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Osteoporosis: A Costly but Preventable, Treatable Disease

Teri Wood, PhD, Epidemiologist, Chronic Disease Prevention and Control Branch, Division of Adult and Child Health Improvement

Introduction

Osteoporosis is a disease in which bones lose strength due to microarchitectural deterioration, which lowers bone strength and increases fracture risk. Fractures can be caused by minor bumps or during normal daily activities. These fractures occur typically in the hip, spine and wrist. Fractures resulting from osteoporosis are common, costly, and become a chronic burden on both individuals and society. While osteoporosis is most common among elderly white women, it affects both sexes and all races, although to varying degrees.

The Impact of Osteoporosis

Osteoporosis and the mortality and morbidity resulting from associated fractures is a major public health threat for an estimated 44 million Americans, or 55 percent of individuals 50 years of age and older. In the U.S., 10 million individuals are estimated to already have the disease and almost 34 million more are estimated to have low bone mass, placing them at increased risk for osteoporosis.

An estimated 1.5 million individuals suffer from a bone disease-related fracture each year. Examination of lifetime risk shows an even greater scope of impact. Four out of every 10 white women age 50 or older in the U.S. will experience a hip, spine or wrist fracture sometime during the remainder of their lives. Thirteen percent of white men will experience an osteoporosis-related fracture. While the lifetime risk for men and non-white women is less across all fracture types, it is nonetheless substantial, and may be rising in certain populations such as Hispanic women.

In 2002, the National Osteoporosis Foundation (NOF) estimated nearly 130,000 Kentucky women suffered from osteoporosis and an additional 340,000 had low bone mass. The organization projected that by 2020, 175,000 Kentucky women would have osteoporosis and an additional 640,000 would have low bone mass. The Surgeon General's 2004 report on bone health shows that Kentucky has one of the highest rates of hip fracture in the nation.

Complications from fractures often result in chronic pain, partial disability, and in some cases, death. Two-thirds of individuals who suffer a hip fracture will never regain their full level of function experienced prior to the fracture. Twenty percent of those suffering a hip fracture die within 12 months. Of those patients surviving a hip fracture, 50% will require long-term assistance with daily life activities, and 25% will require full-time nursing home care. Fractures of the vertebrae cause major complications, including restrictive lung disease, altered abdominal anatomy, abdominal pain and distention, reduced appetite and premature satiety. In addition to physical challenges, patients experience psychological symptoms, including depression, loss of self esteem and strained social and family relationships.

Osteoporosis Prevention

Osteoporosis prevention begins with adequate in-

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take of calcium and vitamin D in childhood and adolescence when peak bone mass is developed.

Supplemental calcium and vitamin D intake in adulthood, especially for women over age 50, has also been shown to reduce the risk of hip fracture. The National Academy of Sciences recommends calcium intake of 1200 mg per day and 400 to 600 international units (IU) of vitamin D per day.

The NOF recommends an 800 IU per day vitamin D intake for those at risk of deficiency such as elderly, chronically ill, housebound or institutionalized adults. The NOF stated that despite recent findings from the Women's Health Initiative (WHI). The foundation does not plan to revise its guidelines on calcium and vitamin D intake. It is important to note that the WHI study found that "calcium and vitamin D supplements in healthy postmenopausal women provide a modest benefit in preserving bone mass and preventing hip fractures in certain groups, including older women, but do not prevent other types of fractures or colorectal cancer".

Tobacco and excessive alcohol use are known to be detrimental to bone health. Therefore, tobacco cessation and alcohol abuse treatment programs are beneficial in reducing osteoporosis risk and reducing fracture risk in those who already have decreased bone density.

Osteoporosis Risk Assessment

Because there are no warning signs of osteoporosis before a fracture occurs, clinical evaluation of all women postmenopausal is important to determine the need for Bone Mass Density (BMD) testing. While postmenopausal women over age 65 are at highest risk for osteoporosis, the possibility of osteoporosis should not be overlooked in both white women and women of color, and men at any age. A fracture resulting from mild to moderate trauma, such as a fall from standing height or less, is perhaps the most important "red flag" for signaling compromised bone health.

The 2004 Surgeon General's report on bone health and osteoporosis lists the following "red flags", which indicate that further assessment for osteoporosis or other bone disease is warranted:

- History of fractures related to mild or moderate trauma
- Family history of bone disease
- Low body weight
- Weight loss of more than 1 percent per year in the elderly
- Late onset of sexual development
- Unusual cessation of menstrual periods
- Anorexia nervosa
- Athletic amenorrhea
- Patients being treated with drugs that affect bone metabolism (e.g., glucocorticoids)
- Patients with diseases linked to secondary osteoporosis
- High levels of serum calcium or alkaline phosphates in otherwise healthy patients
- Hyperparathyroidism, hyperthyroidism or treatment with high doses of thyroid hormone
- Height loss or progressive spinal curvature

Patients with or at risk for osteoporosis should also be assessed for risks associated with falling. One important risk factor for falls among the elderly is poor vision, because many older patients do not have their vision checked regularly. Dementia can also increase the risk for falling due to gait impairment and balance disorders associated with the disease and/or medications taken to treat dementia.

Osteoporosis Diagnosis and Bone Mass Density Testing

The National Osteoporosis Foundation Physicians Guide states that BMD testing should be performed on:

- All women aged 65 and older regardless of risk factors
- Younger postmenopausal women with one or more risk factors other than being white, postmenopausal and female
- Postmenopausal women who present with fractures in order to confirm diagnosis and determine disease severity
- Men who present with low trauma fractures
- Men who are being treated with a Gonadotropin-releasing hormone (GnRH) agonist for prostate

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cancer
- Healthy men starting at age 70

A variety of BMD testing techniques exist and are good predictors of fracture risk. Techniques include:
- Dual x-ray absorptiometery (DXA): can be used to measure BMD in the spine, hip or wrist. Central DXA of the hip and/or spine is the preferred measurement for definitive diagnosis.
- Peripheral dual x-ray absorptiometry (pDXA) and single-energy x-ray absorptiometry (SXA): used to measure bone density in the forearm, finger or heel.
- Quantitative computed tomography (QCT): most commonly used to measure trabecular bone density in the spine.
- Ultrasound densitometry: used to assess bone density in the heel, tibia, patella and other peripheral sites. Not as precise as DXA or SXA, but valid predictors of fracture risk.

Diagnosed osteoporosis requires lifelong management. Patients should be asked about compliance with treatment plans and encouraged to continue therapies to reduce fracture risk. Physicians may choose to monitor changes in bone density every year or two during pharmacological treatment. Monitoring every two years is consistent with guidelines from the Centers for Medicare and Medicaid Services (CMS) .

Conclusion

Health care professionals of all types have an important role to play in the early diagnosis and treatment of osteoporosis. In addition to risk factor assessment and identifying high risk patients who need bone density scans, they can educate patients on nutrition, physical activity, medication compliance and assess risks for falls in the elderly. Patients who have been identified as both high risk for osteoporosis and high risk for falling are candidates for interventions such as an exercise routine to improve strength and balance, modification of the home environment, changes in medications and the use of "hip protectors" to cushion the impact from a fall.

Children and young/middle-aged adults should be encouraged to adopt healthy lifestyles that include good nutritional choices and physical activity. Tobacco cessation and decreased alcohol consumption are also recommended for optimal bone health.

For more information, contact the National Osteoporosis Foundation Physicians Guide. Additional resources for health professionals are available on the NOF Web site at: http://www.nof.org.

Arbovirus Surveillance in Kentucky - 2006

Mike Schardein, MS, Environmental Biologist,
Surveillance and Health Data Branch,
Epidemiology and Health Planning

Kentucky is now entering its sixth West Nile Virus (WNV) surveillance season. The Kentucky Department for Public Health (KDPH) will continue to work with local health departments (LHDs) and the Kentucky Department of Agriculture (KDA) to document sentinel events involving WNV and other arboviruses. With the increase of WNV and other arbovirus activity in surrounding states last year, early awareness of viral activity in a geographic area is critical for personal protection and control measures. Surveillance for WNV positive birds, horses and mosquito pools will continue, as well as surveillance for human cases of West Nile Neuroinvasive (West Nile Encephalitis) and West Nile Non-Neuroinvasive Disease (West Nile Fever). Surveillance testing for other arboviruses will also continue.

Kentucky is a full participant in the Federal Arbonet Surveillance System of recording arbovirus information. The KDPH encourages hospitals and physicians to submit specimens on patients with suspected arboviral neurological illness to the Divison of Laboratory Services. For specific information on specimen submission, contact the Virology Section at (502) 546-4446, ext. 4484. In addition, LHDs, hospitals and physicians are encouraged to contact the KDPH at (502) 564-3418 if a patient with suspected arboviral neurological illness is pregnant at time of symptoms, as the Centers for

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Disease Control and Prevention (CDC) is partnering with all states for a study on the effects of maternal WNV on newborns.

Arboviruses (arthropod-borne viruses) are a group of viruses that are spread mainly by blood-sucking insects. Birds are the key reservoir for the viruses and the infection of mosquitoes. Since the major vector of arboviruses in the U.S. is the mosquito, it is important to remember that weather and climate affect mosquito populations differently on a year-to-year basis and from region-to-region. Since the weather in a region or area can change from year-to-year, it is hard to predict the severity of arboviral activity into the future. Therefore, prevention measures on state, local and individual levels are the only ways to decrease arbovirus activity.

Ways to Reduce the Risk of Arbovirus Exposure

- Work within your community to remove and control mosquito populations. Notify your LHD to have junkyards and drainage ditches added to the KDA's list of sites to be treated on a regular basis during periods of rain.

- Work around your own yard to remove standing water or other man-made objects that will collect and hold water (i.e., unmaintained pools).

- Protect yourself when outdoors, especially during evening hours with appropriate clothing and repellent products such as DEET. Refer to the CDC's Web site (www.cdc.gov) to review insect repellent use recommendations and always use repellents as directed.

- Remember that not all mosquitoes are the same. Just because it has been dry for weeks, mosquitos still may be present. Mosquitoes breed and thrive in many different environments.

Clearing up Public Misconceptions about Arboviruses

- Arboviruses are not passed to humans via birds or human-to-human contact. They are passed on through a vector (mosquito, or in some cases, a tick).

- There is only a small chance of becoming infected or showing symptoms of an arbovirus infection. The highest risk age groups are the young and old.

- A visual lack of mosquitoes (either individual or bites) does not mean that there is a decreased risk of virus activity.

For further information on arboviruses, contact Mike Schardein (Mike.Schardein@ky.gov) at (502) 564-3418 Ext. 4186.

Doctors' Attention Requested on Death Certificates

Troy Chisholm, Program Coordinator/
Quality Assurance Representative,
Vital Statistics Branch

The Office of Vital Statistics receives numerous death certificates from funeral homes each day that must be returned because the physician did not adequately complete the sections required. This causes unusually long delays in the process of filing of death certificates and delays family members of the deceased receiving their certified copies, enabling them to complete estate and other legal duties.

Physicians are reminded that all required sections (23a. through 29, and 30a. through 30f. only if death was due to an injury) of the death certificate should be legible, accurate and complete. The Office of Vital Statistics has the "Physicians' Handbook on Medical Certification of Death" and the "Funeral Directors' Handbook on Death Registration and Fetal Death Reporting" available upon request. These handbooks are useful tools in preparing the sections required by the doctor and funeral directors.

Doctors and funeral directors can contact the Office of Vital Statistics, 275 East Main St., 1 E-A, Frankfort, KY 40621 or call (502) 564-4212 to speak with Quality Assurance Representatives Troy Chisholm (ext. 3980) or Sheryl Meador (ext. 4425). Information is also available on the DPH Vital Statistics Web page at http://www.chfs.ky.gov/dph/vital/.

Kentucky's Fluoridated Water Supplement Program

Linda Grace Piker, MS, MPH, RD, LD
Health Program Administrator, Oral Health Program

Editor's Note: This article is a supplement to the article entitled "The Kentucky Department for Public Health's Community Fluoridation Program" , which was published in the September 2005 edition of Epi Notes.

The Kentucky Department for Public Health's Oral Health Program (KOHP) monitors public water systems in the state and includes fluoride enforcement and surveillance. Fluoride supplements are an essential component to this program and are available for children whose home drinking water supply is deficient in fluoride content.

Fluoride Supplements

Currently 99.6 percent of Kentucky's public water systems are optimally fluoridated and 90 percent of Kentuckians have access to optimally fluoridated water; however, there is still a need to provide fluoride supplements to children who are not presently receiving optimally fluoridated drinking water, other fluoride supplements or vitamins with fluoride. The primary target audience for the program is preschool children (6 months-6 years), but fluoride supplementation may be provided to children up to 16 years of age who are not receiving optimal amounts of fluoride. Sources of water for consumption, which may not be optimally fluoridated, include cisterns, wells, filtered water, springs, mountain water and bottled water.

Individuals not located in an area served by Kentucky's public water systems can obtain water sample test kits from dentists, physicians and local health departments participating in the Fluoride Supplement Program. The healthcare provider assesses the drinking water supply and if water is not from a known fluoridated water source (e.g., city water), a water sample kit is issued to the family. The water sample is then sent to the state public health laboratory for analysis. If the water is low in fluoride, supplementation may be required. Dosage is based on the level of fluoride in the water and the child's age, in accordance with the Centers for Disease Control and Prevention (CDC) guidelines. The supplements come in the form of drops and tablets. Drops are issued to children between 6 months and 3 years of age, while tablets are provided to children 3 years of age and up. Parents or guardians are advised concerning the importance of giving their child no more than the prescribed amounts of fluoride. The KOHP provides supplements and testing supplies free of charge to dentists, physicians and the local health departments. There is no fee for families to participate in this program.

It is not necessary to have city water submitted to the state lab to test for the fluoride content of the water. Coordinators from the Kentucky Department for Public Health's Community Fluoridation Program routinely monitor Kentucky's public waters systems to ensure that optimally fluoridated water is available for the state's residents.

When bottled water is the primary source of drinking water for children, check the label to find out if the fluoride content of the water is listed. If the fluoride content of bottled water is not listed on the bottle label, there are several sources of information which can be helpful in determining the fluoride content of different brands of bottled water. Generally, bottled water has a toll-free phone number printed on the label to call to learn the fluoride content of the bottled water. Additional resources for learning the fluoride content of bottled water can be found at International Bottled Water Association (IBWA) Information Hotline (1-800-WATER-11) or on the IBWA Web site at http://www.bottledwater.org/default.htm. If the fluoride content of the bottled water is not available from the sources listed above, contact your dentist, physician or local health department to obtain a water sample test kit.

For additional questions or concerns about the Fluoride Supplement Program, contact Linda Grace Piker (Linda.Piker@ky.gov) or Dr. Jim Cecil (James. Cecil@ky.gov) at (502) 564-3246.

Contraceptive Update on Kentucky's Title X/ Family Planning Clinics

Emily A. Anderson, RN
Title X Program Director,
Division of Adult and Child Health Improvement

The wide availability of birth control methods in today's world can make choosing a method of birth control one of the most challenging decisions for women. In the 20th century, the birth control pill was primarily one of the only choices women had if they wanted to prevent pregnancy. Luckily, the 21st century brought scientific medical advancements that provided more options for birth control. These new methods satisfied the modern woman's expectations towards exercising personal choice.

The Kentucky Department for Public Health's federally funded Title X/Family Planning Program supports individuals having the means and information to exercise personal choice in determining the number and spacing of their children. Each of Kentucky's 160 statewide family planning clinics, located primarily in local health departments, offers a broad range of acceptable and effective medically approved family planning methods and services. All federal Food and Drug Administration (FDA) approved methods of birth control are offered either onsite or by referral. While all individuals are eligible for Title X services, the Title X program identifies those most in need of publicly funded family planning services as individuals whose income falls at or below 100% of the federal poverty level. The program targets existing services to meet the needs of those individuals. Clients are not denied services based on inability to pay. A schedule of discounts is utilized with sufficient proportional increments so that inability to pay should not be a barrier to service.

According to the 2005 Kentucky Family Planning Annual Report (FPAR), the Title X Program served 119,036 individuals in 2005 (an increase of 4% from 2004). Of this total, 61% were identified as being at or below 100% of the federal poverty level. The majority of family planning participants were women (96%). The pill still remains by far the most popular method (43%), even when compared to the well-received injectable contraceptive method Depo Provera® (7.3%). However, the latest pioneer methods of birth control such as the vaginal ring and transdermal patch showed a significant increase in popularity last year with increases of 33% and 50% respectively.

The vaginal ring, NuvaRing®, is a once-a-month method of birth control with an efficacy rate of 99.7% with perfect use. The flexible transparent ring is self-inserted into the vagina and left in place for three weeks for a steady release of 15 mcg of ethinyl estradiol and 120 mcg of etonogestrel. The ring is self-removed on the fourth week and the woman's menses usually will start two to three days afterward. To continue to prevent pregnancy, a new ring must be inserted one week (seven days) after the last ring was removed. Benefits of using the ring include: easy insertion only once a month in the privacy of the patient's home and small size and flexibility, with most women not noticing any pressure or discomfort. Exact placement is not important since it doesn't act as a barrier method. The risks with the ring are the same as for combined hormonal oral birth control pills. Some women should not use the ring if they have specific health conditions or risk factors such as smoking, some types of diabetes and cardiovascular disease. The NuvaRing® does not act as a barrier method and will not give protection against HIV-AIDS or sexually transmitted infections (STIs) such as chlamydia, herpes, genital warts, gonorrhea, hepatitis B and syphilis. Clinicians in Title X clinics are encouraged to promote the use of the ring by allowing the patient to sample easy self-insertion during her family planning visit.

During the Summer 2005 Olympic Games, a European women's soccer team popularized the use of the transdermal patch, Ortho Evra®. The patch "sported" by the soccer players on their upper back quickly became viewed by young women as the new fashion accessory. Family planning clinics everywhere noticed an increase in females requesting this method of birth control in their desire to copy the soccer team's "look". The patch is a once-a-week method of birth control on a four week cycle. A new patch must be used each week for three weeks. During the fourth or "patch free" week, the woman's period is expected to occur. The patch has

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99% efficacy with perfect use. The thin, stick-on, 1-3/4 inch square patch allows 20 mcg of ethinyl estradiol and 150 mcg of the progestin, norelgestromin to enter the bloodstream transdermally. It can be applied to the abdomen, buttocks, lower back, upper outer arm or upper back (as with the members of the women's soccer team). Benefits of the patch are that it is small, thin and smooth; it is changed only once a week and can be worn in a different place each week; it stays on during bathing, showering, swimming or exercise; and it is visible to the patient to view so she knows it is working. The patch is a combined hormonal birth control method. It has many of the same risks as combined oral birth control pills. In November 2005, the FDA advised Ortho McNeil, the manufacturer of Ortho Evra®, to add a bolded warning to the prescribing information for Ortho Evra®. This bolded warning states that hormones from patches applied to the skin get into the blood stream and are removed from the body differently than hormones from oral birth control pills. Patch users will be exposed to about 60% more estrogen than if they use an oral contraceptive with the same hormonal level. In general, increased estrogen exposure may increase the risk of side effects. Title X clinics have been advised to continue their prescribing of Ortho Evra® based on the patient's individual verbal, written and evaluated history.

Second to the popularity of the pill has been the use of the injectable contraceptive Depo Provera®. Depo Provera® has an efficacy of 99.7% with perfect use. Patients are given an intramuscular injection of Depo Provera® every 12-13 weeks. Depo Provera® can be given immediately after the delivery of a baby. Depo Provera® has been a very attractive method for adolescents simply because of convenience and compliance. They do not have to remember to take a pill everyday and their periods often become light. Some report amenorrhea. Depo Provera® contains no estrogen. Unlike combined hormonal birth control methods, Depo Provera® is safe to use while breastfeeding. Women who cannot take estrogen because of contraindications or side effects may wish to try Depo Provera®. Recently, a new form of Depo Provera® was introduced on the market, Depo Provera SubQ 104 mg®. The product has the same active ingredient as Depo-Provera® contraceptive 150 mg injection, but the advantage of the Depo SubQ 104 mg® is that it provides 31% less hormone and is given every 13-14 weeks. It can be given subcutaneously using a smaller needle, as opposed to the 150 mg dose that is given with a larger needle in a muscle. Its cost effectiveness ($19.14/dose) makes Depo Provera® very popular with consumers.

In November 2004, the FDA and Pfizer Corporation released a black box warning to the Depo Provera® prescribing label. This black box warns the user that recent studies show that "some women who used Depo Provera® may lose significant bone mineral density. Bone loss is greater with increasing duration of use and may not be completely reversible. It is unknown if use of Depo Provera® during adolescence or early adulthood (a critical period of bone accretion) will reduce peak bone mass and increase the risk of osteoporosis fracture in later life. Depo Provera® should be used as a long-term birth control method (longer than 2 years) only if other birth control methods are inadequate." In response to this black box warning, the Kentucky Title X program made appropriate revisions to their existing administering guidelines.

The availability of the ring, patch and injectable methods has created more options for individuals to exercise personal choice in determining their reproductive health. While some of these choices have more advantages than others for certain individuals, the Kentucky Title X Program remains committed to providing a broad range of contraceptive methods from highly qualified providers.

For further information concerning the Kentucky Title X/Family Planning Program, contact Emily Anderson (EmilyA.Anderson@ky.gov) at (502) 564–2154 Ext. 4588.

References furnished upon request.

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William D. Hacker, MD, FAAP, CPE
Commissioner, Department for Public Health

Kraig E. Humbaugh, MD, MPH
State Epidemiologist and Director,
Division of Epidemiology and Health Planning

Barbara J. Fox, MS
Editor

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