# Appendices

## Contents of Transmittal Letter

### The letter that accompanied the survey stated:

Dear Dr. _____:

We are currently studying ways to improve medical care for patients with osteoporotic fractures. We would be grateful if you would take the time to complete the enclosed confidential survey, which we have distributed to all orthopaedic surgeons in Utah, Idaho, and Wyoming. This survey deals with orthopaedic surgeons' opinions on this important issue.

We would be grateful if you would complete the survey and return it in the enclosed self-addressed envelope.

We thank you in advance for your cooperation.

Sincerely,

# Survey Questions and Responses

**DXA** = dual energy X-ray absorptiometry scan (for bone density measurement)
**Low-energy fractures =** fractures that occur with minimal trauma (such as a fall from a standing height or from a height of less than three feet). Excluded fractures are those that occurred from higher energy motor vehicle accidents and sports-related injuries, or are associated with tumors.
Questions that are shaded (numbers 9 and 15) are those where there are significant differences in responses between the small (**Sm**, n = 14) and large (**Lg**, n = 93) sub-groups. 1 Only questions 2 and 4 (also shaded) showed statistically significant differences or trends between the large sub-group and the non-responders (n = 15). Response frequencies for the non-responders are also included for these two questions.
(**SA** =Strongly Agree; **A** = Agree; **No =** No Opinion; **D** = Disagree; **SD** = Strongly Disagree; **WM-W** = Wilcoxon Mann-Whitney Test; **F-F-H** = Fisher-Freeman-Halton Test; **FE** = Fisher's Exact Test)

1. I strongly consider the diagnosis of osteoporosis when treating low-energy fractures (e.g., of the hip, proximal humerus, or wrist) in middle-aged to elderly patients.

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (49/107; 45.8%) | (42.9%) | (46.2%) |
| **A** | (52/107; 48.6%) | (50.0%) | (48.4%) |
| **NO** | (5/107; 4.7%) | (7.1%) | (4.3%) |
| **D** | (1/107; 0.9%) | (0.0%) | (1.1%) |
| **SD** | (0/107; 0.0%) | (0.0%) | (0.0%) |

**Small vs. Large Sub-group p = 0.837 (WM-W)**
**Large vs. Non-responders p = 0.704 (WM-W)**

2. Expanding orthopaedic practice into prescribing pharmacologic treatments for osteoporosis is appropriate.

| | Total Group | Small | Large | Non-responders |
|---|---|---|---|---|
| **SA** | (25/107; 23.4%) | (21.4%) | (23.7%) | (21.4%) |
| **A** | (48/107; 44.9%) | (50.0%) | (44.1%) | (21.4%) |
| **NO** | (12/107; 11.2%) | (7.1%) | (11.8%) | (0.0%) |
| **D** | (22/107; 20.6%) | (21.4%) | (20.4%) | (42.9%) |
| **SD** | (0/107; 0.0%) | (0.0%) | (0.0%) | (14.3%) |

**Small vs. Large Sub-group p = 0.969 (WM-W)**
**Large vs. Non-responders p = 0.052 (WM-W)**

3. If I were to prescribe a pharmacologic agent for osteoporosis, I would be concerned about adverse events that may occur when using these agents.

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (32/107; 30.0%) | (35.7%) | (29.0%) |
| **A** | (69/107; 64.5%) | (57.1%) | (65.6%) |
| **NO** | (1/107; 0.9%) | (0.0%) | (1.1%) |
| **D** | (5/107; 4.7%) | (7.1%) | (4.3%) |
| **SD** | (0/107; 0.0%) | (0.0%) | (0.0%) |

**Small vs. Large Sub-group p = 0.706 (WM-W)**
**Large vs. Non-responders p = 0.403 (WM-W)**

4. I am concerned enough about adverse events with pharmacological agents that I would rather avoid prescribing these agents for osteoporosis.

| | Total Group | Small | Large | Non-responders |
|---|---|---|---|---|
| **SA** | (7/107; 6.5%) | (7.1%) | (6.5%) | (20.0%) |
| **A** | (43/107; 40.2%) | (35.7%) | (40.9%) | (53.3%) |
| **NO** | (13/107; 12.1%) | (28.6%) | (9.7%) | (0.0%) |
| **D** | (39/107; 36.4%) | (28.6%) | (37.6%) | (20.0%) |
| **SD** | (5/107; 4.7%) | (0.0%) | (5.4%) | (6.7%) |

**Small vs. Large Sub-group p = 0.644 (WM-W)**
**Large vs. Non-responders p = 0.077 (WM-W)**

5. If I were to prescribe a pharmacologic agent for osteoporosis, I would feel most comfortable selecting an agent from the following categories:
(SERMs = selective estrogen receptor modulators)

| | (% of Total Group, Sm Sub-Group, Lg Sub-Group) |
|---|---|
| a. Bisphosphonate (e.g., Fosamax) | (73.8%, 85.7%, 72.0%) |
| b. Nasal spray calcitonin | (39.3%, 42.8%, 38.7%) |
| c. SERMs (e.g., Raloxifene) | (10.3%, 14.3%, 9.7%) |
| d. Conjugated estrogen | (15.9%, 28.6%, 14.0%) |
| e. Calcium supplement | (86.0%, 71.4%, 88.2%) |
| f. Vitamin D supplement | (77.6%, 64.3%, 79.6%) |
| g. Other | (1.9%, 0.0%, 2.2%) |
| h. None | (7.5%, 7.1%, 7.5%) |

**Small vs. Large Sub-group p = 0.175 (F-F-H)**
**Large vs. Non-responders p = 0.668 (F-F-H)**

6. I would consider initiating pharmacologic treatment for patients who have fallen and sustained a fracture of the hip, proximal humerus, or wrist and have several risk factors for osteoporosis. (Assume that no DXA has been obtained.)

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (19/107; 17.8%) | (35.7%) | (15.0%) |
| **A** | (36/107; 33.6%) | (21.4%) | (35.5%) |
| **NO** | (14/107; 13.1%) | (14.3%) | (13.0%) |
| **D** | (35/107; 32.7%) | (28.6%) | (33.3%) |
| **SD** | (3/107; 2.8%) | (0.0%) | (3.2%) |

**Small vs. Large Sub-group p = 0.231 (WM-W)**
**Large vs. Non-responders p = 0.486 (WM-W)**

7. In view of the previous section, I would be interested in *initiating* pharmacologic treatment of such patients, in most cases, *if they also* have osteoporosis by DXA.

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (34/107; 31.8%) | (35.7%) | (31.2%) |
| **A** | (43/107; 40.2%) | (28.6%) | (41.9%) |
| **NO** | (10/107; 9.3%) | (14.3%) | (8.6%) |
| **D** | (18/107; 16.8%) | (21.4%) | (16.1%) |
| **SD** | (2/107; 1.9%) | (0.0%) | (2.2%) |

**Small vs. Large Sub-group p = 0.922 (WM-W)**
**Large vs. Non-responders p = 0.139 (WM-W)**

8. In view of question no. 6, I would be interested in initiating pharmacological treatment of such patients, in most cases, if the patient's primary care physician or other primary healthcare provider (PCP) will assume responsibility for work-up and continuation of treatment.

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (25/104; 24.0%) | (21.4%) | (24.4%) |
| **A** | (47/104; 45.2%) | (50.0%) | (44.4%) |
| **NO** | (11/104; 10.6%) | (14.3%) | (10.0%) |
| **D** | (20/104; 19.2%) | (14.3%) | (20.0%) |
| **SD** | (1/104; 1.0%) | (0.0%) | (1.1%) |

**Small vs. Large Sub-group p = 0.919 (WM-W)**
**Large vs. Non-responders p = 0.767 (WM-W)**

9. I am willing to initiate work-up for secondary causes of osteoporosis.

| | Total Group | Small | Large | Non-responders |
|---|---|---|---|---|
| **SA** | (3/104; 2.9%) | (0.0%) | (3.3%) | (0.0%) |
| **A** | (36/104; 34.6%) | (14.3%) | (37.8%) | (35.7%) |
| **NO** | (8/104; 7.7%) | (7.1%) | (7.8%) | (7.1%) |
| **D** | (48/104; 46.2%) | (42.9%) | (46.7%) | (35.7%) |
| **SD** | (9/104; 8.7%) | (35.7%) | (4.4%) | (21.4%) |

**Small vs. Large Sub-group p = 0.004 (WM-W)**
**Large vs. Non-responders p = 0.305 (WM-W)**

10. I am willing to initiate work-up for secondary causes of osteoporosis if the patient's primary healthcare provider will assume the continuation of this work-up in a timely fashion.

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (9/105; 8.6%) | (7.1%) | (8.8%) |
| **A** | (57/105; 54.3%) | (57.1%) | (53.9%) |
| **NO** | (9/105; 8.6%) | (7.1%) | (8.8%) |
| **D** | (26/105; 24.8%) | (21.4%) | (25.3%) |
| **SD** | (4/105; 3.8%) | (7.1%) | (3.3%) |

**Small vs. Large Sub-group p = 0.942 (WM-W)**
**Large vs. Non-responders p = 0.346 (WM-W)**

11. I consider a "timely fashion" in the previous question to be _____ after a fracture.

| (% of Total Group, Sm Sub-Group, Lg Sub-Group) | |
|---|---|
| a. < Two weeks | (11.6%, 21.4%, 9.9%) |
| b. Two to four weeks | (41.1%, 42.9%, 40.7%) |
| c. Four to eight weeks | (31.6%, 21.4%, 33.3%) |
| d. Eight to twelve weeks | (12.6%, 7.1%, 13.6%) |
| e. Twelve to sixteen weeks | (3.2%, 7.1%, 2.5%) |

**Small vs. Large Sub-group p = 0.313 (WM-W)**
**Large vs. Non-responders p = 0.472 (WM-W)**

12. There are benefits of initiating early (within two weeks of fracture) pharmacologic treatments with anti-resorptive agents for patients that are at risk for osteoporosis and have a fracture of the hip, proximal humerus, or wrist.

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (5/105; 4.8%) | (14.3%) | (3.3%) |
| **A** | (32/105; 30.5%) | (21.4%) | (31.9%) |
| **NO** | (51/105; 48.6%) | (50.0%) | (48.4%) |
| **D** | (17/105; 16.2%) | (14.3%) | (16.5%) |
| **SD** | (0/105; 0.0%) | (0.0%) | (0.0%) |

**Small vs. Large Sub-group p = 0.710 (WM-W)**
**Large vs. Non-responders p = 0.701 (WM-W)**

13. In view of the previous question, I consider the "benefits" of initiating early pharmacologic treatment (within two weeks of fracture) to be:

| (% of Total Group, Sm Sub-Group, Lg Sub-Group) | |
|---|---|
| a. None | (12.9%, 7.1%, 13.8%) |
| b. Enhancement of healing | (16.8%, 28.6%, 15.0%) |
| c. Reduce subsequent fracture risk | (37.6%, 35.7%, 38.0%) |
| d. Benefits equivalent | (11.9%, 7.1%, 12.6%) |
| e. I do not know | (38.6%, 28.6%, 40.2%) |

**Small vs. Large Sub-group p = 0.151 (F-F-H)**
**Large vs. Non-responders p = 0.248 (F-F-H)**

14. A low-energy fracture in a patient at risk for osteoporosis may be a stronger indicator for initiating pharmacological treatment than a DXA scan showing osteoporosis.

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (7/107; 6.5%) | (7.1%) | (6.5%) |
| **A** | (60/107; 56.1%) | (50.0%) | (57.0%) |
| **NO** | (21/107; 19.6%) | (21.4%) | (19.4%) |
| **D** | (19/107; 17.8%) | (21.4%) | (17.2%) |
| **SD** | (0/107; 0.0%) | (0.0%) | (0.0%) |

**Small vs. Large Sub-group p = 0.693 (WM-W)**
**Large vs. Non-responders p = 0.625 (WM-W)**

15. When encountering a low-energy fracture of the hip, proximal humerus, or wrist in a patient with clinical suspicion of osteoporosis, I routinely notify their primary healthcare provider.

| | Total Group | Small | Large | Non-responders |
|---|---|---|---|---|
| **SA** | (7/107; 6.5%) | (7.1%) | (6.5%) | (6.7%) |
| **A** | (49/107; 45.8%) | (21.4%) | (49.5%) | (46.7%) |
| **NO** | (15/107; 14.0%) | (7.1%) | (15.1%) | (0.0%) |
| **D** | (36/107; 33.6%) | (64.3%) | (29.0%) | (40.0%) |
| **SD** | (0/107; 0.0%) | (0.0%) | (0.0%) | (6.7%) |

**Small vs. Large Sub-group p = 0.034 (WM-W)**
**Large vs. Non-responders p = 0.450 (WM-W)**

16. In view of the previous question, how do you or your staff notify the patient's primary healthcare provider?

| (% of Total Group, Sm Sub-Group, Lg Sub-Group) | | |
|---|---|---|
| Send letter | (46/96; 47.9%) | (41.7%) | (48.8%) |
| Telephone | (15/96; 15.6%) | (8.3%) | (16.7%) |
| Don't notify | (16/96; 16.7%) | (33.3%) | (14.3%) |
| Other | (19/96; 19.8%) | (16.7%) | (20.2%) |

**Small vs. Large Sub-group p = 0.669 (F-F-H)**
**Large vs. Non-responders p = 0.143 (F-F-H)**

17. I believe that there is a substantial lag time between the occurrence of a fracture in a patient at risk for osteoporosis and: 1) the arrival at a definitive diagnosis of osteoporosis, and 2) the initiation of pharmacologic treatment.

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (13/105; 12.4%) | (35.7%) | (8.8%) |
| **A** | (62/105; 59.0%) | (35.7%) | (62.6%) |
| **NO** | (14/105; 13.33%) | (21.4%) | (12.1%) |
| **D** | (15/105; 14.3%) | (7.1%) | (15.4%) |
| **SD** | (1/105; 1.0%) | (0.0%) | (1.1%) |

**Small vs. Large Sub-group p = 0.137 (WM-W)**
**Large vs. Non-responders p = 0.100 (WM-W)**

18. I would favor a program where I initiate treatment of patients with apparent osteoporotic fractures, but have their primary healthcare provider assume the continuation and monitoring of pharmacologic management and work-up for secondary causes.

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **SA** | (22/107; 20.6%) | (28.6%) | (19.4%) |
| **A** | (53/107; 49.5%) | (50.0%) | (49.5%) |
| **NO** | (11/107; 10.3%) | (7.1%) | (10.8%) |
| **D** | (19/107; 17.8%) | (14.3%) | (18.3%) |
| **SD** | (2/107; 1.9%) | (0.0%) | (2.2%) |

**Small vs. Large Sub-group p = 0.350 (WM-W)**
**Large vs. Non-responders p = 0.312 (WM-W)**

19. The role of an orthopaedic surgeon in initiating the pharmacologic treatment of patients with fractures of the hip, proximal humerus, or wrist with clinical risk factors for osteoporosis should be:

| (% of Total Group, Sm Sub-Group, Lg Sub-Group) | |
|---|---|
| a. Refer to PCP for treatment | (31.8%, 28.6%, 32.7%) |
| b. Initiate treatment then refer to PCP | (28.0%, 28.6%, 28.0%) |
| c. Initiate work-up and treatment then refer to PCP | (42.1%, 42.9%, 42.0%) |

**Small vs. Large Sub-group p = 1.000 (F-F-H)**
**Large vs. Non-responders p = 0.732 (WM-W)**

20. Did you know that a low-energy fracture in a post-menopausal female might be more predictive of a future fracture than moderately to severely low bone mineral density determined by DXA scan?

| (% of Total Group, Sm Sub-Group, Lg Sub-Group) | |
|---|---|
| a. Yes, I know this | (60.0%, 50.0%, 61.5%) |
| b. No, I did not know this | (40.0%, 50.0%, 38.7%) |

**Small vs. Large Sub-group p = 0.559 (FE)**
**Large vs. Non-responders p = 0.578 (FE)**

21. How many years have you been in practice?

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **0-5** | (13/101; 12.9%) | (85.7%) | (1.1%) |
| **6-10** | (8/101; 7.9%) | (0.0%) | (9.2%) |
| **11-15** | (16/101; 15.8%) | (14.3%) | (16.1%) |
| **16-20** | (13/101; 12.9%) | (0.0%) | (15.0%) |
| **>20** | (51/101; 50.5%) | (0.0%) | (58.6%) |

**Small vs. Large Sub-group p < 0.001 (t test)**
**Large vs. Non-responders p < 0.001 (t test)**

22. What is your sub-specialty?

| | Total Group | Sm Sub-Group | Lg Sub-Group |
|---|---|---|---|
| **General** | (73/104; 70.2%) | (71.4%) | (70.0%) |
| **Joint** | (6/104; 5.8%) | (7.1%) | (5.6%) |
| **Sports** | (11/104; 10.6%) | (7.1%) | (11.1%) |
| **Spine** | (3/104; 2.9%) | (0.0%) | (3.3%) |
| **Trauma** | (3/104; 2.9%) | (7.1%) | (2.2%) |
| **Pediatrics** | (0/104; 0.0%) | (0.0%) | (0.0%) |
| **Hand** | (3/104; 2.9%) | (7.1%) | (2.2%) |
| **Foot/Ankle** | (5/104; 4.8%) | (0.0%) | (5.6%) |

**Small vs. Large Sub-group p = 0.737 (F-F-H)**
**Large vs. Non-responders p = 0.621 (F-F-H)**

Note that sample sizes are too small to make comparisons between specialties on each of the 22 questions.