D.S., frequently sees women whose jawbone tissue has died and who have suffered nasty infections after tooth extractions or other invasive procedures, such as bone surgery. Most cases occur in patients who have certain types of cancer and, as a part of treatment, take a higher dose of bisphosphonates intravenously. But in a 2009 review of cases, Sedghizadeh found that nine of 208 oral bisphosphonate users on the patient rolls had developed such osteonecrosis, or death of jaw tissue.

While these numbers may be somewhat high because the dental school program serves such serious cases, new research confirms the link: An April study of more than half a million HMO members revealed that while osteonecrosis is quite rare, it is nonetheless 9.2 times more likely to occur in someone taking oral bisphosphonates. Why a bone medication might increase tissue death and infection risk is still unclear. Salvatore L. Ruggiero, M.D., D.M.D., the New York oral surgeon who first alerted his profession to the problem, suspects these drugs may have a bigger impact on the jawbone because that part of the skeleton has a high rate of bone turnover, and they therefore may interfere with the normal healing process.

If you're about to start on a bisphosphonate, check in with your dentist to see if you need any major work. Or, if you're already on the medication, ask your doctor if taking a "drug holiday" makes sense. But don't skip needed work — if you have an abscessed tooth, for example, you could risk a life-threatening infection. Better to tell the dentist about your drugs so she or he can take extra precautions.

Over the years, there have been multiple lawsuits filed against drug companies by patients who have suffered jaw problems and other complications they believe stem from their use of bisphosphonates. So far, in suits against Merck, the drugmaker has prevailed in several cases, but had a judgment against it in another, which Merck is now in the process of appealing. The vast majority of cases are still pending trial. When asked for comment, the companies selling these medications pointed to their success in helping prevent fractures and their commitment to patient safety.

Next: The thousands of women who need these drugs, and aren't getting them

The Invisible Patient

Here's the kicker: For all the women who are suffering from the effects of taking these drugs too soon and for too long, there are untold thousands who truly need them — and aren't getting them. Almost nine out of 10 hip fractures occur in people 65 or older, yet fewer than half of older women have had even one bone-density screen, reports Herbert Muncie, M.D., professor of family medicine and a specialist in geriatrics at the LSU Health Sciences Center School of Medicine in New Orleans. Don't blame Medicare: It covers testing every two years — with no co-pay.

And the tests are far more helpful in older women. You and your mom may have matching T-scores, but your chances of breaking a bone aren't even in the same ballpark. "Density is just one of the ways bones change with age and become more prone to fracture," says Dr. Recker. Older bones also differ in their proteins, their supporting scaffolding, and the hormones that determine when and



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where minerals are deposited. "If a woman in her 40s and a woman in her late 60s or early 70s both have a T-score of -2.5 , the older woman has 10 times the risk of fracture," he notes.

Even when an older woman breaks a bone, her doctor may not think of osteoporosis. "I've frequently seen patients who have had three, four, or five fractures — it's painful just to listen to their stories — but weren't being tested or treated for osteoporosis," says geriatrician Beatrice Edwards, M.D., who is director of the Fracture, Osteoporosis and Metabolic Bone Disease Program at Northwestern University's Feinberg School of Medicine in Chicago.

Most of these women had fragility fractures, which signal that you need not just evaluation, but treatment. "If you've broken a bone from day-to-day activities or a simple fall, you have osteoporosis, no matter what your bone-density score is," says Dr. Watts. "If someone has a heart attack, you treat them to reduce the chance of

another, even if they don't have high blood pressure or high cholesterol. People who've already had a 'bone attack' also need therapy."

To figure out *why* doctors weren't taking action when treating fracture patients, Dr. Edwards assembled focus groups of hospital-based physicians in Chicago. Their responses: They felt unprepared to deal with the condition, or they didn't consider it an acute problem. Tellingly, they also admitted they were reluctant to enter the turf of primary-care doctors. But primary-care docs often don't get the chance to help, either: After a fracture, only one in 10 patients who had been treated in the ER went back to her regular doctor or to a specialist afterward for a bone check and treatment, Dr. Edwards found in a survey of 70 patients. Like Peggy Keenan, the 76-year-old Michigan woman who endured two serious breaks, all figured that anyone who had a similar fall would have broken something.

More frightening, not enough doctors are making sure patients understand their risk: In a large 2010 international study led by Ethel Siris, M.D., director of the Toni Stabile Osteoporosis Center of Columbia University Medical Center in New York City, only one-third of women who had broken a bone after age 45 considered themselves to be at even a slightly higher risk of having another fracture compared with other women their age. And, inexplicably, one in five thought she was at *less* risk. In reality, such women's odds are doubled.

Maybe if this survey is given again in a few years, patients (and their doctors) will be more knowledgeable. The American Orthopaedic Association has launched "Own the Bone," a program for doctors to reinforce that fracture care includes follow-up so patients with low bone mass or osteoporosis have every chance to avoid a future fracture.

Next: Changing priorities in bone health

For many women, that will mean taking bisphosphonates — and in this case, the benefits may well outweigh the risks. "Every single drug and medical treatment has potential complications," says Andrew D. Bunta, M.D., an orthopedic surgeon at Northwestern's Feinberg School of Medicine. "Compared with the number of fractures that are prevented and the ability of people to stay active in their senior years, the risks of complications are minimal."



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Even Dr. Ott, the Seattle bone specialist who sounded some of the earliest and loudest warnings about the long-term risks of bisphosphonates, prescribes them — and often. "For the right people, these drugs really prevent fractures," she says.

Now, as women push health agencies to recognize the risks of prescription bone protection, and as professionals finally begin targeting the patients who truly need attention, the dangerously distorted priorities in bone health are slowly beginning to change. But whether you're at risk of too much treatment or too little, you have to advocate for your own best care.

When the FDA warnings on femur fractures came out last October, Joy Vogelgesang, 56, co-owner of a bookstore in Keauhou, HI, had been on bisphosphonates for five years. At her next doctor's appointment, her M.D. reviewed her medication list and didn't suggest any changes.

But when Vogelgesang asked about the bone drug, the doctor readily said it was OK to stop. "She acknowledged that after five years, I'd probably gotten all the benefit I was likely to. But if I hadn't raised the issue, I could have been taking it forever," says Vogelgesang.

Peggy Keenan has become a fiery advocate for self-help, encouraging friends to keep up their strength and balance exercises and urging older women to demand bone testing: "You can't just put this in the hands of your doctor — you have to know the facts, ask questions, and make sure you get the right treatment for you."

Next: What to do if you're taking osteo drugs



Sean Russell/Getty Images

Top Up on Bone Drugs

Osteoporosis medications work in different ways. But whichever one you take, make sure to remember your calcium and vitamin D: Some of these drugs work only if you have enough of these nutrients in your blood stream. Here is more medication-specific information, including how to maximize benefits and minimize risks.

BISPHOSPHONATES

Includes: Fosomax (alendronate), Boniva (ibandronate), Actonel (risedronate), Reclast (zoledronic acid)

How they're given: Depending on the drug, bisphosphonates may come in daily, weekly, or monthly tablets, weekly liquids, by IV, and with or without vitamin D.

Side effects:

- *Alendronate:* [Go to medlineplus.com](http://www.medlineplus.com)

- *Ibandronate*: [Go to medlineplus.com](#)
- *Risedronate*: [Go to medlineplus.com](#)
- *Zoledronic acid*: [Go to medlineplus.com](#)

Also know:

No skipping For the meds to work, you need to take at least 80 percent of your prescribed doses. But research has shown that fewer than half of people actually do.

Wash them down To minimize heartburn (and perhaps more serious esophagus problems), religiously follow rules about water before and with the pills, and stay upright 30 to 60 minutes after taking.

Floss These drugs have been linked to jaw osteonecrosis, decay of the tissue and bone. Now, more than ever, keep up the oral hygiene to avoid invasive procedures. Wait to start the drugs if you will need work or are undergoing it now. If you're already taking the meds, tell your dentist: Special care can be taken to reduce infection if you need implants or extractions.

Report mystery pains Bisphosphonates may carry a risk of thighbone fractures. Most thigh fractures are preceded by months of pain with no clear muscle or joint cause. A nuclear bone scan can reveal if it's a stress fracture that needs bone-forming medication (such as Forteo) or a rod inserted before the bone cracks.

Test before Reclast Severe kidney problems have occurred after Reclast infusions. Before starting on the drug, report any kidney problems or medications to your doctor. Drink plenty of water before and after each treatment.

EVISTA (RALOXIFENE)

How it's given: Daily pills.

Side effects: [Go to medlineplus.com](#)

Also know:

Potential dangers Raloxifene may increase your risk of blood clots, and, for people with cardiovascular issues, it may up the chances of a more serious or fatal stroke.

Breast bonus Raloxifene works by mimicking estrogen's bone-protecting effects. At the same time, it may block estrogen receptors in the breast, lowering breast cancer risk. It is FDA approved for reducing invasive breast cancer risk in certain groups of women.

Watch for hot spots Warmth and swelling of legs, hands, or feet can signal a blood clot, as can eye inflammation; see your doctor immediately.

FORTEO (TERIPARATIDE)

How it's given: Daily self-injections, for up to two years

Side effects: [Go to medlineplus.com](#)

Also know:

Cancer concern In lab rats, the drug causes the bone cancer osteosarcoma. Tell your doctor if you've ever had a bone disease like Paget's disease, bone cancer (or a cancer that has spread to your bones), or bone radiation therapy, or if you have an increased risk of osteosarcoma.

PROLIA (DENOSUMAB)

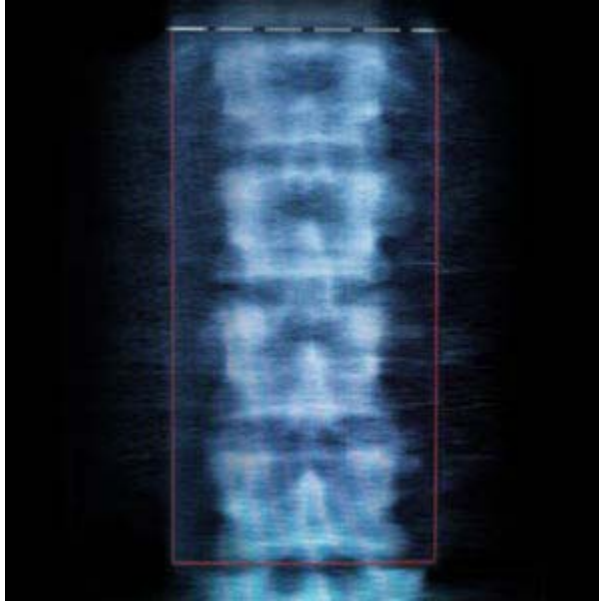
How it's given: Injections twice a year

Side effects: [Go to medlineplus.com](http://medlineplus.com)

Also know:

Dental worries Although it works differently from bisphosphonates, Prolia has also been associated with serious jaw problems. Take care of your teeth diligently, following the same oral precautions as you would with bisphosphonates.

Next: An inside view of bone density scanning



Robert Llewellyn/Getty Images

Wait Your Turn

Unlike mammograms, about which the advice of professional organizations seems to clash, there's actually consensus regarding bone-density screening for healthy women: Start when you're 65. If, however, you're younger and your fracture risk is as great as that of a 65-year-old woman, then you need earlier screening, per new guidelines from the U.S. Preventive Services Task Force. How would you know? Go to goodhousekeeping.com/frax for the World Health Organization's FRAX (Fracture Risk Assessment) calculator. Answering several questions (and leaving the T-score info blank) will give you your 10-year risk of having a major osteoporotic fracture or a hip break; if either is near 10% or higher, ask your doctor about screening, advises Ned Calonge, M.D., former chairperson of the task force.

Note that FRAX works only for postmenopausal women, and routine screening before that point doesn't make sense. "No medical organization endorses premenopausal 'baseline' screening in normal, healthy women with no risk factors," says Margery Gass, M.D., executive director of the North American Menopause Society. If your doctor suggests screening, ask how the results might change your care.

Find the Right Machine

Bone-density scans use very low-level X-rays to measure the amount of minerals in a section of bone. Most meaningful is a central DXA scan of your spine and hips. If there are signs you may already have vertebral fractures — you have unexplained back pain or have shrunk more than an inch and a half — ask about being tested on a machine that simultaneously does a vertebral fracture assessment. If you can, check with a local osteoporosis center to find the best machine in your area: An inferior or poorly calibrated scanner can give fluky readings, leading to unnecessary drug treatment or, possibly, missing a diagnosis of osteoporosis. Try to return to the same machine — or at least the same brand — for future scans, so results will be comparable. Stop taking calcium the day before your test: A partially digested pill lying over a vertebra may be measured along with the bone, making your density seem higher than it really is.

Decode Results Accurately

Chances are, you will get a T-score (see "The Scorecard," below). If you're postmenopausal and in the gray zone between -2.5 (osteoporosis) and -1.0 (normal), your doctor may recommend prescription treatment. Before you agree, re-FRAX, this time adding in your T-scores. The National Osteoporosis Foundation suggests that treatment be considered only if your 10-year risk of hip fracture is 3% or higher or your chance of any osteoporosis-related fracture is 20% or above.

Don't Sweat the Small Changes

If your test is OK, you don't need another scan for three years (two if you're on certain medications or have a medical condition that affects your bones). When you go for that follow-up screen, consider your results pretty much the same if there's a change of less than 6% in your hip measure or 4% in your spine. Even scans repeated at the same visit can come up with different results. In one study, scores changed as much as 6% after the patients walked around between measurements.

The Scorecard and What It Means

When you have a bone-density scan, you are usually given your results as a T-score, which measures the density of your bones against that of an average young, healthy adult woman. A score of 0 means you match that standard; a positive (+) score means your bones are more dense than that average, while a negative score ($-$) indicates your bones are less dense. More specifically:

T-score of -1.0 and above normal

T-score of -1.1 to -2.4 : low bone density (osteopenia)

T-score of -2.5 or below: osteoporosis

Next: Learn how to give your bones a midlife tune-up



Dana Gallagher

Do What You Love A large Swedish study found that middle-aged women who gardened, picked berries, shoveled snow, and walked frequently sustained far fewer hip fractures later in life than those who were less active. No surprise. But these "just generally active" women also fared better (hip-wise) than those who engaged in more formal, gym-type exercise.

Get Balanced Strengthening leg muscles helps prevent falls and, if you do tumble, makes bones more resilient. Try tai chi or standing yoga poses for extra strength and balance training.

Stay Flexible Letting yourself get stiff changes how you walk, making falls more likely. Try to stretch every day.

Buy New Glasses Bifocals or progressive lenses are convenient. But invest in a pair of regular distance specs for outdoor walks. With these, "your depth perception and contrast sensitivity are better, making you less likely to fall on stairs

or uneven ground," says epidemiologist Judy Stevens, Ph.D., of the CDC.

Never Say It's Too Late In another Swedish study, women ages 66 to 87 who did twice-weekly strength-training, aerobic, and weight-bearing sessions for a year walked faster, had stronger grips,

and gained bone density in their hips. "But they had to keep it up; otherwise, they lost the benefits," says lead researcher Undis Englund, M.D., Ph.D.

Next: Learn the best (and worst) moves for your bones



Dana Gallagher

Sports

Top Choices: Racquet sports, soccer, basketball; racquet sports strengthen wrists and, with their pivots and side moves, are great for hips and spine

Little Bone Benefit: Cycling

Red Flag: Golf. If you have osteoporosis, the sudden twisting moves may place unusual force on the spine (it's less risky if you're experienced); also avoid sports such as downhill skiing in which falls are likely

Aerobics

Top choices: Jogging, speed walking (at 4.5 mph), aerobic dance (especially step aerobics)

Little Bone Benefit: Swimming

Red Flag: If you have osteoporosis, jumping may overstress or twist the spine (some yoga poses may, too)

Resistance Training

Top Choices: For your hips: lunges and squats. For your spine: one-arm and two-arm rowing moves with weights or resistance bands; straight-arm raises to the front or side

Little Bone Benefit: Bicep curls

Red Flag: Ab-curl and back-extension machines put too much compression on vertebrae if you have osteoporosis

Next: What to Eat for Strong Bones

Head to the Dairy Case Food is always a better source of nutrients than pills. In addition, a new review of studies found that women who took calcium, or a combo of calcium and vitamin D supplements, were up to 24% more likely to have a heart attack. Doctors are debating how significant the risk is, but few would dispute the value of dairy. You need 1,000 mg of calcium a day, (1,200 if you're postmenopausal), which translates to three (8-oz.) servings of nonfat milk or yogurt, 4¾ slices of reduced-fat cheese, or any combo.

Get the Right Dose Statistics show that about two-thirds of Americans don't eat enough dairy. If you don't get any, then two 500-mg or 600-mg calcium supplements a day are still smart prevention.



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Your body best absorbs about 500 mg at a time, so spread them out. If your dairy-meter falls somewhere between "lots" and "none," one dose a day is OK. As to types of calcium: Calcium carbonate is cheaper, but for it to be absorbed well, you need to take it with a meal. The pricier calcium citrate can be taken at any time.

Don't Forget Your D It's unlikely you'll get enough of this vitamin from food, so a pill makes sense. Make sure you get enough. The Institute of Medicine just raised the Recommended Dietary Allowance for D to 600 IUs (up from 200 to 400) for adults. But many experts, including David L. Katz, M.D., M.P.H., director of the Yale-Griffin Prevention Research Center, think even the new figure is too low. "Considering that the likelihood of benefit is very high and the likelihood of any harm is remote, I think many people, particularly in more northern areas [where you get less D from the sun], could benefit from 1,000 to 2,000 IUs a day," Dr. Katz says.

Pack in the Produce, Too Fruits and veggies promote a bone-strengthening acid-base balance in your bloodstream. Don't worry about the chemistry, but do eat at least five servings a day, including dark-green veggies. "Worldwide, people get less calcium than we do, but their rates of osteoporosis are lower, probably because they eat more produce and fewer animal products, and they get more weight-bearing exercise and sun exposure," Dr. Katz points out.

—Samantha B. Cassetty, M.S., R.D., GHRI nutrition director

Next: What one young woman learned about gene testing



Amber Venerable

I am all about prevention. Although I'm only 24, I slather on anti-aging cream daily; as assistant beauty editor at GH, I've learned it's easier to prevent wrinkles than to fight them 20 years from now. I feel the same way about my health, which is why, when GH began this report on osteoporosis, I signed on for genetic testing to see if I was at increased risk for the disease. The test, from Interleukin Genetics, looks for three genetic variations that purportedly up the chances of low bone-mineral density and spinal fractures. It was easy enough: I simply took a swab from inside my cheek and mailed it off to the company for analysis. About two weeks later — for \$169, plus \$13 for expedited shipping — I learned that I didn't have those genetic variations. I could have saved my money, says osteoporosis expert Susan Ott, M.D., of the University of Washington. "There just aren't any published studies to support the validity of such a test," she says. But she did endorse the lifestyle advice that Interleukin's genetic professional gave me. "The spine continues to grow until age 25 or 30, so it's

particularly important that women in their early 20s eat well and exercise in order to develop strong bones," Dr. Ott explains. Her recommendations:

- Get plenty of calcium — 1,000 mg a day, along with 600 IU of vitamin D (the RDA, but see [Eating for Strong Bones](#))
- Work in 30 minutes of weight-bearing exercise every day
- Maintain a BMI between 20 (a bit higher than the official "healthy") and 25
- Think about birth control. The pill seems to be safe for bones, but Depo- Provera causes some bone loss (which reverses when you stop using it)

Next: A test to go with your bone-density test



Roughly 10 million Americans have osteoporosis ("brittle bone disease") and some 34 million have low bone density (sometimes called osteopenia). The National Osteoporosis Foundation recommends that women age 65 and older, men age 70 and older, and others based on individual risk factors or health history undergo periodic screening to measure the mineral density of their bones. When you are tested, you receive a T-score, which compares your bone density to that of a young, healthy adult.

Here's what the T-scores mean:

- 1.0 and above = normal
- 1.1 to —2.4 = low bone density
- 2.5 or below = osteoporosis

Dana Gallagher

Numbers aside, what you really want to know when you go for a bone-mineral density screen is whether you're likely to have a fracture due to thinning bones. Many factors contribute to that

risk, and a new mathematical calculator, called FRAX (Fracture Risk Assessment), weighs several of these and provides you with the 10-year probability of sustaining a hip fracture specifically or any osteoporosis-related fracture. You can use FRAX before getting tested to see whether it would be a good idea in your case; if your fracture risk is 10% or over, talk to your doctor. But the calculator is primarily designed to use *after* screening, to help guide your doctor in deciding whether or not you need treatment to protect your bones.

To do FRAX yourself, go to [the website](#) and bring the results to your doctor.

<http://www.goodhousekeeping.com/health/diseases/osteoporosis-report>