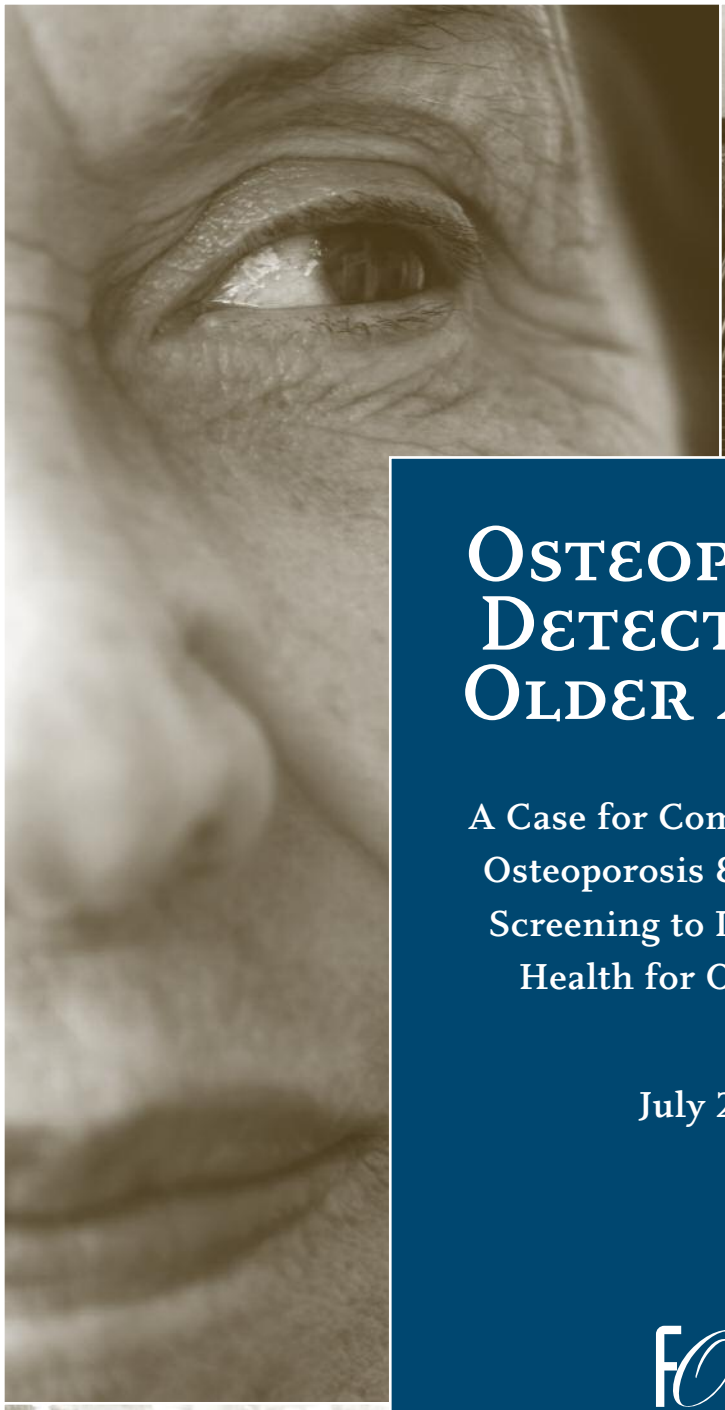
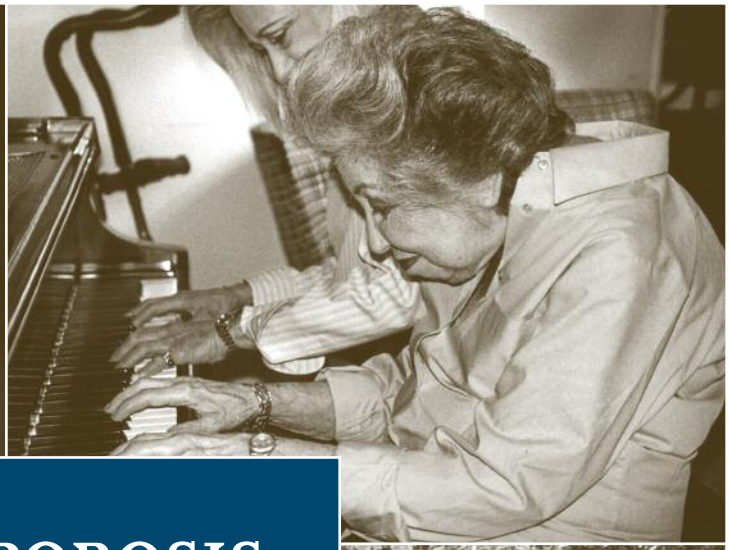
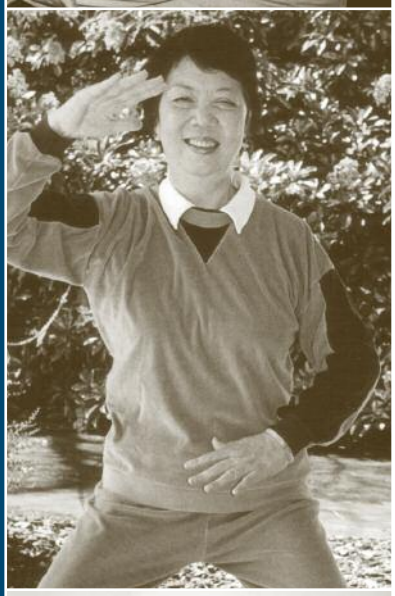




Osteoporosis Detection in Older Adults

A Case for Community-Based Osteoporosis Education and Screening to Improve Bone Health for Older Adults

July 2006



FORE
Foundation for Osteoporosis Research and Education

Executive Summary

Osteoporosis is epidemic in the United States. Currently, *44 million Americans have the disease or are at risk for osteoporosis and fractures*. The National Osteoporosis Foundation estimates that one in every two women and one in every four men aged 50 or older will suffer an osteoporosis-related fracture during their lives.[1] This is significantly higher than the risk of diagnosis for other life-threatening disease such as heart disease, breast or prostate cancer.

Osteoporosis is both preventable and treatable. It is not a part of the normal aging process, although age is an important risk factor for bone loss. Osteoporosis is a disease brought about by decreased bone mass and structural deterioration that leads to fractures, pain and disability for large numbers of older adults. Bone loss may remain hidden for years until one or more fractures occur even after only mild or moderate trauma. Using screening tools, detection of osteoporosis is possible at treatable stages of the disease; and early detection and treatment have been shown to prevent fractures and decrease associated disability, loss of independence and mortality. Screening for low bone mass, particularly in older adults, is a critical step in determining an individual's need for treatment.

"Much of the burden of the disease can potentially be avoided if at-risk individuals are identified and appropriate interventions (both preventive and therapeutic) are made in a timely manner."[2]

— U.S. Surgeon General

The health costs and financial impacts of the escalating rate of osteoporosis occurrence in the United States are staggering and will continue to dramatically rise unless action is taken to 1) increase public awareness of osteoporosis, 2) identify at-risk individuals, and 3) provide treatment to those who could benefit. In 2005, more than two million individuals in the United States experienced osteoporosis-related fractures resulting in medical costs estimated at more than $16.9 billion.[3] The healthcare cost is projected to range from $31 billion to $62 billion by 2020.[4] Costs for osteoporosis in California topped $2.4 billion in 1998 with an additional $4 million in lost productivity resulting from premature death.[5] The total cost for one hip fracture in California approached nearly $60,000 in 1998 costs.[6]

When it comes to receiving recommended osteoporosis screening, there is a dramatic shortfall among most high risk populations. Only 12% of all women age 65 and older receive the recommended bone mineral density test and only half of all post-menopausal women are aware of needing the test.[7] The National Osteoporosis Risk Assessment studied almost 200,000 healthy women age 50 and older and found that 40% of the women had decreased bone mass (osteopenia), 7% had osteoporosis, 11% had suffered from fractures since the age of 45, and in all cases, the women were completely unaware that they were at risk for fracture.[8]

The screening gap is great for all older Americans, but the gap is even greater among ethnic and racial minorities, the uninsured, underinsured, and those living in rural areas. According to the report of the U.S. Surgeon General: "Closing this gap will not be possible without specific strategies and programs geared toward bringing improvements in bone health to all currently underserved populations."[9]

The U.S. Surgeon General encourages population- and community-based interventions to address bone health and the under-identification of osteoporosis in at-risk populations.[10] The Foundation for Osteoporosis Research and Education (FORE) conducted such a community-based intervention and determined that it can be effective in improving awareness and detection of individuals at risk for osteoporosis and fractures among underserved groups. According to three-year data from FORE's five-year initiative in Contra Costa County, California, the project reached nearly 4,500 older adults from a variety of ethnic groups with bone health information and screened nearly 3,000. Sixty percent of those screened had low bone mass (osteopenia) or osteoporosis.[11] Individuals at the highest risk for fracture were offered free calcium with vitamin D supplements and follow-up counseling for one year. Individuals identified with osteoporosis were encouraged and assisted to seek appropriate treatment.

This policy brief makes the case for improving identification of low bone mass and osteoporosis among older adults by supporting community-based education and screening to reduce the risk of life altering fractures.

The brief:

1) explores the escalating need for osteoporosis interventions;

2) outlines the rationale and efficacy for osteoporosis screening;

3) presents a community-based model for screening at-risk and underserved individuals and groups; and

4) recommends support for and improvement of community-based efforts to reach underserved, at-risk groups.

In the United States, 90% of the expenditures associated with osteoporosis are related to the costs of treating fractures and providing post-fracture care. Only 10% of expenditures are being invested to prevent undiagnosed osteoporosis so as to prevent future fractures.[12] As a society, we need strong leadership in public health to begin to reverse the trends in economic, social and individual costs associated with this preventable and treatable disease.

This brief advocates for increased funding and support for community-based education and screening programs to reach underserved older adults.

Recommendations include:

- Implementation of community-based, multi-strategy bone health and osteoporosis interventions for underserved, low income communities
- More integration of osteoporosis and bone health education in overall healthy aging promotions in underserved communities
- Expanded implementation of bone density screening in public health and community clinics
- Better use of existing programs to improve access to services and free or low-cost medications for those identified who are at risk for fracture
- Increased availability of fall prevention programs for all older adults to prevent falls that could result in debilitating, life-threatening and costly fractures
- More relevant osteoporosis education materials tailored for older adults, especially those in culturally and linguistically diverse populations
- Evaluation of the efficacy of community-based interventions in preventing fractures and improving the bone health of underserved populations

There are roles for policymakers, government, community-based organizations, healthcare systems and providers that can assure that poor and diverse older adults have access to education, screening and treatment to prevent loss of independence, costly fractures and diminished quality of life.

Acknowledgements

The Foundation for Osteoporosis Research and Education (FORE) thanks the John Muir Community Health Fund and the Y&H Soda Foundation who funded the *Senior Osteoporosis Screening Project* and the creation of this paper. It is our hope to increase awareness about the effectiveness of community-based osteoporosis education and screening to improve bone health for older adults who have, or are at risk, for osteoporosis.

Beverley Tracewell RN headed our project team of Kristi Baird and Donna Schuppert, who were critical in developing the relationships and trust that made the project so successful. We would also thank our primary author and researcher, Scott Burg, editor, Kathleen Tabor, our designer, Michael Arnaud, and Amelia Davis our photographer. Front cover upper left photograph © Klementiev Samara. Image from BigStockPhoto.com.

Professor Andrew Scharlach from the University of California, Berkeley School of Social Welfare, Gloria Cavanaugh, CEO of the American Society on Aging, and Dr. Coleman Gross provided important guidance in the initial stages of the report development. FORE's Medical and Scientific Advisory Board gave critical feedback on the presentation of the case. Members include Claude Arnaud MD, Bruce Ettinger MD, Frederick Singer MD, Betsy McClung RN, Michael McClung MD, Nancy Woods PhD, and Dolores Shoback MD. Our other reviewers included Robert MacLaughlin, consultant to California State Senator Elaine Alquist, the Chair of the Subcommittee on Aging and Long Term Care, and Pam Ford-Keach, Chief of the Department of Health Services California Osteoporosis Prevention and Education Program.

Finally, we thank all of our partners in the Healthy Aging Initiative. Without their support, encouragement and trust, we would not have been able to reach so many older adults with this important bone health information.

Kathleen M. Cody

Executive Director
Foundation for Osteoporosis Research and Education

About FORE

FORE is a 501 (c)(3) non-profit, voluntary health organization founded in 1990 in Oakland, California. As a premier osteoporosis resource center for individuals, clinicians, and community organizations, FORE provides leading edge, appropriately tailored information for physicians and the general public, support for the newly diagnosed patient, and technical assistance and training. As a leader in bone health, FORE builds coalitions to promote awareness of osteoporosis and bone health among diverse populations and advocates for policies and funding support. As a top quality research institution, FORE's programs support development of treatments and a cure for osteoporosis as well as evaluate standards of care and best practices in treatment, early detection and prevention of osteoporosis.

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The Human Costs and Financial Burden of Osteoporosis

Overview

Osteoporosis is epidemic in the United States. The health and financial impacts of the mounting rates of osteoporosis in the United States are staggering and will only rise if action is not taken quickly. Forty-four million Americans have osteoporosis or are at risk for osteoporosis. One in every two women and one in every four men aged 50 or older will suffer an osteoporosis-related fracture during their lives.[13] A 50-year old woman's lifetime risk of dying from a hip fracture is equal to her risk of dying from breast cancer and greater than her risk of dying from uterine cancer.[14]

In 2005, more than 2 million individuals in the United States experienced osteoporosis-related fractures resulting in medical costs estimated to be more than $16.9 billion.[15] Due to the aging of our population and the increasing cost of medical care, by 2020 this figure is estimated to be as high as $62 billion.[16] Costs for osteoporosis in California topped $2.4 billion in 1998, with hip fractures accounting for 64% of the burden. This is in addition to over $4 million in lost productivity resulting from premature death.[17] According to this same report, the total cost for one hip fracture in California approached nearly $60,000.[18]

Direct Cost of One Hip Fracture:

– Hospital inpatient facility cost	$8,358
– Hospital inpatient physician cost	$807
– Emergency room visit	$1,063
– Hospital outpatient visit	$1,940
– Office-based provider visits	$1,944
– Prescription medications	$177
– Home health care	$2,518
– Nursing home care	$41,493
Total cost of one hip fracture:	**$58,300**

Preventable fractures are often the result of unchecked osteoporosis. Osteoporotic fractures most commonly involve the hip, spine, and wrist. Of these, hip fracture is associated with the greatest disability and mortality. A study of white North American women 50 years of age and older estimated that 17.5% will have a hip fracture during their remaining lifetime due to risk factors.[19] A quarter of individuals will require long term nursing home care following a hip fracture.[20] A 2001 NIH Consensus Development Panel reported that about 20 percent of people with hip fractures die within one year, while nearly two thirds never regain their preoperative activity status and many lose their ability to live independently.[21] Research has shown that most osteoporotic fractures, especially fractures of the vertebrae, are caused by forces associated with activities of everyday life.[22] ***As the disease progresses, bones become so vulnerable that fractures can occur spontaneously or through such a mild strain as opening a stuck window, lifting a light object from the floor or even just coughing, sneezing or receiving a loving hug.***

In the United States, osteoporosis causes 2 million hip, wrist and vertebral fractures every year. Nearly half of those fractures occur in the spine. As with hip fractures, vertebral fractures have devastating long-term effects including curvature of the spine and height loss that leads to a decrease in lung capacity as well as digestive problems. The presence of a vertebral fracture substantially increases the risk that subsequent fractures will occur, initiating a downward spiral of physical, social, and psychological consequences. Individuals with pain from vertebral fractures often reduce their social activity, which in turn, leads to further loss of independence and quality of life. An observational study in women with vertebral fractures showed that osteoporosis interfered with their ability to perform daily activities and substantially increased their fear of falling.[23] Although many vertebral fractures are undetected, they contribute substantially to increased disability and even mortality.[24]

The Problem Will Grow: Demographic Trends and Implications for Osteoporosis

The nation's population is growing older rapidly. With the aging of the baby boomer population huge strains on the public benefit and health care systems are anticipated. At present, 12% of the U.S. population is over age 65 and accounts for one third of U.S. health care expenditures.[25] The total population over 65 is expected to double by the year 2030, growing to 70 million people or 20% of the U.S. population placing even greater burdens on the healthcare system and benefit programs for older adults.[26] High-level costs such as those from hip fractures that result not only in costly medical care but long-term disability and care will increase as the population ages.

The older population is primarily comprised of women, many of whom are poor. According to the World Health Organization, women live an average of seven years longer than men.[27] In 2000, there were 20.6 million women over age 65 and 14.4 million men.[28] Due to their greater longevity, women are at higher risk of suffering from the chronic disorders and disabilities that increase with age such as cancer, obesity, arthritis, heart disease and osteoporosis. With women much more likely to suffer from osteoporosis, the number of individuals with osteoporosis and resulting fractures will increase significantly.

The growing number of older adults, particularly older women, living in poverty will further strain the healthcare system. Poverty is associated with higher levels of disease, late diagnosis, co-morbidities and more costly treatments. The chances that a woman will live at or below the poverty line are increased by age and further increased by minority status. Nearly three-fourths of the nation's elderly poor are women. Among women 65 and older, 11.1% of Caucasians, 30.2% of African Americans and 25.3% of Hispanic Americans live at or below the poverty line.[29] Financial disparities will influence the degree to which older women can afford basic healthcare. Older women experience the most difficulty securing private individually purchased health coverage. A recent study confirmed that a woman at age 50 could not reasonably purchase health insurance in 48 states in the U.S[30]

California will face significant challenges as a result of the demographic shifts. California is home to nearly four million people over age 65—the largest older adult population in the nation and this age group is projected to be the fastest growing age group between 2000 and 2020. By 2020, California is likely to have an additional 2.6 million older adults, totaling nearly 7 million older residents.[30] The percentage of very old residents will also grow. Currently, there are about 425,000 adults over age 85. This is likely to increase by 50% in the next decade and a fivefold increase is possible by 2050. Among older Californians, there are nearly 40% more women than men.[32]

Protecting the health and independence of older adults is critical to the health care system and the economic health of our state. Many analysts fear that the great increase in the numbers of older people may strain our health care system and public programs that finance health care to the breaking point. Older Californians are expected to be healthier than in the past, but their sheer numbers could negatively impact programs such as Medi-Cal (California's health insurance for low-income elderly).[31] According to the California HealthCare Foundation, the monthly Medi-Cal cost for serving those aged 65 and older is more than four times that of serving non-disabled adults.[32] Given the projected growth of this age group, these monthly costs are certain to skyrocket. Preventing high cost medical and long term care from fractures is critical for older Californians and the state as a whole.

The Case for Osteoporosis Screening

Screening for osteoporosis is recommended by a wide array of experts and professional associations. The U.S. Preventive Services Task Force (USPSTF) 2002 guidelines for osteoporosis screening recommends that women age 65 and older have routine bone density testing for osteoporosis. The USPSTF guidelines also recommend routine bone density screening for women beginning at age 60 if there are additional risk factors for osteoporosis.[33] The National Osteoporosis Foundation (NOF) recommends bone density testing for all women age 65 or older and for all postmenopausal women who have had a fracture or who have one or more risk factors for osteoporosis.[34] The broadest recommendations come from the American Association of Clinical Endocrinologists (AACE)[35] who add specific recommendations for men over age 70, men with non-traumatic fractures and women on hormone therapy.

Bone Density Testing Recommendations from the USPSTF, NOF, and AACE

Patient Category	USPSTF	NOF	AACE
Women › 65 years of age	Yes	Yes	Yes
Women aged 60-64 with risk factors	Yes	Yes	Yes
All women with a fragility fracture	Yes	Yes	Yes
Anyone receiving treatment for osteoporosis		Yes	Yes
Men aged › 70 years			Yes
All men with a fragility fracture			Yes
Anyone considering therapy for osteoporosis	Yes		Yes

Screening can detect early stages of chronic degenerative diseases such as hypertension, diabetes mellitus and osteoporosis that are often asymptomatic. Many chronic diseases remain asymptomatic for long periods of time, often years, before they are diagnosed. Although screening does not by itself produce better health, it reduces the costly delays in diagnosis and institution of preventive and therapeutic interventions that can potentially improve patient outcomes. Without effective screening programs (blood pressure, blood glucose, bone mass measurements) diseases such as hypertension, diabetes and osteoporosis pass through their silent, asymptomatic phase and result in complications such as stroke, kidney disease and fracture. Once disease processes have advanced they are more costly and difficult to treat.

Screening empowers people to address their own health concerns. Screening programs can be engineered to provide additional information besides the measurement at

hand, such as bone mass. Screening allows for a point-of-contact that provides opportunities to educate people on what preventive steps they can take to improve health or reduce further risk of disease and the associated complications of that disease. Screening gives people information that can assist them in acting on their own and talking with their healthcare providers – thus encouraging people to take control of their health.

Screening is an essential part of population-based chronic disease interventions. The *California Strategic Plan for An Aging California Population* recommends community-based screening programs that include osteoporosis screening as part of preventive health strategies for older adults aimed at "avoiding or slowing the rate of disease progression and reducing the risks of disability and death."[36]

Osteoporosis fits chronic disease management rubrics for determining the appropriateness of screening.[37]

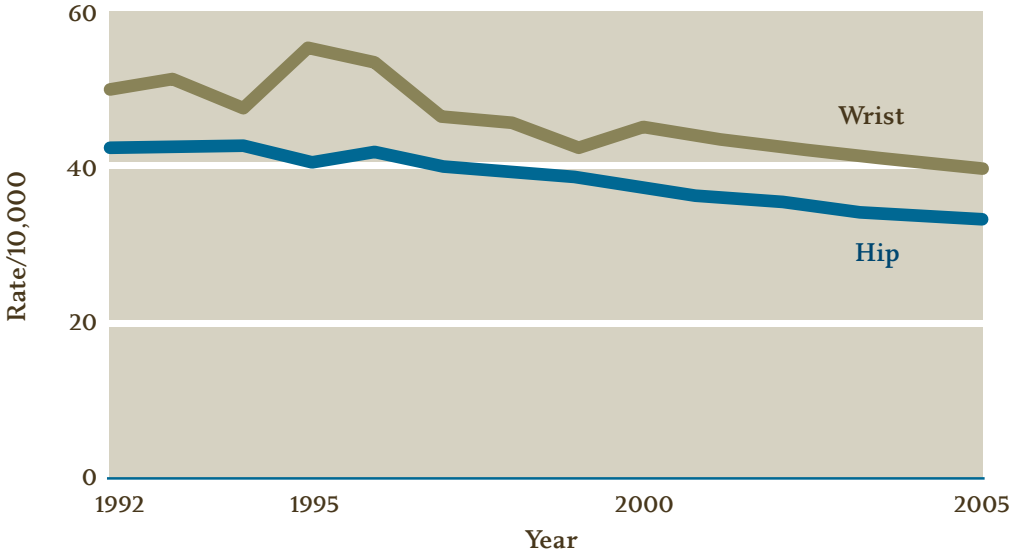
Screening is considered appropriate when:

- A disease represents an important health problem in the population as a whole
- Its natural history is known
- A diagnosis of the pre-clinical stage is feasible
- Earlier identification results in interventions that will provide greater benefit than waiting for symptoms or complications to reveal the diagnosis
- Its treatment at an earlier stage is more effective than treatment begun after the development of symptoms
- A suitable screening test is available
- Early treatment improves clinical outcomes
- There is appropriate follow-up of those individuals with positive screening results to ensure thorough diagnostic testing occurs[38]

Studies indicate that osteoporosis screening is cost effective. Screening and treatment programs, and other medical interventions are considered "cost-effective" if they result in significant health and functional benefits to the patient at reasonable cost. Researchers have compared the lifetime costs and health consequences of universal screening and treatment for diagnosed women ages 65 and older compared with not screening for or addressing their osteoporosis.[39 40] Results strongly suggest that there are significant quality of life benefits and medical care cost savings accrued through screening and treatment programs for women 65 years and older, and that even those in nursing homes can benefit from screening.

In Ontario, Canada, a major province-wide osteoporosis awareness and screening effort launched in 1992 has actually reversed the expected trends in hip fracture despite the aging of the population. The researcher's conclusions for the decline in fracture rates point to increased diagnosis and treatment of osteoporosis.[41]

Fracture Trends in Ontario Women 1992-2005



Researchers at Johns Hopkins University have determined that screening for and treatment of osteoporosis in men and women age 65 and older can prevent a significant number of hip fractures annually.[42]

Barriers to Screening

Barriers to screening have been studied often, with cost identified as a dominant factor. Additionally, lack of awareness and education on the part of both physicians and patients plays a large role in the disparity of preventive screening measures for older patients. Data indicate that doctors are less aggressive when recommending preventive measures to the elderly.[43] In fact, 9 of every 10 adults over the age of 65 go without the appropriate screenings, according to the 2003 CDC report, "Healthy Aging for Older Adults."[44] Many interventions, including therapies for osteoporosis are effective even in the very elderly.[43]

According to a February 2006 report from the International Longevity Center USA, *Ageism in America*, discriminating against people purely on the basis of their chronological age is deeply embedded and widespread in American society. This trend is especially evident in healthcare and in particular health screening. According to the report:

- 60 percent of adults over 65 do not receive recommended preventive services, including screening for common cancers, and 40 percent do not receive vaccines for flu and pneumonia. They receive even less preventive care for high blood pressure and cholesterol

- Only 10 percent of people aged 65 and above receive the appropriate screenings for bone mass, colorectal and prostate cancer and glaucoma[46]

Bone density testing has been a covered benefit under Medicare since 1998, yet only one-third of women are being screened and one-half have never talked to their doctor about osteoporosis.[47] While simple, inexpensive, painless and reliable screening tests are available, less than 10% of osteoporotic individuals are aware of having the disease.[48] Despite the efficacy of screening for diseases such as osteoporosis, a 2006 study by researchers at the Medical College of Wisconsin found that older women, who are among the highest risk groups and who most need bone density testing to determine if they have osteoporosis, are the ***least likely*** to get screened.[51] The screening gap is great for all older Americans, but the gap is even greater among ethnic and racial minorities, the uninsured, underinsured, and those living in rural areas.

People's beliefs about their risks for osteoporosis also play a role in the low rate of screening. In a 2004 National Osteoporosis Foundation survey, relatively few people, regardless of their age, believe they are at risk for osteoporosis, with only 15 percent saying it definitely or probably will occur. Yet the majority of women 45 and older have at least two risk factors for osteoporosis with the risk increasing with age. Nearly 60% of women age 45 to 54, 65% of women age 55 to 64, and 70% of women age 65 and older are at risk for osteoporosis.[49]

Community-based education screening programs can overcome many of these barriers by improving knowledge of older adults, providing support for healthy behaviors, easing access and removing cost issues.

Disparities Among Minority and Other Underserved Populations

According to 2000 and 2002 data, the proportion of elderly female Medicare beneficiaries who reported ever being screened for osteoporosis with a bone mass or bone density measurement was lower among Blacks and Asian Pacific Islanders compared with Caucasians; among Hispanics compared with non-Hispanic Whites; and among poor, near poor, and middle income women compared with high income women.[50] Urban medically underserved communities have disproportionately high rates of morbidity and mortality exacerbated by a lack of necessary screening and health education outreach programs. Women in rural parts of the United States are less likely to use breast cancer, cervical cancer, and osteoporosis screening than other major population groups.[51]

In California, the percentages of women who report ever having a bone density test vary by race and ethnicity. About 40% of Caucasian women aged 50 and older report being tested, which is significantly higher than among other racial and ethnic groups. Asians were the next most likely to have been tested (30 percent), followed by American Indians and Latino women (25 percent and 18 percent respectively). Only 17 percent of African American women reported ever having a bone density test.[52]

Numerous barriers contribute to the failure of screening programs in ethnically diverse and underserved communities: (1) inadequate access to care; (2) mistrust of the health care system; (3) fear and fatalism; (4) lack of knowledge of disease prevention and screening recommendations; (5) lack of cultural sensitivity; and (6) financial burden.[53 54]

Today underserved populations rely on an unorganized patchwork of providers, notably emergency rooms and community health clinics that are ill-equipped to provide or even facilitate the coordinated, ongoing preventative and treatment services that are needed to maintain bone health and overall health and well-being.[55]

Inadequate research on bone health among some ethnic minority groups as well as limited access to health care may contribute in part to under-diagnosis of osteoporosis in minority populations. Misconceptions among healthcare providers that osteoporosis affects only Caucasian women significantly contributes to the under diagnosis of osteoporosis in minority populations.

Population Based Approaches to Osteoporosis Screening and Detection

The Report of the Surgeon General encourages population- and community-based interventions to address bone health and the under-identification of osteoporosis in at-risk populations.[56] Population based interventions promote the overall health of the community by preventing disease, injury, disability and premature death as opposed to clinical interventions which target individuals. Population and community-based interventions that include assessment, health promotion, and disease prevention activities along with monitoring and evaluation of services have been found to be successful in increasing physical activity and reducing tobacco use.[57 58] Population-based approaches can be crafted and tailored to reach specific segments of the population even those unlikely to be reached through clinical interventions. The most effective population based approaches in bone health often involve a combination of individual and population level initiatives. The report of the Surgeon General cites *Project Osteoporosis* in Florida as an effective model that combined media outreach, community education and screening for individuals.[59]

The Surgeon General's Report also draws comparisons between potential population-based strategies for osteoporosis and successful interventions that changed public awareness and promoted preventive behaviors to reduce elevated cholesterol among Americans. According to a study of the results of the population-based cholesterol program, some 70-80 million Americans who were unaware of their blood cholesterol levels took action to find out and do something to protect their hearts. Since the program began, the average total cholesterol level of American adults has fallen significantly.[60]

In light of the success with population-based cholesterol program, it is important to consider that *a bone mass measurement is a better predictor of fracture than a cholesterol level is of a heart attack, yet routine cholesterol screening is a widely accepted practice and bone mass measurements are not.*[61 62]

Elements of other successful population and community-based interventions among underserved populations to increase detection in other disease domains can be valuable in developing frameworks and methodologies for osteoporosis programs. In a review of the research literature, Marie Wolff, PhD, from the Center for Healthy Communities at the

Similarities between bone loss and elevated cholesterol[1]

- The first symptom can be a serious event such a heart attack or fracture
- The disease or condition can be under-detected, under-diagnosed, under-treated, and under-acknowledged
- They require a two-pronged approach to improve outcomes: life style change, early detection and control
- There is an ability to assess, educate and monitor based on a "number", e.g., cholesterol level or T-score
- A tremendous need for awareness exists

Medical College of Wisconsin, characterized primary elements for developing and sustaining successful cancer prevention and screening programs for African Americans in underserved communities.[63]

They include:

- Community participation in the development, implementation and evaluation of programs
- Using social institutions (church, school, clinic) as entry points into the community
- An understanding of cultural belief systems and literacy levels must inform the development of materials and strategies
- Program sustainability and long-term involvement with community
- Innovative outreach strategies and sites
- Social network/social influence interventions

In a research paper assessing the remaining barriers to mammography use among medically underserved women, Institute of Medicine Fellow, Monica Peek, MD, MPH also reported on a number of effective strategies to enhance utilization.[65] Her analysis described several effective approaches or program strategies that have implications for osteoporosis programs targeting underserved groups. The most effective programs include multiple strategies that could involve enhancing access to services, education, using existing social networks, providing direct individual contact, and using healthcare systems and healthcare providers to support the efforts.

Effective Strategies for reaching underserved and limited English-speaking communities

Access-enhancing interventions address the structural, economic, and geographic service barriers and include mobile vans, transportation services, translation services, facilitated scheduling and patient navigators, and providing free or low-cost screening.

Community education/mass media are helpful where community members are more likely to receive their health information from television or radio than from print media or traditional health sources due to low literacy, limited English proficiency and lack of technology.

Social networks can influence health behaviors in communities where racial or ethnic minorities interact less frequently with formal health services and often distrust the health care system. Community peer health educators can overcome the social, cultural, and linguistic barriers to screening.

Individual-directed interventions such as letters/reminders, in-person counseling, and telephone counseling are effective outreach tools.

System/provider-directed interventions are used in health delivery systems and health plans that emphasize preventive services.[65]

A Case Study: Community-Based Osteoporosis Education and Screening to Improve Bone Health for Older Adults

In July 2002, with funding from John Muir Community Health Fund and the Y&H Soda Foundation, the Foundation for Osteoporosis Research and Education (FORE) initiated the *Senior Osteoporosis Screening Project* for older adults in East and Central Contra Costa County[66] in Northern California. This community-based effort provides education, free bone density screening and follow-up counseling to ethnically diverse and at-risk older adults. The project is an integral part of Contra Costa County's broader Healthy Aging Initiative, a six-year effort initiated by the Community Health Fund and Soda Foundation to help the local area prepare for the challenges and opportunities of a rapidly aging population.

Project Methodology

The project utilized many lessons from successful community-based disease management interventions to gain acceptance and reduce barriers for underserved, ethnically diverse older adults. Working with a network of referral agencies and organizations well established in the communities opened doors and built trust among community members. The agencies helped identify older adults to participate and provided sites for the screening and education programs. The program was conducted where seniors congregate and in their own language. Over 60 different venues were used during the first three years to reach out to older adults in isolated communities. Senior centers, senior residential facilities and HUD housing projects provided excellent venues to reach older adults in settings comfortable for them.

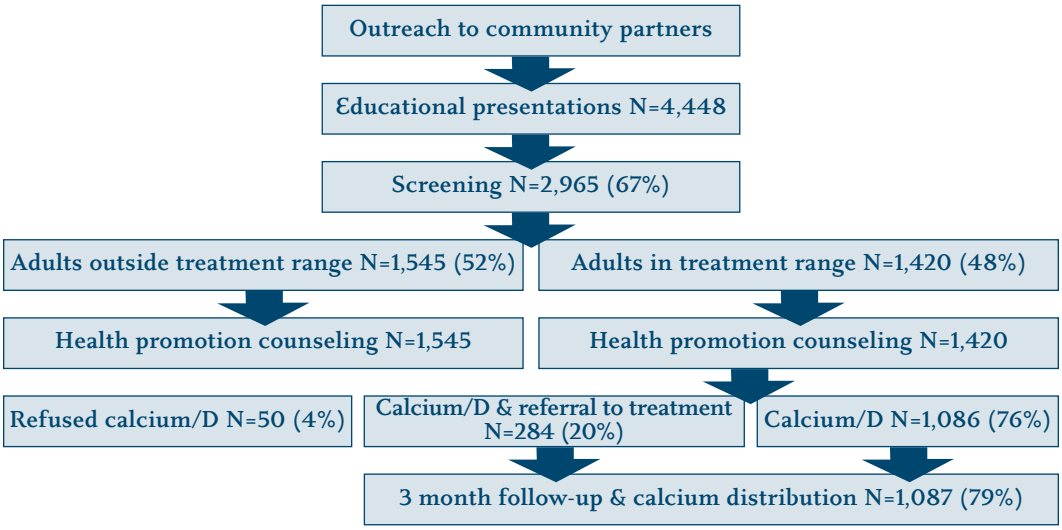
Once partners and program sites were identified, project staff scheduled health promotion presentations for the community. The presentation provided basic information about osteoporosis and its consequences, discussed risk factors and treatment of the disease, promoted bone healthy diet and exercise, and encouraged screening for those at risk. To overcome fear of screening by the older adults, project staff explained how the process worked and that it is quick and painless. Participants were encouraged to return on a date that free screening would be available – usually within one week of the presentation. With the assistance of bilingual community volunteers, lectures were also provided in Spanish, Farsi, Russian and Chinese. Project staff conducted presentations for 4,448 ethnically diverse older adults.

Usually within one week, project staff return to each community site and provide free bone density screening using peripheral dual x-ray absorptiometry equipment. Bone density is measured at the forearm with GE Lunar PIXI and Norland peripheral densitometry machines in all participants. The screening test takes less than one minute. A licensed technician, trained to provide individual feedback, then spends additional time describing the screening results to each participant. The project staff screened 2,965 older adults during 77 screenings days, averaging 38 individuals per event.

During the review of the screening results with the participants, the technician helps them understand their individual bone density report and how they might proceed. Individuals with normal bone mass are encouraged to continue activities to maintain their bone. Participants with low bone mass are counseled about their calcium and vitamin D intake, level of appropriate physical activity and other behaviors that could reduce their risk of osteoporosis or fracture. Individuals at the highest risk of fracture are encouraged to talk to their doctors about whether they would be a candidate for further diagnostic tests and possibly treatment. All participants receive information about osteoporosis, bone health, and in particular, a brochure on calcium and vitamin D.

Individuals at the highest risk for fracture, and identified by the technician to be in the recommended range for treatment of osteoporosis[67] receive 60 days of free calcium with vitamin D supplements and are asked to return in 60 days for another supply of supplements. These participants are asked to take their results to their physicians for further diagnostics and perhaps medication. A nurse practitioner assists those without a primary care provider to enroll in a patient assistance program or register for care at local public health or community clinics.

Project staff return every 60 days to distribute more calcium with vitamin D supplements and talk with participants about their progress. Nearly 20% of those identified by bone density measurement to be at risk for fracture sought appropriate treatment at the time of this report. Some 176 older adults who were identified with osteoporosis accepted help in accessing the appropriate medical care or enrolling in pharmaceutical patient assistant programs. At least 171 individuals were not aware of health care benefits available to them that the project helped them access.



To assess the effectiveness of implementation strategies, project staff regularly sought feedback from partners in evaluating progress and modifying the program as needed. As a result, the program was adapted to meet cultural needs of the different ethnic communities. For example, Hispanics were more likely to come to events at their church than the senior centers, and

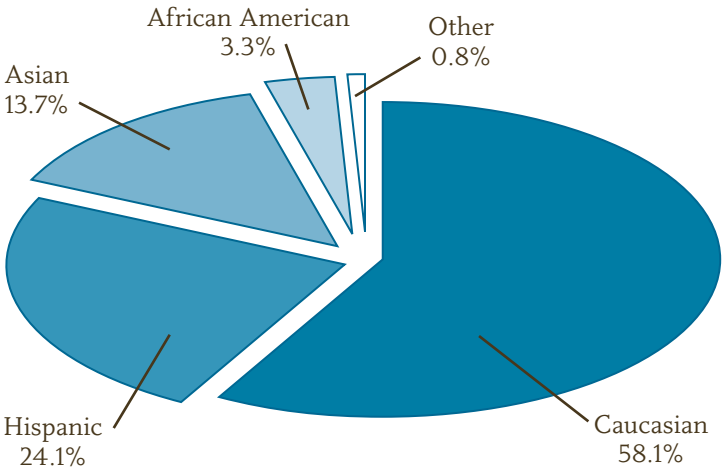
ethnic-specific gathering places were sought out. In addition, staff held four focus groups with older adults who participated in the project to understand the strengths and challenges of the program. From these interactions they learned about the best time of day for gathering various groups, and that the events needed to be both socially interactive and individualized.

Project Results

Data was collected over the first three years of the five year project which includes the project development and start-up period. Staff collected data on bone density, and demographics including self-reported age and ethnicity. Project performance data indicate that, during the first three years, 4,448 community members received education and/or screening with 2,965 individuals screened. The age of participants ranged from 55 years old to 103 years old and averaged 74 years. Twenty-two percent of the participants were 81 years of age or older; 18.8% were 76-80 years of age; 14.8% were 75-71; 25.5% were 65-70 and 18.7% were under the age of 65.

The participants closely represented the ethnicity of East and Central Contra Costa County with some under-representation of African Americans. Of 2,965 older adults screened 1,723 or 58.1% were Caucasian, 715 or 24.1% Hispanic, 405 or 13.2% Asian and 99 or 3.3% were African Americans. Twenty-three of the participants identified themselves as "other". Some participants were recent immigrants from Afghanistan, Russia and Latin America. By year three, access into more ethnically diverse communities increased the percent of non-Caucasian individuals to almost 50% of the total population screened.

Ethnicity of Participants



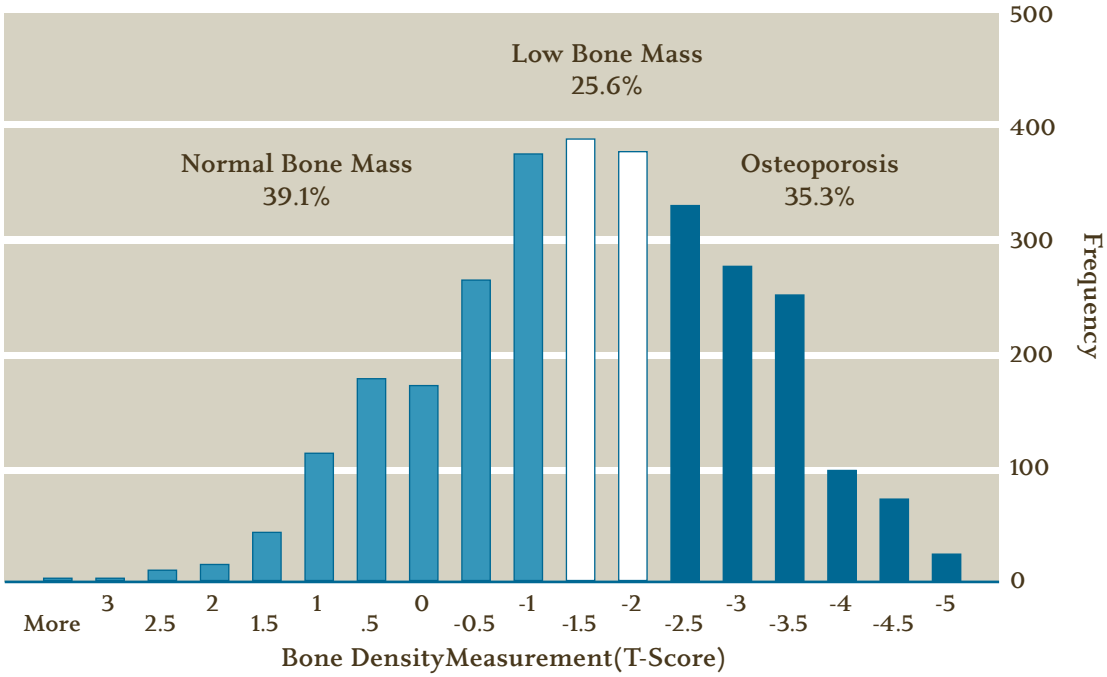
Number of participants screened = 2,965

(Populations in the cities of Central Contra Costa are 60%-80% Caucasian. Hispanics make-up 25%-33% of Central County cities, Asians 5%-9% and African Americans make up only 1%-3% of the population. In East County, Caucasians make up 43.5%-46% of the population, Hispanics comprise 32%-38.6% of the population, African Americans are 17%-18.9% of the population and Asians range from 11%-12.6% of the population).

At one community event, a small, frail woman hobbled into the room at the senior center where the project staff was conducting bone density screening. She moved haltingly and painfully, hunched over her walker and holding on carefully. She said that she had come to have her bone density tested for the very first time ever. Even after two hip replacements and one knee replacement, she had never been screened for osteoporosis. Once she had cracked her ribs while sneezing she said. Prior to her last hip operation, she had been living independently, but now lives in HUD Assisted Living Housing. The bone density test revealed that her peripheral T-score was –4.6, indicating severe osteoporosis. Armed with this new information, she had what she thought was "proof" to persuade her doctor that she must have treatment to minimize the effects of this increasingly painful condition. With a supply of calcium and vitamin D, she left with a new resolve to improve her well-being.

Screening results indicate that among this underserved group of older adults, bone health is a problem and osteoporosis has been left undetected and untreated for significant numbers. Of those screened, 1,046 or 35.3% had results indicating osteoporosis, 759 or 25.6% scored in the osteopenic range (low bone mass) and 1,160 or 39.1% had scores in the normal range.[68]

Frequency of Patients by Bone Density Measurements



N=2,965
Measurements obtained with GE LUNAR PIXI and Norland pDEXA machines

Bone density results for all participants ranged from a high T-score of 3.9 to a very low T-score of -6.97 with a standard deviation of 1.48. The mean T-score was -1.86 (indicating low bone mass) with a standard deviation of 1.47 across all those screened. As a group, Caucasians had the lowest mean bone mass T-score results (-1.95), mean results for Asians was -1.77 and for Hispanics was -1.73. African American had the highest mean results of -1.19.[69]

Percent of Participants by Bone Density Screening Results

Ethnicity	Normal Bone Mass % (T-score >-1.0)	Low Bone Mass % (T-score -1.0 to -2.5)	Osteoporosis % (T-Score <-2.5)
Caucasian (N=1,723)	36.9	25.4	37.8
Asian (N=405)	39.5	27.9	32.6
Hispanic (N=715)	42.7	24.3	33.0
African American (N=99)	53.5	29.3	17.2

Discussion

Project results demonstrate that cost effective intervention programs with appropriate screening tools and follow-up can give older adults the information and encouragement to make positive changes to improve their bone health. Of the 4,448 who came to the health promotion lectures, 68% returned for the free osteoporosis screening. Of those in the treatment range[70] over three fourths accepted a 60-day supply of calcium with vitamin D and returned three additional times during the course of twelve months for a refill on these supplements. The screening and counseling provided by project staff motivated many at-risk older adults to work with their health care providers on appropriate treatment. Nearly 20% of those identified with osteoporosis went on to consult with a health care professional to receive appropriate treatment. Of those entering treatment, half received support through patient assistance programs.

The project provided many lessons that can be used in refining and developing community-based interventions, including:

Interagency cooperation is essential in reaching underserved seniors in the targeted communities and neighborhoods. Increased participation by local seniors was directly related to the level of knowledge and cooperation built with trusted community resources.

Cost effective community interventions can reach large numbers of people in underserved communities. FORE was able to provide education, screening, follow-up and support to 4,448 individuals at a cost of approximately $25-$35 per participant.

Follow-up with participants improves adoption of bone healthy behaviors. Increasing the number of visits to each site was effective in:

- Ensuring that at-risk older adults were taking calcium and vitamin D and making other lifestyle changes
- Promoting access to treatment by those with osteoporosis
- Providing venues for social interactions that can improve overall health and well being of isolated seniors

Smaller, community group events provide better opportunities for individual follow-up than large events. Health fairs provide excellent opportunities for outreach and awareness to large numbers, but are not amenable for follow-up with those needing treatment, counseling and support.

Language and educational barriers pose significant challenges in verbal information dissemination. While FORE recruited volunteers to translate and give lectures in native languages, it was difficult to ascertain the actual information conveyed and how much

each non-native English speaking individual actually understood of the information provided. ***Bilingual health educators can be more effective in providing information and answering questions.***

Educational materials from trusted sources are tailored to the participants and their respective communities are more effective. Osteoporosis materials that are relevant to the interests and lifestyles of older adults were more effective than those aimed at a general audience. The participants took materials from trusted organizations more often than materials that were pharmaceutically branded. More materials are needed in non-English languages that explain osteoporosis and outline culturally appropriate bone health promotion.[71] ***Bone health and senior-relevant literature is inadequate.***

Access to on-going support and free or low cost preventive services and medications is critical in low income, underserved communities to improve bone health. The increase in the number of project participants taking calcium and vitamin D supplements was the result of a combination of factors:

- Education about the importance of calcium and vitamin D at lectures and screenings
- Availability of resources through donations from corporate partners Safeway Stores, Mission Pharmacal and GlaxoSmithKline
- Quarterly delivery of calcium to each site. (Maintaining the calcium subsidy was imperative given the income level of the participants - many of whom could not otherwise afford to buy calcium on their own)

Planning at the outset for project evaluation is important to effectively assess the outcomes. More evaluation is needed to demonstrate the impact of multi-strategy community-based screening on improving bone health. Projects must establish the intended outcomes and measures and implement specific strategies for collecting data before programs are implemented; otherwise, evidence of success and many lessons can be lost.

Recommendations

Ignoring the current and burgeoning problem of osteoporosis with the resulting debilitating and expensive fractures will result in staggering human and healthcare costs. Bone density testing is both a recommended and a Medicare-covered benefit for women over 65. Still, the vast majority of eligible women are not being tested, even those with significant risk factors for osteoporosis and fractures. For older women in low income, minority or rural communities and for older men with risk factors, bone density testing and osteoporosis treatment is even rarer. FORE's demonstration project illustrates the potential for cost-effective, multi-strategy community-based education and screening to improve access to treatment and overall outcomes for older adults with low bone mass or osteoporosis. Such multi-strategy approaches increase community awareness, mobilize support, provide information and tools to change behaviors and identify those requiring additional follow-up and care.

Based on research and experience, The Foundation for Osteoporosis Research and Education recommends the following programs and efforts to improve bone health and reduce independence- ending fractures among older women in underserved communities.

The recommended improvements include:

1. Implementation of community-based, multi-strategy bone health and osteoporosis interventions for underserved, low income communities. *Multi-strategy interventions combine education, bone density screening, and most importantly, the necessary follow-up once individuals are identified to be at risk for fractures. Follow-up includes referral to appropriate health services, advocacy, encouragement to engage in bone healthy behaviors, distribution of free calcium/vitamin D, and return visits for additional counseling and support. All are offered in the communities and in settings where seniors live and congregate.*

2. More integration of osteoporosis and bone health education in overall healthy aging promotions in underserved communities. *Health promotion programs can target prevention or intervention of multiple chronic diseases with messages about nutrition and physical activity that are consistent across many conditions. Such programs address the desire of people to maintain their independence and health as long as possible.*

3. Expanded implementation of bone density screening in public health and community clinics. *People in underserved communities often receive primary healthcare through nonprofit community clinics or public health facilities. In the future it is likely that more low income or uninsured older adults will seek care through these avenues.*

4. Better use of existing programs to improve access to services and free or low-cost medications for those identified who are at risk for fracture. *Older adults and particularly those in underserved communities are often unaware of or unable to understand the various benefits or aid programs available to them, such as Medicare Part D. Many patient assistance programs have trained eligibility specialists that can help people find and apply for free or low-cost benefits.*

5. Increased availability of fall prevention programs for all older adults to prevent falls that could result in debilitating, life-threatening and costly fractures. *Fall prevention programs address key factors to prevent falls including risk assessment and management programs offered by hospitals and healthcare providers. These programs address environmental problems in the home and the community, and provide balance and mobility training and nutritional and other counseling.*

6. More relevant osteoporosis education materials tailored for older adults, especially those in culturally and linguistically diverse populations. *Much of the available literature is not relevant to the elderly or older adults with disabilities. Pharmaceutically-sponsored materials, while an important tool, must be accompanied by materials from trusted, nonprofit sources. There are very few such resources in English and even fewer printed resources in other languages. Translated and culturally sensitive materials are critical in reaching diverse older adult audiences. Many ethnically diverse older adults are not literate in English or prefer resources in their own language.*

7. Evaluation of the efficacy of community-based interventions in preventing fractures and improving the bone health of underserved populations. *Intervention programs are recommended in the report from the Surgeon General. However, there is insufficient evaluation of community-based strategies for improving osteoporosis identification and intervention. Evaluation could more fully illuminate what strategies work best and with what communities.*

Leadership Opportunities to Reduce Osteoporosis and Fractures in Older Adults

Government (Federal, state and local governmental agencies and elected officials) can support comprehensive health promotion that includes education, community-based screening for older adults, and follow-up to assure access to services for all populations.

Health Care Professionals and Associations can work with and support community screening programs for older adults. They can provide education at community events and provide services for the underinsured that need treatment. They can respond to referrals from community screening as well as include bone health assessments as part of regular wellness visits, look for red flags and assess for secondary osteoporosis in those with other diseases, educate their patients about bone health and healthy lifestyles, and recognize that fractures may signal bone disease and refer patients for assessment and treatment if warranted.

Health Systems and Hospitals can implement systems-wide bone health promotion strategies, develop practices to refer patients with fractures for osteoporosis assessment, promote bone health education and practices among providers, and adopt insurance policies that cover bone health services. Local community benefit foundations or programs can fund and support community-based screening and provide follow-up services for underserved populations.

Communities and Community-Based Organizations can assist with and promote community-based screening programs in isolated and diverse populations. They can increase access to information, and support prevention and intervention programs for diverse populations that promote nutrition, physical activity and screening.

Industry can provide additional access to medications and information for uninsured or underinsured older adults. They can fund community-based screening, multi-language written materials and provide free treatments, as well as calcium and vitamin D.

In 2002, the National Osteoporosis Foundation estimated that 4,735,200 Californians have low bone mass or osteoporosis and are at risk for fracture. Improvements in these numbers are unlikely without leadership and funding from the public and private sectors including policymakers, public health and healthcare institutions, and community-based organizations and industry.

Now is the time to act. According to Surgeon General Richard Carmona, bone health is critical to the overall health of Americans. Yet "too little of what has been learned has been applied in practice." There are proven strategies that can reach even the most isolated older adults with information and support that can literally save their lives and improve their quality of life while preventing the extraordinary cost of debilitating fractures to the healthcare system.

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70 Bone density measurement of T-score -2.0 or below.

71 FORE has established an outreach committee for special populations to work with representatives from the Chinese and Spanish-speaking communities to develop language specific materials.

Foundation for Osteoporosis Research and Education

300 27th Street, Suite 103 • Oakland, CA 94612 • www.fore.org