

Managing Osteoporosis

A Nova Scotia Approach



**Report
of the
Provincial
Osteoporosis
Committee**

June 2002


NOVA SCOTIA
Department of Health

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ISBN: 0-88871-749-0

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*"I have become quite depressed since I broke my arm and pelvis.
I am 82 years old yet I feel like a dependent child again.
I wish that I had known more about what it really means
to have osteoporosis before my fall happened."*

— Mrs. D., Patient with Osteoporosis


Acknowledgements

I wish to acknowledge, with gratitude, the cooperation and the contribution of time, effort and energy made by the members of the Provincial Osteoporosis Committee.

In addition, I would like to thank Dr. Gillian Graves and Dr. Philip Acott for their time and recommendations in reviewing the Guidelines for Bone Density Testing developed by the committee.

A special thank you to Dee Ryan-Meister, graphic designer, Communications Nova Scotia, and Sue McKeage, Director of Communications, Department of Health, for editing, design and layout.

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Executive Summary

Osteoporosis is a common metabolic bone disease affecting an estimated 30% of women and 12.5% of men over the age of 50 (1). Although not the sole cause of fracture, osteoporosis is a major determinant of fracture risk. Hip fractures, in particular, are a devastating injury with mortality in the first year after fracture approaching 20% (2). In Nova Scotia, hip fractures constitute, on average, 64% of the 1683 total fractures in the province, resulting in the use of 22,124 inpatient hospital days annually (Table 1). Early identification and appropriate treatment of the disease is considered to be a key strategy in reducing the risks of fractures.

Bone densitometry, the principal diagnostic tool in osteoporosis, continues to be the most effective and accurate measure for the identification and monitoring of the disease (3). The role and use of peripheral devices, such as ultrasonometry, identified as an additional diagnostic tool, was reviewed. In reviewing the current evidence, ultrasound as a screening or diagnostic tool to identify risk factors in osteoporosis was not recommended at this time. The capacity to respond to the needs of this population has been significantly challenged with limited availability of bone densitometry machines in the province. Until 1999, there was only one machine, located at the QEII in Halifax, to provide diagnostic services for the province. An additional machine at Fishermen's Memorial in Lunenburg, purchased in 1999 and at Colchester Regional in Truro in 2001, has provided additional capacity and improved access for residents within the province. Currently, individual clinicians within each of the facilities determine the appropriate use of bone densitometry.

Beginning in July 1997, the Department of Health has invested considerable time and resources in an attempt to address the growing demand for diagnostic services, specifically bone densitometry, in the province. Committees, whose membership reflected the clinical experts in the field, were established to make recommendations on how patients, who were at risk for osteoporosis, should be assessed, diagnosed and treated in Nova Scotia (3). The report recommended the addition of at least five new densitometry units to improve access, the development of province wide screening guidelines and the review of current practice guidelines for the treatment of osteoporosis. In the spring of 1999, approval for the introduction of two mobile bone densitometry machines was publicly announced and a committee was established to develop the plan. The committee was dissolved in August 1999 without a final report completed.

In June 2001, the Department of Health, reviewing and building on the previous work completed, established a provincial committee, to develop a provincial approach that would coordinate and integrate health services from prevention to treatment to the population at risk or who have osteoporosis. This approach was to be developed with

the understanding that two (2) additional bone densitometry machines would be approved by the province. The committee established reflected the interests, expertise and sectors required to address its mandate.

Drawing on the input and expertise of the committee members, the literature, practices in other jurisdictions and recent recommendations from the National Osteoporosis Foundation, the Osteoporosis Society of Canada, the Society of Obstetricians and Gynaecologists of Canada, the World Health Organization, Health Canada Guidelines, the Canadian Association of Radiologists and the Nova Scotia Report of the Expert Panel, the committee is pleased to offer the following twelve (12) recommendations:

It is recommended that:

Prevention

1. A coordinated, inter-sectoral program, be developed to educate children, parents and health care providers on the important factors in preventing osteoporosis during childhood and adolescence.

The most important factors in preventing osteoporosis are attaining peak bone mass during childhood and adolescence and maintaining bone mass thereafter. It is evident that optimizing diet and activity at this stage would have the most significant impact in preventing osteoporosis. **Crucial years for building healthy bones are in childhood and most particularly in teenage years, 10–14 in girls and 13–17 in boys (21, 24, 25).**

2. Community based initiatives to reduce the incidence of falls in the elderly population must be strengthened and endorsed.

The prevalence of injuries and fractures due to falls is proportionately highest among the elderly and persons with disabilities. Due to the complex personal and environmental factors known to contribute to falls, finding ways to reduce their occurrence is a major challenge. Any one group or sector cannot solve the problem. It is our belief that community based initiatives, through partnerships with other sectors and agencies, will assist in reducing the incidence of falls in Nova Scotia's rapidly aging population.

3. The long term care sector establish a preventative and outcome measurement program that assesses and implements supplementation of resident's nutrition with calcium and Vitamin D. In addition, and in collaboration with the District Health Authorities, a fall assessment program that includes the appropriate use of hip protectors be considered to reduce the risk of fractures.

It is estimated that 10% of falls resulting in fractures occur in institutions. It is evident that the risk of fracture in this population can be significantly reduced with the use of Vitamin D and calcium, the identification of residents most at risk for falls and the appropriate use of hip protectors.

4. A standardized risk and fall assessment protocol should be incorporated into the home care assessment process and the discharge process in acute care.

Falls are both predictable and preventable. Personal risk factors associated with falls, particularly among the older population, appear to operate in an additive way. The likelihood of a fall increases with the number of risks associated with an individual. Health care providers in home and in acute care settings have unique opportunities to identify and implement appropriate interventions with individuals at risk for falls.

Standards and Guidelines for Diagnosis and Treatment

5. The criteria for bone density testing be accepted and implemented as provincial guidelines.

Bone mineral densitometry should be performed when the decision to treat is based on how the test will change the patient's management, such as altering counselling regarding activity or changing the therapy. Based on a cost-benefit analysis, bone densitometry is not currently recommended as a routine screening tool. The most effective technology for diagnosis of osteoporosis is bone mineral densitometry.

6. The Provincial Formulary Management Committee approves the recommended revisions to the medications used for the treatment of Osteoporosis covered by the Nova Scotia Seniors' Pharmacare Program.

Based on the best evidence and clinical opinion we believe that minor changes are needed to the current medications covered by Pharmacare to optimize the care of patients/clients with osteoporosis.

7. District Health Authorities should incorporate primary prevention services into care planning. Nutritional and medication counselling, activity programs, and follow up support are important to include in a primary prevention regime.

Effective treatment requires compliance with lifestyle changes and adherence to the medication regime. The evidence is clear that compliance to osteoporosis drugs is low. Patients who are well educated about osteoporosis medications have a higher compliance rate. Educational and support programs, such as those provided within the Capital Health District (Dartmouth General & the QEII) are examples of how education and follow-up services could be provided. Partnerships with community based groups and agencies to support activity programs and community awareness are necessary.

Quality Standards, Performance Monitoring and Reporting

8. The guidelines and recommendations outlined for the standardization and quality monitoring of the bone densitometry units are implemented.

The value of bone densitometry is not only in the initial diagnosis of risk, but also as a tool to monitor the effectiveness of treatment. To achieve comparability of patient results over time and between machines, the continuation of a single vendor in the province should be maintained in the replacement and acquisition of new units. The validity and reliability of the results will be further enhanced through a standardized quality monitoring approach that assesses each unit, each unit as compared to others in the province, the technologist performing the exam and the physician interpreting the results. The implementation of the Bone Densitometry Accreditation Program of the Canadian Association of Radiologists (Appendix G) to all bone densitometry services, provided in the Districts, will also facilitate a consistent standardized approach.

9. The development and use of indicators, both for clinical and non-clinical activities related to the management of osteoporosis, must be emphasized to be of maximum benefit. To better facilitate development of indicators, it is further recommended that a process be put in place to validate the core set of indicators to be collected.

The Department of Health currently collects data on the type, place of fall and number of fractures occurring on an annual basis in each District Health Authority. We believe additional indicators that monitor the adherence of the guidelines developed for bone density testing and the standardization of the units is necessary. This will evaluate the benefits outlined for the management of osteoporosis and ultimately the reduction of fractures in the province.

Resources/Access

10. The next two (2) bone density units to be purchased and supported by the Department of Health should be placed in Industrial Cape Breton and the other in the Southwestern part of the province.

A review of other jurisdictions noted significant variation in identifying the appropriate number of bone density units for a specified population. While there was considerable discussion on the appropriate number of bone density units for Nova Scotia, determining the adequate number of units was beyond the scope of our committee. First, our review of the available data, and utilization of the current units identified significant access issues for residents of Cape Breton and the Southwest area of Nova Scotia. We believe this access issue should be addressed in the placement of the next two units. Second, we noted the underutilization of the unit in Truro, operating on a half-day basis, and believe that existing units should be maximally operated.

A centralized booking system for bone density testing, with the implementation of the Meditech system and the interface with McKesson's at the QEII, should also be explored to facilitate the appropriate utilization of the units.

Education and Communication

11. An educational and communication plan for the management of osteoporosis be developed and implemented to educate the public and support clinical care.

To successfully implement the recommendations and achieve a coordinated approach to the management of osteoporosis, a planned educational approach will be required with health care providers in the District Health Authorities and long term care facilities. We also believe a communication plan that includes the Osteoporosis Society of Canada, Nova Scotia Chapter, will be essential in clarifying expectations and responsibilities of patients/clients.

Leadership

12. The roles and responsibilities of the Department of Health and the District Health Authorities should be identified in implementing the recommendations outlined.

The provincial approach to the management of osteoporosis, outlined in the recommendations, will require a coordinating role from the Department of Health. We envision this role to oversee the implementation of the recommendations and the development of a process to review and evaluate the impact within two years. Operationalizing the recommendations, including the monitoring and reporting of indicators on an annual basis, will be a collaborative effort between the Department of Health and the District Health Authorities.

The recommendations outlined are presented as the first step in the process of addressing the issues associated with the prevention, diagnosis and treatment of osteoporosis.

The implementation process, with ongoing evaluation, will be essential to ensure the overall outcome — the reduction of fractures and associated effects on both the individual and family who are at risk or have osteoporosis in Nova Scotia.

Mandate of the Provincial Osteoporosis Committee

The Provincial Osteoporosis Committee (POC) was established in June 2001, to develop a provincial approach that would coordinate and integrate care and health services provided to the population at risk or who have osteoporosis. Central to the work of this committee was the recognition and acknowledgement of the work previously completed on osteoporosis. The report of the Expert Panel on the Diagnosis and Management of Osteoporosis (February, 1998) contained a number of recommendations on how patients at risk for osteoporosis should be assessed, diagnosed and treated in Nova Scotia. Though incomplete, the Bone Densitometry Committee's (1999) work also served as the foundation for the work of the POC. The committee membership (Appendix A) reflected the interests, expertise and sectors required in addressing the following objectives:

- To develop provincial standards, outcomes and performance indicators for the prevention, diagnosis and treatment of Nova Scotia residents at risk for or who are experiencing osteoporosis.
- To establish mechanisms to monitor, document and report on selected performance indicators.
- To outline implementation strategies for the standards/guidelines, monitoring, reporting, roles and responsibilities of the stakeholders in the process.
- To develop strategies and timelines to assess and/or revise the care and health services delivered to this population.

Adopting the principles and goals identified and elaborated on by the Expert Panel on the Diagnosis and Management of Osteoporosis (February, 1998) and the current strategic directions of the Department of Health, the POC viewed its mandate as developing recommendations that would result in an overall reduction in the rate of insufficiency fractures in residents of Nova Scotia. The recommendations focus on prevention, improved detection, education and treatment of osteoporosis throughout the lifecycle.

The committee held its initial meeting in June 2001 and continued to meet until November 2001, for a total of five meetings. The resultant report has been developed through the input and contributions of the committee experts and consultation with those in the field. The committee also reviewed the literature, current projects in the Province, (Community Links of Nova Scotia) practices in other jurisdictions, the recommendations from the National Osteoporosis Foundation, the World Health Organization, the Osteoporosis Society of Canada, the Canadian Association of Radiologists and the Society of Obstetricians and Gynaecologists of Canada.

The Report's Approach

The report's approach to managing osteoporosis is in the context of the Department of Health's strategic directions and growing emphasis on a population health approach for Nova Scotia. The committee members deliberated on whether to centre the recommendations from a disease management or from a health promotion perspective. The focus on managing osteoporosis became the central thrust, although there is clearly an underlying emphasis on the development and maintenance of healthy bones throughout one's life. The overall objective of the committee was to provide a report that built on the excellent work previously completed for the Department of Health. As such, detailed information referred to in the report can be obtained from the Department.

The work and unique contributions of each Committee member is reflected in the report. Disease identification, incidence and relevant statistics will highlight the significance of the problem for Nova Scotia followed by the recommendations with supporting rationale. Each recommendation includes the estimated costs, based on available information, and implementation strategies. An overall implementation plan is proposed with suggested timelines.

Significance of the Problem

Osteoporosis is a major health and economic problem in Nova Scotia, in Canada and in other countries. It is estimated that 30% of women and 12.5% of men over the age of 50 have osteoporosis (1). The Canadian Multi Centre Osteoporosis Study estimated that 1,000,000 women and 400,000 men in Canada are affected by osteoporosis, for a total of 1.4 million Canadians (3). Applied to Nova Scotia, this means that 43,340 women and 15,424 men are estimated to have osteoporosis. The majority of them remain undiagnosed and possibly non-symptomatic (Appendix G).

Osteoporosis is a disease in which there is a generalized loss of bone mass and micro-architectural deterioration of bone tissue (4). There is a consequent reduction in bone strength and an increased susceptibility to spontaneous fractures or fractures in response to low energy trauma. The World Health Organization defines osteoporosis as a bone mineral density measurement (T Score) of more than 2.5 standard deviations below the mean for young adults (6, 7). Low bone mineral density is the single most important predictor of bone fragility and accounts for 80% of an individual's fracture risk. The relative risk of new fractures resulting from mild to moderate trauma is about 2.0 for every 1 standard deviation decrease in bone density below age-matched controls. In vertebral fractures, the relative risk rises to 2-2.4. Risk is further increased when associated with other factors such as previous fractures and family history (8). According to the US National Osteoporosis Foundation, an estimated 70% of all hip fractures are a result of osteoporosis (7).

In 1993, Goeree et. al., estimated that osteoporosis-related hip fractures accounted for 21,000 hospitalizations in Canada (5). Another study attributed 80% probability of osteoporosis contributing to fracture in white women aged 45-65 and rising to 95% in the over 85-age group (7, 9). The most significant clinical manifestation of osteoporosis is fracture resulting in further complications of pain, deformity, postural changes due to spinal fractures, disability, physical deconditioning due to inactivity, loss of independence and changes in self-image and death.

- Vertebral compression fractures occur more frequently in women than in men, and typically affect T8-L3*. Two thirds of these fractures, which may develop during routine activities such as bending, lifting, or rising from a chair or bed are asymptomatic and it is possible that half of these fractures may not come to clinical attention.
- Hip fractures tend to affect an older population and the sex distribution is more even than with vertebral fractures. Most patients fail to recover normal activity and mortality within one-year. This approaches 20% for women and 34% for men. It is important to note that 14% of patients who suffer hip fractures are in a nursing home within the first year of injury (8).
- Wrist fractures are also common leading to conditions such as premature arthritis and painful wrist motion (3).

In Canada, it is estimated that the diagnosis of osteoporosis utilizes 1.8 million inpatient days per year (10). As illustrated in Table 1, inpatient separations in Nova Scotia for hip and spine/wrist fractures have clearly increased by 11% and 17% respectively. This increase has resulted in the use of 28,760 inpatient days in 2000. The financial impact of fractures, specifically related to hip fractures, has been studied in Canada and in 1993 it was estimated to be \$1.3 billion per year (\$465 million in acute hospitalization, \$563 million for long term, \$279 million in chronic care costs) (5). These direct care estimates exclude the costs to families or caregivers in caring for the family member at home. In Nova Scotia, the costs have not yet been accurately identified; however, the report of the Expert Panel estimated the annual acute care costs to be \$8 million in 1996-97 (3). Several other studies, conducted in the United States, identified the range of acute care costs, specifically associated with hip fractures, to be between \$19,500-21,900 per patient (8, 11, 12). These studies also concluded that 14% of patients who suffer hip fractures are transferred to a nursing home for care within the first year of injury. The average nursing home cost for one resident in Nova Scotia is approximately \$46,355 a year. We do know that with Nova Scotia's aging population and the rising incidence of fractures, the cost associated with care in all settings (acute & chronic) will continue to increase. To reverse this trend strategies are required to reduce the incidence of osteoporosis, improve early identification and treatment, and decrease the occurrence of falls.

*However, a recent Canadian study (42) suggested the discrepancy between men and women was not as great as previously thought.

Table 1: Inpatient Separations and Total Patient Days

Diagnosis	Total Separations						Total Patient Days					
	1995	1996	1997	1998	1999	2000	1995	1996	1997	1998	1999	2000
Hip Fracture	968	1049	1108	1035	1043	1167	18730	18918	25758	17643	25192	23110
Spinal Fracture	191	211	186	169	199	195	2349	2740	2545	2189	2427	3110
Wrist Fracture	445	389	420	383	427	435	2470	2674	2828	3704	2552	2540
Grand Total	1604	1649	1714	1587	1669	1797	23549	24332	31131	23536	30171	28760

Recommendations, Estimated Costs and Implementation Strategies

The following twelve recommendations with supporting rationale are submitted for consideration. In addition, implementation strategies and estimated costs are identified. An overall implementation plan that pulls all strategies together is presented in a separate section of the report. The recommendations are based on our review of the literature, consultation with experts outside the committee members, practices in other jurisdictions and the recommendations from the National Osteoporosis Foundation, the World Health Organization, the Osteoporosis Society of Canada, the Canadian Association of Radiologists and the Society of Obstetricians and Gynaecologists of Canada. The recommendations are presented under the broad headings of: prevention, guidelines for diagnosis and treatment, quality standards, performance monitoring and reporting, resources/ access, education and communication and leadership.

Prevention

- 1. Develop a coordinated, inter-sectoral program, to educate children, parents and health care providers on the important factors in preventing osteoporosis during childhood and adolescence.***

Rationale

The available evidence clearly indicates a role for healthy lifestyle practices in promoting healthy bones and decreasing the likelihood of fractures throughout the lifecycle. Calcium is a mineral that plays an essential role in the development and maintenance of a healthy skeleton. Vitamin D promotes active absorption of calcium across the intestinal wall and is thought to play a role in bone mineralization. The role of adequate calcium

and Vitamin D through diet and nutritional supplementation throughout life has been identified as a key factor in maintaining healthy bones (13-23). **Crucial years for building healthy bones are in childhood and most particularly in teenage years, 10–14 in girls and 13–17 in boys** (21, 24, 25). The bone mass accumulated during youth and the rate of bone loss occurring after age 35 determines the amount of bone present later in life. Both processes are thought to be equally important in determining bone mass at age 70. Factors most associated with achieving maximal peak bone mass are genetic heritage, physical activity and adequate diet (8).

In addition, emphasizing the importance of being smoke free during the teenage years has been identified as a general measure for health and in preventing osteoporosis and osteoporosis related fractures in the middle years of life.

Estimated Costs

There are no direct costs associated with the implementation of this recommendation.

Implementation Strategy

There are many agencies, associations, societies and departments whose mandate includes public education and primary health promotion in adopting healthy lifestyles. Emphasizing the importance of adequate calcium and Vitamin D, and physical activity during the teenage years could be emphasized through partnerships with the Osteoporosis Society of Canada, Nova Scotia Chapter, the Nova Scotia Heart and Stroke Association, the Department of Education and the Dairy Industry. The partnership with the Department of Education would provide many opportunities to promote activity and healthy eating habits, beginning with a review of the meals and snacks offered to students in Nova Scotia schools. It is assumed that the Public Health Branch of the Department of Health would take the lead role in this initiative.

2. Strengthen and enlarge community based initiatives to reduce the incidence of falls in the elderly population.

Rationale

Falls are a widespread problem that is extremely costly in terms of human suffering and economic impact. The prevalence of injuries due to falls is proportionately highest among the elderly and persons with disabilities. This problem is expected to be compounded in the decades ahead with the significant projected increase in the population over 65. About one in three elderly people experience a fall every year and approximately one quarter of these suffer moderate to severe injuries (26). One study reported that one in 12 people age 65 and over reported being injured by a fall in the previous year. Risk factors include personal factors, interactions between people and

their environments and environmental factors (27). The personal factors are summarized in Table 2. Personal risk factors associated with falls, particularly among the older population, appear to operate in an additive way. The likelihood of a fall increases with the number of risks associated with an individual (8, 27). However, these factors are part of a bigger picture. Most falls happen in combination with the environment; singular strategies like exercise or reducing medication will not solve the problem. Due to the complex personal and environmental factors known to contribute to falls, finding ways to reduce their occurrence is a major challenge. The problem cannot be solved by any one group but requires a multifaceted and interdisciplinary approach.

Currently in Nova Scotia, Community Links, in partnership with the Nova Scotia/Nunavut Command of the Royal Canadian Legion and the Family Caregivers Association of Nova Scotia, has received federal funding for a province-wide project. The aim of the project is to create a broad-based intersectoral partnership that will develop and support sustainable population health and health promotion approaches to preventing falls among seniors, veterans and caregivers in Nova Scotia (Appendix B). We believe this project will be an effective approach in addressing this recommendation.

Table 2: Personal and Indoor Environmental Risk Factors Associated with Falling

- | | |
|--|--|
| <ul style="list-style-type: none"> • Female gender • Previous falls • Fear of Falling • Functional Impairment <ul style="list-style-type: none"> – Poor Balance – Hypotension – Dizziness • Sensory Impairment <ul style="list-style-type: none"> – Impaired vision/bifocals – Diminished proprioception — impaired hearing • Musculoskeletal Status <ul style="list-style-type: none"> – Muscle weakness – Reduced bone density – Stiff gait • Advanced Age • Cognitive and Emotional Disorders <ul style="list-style-type: none"> – Dementia – Depression – Attention deficits • Chronic illness <ul style="list-style-type: none"> – Hypothyroidism • Cardiovascular changes | <ul style="list-style-type: none"> • Nocturia • Strokes • Arthritis/osteoporosis • Effects of medications • Excessive medications • Drug interactions • Behavioural Risks <ul style="list-style-type: none"> – Risk Taking – Hurrying – Inattention • Lifestyle <ul style="list-style-type: none"> – Drugs – Alcohol – Sedentary Living – Choice of footwear • Indoor environment <ul style="list-style-type: none"> – Stairs – Poor illumination – Slippery floors – Scattermats – Telephone cords – Furniture at improper heights |
|--|--|
-

Estimated Costs

The Department of Health currently contributes to supporting the activities of Community Links. There are no further direct costs identified.

Implementation Strategy

The Department of Health continues to partner with Community Links the lead in a provincial project — to *Prevent Falling in Nova Scotia* (Appendix B). In addition to the objectives, the network and tool kit development, train the trainer program and a public awareness campaign, will be effective strategies in supporting community based initiatives to reduce the occurrence of falls in all Nova Scotia communities. We recommend a member of the provincial trauma program become a member of the project's steering committee and report regularly to the co-ordinator, Department of Health, monitoring the implementation of the outlined recommendations.

3. The long term care sector establishes a preventative and outcome measurement program that assesses and implement supplementation of resident's nutrition with calcium and Vitamin D. In addition, and in collaboration with the District Health Authorities, a fall assessment program that includes the appropriate use of hip protectors be considered to reduce the risk of fractures.

Rationale

The evidence is clear that all individuals over the age of 65 can benefit significantly from an adequate intake of calcium and Vitamin D. Appropriate intake has been shown to reduce the risk of non-vertebral fractures by 50% at three years (18). For those individuals who have minimum exposure to light, such as the housebound elderly or those in nursing homes, the evidence is sufficient to recommend 400–800 international units of Vitamin D as a public health measure (8). A study conducted in a nursing home setting, examining the effect of calcium and Vitamin D supplementation to elderly women, found a 43% reduction in hip fractures and a 32% reduction in non-vertebral fractures at 18 months (19).

A survey of the 74 licensed nursing homes and homes for the aged in Nova Scotia was conducted by the Continuing Care Branch in the Department of Health in November 2001 to assess the current status of prevention and treatment programs around osteoporosis (Appendix C). The results of the survey indicated that 10% of the 5224 residents were receiving a calcium supplement with only 4.8% receiving Vitamin D. One facility, North Queen's Nursing Home in Caledonia, has initiated a program of daily supplementation of calcium and Vitamin D to the pudding at lunch, and this is offered to all residents (Appendix D). The cost of this method of supplementation has been

identified as 10.5 cents per resident per day. As identified previously, hip fractures usually result from two interacting processes; a fall or other traumatic event resulting in direct impact to the hip and an underlying weakness in the bone caused by osteoporosis. Leading risk factors for falls include weakness, gait and balance disorders, functional, visual and/or cognitive impairment and the side effects of drugs, together with environmental hazards such as icy pavements and/or objects on the floor. Multifactorial assessments of risk, combined with targeted interventions such as exercise programs, inspection and control of hazards in the living environment, can significantly reduce the incidence of falls by 10-30%. A falls assessment program that includes identified outcome measures will need to be more fully developed in the province to address all factors influencing the risk of falls.

More recently, the use of hip protectors** (padded undergarment to protect hips) has been identified as a possible strategy in reducing the risk of fracture in persons at increased risk (those with osteoporosis and a high risk of falling, such as those with impaired gait or balance and weakness) and particularly for those residing in health care institutions because they are likely to be frail (28, 29). The research currently being conducted at the Veterans unit at the QEII, which is examining the use of hip protectors, will be useful in establishing the appropriate use in long term care facilities in Nova Scotia.

Estimated Costs

The cost associated with nutritional supplementation for all nursing home residents in Nova Scotia is estimated to be \$200,000 annually. This cost should be accommodated within existing budgets. Currently, the purchase of hip protectors (\$150-200) for individual residents require special approval from the Department of Health.

Implementation Strategy

A number of activities will be required to implement all aspects of this recommendation. These include policy development around supplementation, appropriate exercise programs in long term care facilities, the development of a falls assessment program with outcome measures that are monitored and reported, the appropriate use of hip protectors and a process to educate the long term care staff. The experience and findings of the QEII's work in the use of hip protectors should be incorporated into the approach.

We believe that a member within the Continuing Care Branch, Department of Health, will need to be assigned a lead role in working with long term care facilities and the District Health Authorities to ensure consistency and appropriate use of limited resources in operationalizing this recommendation.

** Only two (2) types of hip protectors have been found to be effective at reducing hip fractures (28, 29).

4. Incorporate a standardized risk and fall assessment program with outcome measures into the home care assessment process and the discharge process in acute care.

Rationale

Falls are predictable and preventable. Personal risk factors associated with falls, particularly among the elderly population appear to operate in an additive way. The likelihood of a fall increases with the number of risks associated with an individual. Health care providers in home and in acute care have unique opportunities to identify and implement appropriate interventions with individuals at risk for falls. The implementation of the automated assessment process for Single Entry in the province (Minimum Data Set-Home care) provides an excellent guide for assessment of clients at risk for falls. An extensive educational program is planned for care coordinators in the District Health Authorities. Ongoing assessment of clients in long term care facilities, home care and on discharge from acute care will also require education and training.

Estimated Costs

The cost associated with the educational program on the use of the automated assessment tool for Single Entry is included in the budget. Additional time may be required to educate long term and acute care staff on the assessment tool.

Implementation Strategy

The fall assessment guidelines outlined in the Minimum Data Set-Home Care (MDS-HC) have been developed by experts in the area of fall prevention and could serve as the basis for the development of a fall prevention program in all practice settings. The educational program planned for single entry could be adapted to the acute and long-term care setting. To maximize the use of resources, it is further suggested that a coordinated approach, (LTC, home care and the discharge planners in acute care) be used to formalize this process. The Continuing Care Branch at the Department of Health, specifically the educational coordinator for the MDS-HC guidelines, could potentially take the lead with this initiative.

Standards and Guidelines for Diagnosis and Treatment

5. Accept and implement the criteria for bone density testing as provincial guidelines.

Rationale

Bone mineral densitometry should be performed when the decision to treat is based on how the test will change the patient's management, such as altering counselling regarding activity or changing the therapy. Based on a cost-benefit analysis, bone densitometry is not currently recommended as a routine screening tool. The most effective technology for diagnosis of osteoporosis is bone mineral densitometry (3). The process for the development of the guidelines for bone density testing considered the available evidence, the input and contributions of the committee experts and consultation with those in the field, the literature, practices in other jurisdictions, the recommendations from the National Osteoporosis Foundation, the World Health Organization, the Osteoporosis Society of Canada and the Society of Obstetricians and Gynaecologists of Canada. The guidelines developed were also sent to two clinical experts outside the POC for comments.



While there is no clear consensus on the criteria for bone density in men, the POC considered current evidence in providing direction for the use of testing in men within the guidelines. Though not routinely identified, children may also require the use of bone density testing in the management of symptomatic osteoporosis in rare metabolic bone disorders and those therapies/diseases known to affect the bone density of children and adolescents. The guidelines clearly

recommend that Bone Mineral Density testing in children should only be ordered on the recommendation of a paediatrician or other specialist with a special interest in metabolic bone diseases. In paediatric cases, the Z score is crucial for interpretation. Results of bone density testing in children should report the Z score.

The recommended target population for assessment using bone mineral densitometry is outlined in Appendix E.

Estimated Costs

Estimates for the printing, circulation and educational costs associated with the developed guidelines are \$2,700–\$5,000.

Implementation Strategy

Studies have indicated that family practitioners play a key role in the appropriate use of bone density testing (30). We believe that in addition to physician specialists, every family practitioner should receive a copy of the guidelines (Appendix E) in conjunction with an educational component to be provided in each District Health Authority. Initiating a partnership with the Medical Society will also provide a method of communicating the findings and recommendations associated with this report to all physicians in the province, (provide the necessary background and supporting rationale to the guidelines). We believe the education should be provided by the physicians who were members of the POC.

6. The Provincial Formulary Management Committee approve the recommended revisions to the medications used for the treatment of Osteoporosis covered by the Nova Scotia Seniors' Pharmacare Program.

Rationale

Fundamental to any recommendation regarding prevention of osteoporosis, is the understanding that lifestyle changes to promote preservation of bone density will be followed. These include maintaining an adequate intake of calcium and Vitamin D, maintaining appropriate body weight, not smoking, undertaking regular physical activity and limiting intake of alcohol and caffeine. These important lifestyle choices are used in conjunction with, but cannot replace, the antiresorptive drugs used to treat osteoporosis where appropriate.

Antiresorptive agents used in the prevention and treatment of osteoporosis include hormone replacement therapy, bisphosphonates, (alendronate, etidronate and risedronate) selective estrogen receptor modulators (raloxifene) and calcitonin. Each of these agents has value in the management of osteoporosis, but the benefits have often only been proven in certain settings.

In the setting of already established postmenopausal osteoporosis (PMO) the second generation bisphosphonates (alendronate and risedronate) have been proven effective in decreasing vertebral, hip and other non-vertebral fractures (31, 32, 33, 34). Raloxifene (35) and, to a lesser degree, etidronate, (36) have been proven to decrease vertebral fractures in established PMO. The quality of the data in this setting for the efficacy of estrogen and calcitonin is debatable and consequently, they are considered second-line agents in the treatment of established osteoporosis.

In the setting of glucocorticoid-induced osteoporosis (GIOP) the second generation bisphosphonates, (alendronate and risedronate) have been proven to decrease the risk of vertebral compression fractures (37, 38, 39). Two other options have been studied in

this setting, etidronate with inconsistent results on its efficacy to decrease the incidence of new vertebral fractures and calcitonin, with benefits on vertebral bone density, but which failed to show any decrease in the risk of vertebral fractures. Estrogen and raloxifene have not been studied in GIOP.

In male osteoporosis, there is a paucity of studies. However, alendronate has proven benefits in decreasing vertebral fractures in men with osteoporosis (40). There was a small study that showed benefits on bone density in men with osteoporosis treated with etidronate but the study was not powered to show benefits on incidence of fractures. Although there is no specific data in the use of either risedronate or calcitonin in male osteoporosis, it is believed that these have much the same benefit in this setting as those in the established postmenopausal osteoporosis.

Acute osteoporotic vertebral fractures are often asymptomatic; however, they can cause unbearable pain. This can lead to the patient becoming bedridden and often results in hospitalization. Pain may last for up to 3 months. There are well-documented analgesic benefits of calcitonin in the setting of painful vertebral fractures (41). Calcitonin also has the advantage of having very few side effects. This can make calcitonin very useful especially compared to the side effects of other commonly used analgesic agents used in this setting. As an example, narcotics are effective agents to control the pain of an acute vertebral fracture; however, it often makes people drowsy which can lead to increased falls. This is a disastrous combination in the setting of established osteoporosis. COX-2 specific inhibitor (COXIBs) and Non-Steroidal Anti-inflammatory Drugs (NSAIDs) are also used for pain control, but they may cause hypertension and renal complications in the elderly, which is the group most at risk for osteoporosis.

In summary, the appropriate choice of therapy for osteoporosis is highly dependent on the efficacy of the agent in the appropriate setting. Other important factors to be considered on an individual basis are patient characteristics pertaining to contraindications to certain agents and patient preference.

Currently, the Nova Scotia Seniors' Pharmacare Program has reasonable coverage for antiresorptive agents in the setting of confirmed and established osteoporosis. However, modifications to the criteria for these agents to allow their use in the prevention of steroid-induced osteoporosis are recommended and are outlined in Appendix F. We are also recommending that the duration of calcitonin coverage in painful bone fractures from osteoporosis and in other settings be extended from 6 weeks to 3 months.

Estimated Costs

In patients younger than 65 with osteoporosis, institution of an appropriate agent will occur prior to the period of usual benefit coverage by the Pharmacare Program. Drug costs will be covered by the individual or by their private insurance program.

In certain instances, the course of treatment will be completed before the patient reaches 65 years of age and it can be argued that this will result in cost savings for both the Nova Scotia Pharmacare Program and to the Department of Health (as a result of decreased hospitalization for osteoporotic fractures).

It is anticipated these recommended changes to the Nova Scotia Pharmacare Program criteria (Appendix F) will result in an increase in costs. A review of the cost trends, illustrated in Table 3, of the antiresorptive agents over the last several years suggests that an increase of 15-20% is a reasonable estimate. The \$215,600-\$287,600 increase in 2002-2003 is expected to be covered within the operational funds of the Nova Scotia Pharmacare Program. It is important to note that better management of patients with osteoporosis will lead to some savings to other budgets within Department of Health as a result of decreased admissions to hospitals and long term care facilities.

Table 3: Pharmacare Costs for Osteoporosis

Individuals Treated	Year				
	1998/1999	1999/2000	2000/2001	2001/YTD	2001/2002 Projected
	415	1,167	1,421	1,941	2,329
*Drug Costs	665,862	1,004,027	1,232,884	1,363,035	1,415,178

Source: Nova Scotia Pharmacare Program

**Drug Costs includes dispensing fees*

Implementation Strategy

We will be forwarding a letter to the Formulary Management Committee at the Department of Health requesting that the criteria for coverage under the Pharmacare Program be revised based on the current clinical evidence and recommendations from the expert clinicians. If approved, a communication plan informing all physicians will need to be initiated with the Pharmacare Section of the Department of Health taking the lead on this initiative. The approved guidelines could become part of a continuing medical education initiative through the Drug Evaluation Alliance of Nova Scotia.

7. District Health Authorities should incorporate primary and secondary prevention services into care planning. Nutritional and medication counselling, activity programs, and follow up support are important to include in a primary prevention regime.

Rationale

Effective treatment requires compliance with lifestyle changes and adherence to the medication regime. The evidence is clear that compliance to osteoporosis drugs is low. Patients who are well educated about osteoporosis medications have a higher compliance rate. Educational and support programs, such as those provided within the Capital Health District (Dartmouth General & the QEII) are examples of how education and follow up services could be provided. Other partnerships that can be developed to support primary and secondary services to patient/families and to improve awareness include the Osteoporosis Society of Canada, Nova Scotia Chapter, and other community agencies.

Estimated Costs

There are many ways to implement this recommendation. The QEII has a regular part-time nurse position that provides ongoing support and education to clients diagnosed with osteoporosis. Dartmouth General Hospital (DGH) Osteoporosis Program provides monthly education session to patients with a confirmed diagnosis of osteoporosis or osteopenia. It is already available to all districts via telehealth. The cost to the Capital Health Authority is minimal since Dartmouth General Hospital Osteoporosis Program is funded through community fund raising efforts.

Implementation Strategy

Each District Health Authority should explore potential partnerships with other DHAs and/or community agencies, to develop the services necessary to provide ongoing education and support to patients/families and to increase awareness in the community.

Quality Standards, Performance Monitoring and Reporting

8. Implement the guidelines and recommendations outlined for the standardization and quality monitoring of the bone densitometry units.

8. a) Equipment Standardization

Recommendation

At the time of purchase of subsequent DEXA units by the province of Nova Scotia, provided the units are relatively equal in their abilities and contract prices, acquisition of units similar to those presently in clinical use should be strongly encouraged so comparable data is produced.

Rationale

The value of bone densitometry is great in the initial diagnosis and in monitoring the effectiveness of treatments. To be effective in this monitoring, the Dual Energy X-Ray Absorptiometry (DEXA) service needs to be assured that the values produced are consistent over time. Each vendor now provides this required consistency and stability. Therefore, based upon these criteria alone, there would be no need to standardize equipment.

There is another significant factor to consider. Results from one vendor's unit are not directly comparable to units from other vendors. There is a difference in both the absolute numeric value generated and more importantly the databases used for comparison (especially in the spine). There are potential differences in the T and Z scores. This limits the comparative data analysis if patients move between machines for follow-up exams. As well, it makes population based assessments difficult.

In addition, the ability to do bone testing in children will require the units to provide Z scores. This can be achieved with the purchase of pediatric software.

Estimated Costs

No additional direct costs are identified.

Implementation Strategy

The purchase of new DEXA's will need to comply with existing units. The Department of Health, Acute Care Branch, would be the appropriate coordinator of the process.

8. b) Quality Control/Quality Assurance

Recommendations

The Bone Densitometry Accreditation Program of the Canadian Association of Radiologists should accredit all bone densitometry service in Nova Scotia (Appendix G).

The medical physicist should use the same phantom as each unit is inspected annually. This data can be used for comparison of each unit in the province.

An ongoing quality assurance program should be established to assess all DEXA units in the province.

Rationale

DEXA requires a strong quality control program to ensure validity and reliable results. This is especially true since patients may be examined on more than one unit in the province. Quality control and quality assurance must assess all components of the process.

The Canadian Association of Radiologists have developed an Accreditation Program for Bone Densitometry. This program meets most of the province's needs for quality assurance. This accreditation program has components, which will help address, the work quality of the technologist and interpreting physicians. It also requires annual inspection by a medical physicist which will be helpful in inter-unit comparisons.

Each Unit

The manufacturer provides phantoms and a list of daily quality control test procedures. Strict adherence to these will monitor the stability of the DEXA unit itself.

Unit Comparability

The manufacturer of the existing DEXA units in Nova Scotia guarantees a certain level of comparability between all manufactured units. To monitor the performance between units, a single Lucite phantom could be used on a semi annual basis and after major equipment repair. This phantom would be scanned with each unit and the values compared to the values obtained on the other units.

Medical Radiation Technologist

The single largest determinant of the accuracy and precision of DEXA results is the technologist. The ability to standardize results will be increased by limiting the number of technologists performing the exams, ensuring a certain level of knowledge and putting in place certain methods of monitoring performances. Technologists performing bone densitometry should be certified by the International Society of Clinical Densitometry (ISCD) or a Canadian alternative accepted by the Accreditation Program for Bone Densitometry of the Canadian Association of Radiologists.

Physician

Standards must ensure that there is a consistent high quality approach to the interpretation of the results. The interpreting physician must be able to relate the information from various sources including clinical history, x-rays, bone densitometry and provide the appropriate interpretation.

Estimated Costs

The allocation of staff and radiologist's time from the District Health Authorities will be required to develop a provincially, standardized approach. The Bone Densitometry Accreditation program costs are \$400 per unit (Appendix B).

Implementation Strategy

All District Health Authorities with bone density units will need to be involved in the development of a province wide quality assurance program. We would suggest that a

member of our committee be assigned a lead role in coordinating a group from the District Health Authorities to develop the specific program.

8. c) Standards for Bone Density Reporting

Recommendation

Special training and competency in the functioning, indications, interpretations, limitations, artifacts and quality control of bone densitometry is the final aspect-defining competency. Training and certification in Nuclear Medicine confers such competency. For those trained in the other aspects of diagnostic imaging, further training and certification of competency is required. This is currently obtainable with training from the International Society of Clinical Densitometry (ISCD). Efforts to develop a Canadian base system are currently underway and as they develop may be substituted for the ISCD.

Rationale

Bone density reporting requires a medical practitioner trained in the basic medical sciences. It is essential that they have an understanding of basic physiologic processes of bone metabolism and how that may be changed in various pathologies and its impact on patient management.

The interpreting and overseeing physician must have a solid understanding of diagnostic tests and how they fit into patient management. They must understand diagnostic radiation. This is in terms of its effects both positive and negative. Those trained and certified in the Royal College Specialties of Diagnostic Imaging and Nuclear Medicine possess such skills.

Estimated Costs

Currently, the radiologists have self-funded the education required. Support, from the DHAs, for additional training for radiologists may need to be considered.

Implementation Strategy

The District Health Authorities will need to discuss the appropriate strategies for continuing education with their radiologists.

8. d) Report Standardization

Recommendation

The machine pages with images and numerical analysis should be standardized. It is less important to standardize the “interpretive” part of the report as long as the necessary information is included. The professionals providing this interpretation should be encouraged to develop a template that could be used by all groups since “relative”

similarity could be easily achieved. This template should include components recommended by the Accreditation Program for Bone Densitometry recognized by the Canadian Association of Radiologists.

Bone densitometry should be included in the plans for the provincial Picture and Archiving Communication System (PACS) and central archive. DIACOM connectivity must be part of the tender.

Rationale

A review of the reports that can be produced by the bone densitometry (DEXA) units presently in use in Nova Scotia was completed. Also reviewed was the report issued by the radiologist containing the signature.

Although there were some differences in the layout and arrangement of the two pages of the “report” as produced by the units, the equipment supplier noted that this could be easily standardized. In reviewing samples of interpretive reports from the three sites (QEII, Fishermen’s, Colchester Regional) a significant difference in the content of the reports was not demonstrated by those generated by the unit and verified by the radiologist, or those dictated directly. It should not be difficult to achieve some adjustments which would make the look of the reports somewhat similar.

As the province moves toward a central patient archive, it becomes very important to standardize the equipment and reports. Standardization will help bone densitometry to integrate into this single record.

Steps are already underway to create a central archive of computerized tomography (CT) imaging procedures using a Picture and Archiving Communication System (PACS). The province only has one vendor DEXA product in clinical use at this time and the process to develop links between the sites having bone densitometry and the central archive has already begun. By putting this data into a central archive, it would be more readily available for access by clinicians or for trend analysis and outcomes of the DEXA service.

Estimated Costs

Staff and physician time will be required to implement the outlined recommendations.

Implementation Strategy

All District Health Authorities with bone density units will need to develop consistent policies and procedures associated with the recommendations outlined. We believe that one to two members of our committee, including a radiologist, should take the lead on developing policies, procedures and the standardization of reports for all District Health Authorities.

9. The development and use of indicators, both for clinical and non-clinical activities related to the management of osteoporosis, must be emphasized to be of maximum benefit. To better facilitate development of indicators, it is further recommended that a process be put in place to validate the core set of indicators to be collected.

Rationale

The Department of Health currently collects data on the type, place of fall and number of fractures occurring on an annual basis in each District Health Authority. We believe additional indicators that monitor the adherence to the guidelines for bone density testing, and the standardization of the units, is necessary, to evaluate the benefits for managing osteoporosis and ultimately reducing fractures in the province. In addition to monitoring bone density testing for compliance to the guidelines, Table 4 identifies other performance indicators that would be beneficial to monitor and report to DHAs/DoH on an annual basis.

Table 4: Performance Indicators

Benchmark	Quality Dimension
Wait times for testing	Patients on wait list/average number of patients seen per week
Positive test results	Number of positive osteoporosis diagnosis/number of tests done
Compliance to treatment	Number of compliant patients/number of return checks
Outcome from treatment	Number of improved results/number of compliant patients

Estimated Costs

There is a computer software program that can be implemented with the bone density units to track indicators. Staff time will be required to implement this recommendation.

Implementation Strategy

All District Health Authorities with bone density units will be required to standardize the data collected. We would suggest that a member of our committee be assigned the lead in coordinating a group from the five District Health Authorities. The group would include representatives from the diagnostic departments, the Department of Health, and the Performance Measurement and Health Informatics Branch, to validate the core set of indicators to be developed. Additional strategies and timelines will need to be further developed to monitor and report the validated indicators.

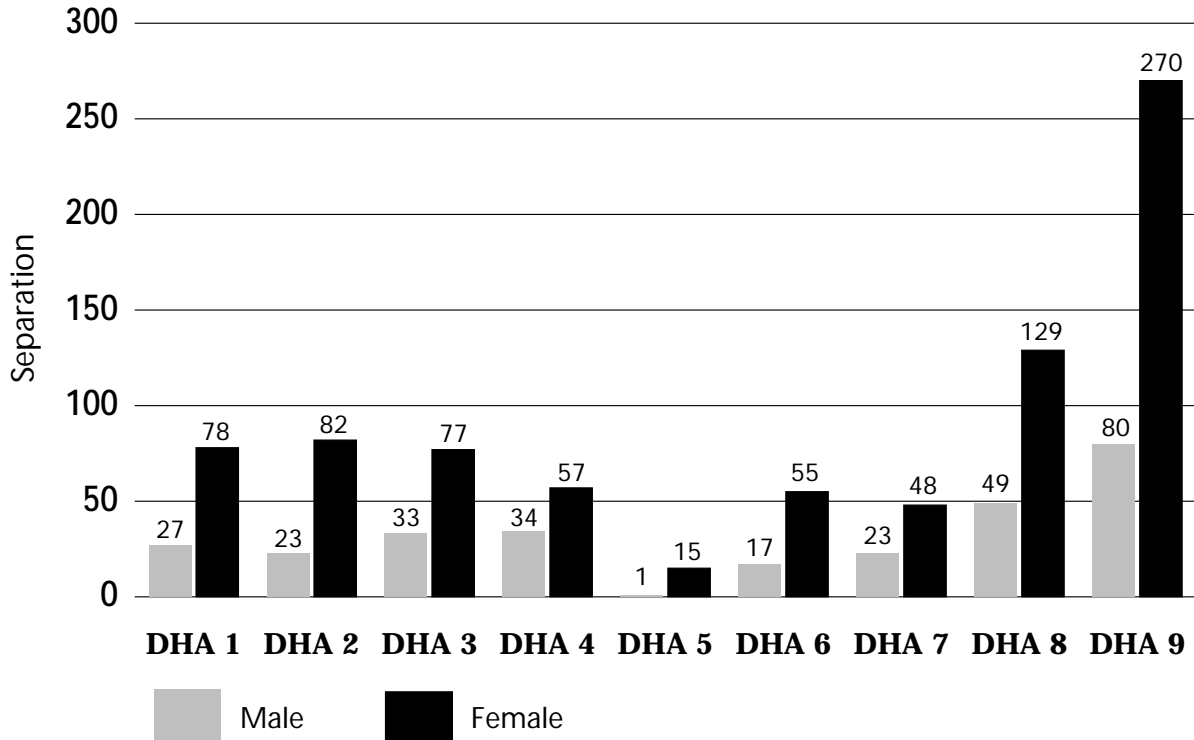
Resources/Access

10. The next two (2) bone density units purchased and supported by the Department of Health should be placed in industrial Cape Breton and the other in the Southwestern part of the province.

Rationale

A review of other jurisdictions identified significant variation in identifying the appropriate number of bone density units for a specified population. While there was considerable discussion on the adequacy of the number of bone density units for Nova Scotia, determining the appropriate number of units was beyond the scope of our committee. First, our review of the available hip fractures data (Table 5, Appendix H, I) and utilization of the current units identified significant access issues for residents of Cape Breton and the Southwest area of Nova Scotia. We believe this access issue should be addressed in the placement of the next two units. It is anticipated that the additional bone density testing capacity will impact positively on current wait times. However, if wait lists become too long, a process that addresses the need for urgent bone density will need to be put in place within the District Health Authorities. Second, we noted that the unit in Truro operates on a half-day basis only, and we believe that existing units should be maximally operated. A centralized booking system for bone density testing, with the implementation of the Meditech system and the interface with McKesson's at the QEII, should also be explored to facilitate the appropriate utilization of the units.

**Table 5 Total Separations — Hip Fractures by DHA of Residence
Fiscal 2000–01 (exclude transport accidents)**



2001/11/06

Performance Measurement & Health Informatics

Estimated Costs

Capital Expenses

2 Bone Density Units — \$94,000 x 2 = \$188,000.00

Operating Expenses

Salaries: 2.5 FTE's (includes .5 for Truro)	\$200,672.00
*Expenses	7,000.00
Education	3,000.00
MSI Fees	<u>250,000.00</u>
Total:	\$648,672.00

*Estimates of expenses excludes maintenance contract and tube replacements after year one (\$10,000–\$12,000).

Implementation Strategy

Following Department of Health approval for the purchase of the units, Cape Breton and Southwestern District Health Authorities should consider collaborating on the purchase of the two (2) additional units. It is understood that all the districts with bone density units, including those currently in operation, will comply with the guidelines outlined in this report.

Education and Communication

11. Develop and implement an educational and communication plan for the management of osteoporosis to educate the public and support clinical care.

Rationale

To successfully implement the recommendations and achieve a coordinated approach to the management of osteoporosis, a planned educational approach will be required with health care providers in the District Health Authorities and long term care facilities. We also believe a communication plan that includes the Osteoporosis Society of Canada, Nova Scotia Chapter, will be essential in clarifying expectations and responsibilities of patients/clients in Nova Scotia.

Estimated Costs

Staff time from the Department of Health and District Health Authorities will be required to develop the communication plan.

Implementation Strategy

Communication staff in the District Health Authorities and the Department of Health will need to work collaboratively to develop a communication plan around the report and the strategies to implement the recommendations. In addition, collaboration with the Osteoporosis Society of Canada, Nova Scotia Chapter, will be helpful in disseminating the recommendations outlined in the report.

Leadership

12. Identify the roles and responsibilities of the Department of Health and the District Health Authorities in implementing the recommendations outlined.

Rationale

The provincial approach to the management of osteoporosis, outlined in the recommendations, will require a coordinating role from the Department of Health. We envision this role to oversee the implementation of the recommendations and the development of a process to review and evaluate the impact within two years. Operationalizing the recommendations, including the monitoring and reporting of indicators on an annual basis, will be a collaborative effort between the Department of Health and the District Health Authorities.

Estimated Costs

Staff time from the Department of Health and the District Health Authorities will be required.

Implementation Strategy

The Department of Health will need to designate responsibility to a branch. In addition, the District Health Authorities will need to identify the lead person responsible for the monitoring and reporting of indicators. A meeting to establish required actions and timelines will facilitate the overall management of the implementation process and expected outcomes.

Action Plan

Listed below are the actions required to support the recommendations. Each action outlines the accountabilities and associated timelines.

1. Approval of Committee Report
Accountability: Department of Health
Implementation Timeline: June 2002

2. Communication Plan developed to announce the Department of Health's Response
Accountability:
 - Communication staff at the Department of Health
 - Communication staff at Cape Breton DHA
 - Communication staff at Southwest Nova DHA*Implementation Timeline:* June 2002

3. Person and/or division within the Department of Health identified as Implementation Coordinator
Accountability: Department of Health
Implementation Timeline: June 2002

4. Implementation team with lead people and strategies identified
Accountability:
 - Department of Health
 - South Shore DHA
 - South West Nova DHA
 - Colchester East Hants DHA
 - Cape Breton DHA
 - Capital Health DHA*Implementation Timeline:* June 2002

5. First implementation team meeting
Accountability:
 - Department of Health
 - District Health Authorities*Implementation Timeline:* June 2002

Summary

Osteoporosis is a public health concern that will become increasingly important as our population ages. It is a chronic, progressive metabolic bone disease that can affect almost the entire skeleton. Low bone mass by itself causes no symptoms. Osteoporosis is preventable and treatable but, because there are no warning signs until a fracture occurs, few people are diagnosed in time for effective therapy to be administered during the early phase.

The economic burden attributable to osteoporotic fractures is also significant. In Nova Scotia, the incidence of fractures will continue to rise as our population ages. Even the occurrence of a fracture may not elicit interventions to reduce the likelihood of subsequent fractures. Consequently, large numbers of individuals experience the pain, expense, disability and decreased quality of life caused by osteoporosis. To reduce the enormous costs associated with osteoporotic fractures, both fiscal and human, a number of strategies will need to be implemented and are outlined in the twelve recommendations developed by the Provincial Osteoporosis Committee. These are presented as the **first step** in the process of addressing the many issues associated with the prevention, diagnosis and treatment of osteoporosis in the province of Nova Scotia. The implementation process with ongoing evaluation will be essential to ensure the overall outcome—the reduction of fractures and associated effects on the individual and family who are at risk or have osteoporosis in Nova Scotia.

References

1. Melton, L.J. III, How many women have osteoporosis now? *J Bone Miner Res*, 1995; 10:175-177.
2. Sernbo, I., Johnell, O. Consequences of a hip fracture: a prospective study over 1 year, *Osteoporosis International*, 1993; 3:148-153.
3. Bone Densitometry in the Province of Nova Scotia. *Report of the Expert Panel on the Diagnosis and Management of Osteoporosis*. Halifax, NS. June 1998.
4. NIH Consensus Development Conference: Diagnosis, prophylaxis and treatment of osteoporosis. *American Journal of Medicine*, 1993, 94:646-650
5. Goeree, R., O'Brien, B., D., Cuddy, L., Ferraz, M., Adachi, J., An assessment of the burden of illness due to osteoporosis in Canada, *J Soc Obstet Gynaecol Can*, 1996; 18(July suppl); 15-24.
6. Scientific Advisory Board, Osteoporosis Society of Canada, Clinical practice guidelines for the diagnosis and management of osteoporosis, *Can Med Assoc J*, 1996; 155:1113-1133.
7. Melton, L.J.III, Thamer, M., Ray, N.F., Chan, J.K., Chestnut, C.H.III, Einhorn, T.A., et al., Fractures attributable to osteoporosis: report from the National Osteoporosis Foundation, *J Bone Miner Res*, 1997;12(1).
8. National Osteoporosis Foundation, Osteoporosis: review of the evidence for prevention, diagnosis and treatment and cost-effective analysis, *Osteoporosis International*, 1998;(Suppl) 4:S3-S6:1-80.
9. Elliott, D., Osteoporosis, Hip fractures and bone mineral density testing — Is mass screening a solution or a problem? (1998) *Unpublished paper*.
10. Papadimitropoulou, E.A., Coyte, P.C., Josse, R.G., Greenwood, C.E. Current and projected rates of hip fracture in Canada, *Can Med Assoc J*, 1997;157(10):1357-1363.
11. US Congress Office of Technology Assessment Hip fracture outcomes in people age 50 and over- Background paper. *OTA-BP-H-120 Washington DC; US Government Printing Office, July, 1994*.
12. Brainsky, A., Fox, K.M., Epstein, R., et al., The economic cost of hip fractures in the elderly. Presented at the 41st Annual Meeting, *Orthopaedic Research Society, Orlando, Fla., February 13-15, 1995*.
13. Panel members. NIH Consensus Conference: Optimal calcium intake. *JAMA*, 1994; 272:1942-1948.
14. Johnston, CC., Miller, JZ., Slemenda, CW., Reister, TK., Hui, S., Christian, J.C., Peacock, M. Calcium-enriched foods and bone mass growth in prepubertal girls-a randomized, double-blind, placebo-controlled trial. *J Clin Invest*. 1997;99: 1287-1294.
15. Chan, G.M., Hoffman, K., McMurry, M. Effects of dairy products on bone and body composition in pubertal girls. *J Pediatr* 1995; 126:551-556.
16. Cadogan, J., Eastell, R., Jones, N., Barker, M.E. Milk intake and bone mineral acquisition in adolescent girls: randomized, controlled intervention study. *BMJ* 1997; 315: 1255-1260.

17. Reid, I.R., Ames, R.W., Evans, M.C., Gamble, G.D., Sharpe, S.J. Effect of calcium supplementation on bone loss in postmenopausal women. *N Engl J Med* 1993; 328: 460–464.
18. Dawson-Hughes, B., Harris, S.S., Krall, E.A., Dallal, G.E. Effect of calcium and Vitamin D supplementation on bone density in men and women 65 years or older. *N Engl J Med* 1997; 337: 670–676.
19. Chapuy, M.C., Arlot, M.E., Duboeuf, F., Brun, j., Crouzet, B., Arnaud, S., Delmas, P.D., Meunier, P.J. Vitamin D3 and calcium to prevent hip fractures in elderly women. *N Engl J Med* 1992; 327: 1637–1642.
20. Recker, R.R., Hinders, S., Davies, K.M., Heaney, R.P., Stegman, M.R., Lappe, J.M., et al., Correcting calcium nutritional deficiency prevents spine fractures in elderly women. *N Engl J Med* 1996; 11:1961–1966.
21. Cumming, R.G., Nevitt, M.C. Calcium for the prevention of osteoporotic fractures in postmenopausal women. *J Bone Miner Res* 1997; 12:1321–1329.
22. LeBoff, M.S., Kohlmeier, L., Hurwitz, S., Franklin, F., Wright, J., Glowacki, J. Occult Vitamin D deficiency in postmenopausal US women with acute hip fracture. *JAMA* 1999; 281: 1505–1411.
23. Theintz, G., Buchs, B., Rizzoli, R., Slosman, D., Clavien, H., Sizonenko, P.C., Bonjour, J.P. Longitudinal monitoring of bone mass accumulation in healthy adolescents: evidence for a marked reduction after 16 years of age at the levels of lumbar spine and femoral neck in female subjects. *J Clin Endocrinol Metab* 1992; 75; 1060–1065.
24. Faulkner, R.A., Bailey, D.A., Drinkwater, D.T., McKay, H.A., Arnold, C., Wilkinson, A.A. Bone densitometry in Canadian children 8–17 years of age. *Calcif Tissue Int* 1996; 59: 344–351.
25. Faulkner, R.A., Bailey, D.A., Drinkwater, D.T., Wilkinson, A.A., Houston, H.A. Regional and total body bone mineral content, bone mineral density, and total body tissue composition in children 8–16 years of age. *Calcif Tissue Int* 1993; 53;7–12.
26. Gallagher, E., Scott, V. Taking Steps: Modifying pedestrian environments to reduce the risk of missteps and falls. *Victoria, B.C. University of Victoria; 2000.*
27. Alexander, B.H., Rivara, F.P., & Wolf, M.E. The cost and frequency of hospitalization for fall-related injuries in older adults. *Amer J of Public Health*, 1992. 82(7):1020–1023.
28. Rubenstein, L. Hip protectors—A breakthrough in fracture prevention. *N Engl J Med* 2000 343:1562–1563.
29. Kannus, P., Parkkari, J., Niemi, S., Pasanen, M., Palvanen, M., Jarvinen, M., Vuori, I. Prevention of hip fractures in elderly people with use of a hip protector. *N Engl J Med* 2000: 343:1506–1513.
30. Jaglal, S.B., McIaac, W.J., Hawker, G., Jaakkimainen, L., Cadarette, S.M., Chan, T.B. Patterns of use of the bone mineral density test in Ontario. *CMAJ* 2000; 163(9)1139–1143.
31. Black, D.M., Cummings, S.R., Karpf, D.B., Cauley, J.A., Thompson, D.E., Nevitt, M.C., et al. Randomized trial of effect of alendronate on risk of fracture in women with existing vertebral fractures. Fracture intervention Trial Research Group. *Lancet* 1996; 348:1535–1541.
32. Harris, S.T., Watts, N.B., Genant, H.K., McKeever, C.D., Hangartner, T., et al. Effects of risedronate treatment on vertebral and nonvertebral fractures in women with postmenopausal osteoporosis: a randomized controlled trial. *JAMA* 1999; 282:1344–1352.

33. Reginster, J.Y., Minne, H.W., Sorensen, O.H., Hooper, M., Roux, C., Brandi, M.L., et al. Randomized trial of the effects of risedronate on vertebral fractures in women with established postmenopausal osteoporosis. *Osteoporosis Int* 2000;11:83-91.
34. McClung, M.R., Geusens, P., Miller, P.D., Zippel, H., Bensen, W., Roux, C., et al. Effect of risedronate on the risk of hip fracture in elderly women. *N Engl J Med* 2001;344:333-340.
35. Ettinger, B., Black, D., Mitlak, B.H., Knickerbocker, R.K. Reduction of vertebral fracture risk in postmenopausal women with osteoporosis treated with raloxifene: results from a 3-year randomized clinical trial. *JAMA* 1999;282:637-645.
36. Harris, S.T., Watts, N.B., Geannt, H.K., Wasnich, R.D., Ross, P., et al. Four-year study of intermittent cyclic etidronate treatment of postmenopausal osteoporosis: three years of blinded therapy followed by one year of open therapy. *Am J Med* 1993; 95: 557-67
37. Saag, K.G., Emkey, R., Schnitzer, T.J., Brown, J.P., Hawkins, F., Gowmaere, S., et al. Alendronate for the prevention and treatment of glucocorticoid-induced osteoporosis. Glucocorticoid-induced osteoporosis intervention study group. *N Engl J Med* 1998;339:292-299.
38. Cohen, S., Levy, R., Keller, M., Sewell, K.L., Boiling, E. Risedronate therapy prevents corticosteroid-induced bone loss: a twelve-month, multicenter, randomized, double-blind, placebo-controlled, parallel-group study. *Arthritis Rheum* 1999;42:2309-2318.
39. Reid, D., Cohen, S., Pack, S., Chines, A. Risedronate reduces the incidence of vertebral fracture in patients on chronic corticosteroid therapy. *Arthritis Rheum* 1998;41:S136.
40. Orwoll, E., Ettinger, M., Weiss, S., Miller, P., Kendler, D., et al. Alendronate for the treatment of osteoporosis in men. *N Engl J Med* 2000;343:604-610.
41. Lyritis, G.P., Paspatis, I., Karachalios, T., Ioadimidis, D., Skarantavos, G., Lyritis, P.G. Pain relief from nasal salmon calcitonin in osteoporotic vertebral crush fractures: a double blind, placebo-controlled clinical study. *Acta Orthop Scand* 1997;68:112-114.
42. Jackson, S.A., Tenenhouse, A., Robertson, L. CaMos Study Group Vertebral Fracture definition from population based data. Preliminary results from the Canadian Multi Center Osteoporosis Study CaMos *Osteoporosis International* 2000;11:680-687.