The Emerging Epidemiology of Rural AIDS

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ABSTRACT: *The incidence of AIDS in rural areas is increasing rapidly. However, historically it has been overshadowed by AIDS in the epicenters. From 1991-1992 the increased percentage of cases was higher in nonmetropolitan areas than in any other areas of residence. The rate per 100,000 also increased at almost the same rate in rural areas as in the largest metropolitan areas, defined by the Centers for Disease Control (CDC) as having a population of more than 500,000, and in other metropolitan areas of 50,000 to 500,000 population, as designated by CDC.*

To date, the epidemiology of AIDS in rural areas has not been defined. This information is necessary to developing effective policies and programs. The research presented here reviews the literature on AIDS in specific areas and populations at risk as a basis for generating hypotheses for further study. The first wave of the epidemic, primarily affecting homosexual or bisexual men, is strongly evident in many rural locations. The second wave of the epidemic is strongly evident in the South and can be seen among high-risk groups such as black women, adolescents, migrant and seasonal farm workers, people who abuse alcohol, intravenous drug users, and users of crack cocaine, including those who trade sex for drugs. Poverty is a common characteristic of the second-wave population. Proximity to interstate highways as well as metropolitan areas may also be associated. A national study of the epidemiology of AIDS in rural America is imperative.

Acquired immune deficiency syndrome (AIDS) in rural America is a growing concern of the National Commission on AIDS, as acknowledged in its report to the president from September 1991 (National Commission on AIDS, 1991). Historically, AIDS in rural areas has been overshadowed by the number of AIDS cases in metropolitan areas. However, the epidemic continues to remain dynamic, and rural areas require immediate attention.

Table 1 illustrates the rapid rate of increase of of AIDS in nonmetropolitan areas, which is even greater than the rate of increase in metropolitan areas with 50,000 to 500,000 population and almost equal to that of the largest metropolitan areas. The total number of cases is small at present. However, the concern is that the number of AIDS cases in nonmetropolitan statistical areas (MSAs) increased 9.4 percent as compared to 3.3 percent in MSAs of 50,000 to 500,000, and 3.1 percent in MSAs with 500,000 and more (Centers for Disease Control, 1993).

The Centers for Disease Control (CDC) began reporting AIDS by nonmetropolitan area in the spring of 1991. Table 2 presents the distribution of AIDS cases by Census Divisions in rural America. Current policies prevent the CDC from making nonmetropolitan data available by state or by risk

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Table 1. AIDS Cases by Area of Residence, 1991-1992.

Areas of Residence	1991 Number	1991 Percent of Total Cases	1991 Rate	1992 Number	1992 Percent of Total Cases	1992 Rate	Change from 1991-1992 Number	Change from 1991-1992 Percent of Total Cases	Change from 1991-1992 Rate
Non-metropolitan area	2,734	6.03	4.8	2,992	6.38	5.3	258	+0.35	+0.5
Metropolitan areas with 500,000 or more population	37,762	83.29	25.3	38,937	82.96	25.8	1,175	-0.33	+0.5
Metropolitan areas with 50,000 to 500,000 population	4,842	10.68	10.0	5,003	10.66	10.2	161	-0.02	+0.2
Total									
Mathematical total	45,338	100	—	46,932	100	—	1,594	—	—
CDC total (includes 13 patients whose residence is unknown)	45,524	—	17.9	47,106	—	18.3	—	—	+0.4

Notes:
1. Mathematical total and CDC total do not agree because of the inclusion of cases with unknown residence by the CDC.
2. Rates are per 100,000 population and are crude rates.

Source: Table was developed based on data from the Center for Disease Control, HIV/AIDS Surveillance, Year End Edition, February 1993.

Table 2. Reported Non-metropolitan AIDS Cases by Census Divisions through March 31, 1992.

Census Division	Number of Reported Cases
Mountain	564
New England	601
West North Central	633
U.S. Territories	809
Pacific	884
East North Central	1,035
East South Central	1,109
Mid-Atlantic	1,262
West South Central	1,541
South Atlantic	3,594
Total	12,062

Source: Personal communication, Centers for Disease Control, April 6, 1992.

category, although such information is collected.

Carwein and Berry (1992) provided further evidence that AIDS is a concern even in many of the most remote rural areas through their survey of frontier hospitals with fewer than 50 beds in communities with fewer than six persons per square mile. In frontier communities in the Mountain Census Division, including parts of Nevada, Arizona, New Mexico, Utah, Idaho, Wyoming, Montana, and Colorado, 16 (26%) of the 62 hospitals that responded to the survey had provided care and services to HIV-infected patients. Another 11 hospitals reported awareness of HIV-positive persons in their medical service area, providing a cumulative estimate of 44 percent of the hospitals aware of persons in their community with HIV infection.

The Problem

The epidemiology of rural AIDS must be defined to develop appropriate preventive and other health service policies and programs. This paper examines the health care literature for data on the distribution

and determinants of HIV infection in rural areas. This literature primarily may be classified as descriptive epidemiology. This article contributes to building the base for scientifically valid data through synthesis and hypothesis generation. The populations addressed are: men who have sex with men women, adolescents, migrant and seasonal farm workers, and substance abusers, as well as Native Americans and Native Alaskans.

Methods

A literature search included the following systems: MEDLINE: AIDSLINE; Expanded Academic Index—1985 to 1993; Business Index, 1982 to present; Applied Science and Technology Index, late 1983 to 1993; Education Index, late 1983 to 1993; General Science Index, 1984 to 1993; Humanities Index, 1983 to 1993; and the Social Science Index, late 1983 to 1993. Specific searches on the terms rural HIV and rural AIDS, and general searches on HIV and AIDS were performed. Sources so identified were used to locate other studies and reports.

Reporting HIV/AIDS in Rural America

Most state data on rural areas are based on public health reporting. Such data may be influenced by the state's policies on testing (anonymous or confidential), as well as approaches to partner notification and case finding. Possibly the issue of confidentiality is even more of a concern in rural than urban areas. The population using public health programs, however, clearly represents only part of the denominator.

While states commonly require private physician reporting, the reliability and validity of these processes in rural areas are unknown.

Only one HIV seroprevalence study among hospital patients in a rural area was found among the searches (Murrill, Kuncl, Weeks, Whyte, Petersen, & Janssen, 1992). In a hospital-based study in rural southern Georgia, one of every 200 patients (7 patients) was found to be positive among the 15-24 year olds tested. HIV-positive persons were found on every service and among men, women, blacks, whites, and every age group tested. Some were not suspected by their physicians.

Clearly, hospitals, as well as public health departments, other public programs such as community health centers, private practitioners, and others, cooperatively can better assess the HIV status of a community. Such studies are needed in the future.

High-risk Groups: Men Who Have Sex with Men

The number of men who have sex with men with AIDS in the combined categories of rural areas and population areas with fewer than one million residents have increased linearly from 1986 through 1991 (Karon & Berkelman, 1991) (Note 1). Incidence among the risk group of men who have sex with men is increasing less rapidly in the three major epicenters—New York City, Los Angeles, and San Francisco—as well as in many other large cities. Indications are that the incidence has plateaued, first in whites and then among all ethnic groups (Karon & Berkelman, 1991). For the United States as a whole, the first wave of the AIDS epidemic, which began with homosexual and bisexual men, is shifting to other population groups.

A popular belief is that many HIV-positive persons, primarily homosexual and bisexual men from rural areas, become infected while living in an urban area and return home as their disease progresses. HIV-infected persons who return home were a major concern of the 1990 Invitational Workshop "HIV Infection in Rural Areas: Issues in Prevention and Services," sponsored by the Health Resources Services Administration. Further research is needed to answer the question: Does a scientific base exist to substantiate that returning home characterizes a (or the) major pattern in the epidemiology of rural HIV patients?

Returning Home and AIDS in Rural Areas

Migration of HIV-positive persons to rural areas has been described in Iowa, North Carolina, West Virginia, Washington, Minnesota, and Tennessee (Davis, Cameron, & Stapleton, 1992; Rumley, Shappley, Waivers, & Esinhart, 1991; Patton, 1989; Brandt, 1992; Tucker, Pace, & Soth, 1991; Verghese, Beck, & Sarubbi, 1989). None of these reports are scientifically generalizable to all rural areas or even to all rural areas in a specific state.

Davis and colleagues (Davis, Cameron, & Stapleton, 1992) attempted to build the rural migration case based on their analysis of 262 HIV-positive

patients seen over a three-year period in the University of Iowa Virology Clinic. This number included 72 percent who were homosexual or bisexual, compared to 58 percent estimated from national risk data. Demographic data on these patients indicted that 46 percent had moved into or back to the state, whereas an estimated 8 percent moved out of the state during the study period. Comparison to state data revealed that the Iowa case figures underestimated AIDS prevalence in the state, with 23 percent of the university's patients having an AIDS diagnosis not being included in state figures.

An important methodological problem with the Iowa study is that an operational definition of rural is not presented based on any governmental or social science conventional definition. Rural was equated with low prevalence of the disease in a specific area, i.e., the state of Iowa.

Another medical center study was conducted in West Virginia (Patton, 1989). The researcher described the typical patient as homosexual, male, originally from West Virginia but infected and diagnosed in a large metropolitan area, returning to West Virginia unemployed, Medicaid dependent, younger than age 30, tertiary care dependent, i.e., high care acuity, and homeless. Like the Iowa study, low prevalence and rural were equated.

An additional medical center study was conducted by a medical school in eastern North Carolina that serves a large but not exclusively rural population (Rumley, Shappley, Waivers, & Esinhart, 1991). Their findings are interesting in that they suggest that the patterns of patients they are seeing have shifted rapidly from a population that was returning home from an urban area, especially New York to a population in which "locally infected" patients outnumber those returning home. The new rural wave is more likely to be female, non-white, and younger with heterosexual and/or intravenous drug use related transmission. Disease patterns also are shifting from diseases more common among homosexual and bisexual men such as *Pneumocystis carinii pneumonia* and Kaposi's sarcoma, to diseases such as *Cryptococcus neoformans* infections, HIV wasting, and HIV encephalitis.

All three medical center studies have limitations for estimating the epidemiological significance of migration since they included only patients using a single site for health care.

Migration to rural areas was documented in a study of 32 patients between January 1987 and January 1991 in a rural north-central Washington community of 40,000 (Tucker, Pace ,& Soth, 1991). One-half (16) of the patients were diagnosed locally, 11 elsewhere in the state, and five in other states. All were previous residents of the rural community. The patient population was not characterized by any one high-risk category.

Brandt, a nurse case manager in rural Minnesota, in a report at the Fifth Annual AIDS Update Conference (San Francisco, October 1992) estimated that 50 percent of rural persons with HIV among her case load had recently moved home due to their disease (Brandt, 1992). Most were homosexual or bisexual men.

Tatum and Schoech stress that the health services literature and the media document people both leaving and returning to rural areas. Reasons frequently cited were:

> ...they leave the areas to obtain services, to find physicians more knowledgeable about HIV, to participate in clinical drug trials, to escape discrimination or harassment they experience or fear, or to avoid the long travel to services in communities nearby. They return home to receive care, or in some cases to die at home. For some persons with HIV disease, this is a matter of choice. Others have depleted their resources and find themselves with virtually no place else to go (Tatum & Schoech, 1992).

Tatum and Schoech, to better understand migration, distributed a questionnaire to a sample of AIDS service providers in Dallas and to nine national experts. While the method of selecting the study group might be questioned, the work is valuable for generating hypotheses. Experts and providers agreed that diagnosis appears to be a major reason for moving. Those who moved from rural to urban areas usually were HIV positive symptomatic; those who moved from urban to rural areas often had advanced stages of HIV. Migration also occurred from urban to urban area primarily among HIV-symptomatic persons.

Providers and experts differed considerably in estimating the degree of migration, which may reflect their experience in different parts of the country. They generally agreed that approximately 20 percent of HIV-positive persons migrated in some fashion. They also agreed that rural-to-urban moves are most common. Their conclusion runs counter to most other reports on migration, which emphasize the "going home" dimension of rural AIDS, and underlines the importance of further epidemiological research.

The case of a young man from a rural coal mining area in Appalachia who was declared missing by his family for many years and returned home with HIV is documented in the office practice of Verghese, et al., in rural Tennessee (Verghese, Beck, & Sarubbi, 1989). This case suggests the possibility of yet another form of migration, runaway rural adolescents; some may have AIDS at departure while others may contract the disease in an urban setting.

States with low HIV incidence and prevalence are especially concerned if data are not adjusted for in-migration, since federal and state funding may be based on case figures where initial diagnosis occurs. The results may be a higher use of local HIV services than predicted by the CDC or state data but less than a fair share of funds. Other problems also exist in providing continuity of care, such as availability of medical records and waiting periods to qualify for financial and social support services.

Locally Infected Men Who Have Sex With Men

The high-risk group of homosexual and bisexual men in rural areas is undoubtedly not limited to those returning home but includes long-term residents of rural areas.

The CDC reported for 1991 that the largest number of cases and most rapid increase of cases among homosexual/bisexual men occurred in the South, including the Census Bureau Divisions of South Atlantic, East South Central, and West South Central. They do not, however, further analyze these data in relation to metropolitan and nonmetropolitan areas (Monthly Morbidity Mortality Weekly Reports, 1992).

Homosexual and bisexual men in rural southern areas have been shown in at least one study to engage extensively in high-risk behavior, including unprotected anal intercourse and failure to use condoms during other sexual encounters. Kelly, et al., in 1990 interviewed homosexual and bisexual men who lived in Biloxi and Hattiesburg, Miss., and Monroe, La., communities of 50,000 to 70,000 residents located at least 60 miles from each other or another city of larger size (Kelly, St. Lawrence, Brasfield, Stevenson, Diaz, & Hauth, 1990). They found that 25 percent of those in the study reported participating in unprotected insertive anal intercourse and 23 percent in receptive unprotected anal intercourse during the previous two months. They express concern since this is a higher rate than previously published and unpublished reports reviewed.

The study's strength is that it is one of the few that has focused on high-risk behavior among homosexual men other than in epicenters. However, the study population was 91 percent white. Furthermore, while labelled "rural" by the authors and possibly viewed as rural by Mississippi and Louisiana, the size of the communities would fit definitions of urban by both the Census Bureau and Office of Management and Budget. Caution seems appropriate in generalizing to all homosexual or bisexual men in the South or rural areas nationally.

Two other reports describe patterns of rural homosexual or bisexual sexual practices and HIV prevalence. Anecdotal information reported by Bell is based on unpublished interviews by Exoo, a Unitarian minister in South Carolina (Bell, 1991). He reports a significant number of married rural men who engaged in anonymous unprotected sex with other men at interstate rest stops and in adult book stores. Brandt describes her rural case load in Minnesota as approximately evenly divided between married bisexual men and homosexual/bisexual men returning home (Brandt, 1992). Whether rural married men who are bisexual or heterosexual are a significant part of rural cases is unknown.

Rural Women with AIDS: Inter-relationship with Race

AIDS is increasingly becoming a concern among women in rural areas and has earlier been recognized in urban areas. The epidemiology of women with AIDS from 1981 through 1990 shows both increases in percentages and numbers. Approximately 3 percent of all AIDS cases were women in 1981, and this has grown to 10 percent of all cases in 1990 (Ellerbrock, Bush, Chamberland, & Oxoly, 1991). Most of these women were black or Hispanic, residents of the Atlantic coast, residents of predominately urban populations, and in the age group 15-44.

Ellerbrock, et al., (1991) found a growth from 22 percent to 28 percent of the proportion of women with AIDS reported from smaller cities and rural areas during the time period 1986-1990. For nonmetropolitan areas alone (population less than 50,000), the percentage of cases and the cumulative incidence rates were 7 percent and 12 percent per 100,000, respectively, for all women with AIDS. Local researchers, especially in the South, are beginning to

Table 3. Number of AIDS Cases[1] and Percentage of Cases Diagnosed in Intravenous Drug Users,[2] United States, 1989-1991.

	Non-MSA		Small MSA		Large MSA	
U.S. Geographic Region	Total Number of AIDS Cases	Percent IDU	Total Number of AIDS Cases	Percent IDU	Total Number of AIDS Cases	Percent IDU
Northeast	1,078	45.2	2,093	53.2	35,170	46.5
North Central	1,092	16.8	1,908	19.8	9.977	18.3
South	4,340	24.3	6,154	24.0	33,218	24.5
West	942	21.7	2,357	19.8	27,008	14.9

1. Adjusted for reporting delays.
2. Includes homosexual and bisexual men who inject drugs, heterosexual men who inject drugs, and women who inject drugs.

Note: The table data exclude unknown MSAs. MSA: Metropolitan Statistical Area. IDU: Injection Drug User. Data are from Centers for Disease Control, Atlanta, GA.

Source: Steel, E., Fleming, P., & Needle, R. (1993). Letters to the editor: The HIV rates of injection drug users in less-populated areas. American Journal of Public Health, 83(2), 287.

more fully investigate this growth.

Three hundred and eight women with AIDS were reported in Georgia through December 1990 (Whyte & Carr, 1992). Seventy-seven (25%) were white and 228 (75%) were black. One hundred sixty-eight (54%) were from metropolitan Atlanta and 142 (46%) were from other parts of the state including a large proportion from rural areas. (The reverse is true with men, of whom 76% are from metropolitan Atlanta and the rest are from other parts of the state.) Blacks comprised 74 percent of the cases among women in urban areas and 76 percent of the cases among women in other areas. Black women account for 28 percent of the female population in Georgia and 76 percent of the total AIDS cases among women in the state.

The study also found that survival rates varied considerably among metropolitan Atlanta and other parts of the state (400 and 296 days), possibly suggesting a delay in diagnosis. The same was also true for cases of *Pneumocystis carinii* pneumonia (460 and 373 days).

Wooten (1989) described the pattern of persons with AIDS in rural California, who were also more likely to be female (Wooten, 1989). Persons with AIDS were also more frequently heterosexual and slightly more likely to be white, in contrast to the Atlanta study.

Children and Rural AIDS

Coupled with the concerns of increasing AIDS cases among women is transmission to children. The CDC estimates that 25 percent to 35 percent of the children of HIV-positive mothers become HIV positive (McCoy, Trapido, Lewis, & Khoury, 1991). No estimates have been made in relation to rural areas. Two efforts with a rural dimension may add to the understanding of these problems and have been funded by the Bureau of Health Resources Administration Pediatric/Family AIDS Service Demonstration Programs. One project is in San Antonio and includes the Rio Grande Valley; the second is a Seattle project that includes the Yakima Health District.

Substance Abuse and Rural AIDS

Concern for intravenous drug use and AIDS is noted in a recent letter to the editor of the *American Journal of Public Health*. Steel, et al., report on the number of AIDS cases and the percent diagnosed with AIDS among intravenous drug users by Census

Region for 1989-1991 (Steel, Fleming, & Needle, 1993). For nonmetropolitan statistical areas, intravenous drug use associated with AIDS is especially a concern in the Northeast Census Region and in the South and West Census Regions.

Linkage between drugs and AIDS in rural areas is also the subject of an article by Steel and Haverkos (1992). Their review indicates that substance abuse rates are approximately the same for urban and non-urban states. Historically, however, alcohol has been the most widely used drug in rural America. They also note an increased use of intravenous drugs and crack-cocaine.

The Atlanta study of women by Whyte and Carr (1992) found intravenous drugs associated with contracting AIDS among 58 percent (178) of the women in Atlanta and 42 percent (79) in rural and other areas of the state. The California study found, in contrast, that rural rather than urban women with AIDS were more likely to have a history of intravenous drug use (Wooten, 1989).

Another study in Palm Beach County, Fla., focused on rural HIV and pregnant women (Ellerbrock, et al., 1992). Among the study group, 52 of 1,011 women (5.1%) were HIV positive. Black women had the highest rate of infection, 8.3 percent. Only 0.4 percent of the women reported injecting drugs, and all of these women were seronegative for HIV. By contrast, one-third of the 43 women who reported crack-cocaine use were HIV seropositive. This study also found that HIV-positive women receiving prenatal care were three times more likely to test positive for gonorrhea, chlamdial infection, or syphilis compared to HIV-seronegative women.

A study by Forney, et al., examined patterns of exchanging sex for crack-cocaine among women in rural Georgia compared to inner-city Miami (Forney, Inciardi, & Lockwood, 1992). Despite the questions of scientifically comparing such diverse populations, the observations are of interest. Behaviors were similar, including initial and continuous drug use, as well as the practices of exchanging sex for drugs. All 60 women were selected for the study because they had exchanged sex for crack. The primary drugs used by both groups were alcohol, marijuana, and crack. Most of the women in the study had been tested for HIV, with 15 percent of the Miami women and 11 percent of the Georgia women testing positive.

McCoy, et al., studied HIV infection in the rural community of Belle Glade, Fla., which accounted for about one-third of the cases but only 4 percent of the population, many of whom are migrants, in Palm Beach County (McCoy, Trapido, Lewis, & Khoury, 1991). A major truck route for transporting agricultural products goes through the area and both drug trafficking and prostitution are reported in the area. Nearly one half (49.5 percent) of the study population used crack more than twice daily. Alcohol was used by 84.1 percent of the subjects two to six times a week, marijuana was used less than four times a month by 57.5 percent of subjects, and other drugs (heroin and other forms of cocaine) were used rarely.

Forney and Holloway (1990) suggest that the combination of crack, syphilis, and AIDS presents a triple threat in southeast rural Georgia. While the incidence syphilis rose 68 percent nationally from 1986-1989, it increased 800 percent in southeast Georgia during this time period. They link this growth to the number of women who are supporting their crack cocaine habits through prostitution. The authors also indicate the direct linkages between these behaviors and the growth of AIDS in rural southeast Georgia.

Seavey, Berry, and Bogue (1992) also describe a rural setting in South Carolina along Interstate 1 where crack has become a major concern. Sex exchanged for drugs has become common, resulting in a growing number of HIV-positive black women. The extent to which this phenomena is more widespread along interstate highways is not well documented but substantiated by numerous anecdotal reports.

Adolescents and Rural AIDS

Nationally, the increase in HIV infection among teen-agers, especially from minority groups, is of growing concern. A study of seroprevalence among applicants for U.S. military service between 1985 and 1989 provides useful national data. The study group, however, is admittedly not representative or rural specific (Burke, Brundage, Goldenbaum, Gardner, Paterson, Visintine, & Redfield, 1990). Approximately one of every 3,000 teen-age applicants were seropositive. Cases of AIDS identified or reported nationally among teen-agers are much rarer, about 0.4 percent. Somewhat surprising was a rate similar among teen-age males and females, with an even higher prevalence among females 17 and 18 years old. Prevalence was highest among black teen-age applicants (1.06 per 1,000), next highest among Hispanics (.31 per 1,000), and lowest among whites (.18 per 1,000). HIV-positive applicants were more likely to come from urban, densely populated coun-

ties. Ten states had the highest number of HIV-positive individuals, some with a sizable rural population.

A study of disadvantaged out of school adolescents in the U.S. Jobs Corps found very high rates (1.7/1,000) among students in the Southeast from nonmetropolitan rural and small towns (St. Louis, Conway, Hayman, & Miller, 1991). For the South Census Division, this rate was 2.3/1,000. Overall, these rates are more than 10 times higher than for a cross section of military applicants of the same age. As was found in the military study, national rates for blacks and Hispanics were much higher than for whites.

Seroprevalence levels among adolescents who attended rural health department clinics for sexually transmitted diseases (STDs) in Mississippi have also been studied (Young, 1992). Young found that during a two-year period from 1988-1990 a seropositive rate for males and females was almost equal (4.1/1,000 for males and 3.8/1,000 for females) and suggests that the transmission was primarily heterosexual. Rates for blacks were 3.5 times greater than for whites. Rural and urban rates were about the same. Young concludes that the combination of high STD rates and high teen-age pregnancy rates makes Mississippi an "epicenter" of the HIV epidemic among adolescents.

Durant, et al., note that there is also growing evidence that AIDS among minority adolescents living in the rural South is of concern (Durant, Ashworth, Newman, McGill, Raubin, & Barcnowski, 1992). Their case is built on an analysis of CDC reports through 1991 indicating that the increase of AIDS in the South includes a high percentage of young rural blacks and an analysis of knowledge level and perceived chances of having HIV infection among 294 sixth-, seventh-, and eighth-grade students in a rural Southern county. These rural adolescents were found to score 10 percent or more below national comparable groups on knowledge level of HIV infection. This raised concerns among the authors as to whether the study group had sufficient knowledge to make reasonable decisions regarding HIV infection. Furthermore, they question a possible myth that rural youth are more insulated from getting AIDS.

This insulation myth is also questioned by a study comparing rural and urban adolescents in Arkansas (Boswell, Fox, Hubbard, & Coyle, 1992). These findings indicated no statistically significant differences related to knowledge when gender had been controlled for. Rural adolescents, however, were less likely to have attitudes that protect against HIV. A concern for both populations was that, even with high levels of knowledge, adolescents continued high-risk behaviors.

Migrants and Seasonal Workers and AIDS

Other high-risk groups include seasonal farm workers and migrants with a high representation of blacks, especially in the South. Two East Coast studies of HIV prevalence among farm workers have been conducted (Jones, Rion, Hollis, Longshore, Leverette, & Ziff, 1991; CDC, 1988). A study of migrant and seasonal farm workers in North Carolina conducted in 1987 found a 2.6 percent HIV seropositivity among migrant and seasonal workers who attended a health clinic (CDC, 1988). Black males had a prevalence rate more than twice (5.9 percent) that of black females. Whites comprised only a small portion of the study group and all tested HIV negative. Persons testing positive for syphilis (16 percent) had more than twice the HIV-seropositive rate of persons who tested negative for syphilis. A large percent of the migrant study group was Hispanic (29.3 percent), but all tested negative for HIV. Fifty-two percent of those in the North Carolina study had a permanent residence in Florida; 85 percent were male and 75 percent single. Almost one-half (46 percent) reported that they never used condoms. No specific risk group was most common.

A study among migrant workers in South Carolina found about a one in eight (13 percent) HIV-seropositivity rate in rural migrant camps (Jones, Rion, Hollis, Longshore, Leverette, & Ziff, 1991). Part of the reason for the high rate may be that the investigators studied the population at risk in their work setting. Blacks represented 78.8 percent of the study group. These migrants commonly work from March to August in South Carolina and spend the rest of the year in Florida, Georgia, North Carolina, Virginia, West Virginia, and Pennsylvania, thus potentially increasing the geographic spread of the disease.

A concern associated with HIV infection is the frequent occurrence of tuberculosis among migrants. The recent outbreak of multi-drug resistent strains of tuberculosis is especially a threat (Ciesielski, Seed, Esposito, & Hunter, 1991; Sumaya, 1992).

The growing number of Hispanics with AIDS is of national concern. Hispanics primarily live in urbar areas, especially inner cities. While no published reports directly address rural Hispanic AIDS, it is

generally recognized that there is a concern for AIDS among rural Hispanic migrant and seasonal farm workers, especially in states such as Florida, Texas, and California, as well as among persons of Hispanic origin who cross both directions in the Mexico-United States border states.

American Indians and Alaskans and Rural AIDS

Many American Indians and Alaskans live in rural areas. A survey administered in 24 Indian Centers on reservations in Oregon, Washington, and Idaho included 710 American Indians (Hall, Wilder, Bodenroeder, & Hess, 1990). The study was designed to assess knowledge and behavior. Based on data collected, the investigators estimated that 10.6 percent of the male population and 6.4 percent of female population were at high risk from factors such as high rates of sexually transmitted diseases and drug abuse, compared to 3 percent of the general population.

Conway, et al., of the Indian Health Service conducted a network of surveys in different types of clinics from July 1, 1989, through June 30, 1991 (Conway, Ambrose, Chase, Hooper, Helgerson, Johannes, Epstein, McRae, Keevama, Raymond, Schable, Statten, Petersen, & Dondero, 1992). A total of 37,681 serological specimens were collected from prenatal and sexually transmitted disease American Indian and Alaskan patients in 58 Indian Health Service clinics. The rate for prenatal patients was almost identical for rural (0.9/1,000) and urban (1.1/1,000) patients. These rates were four to eight times higher than similar women of all races. The rate of HIV infection among individuals seen in a sexually transmitted disease clinic was considerably higher for urban areas and for males than for rural areas and females: 4.5/1,000 for males (urban 10.8/1,000 and rural 2.0/1,000) and .7/1,000 for females (urban 0.9/1,000 and rural 0.6/1,000).

The Communicable Disease Centers indicate that the number and rate of reported AIDS cases among American Indians and Alaskans is relatively low (4.0 per 100,000 or a total of 237 cases through 1990) (Metler, Conway, & Stehr-Green, 1991). AIDS surveillance data indicate the rate of increase among this population is, however, rapid.

Compared to the total U.S. population, American Indians and Alaskans are younger, less educated, poorer, and less likely to be employed. These two groups also have higher rates of sexually transmitted diseases and drug abuse (Metler, Conway, & Stehr-Green, 1991). These factors would seem to make the population at high risk for AIDS and especially vulnerable for rapid spread in tribes in isolated rural areas.

Summary and Conclusions

This review of the existing literature on rural AIDS is primarily characterized by case studies and anecdotal information. No previous attempts have been made to link these emerging reports. This article's contribution to descriptive epidemiology is a synthesis intended to be useful in developing hypotheses for more rigorous research.

Based on the review of the literature, certain questions emerge to form a framework for conceptualizing many of the patterns that are evolving in the rural AIDS epidemic. This list is not exhaustive but would seem to be of high priority.

A first set of questions concern the validity and reliability of AIDS reporting. The differences among rural census divisions is considerable. However, it is unclear to what extent these are real differences.

1. To what extent does rural AIDS/HIV reporting reflect primarily the extent of the infection among people who participate in public health and other public programs for screening and counseling, patient care, and preventive activities? How accurately do these reports reflect the number of rural persons who are tested in private offices, receive their medical care locally through the private sector, or leave the community for testing and care?
2. To what extent is AIDS/HIV reporting in rural areas affected by policies on confidential versus anonymous reporting, practices of partner notification, and contact tracing? Do issues of confidentiality in some rural areas have a greater effect on HIV reporting than in other rural areas and urban areas?
3. To what extent is reporting better in settings where surveillance is linked to access to patient care?

As part of the process of reporting the phenomenon of rural AIDS, "returning home" has received considerable attention. The dynamics of this process as well as a broader process of rural migration are not well understood. Certain questions emerge for priority attention.

4. Is returning home to a rural area with HIV infection a similar pattern in all rural areas or is it a more common pattern in select regions, e.g., higher in the South with a tradition, especially among black families, of moving North for employment and sending children back to the South for summer vacations and high school?
5. Are returning home and migration to rural areas higher in states with large expenditures for HIV services than states with lower expenditures, e.g., New Mexico with high expenditures compared to Wyoming with low expenditures?
6. Is migration from rural areas to urban areas a common practice for HIV-positive individuals, and if so, at what stage of the illness and for what reasons?

Various factors seem to be emerging from the literature as associated with AIDS infection across rural populations. The nature and effect of these possible relationships is a major area of concern for study.

7. Are there environmental or host predictors of increased incidence and prevalence of HIV infection that can be identified in rural areas? Do these primarily account for regional rural differences or differences among select populations such as Afro-Americans and Native Americans? If so, how important are the following:
   - high rates of syphilis and other sexually transmitted diseases;
   - high teen-age pregnancy rates;
   - high levels of poverty;
   - high levels of sex exchanged for drugs;
   - high levels of substance abuse including crack cocaine, alcohol, and intravenous drug injections;
   - high levels of crime; and
   - low knowledge of AIDS transmission and negative attitudes toward protection, especially among adolescents?
8. Is a rural community's relative geographic location associated with high levels of HIV infection, e.g., close proximity to a metropolitan area, a border state with Mexico, or location on an interstate highway?
9. Do rural areas with cultural and religious traditions of low acceptance of gay and alternative lifestyles, e.g., Bible Belt and Western Mormon communities, have an increased probability of certain risks and certain groups becoming infected by the HIV virus? For example:
   - men taking risks with other men through anonymous sex, e.g., at gay bars, rest stops, and adult book stores; and
   - women becoming infected through heterosexual transmission?
10. Do rural communities that are more culturally homogenous have a higher or lower incidence and prevalence rate for HIV infection, e.g. rural Iowa versus rural Florida?

A relationship may also exist between living in a rural area and the length of time one survives with the disease following diagnosis.

11. To what extent do people from some rural areas become diagnosed at later stages of their infection than in other rural areas?
12. To what extent are there differences in life expectancy following diagnosis? How do these intrarural differences compare with urban findings?

The time has arrived to develop a more sophisticated understanding of the epidemiology of rural AIDS. Some of this understanding could be achieved by implementing existing legislation. While Public Law 101-381, Ryan White Comprehensive AIDS Resources Emergency Act of 1990, is primarily directed at emergency relief for the cities hardest hit by the AIDS epidemic, it also provides states with resources for organizing and delivering HIV services in rural areas. Section 403 also focuses specifically on the need to better understand the rural epidemiology of AIDS. It states:

> (a) ...the Secretary of Health and Human Services, after consultation with the Director of the Office of Rural Health Policy, shall:
>
> (1) conduct a study for the purpose of estimating the incidence and prevalence in rural areas of cases of acquired immune deficiency syndrome and cases of infection with the etiologic agent for such syndrome; and
>
> (2) in carrying out such study, determine the adequacy in rural areas of services for diagnosing such cases and providing treatment for such cases that are in the early stages of infection (PL 101-381, 1990).

A better knowledge of the epidemiological patterns of AIDS found in various parts of rural America is essential to effectively develop federal, state, and local policies as well as voluntary initiatives in response to the growing number of rural AIDS cases.

Appendix

U.S. Census Divisions and States

Census Division 1, New England
- Connecticut
- Maine
- Massachusetts
- New Hampshire
- Rhode Island
- Vermont

Census Division 2, Middle Atlantic
- New Jersey
- New York
- Pennsylvania

Census Division 3, South Atlantic
- Delaware
- District of Columbia
- Florida
- Georgia
- Maryland
- North Carolina
- South Carolina
- Virginia
- West Virginia

Census Division 4, East North Central
- Illinois
- Indiana
- Michigan
- Ohio
- Wisconsin

Census Division 5, East South Central
- Alabama
- Kentucky
- Mississippi
- Tennessee

Census Division 6, West North Central
- Iowa
- Kansas
- Minnesota
- Missouri
- Nebraska
- North Dakota
- South Dakota

Census Division 7, West South Central
- Arkansas
- Louisiana
- Oklahoma
- Texas

Census Division 8, Mountain
- Arizona
- Colorado
- Idaho
- Montana
- Nevada
- New Mexico
- Utah
- Wyoming

Census Division 9, Pacific
- Alaska
- California
- Hawaii
- Oregon
- Washington

Notes

1. Data are not, however, available to disaggregate the proportion of rural AIDS that is accounted for by men who have sex with men.

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