therefore be difficult to make meaningful comparisons between these groups without some independent method of assessing gas exchange efficiency.

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The author has reported to the ACCP that no significant conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article.

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Considerations About the Response Format of the Airways Questionnaire 20

To the Editor:

We have read with interest the recently published article by Chen et al in CHEST (June 2006) warning about the potential problems of the response format of the Airways questionnaire 20 (AQ20). The original AQ20 was a simple, reliable, and valid instrument, allowing the following three possible responses: “yes”; “no”; and “not applicable” (with a score of 0 for the answer “not applicable,” which is equivalent to “no”). Patients with the greatest disability were more likely to respond “not applicable,” yielding a lower total score and, therefore, underestimating actual impairment.

In order to correct this drawback, the authors modified seven activity-based items (items 3, 4, 10, 11, 12, 13, and 14) to include an “unable” response that was given a score of 1 (equivalent to “yes”). Only a minority of subjects (5.9%) in this study endorsed an “unable” response that was given a score of 1 (equivalent to “not applicable”). Thus, of all non-“yes/no” responses to the activity-based items (items 3, 4, 10, 11, 12, 13, and 14) to include the greatest disability were more likely to respond “not applicable,” which is equivalent to “no”). Patients who choose the option “not applicable” will have chosen “not applicable” in the original format.

We appreciate the insightful comments provided by Blanco-Aparicio and Vázquez regarding our recent article in CHEST (June 2006). We agree that the frequency of “not applicable” responses is an interesting question. Among the seven modified items (n = 352 subjects), 391 of the 2,464 responses were “not applicable.” As reported in our original article, there were 39 “unapplicable” responses. Thus, of all non-“yes/no” responses to the modified items nearly 10% were “unapplicable.” Since we did not consider in our original article, it is not possible to determine what proportion of subjects who responded “unapplicable” would have chosen “not applicable” in the original format.

Consistent with the findings of Blanco-Aparicio and Vázquez, we observed a higher frequency of “not applicable” responses for item 3 (“gardening”) and item 11 (“activities at work”) relative to the other five modified items (Table 1). In addition, we also observed a high frequency of “not applicable” responses for item

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### References


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**Table 1—Response Frequencies for Modified AQ20 Items**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Yes</th>
<th>No</th>
<th>Unable</th>
<th>NA*</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>30.4</td>
<td>38.1</td>
<td>3.4</td>
<td>28.1</td>
</tr>
<tr>
<td>4</td>
<td>20.8</td>
<td>73.2</td>
<td>1.1</td>
<td>4.8</td>
</tr>
<tr>
<td>10</td>
<td>28.5</td>
<td>67.5</td>
<td>0.6</td>
<td>3.4</td>
</tr>
<tr>
<td>11</td>
<td>18.8</td>
<td>40.7</td>
<td>1.7</td>
<td>38.8</td>
</tr>
<tr>
<td>12</td>
<td>57.8</td>
<td>33.6</td>
<td>2.0</td>
<td>6.6</td>
</tr>
<tr>
<td>13</td>
<td>40.1</td>
<td>51.1</td>
<td>0.9</td>
<td>8.0</td>
</tr>
<tr>
<td>14</td>
<td>19.4</td>
<td>57.6</td>
<td>1.4</td>
<td>21.7</td>
</tr>
</tbody>
</table>

*NA = not applicable.

14 (“a night out”). The high frequency of “not applicable” responses to these items, despite the inclusion of the “unable” option, suggests that the activities queried by these items may in fact be less relevant to the study population. In a recent publication by Barley and Jones, Rasch analysis was used to assess the measurement properties of the AQ20 over time. Item 3 was found to be unstable due an increase in “not applicable” responses related to seasonal changes over the study period. The variable relevance of these items to subjects, rather than the inability to perform these activities, may explain the lack of correlation between “not applicable” responses and other health status measures noted by Blanco-Aparicio and Vázquez. Nevertheless, we believe that providing an “unable” response option further minimizes the potential for any misclassification, particularly among those subjects with a high degree of respiratory impairment.

We agree with the final conclusion of Blanco-Aparicio and Vázquez that additional studies of this question are needed.

**Alteration of Bone Mineral Density in Cystic Fibrosis Adults**

**To the Editor:**

We read with interest the article by Stephenson and colleagues regarding the prevalence of vertebral fractures in adults with cystic fibrosis and their relationship to bone mineral density (BMD), and we would like to add some comments based on our clinical experience. In our cystic fibrosis center, 62 of 81 adult patients (76.5%) have undergone dual energy radiography absorptiometry (DXA) at least once in the last 5 years; 25 of these patients are female and 37 are male (mean age, 27.1 years; SD, 3.2 years). At the time of DXA, none of the patients had been treated with drugs for osteoporosis before measuring bone density and none of them had received a lung transplant. BMD was measured using DXA (Delphi A S/N 70509; Hologic; Bedford, MA) in lumbar spine (L1-L4), and the results were expressed as an absolute value of BMD (grams per centimeter squared) and BMD T-score. Osteopenia was present in 45.1% of the patients (n = 28), and osteoporosis was present in 11.3% (n = 7) [World Health Organization diagnosing criteria]. In all examined patients, vertebral fractures were excluded by clinical history and by lateral chest radiographic imaging performed in occasion of follow-up visits.

In accordance with the findings of Stephenson and colleagues, in our patients BMD values correlated with body mass index (BMI) values (R = 0.34, p = 0.006) and with FEV1, expressed as percentage of the predicted value according to age and sex (R = 0.21, p < 0.05), but also with Chrise-in-Norman radiographic score (R = −0.27, p = 0.03). Similarly, a correlation was found between the BMD T-score values and the BMI values (R = 0.27 p = 0.03) and Chrise-in-Norman score (R = −0.32, p = 0.02).

The mean value of BMI was significantly different between subjects with normal BMD (22.2 kg/m2; SD, 2.1 kg/m2) and those with alterations in BMD (20.3 kg/m2; SD, 2.5 kg/m2; t test, p = 0.002). A statistically significant difference was also found in the mean value of FEV1; between those patients with normal BMD (70.6%; SD, 23.8%) and those with alterations in BMD (55.2%; SD, 25.6%; t test, p = 0.02).

Our data are consistent with the findings of Stephenson and colleagues; even though in our population we did not observe any case of fracture. However, knowing that patients with fractures have a higher mean BMD value is likely not to have clinical relevance; it would have been interesting to know the proportion of patients with osteopenia and osteoporosis in the fracture and no-fracture groups. This information would imply important consequences from a preventive point of view, as it would offer clinicians a tool to evaluate the risk of pathologic fractures in cystic fibrosis patients according to their mineral bone status. Also, the presence of symptomatic osteoporosis is a contraindication for lung transplantation, and the risk of chest fractures developing may exclude a patient from a possible vital therapeutic opportunity.

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The authors have no conflicts of interest to disclose.

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