Objective: To examine the frequency with which rural residents' undergo human immunodeficiency virus (HIV) antibody testing and the reasons why.

Design: Data are from the 1991 National Health Interview Survey's supplemental questions on knowledge and attitudes about acquired immunodeficiency syndrome.

Subjects: The respondents were 42,725 adults (aged ≥18 years), representing a nationwide sample of the civilian, noninstitutionalized population of the United States. Rural (n=9903) and urban (n=32,822) respondents were compared.

Results: Although 7.1% of rural and 7.9% of urban respondents are at high risk for contracting HIV (P=.06), 25.2% of rural and 33.0% of urban respondents had been tested for HIV (P=.001). Excluding blood donations, 10.7% of rural and 17.2% of urban respondents had been tested for HIV (P=.001). The primary reason between the two groups for not getting tested was a belief of being at low risk for contracting HIV. Rural respondents were less likely than urban respondents (6.6% vs 10.4%) (P=.001) to be tested for HIV in the next 12 months. Rural respondents were less informed about HIV risks than were urban respondents. Urban residence is a significant predictor of having had an HIV test even after controlling for actual risk status, perceived risk status, age, education, income, sex, perceived health status, and a scale of knowledge of acquired immunodeficiency syndrome risk factors (odds ratio, 1.54; 95% confidence interval, 1.37 to 1.73).

Conclusions: Rural residents are less knowledgeable about HIV risk factors and are less likely to have been tested for HIV. With the increasing rates of infection in rural areas, specific and focused efforts for counseling and testing for HIV antibodies in rural areas might prevent and control HIV infection and acquired immunodeficiency syndrome.

(Arch Fam Med. 1995;4:41-45)

ALTHOUGH THE prevalence of the human immunodeficiency virus (HIV) and its sequelae, acquired immunodeficiency syndrome (AIDS), is substantially higher in metropolitan areas of the United States than in nonmetropolitan areas, a significant number of individuals in rural areas are HIV-positive or have AIDS. Recent evidence indicates that the rate of HIV-related disease has shown rapid increases in rural areas. Moreover, although the incidence of AIDS among gay and bisexual men in urban areas of the United States has increased much less rapidly after 1986 and seems to have reached a plateau, in rural areas, the incidence has increased linearly through at least 1989.

Counseling and testing for HIV antibodies are key foci of the US Public Health Service plan for the prevention and control of HIV infection and AIDS. Barriers to the use of the HIV test include a lack of health care access, perceived personal benefit of the test, and professional use of and disclosure of the test results. Although education has been positively correlated in the general population with being tested, it has been shown to be negatively related with being tested in a sample of gay and bisexual men. Furthermore, the individual's perceived risk for HIV and confidentiality of the test results have been noted as barriers to the use and intention for using the HIV test. Because of the importance placed on the HIV antibody test by practitioners and epidemiologists, research has focused on individuals' intentions and use of the test. Research has
SUBJECTS AND METHODS

The data are from the 1991 National Health Interview Survey (NHIS), which solicited responses concerning one’s knowledge and attitudes about AIDS. The NHIS is given annually to a nationwide sample of the civilian, noninstitutionalized population of the United States and has been in existence since 1957. The NHIS uses a multistage probability sampling design. Additional information on the methods of the NHIS has been published previously.

MEASURES

All respondents were asked if they had been tested for HIV, and if they had given blood as a way to obtain an HIV test. For individuals who have not had an HIV test, the following reasons were examined: (1) the individual does not consider himself or herself at risk of contracting AIDS; (2) the individual is afraid of losing his or her job, insurance, housing, friends, or family if people were to know that he or she is HIV-positive; (3) the individual does not trust personnel in medical clinics or hospitals to keep the test results confidential; and (4) the individual does not know where to go for a test. For individuals who have had an HIV test, the provision of counseling at the time of the test, belief in the accuracy of the results, and perceived confidentiality of the results were measured. All respondents were asked if they intended to be tested for HIV in the next 12 months. Respondents reported their perceived chances of having and contracting HIV on a four-point scale (where 1 indicates none; 2, low; 3, medium; and 4, high). Furthermore, respondents were allocated into groups at high and low risk of HIV infection. Individuals were allocated into the high-risk group if they answered yes to any of the following: (1) an individual with hemophilia or another blood-clotting disorder who has received blood coagulation factors since 1977; (2) a man who has had sex with another man at some time since 1977; (3) an individual who has taken illegal drugs by needle at any time since 1977; (4) an individual who has had sex for money or drugs since 1977; (5) an individual has been the sex partner to any person who could answer yes to any of the previous categories; or (6) the individual had a blood transfusion between 1977 and 1985.

Knowledge of AIDS is assessed by a variety of indicators. Respondents were asked how much they thought they knew about AIDS on a four-point scale (where 1 indicates a lot; 2, some; 3, a little; and 4, nothing) and whether they had ever heard the AIDS virus referred to as HIV. A nine-item summative scale of HIV risks was used as an indicator of knowledge of perceived risks. The higher the score, the less the perceived risks. The scale was scored so that the higher the score, the more informed the individual was regarding HIV risks.

Urban individuals are those whose residence is part of a metropolitan statistical area, while rural individuals are those living outside this area. Metropolitan statistical areas have been proposed as a conventional definition of rurality.

The demographic characteristics of race, age, sex, education, and annual household income were also collected. A final indicator assessed self-perceived health status on a five-point scale (where 1 indicates excellent; 2, very good; 3, good; 4, fair; and 5, poor).

DATA ANALYSIS

Because of the complex survey design of the 1991 NHIS, sampling weights were used, and weighted parameter estimates and SEs were computed with the aid of the SUDAAN statistical package. By using this method, the analysis provides unbiased national estimates, and the data are representative of the adult civilian, noninstitutionalized population. Analyses were used for bivariate analyses of categorical data between rural and urban residents. Student’s t tests were used to compare mean differences in age, education, and HIV perceptions between rural and urban adults. Two logistic regression models were computed to determine the independent relationship between rural or urban residence and the dichotomous variable of ever having had an HIV antibody test, and intention for having an HIV antibody test sometime in the next 12 months, while controlling for other possible predictors of use or intention for having the HIV test. The first regression model with the dependent variable of ever having had an HIV antibody test (not including blood donations) was computed with the following predictor variables: (1) rural or urban residence; (2) age; (3) education; (4) total family income; (5) sex, (6) race; (7) perceived health status; (8) perceived chance of having HIV now; (9) a scale of knowledge of HIV risks; and (10) whether the individual is at high risk of HIV. The logistic regression model on the intention for HIV testing used the previously listed variables with the addition of a variable indicating the respondent’s perceived chances of contracting HIV. Responses of don’t know, a refusal, or no answer were eliminated from the analysis. Thus, the sample size of individuals eligible for analysis varies across items.

Owing to the large sample size and its effect on significance levels, particularly in the case of Student’s t tests, this study considers a two-tailed α of P < .01 as a statistically significant finding.

Moreover, anonymity is especially difficult to maintain in rural settings, thereby affecting the use of services that could stigmatize the individual.

The purpose of this study is to examine rural residents’ use of and intentions for using the HIV antibody test.

RESULTS

Within the sample of 42 725 individuals, 9003 (23%) were rural and 32 822 (77%) were urban residents. The demo-
Table 1. Demographic Characteristics of Rural and Urban Adults

<table>
<thead>
<tr>
<th></th>
<th>Rural Adults (n=9903)</th>
<th>Urban Adults (n=32,822)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex, % M/F</td>
<td>47/53</td>
<td>48/52</td>
<td>.16</td>
</tr>
<tr>
<td>Race, % W/B</td>
<td>90/8</td>
<td>84/12</td>
<td>.001</td>
</tr>
<tr>
<td>Other</td>
<td>2/4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (±SD) age, y</td>
<td>46.02±37.81</td>
<td>43.48±28.99</td>
<td>.001</td>
</tr>
<tr>
<td>Mean (±SD) education level, y</td>
<td>12.03±5.96</td>
<td>12.79±5.43</td>
<td>.02</td>
</tr>
</tbody>
</table>

Table 2. Reported Actual and Perceived Risk for HIV Among Rural and Urban Adults

<table>
<thead>
<tr>
<th></th>
<th>Rural Adults (n=9903)</th>
<th>Urban Adults (n=32,822)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>At high risk of contracting HIV</td>
<td>7.1</td>
<td>7.9</td>
<td>.06</td>
</tr>
<tr>
<td>Perceived chance of having HIV now</td>
<td>1.19±0.98</td>
<td>1.21±0.18</td>
<td>.55</td>
</tr>
<tr>
<td>Perceived chance of getting HIV</td>
<td>1.25±0.98</td>
<td>1.30±0.18</td>
<td>.001</td>
</tr>
</tbody>
</table>

*Respondents assessed their perceived chances of having and contracting the human immunodeficiency virus (HIV) on a four-point scale, in which 1 indicates none; 2, low; 3, medium; and 4, high. Data are reported as mean (±SD) except where noted.

Table 3. Frequency of Human Immunodeficiency Virus (HIV) Test by Rural and Urban Adults

<table>
<thead>
<tr>
<th></th>
<th>Rural Adults (n=9903)</th>
<th>Urban Adults (n=32,822)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Ever tested</td>
<td>10.7</td>
<td>17.2</td>
<td>.001</td>
</tr>
<tr>
<td>% Ever tested, including blood donations</td>
<td>25.2</td>
<td>33.0</td>
<td>.001</td>
</tr>
<tr>
<td>% Expected to have an HIV test in next 12 mo</td>
<td>6.5</td>
<td>10.4</td>
<td>.001</td>
</tr>
</tbody>
</table>

Rural individuals were less confident than urban individuals in their knowledge of AIDS (2.18 vs 2.03) (P=.001). Rural individuals also less likely than urban individuals to have heard the AIDS virus referred to as HIV (86.1% vs 88.4%) (P=.001). Furthermore, rural individuals are less accurate than urban individuals in their knowledge of HIV risks (32.98 vs 33.57) (P=.006).

The actual and perceived risk status for HIV of the two groups is shown in Table 2. Although the groups are not significantly different in terms of actual risk status, rural individuals have a lower perception of future risk for contracting HIV than do their urban counterparts.

A small proportion of both groups reported that they had donated blood to receive an HIV test. Among rural individuals who had donated blood, 2.3% had done so to receive an HIV antibody test, while 3.3% of their urban counterparts had done so (P=.09). Table 3 indicates the difference between the groups in terms of the use and intention for using the HIV antibody test. Rural individuals were less likely than were urban individuals to have had an HIV test, as well as to intend to have one in the next 12 months. The primary reason among both groups for not getting tested was a belief of being at low risk of contracting HIV. This reason was cited by 92.2% of the rural and 91.1% of the urban individuals (P=.24). The other investigated reasons (the individual is afraid of losing his or her job, insurance, housing, friends, or family if people were to know that he or she is HIV-positive, the individual does not trust personnel in medical clinics or hospitals to keep the test results confidential, and the individual does not know where to go for a test) were each chosen by less than 1% of either group. Among those who have had an HIV antibody test, 15.7% of the rural and 18.6% of the urban individuals had received counseling at the time of the test (P=.09). Greater than 99.7% of rural and urban individuals believed that the test results were accurate. In terms of the perceived confidentiality of the test results, 96.5% of the rural and 97.6% of the urban individuals believed that the confidentiality of the test results was handled properly (P=.17).

When controlling for the effect of the other variables in the logistic regression model on whether someone has ever had an HIV antibody test, the results indicate that urban individuals are 1.54 (95% confidence interval, 1.37 to 1.73) times as likely as rural individuals to have been tested. Furthermore, after controlling for the other variables in the logistic regression model on their intention to be tested in the next 12 months, urban individuals are 1.42 (95% confidence interval, 1.21 to 1.66) times as likely as rural individuals to expect to have an HIV test.

The results indicate that rural individuals are less likely than urban individuals to have had or intend to have an HIV antibody test. Although the groups were not significantly different in actual risk status for HIV, rural individuals have a lowered perceived risk for infection from HIV. Rural individuals know less and are less confident about their knowledge regarding HIV than are their urban counterparts. Perhaps because of this, rural individuals perceive themselves to be at lower risk of contracting HIV, which influences their use of HIV antibody testing.

Rural individuals may underestimate the probability of the risks for contracting HIV. If people do not perceive or if they underestimate a risk, they are not likely to adopt behaviors that might decrease their risk. The
Health of individuals depends in part on the availability and understanding of personal health information. It would seem that with the expanded dissemination of medical information in the mass media, the public would be informed about HIV and AIDS. However, evidence indicates that generally 40% of individuals who have greater than a high school education have a misunderstanding of the popular media health reports.26

Knowledge regarding HIV and risk assessments account for some of the difference in rural individuals’ experience obtaining HIV tests and the intention to be tested between the groups, but there is still a difference between the groups in the use of and intention for testing after controlling for these factors. This would suggest that other forces are at work in influencing this health behavior. The differences between rural and urban individuals in having had or intending to have HIV testing cannot be attributed to confidentiality concerns, fear of job displacement, or discrimination in housing.

The results of this study highlight several issues that have important implications for HIV antibody test policy in rural areas. Although HIV antibody testing and counseling are seen as important elements of the AIDS prevention effort,10 HIV testing policies have been controversial for a variety of reasons, particularly in terms of human rights and psychological well-being.29 The provision of potentially stigmatizing health services in rural areas are hindered by the factors of availability, accessibility, and acceptability.26 Rural individuals are disadvantaged in terms of availability and accessibility of health services in that they are more likely to be without a regular source of health care, have to travel farther to reach health care, and are less likely to have health insurance than are urban individuals.26 Acceptability may be hampered by several factors, including (1) a tradition of handling one’s own problems, (2) beliefs related to the cause of a disorder and appropriate treatment, and (3) a lack of knowledge about disorders and specialty health services. These elements of acceptability of HIV antibody testing services may play a role in the lower utilization of testing by rural individuals. Compounding the problem of providing HIV testing in a way acceptable to rural individuals is the evidence that rural individuals are less likely to use preventive health services than are urban individuals.31,33 It seems that for the effective delivery of this service to rural individuals of the United States, unique and focused programs will have to be undertaken.

Although there are many advantages to analyzing large-scale data sets like the NHIS, including the large and representative sample, the investigator is limited to the information supplied in the data set. Furthermore, the data are based on self-reports of possibly socially undesirable behavior with no external validity check of high-risk behaviors. Individuals were allowed to refuse to answer questions, so the sensitive nature of specific questions may have self-eliminated individuals who were at high risk or felt threatened or embarrassed by their responses.

With the increasing rates of infection in rural areas, specific and focused efforts for counseling and testing for HIV antibodies might be undertaken for the prevention and control of HIV infection and AIDS. Accepted for publication August 11, 1994.

All analyses, interpretations, and conclusions are those of the authors and are not those of the National Center for Health Statistics, which is responsible only for the initial data.

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REFERENCES

Practice Commentary

This study compares the use of HIV antibody testing between rural and urban adult populations. It is encouraging that in both groups, the percentage of the population that had been tested for HIV greatly exceeded the percentage of the population at high risk for contracting HIV. Furthermore, while we can compare the perceived risk of contracting HIV between urban and rural adult populations, we are unable to correlate the perceived risk to the actual risk in either group. One is a percentage, the other a graded scale.

A most striking finding is that the overwhelming citation for not being tested was the perception of being at low risk for contracting HIV. Rural practitioners and medical groups should note that access to testing, confidence in accuracy and confidentiality of the test, and fear of reprisals are minimal barriers compared with perception of low risk. Accurate dissemination of information regarding risk factor assessment appears crucial for both urban and rural adult populations to accurately test for HIV. The means of effective education may differ between the two groups.

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