Osteoporosis prevention for women 25 years and younger: knowledge beliefs and practices of providers at Montana Title X clinics

Nancy Mulla

The University of Montana

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OSTEOPOROSIS PREVENTION FOR WOMEN 25 YEARS AND YOUNGER: KNOWLEDGE, BELIEFS AND PRACTICES OF PROVIDERS AT MONTANA TITLE X CLINICS

by
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Presented in partial fulfillment of the requirements for the degree of Master of Science The University of Montana Missoula, Montana December 17, 1999

Approved by:

Chairperson

Dean, Graduate School

12-30-99
Thesis Abstract

Mulla, Nancy, M.S., December 1999

Health and Human Performance

Osteoporosis Prevention for Women 25 Years and Younger: Knowledge, Beliefs and Practices of Providers at Montana Title X Clinics

Committee Chair: K. Ann Sondag, Ph.D.

The purpose of this study was to conduct an assessment of health care providers' knowledge, beliefs and practices regarding osteoporosis prevention for women 25 years and younger. In addition, barriers to providing osteoporosis prevention information were explored. A questionnaire was distributed to providers at Montana's Title X clinics; follow up telephone interviews were conducted for further insight on providers' needs and clarification of questionnaire data.

A combination of descriptive statistics, chi square tests and discriminant analyses were run on questionnaire data; follow up telephone interview data were qualitatively analyzed. Results indicated most providers believe that osteoporosis prevention is important and are well informed about the disease. Inadequate calcium intake, lack of exercise, smoking, and the use of Depo-Provera® as contraception were viewed as the most important risk factors when addressing the development of osteoporosis and when screening for osteoporosis risk. No specific assessment tool for osteoporosis risk was utilized, and inconsistencies in screening practices were found. Verbal instruction was used most often when providing osteoporosis education, and lack of written materials was perceived as a barrier to providing that information. Other perceived barriers to providing information included patients' lack of receptiveness to osteoporosis information, the lack of professional education for registered nurses, and not enough time with patients. However, no statistical significance was found between the number of patients seen per day and providers' perception of time as a barrier.

The results of this study assisted the Montana Department of Health and Human Services in understanding the needs of providers regarding osteoporosis prevention. Development of educational materials and services will improve providers' prevention practices at Montana's Title X clinics. Ultimately, improving osteoporosis prevention efforts among health care providers will help reduce the number of women who suffer from this incurable disease.

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I wish to express my sincere gratitude to all the wonderful people whose support made this experience possible:

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To my life partner, Sean, for his enduring love, support and friendship. No words can express my appreciation.

Finally, the most heartfelt thanks to my boys, Kadin and Liam, for giving me the true meaning of life and love.
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CHAPTER I
Introduction to the Study

Osteoporosis affects 28 million Americans, 80% of whom are women. An estimated $14 billion per year is spent on treatment, which equates to $38 million spent each day. Predictions are that up to 41 million people will be affected by 2015 if this disease is not addressed (Osteoporosis and Related Bone Diseases, National Resource Center (ORBD~NRC), 1999).

There is no cure for osteoporosis. And, while the incidence of osteoporosis could be greatly reduced if prevention efforts were focused on obtaining peak bone mass in earlier years, most prevention efforts have been devoted to decreasing bone loss after the attainment of peak bone density, such as in menopause. (Cerrato, 1992; Cadogan, Eastell, Jones & Barker, 1997).

The importance of focusing prevention efforts on young women is evident- it is estimated that even a 5% increase in bone mass during adolescence and young adulthood can reduce the risk of osteoporosis by 40% (Bachrach, 1996). Peak bone mass can be increased by reducing risk factors associated with osteoporosis such as smoking, excessive use of alcohol, inadequate diet and eating disorders, lack of exercise, amenorrhea, and calcium and vitamin D deficiency. The use of Depo-Provera® for contraception also has been associated with decreased bone density in young women (Cromer et al, 1996). Efforts to reduce these risk factors should be targeted toward adolescents and
young women who are in their prime years for attaining and maintaining optimal bone density (Katzman, 1991).

Purpose of the Study

There is a lack of information on health care providers' prevention efforts for women 25 years and younger. Most research reviewed on providers regarding osteoporosis has focused exclusively on postmenopausal women (Grisso, Baum & Turner, 1990; Willhite, 1998; Suarez-Almazor, Homik, Messina & Davis, 1997). More information is needed regarding providers' knowledge, beliefs and practices in relationship to osteoporosis prevention strategies for young women. Therefore, the purpose of this study was to conduct an assessment of health care providers' knowledge, beliefs and practices regarding osteoporosis prevention for women 25 years and younger. In addition, barriers to osteoporosis prevention and education were explored.

Research Questions

1. What do health care providers know about osteoporosis prevention for women 25 years and younger?
2. What are health care providers' beliefs regarding osteoporosis prevention for women 25 years and younger?
3. What are health care providers' current practices regarding osteoporosis prevention for women 25 years and younger?
4. What do health care providers perceive to be barriers to disseminating osteoporosis prevention information and education?
Significance of the Study

Information from this study provides the Montana Department of Public Health and Human Services (DPHHS) Women's Health Section (WHS) with an understanding of providers' knowledge, beliefs and practices regarding osteoporosis prevention for women 25 years and younger. Barriers to disseminating osteoporosis prevention information and education have been identified, as well as prevention strategies that may be used by health care providers at Montana Title X Family Planning clinics. Ultimately, improving osteoporosis prevention efforts of health care providers will help reduce the number of women who suffer from this incurable disease.

Delimitations

The following were delimitations of this study:

1. The study was delimited to health care providers employed at Title X clinics in Montana.
2. Data were collected via mailed questionnaires and telephone interviews.
3. Data were restricted to respondents' self report on questionnaires and during telephone interviews.
Limitations

The following limitations existed in this study:

1. Response was limited to the voluntary action of participants filling out the questionnaire.

2. Telephone interview data were limited by what they were willing and able to share.

3. Data were limited to the participants' accuracy and honesty when filling out questionnaires and when participating in telephone interviews.

Definition of Terms

**Amenorrhea:** The abnormal absence or suppression of the menstrual discharge (Webster's, 1965).

**Anovulation:** The absence of production and discharge of an ovum (egg) during the female reproductive cycle (Taber's, 1989).

**Beliefs:** A state or habit of mind in which trust or confidence is placed in some person or thing (Webster's, 1965).

**Calcitonin:** A hormone from the thyroid gland important in bone and calcium metabolism (Taber's, 1989).

**Depo-Provera:** The pharmaceutical name for Depot Medroxyprogesterone Acetate, an injected form of contraception used by many young women (Cromer et al, 1996).
Glucocorticoid: A general classification of adrenal cortical hormones that are primarily active in protecting against stress and in affecting protein and carbohydrate metabolism (Taber's, 1989).

Health Care Provider: For the purpose of this study, any person that may provide counseling, education, treatment or information regarding osteoporosis prevention to non-pregnant clients 25 years or younger at a Title X clinic or affiliated satellite clinic.

Hyperparathyroidism: Condition due to increased activity of the parathyroid, which regulates calcium and phosphorus metabolism (Taber's, 1989).

Hyperprolactinemia: Excess secretion of prolactin thought to be due to hypothalamic-pituitary dysfunction, which is usually associated with amenorrhea (Taber's, 1989).

Norplant: A steroid medication implanted under the skin and time released into the body to prevent pregnancy (Taber's, 1989).

Oral contraceptive: Colloquially termed "the pill," an oral medication consisting of chemicals similar to natural hormones (estrogen and progesterone) that prevents conception (Taber's, 1989).

Osteoblast: A cell of mesodermal origin that is concerned with the formation of bone (Taber's, 1989).

Young Women: For the purpose of this study, all non-pregnant women 25 years or younger.
CHAPTER II
Review of Literature

Osteoporosis, or “porous bone,” is defined by the National Osteoporosis Foundation as “a disease characterized by low bone mass and structural deterioration of bone tissue, leading to bone fragility and an increased susceptibility to fractures of the hip, spine, and wrist.” It is also defined as approximately 25% of bone loss compared to a healthy young adult or, on a bone density test, 2.5 standard deviations below normal (National Osteoporosis Foundation (NOF), 1999).

Osteoporosis affects 28 million Americans, 80% of whom are women. One out of every two women will have an osteoporosis-related fracture in her lifetime (NOF, 1999). Although men are also affected, for the purpose of this study, review of literature was limited to information relating to women, and the focus of the review was on young women, 25 years and younger.

An estimated $14 billion per year is spent on osteoporosis and related fractures, which equates to $38 million spent each day. If this issue is not addressed, it is predicted that up to 41 million people will be affected by 2015 (Osteoporosis and Related Bone Diseases, National Resource Center (ORBD~NRC), 1999).

Osteoporosis is often referred to as the "silent disease" because bone loss occurs without symptoms, and may go undetected until a bone fractures. It can strike at any age, but those most affected are women over 45 years of age.
Menopausal women are at greatest risk because bone loss is accelerated by decreased estrogen levels (NOF, 1999). Most literature focuses on treatment and prevention of osteoporosis for postmenopausal women. However, studies show that acquiring optimal peak bone mass is crucial in reducing the risk of osteoporosis-related fractures later in life (Cadogan, Eastell, Jones & Barker, 1997). Peak bone mass is acquired before the age of thirty, with the majority of bone density being obtained during the first two decades of life (NOF, 1999). During these important years, the increase of bone mass can make a significant difference; even a 5% increase can reduce the risk of osteoporosis by 40% (Bachrach, 1996). If peak bone mass is obtained in earlier years, one has a "jump start" on preventing this disease, and minimizes the threat of postmenopausal problems (Cerrato, 1992). Osteoporosis is more likely to develop if optimal bone mass is not acquired during adolescent years (ORBD~NRC, 1999). The focus of prevention, therefore, should be on children, adolescents and young women who are in their prime years for attaining and maintaining optimal bone density (Katzman, 1991).

Bone and Peak Bone Mass

Bone is a living, complex tissue, made up of mostly collagen and calcium phosphate. These two components make bone both strong and flexible. Over 99% of the body's calcium is in the bones and teeth (ORBD~NRC, 1999). Bone tissue development - called remodeling - occurs throughout the life cycle.
Formation occurs when new bone is added and resorption occurs when old bone is removed. Before age 30, formation occurs faster than resorption, with the majority of bone mass accumulating during the first twenty years (NOF, 1999; Drugay, 1997; NIH, 1994). Infants and children have steady but slow bone growth, until puberty. At this time and through adolescence, up to 60% of total bone mass is acquired (Katzman, 1991). By age 18, skeletal growth is nearly complete, and only a minor (but important) percentage of bone is accumulated between ages 18 and 30 (NIH, 1999). After age 30, bone resorption begins to exceed formation. This decline is slow and steady until menopause, when at this time bone density can be rapidly lost, especially during the first few years after menopause. Osteoporosis is more likely to develop if optimal bone mass is not attained (ORBD~NRC, 1999). Peak bone mass is affected by many factors (NOF, 1999).

**Risk Factors of Osteoporosis**

Many factors can interfere with attaining and maintaining peak bone mass, increasing risk for osteoporosis. While factors alone cannot predict actual fracture risk, they are guidelines for discussion of these issues. Some factors can be controlled; others cannot. Multiple risk factors increase the likelihood of developing osteoporosis (Drugay, 1997). All risk factors are important in osteoporosis prevention.
Gender, Body Size, and Age

Women are at higher risk for developing osteoporosis. Bone is lost more rapidly when estrogen levels are decreased, such as during menopause and with menstrual irregularities. Women also have less bone tissue than men (ORBD-NRC, 1999). A small, thin-boned woman is at higher risk. Risk increases with age, as bone becomes less dense and weaker (NOF, 1999).

Ethnicity

Caucasian and Asian women are at highest risk for osteoporosis. Hispanic and African-American women have lower risk, but are still considered to be at significant risk (NOF, 1999).

Genetics and Family History

Genetics and family history affect osteoporosis risk. Studies show that bone density in young women is strongly influenced by genetic factors (Matkovic et al., 1990). Sixty to 80% of bone mass is attributed to genetic predetermination. Women with parents or grandparents who have osteoporosis are considered at higher risk (ORBD-NRC).

Alcohol use

Excessive use of alcohol directly affects bone formation. At high blood alcohol concentrations, alcohol is toxic to osteoblasts, the cells that make new bone (ORBD-NRC NEWS, 1995). A study with a group of long-term alcoholics showed a decrease in bone formation during alcohol intoxication; bone formation
did return to normal after the cessation of drinking (Griffiths, Parantainen, & Olson, 1993). In addition to the effect on bone formation, an excessive alcohol intake may replace nutritional foods, thus decreasing important nutrients such as calcium and vitamin D (ORBD-NRC NEWS, 1995).

While excessive alcohol consumption has shown to have a negative effect on bone formation, there is an association between moderate alcohol consumption and an increase in bone mineral content in postmenopausal women. This could possibly be due to increased levels of female sex hormones with moderate alcohol use (Laitinen & Valimaki, 1991). Calcitonin, a thyroid hormone that inhibits bone resorption, has also been shown to increase with a moderate alcohol intake (Griffiths, Parantainen & Olson, 1993).

Cigarette smoking

Cigarette smoking increases risk for osteoporosis. Significant bone loss has been seen with prolonged smoking in postmenopausal women. Also, low bone density has been associated with cigarette smoking in adolescents and young adults (ORBD-NRC News, May 26, 1998). Research also suggests differences in bone density between nonsmokers and smokers, possibly due to other accompanying lifestyle factors for smokers such as a higher consumption of alcohol, less physical activity, and/or a sub-optimal nutritional diet. In addition, smokers are often thinner than a nonsmoker and tend to go through menopause earlier than nonsmokers. Postmenopausal smokers have lower
estrogen levels than nonsmokers, which may increase bone resorption. Researchers have found that quitting smoking may help decrease smoking-related bone loss, even late in life (ORBD~NRC NEWS, January 19, 1998).

**Lack of Exercise**

Lack of exercise increases risk for osteoporosis. Regular, weight-bearing exercise has been associated with an increase in bone mineral density (Jonnavithula et al., 1993). Also, an inactive lifestyle may put one at higher risk. A positive correlation exists between physical activity and increased bone mass. More active children may gain 5%-10% more skeletal mass during adolescent growth, which is an important advantage in attaining peak bone mass (Peacock, 1991).

**Medications**

Certain medications increase risk for osteoporosis. Long-term use of glucocorticoid can lead to decreased bone density. Anti-seizure medications, gonadotropin releasing hormone (GnRH) analogs and aluminum-containing antacids can also contribute to bone loss. Other drug therapies that can affect bone density are certain cancer treatments and excessive thyroid hormone therapies (ORBD~NRC, 1999).
**Calcium, Vitamin D, Phosphorus and Sodium**

Good nutrition is essential for bone growth and maintenance of bone mass. Although a balanced diet of all food groups is needed for overall health, a number of nutrients are specifically needed for healthy bone. Vitamin A, vitamin C, magnesium, zinc, and proteins are all needed for healthy bone, and calcium is especially important in bone formation. Ninety-nine percent of the body's calcium is found in the bones and teeth (ORBD-NRC, 1999). Vitamin D is important in calcium absorption, phosphorus affects bone mass, and sodium plays an important part in calcium addition to the bone.

**Calcium.**

Calcium is essential for bone growth. Deficiencies in youth can account for a 5-10% difference in peak bone mass (Matkovic, 1993). Calcium deposited during pubertal years may determine the risk of osteoporosis and fractures later in life (Sandler, et al., 1985).

A study conducted with white adolescent girls (mean age, 12.2) showed those who had an increase of calcium through milk consumption in their diets had statistically significant increases in bone density and bone mineral content over an 18-month period (Cadogan et al., 1997). Genetically predetermined bone mass may not be reached in children and adolescents with calcium intake levels below 1,000 mg per day (Matkovic, 1993). Also, Sandler et al. (1985) studied postmenopausal women, their bone density, and their recall of milk consumption (as a calcium source) as children. The results suggest that "milk
consumption during childhood and adolescence appears to be needed not only for growth and development, but possibly also to assure, within genetic limits, an optimal peak of bone mass and thus greater latitude for the maintenance of skeletal integrity in the face of bone losses” (p. 274). Furthermore, studies show young women are not consuming enough calcium for strong bones (Harel, et al., 1998; Kasper et al., 1994; Lysen & Walker, 1997; Farley, 1997). A study conducted on adolescents and calcium consumption showed that 89% of the subjects consumed less than the RDA for calcium, with girls consuming only 45% of the RDA. Those who were aware of daily requirements consumed more calcium on a daily basis (Harel et al., 1997).

Calcium intake recommendations change over the life span. Demand for calcium is greater during childhood and adolescence, during pregnancy and breastfeeding, and after menopause. Recommended calcium intakes have been studied and adjusted within the past few years (Matkovic, 1995). Calcium recommendations from The National Academy of Sciences (1997) and National Institutes of Health (1994) are shown in Table 1.
Table 1. Recommended Calcium Intakes

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<tr>
<td>Birth - 6 months</td>
<td>210</td>
<td>Birth - 6 months</td>
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<tr>
<td>6 months - 1 year</td>
<td>270</td>
<td>400</td>
</tr>
<tr>
<td>1 - 3</td>
<td>500</td>
<td>6 months - 1 year</td>
</tr>
<tr>
<td>4 - 8</td>
<td>800</td>
<td>1 - 10</td>
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<tr>
<td>9 - 13</td>
<td>1300</td>
<td>800 - 1200</td>
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<tr>
<td>14 - 18</td>
<td>1300</td>
<td>11 - 24</td>
</tr>
<tr>
<td>19 - 30</td>
<td>1000</td>
<td>1200 - 1500</td>
</tr>
<tr>
<td>31 - 50</td>
<td>1000</td>
<td>25 - 50 (women &amp; men)</td>
</tr>
<tr>
<td>51 - 70</td>
<td>1200</td>
<td>51 - 64 (women on ERT &amp; men)</td>
</tr>
<tr>
<td>70 or older</td>
<td>1200</td>
<td>51+ (women not on ERT)</td>
</tr>
<tr>
<td>Pregnant or lactating</td>
<td>1000</td>
<td>65 or older</td>
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<tr>
<td>14 - 18</td>
<td>1300</td>
<td>1200 - 1500</td>
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<td>19 - 50</td>
<td>1000</td>
<td></td>
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</table>

Calcium amounts are designed to provide optimal intakes for all ages. The FDA has set a “percent Daily Value” (%DV), which shows the amount of calcium in food on food labels. 100% DV of calcium is 1,000 mg. For example, 14 - 18 year olds, who require 1300 mg of daily calcium (National Academy of Sciences, 1997), would need 130% DV of calcium. To convert % DV to mg, multiply the %DV X 1000. For example, one cup of milk has 30% DV - .30 X 1000 = 300 - so one cup of milk contains 300 mg of calcium. Table 2 shows the %DV for many calcium containing foods.
Table 2. Calcium Containing Foods and %Daily Value

<table>
<thead>
<tr>
<th>Calcium Foods and % Daily Value (DV)</th>
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<tr>
<td><strong>Milk Products (2-3 servings)</strong></td>
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<tr>
<td>Nonfat milk, Ca+ fortified 1 cup</td>
<td>Collards ½ cup 20% DV</td>
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<tr>
<td>Yogurt 1 cup 35% DV</td>
<td>Turnip greens 2/3 cup 15% DV</td>
</tr>
<tr>
<td>Milk 1 cup 30% DV</td>
<td>Kale 2/3 cup 10% DV</td>
</tr>
<tr>
<td>Cheese 1 oz 20% DV</td>
<td>Bok choy ½ cup 10% DV</td>
</tr>
<tr>
<td>Pudding ½ cup 10% DV</td>
<td>Broccoli 1 stalk 6% DV</td>
</tr>
<tr>
<td>Cheese spread 2 TBS 15% DV</td>
<td>Carrot 1 med 2% DV</td>
</tr>
<tr>
<td>Frozen yogurt ½ cup 15% DV</td>
<td></td>
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<tr>
<td>Cottage cheese ½ cup 6% DV</td>
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<tr>
<td><strong>Vegetables (3-5 servings)</strong></td>
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<tr>
<td><strong>Meat and Bean Group (2-3 servings)</strong></td>
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<tr>
<td>Calcium-processed tofu 3 oz 60% DV</td>
<td>Ca fortified orange juice 1 cup 30% DV</td>
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<tr>
<td>Dry-roasted almonds ½ cup 10% DV</td>
<td>Dried figs 2 figs 6% DV</td>
</tr>
<tr>
<td>Scrambled eggs 2 eggs 8% DV</td>
<td>Orange 1 orange 4% DV</td>
</tr>
<tr>
<td>Baked beans with sauce ½ cup 8% DV</td>
<td>Kiwi 2 kiwis 4% DV</td>
</tr>
<tr>
<td>Black-eyed peas ½ cup 2% DV</td>
<td>Strawberries 8 berries 2% DV</td>
</tr>
<tr>
<td><strong>Fruits Group (2-3 servings)</strong></td>
<td></td>
</tr>
<tr>
<td>Grilled cheese sandwich 1 sand 25% DV</td>
<td></td>
</tr>
<tr>
<td>Lasagna 1 cup 25% DV</td>
<td></td>
</tr>
<tr>
<td>Soups prepared with milk 1 cup 15% DV</td>
<td></td>
</tr>
<tr>
<td>Chili con carne with beans 1 cup 10% DV</td>
<td></td>
</tr>
<tr>
<td>Cheese pizza (12-inch) ¼ pizza 25% DV</td>
<td></td>
</tr>
<tr>
<td>Macaroni and cheese 1 cup 25% DV</td>
<td></td>
</tr>
<tr>
<td>Sliced ham 4% DV</td>
<td></td>
</tr>
<tr>
<td><strong>Mixed Dishes</strong></td>
<td></td>
</tr>
<tr>
<td>Corn tortillas 3 tortillas 8% DV</td>
<td></td>
</tr>
<tr>
<td>Bread 1 slice 4% DV</td>
<td></td>
</tr>
<tr>
<td><strong>Grain Products</strong></td>
<td></td>
</tr>
<tr>
<td>Waffles (4&quot; sq.) 2 waffles 20% DV</td>
<td></td>
</tr>
<tr>
<td>Pancakes (5-inch) 3 pancakes 20% DV</td>
<td></td>
</tr>
<tr>
<td>Calcium-fortified cereal 1 cup 15% DV</td>
<td></td>
</tr>
<tr>
<td>Calcium-fortified bread 1 slice 8% DV</td>
<td></td>
</tr>
<tr>
<td>Bread 1 slice 4% DV</td>
<td></td>
</tr>
<tr>
<td><strong>Fats, Oils, and Sweets (use sparingly)</strong></td>
<td></td>
</tr>
<tr>
<td>Milk chocolate 1.5 oz bar 8% DV</td>
<td></td>
</tr>
</tbody>
</table>
| **Calcium comes from all different sources, and many foods are now fortified with calcium. Milk and other dairy products are considered excellent sources of calcium, and are commonly consumed. Many other non-dairy foods also contain calcium (see Table 2) (Farley, 1997). Calcium may also be consumed by supplementation. Absorption of calcium is most efficient at individual doses of 500 mg or less, taken between meals (NIH, 1994).**
**Vitamin D.**

Vitamin D enhances calcium absorption. This important vitamin facilitates the movement of calcium from the intestine to the blood stream and into bone (Farley, 1997). Vitamin D can be obtained through diet, supplementation, and adequate exposure to sunlight. 400 to 800 IU is the daily recommendation for vitamin D (NIH, 1994).

**Phosphorus.**

Phosphorus is easily obtained and found in many different foods. Milk products, meat products and grains can contribute up to 80% of all phosphorus in one’s diet (Anderson & Garner, 1996). Phosphorus is also added to food in the form of food additives, and is found in cola-type soft drinks (Calvo, 1994). An adequate dietary ratio of calcium to phosphorus ranges from 1:1 to 1:2, with a value of 1:1.4 being optimal. A high phosphorus, low calcium diet may be typical for many young American women, drinking more sugary soft drinks than milk and lacking other calcium foods. Calcium to phosphorus ratios tend to exceed 1:2 in these diets, and can even get closer to 1:4 (Anderson & Garner, 1996). When calcium to phosphorus ratios exceed 1:2, peak bone mass may be impaired, or bone loss could be accelerated. Studies in animals have shown a significant reduction in vertebral bone mass when fed a high phosphorus, low calcium diet (Calvo, 1994). Also, studies in young women have shown a mild hyperparathyroidism with a high phosphorus, low calcium diet over a period of four weeks. This suggests that the persistent changes in parathyroid hormone,
a calcium and phosphorus metabolism regulator, is not conducive to optimizing peak bone mass (Calvo, 1994). Too much phosphorus intake in relation to calcium intake may contribute to low bone mass, which increases the risk of osteoporosis (Anderson & Garner, 1996).

**Sodium.**

Sodium intake may increase risk of osteoporosis. The recommended daily allowance (RDA) for sodium is 2,400 mg. Lysen and Walker (1997) found that 68.1% of adolescents surveyed exceeded the RDA. Studies have shown a significant positive correlation between high sodium intake and urinary calcium excretion in pre-adolescent females. Urinary calcium has a negative impact on bone density by reducing calcium addition (Matkovic et al., 1995).

**Estrogen Deficiency and Amenorrhea**

Estrogen deficiency increases risk for developing osteoporosis. Decreased levels of estrogen are associated with decreased bone density (Drinkwater, Bruemner, and Chesnut, 1990). Osteoporosis can develop in young women due to estrogen deficiency, just as it can in postmenopausal women. Amenorrhea, or cessation of menstrual periods, is the predominated symptom of estrogen deficiency. Menopausal women become amenorrheic as their estrogen levels decrease. Other conditions cause amenorrhea in adolescents and young adults which can lead to osteoporosis states for this age group (Kilbanski, 1994). Hyperprolactinemia and stress-induced anovulation can bring on amenorrhea. Also, an insufficient percentage of body fat due to eating...
disorders or excessive exercise can bring on amenorrhea. In any one of these situations, estrogen levels may become deficient and risk for osteoporosis increases (Kilbanski, 1994). Studies show that prolonged amenorrhea may result in irreversible decreases in bone density (Drinkwater, Bruemner, and Chesnut, 1990; Jonnavithula et al., 1993). Athletic training and anorexia nervosa both affect teens and young adults, and influences amenorrheic states (Jonnavithula et al, 1993).

The female athlete.

Up until the 1980's, amenorrhea was regarded as something that came along with being an athlete as a consequence of training. Today, it is looked at as an indication of a problem. Many female athletes are at high risk for osteoporosis, not only later in life, but during earlier years, as well. Excessive exercise and restricted diets in these young women may cause amenorrhea (Skolnick, 1993). Barbara L. Drinkwater, Ph.D., a research physiologist at the Pacific Medical Center in Seattle, WA is a pioneer in osteoporosis research. At the 40th annual meeting of the American College of Sports Medicine, Drinkwater described many cases of amenorrheic athletes. "We don't see many with above-average bone densities, which one would expect to find in young physically active women. More disturbing is that many of these young women have bones that are equivalent to the bones of 50-to 60-year-old women" (Skolnick, 1993, p. 922). Drinkwater also said that approximately half of the amenorrheic athletes
she and her colleagues studied had bone densities at least one standard
deviation below the mean bone density for normal women; many had bone
density levels more than two standard deviations below the mean for normal
women, which is close to the standard diagnosis for osteoporosis (NOF, 1999).
According to Drinkwater (1990), previous amenorrheic female athletes who had
resumed menstruating showed some increase in bone density, but this increase
plateaued at a level well below normal bone mass for their age group. Normal
bone mass had not been reached even four years after menstruation resumed.
Bone loss may also be irreversible. Studies suggest that extended periods of
amenorrhea may result in permanent decrease of bone density. Longer
longitudinal studies need to be conducted to assess the possibility of regaining
normal bone density (Drinkwater, Bruemner & Chestnut, 1990). Amenorrhea in
female athletes needs to be recognized as a red flag for osteoporosis risk.
Pre-participation examination may be a good time to screen for possible
symptoms and risk factors for osteoporosis (Skolnick, 1993).

Anorexia Nervosa.

Anorexia nervosa is characterized by “a weight loss to less than 85% of
ideal body weight by self-imposed food restriction” (Kilbanski, 1994). This
disease creates complex problems within the body, and affects many systems
that contribute to the development of bone loss, including estrogen deficiency
(Klibanski, 1994). Studies have shown that osteoporosis develops in young
women with anorexia nervosa (Cundy et al., 1991). Furthermore, bone loss in anorexic women is of greater severity compared to other groups of amenorrheic women, such as athletes. Up to a 50% reduction in bone mass has been reported in anorexic women in their teens and early 20's (Klibanski, 1994). These women may have sustained permanent bone loss, which will put them at a higher risk for osteoporosis throughout their lives (Klibanski, 1994; Drinkwater, Bruemner and Chesnut, 1990; Jonnavithula et al., 1993; Skolnick, 1993).

**Contraception Use**

The risk of osteoporosis associated with contraception methods has just recently been studied. Although research is limited, studies show there may be a relationship between certain types of contraception and bone density. With the use of Depo-Provera, a progesterone contraceptive, most women become amenorrheic (Cundy et al, 1991). Cromer et al. (1996) conducted a study comparing bone densities in girls, ages 12-21, before and after treatment of hormonal contraceptives (Depo-Provera, Norplant, and oral contraceptives) and bone densities in a control group receiving no hormonal treatment. After one year of treatment, all groups increased their mean bone density except for the Depo-Provera group, whose mean bone density decreased significantly compared to the control group; after two years of treatment, mean bone density decreased by 3.12% in the group receiving Depo-Provera, whereas the control group had an increase of 9.49% in mean bone density, and the group using
Norplant also had 9.33% increase in mean bone density as well. Oral contraceptive users were not assessed at two years because no person in the group continued taking oral contraception. Findings suggest that "levels of estrogen associated with Depo-Provera therapy may not be adequate for girls of this age to produce optimal bone mineralization" (Cromer et al., 1996, p. 675).

Another study conducted by Cundy et al. (1991) showed a 7.5% decrease in bone density among Depo-Provera users. In a follow-up study using some of the same subjects, a mean gain of 6.4% was seen after discontinuation of Depo-Provera. This study suggests that bone loss may be reversible after treatment ceases (Cundy et al., 1993). It is very important to note that these two studies by Cundy et al. were confined to adult women, all of whom were 25 years or older (1991 & 1993). Since over half of bone mass is achieved during adolescent years (Cadogan, 1997), an increase in bone density during these years seems almost certain. The decrease of bone density in adolescent Depo-Provera users raises questions and concerns regarding osteoporosis risk. At present, there are no conclusions on adolescents and the effects on bone density with long term use of Depo-Provera. Also, no studies have been conducted on bone density and adolescents who have stopped receiving Depo-Provera. "A future direction for research in this area would be to examine the degree to which adolescents regain lost bone after discontinuing this contraceptive method and whether estrogen replacement might attenuate bone loss during long-term use of Depo-Provera" (Cromer et al., 1996, p. 676).

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Detection of Osteoporosis

Osteoporosis may go undetected until a fracture occurs. A bone mineral density (BMD) test is a clinical test that measures bone density. This test can confirm a diagnosis of osteoporosis. There are different types of BMD tests; some measure spine, wrist, and hipbone density, and others measure density in the heel or hand (Drugay, 1997). Diagnostic criteria using standard deviations (SD) from the norm have been established by the World Health Organization. Criteria for bone mineral density values for osteoporosis are set at any value greater than 2.5 SD below the young adult mean (NOF, 1999). These tests are non-invasive and safe. Most BMD tests are mainly recommended to postmenopausal women (NOF, 1999). Literature suggests that tests be used for young women indicating a high number of risk factors (Lysen and Walker, 1997).

Therapeutic Medications

A number of medications are available for osteoporosis, both for prevention and treatment. Medications currently approved by the FDA for use in postmenopausal women include estrogen, calcitonin, alendronate, and raloxifene (ORBD-NRC, 1999). Treatments under investigation include sodium fluoride; vitamin D metabolites; parathyroid hormone; other bisphosphonates and selective estrogen receptor modulators (NOF, 1999). Literature suggests that hormone replacement therapy also be used for young women at higher risk for osteoporosis, such as those with amenorrhea. To date, however, no data is
available on dosages for younger women and how effective this treatment would be for increasing bone density (Skolnick, 1993).

Prevention

There is no cure for osteoporosis. Acquiring and maintaining optimal bone mass in young women is critical for prevention. Literature shows that most efforts in osteoporosis prevention have been devoted to decreasing bone loss after the attainment of peak bone density, such as in menopause. However, given that increased peak bone density reduces osteoporosis risk in later years (Matkovic, 1995), attention must be given to factors that affect peak bone mass. Emphasis on the latter is directed toward children and adolescents, as the majority of peak bone mass is attained during these years. Osteoporosis prevention needs to begin decades before women experience menopause.

The best prevention against osteoporosis is attaining optimal peak bone mass and maintaining optimal bone density (Cadogan, Eastell, Jones, & Barker, 1997). Peak bone mass can be more easily attained and maintained by reducing changeable risk factors associated with osteoporosis. “Adolescents should be strongly encouraged to adopt healthy lifestyles, characterized by adequate calcium intake, moderate weight-bearing exercise, limited high-sodium intake, and an absence of eating disorder, smoking and alcohol consumption” (Lysen and Walker, 1997). As the importance of prevention has become more
evident, programs directed toward children, adolescents and young adults are being studied, developed, and implemented.

Osteoporosis Prevention Strategies

Most literature available on osteoporosis prevention is geared toward postmenopausal women. There is, however, an increasing focus on prevention strategies for adolescents and young women. Lysen & Walker (1997) list several suggestions for osteoporosis prevention strategies:

- Prevention educational materials for use by health educators, school nurses, physical education teachers, dietitians, health care providers and parents need to be developed.
- Risk assessments can provide valuable information for physicians and other health professionals, used as screening tools for increased risk for osteoporosis.
- Food industries and agencies can also be involved by promoting benefits of improved bone health (Lysen & Walker, 1997).

It is evident that researchers agree that many avenues can be utilized to get important osteoporosis prevention information to youth and effectively impact their beliefs and behaviors regarding osteoporosis (Harel, et al., 1998; Kasper et al., 1994; Drugay, 1997; Lysen & Walker, 1997; ORBD-NRC NEWS, 1997).

Perceptions Among Young Women

To develop an effective program, it is important to know how young women perceive osteoporosis, what they believe to be true, what their attitudes
are, and their behaviors toward osteoporosis prevention. Kasper, et al. (1994) found that, among college women (mean age of 19.6 years; 92% white), the more information they had seen or heard about osteoporosis, the more likely they were to correctly identify risk factors, with most identifying low calcium intake and lack of physical exercise as risk factors. In spite of having knowledge regarding osteoporosis and being able to identify risk factors, there was not a statistical significant correlation between these two factors and behaviors. The majority of the young women were not consuming the recommended daily amount of calcium, and were lacking sufficient exercise for osteoporosis prevention. In addition, the study documents that "young women believe that it is unlikely that osteoporosis will develop in them. Women are also less concerned about osteoporosis, believe that they are less responsible for osteoporosis developing, and believe that osteoporosis is less serious than other common causes of morbidity and mortality in women" (p. 701).

Another study done with adolescents (mean age of 14.8, 52% female) showed that while the youngsters were aware of major health benefits of calcium, they lacked specific information about daily requirements, sources, and amounts. Eighty-nine percent of the adolescents consumed less than the RDA for calcium, with girls consuming an average of 536 mg daily, which is over 700 mg lower than the recommended daily intake for this age group (Harel, et al., 1998). Another study conducted by ORBD-NRC, NOF, and others (1998),
found that many girls have limited knowledge about bone formation, bone health, and osteoporosis, or what they can do to prevent osteoporosis; only 13% of girls 12-19 years old get enough calcium to build strong bones; and 53% of young women ages 12-21 exercise less than three times a week.

**Educational Programs**

Currently, there are educational programs being developed and implemented throughout the United States. NIH, NOF, and ORBD~NRC have developed and disseminated invaluable information regarding osteoporosis. Educational programs targeting younger populations are just recently being implemented. The most familiar educational program, the "milk mustache" campaign, is nationwide and working to reach teenagers through magazine advertisements. This campaign uses famous people with whom teens identify to promote calcium intake through milk consumption. The campaign also uses radio public service announcements, book covers, and an Internet site (http://www.whymilk.com) (National Institute of Child Health and Human Development (NICHD), 1999).

Another educational program, "Crash Course on Calcium," was developed by the Milk Processor Education Program and the National Dairy Council with technical assistance from NICHD, and the American Academy of Orthopedic Surgeons (AAOS). This program gives teachers tools to educate teens on osteoporosis and prevention. An Internet site is available at
In addition to "A Crash Course on Calcium", NICHD has another educational campaign called "Milk Matters." This campaign educates young people about the importance of calcium for building strong bones and a healthy body. Information is available at the Internet website www.nih.gov/nichd.

Furthermore, many states are developing educational awareness programs for children, adolescents, and young adults. Currently, The Massachusetts Department of Public Health has established a comprehensive program that includes information developed for teachers and health educators to educate and inform school age girls and teens. Included in this information is a risk assessment for young women (Massachusetts Department of Public Health, 1999).

Health Care Providers and Osteoporosis Prevention

Health care providers may have the opportunity to educate young women about osteoporosis prevention. Many studies suggest that physicians and other health care workers, including pharmacists, nutritionists, and nurses should be involved in educating young women about osteoporosis prevention (Harel et al., 1998; Kasper et al., 1994; Drugay, 1997; Willhite, 1998; ORBD-NRC NEWS YOU CAN USE, 1999). However, some of these same studies show little information is actually received from health care providers (Harel et al., 1998;
Kasper et al., 1994). Harel et al. (1998) reported only 38% of those surveyed discussed health benefits of calcium with their health care provider (p. 226). Similarly, Kasper et al. (1994) reported no significant relationship between current or previous contraceptive use and having received information about osteoporosis from a health care provider (p. 700). Kasper et al. (1994) suggest that "health care providers have either missed opportunities to disseminate osteoporosis information to young women or such information has not been received and retained by them" (p. 701). It is also possible that providers have disseminated osteoporosis information, but young women do not perceive themselves as susceptible to the disease (Kasper, et al., 1994).

To date, all research found on providers' attitudes, knowledge, beliefs, and practices regarding osteoporosis has exclusively focused on postmenopausal women (Grisso, Baum & Turner, 1990; Willhite, 1998; Suarex-Almazor, Homik, Messina, & Davis, 1997). Findings from one of these studies suggest that "individual physician perceptions may be more influential than patient characteristics in the decisions physicians make when preventing and managing osteoporosis" (Suarex-Almazor, Homik, Messina, and Davis, 1998, p.1106).

**Barriers to providing osteoporosis prevention information.**

The U.S. spends more on health care than any other country. The majority of this spending focuses on caring for patients in the end stages of
disease. Only 3% of U.S. health care expenditures are spent on prevention (ORBD-NRC, 1999). Possible reasons why health care practices have not focused on prevention include:

- Uncertainty about effective strategies for implementing preventive care in clinical practice
- Lack of evidence about the effectiveness of preventive interventions in reducing morbidity and mortality
- Confusion about the conflicting recommendations of different organizations
- Lack of time for health promotion counseling in busy clinical settings
- Inadequate reimbursement for preventive services
- Little evidence of the cost-effectiveness of some preventive measures
- Poor preparation in medical school and postgraduate clinical training for practicing health promotion and disease prevention (ORBD-NRC NEWS, Guidelines to Clinical Preventive Services, April 8, 1996).

Health care providers’ needs for providing osteoporosis prevention information to young women.

Information regarding providers’ needs in relationship to osteoporosis prevention in children, adolescents and young adults has not been found. The Massachusetts Department of Public Health did provide a partial list of survey questions that had been asked of pediatricians and pediatric clinicians. It is evident that more data are needed regarding health care providers’ needs in relationship to osteoporosis prevention.
CHAPTER III

Methodology

The purpose of this study was to conduct an assessment of health care providers' knowledge, beliefs and practices regarding osteoporosis prevention in women 25 years and younger. In addition, barriers to disseminating osteoporosis prevention information and education were identified.

Description of Target Population

The population investigated in this study was health care providers employed at Montana Title X Family Planning primary and affiliated satellite clinics. A health care provider, for the purpose of this study, is defined as any person that may provide counseling, education, treatment or information regarding osteoporosis prevention to non-pregnant clients 25 years or younger. There are 15 primary Title X clinics and 17 satellite clinics in Montana (see Appendix A). Approximately 75 health care providers were eligible to participate.

Procedures

Selection of Sample

Questionnaire.

An introductory letter was sent to the clinical director at each Title X primary clinic (see Appendix B). This letter explained the purpose of the study and the assessment process. Directors were asked to provide the names and titles of health care providers in their clinics who may provide counseling,
education, treatment, or information regarding osteoporosis prevention to clients 25 years or younger. Directors recorded these names on a response form (see Appendix C) and returned them in a postage paid envelope. As incentive, DPHHS agreed to substitute participation in this study for the Title X Internal Medical Audit Requirement. Survey results are available to all Title X clinics.

**Telephone interviews.**

After analysis of the questionnaire data, a telephone interview response form was sent to each health care provider who returned a questionnaire (see Appendix D), with a return postage-paid envelope included. Returned response forms were numbered and simple random sampling was used for selecting participants (McMillan & Schumacher, 1997, p.166). The number of interviews to be conducted was predetermined to be 20% of the total number of questionnaires returned.

**Instrumentation**

**Questionnaire.**

The questionnaire was comprised of a series of fourteen questions designed to pinpoint the knowledge, beliefs and practices of health care providers regarding osteoporosis prevention for women 25 years and younger. Possible barriers to disseminating osteoporosis prevention information and education were also addressed (see Appendix E). The review of literature was an integral part of development. While no questionnaire was found specifically
targeting osteoporosis prevention for women 25 years and younger, two surveys focusing on menopausal osteoporosis were located. Questions from these existing tools were modified, and additional items were developed. The instrument was reviewed by experts for face and content validity, and revisions were made accordingly. Finally, the questionnaire was pilot tested among a group of health care providers.

**Telephone interviews.**

Structured telephone interviews were used to collect additional information regarding health care providers’ needs. This type of interviewing uses standardized, open-ended interview questions, and are asked in the same order, thus reducing interviewer effects and bias (Mcmillan & Schumacher, 1997, p. 447). After analysis of questionnaire data, fifteen interview questions were designed to further clarify questionnaire data, and to gain a deeper understanding of providers’ knowledge, beliefs and practices regarding osteoporosis prevention (see Appendix F). Items were grouped by topic and arranged to ensure flow of the interview, as suggested by Gilmore & Campbell (1996). An introduction and conclusion were developed to ensure consistency in the interview process (see Appendix G).

**Data Collection**

**Questionnaire.**

After approval by the UM Human Institutional Review Board (see Appendix H), questionnaires were sent via postal mail to each health care
provider identified by clinical directors. Participants completed the survey and returned it in the provided postage paid envelope, which was coded for the purpose of follow up. Upon return, the questionnaire was separated from the envelope, and the code number recorded. No identifying information was recorded on the questionnaires, maintaining the anonymity of participants. Two weeks after the initial mailing, follow up telephone calls were conducted, encouraging those who had not returned the questionnaire to do so.

**Telephone interviews.**

Structured telephone interviews were conducted. The health care provider was telephoned during the time indicated on the interview response form (see Appendix D). The interview began with the recited introduction (see Appendix G), and the researcher proceeded through the interview schedule (see Appendix F). As each question was answered, written notes were taken. The participant was given all the time needed to answer the question to her satisfaction. Each session lasted approximately 10 - 15 minutes, as suggested by Gilmore & Campbell (1996, p.31). The interviews were audio-taped with a recording device from UM Instrumental Media Services. The recorded tapes were used to clarify written notes when needed. Immediately following each interview, the general impression and tone of the interview was noted, as well as any other information deemed pertinent for data analysis. Interviews were conducted over a five-day period.
Data Analysis

Questionnaire.

Questionnaire responses were statistically analyzed using an SPSS computer program, which included a descriptive analysis of health care providers' knowledge, beliefs and practices regarding osteoporosis prevention in women 25 years and younger. Barriers to disseminating osteoporosis prevention information were also identified. For question #10, a discriminant analysis was conducted to evaluate the difference between providers' responses to "not enough time with client" as a barrier to providing osteoporosis prevention information and the average number of patients seen per day. Furthermore, a total of 37 chi square tests were conducted to evaluate the differences between providers' responses to items and the provider's age, title, or years in practice for questions #one through #seven, #10, and #11. For the purpose of this study, unless otherwise specified, these variables were divided into the following categories:

<table>
<thead>
<tr>
<th>Age</th>
<th>Title</th>
<th>Years in Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-39 years</td>
<td>Registered Nurse (RN)</td>
<td>2-5 years</td>
</tr>
<tr>
<td>40-49 years</td>
<td>Nurse Practitioner (NP)</td>
<td>6-10 years</td>
</tr>
<tr>
<td>50+ years</td>
<td>Other (see Results, &quot;titles&quot;)</td>
<td>11-20 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20+ years</td>
</tr>
</tbody>
</table>
**Telephone interviews.**

Telephone interview data was qualitatively analyzed to interpret recurring patterns and themes of each interview question. Predetermined categories used in the interview schedule included:

- screening criteria and practices
- messages regarding osteoporosis prevention
- age groups most important for osteoporosis prevention
- number of patients and influence of education practices
- barriers to disseminating information and influence of these barriers on educational practices
- educational information and tools used
- any additional information noted by participants

Immediately following each interview, the general impression and tone, along with any significant data, was noted on the interview schedule, and data was read briefly for initial informal analysis. Immediately following the completion of the last interview, formal analysis began, and was conducted as suggested by McMillan & Schumacher (1997, p.508-523). Each category was analyzed separately. First, category data was read in its entirety from all 14 interviews. Then, data from each question was transferred to an organizing grid (see Appendix I), constructing an integrative diagram. Data segments were sub-categorized, and placed in a corresponding box according to topic. Patterns were identified as data segments were classified, and themes emerged.
CHAPTER IV

Results

The purpose of this study was to conduct an assessment of health care providers' knowledge, beliefs and practices regarding osteoporosis prevention in women 25 years and younger. In addition, barriers to disseminating osteoporosis prevention information and education were identified.

Questionnaire

Demographics

Questionnaires were sent to 74 health care providers. Sixty-nine providers responded, for a return rate of 93%. Five questionnaires were not returned; two providers were no longer employed at a Title X clinic, two providers did not fill out the questionnaire as it did not pertain to them, and one provider did not return the questionnaire for unknown reasons.

Participants' titles.

Participants' titles included seven groups: registered nurses (RN), nurse practitioners (NP), clinic directors, health educators, medical doctors (MD), licensed practical nurses (LPN), and physician assistants (PA). The following is a breakdown of the participants (n=69):

- 52.2% (n=36) were RNs
- 29.0% (n=20) were NPs
- 4.3% (n=3) were clinic directors
- 2.9% (n=2) were health educators
- 4.3% (n=3) were MDs
- 2.9% (n=2) were LPNs
- 1.4% (n=1) were PAs.
Participants' gender and age.

Ninety-seven percent (n=67) of the participants were female, and 2.9% (n=2) were male. Participants' ages were grouped as follows (n=69):

- 2.9% (n=2) were 20 - 29 years of age
- 17.4% (n=12) were 30 - 39 years of age
- 47.8% (n=23) were 40 - 49 years of age
- 31.9% (n=22) were 50 years or older

Years in practice.

Years in practice ranged from one to 45 years, and the average was 13.9 years. The following is a breakdown of years in practice (n=64):

- 2.8% (n=2) had practiced less than 2 years
- 18.7% (n=13) had practiced 2 - 5 years
- 27.3% (n=19) had practiced 6 - 10 years
- 18.7% (n=13) had practiced 11 - 20 years
- 24.2% (n=17) had practiced more than 20 years

Number of patients seen per day and percentage of patients seen who are women 25 years and younger.

The number of patients seen per day ranged from one to 30, with an average of approximately 12 patients per day. The majority (71.4%) saw nine or more patients per day (n=63). Percentage of patients seen by providers who were women 25 years and younger ranged from 10% to 100%, with an average of 62.38% (n=65).
Descriptive Analysis

Frequencies of responses are listed below for questions one through twelve. Responses to questions #13 and #14 can be found in Demographics (see above). Functional discriminant analysis results (see question # 10) and statistically significant chi square results (see questions #1, #7, and #10) are also reported.

**Question #1: “In general, how would you rate the importance of osteoporosis prevention?”**

A four-point Likert Scale of “not important,” “somewhat important,” “important,” or “very important” was used for response categories. Responses are as follows (n=69):

- 1.4% (n=1) - not important
- 4.3% (n=3) - somewhat important
- 14.5% (n=10) - important
- 79.7% (n=55) - very important

A chi square test showed a statistical difference between beliefs of the importance of osteoporosis prevention and titles of providers (p < .001). Providers with titles in the “other” category rated the general importance of osteoporosis prevention as less important than did registered nurses or nurse practitioners. Of those who responded “not important” or “somewhat important,” two were medical doctors and two were clinical directors.
**Question #2:** “In your opinion, which of the following scenarios is preferred for osteoporosis prevention?”

Participants were given three options and asked to check one.

Responses are as follows (n=68):

- 72.5% (n=50) - attaining peak bone mass before the age of 30
- 14.5% (n=10) - preventing bone loss with calcium supplementation after age 30
- 11.6% (8) - estrogen replacement therapy during menopausal years

**Question #3:** “Rate each of the following risk factors in terms of its importance in contributing to the development of osteoporosis.”

This question included 12 risk factors that were rated by importance. A four-point Likert Scale of “not important,” “somewhat important,” “important,” and “very important” was used for response categories. See Table 3 for responses to each risk factor.

**Table 3. Importance of Risk Factors**

<table>
<thead>
<tr>
<th>Risk factors contributing to the development of osteoporosis</th>
<th>Not Important</th>
<th>Somewhat Important</th>
<th>Important</th>
<th>Very Important</th>
<th>Total # of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>a. Inadequate calcium</td>
<td>0</td>
<td>0</td>
<td>2.9</td>
<td>2</td>
<td>72.5</td>
</tr>
<tr>
<td>b. Lack of exercise</td>
<td>0</td>
<td>0</td>
<td>10.1</td>
<td>7</td>
<td>53.6</td>
</tr>
<tr>
<td>c. Smoking</td>
<td>0</td>
<td>0</td>
<td>7.2</td>
<td>5</td>
<td>53.6</td>
</tr>
<tr>
<td>d. Depo-Provera® use</td>
<td>1.4</td>
<td>1</td>
<td>10.1</td>
<td>7</td>
<td>46.4</td>
</tr>
<tr>
<td>e. Disordered eating</td>
<td>0</td>
<td>0</td>
<td>13.0</td>
<td>9</td>
<td>36.2</td>
</tr>
<tr>
<td>f. Thin boned / small frame</td>
<td>5.8</td>
<td>4</td>
<td>10.1</td>
<td>7</td>
<td>46.4</td>
</tr>
<tr>
<td>g. Family history</td>
<td>1.4</td>
<td>1</td>
<td>17.4</td>
<td>12</td>
<td>36.2</td>
</tr>
<tr>
<td>h. Vitamin D deficiency</td>
<td>0</td>
<td>0</td>
<td>21.7</td>
<td>15</td>
<td>31.9</td>
</tr>
<tr>
<td>i. Amenorrhea</td>
<td>2.9</td>
<td>2</td>
<td>26.1</td>
<td>18</td>
<td>30.4</td>
</tr>
<tr>
<td>j. Excessive alcohol use</td>
<td>2.9</td>
<td>2</td>
<td>30.4</td>
<td>21</td>
<td>34.8</td>
</tr>
<tr>
<td>k. Ethnicity</td>
<td>1.4</td>
<td>1</td>
<td>36.2</td>
<td>25</td>
<td>42.0</td>
</tr>
<tr>
<td>l. Oral contraceptive use</td>
<td>44.9</td>
<td>31</td>
<td>26.1</td>
<td>31</td>
<td>4.3</td>
</tr>
</tbody>
</table>
An additional option labeled “other” was provided for participants to write in factors not already listed. Comments included “caffeine intake,” “soft drink intake,” “steroid use,” “low level of estrogen with no estrogen replacement,” and “knowledge/education of Ca+ importance.”

**Question #4: “How receptive do you think women 25 years and younger are to information/education regarding osteoporosis prevention?”**

A four-point Likert Scale of “not receptive,” “somewhat receptive,” “receptive,” and “very receptive” was used for response categories. Responses are as follows (n=69):

- 20.3% (n=14) - not receptive
- 60.9% (n=42) - somewhat receptive
- 17.4% (n=12) - receptive
- 1.4% (n=1) - very receptive

**Question #5: “What is the most important osteoporosis prevention message to give women 25 years and younger about physical activity?”**

Participants were given three options and asked to check one. Responses are as follows (n=69):

- 94.2% (n=65) - engage in exercises such as weight lifting or walking
- 5.8% (n=4) - engage in exercises such as swimming or bicycling
- 0% (n=0) - maintain good posture
**Question #6:** “How many milligrams of calcium would you recommend for women 25 years and younger?”

Answers were written in milligrams daily. Responses ranged from 350 mg to 2000 mg, with an average response of 1136 mg, and a mode of 1200 mg (36.4%). The following is a breakdown of responses (n=66):
- 6% (n=4) reported between 0 - 500 mg
- 4.5% (n=3) reported between 501 - 999 mg
- 66.7% (n=44) reported between 1000 - 1500 mg
- 22.7% (n=15) reported between 1501 - 1500 mg

**Question #7:** “Rate each of the following age groups in terms of its importance in educating about osteoporosis prevention.”

Five age groups were rated by importance. A four-point Likert Scale of “not important,” “somewhat important,” “important,” and “very important” was used for response categories. See Tables 4 for responses to each age group.

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Not Important %</th>
<th>Somewhat Important %</th>
<th>Important %</th>
<th>Very Important %</th>
<th>Total # of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-teen (8 - 12)</td>
<td>7.2 % 5</td>
<td>24.6 % 17</td>
<td>36.2 % 25</td>
<td>30.4 % 21</td>
<td>68</td>
</tr>
<tr>
<td>Teen (13 - 19)</td>
<td>0 % 0</td>
<td>10.1 % 7</td>
<td>21.7 % 15</td>
<td>66.7 % 46</td>
<td>68</td>
</tr>
<tr>
<td>Early adult (20 - 40)</td>
<td>0 % 0</td>
<td>1.4 % 1</td>
<td>14.5 % 10</td>
<td>84.1 % 58</td>
<td>69</td>
</tr>
<tr>
<td>Mid life (41 - 65)</td>
<td>0 % 0</td>
<td>2.9 % 2</td>
<td>13.0 % 9</td>
<td>84.1 % 58</td>
<td>69</td>
</tr>
<tr>
<td>Elderly (66 &amp; up)</td>
<td>0 % 0</td>
<td>5.8 % 4</td>
<td>23.2 % 16</td>
<td>69.6 % 48</td>
<td>68</td>
</tr>
</tbody>
</table>

*Statistical difference between belief and title (p < .01).
A chi square test showed statistical difference in providers' beliefs regarding the importance of osteoporosis prevention education for teens (13 - 19) and providers' titles. Providers with titles in the "other" category rated the importance of education for teens (13 - 19) as less important than did registered nurses or nurse practitioners. Of those who responded "not important" or "somewhat important," two were medical doctors, one was a clinical director, and one was a health educator.

**Question # 8:** "Do you believe that you as a health care provider are the best source of osteoporosis prevention information for women 25 years and younger?".

Responses are as follows (n=69):

- 73.9% (n=51) responded "yes"
- 4.3% (n=3) responded "no"
- 21.7% (n=15) responded "not sure"

A second question was asked, *"If no or not sure, who or what would be the best source?"* Responses included "teacher" (n=3), "parents or family" (n=7), "peers" (n=3), "school nurse or school programs" (n=7), "family practitioner, OB/GYN, or health care provider" (n=2), "media" (n=5), "public education" (n=1), "dietician" (n=1), "repeated sources" (n=1), and "universal access" (n=1).
Question # 9: “How often do you use screening criteria to determine which patients receive information about osteoporosis prevention?”

A four-point Likert Scale of “never,” “rarely,” “sometimes,” and “often” was used for response categories (n=69). Responses are as follows:

- 20.3% (n=14) “never” use screening
- 11.6% (n=8) “rarely” use screening
- 27.5% (n=19) “sometimes” use screening
- 40.6% (n=28) use screening “often”

A follow up question was asked, “If you use screening criteria, what patient behaviors or characteristics are included?” Twelve behaviors or characteristics were listed, and participants were asked to check those that applied. See Table 5 for responses.

<table>
<thead>
<tr>
<th>Behavior or characteristic</th>
<th>Checked as “used”</th>
<th>Total # of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>a. Inadequate calcium</td>
<td>89.7</td>
<td>52</td>
</tr>
<tr>
<td>b. Lack of exercise</td>
<td>79.3</td>
<td>46</td>
</tr>
<tr>
<td>c. Smoking</td>
<td>81.0</td>
<td>47</td>
</tr>
<tr>
<td>d. Depo-Provera® use</td>
<td>86.2</td>
<td>50</td>
</tr>
<tr>
<td>e. Disordered eating</td>
<td>74.1</td>
<td>43</td>
</tr>
<tr>
<td>f. Thin boned / small frame</td>
<td>67.2</td>
<td>39</td>
</tr>
<tr>
<td>g. Family history</td>
<td>72.4</td>
<td>42</td>
</tr>
<tr>
<td>h. Vitamin D deficiency</td>
<td>50.0</td>
<td>29</td>
</tr>
<tr>
<td>i. Amenorrhea</td>
<td>65.6</td>
<td>38</td>
</tr>
<tr>
<td>j. Excessive alcohol use</td>
<td>51.7</td>
<td>30</td>
</tr>
<tr>
<td>k. Ethnicity</td>
<td>34.5</td>
<td>20</td>
</tr>
<tr>
<td>l. Oral contraceptive use</td>
<td>41.4</td>
<td>24</td>
</tr>
</tbody>
</table>
An additional option labeled “other” was provided for participants to write in screening criteria not already listed. Comments included: "diabetes, thyroid, endocrine related," "soft drink intake," "being female" and "caffeine intake, other vitamins."

**Question # 10:** "To what extent do you agree that the following are barriers to you providing osteoporosis prevention information to women 25 years or younger?"

Eight possible barriers were rated in terms of agreement. A four-point Likert Scale of "strongly disagree," "disagree," "agree" and "strongly agree" was used for response categories. See **Table 6** for responses to each barrier.

**Table 6. Barriers to Providing Osteoporosis Prevention Information**

<table>
<thead>
<tr>
<th>Possible barriers to providing information</th>
<th>Strongly Disagree %</th>
<th>Disagree %</th>
<th>Agree %</th>
<th>Strongly Agree %</th>
<th>Total # responses n</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Lack of written materials for patients (i.e. brochures)&quot;</td>
<td>5.8 4</td>
<td>20.3 14</td>
<td>55.1 38</td>
<td>11.6 8</td>
<td>64</td>
</tr>
<tr>
<td>&quot;Not enough time with client&quot;</td>
<td>5.8 4</td>
<td>34.8 24</td>
<td>36.2 25</td>
<td>15.9 11</td>
<td>64</td>
</tr>
<tr>
<td>&quot;Osteoporosis prevention is not supported through grants&quot;</td>
<td>7.2 5</td>
<td>29.0 20</td>
<td>44.9 31</td>
<td>7.2 5</td>
<td>61</td>
</tr>
<tr>
<td>&quot;Osteoporosis prevention is not reimbursable through insurance&quot;</td>
<td>8.7 6</td>
<td>21.7 15</td>
<td>34.8 24</td>
<td>13.0 9</td>
<td>54</td>
</tr>
<tr>
<td>&quot;Lack of education in my professional training&quot;</td>
<td>31.9 22</td>
<td>37.7 26</td>
<td>17.4* 12</td>
<td>4.3 3</td>
<td>63</td>
</tr>
<tr>
<td>&quot;Not a priority for me during office visit&quot;</td>
<td>26.1 18</td>
<td>39.1 27</td>
<td>15.9 11</td>
<td>4.3 3</td>
<td>59</td>
</tr>
<tr>
<td>&quot;Insufficient research making the case for prevention ...&quot;</td>
<td>36.2 25</td>
<td>40.6 28</td>
<td>11.6 8</td>
<td>2.9 2</td>
<td>63</td>
</tr>
<tr>
<td>&quot;Osteoporosis prevention is not supported by clinic admin.&quot;</td>
<td>29.0 20</td>
<td>53.6 37</td>
<td>7.2 5</td>
<td>0 0</td>
<td>62</td>
</tr>
</tbody>
</table>

*Statistical difference between belief and title (p<.01)
An additional option labeled "other" was provided for participants to write in barriers not already listed. Comments included: "other more pressing issues in age group," "already too much info to give," "useful education, families and offspring," "need to self-train, brochures would help."

A discriminant analysis showed no statistical difference between providers who responded that "not enough time with client" was a barrier and the average number of patients seen per day.

A statistical difference was detected by a chi square test between providers who responded "lack of education in my professional training" was a barrier and provider's titles (p<.01). Nurses reported more often than nurse practitioners that they believed they lacked adequate education.

**Question # 11: To what extent do you agree that the following are barriers to women's receptiveness to osteoporosis prevention information?**

Four possible barriers were rated in terms of agreement. A four-point Likert Scale of "strongly disagree", "disagree", "agree" and "strongly agree" was used for response categories. See Table 7 for responses to each barrier.

An additional option labeled "other" was provided for participants to write in perceived barriers not already listed. Comments included "receive so much other info it's hard for them to hear more", "attitude of invincibility", "a lot of time, young women believe they are young forever - 'I'll worry about it later'".
Table 7. Barriers to Women’s Receptiveness to Osteoporosis Prevention

<table>
<thead>
<tr>
<th>Possible barriers to receptiveness</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Total # responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>&quot;Young women don't believe they are susceptible...&quot;</td>
<td>1.4</td>
<td>1</td>
<td>2.9</td>
<td>2</td>
<td>44.9</td>
</tr>
<tr>
<td>&quot;Young women do not have knowledge of risks of osteo.&quot;</td>
<td>1.4</td>
<td>1</td>
<td>8.7</td>
<td>6</td>
<td>52.2</td>
</tr>
<tr>
<td>&quot;Osteoporosis prevention is not a priority for the patient&quot;</td>
<td>2.9</td>
<td>2</td>
<td>8.7</td>
<td>6</td>
<td>63.8</td>
</tr>
<tr>
<td>&quot;Chronic disease in general is not a priority for young women&quot;</td>
<td>4.3</td>
<td>3</td>
<td>7.2</td>
<td>5</td>
<td>49.3</td>
</tr>
</tbody>
</table>

Question # 12: If you provide information regarding osteoporosis prevention to women 25 years and younger in what manner do you provide it?

Seven informational tools were listed, and participants were asked to check those that applied. Participants also had the option of checking "question does not apply." See Table 8 for responses.

Table 8. Manner in which Information is Provided

<table>
<thead>
<tr>
<th>Manner in which information may be provided</th>
<th>Checked</th>
<th>Total # of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;does not apply&quot;</td>
<td>4.3</td>
<td>3</td>
</tr>
<tr>
<td>a. Verbal instruction</td>
<td>93.8</td>
<td>61</td>
</tr>
<tr>
<td>b. Brochures</td>
<td>46.2</td>
<td>30</td>
</tr>
<tr>
<td>c. Calcium intake charts</td>
<td>40.0</td>
<td>26</td>
</tr>
<tr>
<td>d. Posters in office</td>
<td>27.7</td>
<td>18</td>
</tr>
<tr>
<td>e. Informational booklets</td>
<td>20.0</td>
<td>13</td>
</tr>
<tr>
<td>f. Promotional handouts</td>
<td>18.5</td>
<td>12</td>
</tr>
<tr>
<td>g. Informational videos</td>
<td>1.5</td>
<td>1</td>
</tr>
</tbody>
</table>
An option labeled "other" was provided for participants to write in tools used not already listed. Comments included: "general nutritional counseling, proper Ca+, general fitness, healthy lifestyle and exercise", "diet sources, alternative supplement choices," "clinic developed info sheet," "on request," individual counseling," and "have Ca+ on hand for free distribution."

Telephone Interviews

Forty-three telephone interview response forms were returned, for a 64% return rate. Fourteen participants were initially selected; two interviewees from the original selection were not available during the interview process, so were randomly replaced with two other names from the remaining response forms. Fourteen telephone interviews were conducted, which constituted 20% of the 69 questionnaires returned; seven participants were RNs, four were NPs, one was an LPN, one was an MD, and one was a clinical director; eight different primary clinics and four affiliated satellite clinics were represented. Results are reported below by interview question.

Question # 1a: How do you determine whether or not to screen a patient regarding osteoporosis?

Screening was mainly determined by reason for the visit. Screening occurred more during initial visits and annual exams, and with patients using Depo-Provera®. Patients being seen for a prescription refill, a sexually
transmitted disease (STD) check, or for a pregnancy test were given less priority for screening for osteoporosis risk.

**# 1b: What criteria are used in screening?**

Criteria used for screening were Depo-Provera® use, inadequate calcium intake, the lack of exercise, and smoking. The information was obtained from a nutritional intake form and a health history form, which is filled out by each patient during an initial visit or annual exam. No assessment tool specific to osteoporosis risk screening was used by any provider.

**# 1c: What do you see as the key screening criteria?**

Depo-Provera® use, inadequate calcium intake, lack of exercise and smoking were all identified as key screening criteria. While calcium intake and Depo-Provera® use were used *most* in screening, participants felt that smoking and lack of exercise were equally important for preventing osteoporosis.

**# 1d: Do you follow up with patients you screen that you find are at risk for osteoporosis?**

Follow up was only practiced consistently with Depo-Provera® users. Patients receiving an injection of Depo-Provera® at the three-month routine follow up visit are asked about calcium intake and supplementation. Other patients are routinely asked about diet, exercise, smoking and family history as general health questions during initial visits and annual exams.
Question #2: What are the most important messages you as a provider can give patients about osteoporosis prevention?

The most important general message was that "Osteoporosis is preventable." Adequate calcium intake, exercise and not smoking were the health behaviors most important to address. Preventing osteoporosis at an early age was also important. One participant stated, "Start now to reduce problems later".

Question #3: Which age group do you believe is most important for osteoporosis prevention?

No specific age group was identified as the most important for osteoporosis prevention; all ages were viewed as important. Many participants stated that although the teenage years are very important in preventing osteoporosis, this age group is not as receptive to osteoporosis prevention information as older women are. One participant stated, "Sooner than later is best, but they [teens] don't listen as well". Another participant stated, "When women start seeing symptoms, it's like a wake-up call at menopause".

Question #4: How does the number of patients seen per day influence your educational practices?

Approximately half of the participants felt that the number of patients seen per day did not influence their educational practices. Osteoporosis prevention information was given, even when rushed for time. One participant stated, "the message is short, but I don't eliminate it". Participants who felt that the number
of patients seen did influence their educational practices cited priority of the visit as the main factor for not educating about osteoporosis. “Prevention gets lost”, one participant stated. “Time is not specifically set aside for osteoporosis prevention, so [prevention] is the first to go when pressed for time”, another stated.

Question #5: Perceived barriers were identified; Do you feel these are barriers? (if yes...) How do they influence your educational practices?

#5a: “Lack of written materials for patients”

Lack of materials was seen as a barrier to educating patients. Not having written materials limits education, and having a good educational tool would help to disseminate osteoporosis prevention information. Types of helpful educational materials were discussed (see Question # 6).

#5b: “Osteoporosis prevention is not supported through grants”

Osteoporosis prevention not being supported through grants was not viewed as a direct barrier to providing osteoporosis information, but participants felt that practices may be indirectly impacted by what types of materials are available. The general belief that “having more money would be nice” was evident, not just for osteoporosis prevention practices, but overall. “Funds are scarce for everything”, one participant stated.
"Lack of receptiveness from patients"

More comments were made regarding this question than any other. All felt strongly that the lack of receptiveness among patients was a major barrier, especially for younger women. This affects educational practices in many ways; some stated that it makes them work harder at educating, while others felt that if osteoporosis prevention information was not being received, it may be wasting time during an office visit. Comments included, "They don’t see osteoporosis as ‘here and now’"; "It’s hard, they are already filled up with other info, so it’s too much already"; "..they seem receptive, but [education] may not translate into changing behavior"; "Teens don’t hear you"; "[Patient’s view is] just give me the birth control and get me out of here"; and "in 20's and 30's, they’re more conscious".

Question #6a: What kinds of educational tools are you using?

Most health care providers used verbal instruction for education. Some participants had brochures, but none were age appropriate, and seldom used with women 25 years and younger. One participant had a poster on the exam room wall, and a few used calcium source handouts. Others used an informational handout from the Depo-Provera® pharmaceutical company. One participant made her own hand out, which she felt was useful, but was not used by all providers in the clinic.
#6b: *What additional tools do you believe would be most helpful in providing information to your patients?*

Participants were eager to give opinions on educational tools they felt would be helpful in educating women 25 years and younger. Videos were mentioned as a possible educational tool that could be viewed while waiting. Other educational tools suggested included handouts, cards, and book markers. When considering these tools, many criteria were stated as important, including:

- make it short, simple and easy
- have a 4th to 6th grade level of reading
- include pictures of osteoporosis bone and/or women
- include all options of calcium sources; not just dairy, but vegetable sources as well
- make it one page or less
- must be age appropriate

Having calcium samples on hand was also suggested, and viewed as an incentive for young women to supplement their diets.

#6c: *Where do you obtain the information you use to educate patients?*

Educational information was obtained from conferences, the Dairy Council, and from the Depo-Provera® pharmaceutical company.

#6d: *Could you send us the current educational tools you have/use?*

All participants using educational tools agreed to send copies of the materials.
Question #7: What else do you want us to know? What comments, concerns, or questions do you have about the questionnaire or process in general?

Many participants wanted to know when the information would be available to them, and what was going to come of the study. Many commented on the importance of osteoporosis prevention education. One participant reiterated the importance of the media and community being involved in educating young people in regard to osteoporosis prevention.
CHAPTER V

The purpose of this study was to conduct an assessment of health care providers’ knowledge, beliefs and practices regarding osteoporosis prevention in women 25 years and younger. In addition, barriers to disseminating osteoporosis prevention information and education were identified.

Summary of Findings

Knowledge and Beliefs

Results of this study indicate that most health care providers at Montana’s Title X Family Planning clinics believe that osteoporosis prevention is important and are well informed about the disease. Specifically, it can be said that most health care providers:

- Believe that attaining peak bone mass before the age of 30 is the preferred scenario for preventing osteoporosis (72.5%)
- Know that engaging in exercises such as weight lifting or walking are important for preventing osteoporosis for women 25 years and younger (94.2%)
- Recommend 1000 mg. or more for daily calcium intakes (89.4%)
- Believe the most important message about osteoporosis is that it is preventable
- View inadequate calcium intakes, lack of exercise, smoking, and the use of Depo-Provera® for contraception as the most important risk factors in addressing the development of osteoporosis (more than 82%)
• Believe that all ages are important for educating about osteoporosis prevention; females younger than 13 years were rated as important less often (66.7%) than females 13 years and older (more than 88%);
• Believe that they (providers) are the best source of osteoporosis prevention information for women 25 years and younger (73.9%)

Practices

The responses to questions regarding health care providers' practice were more varied than responses to knowledge and belief questions. Specifically it can be said that:
• The majority of patients seen by providers are 25 years and younger (62.38%)
• Screening criteria was reported as being used "never," "rarely" or "sometimes" by over half of the respondents (59.4%), and under half reported using screening criteria "often" (40.6%)
• Screening practices were determined mainly by the reason for the visit; screening occurred more often during initial visits and annual exams, and with patients using Depo-Provera®
• No assessment tool specific to osteoporosis risk was used; screening information was obtained from nutritional intake forms and health history forms, filled out during initial visits or annual exams
• Depo-Provera® use, inadequate calcium intakes, lack of exercise and smoking were seen as the key screening criteria when screening young women for osteoporosis risks

• Verbal instruction was reported as the method used most often when providing prevention information (93.8%); brochures (46.2%) and calcium intake charts (40.0%) were the next most popular method; and almost half used a combination of verbal instruction with some other means of written material (49.1%); follow up telephone interviews clarified that current written material was viewed as insufficient and not relevant to women 25 years and younger.

• Providers were consistent in their beliefs and practices; rankings of behaviors or characteristics used as screening criteria are identical to rankings of risk factors perceived to be important (refer to Tables 3 & 5, and telephone interview question #1c)

**Barriers to Prevention**

**Lack of receptiveness of young women.**

Health care providers identified lack of receptiveness of young women to prevention information as a major barrier to providing osteoporosis prevention information and education (81.2%). Specific barriers to women's receptiveness include:

• Disbelief of susceptibility (94.2%)
• Lack of knowledge of risk for their age group (89.9%)
• Osteoporosis prevention is not a priority during an office visit (87.0%)
• Chronic disease prevention in general not a priority (87.0%)

Other barriers to providing osteoporosis prevention information.

Health care providers identified other limiting factors in their ability to provide osteoporosis prevention to women age 25 and younger. Of the barriers listed on the survey:

• Lack of written materials was the barrier identified most often (66.7%); during telephone interviews, providers suggested developing a short, easy-to-read, one-page handout for osteoporosis prevention education
• Not enough time with the patient was identified as a barrier by half of the providers (52.1%). However, a discriminant analysis showed no statistical difference between health care providers' perception of time and the number of patients seen per day; the mean score for patients seen per day was twelve for both groups. Telephone interview data affirmed the same number of providers (approximately half) perceived the number of patients seen per day as a barrier; participants who felt that the number of patients seen per day was a barrier eliminated osteoporosis prevention information when short on time; those who did not see the number of patients seen per day as a barrier continued to include education, even when time was limited.
Lack of professional education was identified by registered nurses as a barrier, while no nurse practitioner identified this as a barrier \((p < .001)\).

Lack of grant support was identified by over half of the providers (52.1%). Telephone interviews clarified that health care providers did not see this barrier as directly impacting their educational practices, but possibly indirectly affecting materials available to help educate women about osteoporosis prevention.

Statistical Differences in Responses Based Upon Age, Title and Years in Practice

Chi square tests were conducted to determine differences in responses based on age, title, and years in practice. Statistical significance was detected in the following areas:

- Providers with titles in the "other" category rated the general importance of osteoporosis prevention as less important than did registered nurses or nurse practitioners. Of those who responded "not important" or "somewhat important," two were medical doctors and two were clinical directors.

- Providers with titles in the "other" category rated the importance of education for teens (13 - 19) as less important than did registered nurses or nurse practitioners. Of those who responded "not important" or
"somewhat important," two were medical doctors, one was a clinical director, and one was a health educator.

- Nurses reported more often than nurse practitioners that they believed they lacked adequate education for providing osteoporosis prevention information.

Discussion/Recommendations

Health care providers at Montana's Title X clinics have the opportunity to educate young women about osteoporosis prevention. Access to this target population is evident in that more than 60% of the patients seen at these primary and affiliated satellite clinics are young women 25 years or younger. And while, most providers are knowledgeable about osteoporosis prevention, believe it is an important issue to address for young women, and view themselves as a primary information source for osteoporosis prevention information, only 40% routinely screen patients for osteoporosis risks. Furthermore, consistency in prevention efforts is lacking. It appears that several issues must be addressed in order for health care providers' to capitalize on the opportunity to educate young women regarding osteoporosis prevention.
Issue #1: Women's Lack of Receptiveness to Osteoporosis Prevention

Providers' perceptions of young women's lack of receptiveness to osteoporosis prevention information influences their practices. This perception is supported by the literature which states "young women believe that it is unlikely that osteoporosis will develop in them. Women are also less concerned about osteoporosis, believe that they are less responsible for osteoporosis developing, and believe that osteoporosis is less serious than other common causes of morbidity and mortality in women" (Kasper et al. (1994), p.701).

Recommendation.

The researcher recommends the development and implementation of a survey of women 25 years and younger who are patients at Montana Title X Family Planning clinics. This survey would identify knowledge and attitudes regarding osteoporosis prevention, along with barriers to receiving information. Additional specific data regarding women's receptiveness to osteoporosis prevention information can be collected through follow up focus groups and/or interviews. A study of patients' perceptions regarding osteoporosis would ascertain a better understanding of the issue, and would assist researchers when developing and implementing effective osteoporosis prevention strategies for providers.
Issue #2: Lack of Educational Materials

The lack of educational materials addressing osteoporosis prevention influences providers’ practices. Supporting literature reveals that educational materials for use by health care providers need to be developed to improve osteoporosis prevention strategies (Lysen & Walker, 1997).

Recommendation.

The researcher recommends the development and implementation of educational materials specifically targeting women 25 years and younger, using health care providers’ suggestions obtained from this study. Relevant, age-appropriate educational tools such as one-page handouts, posters and videos would increase osteoporosis prevention efforts. The survey of patients should take place before development begins, and health care providers should continue to be surveyed during the development of the materials. Focus groups and/or interviews with patients and health care providers will ensure that the materials are appropriate and useful, thus enhancing the efficacy of the tools. Combining educational materials with verbal instruction (already most often used by providers) would support prevention efforts, and increase efficacy of learning. In addition, the use of effective educational materials may assist those providers who eliminate osteoporosis education when pressed for time to provide information more consistently.
Issue #3: Lack of Education

The lack of education was a significant perceived barrier for registered nurses. Supporting literature reveals that poor preparation in school is a possible reason why health care practices have not focused on prevention (ORBD~NRC NEWS, Guidelines to Clinical Preventive Services, April 8, 1996).

Recommendation.

The researcher recommends continuing education for health care providers regarding osteoporosis prevention. Specifically, registered nurses will benefit, increasing their self efficacy for educating young women about osteoporosis. Their perception of lack of education as a barrier to providing prevention information may be reduced, or perhaps eliminated, and providers will educate young women more effectively and consistently.

Issue #4: No Assessment Tool Specific to Osteoporosis Risk

No screening tool specific to osteoporosis risk was used by any provider, and screening practices were inconsistent. Patients being seen for initial visits, annual exams and those receiving Depo-Provera® were given priority for osteoporosis risk screening.

Recommendation.

The researcher recommends the development and implementation of an assessment tool to screen for osteoporosis risk. Supporting literature reveals that risk assessments can provide valuable information for providers and
improve osteoporosis prevention efforts (Lysen & Walker, 1997). Utilizing a risk assessment will increase consistency, and expand screening to those patients who are being seen for reasons other than an initial visit, annual exam, or a Depo-provera® injection. As recommended for the development of educational materials, health care providers should be involved in the development process for the risk assessment tool.

**Issue #5: Providers' Titles and Their Perceptions of Osteoporosis Prevention**

Statistically significant findings regarding providers' titles and their perceptions of osteoporosis prevention warrant consideration. Two medical doctors and two clinical directors rated the general importance of osteoporosis prevention as "not important or only "somewhat important," consistently more often than did registered nurses or nurse practitioners. Also, two medical doctors, one clinical director, and one health educator rated the importance of education for teens (13-19) as less important than did registered nurses or nurse practitioners. These providers are in managerial and/or administrative positions, and may influence the practices of providers in their clinics. Supporting literature reveals that providers' perceptions may be more influential than patient characteristics when making decisions regarding preventing and managing osteoporosis (Suarex-Almazor, Homik, Messina, and Davis, 1998, p. 1106).
**Recommendation.**

The researcher recommends follow up interviews with administrative and managerial personnel at Montana Title X Family Planning clinics. The support and involvement of administration is extremely important for the effectiveness of osteoporosis prevention efforts. Personal interviews with medical doctors, clinical directors, and health educators will provide further understanding of their perceptions of the importance of osteoporosis prevention, and will assist researchers in improving osteoporosis prevention strategies.

**Further Research**

While the information obtained from this study is valuable information, it cannot be generalized to populations other than health care providers at Montana Title X Family Planning primary and affiliated satellite clinics. Surveying health care providers practicing in settings other than Montana Title X clinics would provide additional, useful data. Knowledge, beliefs and practices of other health care providers in regard to osteoporosis prevention for women 25 years and younger can be better understood, thus encouraging continued efforts of osteoporosis prevention strategies among all health care providers.
REFERENCES


NIH Consensus Development Panel on Optimal Calcium Intake (1994).  


Appendix A

Montana Title X Primary and Satellite Clinics
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<tr>
<th>CITY &amp; ZIP CODE</th>
<th>ADDRESS</th>
<th>PHONE</th>
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<tr>
<td>Bozeman 59715</td>
<td>Bridger Clinic, Inc. 300 N. Wilson, Suite 2001</td>
<td>587-0681</td>
</tr>
<tr>
<td>Butte 59701</td>
<td>Family Services Center 25 W. Front</td>
<td>723-6507</td>
</tr>
<tr>
<td>Dillon 59725</td>
<td>Beaverhead County Family Planning 1260 S. Atlantic</td>
<td>683-4771</td>
</tr>
<tr>
<td>Glendive 59330</td>
<td>Dawson County Family Planning 207 W. Bell</td>
<td>377-2935</td>
</tr>
<tr>
<td>Great Falls 59401</td>
<td>Planned Parenthood of Great Falls 1220 Central Ave.</td>
<td>454-3432</td>
</tr>
<tr>
<td>Hamilton 59840</td>
<td>Ravalli County Family Planning 205 Bedford, Box 5018</td>
<td>375-6259</td>
</tr>
<tr>
<td>Havre 59501</td>
<td>Hill County Family Planning Room 112, College Park Plaza P.O. Box 166</td>
<td>265-2519</td>
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<tr>
<td>Helena 59601</td>
<td>Planned Parenthood of Helena 1500 Cannon St.</td>
<td>443-7676</td>
</tr>
<tr>
<td>Kalispell 59901</td>
<td>Flathead County Family Planning 723 5th Avenue East</td>
<td>758-5756</td>
</tr>
<tr>
<td>Lewistown 59457</td>
<td>Central Montana Family Planning 224 W. Main St., Suite 603</td>
<td>538-8811</td>
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<tr>
<td>Libby 59923</td>
<td>Lincoln County Family Planning 421 Montana P.O. Box 765</td>
<td>293-6291</td>
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<tr>
<td>Miles City 59301</td>
<td>Custer County Family Planning Courthouse Annex</td>
<td>233-3440</td>
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<tr>
<td>Missoula 59802</td>
<td>Planned Parenthood of Missoula 219 E. Main St.</td>
<td>728-5561, 728-5490</td>
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<tr>
<td>Polson 59860</td>
<td>Lake County Family Planning 802 Main St., Suite A</td>
<td>883-7288</td>
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<tr>
<td>Anaconda (Butte) 59711</td>
<td>Deer Lodge Co. Family Planning 115 West Commercial St. P.O. Box 970</td>
<td>563-7863</td>
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<tr>
<td>Baker (Glendive) 59313</td>
<td>Fallon Co. Family Planning Box 820 202 S. 4th St. W.</td>
<td>778-3331</td>
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<tr>
<td>Billings (Billings) 59102</td>
<td>Indian health Board 915 Broadwater</td>
<td>245-7318</td>
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<tr>
<td>Boulder (Butte) 59632</td>
<td>Jefferson County Health Dept. 214 S. Main</td>
<td>225-4231</td>
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<tr>
<td>Broadus (Miles City) 59317</td>
<td>Powder River Medical Box 325</td>
<td>436-2297</td>
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<td>Chinook (Havre) 59538</td>
<td>Blaine Co. Family Planning 419 Pennsylvania Ave.</td>
<td>357-2294</td>
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<td>Columbia Falls (Kalispell) 59912</td>
<td>Montana Peaks Bldg. 123 6th St. West</td>
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<td>Powell Co. Family Planning 305 Milwaukee</td>
<td>846-2420</td>
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<td>Eureka Family Planning Lincoln Co. Family Planning P.O. Box 765 Libby, MT 59923</td>
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<td>Harlowton (Lewistown) 59036</td>
<td>Bair Memorial Clinic 530 Third North West</td>
<td>632-4835</td>
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<td>Livingston (Bozeman) 59047</td>
<td>108 ½ W. Callendar, Apt. #3</td>
<td>587-0681</td>
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<tr>
<td>Malta (Havre) 59538</td>
<td>Phillips Co. Family Planning 105 South 2nd St. East P.O. Box 241</td>
<td>654-2521</td>
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<tr>
<td>Phillipsburg (Missoula) 59858</td>
<td>Health Fitness Place 144 W. Broadway</td>
<td>1-800-230-PLAN</td>
</tr>
<tr>
<td>Sidney (Glendive) 59270</td>
<td>Richland Co. Family Planning County Health Department 221 5th St. S.W.</td>
<td>482-2207</td>
</tr>
<tr>
<td>West Yellowstone (Bozeman) 59758</td>
<td>West Yellowstone Clinic 236 Yellowstone St.</td>
<td>587-0681</td>
</tr>
<tr>
<td>Whitehall (Butte) 59632</td>
<td>Jefferson Co. Health Dept. Attn: Whitehall Box 872 Boulder, MT</td>
<td>287-3249</td>
</tr>
<tr>
<td>Wibaux (Glendive) 59353</td>
<td>Wibaux Co. Family Planning Wibaux Co. Courthouse</td>
<td>795-2485</td>
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Appendix B

Introductory Letter
February 26, 1999

Dear Director:

As mentioned at the February 18th Met Net Council meeting, the Women's Health Section (WHS) Title X Program has been granted funds to develop strategies for osteoporosis prevention targeting non-pregnant women 25 years or younger. WHS has contracted with Annie Sondag and Nancy Mulla, health educators at The University of Montana, to assist us in this project. The first step is to accurately identify health care providers' needs in relationship to osteoporosis prevention. Surveying staff regarding their practices and beliefs will identify those needs.

What We Need From You:

Identification of Staff to Be Surveyed
- Please complete the attached form. Include the names and positions of all staff that provide counseling, education or information regarding osteoporosis prevention to non-pregnant clients 25 years or younger. In addition, provide the names and titles of staff at satellite clinics that provide these services.

- Return forms by March 19th to: Nancy Mulla, Department of Health and Human Performance, University of Montana, Missoula, MT 59812. A return envelope is enclosed for your convenience.

Ensure Return of Surveys
- Promote and encourage your staff to participate in the survey to be distributed May 1999.

What We Can Offer You:

- Your participation in this project will help to improve osteoporosis prevention efforts targeted toward women under the age of 25.

- Participation in this project, as indicated by completed surveys, will fulfill the Title X Internal Medical Audit Requirement due July 1999.

- Survey results will be sent to you on request.
We appreciate you taking time out of your busy schedule to help us!

If you have questions or concerns please contact:
Ellie Hardy, Women's Health Section, DPHHS. (406) 444-4348 - or -
Annie Sondag or Nancy Muilla, Department of Health and Human Performance.
University of Montana, (406) 243-5215. e-mail: cbeemer@selway.umt.edu.

Sincerely,

Suzanne Nybo, MS
Section Supervisor
Women's Health Section
Family/Community Health Bureau
Appendix C

Introductory Response Form
<table>
<thead>
<tr>
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PLEASE RETURN IN POSTAGE PAID ENVELOPE

Nancy Mulla, Dept. of HHP, University of Montana, Missoula, MT 59812

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Appendix D

Telephone Interview Response Form
July 16, 1999

Dear ____________________,

This letter is to follow up on the Osteoporosis Prevention Survey that you completed recently. The project is coming along nicely, and I greatly appreciate your cooperation and participation! To further validate the survey findings, I am asking for a small amount of your time to conduct a telephone interview. I know your time is valuable and limited— the interview will take ten to twenty minutes, and can be scheduled at your convenience during your work schedule. The information received from this telephone interview will greatly help to utilize the survey results more effectively in regard to osteoporosis prevention.

Below is a response form. Please fill it out and send it back in the self-addressed postage paid envelope by August 6, 1999. I will be contacting you in August to conduct the telephone interview. This interview will be confidential, and your name will not appear anywhere in the analysis of the interview data.

Again, I greatly appreciate your time in helping me to complete this project. I look forward to talking with you soon.

Sincerely,

Nancy Mulla
Graduate Student
University of Montana

Name_____________________ Clinic location ________________
Phone Number to call for Interview _______________________
Best Time for Interview appointment (Please circle best day & time to contact)

<table>
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If only a specific time works for you, please indicate time and day here: _____________________________________________________________
Appendix E

Questionnaire
A SURVEY OF HEALTH CARE PROVIDERS' EXPERIENCES AND
OPINIONS REGARDING OSTEOPOROSIS PREVENTION IN WOMEN
25 YEARS AND YOUNGER

Instructions: Please respond to the questions by filling in the blanks and marking the appropriate boxes.

1. In general, how would you rate the importance of osteoporosis prevention?
   [ ] not important  [ ] very important
   [ ] somewhat important

2. In your opinion which of the following scenarios is preferred for osteoporosis prevention? (check one)
   [ ] attaining peak bone mass before the age of 30
   [ ] preventing bone loss through calcium supplementation after the age of 30
   [ ] estrogen replacement therapy during menopausal years

3. Rate each of the following risk factors in terms of its importance in contributing to the development of osteoporosis.
   [1=not important, 2=somewhat important, 3=important, 4=very important]
   _ inadequate calcium intake
   _ amenorrhea
   _ ethnicity
   _ lack of exercise
   _ smoking
   _ vitamin D deficiency
   _ oral contraceptive use
   _ excessive alcohol intake
   _ family history
   _ Depo-Provera® use
   _ disordered eating
   _ thin boned / small frame
   _ other

4. How receptive do you think women 25 years and younger are to information/education regarding osteoporosis prevention?
   [ ] not receptive  [ ] very receptive
   [ ] somewhat receptive

5. What is the most important osteoporosis prevention message to give women 25 years and younger about physical activity? (check one)
   [ ] maintain good posture
   [ ] engage in exercises such as weight lifting or walking
   [ ] engage in exercises such as swimming or bicycling

6. How many milligrams of calcium would you recommend for women 25 years and younger?
   ______ mg. daily

7. Rate each of the following age groups in terms of its importance in educating about osteoporosis prevention.
   [1=not important, 2=somewhat important, 3=important, 4=very important]
   _ pre-teenager (8-12)
   _ teenager (13-19)
   _ early adulthood (20-40)
   _ mid life (41-65)
   _ elderly (66 & older)

8. Do you believe that you as a health care provider are the best source of osteoporosis prevention information for women 25 years and younger?
   [ ] yes  [ ] no  [ ] not sure

   If no or not sure who or what would be the best source? ________________

(Please complete questions on back.)
9. How often do you use screening criteria to determine which patients receive information about osteoporosis prevention?

- never
- sometimes
- rarely
- often

If you use screening criteria, what patient behaviors or characteristics are included? (check all that apply)

- inadequate calcium intake
- amenorrhea
- ethnicity
- lack of exercise
- smoking
- vitamin D deficiency
- oral contraceptive use
- excessive alcohol intake
- family history
- Depo-Provera® use
- disordered eating
- thin boned/small frame
- other

10. To what extent do you agree that the following are barriers to women's receptiveness to osteoporosis prevention information?

- not enough time with client
- not a priority for me during office visit
- lack of education in my professional training program
- insufficient research making the case for osteoporosis prevention during early years
- lack of written materials for patients (i.e. brochures)
- osteoporosis prevention is not financially supported through grants
- osteoporosis prevention is not reimbursable through insurance
- osteoporosis prevention is not supported by clinic administrators
- other

11. To what extent do you agree that the following are barriers to women's receptiveness to osteoporosis prevention information?

1- strongly disagree
2- disagree
3- agree
4- strongly agree

- young women do not have knowledge about the risks associated with osteoporosis
- young women don't believe they are susceptible to osteoporosis
- osteoporosis prevention is not a priority for the patient during the office visit
- chronic disease prevention in general is not a priority for young women
- other

12. If you provide information regarding osteoporosis prevention to women 25 years and younger in what manner do you provide it? (check all that apply)

- question is not applicable
- verbal instruction
- brochures
- informational videos
- informational booklets
- promotional handouts
- posters in office
- calcium intake charts
- other

13. Your Title?

Years in Practice?

Female _____ Male _____

Age
- 20-29
- 30-39
- 40-49
- 50 years & older

14. On average how many patients do you see per day? ___________

In general, what percentage of your patients are women 25 years and younger? ________%
Appendix F

Telephone Interview Schedule
Telephone Interview #____
Telephone number called __________________
Interviewee ______________________________
Location ________________________________
Date _________________________________
Time _________________________________

1. a. How do you determine whether or not to screen a patient regarding osteoporosis?

b. What criteria are used in screening?

c. What do you see as the key screening criteria?

d. Do you follow up with patients you screen that you find are at risk for osteoporosis?
2. What are the most important messages you as a provider can give patients about osteoporosis prevention?

3. Which age group do you believe is most important for osteoporosis prevention education?

4. How does the number of patients seen per day influence your educational practices?
5. Perceived barriers were identified; Do you feel these are barriers? (If yes...) How do they influence your educational practices?

a. "Lack of written materials for patients"

b. "Osteoporosis prevention is not supported through grants"

c. "Lack of receptiveness from patients"
6. a. What kinds of educational tools are you using?

b. What additional tools do you believe would be most helpful in providing information to your patients?

c. Where do you obtain the information you use to educate patients?

d. Could you send us the current educational tools you have/use?
7. What else do you want us to know? What comments, concerns, or questions do you have about the questionnaire or process in general?

Post-interview notes:

General Impression:

Any specific theme/tone to interview?

Additional constructs that emerged not already noted?
Appendix G

Telephone Interview Introduction and Conclusion
Hello ______________________, this is Nancy Mulla from the University of Montana. I'm calling to follow up on the Osteoporosis Prevention Questionnaire that you filled out for us. Is this a good time for you? My thesis chair requested that I tape this telephone conversation. This is a totally confidential interview, and your name will not be attached to any information given. I am the only person that hears the tape, and after I complete my thesis, the tape will be erased. Is this OK with you? Great.

The purpose of this interview is to clarify questionnaire results, and to provide additional information to DPHHS regarding your needs in providing osteoporosis prevention information to your patients 25 years and younger. The information you give is very important and valued, and your time is greatly appreciated! There is a series of questions I'll ask you. Please answer as candidly as possible. If you have any questions, please stop me. OK? The first question is..................

Thank you very much, ______________________. Again, I really appreciate you taking time out of your busy schedule to help me! Have a good day.
Appendix H

Institutional Review Board Approval
Submit one completed copy of this Checklist, including any required attachments, for each project involving human subjects. The IRB meets monthly to evaluate proposals, and approval is granted for one academic year. See IRB Guidelines and Procedures for details.

Project Director: Annie Sanders  Dept.: HHP  Phone: 5215
Signature ___________________________ Date: 1-11-99

Co-Director(s): ______________________ Dept.: __________ Phone: ______

Project Title: Osteoporosis Prevention Needs Assessment Study

Project Description: The purpose is to assess health care providers' knowledge, attitudes, beliefs, and current practices in relationship to osteoporosis prevention with young women who seek services at Title X clinics. Please provide the dates requested below:

<table>
<thead>
<tr>
<th>Date Submitted to IRB</th>
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Students only:  Faculty Supervisor: ______________________ Dept.: __________ Phone: ______
Signature: ____________________________________________

(My signature confirms that I have read the IRB Checklist and attachments and agree that it accurately and adequately represents the planned research and that I will supervise this research project)

Project Director: Please complete page 2 of IRB Checklist, on back.

______________________________

For IRB Use Only

IRB Review and Determination:

X Exempt from Review   ___ Expedited/Administrative Review   ___ Approved

Conditional approval:

__________________________________________________________

Resubmit proposal:

__________________________________________________________

Disapproved:

__________________________________________________________

Signature/IRB Chair: ________________ Date: 1-19-99
THE UNIVERSITY OF MONTANA
INSTITUTIONAL REVIEW BOARD (IRB) 001-99
CHECKLIST

Submit one completed copy of this Checklist, including any required attachments, for each project involving human subjects. The IRB meets monthly to evaluate proposals, and approval is granted for one academic year. See IRB Guidelines and Procedures for details.

Project Director: __________ Dept.: ______ Phone: ______
Signature: __________________________ Date: ___-__-__
Co-Director(s): ______________________ Dept.: ______ Phone: ______

Project Title: Osteoporosis Prevention Needs Assessment Project

Project Description: Purpose is to determine health care providers' knowledge, attitudes, and current practices in relationship to osteoporosis prevention with young women seeking services at Title X Clinics.

Please provide the dates requested below:

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Students only:
Faculty Supervisor: ______________________ Dept.: ______ Phone: ______
Signature: ___________________________
(My signature confirms that I have read the IRB Checklist and attachments and agree that it accurately and adequately represents the planned research and that I will supervise this research project.)

Project Director: Please complete page 2 of IRB Checklist, on back.

For IRB Use Only

IRB Review and Determination:
- Exempt from Review
- Expedited/Administrative Review
- Approved
- Conditional approval:
- Resubmit proposal:
- Disapproved:

Signature/IRB Chair: __________________ Date: ___-__-__
Project Information

1. In your opinion, does this project meet the requirements for Research Exempt from Review as outlined in Section B of the IRB Guidelines and Procedures?
   - **Yes** (Complete information below and attach questionnaire/instrument)
   - **No** (Complete information below and attach IRB Summary, eleven items)

2. Human Subjects. Describe briefly: Health Care Providers who work in Montana Clinics - specifically clinics receiving Title X Funding

   Are any of the following included? Check all that apply.
   - **Minors** (under age 18)
   - If YES, specify age range(s):
   - **Members of physically, psychologically, or socially vulnerable population**

3. How are subjects selected/recruited? Explain briefly: Subjects will be sent a letter asking them to volunteer

4. Identification of subjects in data.
   - **Anonymous, no identification**
   - Identified by name and/or address or other

5. Subject matter or kind(s) of information to be compiled from/about subjects.
   Describe briefly: Subjects will be asked about their knowledge, beliefs and practices in relationship to osteoporosis prevention with young women.

   Is information on any of the following included? Check all that apply.
   - Sexual behavior
   - Alcohol use/abuse
   - Illegal conduct
   - Drug use/abuse
   - Information about the subject that, if it became known outside the research, could reasonably place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing or employability.

6. Means of obtaining the information. Check all that apply.
   - Field/Laboratory observation
   - Tissue/Blood sampling
   - Measurement of motions/actions
   - In-person interviews/survey (Attach questionnaire/instrument)
   - Telephone interviews/survey (Attach questionnaire/instrument)
   - Other means (specify):
   - Mail survey (Attach questionnaire/instrument)
   - On-site survey (Attach questionnaire/instrument)
   - Examine public documents, records, data, etc.
   - Examine private documents, records, data, etc.
   - Use of standard educational tests, etc.

7. Is a written consent form being used: **Yes** (Attach copy) **No**

8. Will subject(s) receive an explanation of the research before and/or after the project?
   - **Yes** (Attach copy)
   - **No** (see letter requesting participation)

9. Is this part of your thesis or dissertation? **Yes** **No**

   If YES, date you successfully presented your proposal to your committee: _________
Appendix I

Data Organization Grid
QUESTION # ______

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<th>Category</th>
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