Background: Patients presenting with low-trauma wrist fractures are an ideal target population for early case finding of osteoporosis. We decided to investigate whether this early detection occurred in practice.

Methods: This study was conducted at a single center in Edmonton, Alberta. A structured interview format was used to contact 112 (72%) of 156 patients older than 40 years who were diagnosed as having an atraumatic fracture of the distal radius/ulna from April 1997 to March 1998 and from January 1999 to February 1999. Information on osteoporosis follow-up and drug therapy was obtained from the patient.

Results: The time between fracture and telephone interview ranged from 6 months to 3 years, with the majority of the sample being interviewed at least 1 year after fracture. Of the 112 patients in this study, 44 had sustained previous fractures, 17 of which had occurred at the wrist, vertebrae, or hip. Sixteen patients in the sample had already sustained a subsequent clinical fracture before our telephone contact. Thirty-two patients had received treatment for osteoporosis before fracture. A further 24 patients (21%) had undergone osteoporosis follow-up after fracture. After fracture, 42 (38%) of all patients were receiving either hormone replacement therapy or using a bisphosphonate.

Conclusions: Only 50% of the study population had received osteoporosis follow-up after fracture. Few patients had any change in their medication use after fracture. The findings in this study population suggest that recognition of the potential for osteoporosis in such patients is inadequate. Given the magnitude of this public health care problem, it is clear that attention to case finding and treatment of osteoporosis should be increased.
were unwilling to participate, 4 were unable to answer questions, 11 were dead, and 25 were not traceable. The time between fracture and telephone interview ranged from 6 months to 3 years, with the majority of the sample being interviewed at least 1 year after fracture.

The mean age of the subjects was 64 years (age range, 42-91 years). Eighty-three percent of the patients were female. Ninety-two percent of women had a SCORE index of 6 or more, with a mean value of 14 (Table 1). Forty-four patients had a history of fracture, and 17 (almost 40%) of those fractures had occurred at a typical osteoporotic site (wrist, vertebra, or hip). Sixteen patients (14% of the sample) had sustained another fracture before our telephone contact. Seven (44%) of those fractures had occurred at a typical osteoporotic site (Table 1).

Twenty-nine percent (n=39) of the sample underwent treatment for osteoporosis before fracture. Fifty percent (n=56) of the sample received osteoporosis follow-up after fracture (Table 2). Fifty percent (n=56) of the patients also were taking calcium or vitamin D supplements before fracture. After fracture, 69 patients were taking one of these medications. Thirty percent (n=34) of the patients were receiving either hormone replacement therapy or using a bisphosphonate. After fracture, 38% (n=42) of the patients were taking one of these medications (Table 2).

This study allows several observations. The first is that the majority of fractures in this study occurred in women. This observation confirms the results of large epidemiological studies and supports the idea that wrist fractures are associated with osteoporosis. The vulnerability of women to wrist fractures is likely due to a declining bone mass during the postmenopausal years. It must be emphasized not only that fractures relate to a propensity for falls, but also that aspects of bone structure not reflected in bone mineral density are of importance as well. Thus, 1 fracture significantly increases the risk

### Table 1. Characteristics of the 112 Study Participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean ± SD, y</td>
<td>64 ± 13</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>103 (92.0)</td>
</tr>
<tr>
<td>Asian</td>
<td>4 (3.6)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (4.4)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>93 (83.0)</td>
</tr>
<tr>
<td>Male</td>
<td>19 (17.0)</td>
</tr>
<tr>
<td>Fracture treatment</td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td>91 (81.3)</td>
</tr>
<tr>
<td>Surgical</td>
<td>21 (18.8)</td>
</tr>
<tr>
<td>SCORE, mean ± SD</td>
<td>14 ± 6.2</td>
</tr>
<tr>
<td>History of fracture before wrist</td>
<td></td>
</tr>
<tr>
<td>Fracture at typical osteoporotic site</td>
<td>44 (39.3)</td>
</tr>
<tr>
<td>Fracture at typical osteoporotic site‡</td>
<td>17/44 (38.6)</td>
</tr>
<tr>
<td>History of fracture after wrist</td>
<td>16 (14.3)</td>
</tr>
<tr>
<td>Fracture at typical osteoporotic site</td>
<td>7/16 (43.8)</td>
</tr>
</tbody>
</table>

*All values are given as number (percentage) unless indicated otherwise.

†Typical osteoporotic site is defined as wrist, vertebrae, or hip.
for subsequent fractures, even in patients with similar bone densities.

In men, bone mass does not decline at the same rate, and there is no comparable rise in fracture incidence in men during what would be the postmenopausal years in women. Nevertheless, men with wrist fractures as a result of minor trauma may still be an appropriate target group for case finding of osteoporosis. Fractures due to minor trauma may indicate a secondary cause of osteoporosis. Also, wrist fractures in men are a powerful predictor of subsequent hip fracture risk. A study conducted by Owen et al15 demonstrated a relative risk for hip fracture of 6.4, and one performed by Mallmin et al14 revealed a hazard ratio of 2.27 for hip fracture in men with a history of Colles fracture. These studies indicate that men with Colles fractures are susceptible to further fractures. For these reasons, men were not excluded.

The second finding is that almost 40% of the sample had sustained a fracture before the one in their wrist, and 39% of those fractures had occurred at a typical osteoporotic site. Surprisingly, 14% of the sample at follow-up had already sustained an additional fracture after the one in their wrist by the time of our contact call. The large number of fractures in the study group underscores the importance of case finding, as appropriate treatment can clearly reduce the incidence of fractures.16-20,31

The rationale for case finding in patients with fracture is further supported by the findings of a large cohort study of more than 800 women that was conducted by Sanders et al22 in 1998. The authors reported that patients with fracture were 3 times more likely to have osteoporosis than were population-based controls, irrespective of the degree of trauma.28,29,32 Studies that have focused on Colles fractures also report a high prevalence of osteoporosis.4-6 In a prospective study of 106 women with Colles fracture, 50% of the patients had osteoporosis and only 9% had normal bone mineral density.5 These results highlight the importance of fracture as a clinical indicator for the possibility of osteoporosis.

More than 90% of the women in our study had a SCORE index of 6 or more. The mean value was 14, with an SD of 6. In the study by Lydick et al,27 nearly all women with an index of 14 were in the osteoporotic range (specificity, 93% for T score; 2.5 SD). The fact that the SCORE index was so high in this study further validates the idea that this index both emphasizes risk factors and provides a quantitative measure of a need for osteoporosis screening that family physicians could use.

A liberal definition was used to define follow-up that included a physician discussion on osteoporosis. This flexible definition allows a clinical diagnosis of osteoporosis and limits bias against those patients who cannot access densitometry testing or those who implement a preventive approach to osteoporosis, irrespective of bone density testing.

Despite such a liberal definition, only 50% of the study population received osteoporosis follow-up after fracture. If therapy is examined, few patients had any change in their medication use, as evidenced by a small increase in the rate of calcium or vitamin D supplement use and an even smaller increase in the rate of bisphosphonate or hormone replacement therapy after fracture. The findings in the study population suggest that recognition of the potential for osteoporosis and further complications in such patients is inadequate.

These findings are comparable to those of other studies that have examined the utilization rates of proven therapies. For example, a recent study on the use of β-blockers in the post–myocardial infarction period reported that only 50% of infarct survivors actually receive this therapy.33 The authors concluded that β-blockers are significantly underused despite abundant scientific literature supporting their use.29 Whether osteoporosis or other diseases are examined, it is clear that more than scientific evidence is required to instruct a change in practice.

Interventions to improve osteoporosis follow-up of patients with wrist fracture can include identifying these individuals in the emergency department, providing them with literature on osteoporosis, and faxing an informational sheet to their family physician. Referral of these patients to a dedicated clinic for prevention of osteoporosis is another option. Current studies to assess some of these approaches are under way.

The most significant result of the present study is that 50% of the sample population did not receive any osteoporosis follow-up after minor trauma or fragility fracture. In Canada, the incidence of wrist fractures was 5 per 1000 women older than 50 years.1 Given the magnitude of this public health care problem, quite apart from the costs relating to subsequent hip fracture, more attention should be given to case finding and treatment of osteoporosis.

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