The Roland–Morris Disability Questionnaire and the Oswestry Disability Questionnaire

Martin Roland* and Jeremy Fairbank†

Condition-specific health status measures are commonly used as outcome measures in clinical trials and to assess patient progress in routine clinical practice. The expert panel that met to discuss this special issue of Spine recommended that, when possible, a condition-specific measure for back pain should be chosen from two widely used measures, the Roland–Morris Disability Questionnaire106 (RDQ) or the Oswestry Disability Index (ODI).30 These two measures have been used in a wide variety of situations over many years, and each is available in a number of languages.

In this article, the authors describe these two instruments and provide evidence of their validity and reliability and some comparative results obtained with the use of the two questionnaires. The instruments themselves are included in the appendixes. When used in the forms reproduced in the appendixes, no permission is required from the authors or from Spine. Other back pain–specific health status measures are described by Kopec elsewhere in this edition of Spine.67

The Roland–Morris Disability Questionnaire

Development

The RDQ106 is a health status measure designed to be completed by patients to assess physical disability due to low back pain. It was designed for use in research (e.g., as an outcome measure for clinical trials) but has also been found useful for monitoring patients in clinical practice. It was originally designed for use in primary care in the United Kingdom but has been used in a variety of other settings.

The RDQ was derived from the Sickness Impact Profile (SIP),3 which is a 136-item health status measure covering all aspects of physical and mental function. Twenty-four items were selected from the SIP by the original authors because they related specifically to physical functions that were likely to be affected by low back pain. Each item was qualified with the phrase “because of my back” to distinguish back pain disability from disability due to other causes—a distinction that patients are in general able to make without difficulty.103

Patients completing the RDQ are asked to place a check mark beside a statement if it applies to them that day. This approach was chosen to make it suitable for observing short-term changes in back pain (e.g., the relatively rapid resolution of symptoms of most patients seen in primary care) or short-term changes in response to treatment. The RDQ score is calculated by adding up the number of items checked. Items are not weighted. The scores therefore range from 0 (no disability) to 24 (maximum disability). Although designed for administration on paper, the RDQ has also been satisfactorily administered on computer and by telephone.

The original RDQ also contains a 6-point pain rating scale in the form of a pain thermometer. However, the current authors now recommend that the pain scale of the SF-36 be used in preference, as described in the article on pain measurement by Von Korff et al. elsewhere in this issue.147

The RDQ is short, simple to complete, and readily understood by patients. Stratford et al121 found fewer incomplete or ambiguous responses to the RDQ than to the Oswestry questionnaire. These characteristics, along with evidence of its scientific validity, have led to its widespread use. It is now available in the 12 languages listed in the next section. The questionnaire is reproduced in Appendix 1. As previously stated, there are no restrictions on its use.

Modifications and Translations

Translations of the RDQ are available in French, German, Dutch, Flemish, Romanian, Spanish, Italian, Czech, Swedish, Portuguese, and Polish. These may be obtained from the author (mroland@man.ac.uk). The file on this website also contains details of how the translations were made so that users can judge the likely validity of the translation.1 These translations of the RDQ may also be used without permission from the journal Spine or permission from the authors. If other translations are made, they may be sent to one of the authors (MR) with details of how the translation was obtained, so that they can be included on the Spine website.

A number of researchers have proposed modifications to the RDQ. The simplest modification to the wording of the questionnaire has been to change the terminal phrase of each statement from “because of my back” to “because of my back or leg problem.”98 This makes the questionnaire more suitable for use in a population of patients with sciatica and is an acceptable modification.

Others have proposed modifications to individual items. Stratford and Binkley118 suggested that a number of items were redundant and that the questionnaire could be improved by being reduced to 18 items. Patrick et al198 removed five potentially redundant items and suggested that responsiveness could be increased by adding
four additional items relating to sexual function, daily work, expressions of concern to others, and the need to rub or hold areas that hurt. On the whole, these modifications seem to provide only modest improvement on the original version, and an international group of experts suggested use of the original version, because it has been widely used in many countries.

Underwood et al suggested a modification that asked for each item of the RDQ how many days of the previous month the patient had been affected. Although this version has not been validated, it attempts to incorporate elements of the amount of time that people are affected by their back pain, which often fluctuates. However, it did not perform as well as a modification of Von Korff’s own questionnaire.

**Properties of the Scores**

In the original sample used for development and validation of the scale, median scores of patients with back pain in primary care were eleven on presentation, eight 1 week later, and four 1 month later. Roland–Morris Disability Questionnaire scores reported in a wide variety of settings are presented in a later section of this article. In general, RDQ scores have little or no relation to the age or sex of the respondents.

**Face and Content Validity**

The RDQ focuses on a limited range of physical functions, which include walking, bending over, sitting, lying down, dressing, sleeping, self-care, and daily activities (see Appendix 1). These were chosen as functions that would be relevant to all patients with back pain. The scoring system does not therefore permit or require a “nonapplicable” response. The statements in the RDQ focus almost exclusively on physical function, with only one question on mood. Some aspects of physical function are not explicitly included, for example lifting and twisting or turning.

The limited range of the RDQ is both a strength and a weakness in its content validity. The questionnaire covers only a limited range of the problems that a patient with back pain may face and in particular does not address psychological or social problems. These are undoubtedly of importance and in situations in which their measurement is important, the RDQ should be combined with specific measures of these functions. However, the restricted nature of the domains covered by the RDQ is also a strength, in that this makes the scores easy to understand and interpret.

**Construct Validity**

In assessing the construct validity of a health status measure, it is conventional to compare scores of a questionnaire with those of other established measures. As would be expected with a measure of self-reported physical disability, RDQ scores correlate well with other measures of physical function, including the physical subscales of SF-36, the SIP, the Quebec Back Scale, and the Oswestry questionnaire. Relatively high correlations are also found between RDQ scores and pain ratings.

The RDQ does not attempt to measure psychological distress associated with back pain and thus correlates less well with measures of psychological disability—for example, the psychosocial scales of the SIP. In common with other self-reported disability measures, it shows only modest correlation with direct measures of physical function.

---

**Internal Consistency**

The RDQ has good psychometric properties, evidenced by internal consistency and responsiveness. Cronbach’s α for the scale has been estimated as 0.93, 0.90, and 0.84. The same statistic for modified versions of the RDQ was 0.91 and 0.90. These are high but within the recommended range of 0.7–0.9.

**Reproducibility**

A number of attempts have been made to assess the reproducibility of the RDQ by testing and retesting after the initial assessment. Although generally regarded as an important element of the validity of a questionnaire, the concept of test–retest reliability is somewhat doubtful for an instrument that has been designed to pick up short-term changes in a condition that is itself notoriously changeable.

It is therefore not surprising that when the test–retest intervals are short (e.g., 24 hours) that correlations between two sets of scores are higher than when the test–retest interval is long. However, interpretation of these may be difficult if the interval is so short that patients can remember their previous responses. Quoted test–retest correlations include 0.91 (same day), 0.88 (1 week), 0.83 (3 weeks). In patients with chronic back pain, a correlation of 0.72 was reported for scores taken 39 days apart.

**Responsiveness**

A number of methods can be used to assess the responsiveness of health status measures, to compare different measures in terms of their ability to detect changes over time.

The RDQ compares well with other commonly used disability scales for back pain. It is at least as responsive in patients with back pain as its parent the SIP or the SIP’s physical subscales. Data on responsiveness of the RDQ have been published by a number of authors. In a later section, the responsiveness of the RDQ is compared with that of the Oswestry questionnaire.

Another important element of a questionnaire’s responsiveness is the smallest effect that is clinically significant. Individual authors suggest that the smallest change likely to be clinically significant lies between 2.5 and 3 points. However, this may vary, depending on the level of disability of the patients. Stratford et al suggest that the minimum clinically important change in scores is 1–2 points for patients with little disability, 7–8
points for patients reporting high levels of disability, and 5 points in unselected patients. Patrick et al.⁹⁸ suggest 2–3 points as the minimum clinically important difference (for a 23-item version of the RDQ). These are minimum changes in score that should be regarded as clinically significant in relation to individual patients. Setting the minimally clinically important difference as high as 5 in designing a clinical trial would risk underpowering the trial, because fewer patients are needed if a trial is designed on the basis of a large change in score. For sample size calculations for clinical trials, the authors therefore recommend that changes in scores of 2–3 points on the RDQ be used.

### The Oswestry Disability Index

**Development**

Development of the Oswestry Disability Index (ODI) was initiated by John O'Brien in 1976 in a specialist referral clinic in which a large number of patients with chronic low back pain were seen. Patients with back pain were interviewed by an orthopedic surgeon (Stephen Eisenstein), an occupational therapist (Judith Couper), and a physiotherapist (Jean Davies) to identify the disturbance of activities of daily living through chronic back pain. The index was designed as a measure for both assessment and outcome. Various drafts of the questionnaire were tried. Version 1.0 of the questionnaire was published in 1980³⁰ and widely disseminated after the 1981 meeting of the International Society for the Study of the Lumbar Spine (ISSLS) in Paris.

The questionnaire can be completed in less than 5 minutes and scored in less than 1 minute. Scores for the ODI in a wide variety of settings are shown in Table 1.

Data obtained with the ODI have been pooled for various categories of patients. The weighted mean of the groups is given. The ratio of the variances (F) is not significant in any of the categories, which suggests that the assumptions used to pool the data to produce these weighted mean values are reasonable ones. The sources of data used are tabulated. Other sources of data are given in the final column, but the information in these was not sufficient to use in calculation of the weighted mean values.

### Modifications and Translations

The ODI was validated and improved in a study by a Medical Research Council (MRC) group. This version (2.0) is recommended for general use.¹⁹¹,⁹²,¹⁰⁰ It has been widely distributed by correspondence and is available as part of a computer interview in the United Kingdom (slightly modified)¹,¹⁰¹ or in the United States through MODEMS (PO Box 2354, Des Plaines, IL 60017-2354). It has been administered over the telephone.⁵³,⁹⁰ A modified version of the ODI has been published by the North American Spine Society (NASS).¹⁹ This version (available from www.modems.org) contains a pain diagram, questions from the SF-36 health questionnaire, questions on neurologic symptoms and on the “bothersomeness” of back pain, and a modification of the ODI. The modifications introduced were designed to clarify the wording of some individual response items. This version also specifies that the respondent should answer the questions in relation to “the past week” (the original instrument is not specific on this point; version 2.0 uses “today”). The NASS version is part of the battery of outcome measures recommended by Deyo et al.²³ Psychometric data are limited on the NASS instrument, but the authors know of its use in a number of large studies and psychometric data will become available in due course. This version has led to confusion about the scoring system in recent presentations from North America. The reader is referred to Fairbank and Pynsent for further details.³¹

### Table 1: Normative Data for ODI

<table>
<thead>
<tr>
<th>Category</th>
<th>Total No.</th>
<th>No. of Groups</th>
<th>Weighted Mean ODI Score</th>
<th>S.D./Range</th>
<th>F</th>
<th>Sources Used</th>
<th>Sources Not Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Normal&quot; populations</td>
<td>461</td>
<td>4</td>
<td>10.19</td>
<td>2.2–12</td>
<td>0.37</td>
<td>52,50,53,62,61,90</td>
<td>20</td>
</tr>
<tr>
<td>Pelvic fractures</td>
<td>31</td>
<td>1</td>
<td>13.26</td>
<td>15.4</td>
<td>–</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Idiopathic scoliosis</td>
<td>1264</td>
<td>5</td>
<td>13.81</td>
<td>9.2–13</td>
<td>0.03</td>
<td>33,90</td>
<td></td>
</tr>
<tr>
<td>Neck pain</td>
<td>56</td>
<td>1</td>
<td>9.7</td>
<td>151</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spondylolisthesis</td>
<td>120</td>
<td>5</td>
<td>26.63</td>
<td>6.1–16</td>
<td>1.76</td>
<td>97,115–117,128</td>
<td>86</td>
</tr>
<tr>
<td>Primary back pain</td>
<td>2166</td>
<td>21</td>
<td>27</td>
<td>5.8–23.6</td>
<td>0.33</td>
<td>34,50,52,53,61,82,81,92,93,110–112,132</td>
<td>20</td>
</tr>
<tr>
<td>Psychiatric patients</td>
<td>75</td>
<td>1</td>
<td>30.8</td>
<td>21.5</td>
<td>–</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Neurogenic claudication</td>
<td>82</td>
<td>2</td>
<td>36.65</td>
<td>17–18</td>
<td>0.14</td>
<td>46–48</td>
<td>20</td>
</tr>
<tr>
<td>Chronic back pain</td>
<td>1530</td>
<td>25</td>
<td>43.3</td>
<td>10–21</td>
<td>0.02</td>
<td>8–12,14,24–27,40–42,68–75,80,85,102,113,116,117,121,128–131,132</td>
<td>125–142</td>
</tr>
<tr>
<td>PID/Sciatica</td>
<td>663</td>
<td>9</td>
<td>44.65</td>
<td>10.5–30.1</td>
<td>0.16</td>
<td>13,25–27,35,36,38,131</td>
<td>68–75,114,127</td>
</tr>
<tr>
<td>Fibromyalgia</td>
<td>192</td>
<td>4</td>
<td>44.83</td>
<td>14.2–18.9</td>
<td>0.07</td>
<td>133–142</td>
<td></td>
</tr>
<tr>
<td>Metastases</td>
<td>100</td>
<td>2</td>
<td>48.04</td>
<td>18.1–23</td>
<td>0.04</td>
<td>99,140</td>
<td></td>
</tr>
</tbody>
</table>

Roland and Fairbank • Roland–Morris and Oswestry Questionnaires 3117
sion from the authors (JF) is required if modifications to the instrument are being considered. Validated translation of ODI 2.0 into other languages is strongly encouraged, although the authors ask to be consulted when such translations are undertaken.

**Face and Content Validity**

These address the extent to which the scale appears to be assessing the intended attributes. Twenty-five patients in their first episode of low back pain who might reasonably be expected to improve with time were shown to do so.30 Beurskens et al6 performed a more sophisticated analysis of 81 patients over a 5-week period confirming an expected improvement in ODI scores. Their study allows calculation of an effect size of 0.8.18 However, Kopec et al86 reported an effect size of only 0.07. Fisher and Johnson32 performed one of the most detailed validations of the questionnaire (version 2.0). They related patient behavior while they were completing this and other questionnaires to the patients’ responses within the questionnaires. Two sections of the questionnaires (sitting and walking) correlated with patient response, but correlation was less satisfactory for a third (lifting).

**Construct Validity**

The wording of the ODI was designed on the basis of patients’ self-reports and symptoms of chronic low back pain. The ODI shows moderate correlation with pain measures such as a visual analog scale (n = 94, r = 0.62)39 and the McGill Pain Questionnaire.43,94

The ODI has been used to validate the Pain Disability Index,39,42,108,123 the Low Back Outcome Score,37 The Manniche Scale,87,88 the Aberdeen score,107 a new German language scale,2 the Curtin Scale,43 and a functional capacity evaluation.63

The ODI correlates with SF-36.38,126 ODI is a better predictor of return to work than two different mechanical methods of lumbar spine assessment.82,96 It predicted isokinetic performance,60 isometric endurance,77 and performance with sitting and standing (but not with lifting) in a study involving secret observation.32 In the Mackenzie system of evaluation, “centralizers” show improving ODI scores.125 Physical tests correlate with the ODI,42 but range of movement does not.41

**Internal Consistency**

Using version 1.0, Strong et al123 found Cronbach’s α to be 0.71, and using version 2.0, Fisher and Johnson32 found 0.76 and Kopec, 0.87.66 All these investigations show an acceptable degree of internal consistency.

**Reproducibility**

In the original study, patients with chronic low back pain were tested twice at a 24-hour interval (n = 22, r = 0.99).30 This may include a memory effect. If the test-retest interval is extended to 4 days, the correlation of scores decreases to n = 22, r = 0.9166 and, if retested after a week, n = 22, r = 0.83.39 The disadvantage of increasing the time interval is that natural symptom fluctuation may also be an influence. Grevitt (personal communication, 1997) found a poorer test-retest correlation in a study in which he mailed versions of the questionnaire to patients to complete and then asked them to complete the questionnaire again in a different format when they attended as outpatients.

**Responsiveness**

Receiver operating characteristic (ROC) is a concept used to explore the diagnostic test performance of an instrument or the ability of the instrument to detect change,21 in which its sensitivity is plotted against 1 minus specificity. This allows the ability of the instrument to detect change to be investigated. The ROC index (D’) for the ODI was found to be 0.76, a score that is acceptable but not as good as that of the RDQ scale. This is perhaps not surprising in a population of patients who were not severely affected (mean ODI 26.2 ± 13.5).6,82 The ROC index has not been calculated for the ODI in a group of more severely affected patients. Because the ROC curve depends on sensitivity and specificity, there is an inherent assumption that a “true disability” is known. This may be difficult to justify.21

Data from Meade91 suggest 4 points as the minimum difference in mean scores between groups carrying clinical significance. The US Food and Drug Administration (FDA) has chosen a minimum 15-point change in spinal fusion patients before surgery and at follow-up (Lipscombe, personal communication, 1997). Table 2 shows change in weighted means calculated from publications reporting ODI before and after treatment in various subgroups of patients. Large changes in score are seen in patients with primary back pain and the least in those with spinal metastases. More work is needed in this area.

**Comparison Between the Roland-Morris Disability Questionnaire and the Oswestry Disability Index**

It is important to emphasize that differences between these instruments are not great. Both are widely used, have been extensively tested, and are applicable in a wide variety of settings. The situation in which a choice between the two instruments would be most clear cut would be when a validated translation exists for one but not the other.

Both were originally designed for paper administration. The RDQ has been widely administered over the
telephone. Although the ODI can be administered by telephone, the multiple nature of the response items makes it more difficult.

Floor and ceiling effects may influence the choice of instruments. A greater proportion of patients score in the top half of the distribution of RDQ scores than in the top half of ODI scores. At high levels of disability, the ODI may still show change when RDQ scores are maximal. At the other end of the scale, RDQ scores may still discriminate when ODI scores are at a minimum. The authors therefore recommend use of the ODI in patients who are likely to have persistent severe disability and the RDQ in patients who are likely to have relatively little disability. However, for most patient groups, both instruments function satisfactorily in groups with severe disability.

The RDQ and ODI scores are highly correlated, with similar test–retest reliability and internal consistency. Stratford et al found that the properties of the two instruments were very similar in discriminating power, including ability to detect change over time. Other authors have reported that the ODI performs better or the reverse, or that the result depends on the exact comparison being made. It is difficult to compare these studies in detail, because they relate to different patient populations.

**Normative Data for the Roland–Morris Disability Questionnaire and the Oswestry Disability Index**

In Table 3 normative data are included to give clinicians an idea of the scores that they can expect in a variety of clinical situations. The table includes studies in which both RDQ and ODI scores were both measured in the same group of patients to allow comparison between scores on the two instruments.

**Summary**

The RDQ is a short and simple method of a self-rated assessment of physical function in patients with back pain. Its ease of use makes it suitable for following up on the progress of individual patients in clinical settings and for comparing with other measures of function (e.g., psychological or work disability) in research settings. The ODI is likewise an effective method of measuring disability in patients with back pain with a wide degree of severity and causes. Both instruments have stood the test of time and have been used in a wide variety of clinical situations, in the United Kingdom, the United States, and many other countries.

Both instruments perform as well as most other currently available instruments and better than some. The RDQ may be better suited to settings in which patients have mild to moderate disability and the ODI to situations in which patients may have persistent severe disability. The availability of the two instruments in a wide range of languages permits comparison between studies performed in numerous countries.

**References**

Appendix 1

The Roland–Morris Disability Questionnaire

When your back hurts, you may find it difficult to do some things you normally do.

This list contains sentences that people have used to describe themselves when they have back pain. When you read them, you may find that some stand out because they describe you today. As you read the list, think of yourself today. When you read a sentence that describes you today, put a tick against it. If the sentence does not describe you, then leave the space blank and go on to the next one. Remember, only tick the sentence if you are sure it describes you today.

1. I stay at home most of the time because of my back.
2. I change position frequently to try and get my back comfortable.
3. I walk more slowly than usual because of my back.
4. Because of my back I am not doing any of the jobs that I usually do around the house.
5. Because of my back, I use a handrail to get upstairs.
6. Because of my back, I lie down to rest more often.
7. Because of my back, I have to hold on to something to get out of an easy chair.
8. Because of my back, I try to get other people to do things for me.
9. I get dressed more slowly then usual because of my back.
10. I only stand for short periods of time because of my back.
11. Because of my back, I try not to bend or kneel down.
12. I find it difficult to get out of a chair because of my back.
13. My back is painful almost all the time.
14. I find it difficult to turn over in bed because of my back.
15. My appetite is not very good because of my back pain.
16. I have trouble putting on my socks (or stockings) because of the pain in my back.
17. I only walk short distances because of my back.
18. I sleep less well on my back.
20. I sit down for most of the day because of my back.
21. I avoid heavy jobs around the house because of my back.
22. Because of my back pain, I am more irritable and bad tempered with people than usual.
23. Because of my back, I go upstairs more slowly than usual.
24. I stay in bed most of the time because of my back.

The score is the total number of items checked—i.e., from a minimum of 0 to a maximum of 24.

Appendix 2

Oswestry Disability Index 2.0

Could you please complete this questionnaire. It is designed to give us information as to how your back (or leg) trouble has affected your ability to manage in everyday life.

Please answer every section. Mark one box only in each section that most closely describes you today.

Section 1: Pain intensity

☐ I have no pain at the moment.
The pain is very mild at the moment.
The pain is moderate at the moment.
The pain is fairly severe at the moment.
The pain is very severe at the moment.
The pain is the worst imaginable at the moment.

Section 2: Personal care (washing, dressing, etc.)
- I can look after myself normally without causing extra pain.
- I can look after myself normally but it is very painful.
- It is painful to look after myself and I am slow and careful.
- I need some help but manage most of my personal care.
- I need help every day in most aspects of self care.
- I do not get dressed, wash with difficulty, and stay in bed.

Section 3: Lifting
- I can lift heavy weights without extra pain.
- I can lift heavy weights but it gives extra pain.
- Pain prevents me from lifting heavy weights off the floor but I can manage if they are conveniently positioned, e.g., on a table.
- Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.
- I can lift only very light weights.
- I cannot lift or carry anything at all.

Section 4: Walking
- Pain does not prevent me walking any distance.
- Pain prevents me walking more than 1 mile.
- Pain prevents me walking more than a quarter of a mile.
- Pain prevents me walking more than 100 yards.
- I can only walk using a stick or crutches.
- I am in bed most of the time and have to crawl to the toilet.

Section 5: Sitting
- I can sit in any chair as long as I like.
- I can sit in my favorite chair as long as I like.
- Pain prevents me from sitting for more than 1 hour.
- Pain prevents me from sitting for more than half an hour.
- Pain prevents me from sitting for more than 10 minutes.

Section 6: Standing
- Pain prevents me from sitting at all.

Section 7: Sleeping
- My sleep is never disturbed by pain.
- My sleep is occasionally disturbed by pain.
- Because of pain I have less than 6 hours’ sleep.
- Because of pain I have less than 4 hours’ sleep.
- Because of pain I have less than 2 hours’ sleep.
- Pain prevents me from sleeping at all.

Section 8: Sex life (if applicable)
- My sex life is normal and causes no extra pain.
- My sex life is normal but causes some extra pain.
- My sex life is nearly normal but is very painful.
- My sex life is severely restricted by pain.
- My sex life is nearly absent because of pain.
- Pain prevents any sex life at all.

Section 9: Social life
- My social life is normal and causes me no extra pain.
- My social life is normal but increases the degree of pain.
- Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g., sport, etc.
- Pain has restricted my social life and I do not go out as often.
- Pain has restricted social life to my home.
- I have no social life because of pain.

Section 10: Traveling
- I can travel anywhere without pain.
- I can travel anywhere but it gives extra pain.
- Pain is bad but I manage journeys over 2 hours.
- Pain restricts me to journeys of less than 1 hour.
- Pain restricts me to short necessary journeys under 30 minutes.
- Pain prevents me from traveling except to receive treatment.
Scoring the ODI

For each section of six statements the total score is 5; if the first statement is marked, the score is 0; if the last statement is marked, it is 5. Intervening statements are scored according to rank. If more than one box is marked in each section, take the highest score. If all 10 sections are completed the score is calculated as follows: if 16 (total scored) out of 50 (total possible score) × 100 = 32%. If one section is missed (or not applicable) the score is calculated: Example: 16 (total scored)/45 (total possible score) × 100 = 35.5% Therefore, the final score may be summarized as: (total score/(5 × number of questions answered)) × 100%. The authors suggest rounding the percentage to a whole number for convenience.

Address reprint requests to
Martin Roland
National Primary Care Research and Development Centre
University of Manchester
Williamson Building, Oxford Road
Manchester M13 9PL, UK
E-mail: m.roland@man.ac.uk