

*Osteoporosis and  
its Effect on  
the people of  
Arizona*

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## Executive Summary

- In 1996, 14% of Arizona's population, age 50 and over was diagnosed with osteoporosis.
- Conservative estimates using 1998 Arizona hospital discharge data place the cost of osteoporosis in the state at about \$177 million. This does not include the costs after being discharged, which can include significant costs for long-term care and/or health care. It also does not account for the significant impact on quality of life. Given the projected population growth and the rising cost of health care it appears that efforts need to be directed toward prevention and early detection.
- The few prevention and education programs currently operating in the state focus on adults. Much greater effort must be directed toward youth education programs.
- Education programs for adults need to focus on the importance of screening and early detection. Programs targeting older adults should include a fall prevention component. A reduction in falls is likely to minimize the number of fractures.
- Bone mineral density screening should be mandatory for all post-menopausal women under 65 and all women over 65 regardless of the number of risk factors.
- Better data is needed about modifiable risk factors of osteoporosis. It is recommended that a question pertaining to calcium intake be added to the BRFSS, perhaps in the women's health section. It is suggested that the physical activity data gathered in the BRFSS be recoded to delineate weight-bearing from non-weight bearing exercise.

## Table of Contents

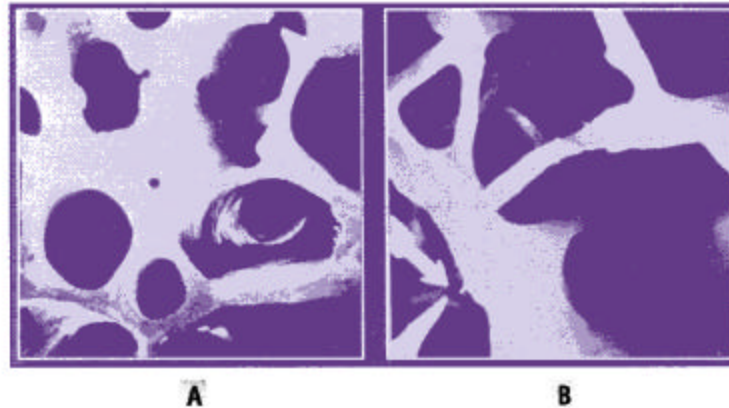
Introduction: Osteoporosis defined and its importance .....	4
Section 1. Prevalence and incidence data .....	7
Section 2. Risk of developing osteoporosis among Arizona residents .....	8
Nonmodifiable factors.....	8
Age .....	8
Gender .....	9
Ethnicity.....	10
Genetics.....	10
Modifiable factors.....	11
Calcium intake .....	11
Weight bearing exercise.....	12
Smoking .....	13
Section 3. Cost to the State - Arizona hospital discharge data (1998).....	14
Section 4. Prevention, screening and treatment of osteoporosis under Arizona's managed care..	16
Section 5. Survey of services provided statewide.....	17
Section 6. Conclusions and recommendations .....	19
References .....	21
Appendix A. Detailed analysis of 1998 Arizona hospital discharge data.....	23

**Introduction:**  
**Osteoporosis Defined and its Importance**

Osteoporosis is the technical name for a disease in which bones become extremely thin and frail.<sup>1</sup> The body typically has fully developed skeletal (bone) mass by the time an individual has reached the early twenties.<sup>2</sup> After this point, a gradual loss of bone mass (known as bone mineral density or BMD) occurs throughout the rest of natural life. There are several factors that scientists believe affect this process. These include smoking, excessive alcohol consumption, calcium and vitamin D intake, presence of appropriate exercise, and family history.

The figure on the next page is taken from the Physician's Guide to Prevention and Treatment of Osteoporosis and published by the National Osteoporosis Foundation (NOF). The figure shows the difference between a healthy bone and an osteoporotic bone. Once a person's BMD has decreased below a certain level, the risk of breaking a bone increases dramatically. Even the slightest slip or fall in a person with osteoporosis can result in fractures of the hip, spine, forearm, or wrist. These fractures decrease mobility, functionality and independence in the person suffering the fracture. In short osteoporosis can significantly degrade one's quality of life. The fact that most osteoporosis related fractures occur in the elderly also places tremendous burden on the caregivers who are often immediate family.

**FIGURE 1. MICROGRAPHS**



Micrographs of biopsy specimens of normal and osteoporotic bone. Panel A is from a 75-year-old normal woman. Panel B is from a 47-year-old woman who had multiple vertebral compression fractures. From Dempster DW, et al. *J Bone Miner Res.* 1986;1:15–21.

Osteoporosis is often undetectable because loss of bone mass typically occurs over a long period of time and is asymptomatic until fractures occur. Thus osteoporosis is referred to as “the silent disease”.

The bones most frequently broken are the hip and spine. Breaks of this type often require costly hospital stays. In 1995 approximately \$14 billion, or 1.5% of the nation’s health care budget, was spent caring for those with the osteoporosis.<sup>3</sup> Such fractures also have long lasting and debilitating effects on those afflicted. The good news is that the disease is thought to be preventable. This means that increased prevention efforts could result in both a significant cost savings and improvement in quality of life.

The purpose of this report is to better understand the scope and impact of osteoporosis in the state of Arizona. To meet this goal the report is divided into six sections. Section 1 presents the available prevalence (number of cases at any one time) and incidence (number of new cases) data at a national and state level.

Section 2 presents the factors that place individuals at risk for thinning bones. These risk factors include age, gender, ethnicity, genetics, calcium intake, weight-bearing exercise, and smoking.

This report pieces together existing data to show the estimated number of Arizonans with these risk factors. Since our current data collection vehicles for statewide health information do not currently focus on osteoporosis as a critical disease risk, the data fro Arizonans are sporadic. The report will make recommendations for a more systematic data collection vehicle for tracking osteoporosis risk and potential impact.

In Section 3 the report documents the financial impact of osteoporosis related health care to the state. Arizona hospital discharge data from 1998 is used in conjunction with empirically based attribution probabilities to arrive at a conservative estimate of the cost of the disease in Arizona. Again recommendations are made for improving methods of data collection statewide to help us better assess the impact of osteoporosis.

Section 4 reports data collected from a survey of managed care organizations to understand the range of osteoporosis prevention, screening and treatment services available to those covered under the top 12 plans in Arizona. These are compared to the physician's guide to prevention and treatment of osteoporosis published by the National Osteoporosis Foundation (NOF).

Section 5 focuses on the breadth and depth of osteoporosis services available in Arizona. Members of the Arizona Osteoporosis Coalition (AZOC) representing academia, health services, government, public health nursing and others, were contacted about their knowledge of programs currently operating in the state. Information is provided about the location and type programs running in the state. This data together with the information provided in Section 4 provides a comprehensive overview of the number and types of programs in the state targeting osteoporosis.

In Section 6 the report provides concluding recommendations based on an analysis of the previous sections.

## Section 1: Prevalence and Incidence Data

Prevalence data tells us the proportion of the population that has the disease. Incidence data indicates new cases within a period of time. It is valuable because it assesses how quickly the disease is developing among the population at risk showing the trend. Unfortunately, incidence data is very costly to collect. This is because the population at risk must be screened and followed over time to discover new cases. This may explain why there is a dearth of osteoporosis incidence data.

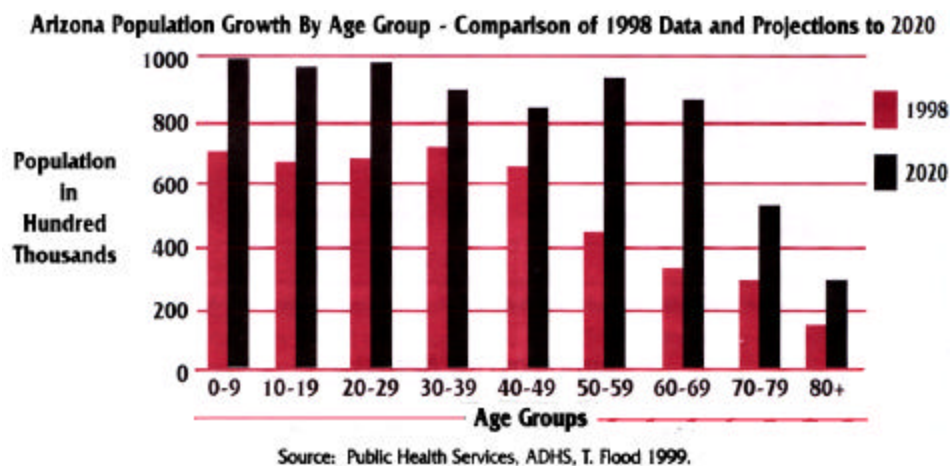
- It is estimated that in 1996 approximately 10 million Americans had osteoporosis.<sup>4</sup>
- Approximately 20 million Americans have low bone mass, placing them at risk for osteoporosis.<sup>5</sup>
- In 1996, estimates of the percent of American men and women with osteoporosis range from 12% (AK) to 15% (IA, ME, NE, NDRI, SD, WV). Comparable figures are reported for Arizona where 14% of the population age 50 and over was diagnosed with osteoporosis.<sup>6</sup>
- The National Institutes of Health (NIH) report that 50% of all women will suffer from an osteoporosis-related fracture during their lifetime.<sup>7</sup> This is equal to a woman's risk of having breast cancer *and* uterine and ovarian cancers.
- Hip fractures result in five to 20 percent higher mortality rates compared to uninjured women of the same age group.<sup>8</sup>

## Section 2: Risk of Developing Osteoporosis Among Arizona Residents

There are many risk factors that contribute to osteoporosis. Risk factors can be categorized as being either modifiable or non-modifiable. Modifiable factors are those related to your lifestyle that you can presumably change if so motivated. Non-modifiable factors are characteristics of the individual that cannot usually be changed. A brief explanation of each risk factor and its impact in Arizona is included below.

### *Non-Modifiable Factors*

**Age** An individual's risk for developing osteoporosis increases with age. The increased risk is most dramatic after menopause for women and past age 50 for men.

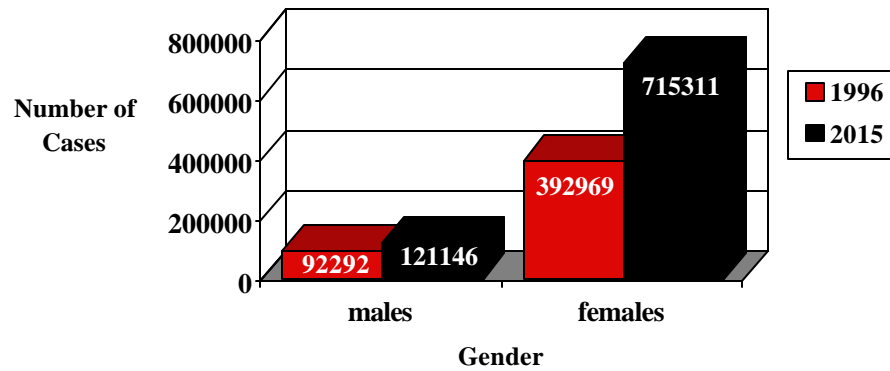


- From the above figure it can be seen that Arizona's elderly population is expected to rise significantly in the next twenty years. Projections have the population in Arizona between 50 and 59 years doubling and between 60 and 69 years almost tripling. This means that about two to three times as many people as there are now will be at risk for osteoporosis in 2020.

Gender

Women possess a significantly greater risk of developing osteoporosis than men.

**Projected Number of Cases of Osteoporosis by Gender in Arizona**

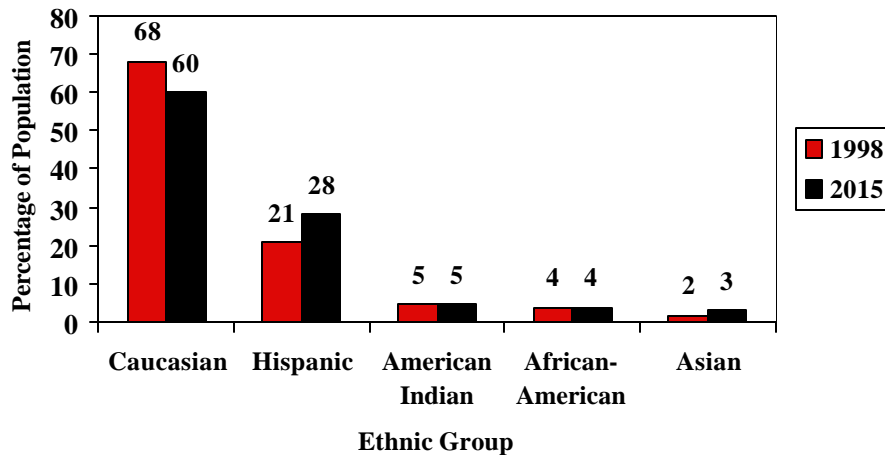


- The number of women, aged 50 and over, who have osteoporosis or are at risk for developing the disease will increase at least an estimated 80% in the next ten years.<sup>9</sup>
- The number of men, aged 50 and over, who have osteoporosis or are at risk for developing the disease will increase at least an estimated 30% in the next ten years.<sup>10</sup>

## Ethnicity

The primary risk group is women of Caucasian/Northern European descent followed by Asian American, then Hispanic populations. Recent data, however, is showing that even the group of women considered to be at lowest risk, African American, is still experiencing alarming rates of osteoporosis incidence.

**Projections of Ethnic Breakdown for Arizona**



- The U.S. Census Bureau provides the data above. Although the proportion of Hispanics is expected to increase the largest proportion of Arizona's population in 2015 is expected to be Caucasian. Thus the majority of Arizona's population is and will be in the highest risk category for osteoporosis.

## Genetics

Genetic heritage is a strong determinant of bone mass accumulation during youth.<sup>11</sup> Thin women or those with small frames have a greater risk for developing the disease.<sup>12</sup> While genetics is a strong determinant of the accumulation of bone mass it is not the only determinant. Bone mass can be significantly affected by changes in lifestyle factors too. These are now discussed.

### *Modifiable Factors*

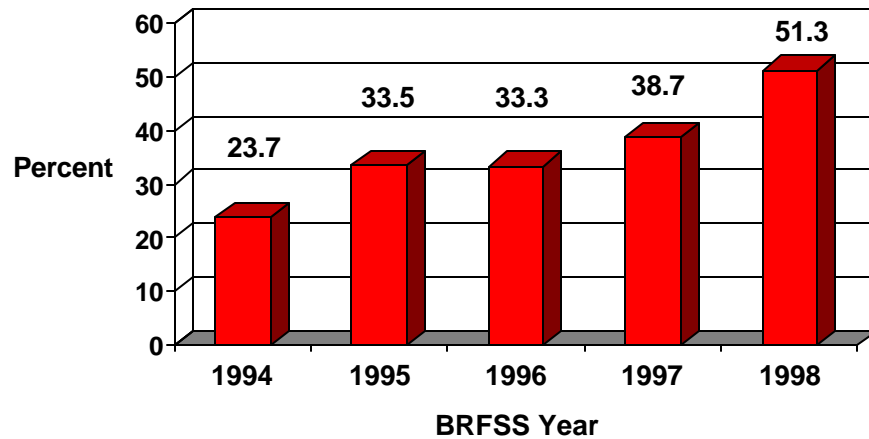
Calcium Intake A strong relationship exists between diet/ calcium intake and risk for osteoporosis. People who do not consume calcium-rich foods during childhood, adolescence and early adulthood are at much greater risk for developing the disease. This is because calcium intake affects bone mass development. The average woman acquires 98% of skeletal mass by approximately age 20.<sup>13</sup> National surveys show that young girls and women consume less than half the recommended amount of calcium needed to grow and maintain healthy bones.<sup>14</sup>

- In Arizona, only 22.5% of the population in 1995 consumed greater than or equal to the United States Recommended Daily Allowance (USRDA) of calcium.<sup>15</sup>
- Within the 45-54 year old age group, nearly one third of Arizonans consumed only 33-65% of the USRDA.<sup>16</sup>

WBE

Weight Bearing Exercise (WBE) during childhood and adolescence contributes to obtaining peak bone mass. “Weight-bearing exercise (in which bones and muscles work against gravity as feet and legs bear the body’s weight) includes walking, jogging, stair climbing, dancing, and tennis. Weight lifting improves muscle mass and bone strength”.<sup>17</sup>

**Percentage of Arizonan's Reporting that they did not Participate in any Physical Activity or Exercise in the Past Month**



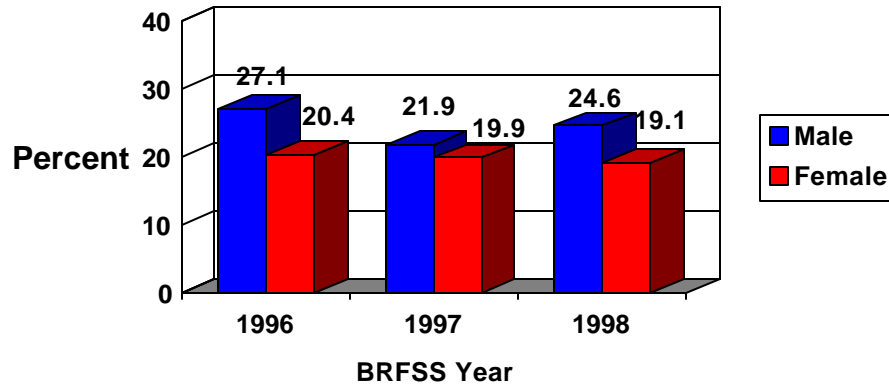
- In 1998 Arizona's population was the most sedentary in the nation. About 49% of Arizona's adult population, over 18 years old, was physically active. The alarming trend shown in the figure above holds across age and gender.
- Dr. Timothy Flood, medical director of the Arizona Department of Health Services Bureau of Public Health Statistics declared a statewide "epidemic of sedentary lifestyle".<sup>18</sup>

## Smoking

Studies have shown that people who smoke tend to have a lower bone density and increased risk of hip and wrist fracture than their non-smoking counterparts.

- A person who has ever smoked has as much as a 50% greater risk of developing a hip fracture due to a decrease in bone density related to smoking than those who have never smoked.<sup>19</sup>

**Percentage of Males and Females Indicating that they Currently Smoke**



- Smoking rates differ across age groups. There are slightly larger percentages of younger smokers than older smokers.
- The data suggests that a significant percentage of Arizonans are self-reported smokers and at increased risk for osteoporosis.

### Section 3: Cost to the State - Arizona Hospital Discharge Data (1998)

This section of the report uses 1998 Arizona Hospital discharge data to estimate the cost of Osteoporosis to the state of Arizona. Hospital discharge records include data about a patient's diagnoses (often more than one), medical procedures/ laboratory tests performed, cost of treatment to the patient, expected source of payment, and demographic data. Diagnoses are coded using the International Classification of Diseases, or ICD9 codes. The difficulty with using these codes is that they often do not represent the true reason or underlying cause for the visit. For example, consider an elderly woman presenting with a hip fracture. If a bone mineral density screening is done it may uncover that the underlying cause for the fracture was brittle bones due to osteoporosis. However, if the bone mineral density screening is not completed then the visit may not be coded as osteoporosis. The result is that the cost attributable to osteoporosis is underestimated.

Using the Delphi technique an expert physician panel developed osteoporosis attribution probabilities that are a consensus about the percentage of cases coded as fractures that could be "attributed" to osteoporosis. The probabilities vary as a function of age, ethnicity, and fracture type (e.g., hip, spine, forearm, wrist). The attribution probabilities can be found in Appendix A.

The attribution probabilities were applied to the 1998 Arizona Hospital Discharge Data base. Tables detailing the cost as a function of gender, age, and fracture type are located on Appendix A.

- The total cost attributable to osteoporosis in 1998 alone is estimated at \$177 million.
- The estimate is conservative, as it does not include some cases for which attribution probabilities could not be applied and does not include costs after being discharged

- 60% (\$103 million) of the cost represents the age range of 65 to 84.
- The amount covered by Medicare varies as a function of fracture type and ranges between 40% and 60%. These are denoted in parentheses under total cost in each table in Appendix A.

Section 4: Prevention, Screening and Treatment of Osteoporosis under Arizona's  
Managed Care

The purpose of this section of the report is to examine the types of osteoporosis-related services provided by Arizona's Health Care Providers. In 1999 the Healthy Women for a Lifetime coalition completed a survey of the 12 major health care providers in Arizona.<sup>20</sup> The survey asked about prevention and treatment of several postmenopausal women's health issues such as breast and cervical cancer, heart disease, depression, and osteoporosis.

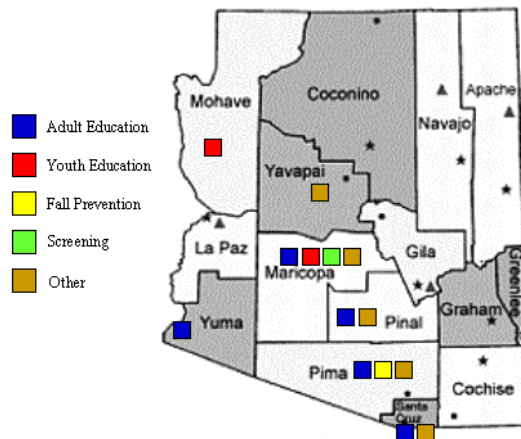
The table below compares the survey findings to the recommendations in the Physician Guide published by the National Osteoporosis Foundation.

Recommendations in NOF Physician Guide	Results from survey of Arizona health care providers
<p>Counsel all women on</p> <ul style="list-style-type: none"> <li>• risk factors for osteoporosis</li> <li>• adequate calcium intake</li> <li>• weight-bearing exercise</li> <li>• avoiding tobacco and alcohol use</li> </ul>	<p>Eight of the 12 plans have limited education programs for osteoporosis prevention.</p>
<p>Bone mineral density screening should be done:</p> <ul style="list-style-type: none"> <li>• all postmenopausal women under 65 who have one or more risk factors</li> <li>• all women over 65, regardless of risk factors</li> </ul>	<p>Bone mineral density screenings for women over 40 are available with a range of restrictions in all plans. Screenings are provided when</p> <ul style="list-style-type: none"> <li>• the Primary Care Physician makes a referral or</li> <li>• prior authorization criteria are met, after requiring "medical indications". Women with risk factors may still be prevented from receiving screenings in some plans when the PCP does not consider it medically indicated.</li> </ul>
<p>FDA approved pharmacologic options for osteoporosis prevention and/or treatment are Hormone Replacement Therapy, alendronate, calcitonin, and raloxifene</p>	<p>Most plans provide coverage for most estrogen-based medications, but the other drugs of choice are sporadically covered. This limits the options for women in some plans who have medical reasons to avoid Hormone Replacement Therapy.</p>

## Section 5: Survey of Services Provided Statewide

The purpose of this section is to gain an understanding of the number and types of osteoporosis related programs and services provided by organizations and agencies other than the health plans examined in Section 3. Each of the 250 members of the Arizona Osteoporosis Coalition was contacted about their knowledge of osteoporosis programs in the state. The Coalition consists of members in health service/delivery and education, public health nursing, private health-related associations, state legislators and academic institutions. A one-page survey was mailed to members representing all 15 counties asking them to document any osteoporosis related programs of which they were aware.

- 40 of the 100 responders provided information about osteoporosis related programs and services



- Adult education activities are concentrated in Maricopa, Pima, Pinal, Santa Cruz, and Yuma counties primarily through the Bone Builders Program.

- There are limited numbers of youth education, fall prevention, and screening activities.

Note: An extensive inventory of educational programs and osteoporosis services in the state is being prepared in a Resource Directory, available in the fall of 2000 through ADHS and AZOC.

## Section 6: Conclusions and Recommendations

- Conservative estimates using hospital discharge data place the cost of osteoporosis in 1998 at about \$177 million. This does not include the costs after being discharged, which can include significant costs for long-term care and/or health care. It also does not account for the significant impact on quality of life. Given the projected population growth and the rising cost of health care it appears that efforts need to be directed toward prevention and early detection.
- The few prevention and education programs currently operating in the state focus on adults. Much greater effort must be directed toward youth education programs. This recommendation is based on the following fact:
  - Maximum bone density is reached by twenty years of age.
  - Many of the modifiable behaviors that affect the accumulation of bone mass are shaped during adolescents (e.g., smoking, weight-bearing exercise, calcium intake).
  - Survey results of members of the Arizona Osteoporosis Coalition indicate that there is only one youth education program in Mohave county.
- Education programs for adults need to focus on the importance of screening and early detection. Programs targeting older adults should include a fall prevention component. A reduction in falls is likely to minimize the number of fractures.<sup>21</sup>
- Bone mineral density screening should be mandatory for all post-menopausal women under 65 and all women over 65 regardless of the number of risk factors. The National Osteoporosis Foundation (NOF) has already made this recommendation.<sup>22</sup> However, in many health plans women will only receive screening if referred by the primary care physician. Early detection through routine screening and appropriate subsequent intervention will significantly decrease the number of fractures.

Better data are needed about modifiable risk factors of osteoporosis. It is recommended that a series of questions pertaining to calcium intake be added to the BRFSS, perhaps in the women's health section. The BRFSS does collect data about the types of physical activity in which people engage. It is suggested that this data be recoded to delineate weight-bearing from non-weight bearing exercise.

## References

- <sup>1</sup> Osteoporosis Website. National Osteoporosis Foundation, URL: <http://www.nof.org>
- <sup>2</sup> Osteoporosis Overview. National Institutes of Health, Osteoporosis and Related Bone Diseases~National Resource Center. Washington, D.C. 1999
- <sup>3</sup> Medical Expenditures for the Treatment of Osteoporotic Fractures in the United States in 1995: Report from the National Osteoporosis Foundation. Ray, Chan, et al. Journal of Bone and Mineral Research vol. 12, No. 1 1997
- <sup>4</sup> 1996 and 2015 Osteoporosis Prevalence Figures, State-by-State Report. National Osteoporosis Foundation, 1/1997 (p 1)
- <sup>5</sup> *ibid.*
- <sup>6</sup> 1996 and 2015 Osteoporosis Prevalence Figures, State-by-State Report. National Osteoporosis Foundation, 1/1997 (p 5)
- <sup>7</sup> Internet page at URL: <http://www.nrc@nof.org>. National Institute of Arthritis and Musculoskeletal and Skin Diseases. Washington, D.C.: National Institutes of Health. National Resource Center for Osteoporosis and Related bone Diseases, 1997.
- <sup>8</sup> *ibid.*
- <sup>9</sup> 1996 and 2015 Osteoporosis Prevalence Figures, State-by-State Report. National Osteoporosis Foundation, 1/1997 (p 5)
- <sup>10</sup> *ibid.* (p 11)
- <sup>11</sup> Genetic Studies in Osteoporosis. M Shiraki. Nippon Rinsho 56 (6): 1374-81 6/98
- <sup>12</sup> Osteoporosis Website. National Osteoporosis Foundation, URL: <http://www.nof.org>
- <sup>13</sup> *ibid.*
- <sup>14</sup> *ibid.*
- <sup>15</sup> Dietary Profile of the State: Nutrition Intake and Fruit and Vegetable Consumption. Taren, D. Arizona Department of Health Services and the University of Arizona College of Public Health (table III.B.1) 1995
- <sup>16</sup> *ibid* (table III.B.3)
- <sup>17</sup> Physician's Guide to Prevention and Treatment of Osteoporosis. National Osteoporosis Foundation. (p. 17) Excerpta Medica, Inc: Belle Meade, NJ 1999
- <sup>18</sup> Arizona's Health Paradox: We're Sedentary Yet Slim. The Arizona Daily Star, p. 1a January, 28, 2000

<sup>19</sup> The Effect of Cigarette Smoking on the Development of Osteoporosis and Related Fractures. Molly T. Vogt, Ph.D. Medscape Orthopaedics and Sports Medicine 3(5) 1999

<sup>20</sup> Healthy Women for a Lifetime: Summary of Managed Care Organization Survey Results. Larkey and Keller. Arizona Cancer Center/Arizona Prevention Center. University of Arizona. Draft 1/20/99.

<sup>21</sup> Osteoporosis International. National Osteoporosis Foundation, Supplement 4, 1998

<sup>22</sup> Physician's Guide to Prevention and Treatment of Osteoporosis. National Osteoporosis Foundation. (p 1) Excerpta Medica, Inc: Belle Meade, NJ 1999

Appendix A – Detailed Analysis of 1998 Arizona Hospital Discharge Data

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## OSTEOPOROSIS ATTRIBUTION PROBABILITIES

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Sex	Race	Fracture Site	Median attribution probability** by Age group		
			45-64 years	64-84 years	85+ years
Women	White	Hip	0.80	0.90	0.95
		Spine	0.80	0.90	0.95
		Forearm/wrist	0.70	0.70	0.80
		Other	0.45	0.50	0.60
		Hip	0.65	0.80	0.95
		Spine	0.65	0.80	0.90
		Forearm/wrist	0.55	0.60	0.70
		Other	0.35	0.40	0.45
	Other *	Hip	0.75	0.85	0.95
		Spine	0.75	0.85	0.95
		Forearm/wrist	0.60	0.70	0.70
		Other	0.35	0.40	0.45
Men	White	Hip	0.60	0.80	0.85
		Spine	0.70	0.90	0.90
		Forearm/wrist	0.40	0.45	0.45
		Other	0.15	0.30	0.45
	Black	Hip	0.30	0.65	0.75
		Spine	0.55	0.75	0.85
		Forearm/wrist	0.20	0.30	0.35
		Other	0.15	0.15	0.25
	Other *	Hip	0.55	0.75	0.85
		Spine	0.60	0.75	0.85
		Forearm/wrist	0.30	0.35	0.40
		Other	0.15	0.20	0.30

Notes:

\* Includes Asian/Pacific Islanders, American Indians, and other races

\*\* Attribution probabilities serve as adjustment factors to the total number of events. For example, if there were 1,000 spine fractures in white women age 45-64, the probability of 0.80 would be multiplied by 1,000 to yield 800 (80%) cases that were due to underlying osteoporosis. Intuitively, attribution probabilities increase with age.

Attribution probabilities were derived from an expert physician panel with broad experience treating and diagnosing osteoporosis fractures based on a three-round Delphi process. See Melton et al., 1997 for methodological details.

Source: Tables 2, 3 and 4 from Melton, LJ, et al., "Fractures Attributable to Osteoporosis: Report from the National Osteoporosis Foundation," *Journal of Bone and Mineral Research* 12(1): 16-23. 1997.

Only one type of osteoporosis related diagnosis	14,739
Two different types of osteoporosis related diagnoses	1,168
Three different types of osteoporosis related diagnoses	94
Four different types of osteoporosis related diagnoses	1
Total Cases	16,002

Note: Since discharge records include up to nine diagnoses for any individual patient, methods were used to ensure that each patient was counted only once.

Only one type of osteoporosis related diagnoses

Hip	6,609
Spine/Vertebrae	2,528
Forearm/Wrist	474
Other	5,128
Total	14,739

Number of Cases

Hip

AGE	45-64	65-84	85+	Total
Women				Total
White	175	2,017	1,385	3,577
Black	4	9	3	16
Other	38	368	243	649
Sub Total	217	2,394	1,631	4,242
Men				
White	96	806	335	1,237
Black	2	7	1	10
Other	25	150	79	254
Sub Total	123	963	415	1,501
Total	340	3,357	2,046	5,743

Spine

AGE	45-64	65-84	85+	Total
Women				Total
White	133	818	371	1,322
Black	--	8	3	11
Other	29	93	32	154
Sub Total	162	919	406	1,487
Men				
White	109	429	110	648
Black	2	--	--	2
Other	23	48	11	82
Sub Total	134	477	121	732
Total	296	1,396	527	2,219

Number of Cases

Forearm and Wrist

AGE	45-64	65-84	85+	Total
Women				
White	46	106	30	182
Black	--	--	--	--
Other	11	19	7	37
Sub Total	57	125	37	219
Men				
White	25	19	6	50
Black	1	--	--	1
Other	10	2	1	13
Sub Total	36	21	7	64
Total	93	146	44	283

Other – Number of Cases

AGE	45-64	65-84	85+	Total
Women				
White	324	688	285	1,297
Black	7	8	--	15
Other	60	98	26	184
Sub Total	391	794	311	1,496
Men				
White	117	192	62	371
Black	5	--	--	5
Other	60	32	12	104
Sub Total	182	224	74	480
Total	573	1018	385	1,976

Total Cost

Hip

AGE	45-64	65-84	85+	
Women				Total
White	3,098,464	37,087,324	24,399,248	64,585,036
Black	140,650	154,468	54,882	350,000
Other	579,437	6,426,305	3,574,763	10,580,505
Sub Total	3,818,551	43,668,097	28,028,893	75,515,541
Men				
White	1,742,847	16,683,261	5,951,149	24,377,257
Black	14,283	108,329	15,217	137,829
Other	1,109,864	2,930,462	1,347,143	5,387,469
Sub Total	2,866,994	19,722,052	7,313,509	29,902,555
Total	6,685,545	63,390,149	35,342,402	105,418,096 (61,103,040-58%)

Spine

AGE	45-64	65-84	85+	
Women				Total
White	3,006,792	11,856,397	4,175,275	19,038,464
Black	*	59,315	25,547	84,862
Other	816,945	1,178,354	328,052	2,323,351
Sub Total	3,823,737	13,094,066	4,528,874	21,446,677
Men				
White	2,876,370	7,383,984	1,159,521	11,419,875
Black	59,232	*	*	59,232
Other	783,152	1,091,266	225,364	2,099,782
Sub Total	3,718,754	8,475,250	1,384,885	13,578,889
Total	7,542,491	21,569,316	5,913,759	35,025,566 (20,102,084-57%)

\* Not enough cases to apply attribution probabilities

Total Cost

Forearm and Wrist

AGE	45-64	65-84	85+	
Women				Total
White	635,056	1,178,665	365,578	2,197,299
Black	*	*	*	-
Other	118,544	176,974	59,332	354,850
Sub Total	771,600	1,355,639	424,910	2,552,149
Men				
White	466,072	189,696	68,151	723,919
Black	13,142	*	*	13,142
Other	121,351	21,291	5,394	148,036
Sub Total	600,565	210,987	73,545	885,097
Total	1,372,165	1,566,626	498,455	3,437,246 (1,388,635-40%)

\* Not enough cases to apply attribution probabilities

Other

AGE	45-64	65-84	85+	
Women				Total
White	6,343,755	10,754,360	3,875,778	20,973,893
Black	136,358	114,270	*	250,628
Other	1,189,158	1,483,527	275,297	2,947,982
Sub Total	7,669,271	12,352,157	4,151,075	24,172,503
Men				
White	2,428,156	3,472,559	755,708	6,656,423
Black	93,061	*	*	93,061
Other	1,666,929	687,825	106,509	2,461,263
Sub Total	4,188,146	4,160,384	862,217	9,210,747
Total	11,857,417	16,512,541	5,013,292	33,383,250 (1,3246,406-40%)

\* Not enough cases to apply attribution probabilities.

Average Cost Per Case

Hip

AGE	45-64	65-84	85+
<b>Women</b>			
White	17,706	18,387	17,617
Black	35,162	17,163	18,294
Other	15,248	17,463	14,711
<b>Men</b>			
White	18,154	20,699	17,765
Black	7,191	15,476	15,217
Other	44,395	19,536	17,052

Spine

AGE	45-64	65-84	85+
<b>Women</b>			
White	22,607	14,494	11,254
Black	*	7,414	8,516
Other	28,171	18,477	10,252
<b>Men</b>			
White	26,389	17,212	10,541
Black	29,616	*	*
Other	34,050	22,735	20,487

\* Not enough cases to apply attribution probabilities

Average Cost Per Case

Forearm and Wrist

AGE	45-64	65-84	85+
<b>Women</b>			
White	13,806	11,119	12,186
Black	*	*	*
Other	10,777	9,314	8,476
<b>Men</b>			
White	18,643	9,984	11,358
Black	13,142	*	*
Other	12,135	10,646	5,394

\* Not enough cases to apply attribution probabilities

Other

AGE	45-64	65-84	85+
<b>Women</b>			
White	19,579	15,631	13,599
Black	19,480	14,284	*
Other	19,819	15,138	10,588
<b>Men</b>			
White	20,753	18,086	12,189
Black	18,612	*	*
Other	27,758	21,495	8,876

\* Not enough cases to apply attribution probabilities