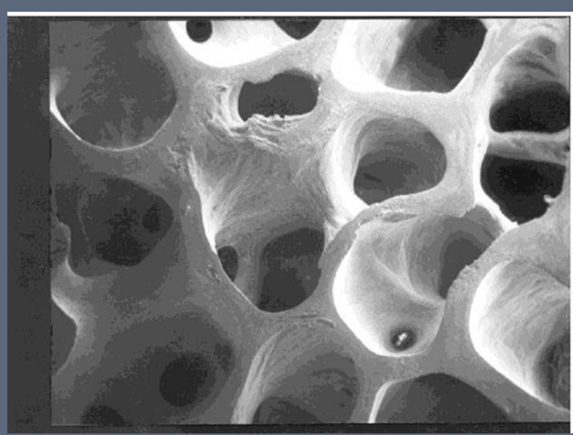

NORMAL BONE

Prevention of Osteoporosis in Geriatric Populations in the United States

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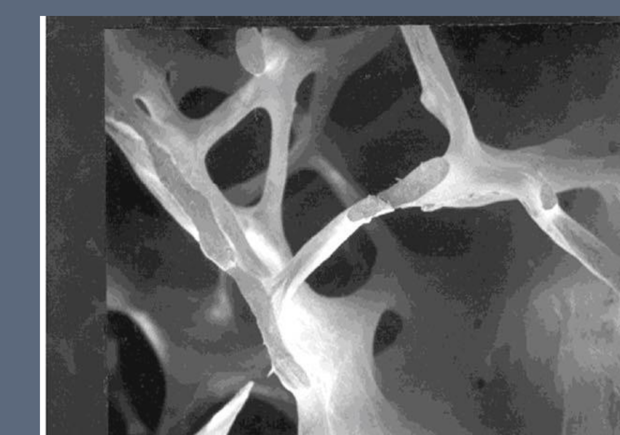


OSTEOPOROTIC BONE

INTRODUCTION

Osteoporosis is a progressive systemic skeletal disease resulting in low bone mass and deterioration of bone tissue

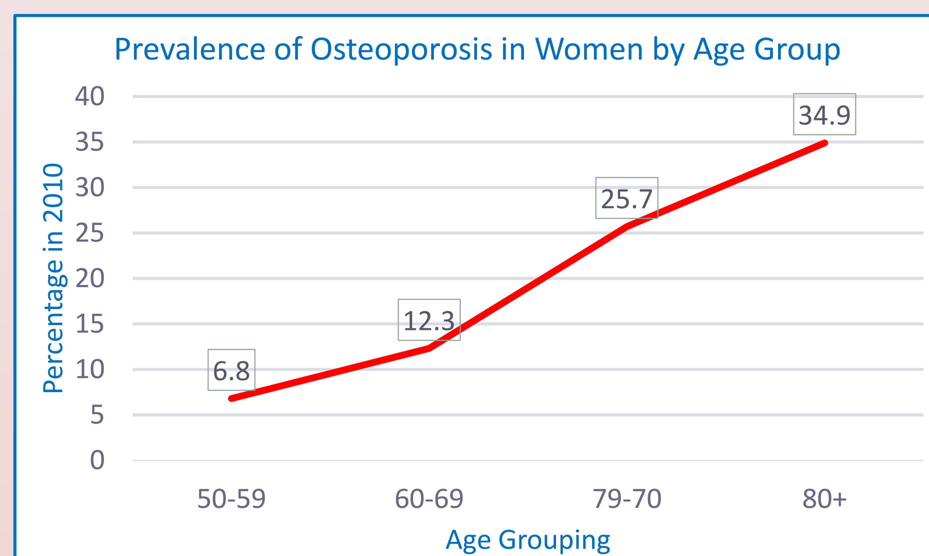
- Primary Osteoporosis is due to normal age related reduction in activity of osteoblast bone producing cells
- Primary Osteoporosis is higher in postmenopausal women than similar age men due to reduction in the bone preserving effects of estrogen
- Secondary osteoporosis is caused by exogenous drugs or systemic disease

Osteoporosis is defined as a femur neck or lumbar spine bone mineral density (BMD) -2.5 standard deviations or more below the average value for a young non-Hispanic female

- Low bone mass or osteopenia is defined as a BMD of -1.5 to -2.5 standard deviations (Kanis, et al., 2008)

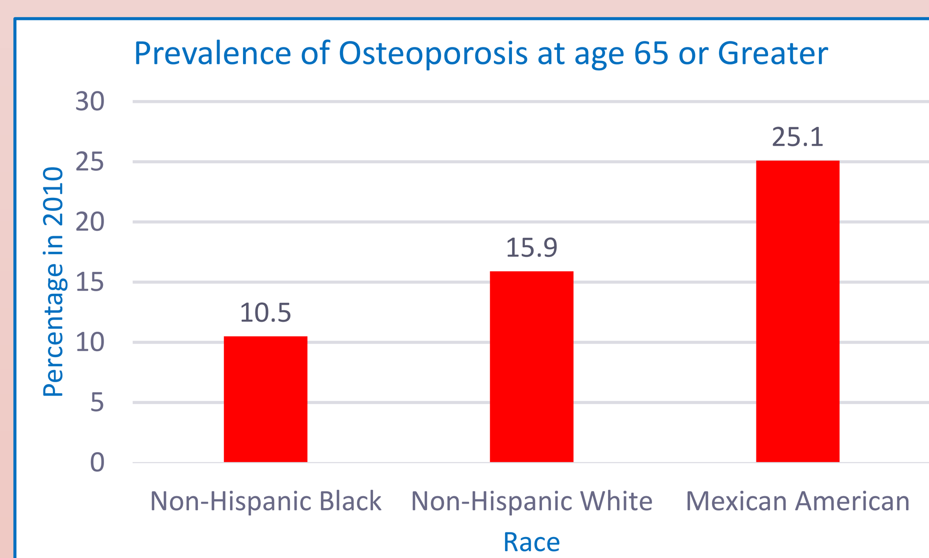
PREVALENCE IN THE U.S.

- 16.2% of adults 65 and older (24.8% of women, 5.6% of men) had osteoporosis in 2010 (Looker & Frenk, 2015)
  - 26.2% of adults 80 and over (34.9% of women, 10.9% of men)
- Significantly higher prevalence in women due to loss of estrogen



(Wright et al., 2014)

- Highest prevalence among Mexican-Americans, followed by non-Hispanic whites, with the lowest among non-Hispanic blacks



(Looker & Frenk, 2015)

- 48.3% of adults over 65 (52.3% women and 44.0% men) had osteopenia in 2010 (Looker & Frenk, 2015)

DISEASE BURDEN

- U.S. osteoporosis-related mortality and morbidity cost was $17 billion in 2005 (Burge et al., 2007)
- By 2025, costs associated with osteoporotic fractures are anticipated to rise by 87% for those aged 65 to 74 years (Burge et al., 2007)
- Lifetime risk of osteoporotic fracture is 40% to 50% for women and 13% to 22% for men (Kling, Clarke, & Sandhu, 2014)
- In a recent study, overall 1 year postoperative osteoporotic hip fracture mortality was 27.3%; mortality at 3.7 years was 79.0% (Panula et al., 2011)
  - Other studies have shown 1 year post osteoporotic hip fracture mortality rates ranging from 12% to 37% (Wolinsky, Fitzgerald, & Stump, 1997)

Levels of Prevention

Primary

- Goals:
  - Address modifiable risk factors to prevent or reduce loss of bone mass
- Interventions (Cosman et al., 2014):
  - General Health Promotion:
    - Educate, promote the consumption of adequate Calcium (1,200mg/day for all ages) and Vitamin D (800IU for adults >= 50 years old)
    - Educate, promote weight bearing exercise for all ages, at least 150 minutes/week
    - Advocate against starting smoking and provide interventions for smoking cessation
    - Educate, promote moderate alcohol consumption
    - Help evaluate and reduce fall risks
  - Specific Health Protection:
    - Treat disease specific causes of osteoporosis such as adrenal insufficiency, Cushing syndrome, diabetes, hyperparathyroidism, GI, hematologic and rheumatic disorders
    - Avoid/minimize drug related causes such as glucocorticoids, PPI's, anticonvulsants, etc

Secondary

- Goals:
  - Identify osteoporosis or osteopenia early in the course of the disease so that appropriate treatment may be initiated before/to prevent additional bone loss and fractures
- Interventions (Lim, Hoeksema, & Sherin, 2009):
  - Perform dual-energy X-ray absorptiometry (DEXA) bone mineral density (BMD) screening of either femoral neck or lumbar spine for:
    - Women: Age >= 65 years without additional risk factors or < 65 years with additional risk factors
    - Men: Age >= 70 years without additional risk factors or >= 50 years with additional risk factors
    - Additional risk factors include low body mass, extended use of glucocorticoids, rheumatoid arthritis, and current smoking
  - Utilize WHO Fracture Risk Assessment Tool (FRAX) screening for all women and men over 50. Can be combined with BMD screening for increased sensitivity or used alone to help determine need for BMD testing
  - Conduct vertebral imaging, in addition to BMD, for women > 65 or men > 70 with osteopenia, unusual height loss, or low trauma frx
  - Continue primary interventions at same levels unless person meets criteria for tertiary interventions

Tertiary

- Goals:
  - Provide treatment to reduce disease burden / limitation, reduce disease progression, and rehabilitate
- Interventions (Kling et al., 2014):
  - Add a bisphosphonate medication for postmenopausal women and men over 50 with:
    - A hip or vertebral fracture
    - Primary osteoporosis (BMD SD of -2.5 or lower), measured at femoral neck or lumber spine
    - Osteopenia (BMD SD between -1 and -2.5) with a FRAX 10-year risk score of at least 3% for hip fracture or at least 20% for major osteoporotic fracture
    - Contraindications: esophageal disorders, certain types of bariatric surgery, Stage 4 or 5 Chronic Kidney Disease (CKD)
    - Repeat BMD screening in 1-2 years for bisphosphonate treatment, with treatment for typically 5 years or less
  - Adjust treatment as possible/applicable for osteoporosis secondary to medications and/or diseases
  - Continue primary interventions with certain modifications:
    - Modify exercises as needed for fall safety but continue at primary intervention levels
    - Monitor serum calcium and vitamin D (serum 25(OH)) and increase primary level intervention doses as required
  - Add Denosumab for women with severe osteoporosis and/or high fall risk
  - Do not add estrogen if used solely for treatment/prevention of osteoporosis
  - Promote fall prevention: Exercise / balance training, home safety audits, vision and hearing correction, evaluation of neurologic issues, avoidance of medications that cause imbalance, and hip pad or other protectors for those with significant risk

ACROSS ALL LEVELS OF INTERVENTIONS

Geriatric focused social media | Health tracking applications | Publications | Provider Education

OUTCOME MEASURES AND GOALS

- **Primary Prevention:**
  - Percent of smoking, alcohol abuse, exercise, and adequate nutrition, based on Healthy People 2020 Goals (HealthyPeople.gov, 2017)
    - Smoking in Adults: Goal - 12%; 2015 Data 15.3%
    - Binge drinking in adults: Goal – 24.4%; 2015 Data 26.9%
    - Meeting exercise guidelines: Goal - 20.1%; 2015 Data 21.4%
    - Meeting daily vegetable goals: Goal - 1.1 cups/1K cal; 2012 Data 0.8
  - Avoidance of inappropriate medications among Medicare patients
    - Percent with annual inappropriate medication review: Goal - 92%; 2015 Data for highest performing insurance plans 87% (CMS, 2015)
- **Secondary Prevention**
  - Percent of adults with BMD screening based on guidelines (NCQA, 2016)
    - Healthcare Effectiveness Data and Information Set (HEDIS) Goal - 90%; 2015 Data 73.8% for HMO patients, 79.3% for PPO patients
- **Tertiary Prevention**
  - Percent of women who had a fracture in last 6 months receiving appropriate treatment (CMS, 2015; NCQA, 2016)
    - Centers for Medicare and Medicaid Services (CMS) 5 Star Goal - 76%; 2015 Data 40.7% for HMO patients, 32.8% for PPO patients

APPLICATION OF THEORY – HEALTH BELIEF MODEL

The Health Belief Model (HBM) was developed by social psychologists working in the U.S. Public Health Services (Nursing Theories, 2012)

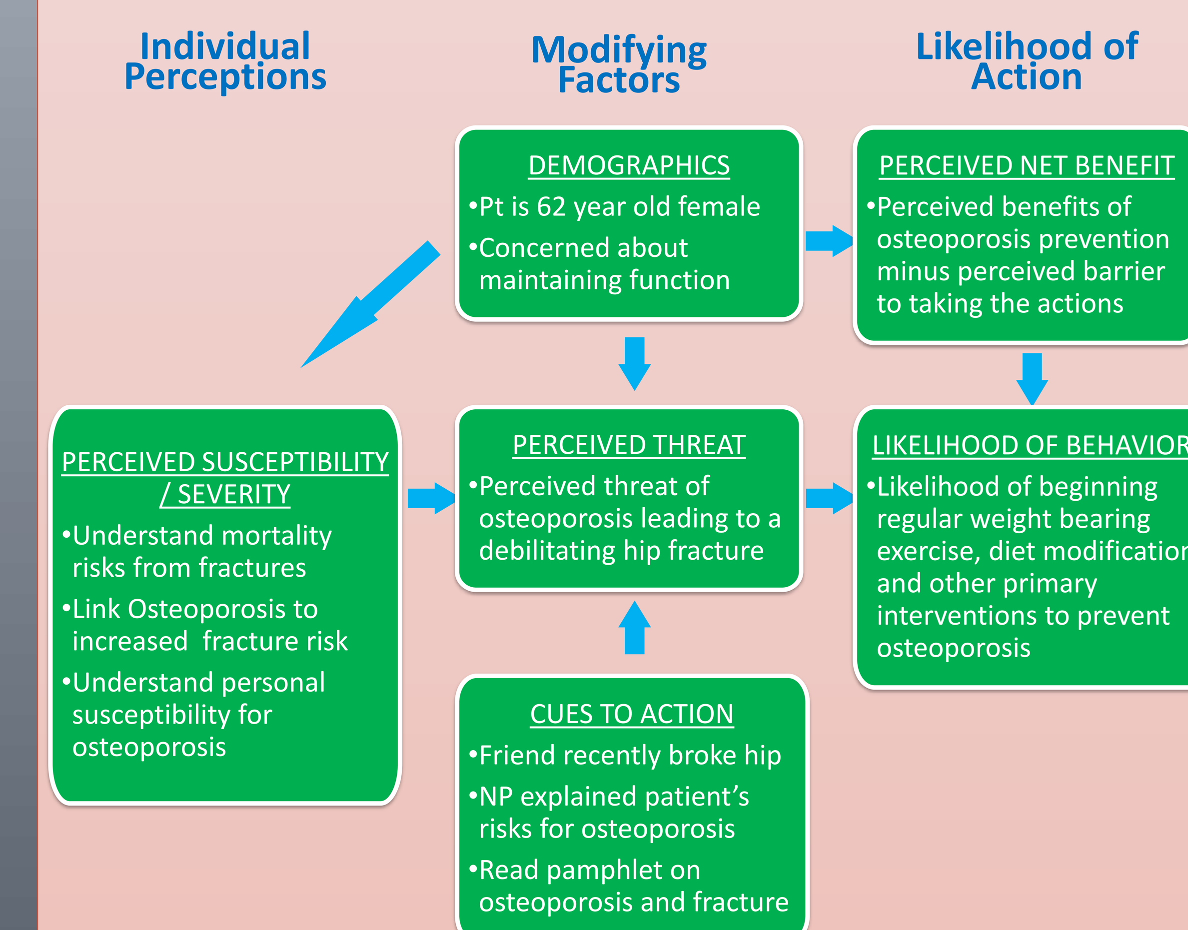
- Developed to understand why people were not participating in programs to prevent diseases

The model proposes that people will participate in preventative health measures based on their perception of four factors:

- The severity of the disease
- The person's susceptibility to the disease
- The benefits of the preventative measure to prevent the disease
- The barriers to taking the preventative measure

The four factors are influenced by:

- A person's specific socio-demographics and other unique factors
- Some "calls to action" – events that move people to change behavior



KEY SUMMARY POINTS

- Osteoporosis is a progressive systemic disease resulting in loss of bone density
- The disease burden from associated fractures is significant and growing
- Multiple primary prevention measures can prevent or reduce bone loss
- Screening can identify osteoporosis or osteopenia at a stage where the disease can be better managed
- Tertiary prevention can reduce bone loss and help minimize fracture risks

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