Osteoporosis

January 1995 through December 1999
2449 Citations

Prepared by
Martha Glock, M.L.S., National Library of Medicine
Kathleen A. Shanahan, M.P.I.A., M.L.I.S., National Library of Medicine
Joan A. McGowan, Ph.D., National Institute of Arthritis and Musculoskeletal and Skin Diseases

2000 March

U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
Public Health Service
National Institutes of Health

National Library of Medicine
Reference Section
8600 Rockville Pike
Bethesda, Maryland 20894
SERIES NOTE

Each bibliography in the Current Bibliographies in Medicine (CBM) series covers a distinct subject area of biomedicine and is intended to fulfill a current awareness function. Citations are usually derived from searching a variety of online databases. NLM databases utilized include MEDLINE®, AVLINE®, BIOETHICSLINE®, CANCERLIT®, CATLINE®, HEALTHSTAR®, POPLINE® and TOXLINE®. The only criterion for the inclusion of a particular published work is its relevance to the topic being presented; the format, ownership, or location of the material is not considered.

Other publications in the Current Bibliographies in Medicine series are available at no cost to anyone with Internet access through the Library's World Wide Web site at http://www.nlm.nih.gov/pubs/resources.html

Comments and suggestions on this series may be addressed to:

Karen Patrias, Editor
Current Bibliographies in Medicine
Reference Section
National Library of Medicine
Bethesda, MD 20894
Phone: 301-496-6097
Fax: 301-402-1384
Internet: ref@nlm.nih.gov

PUBMED® and INTERNET GRATEFUL MED®

To make online searching easier and more efficient, the Library offers two user-friendly interfaces to its databases. Both PubMed and Internet Grateful Med are available from the World Wide Web. The user with Internet access need only point a compatible Web browser to the NLM Web site http://www.nlm.nih.gov/. No other software at the user end is required. Searching through either PubMed or Internet Grateful Med is free-of-charge. Further information on both PubMed and Internet Grateful Med may be found at the NLM Web site given above.

For those users without access to the World Wide Web, please contact the Library's Customer Service Desk at 1-888-FINDNLM (301-594-5983 international) or e-mail custserv@nlm.nih.gov for information on alternative ways to search.

Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through September 30, 2000.
# TABLE OF CONTENTS

**Guidelines and Consensus Statements**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone Density</td>
<td>3</td>
</tr>
<tr>
<td>Falls</td>
<td>6</td>
</tr>
<tr>
<td>Fractures</td>
<td>7</td>
</tr>
<tr>
<td>Genetics</td>
<td>10</td>
</tr>
<tr>
<td>Racial / Ethnic / Gender Differences</td>
<td>16</td>
</tr>
<tr>
<td>Risk Factors</td>
<td>18</td>
</tr>
</tbody>
</table>

**Epidemiology**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone Density</td>
<td>3</td>
</tr>
<tr>
<td>Falls</td>
<td>6</td>
</tr>
<tr>
<td>Fractures</td>
<td>7</td>
</tr>
<tr>
<td>Genetics</td>
<td>10</td>
</tr>
<tr>
<td>Racial / Ethnic / Gender Differences</td>
<td>16</td>
</tr>
<tr>
<td>Risk Factors</td>
<td>18</td>
</tr>
</tbody>
</table>

**Assessment (Diagnosis)**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>35</td>
</tr>
<tr>
<td>Biochemical Markers</td>
<td>41</td>
</tr>
<tr>
<td>Bone Structure / Quality /Histomorphometry</td>
<td>45</td>
</tr>
<tr>
<td>Comparative Methodology</td>
<td>46</td>
</tr>
<tr>
<td>Computed Tomography (CT)</td>
<td>48</td>
</tr>
<tr>
<td>Densitometry</td>
<td>50</td>
</tr>
<tr>
<td>MRI</td>
<td>53</td>
</tr>
<tr>
<td>Spine Morphometry</td>
<td>54</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>55</td>
</tr>
</tbody>
</table>

**Therapy (Treatment and Prevention)**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>59</td>
</tr>
<tr>
<td>Clinical Trial Methodology</td>
<td>59</td>
</tr>
<tr>
<td>Combination Therapies</td>
<td>60</td>
</tr>
<tr>
<td>Comparison of Therapies</td>
<td>61</td>
</tr>
<tr>
<td>Bisphosphonates</td>
<td>62</td>
</tr>
<tr>
<td>Calcitonin</td>
<td>67</td>
</tr>
<tr>
<td>Calcium / Vitamin D</td>
<td>68</td>
</tr>
<tr>
<td>Electromagnetic Stimulation</td>
<td>70</td>
</tr>
<tr>
<td>Estrogen / Androgen</td>
<td>71</td>
</tr>
<tr>
<td>Exercise</td>
<td>74</td>
</tr>
<tr>
<td>Fluoride</td>
<td>76</td>
</tr>
<tr>
<td>Growth Hormone</td>
<td>78</td>
</tr>
<tr>
<td>Parathyroid Hormone</td>
<td>78</td>
</tr>
<tr>
<td>SERM's and Phytoestrogens</td>
<td>79</td>
</tr>
<tr>
<td>Topic</td>
<td>Page</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Bone Growth (Children)</td>
<td>81</td>
</tr>
<tr>
<td>Health Care (Burden of Illness) / Cost Effectiveness</td>
<td>83</td>
</tr>
<tr>
<td>Models and Definitions</td>
<td>87</td>
</tr>
<tr>
<td>Nutrition and Bone Health</td>
<td>87</td>
</tr>
<tr>
<td>Osteoporosis in Men</td>
<td>91</td>
</tr>
<tr>
<td>Oral Bone and Osteoporosis</td>
<td>93</td>
</tr>
<tr>
<td>Pathophysiology</td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>95</td>
</tr>
<tr>
<td>Bone Mechanics</td>
<td>100</td>
</tr>
<tr>
<td>Bone Structure</td>
<td>101</td>
</tr>
<tr>
<td>Quality of Life</td>
<td>102</td>
</tr>
<tr>
<td>Rehabilitation and Fracture Treatment</td>
<td>104</td>
</tr>
<tr>
<td>Secondary Osteoporosis</td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>106</td>
</tr>
<tr>
<td>Glucocorticoid-Related Osteoporosis</td>
<td>118</td>
</tr>
<tr>
<td>Transplantation-Related Osteoporosis</td>
<td>122</td>
</tr>
</tbody>
</table>
INTRODUCTION

Osteoporosis is a major threat for millions of Americans. In the U.S. today, 10 million individuals already have osteoporosis, and 18 million more have low bone mass, placing them at increased risk for this disease. Osteoporosis is characterized by low bone mass and structural deterioration of bone tissue, leading to bone fragility and an increased susceptibility to fractures—especially of the hip, spine, and wrist. It is the most prevalent of the bone diseases that affect Americans, and women are four times more likely to develop osteoporosis than men.

Osteoporosis, once acknowledged as a natural part of aging, does not need to be a consequence of aging any longer. It is largely a preventable disease due to the remarkable progress that has been made in the scientific understanding of its causes, diagnosis, and treatment.

This bibliography was prepared in support of the National Institutes of Health (NIH) Consensus Development Conference on Osteoporosis Prevention, Diagnosis, and Therapy, held in Bethesda, Maryland on March 27-29, 2000.

The conference addressed the following key questions:

* What is osteoporosis and what are its consequences?
* How do risks vary among different segments of the population?
* What factors are involved in building and maintaining skeletal health throughout life?
* What is the optimal evaluation and treatment of osteoporosis and fractures?
* What are the directions for future research?

The bibliography lists selected journal article citations from NLM's MEDLINE and other online databases from January 1995 through December 1999. It has been limited to human studies published in English. In general, reviews, letters, case reports, and editorials have been omitted. The bibliography is arranged in 14 subject categories that address the questions posed by the consensus development conference including: guidelines and consensus statements; epidemiology; assessment; therapy; bone growth; health care (including burden of illness and cost effectiveness); models and definitions; nutrition and bone health; osteoporosis in men; oral bone and osteoporosis; pathophysiology; quality of life; rehabilitation and fracture treatment; and secondary osteoporosis. In general, only articles that report clinical research studies or review comprehensively a particular topic are included. Citations are listed in only one category. Within each category, arrangement is alphabetical by author.

Any reproductions of this bibliography, in whole or in part, must include all credits. If you wish to cite this bibliography, the correct format is:

SAMPLE CITATIONS

Citations in this bibliographic series are formatted according to the rules established for Index Medicus®. Sample journal and monograph citations appear below. For journal articles written in a foreign language, the English translation of the title is placed in brackets; for monographs, the title is given in the original language. In both cases the language of publication is shown by a three letter abbreviation appearing at the end of the citation.

**Journal Article:**

*Authors*                          *Article Title*

Ruocco V, Florio M. Fish-odor syndrome: an olfactory diagnosis.  

*Abbreviated Journal*  *Date*  *Volume*  *Issue*  *Pages*  

**Monograph:**

*Authors/Editors*                          *Title*

Shehin-Johnson SE. Molecular characterization of flavin-containing monooxygenases in rabbit.  

*Place of Publication*  *Publisher*  *Date*  *Total No. of Pages*

*For details of the formats used for references, see the following publication:

Guidelines and Consensus Statements


Hochberg MC, Prashker MJ, Greenwald M, Hannan MT, Lane NE, Lindsey SM, Lovell DJ, Tindall EA. Recommendations for the prevention and treatment of...


**Epidemiology**

**Bone Density**


Shipman AJ, Guy GW, Smith I, Ostlere S, Greer W, Smith R. Vertebral bone mineral density, content and
area in 8789 normal women aged 33-73 years who have never had hormone replacement therapy. Osteoporos Int 1999;9(5):420-6.


Falls


Fractures


Genetics


Langdahl BL, Knudsen JY, Jensen HK, Gregersen N, Eriksen EF. A sequence variation: 713-8delC in the transforming growth factor-beta 1 gene has higher prevalence in osteoporotic women than in normal women and is associated with very low bone mass in osteoporotic women and increased bone turnover in both osteoporotic and normal women. Bone 1997 Mar;20(3):289-94.


Racial / Ethnic / Gender Differences


Harris SS, Wood MJ, Dawson-Hughes B. Bone mineral density of the total body and forearm in premenopausal black and white women. Bone 1995 Apr;16(4 Suppl):311S-315S.


Risk Factors


Felson DT, Zhang Y, Hannan MT, Kannel WB, Kiel DP. Alcohol intake and bone mineral density in


Grant DJ, McMurdo ME, Mole PA, Paterson CR. Is previous hyperthyroidism still a risk factor for


Hla MM, Davis JW, Ross PD, Wasnich RD, Yates AJ, Ravn P, Hosking DJ, McClung MR. A multicenter study of the influence of fat and lean mass on bone mineral content: evidence for...


Klein RF, Carlos AS. Inhibition of osteoblastic cell proliferation and ornithine decarboxylase activity by ethanol. Endocrinology 1995;136(8):3406-11.


Ravn P, Cizza G, Bjarnason NH, Thompson D, Daley M, Wasnich RD, McClung M, Hosking D, Yates AJ, Christiansen C. Low body mass index is an important


**Assessment (Diagnosis)**

**General**


Bouxsein ML, Coan BS, Lee SC. Prediction of the strength of the elderly proximal femur by bone mineral density and quantitative ultrasound


Del Campo MT, Gonzalez-Casaus ML, Aguado P, Bernad M, Carrera F, Martinez ME. Effects of age, menopause and osteoporosis on free, peptide-bound...


Ultrasound units make densitometry cheaper and more accessible to PCPs. Diagn Imaging (San Franc) 1998 Nov;Suppl Bone Mass:3-4.

Biochemical Markers


Quan H, Shih WJ. Assessing reproducibility by the within-subject coefficient of variation with random effects models. Biometrics 1996 Dec;52(4):1195-203.


Ravindra P, Hosking D, Thompson D, Cizza G, Wasnich RD, McClung M, Yates AI, Bjarnson NH,


Yasumizu T, Hoshi K, Iijima S, Asaka A. Serum concentration of the pyridinoline cross-linked carboxyterminal telopeptide of type I collagen (ICTP) is a useful indicator of decline and recovery of bone mineral density in lumbar spine: Analysis in Japanese postmenopausal women with or without hormone replacement. Endocr J 1998;45(1):45-51.


Comparative Methodology


Laval-Jeantet AM, Bergot C, Williams M, Davidson K, Laval-Jeantet M. Dual-energy X-ray absorptiometry of the calcaneus: comparison with vertebral dual-energy X-ray absorptiometry and


Compared Tomography (CT)


Densitometry


MRI


Spine Morphometry


Ultrasound


Hodgkinson R, Njeh CF, Whitehead MA, Langton CM. The non-linear relationship between BUA and


Therapy (Treatment and Prevention)

General


Clinical Trial Methodology


Combination Therapies


Montessori ML, Scheele WH, Netelenbos JC, Kerkhoff JF, Bakker K. The use of etidronate and calcium versus calcium alone in the treatment of...


Comparison of Therapies


Bisphosphonates


Clemmesen B, Ravn P, Zegels B, Taquet AN, Christiansen C, Reginster JY. A 2-year phase II study with 1-year of follow-up of risedronate (NE-58095) in


Mackay FJ, Wilton LV, Pearce GL, Freemantle SN, Mann RD. United Kingdom experience with...


**Calcitonin**


**Calcium / Vitamin D**


Dawson-Hughes B. Calcium and vitamin D nutritional needs of elderly women. J Nutr 1996 Apr;126(4 Suppl):1165S-1167S.


Holick MF. Environmental factors that influence the cutaneous production of vitamin D. Am J Clin Nutr 1995;61(3 Suppl):638S-645S.


Electromagnetic Stimulation


Estrogen / Androgen


Duan Y, Tabensky A, DeLuca V, Seeman E. The benefit of hormone replacement therapy on bone mass is greater at the vertebral body than posterior processes or proximal femur. Bone 1997 Nov;21(5):447-51.


Lindsay R. The menopause and osteoporosis. Obstet Gynecol 1996 Feb;87(2 Suppl):16S-19S.


Exercise


Hartard M, Haber P, Ilieva D, Preisinger E, Seidl G, Huber J. Systematic strength training as a model of


Fluoride


Lundy MW, Stauffer M, Wergedal JE, Baylink DJ, Featherstone JD, Hodgson SF, Riggs BL. Histomorphometric analysis of iliac crest bone


**Growth Hormone**


**Parathyroid Hormone**


**SERM's and Phytoestrogens**


Bone Growth (Children)


Health Care (Burden of Illness) / Cost Effectiveness


Campbell MK, Torgerson DJ, Thomas RE, McClure JD, Reid DM. Direct disclosure of bone density results to patients: effect on knowledge of osteoporosis risk and anxiety level. Osteoporos Int 1998;8(6):584-90.


Epstein RS, Feng W, Hirsch LJ, Kelly M. Intervention thresholds for the treatment of osteoporosis: comparison of different approaches to


Melton LJ 3rd, Thamer M, Ray NF, Chan JK, Chesnut CH 3rd, Einhorn TA, Johnston CC, Raisz


Togerson DJ, Reid DM. The pharmacoeconomics of hormone replacement therapy. Pharmacoeconomics 1999;16(1):9-16.


Models and Definitions


Nutrition and Bone Health


Bryant RJ, Cadogan J, Weaver CM. The new dietary reference intakes for calcium: implications for...


Michaelsson K, Holmberg K, Mallmin H, Wolk A, Bergstrom R, Ljunghall S. Diet, bone mass, and...


Osteoporosis in Men


Effective treatment of osteoporosis in men still to be established. Drugs Ther Perspect 1999;14(6):8-10.


Oral Bone and Osteoporosis


Krall EA, Garcia RI, Dawson-Hughes B. Increased risk of tooth loss is related to bone loss at the whole


Pathophysiology

General


Kassem M, Brixen K, Mosekilde L, Blum WF, Flyvbjerg A. Effects of growth hormone treatment on serum levels of insulin-like growth factors (IGFs) and IGF binding proteins 1-4 in postmenopausal women. Clin Endocrinol (Oxf) 1998 Dec;49(6):747-56.

Kassem M, Khosla S, Spelsberg TC, Riggs BL. Cytokine production in the bone marrow.


Riggs BL, Melton LJ 3rd, O'Fallon WM. Drug therapy for vertebral fractures in osteoporosis: evidence that decreases in bone turnover and increases in bone mass both determine antifracture efficacy. Bone 1996 Mar;18(3 Suppl):197S-201S.


Straub RH, Konecna L, Hrach S, Rothe G, Kreutz M, Scholmerich J, Falk W, Lang B. Serum dehydroepiandrosterone (DHEA) and DHEA sulfate are negatively correlated with serum interleukin-6 (IL-6), and DHEA inhibits IL-6 secretion from mononuclear cells in man in vitro: Possible link between endocrinosenescence and immunosenescence. J Clin Endocrinol Metab 1998;83(6):2012-7.


Bone Mechanics


Li B, Aspden RM. Mechanical and material properties of the subchondral bone plate from the femoral head of patients with osteoarthritis or osteoporosis. Ann Rheum Dis 1997 Apr;56(4):247-54.


Bone Structure


### Quality of Life


Galindo-Ciocon D, Ciocon JO, Galindo D. Functional impairment among elderly women with osteoporotic


Rehabilitation and Fracture Treatment


Secondary Osteoporosis

General


Brand CA, Jolley D, Tellus M, Muirden KD, Wark JD. Risk factors for osteoporosis and fracture in patients attending rheumatology outpatient clinics.


Madsen OR, Egsmose C, Hansen B, Sorensen OH. Soft tissue composition, quadriiceps strength, bone


Schwahn B, Mokov E, Scheidhauer K, Lettgen B, Schonau E. Decreased trabecular bone mineral density in patients with phenylketonuria measured by


Glucocorticoid-Related Osteoporosis


Buckley LM, Leib ES, Cartularo KS, Vacek PM, Cooper SM. Effects of low dose methotrexate on the


Transplantation-Related Osteoporosis


