No other disease in recent history has generated so much concern, fear, anxiety, and prejudice, both among health care personnel and the general public, as has HIV/AIDS. Providers’ attitudes about HIV/AIDS are an important dimension in the delivery of quality care to persons with HIV/AIDS. It is believed that education can alter attitudes, but there is a need for a user-friendly instrument to measure the effect that HIV/AIDS educational programs have on attitudes.

Methods: A pool of HIV/AIDS attitude descriptors was collected through literature review and from individuals working in the HIV/AIDS field. Out of this pool of 90 descriptors, 48 descriptors with the highest face validity were selected through expert consensus ranking to create a preliminary survey instrument. Twenty-six physicians completed a pilot Q-Sort instrument with 48 descriptors. A variance analysis was conducted, and the top 28 descriptors with the most variability were selected for the final Q-Sort instrument, which was then completed by 191 physicians. A factor analysis was conducted to identify a small number of factors that explained the 28 descriptors. A subsample of 22 physicians repeated the test to establish test-retest reliability. Results: Factor analysis revealed three factors: (1) emotionality, (2) ability, and (3) reluctance. The Q-Sort instrument demonstrated good test-retest reliability, with reliability for the three factors of .82, .80, and .88, respectively. Conclusions: This Q-sort instrument is a reliable method for measuring physician attitudes toward HIV/AIDS patients. Further studies can test its use for evaluating the effect of educational programs on changing provider attitudes.

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From the Department of Family Medicine, University of Southern California.
uses a forced-choice method, where one must rank all the descriptors in a pool, and each selection is affected by the other selections. Respondents are thus forced to consider their attitudes more carefully, which can bring out true feelings in responses.

The Q-Sort technique was originally developed by Stephenson in 1935 and was published as a note in *Nature*, titled “Technique of Factor Analysis.” The Q-Sort provided attitude descriptors selected by the researcher based on content validity, variability, and differentiation among individuals. These descriptors are placed by the respondent on a grid with 7 to 11 columns (Figure 1) that resemble a normal distribution. The forced choice is actualized, in that all the descriptors must be placed by the respondent in the grid.

Participants are asked to select from the group of descriptors and rank them by placing them in columns labeled from “least like my attitude” to “most like my attitude.” Typically, one or two descriptors are placed in the extremes, and the majority are placed toward the center, resulting in a normal distribution.

Q-Sort instruments can be used in a variety of settings on the same individual, multiple times, and with short inter-test intervals (eg, to test differences between “self” and “ideal,” “pre intervention” and “post intervention,” etc).

The Q-Sort has been used previously in medicine for several purposes. It has been used as a behavior rating instrument for pediatric HIV patients, in measuring optimal mental health, in measuring personality development, for description of social behavior, in assessing personality pathology, as a hostility scale, as an affect regulation and affective experience measure, as a tool in medical education research, as a measure of infant and mother attachment, as a measure of attachment behavior at home, in cross-cultural nutrition and health research, and in patient education research.

The ability to bring out true feelings and the ability to measure short-term changes arguably makes the Q-Sort technique an ideal method for measuring the effect of training on physicians’ attitudes toward HIV/AIDS patients. It is also a fun instrument in which the subject enjoys moving the attitude descriptors until they are fully satisfied. Q-sort technique allows for shorter administration time than other scaling schemes and is rarely resisted by participants. The Q-Sort requires the respondent to make a distribution that in other rating schemes might be masked. Thus far, no AIDS attitude-related Q-Sort instrument has been developed. The goal of this research is to develop and validate a Q-Sort instrument to measure the attitudes of physicians toward patients with HIV/AIDS.

**Methods**

*Development of Preliminary Instrument*

The first step in the process of developing a Q-Sort instrument is to identify descriptors that reflect the attitudes of physicians toward HIV/AIDS patients. Descriptors that measure attitudes were pooled from several sources, including a MEDLINE computerized database literature search, using “HIV,” “AIDS,” “attitudes,” and “physicians” as key words, from colleagues at the Faculty Development Center in Waco, Tex, and from staff at the AIDS Regional Education Center for Texas and Oklahoma, in Houston. This large pool of
statements or words was reviewed by a jury of AIDS researchers and clinicians for clarity and face validity. These reviewers selected 48 descriptors, and those 48 descriptors constituted the preliminary instrument.

The instrument we devised involved a typical Q-Sort task, which is a comparative process in which respondents are required to sort their responses into a predetermined number of piles. In this study, the piles represented descriptors that ranged from “most accurately reflect my feelings” to “least accurately reflect my feelings.” Response categories are generally forced into an approximately normal distribution by specifying the number of descriptors that can be placed at each point on the scale. For this study, a grid was constructed that had 11 columns, representing the 11 possible points along the scale. The approximately normal distribution was forced by requiring respondents to place two boxes each in columns 1 and 11 at both the extremes, three boxes in columns 2 and 10, four boxes in columns 3 and 9, five boxes in columns 4 and 8, six boxes in columns 5 and 7, and eight boxes in the center column 6.

Pilot Testing of Preliminary Instrument

This initial instrument was mailed with written instructions to a sample of 84 practicing and academic physicians in east and central Texas for pilot testing.

Respondents were instructed to select the two descriptors that most accurately represented their feelings toward the HIV/AIDS patients and place them in column 11 and work toward the center. Similarly, the descriptors that least described their feelings were to be placed in column 1 working toward the center. The descriptors that did not fall in either category were placed in the center column 6. Respondents were advised to freely move these descriptors until they were satisfied with their final placement. They were instructed that it is only the horizontal placement that matters in scoring, not the vertical placement in the grid.

Twenty-five responses were received. To reduce the length of the final instrument and make it more concise and manageable for respondents, variances of all the descriptors were obtained and reviewed. Variability of the descriptor predicts its value to differentiate attitudes. Information on the variability was thus used to select the 28 most discriminating descriptors for the final instrument (Table 1).

Development and Testing of the Revised Instrument

The second Q-Sort instrument was developed from these 28 descriptors. It had a grid with two boxes at the extremes in column 1 and 7, three boxes in columns 2 and 6, five boxes in columns 3 and 5, and eight boxes in the center column 4 (Appendix 1). This Q-sort takes approximately 4–6 minutes to complete.

The second Q-Sort instrument was mailed to a sample of 792 physicians. The sample included all faculty and residents of family practice residency programs in the state of Texas. A total of 191 physicians responded. The mailing included a cover letter explaining the purpose of the project, reaffixable descriptor labels, a printed grid card with a code number for maintaining confidentiality, and a postage-paid return envelope.

One week after the first response the same instrument was sent to a convenience sample of 32 physicians selected from the pool of 191 respondents to assess the test-retest reliability. The retest was sent with a cover letter explaining the purpose of the repeat mailing. Twenty-two physicians responded.

Data Analysis

To identify the underlying constructs measured by the Q-Sort items, an exploratory factor analysis was performed using Principal Components Analysis (PCA). These solutions were rotated using the Varimax procedure and examined for interpretability and parsimony. Factor analysis is commonly used for data reduction and to construct scales. PCA is often the preferred method when the goal is to explain all of the variance in a set of items, and the approach is empirical rather than theoretical.34

<table>
<thead>
<tr>
<th>Descriptor (Item #)</th>
<th>Variance</th>
<th>Descriptor (Item #)</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Angry (2)</td>
<td>12.333</td>
<td>25. Pity (33)</td>
<td>5.458</td>
</tr>
<tr>
<td>3. Aversion (5)</td>
<td>9.065</td>
<td>27. Rejection (34)</td>
<td>5.303</td>
</tr>
<tr>
<td>5. Likable (16)</td>
<td>8.293</td>
<td>29. Fulfilled (24)</td>
<td>4.984</td>
</tr>
<tr>
<td>6. Uncomfortable (44)</td>
<td>8.090</td>
<td>30. Understanding (45)</td>
<td>4.917</td>
</tr>
<tr>
<td>7. Disapproval (15)</td>
<td>8.083</td>
<td>31. Frustrated (23)</td>
<td>4.754</td>
</tr>
<tr>
<td>8. Accepting (1)</td>
<td>7.327</td>
<td>32. Threatened (42)</td>
<td>4.690</td>
</tr>
<tr>
<td>9. Helpless (26)</td>
<td>7.275</td>
<td>33. Sympathetic (41)</td>
<td>4.688</td>
</tr>
<tr>
<td>10. At risk (4)</td>
<td>7.023</td>
<td>34. Distress (17)</td>
<td>4.657</td>
</tr>
<tr>
<td>11. Challenged (9)</td>
<td>7.000</td>
<td>35. Competent (12)</td>
<td>4.657</td>
</tr>
<tr>
<td>13. Cautious (8)</td>
<td>6.923</td>
<td>37. Fearful (22)</td>
<td>4.346</td>
</tr>
<tr>
<td>14. Unsympathetic (46)</td>
<td>6.750</td>
<td>38. Sensitive (39)</td>
<td>4.140</td>
</tr>
<tr>
<td>15. Inadequate (27)</td>
<td>6.643</td>
<td>39. Vulnerable (48)</td>
<td>3.884</td>
</tr>
<tr>
<td>16. Anxious (3)</td>
<td>6.505</td>
<td>40. Responsibility (36)</td>
<td>3.462</td>
</tr>
<tr>
<td>17. Empathetic (21)</td>
<td>6.490</td>
<td>41. Disturbed (18)</td>
<td>3.423</td>
</tr>
<tr>
<td>18. Complicated (13)</td>
<td>6.427</td>
<td>42. Painful (32)</td>
<td>3.417</td>
</tr>
<tr>
<td>20. Rewarding (37)</td>
<td>5.893</td>
<td>44. Unwilling (47)</td>
<td>3.225</td>
</tr>
<tr>
<td>21. Capable (7)</td>
<td>5.743</td>
<td>45. Reluctant (35)</td>
<td>3.167</td>
</tr>
<tr>
<td>22. Stimulated (40)</td>
<td>5.563</td>
<td>46. Conscientious (14)</td>
<td>2.580</td>
</tr>
<tr>
<td>23. Sad (38)</td>
<td>5.558</td>
<td>47. Troubled (43)</td>
<td>2.527</td>
</tr>
<tr>
<td>24. Comfortable (10)</td>
<td>5.540</td>
<td>48. Drained (19)</td>
<td>2.245</td>
</tr>
</tbody>
</table>

The top 28 descriptors with most variability (in bold) were selected for the final Q-Sort instrument.

Table 1

Variance of the 48 Descriptors in the Pilot Q-Sort

The top 28 descriptors with most variability (in bold) were selected for the final Q-Sort instrument.
To derive a numerical score for each factor identified in a score plot, the following protocol was followed. Each descriptor/item that loaded on a specific factor was assigned a numerical score on that factor, depending on where the respondent placed that descriptor along the scale. For example, if descriptor number 1 (“accepting”), which loads on Factor 1, was placed in column 7, the value assigned to Factor 1 is 7. If item number 3 (“anxious”), which loads on Factor 2, is in column 5, a value of 5 is assigned and so on. To maintain consistency of scale, items that had negative factor loadings were reverse coded prior to summing the items for the final scale score. Therefore, an individual who placed the item “angry” in column 6 would be assigned the score of 2 on that item. The final scale/factor score is then calculated as the simple average of the item scores for that factor (See Appendix 2 for an example).

Test-retest reliability was assessed using Pearson Product Moment Correlations between each individual Q-Sort item and each factor measured at time 1 (test) and time 2 (retest).

Results

Inspection of the Scree plot obtained from the factor analysis indicated that solutions with three, four, or five factors were possible to explain the variables in the instrument. The three-factor solution was selected as the one that was most interpretable and conceptually sound. These factors are (1) emotionality, (2) ability, and (3) reluctance. They are shown in Table 2.

Scale scores are interpreted in the following way. A high score on Factor 1 (“emotionality”) means the physician feels accepting, caring, compassionate, empathetic, and open-minded. A low score means the physician feels anger, aversion, disapproval, dislike, offended, rejection, and unsympathetic about HIV/AIDS patients. Factor 1 (“emotionality”) indicates the degree of positive and negative emotional feelings.

A high score on Factor 2 (“ability”) means the physician feels capable and comfortable, and a low score means the physician feels anxious, complicated, helpless, inadequate, and sad about HIV/AIDS patients. Factor 2 (“ability”) indicates the degree of ability the physicians feel they possess to deal with HIV/AIDS patients.

A high score on Factor 3 (“reluctance”) means that the physician feels at risk, cautious, and uncomfortable. A low score on Factor 3 means that the physician feels challenged, gratified, rewarded, and stimulated. Factor 3 measures the degree of reluctance the physician feels about handling HIV/AIDS patients.

The results of the test-retest reliability of individual Q-Sort items are shown in Table 2. The correlations for the individual factor test-retest reliability scores were.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Factor Loadings of the Three Factors and r Values of Descriptors and Factors in the Final Q-Sort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor 1</td>
</tr>
<tr>
<td></td>
<td>EMOTIONALITY</td>
</tr>
<tr>
<td>Factor Loading</td>
<td>Positive</td>
</tr>
<tr>
<td>1. Accepting</td>
<td>(.750)</td>
</tr>
<tr>
<td>2. Angry</td>
<td>(.084)</td>
</tr>
<tr>
<td>7. Capable</td>
<td>(.290)</td>
</tr>
<tr>
<td>3. Anxious</td>
<td>(.439)</td>
</tr>
<tr>
<td>4. At risk</td>
<td>(.373)</td>
</tr>
<tr>
<td>9. Challenged</td>
<td>(.659)</td>
</tr>
</tbody>
</table>

Item #15 “duty bound” and item #22 “pity” failed to load above .300 and were excluded from analysis.

$r$ stands for the Pearson Product Moment Correlation Coefficient. Correlations range from -1 to +1, with values high in absolute value being indicators of strong test-retest reliability. Generally, $r$ values of .60 or above are considered good for reliabilities.22,35

Test-retest reliability coefficients are depicted in brackets below each factor and descriptor. Test-retest reliability for the factors is more important for an instrument than the reliability measures for the individual descriptors, since it is the factor score that is of primary interest and use.
Factor 1 (emotionality) .82, Factor 2 (ability) .80, Factor 3 (reluctance) .88.

Discussion

In response to the need for a user-friendly instrument to assess HIV/AIDS attitudes in providers, I developed the Q-Sort instrument described in this paper. This instrument was found to have three factors: emotionality, ability, and reluctance. It appears to have sufficient internal reliability and validity to be useful as a measure of attitudes of physicians toward HIV/AIDS patients.

One of the limitations of the study was a low response rate. However, the sample size was adequate to conduct the analyses, and the respondents are felt to reasonably represent physicians with whom the measure would be used.

Finally, the data reported here on instrument development should be considered preliminary. Future work is needed with this instrument to test the validity of this Q-Sort instrument in HIV/AIDS educational programs and residency training programs as a pretest and posttest as a measure of attitudinal changes after educational interventions. It would also be desirable to test the validity of this instrument among different types and levels of medical providers and with providers from different cultural backgrounds.

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References

Appendix 1

Sample of a HIV/AIDS Physician Attitudes Q-Sort Instrument
Appendix 2

Scoring of the HIV/AIDS Q-Sort Instrument

Note: Scores for item numbers that are underlined must be reversed before calculating the factor score. These reversals are shown in the column labeled “Factor Score.”