AIDS Among Women in North Carolina

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This paper focuses on the diffusion of AIDS among women in North Carolina. Heterosexual women are the fastest-growing category of people with AIDS in the United States. In 1990, women comprised less than 10% of United States AIDS cases. As of June 1999, however, women were more than 16% of all AIDS cases in the country and one-quarter of new cases.This paper investigates two primary hypotheses: (1) that over time, increases in the number of cases of AIDS have diffused from North Carolina's urban centers to its rural areas; and, (2) following a nation-wide trend, HIV/AIDS in North Carolina has mainly impacted African American women.Analysis of new cases of AIDS among women in North Carolina from 1987 to 1999 is performed via assessment of the mapped patterns. The cumulative totals through 1999 show that only seven of North Carolina's 100 counties had yet to report a case of AIDS among women. Although the dominant urban areas of North Carolina (including cities such as Charlotte, Raleigh and Durham) have the highest AIDS totals, AIDS cases among North Carolina women have occurred also in the small, rural communities.

Introduction

In recent years, the Human Immunodeficiency Virus (HIV) infection, the agent of Acquired Immune Deficiency Syndrome (AIDS), has spread rapidly into the heterosexual community in the United States. Indeed, heterosexual women are the fastest-growing category of people with AIDS in the United States. Each year since 1992, the number of new AIDS cases among women in the United States has increased, particularly among minority women (CDC 2000a). In 1990, women comprised less than 10% of United States AIDS cases. As of June 1999, however, 114,621 women in the United States had been diagnosed with AIDS, representing more than 16% of all AIDS cases in the country and one-quarter of new cases (CDC 2000a).

Women are more susceptible to HIV/AIDS for several reasons. In general, women are biologically more susceptible to sexually transmitted diseases because they have a larger portion of mucosal surfaces exposed during sexual intercourse (Grinstead, Faigeles, Benson and Eversley 1993). This causes HIV/AIDS to affect women differently than men. Second, women tend to have sex with men older than themselves, who in turn are more likely to have had more sexual partners and therefore have had a greater chance of exposure to the disease.

Geography provides a unique perspective for the study of HIV/AIDS. Although diseases occur over time and therefore have a history, they also have a spatial component. Today, new transportation technologies shrink the globe, and places which formerly were separated by weeks or months are now a short airplane flight away. Medical geographers have a role in fighting the epidemic by using their knowledge in several ways: (1) examining the spatial aspects of disease, including diffusion and distribution (Gould 1989; Shannon, Pyle and Bashshur 1991; Cliff and Smallman-Raynor 1992); (2) describing characteristics of regions, including cultural practices and attitudes, and population mobility (Ellis and Muschkin 1996); (3) examining how the epidemic has changed over time (Lam and Liu 1994); and (4) helping identify optimal locations for efforts to stop the spread of HIV/AIDS, including the utilization of scarce public health resources where they will have the most benefit (Berry, McKinney and Marconi 1997). Some further areas of study in HIV/AIDS geography include: regional and local studies (Pyle and Gross 1997); studies examining the location of, and resistance to, HIV/AIDS facilities (Chiotti and Joseph 1995; Takahashi 1997); social theory approaches (Brown 1995; Kearns 1996); and, qualitative and multi-method studies of the geography of HIV/AIDS (Wilton 1996).

This paper will focus on the diffusion of AIDS in women in North Carolina. The male/female ratio in the state has gone from approximately 8:1 in the 1980s to about 2:1 in 1999 (Division of Epidemiology 2000). It is hypothesized that over time, increases in the number of cases of AIDS have diffused from North Carolina's urban centers to its rural areas. Another hypothesis is that HIV/AIDS in North Carolina has mainly impacted African American women, following a nation-wide trend.

The primary data source for this paper is the Centers for Disease Control and Prevention (CDC). AIDS cases are reported to the CDC by all 50 states and the District of Columbia. Every state has a statute requiring laboratories and physicians to report the names of newly diagnosed people with AIDS to health departments. The CDC is the source commonly used by medical geographers, epidemiologists and others researching HIV/AIDS in the United States (the World Health Organization collects global HIV/AIDS data). Due to the confidentiality issues surrounding HIV/AIDS, data are only released at a fairly macro-scale level, especially in more rural areas. For instance, in North Carolina, data are primarily available at the county level, with some data released for larger cities (e.g., Raleigh-Durham, Charlotte and Wilmington).

The analysis and discussion of the diffusion of AIDS among North Carolina women suggest that North Carolina is part of a larger HIV/AIDS picture in the United States. The pattern of the spatial diffusion of HIV/AIDS in North Carolina has mirrored a three stage national pattern of: (1) initial "seeding" within metropolitan areas that functioned as state diffusion centers; (2) the formation of a "HIV/AIDS corridor" in the Piedmont Urban Crescent; and, (3) a new pattern of AIDS diffusing to the rural eastern counties of North Carolina (Figure 1 provides a base map of North Carolina).

Background

The transfer of HIV occurs three ways: (1) through intimate sexual contact; (2) by contact with contaminated blood or blood products, including the sharing of needles, blood transfusions, health care needlesticks and organ transplants; and (3) perinatal means, that is, mother-to-child transfer during pregnancy or birth. In the US, homosexual males and

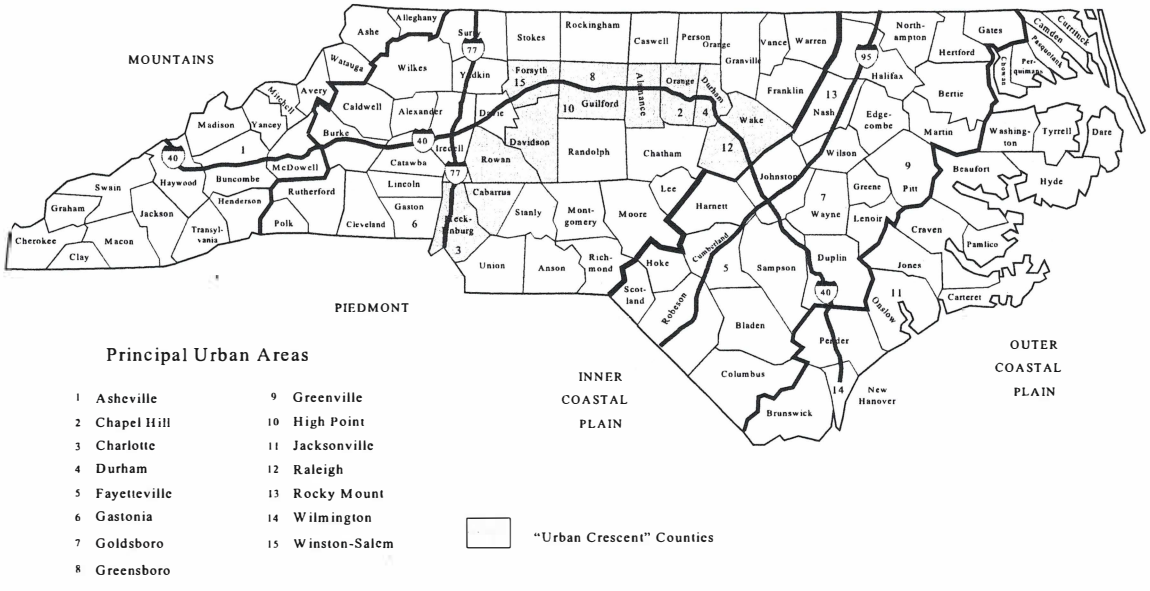

Figure 1. North Carolina Regions, Counties, Urban Areas, and Major Highways.

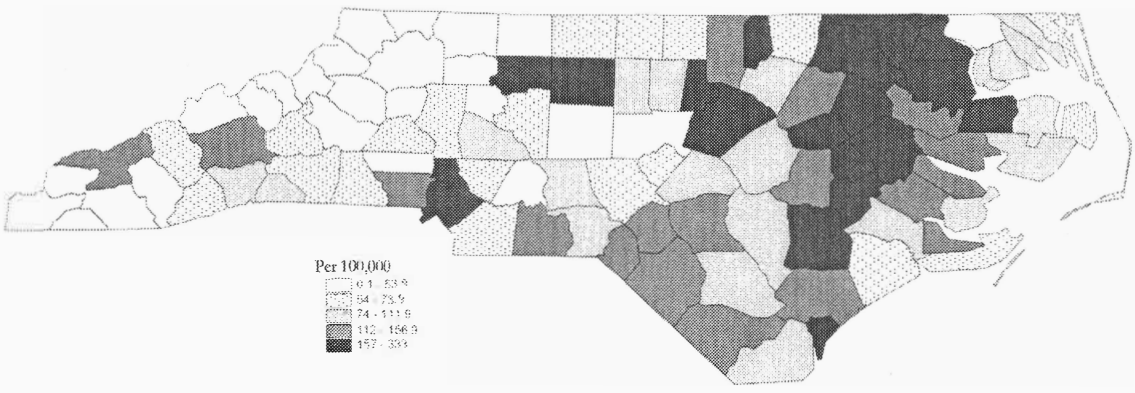

Figure 2. AIDS Rate in NC, 1987-1999
Source: HIV/STD Control Section

injecting drug users have been among the hardest hit populations. In recent years, however, the highest rates has been among women and minorities—and especially minority women.

The geography of the diffusion and distribution of HIV/AIDS in the United States can be represented fairly accurately. Data from the CDC have shown that in the earliest stages (in the beginning of the 1980s), AIDS was definitely a disease of major urban areas (Shannon and Pyle 1989). With HIV/AIDS, hierarchical diffusion between urban areas occurred initially, followed by contagious diffusion out from these centers. Hierarchical diffusion is the spread of a phenomena, in this case a disease, down the urban hierarchy. Prior to 1983, 67% of AIDS cases were in three metropolitan areas: New York City, San Francisco, and Los Angeles (three cities at the top of the urban hierarchy in the United States). Between 1981 and 1985, another focal point emerged in Miami, and by 1987 Denver and Houston entered the picture (Dutt, Monroe, Dutta and Prince 1987). This diffusion from New York City and Los Angeles to cities such as Miami and Denver illustrates the concept of hierarchical diffusion.

By the mid-1980s, as the disease spread further down the urban hierarchy, HIV/AIDS "corridors" could be identified (areas with high HIV/AIDS rates); they occurred in densely populated urban areas and were mostly coastal (Shannon and Pyle 1993). By the end of the 1980s, an HIV/AIDS "periphery" could be seen, consisting of urban areas of the interior western United States as well as sections of the southern United States (Shannon and Pyle 1993).

By the late 1980s to the early 1990s, however, the HIV/AIDS periphery collapsed and even rural areas were included in the scope of the HIV/AIDS epidemic (Verghese, Berk and Sarabbi 1989; National Commission on AIDS 1990; Lam and Liu 1994). This is the final stage of HIV/AIDS diffusion in the United States, that of contagious diffusion, wherein the disease has spread through adjacent areas and nearly everyone is affected.

Two trends have emerged from HIV/AIDS statistics: (1) the southeastern United States has the fastest growing incidence of HIV/AIDS in the country; and (2) there has been a "ruralization" of HIV/AIDS (Ellington, Brown, Gross, Katzin, Roth and Somerville 1994). The initial, major epicenters in New York, California, and Florida are contributing smaller

percentages of new cases as the epidemic spreads to other areas of the United States (Ricketts, Savitz, Gesler and Osborne 1994). HIV/AIDS is no longer confined to a few metropolitan areas or only to marginalized sub-populations of the United States, and thus the geographic component of our understanding of the AIDS epidemic increases in importance.

HIV/AIDS did not begin spreading through North Carolina until the mid-to-late 1980s. In 1985, within the context of the national diffusion of HIV/AIDS, North Carolina was still a peripheral area (Pyle and Furuseth 1992). The pattern at this time appeared random, suggesting that many people with HIV/AIDS had returned home to die. There were two distinct stages of the HIV/AIDS epidemic infusion into North Carolina. The first is referred to as the "infusion stage." From 1985 to 1987, HIV/AIDS became "seeded" within certain counties of the state. By the end of 1987, nodal areas had been established in the Triangle area as well as several coastal counties (Pyle and Furuseth 1992) (Figure 2). Most counties with larger cities were represented in early reporting (i.e., Charlotte in Mecklenburg and Winston-Salem in Forsyth), corresponding with the nationwide pattern of metropolitan areas functioning as the nodes for diffusion into surrounding rural areas.

The second stage, from 1988 to 1990, consisted of HIV/AIDS diffusion within North Carolina and included the "continued growth of AIDS reporting within major metropolitan areas as well as the formation of an AIDS corridor essentially mirroring the Piedmont Urban Crescent from Charlotte to Raleigh" (Pyle and Furuseth 1992, 3). In other words, this 'corridor', or urban crescent, included North Carolina cities such as Charlotte, Highpoint, Greensboro, Winston-Salem, Durham and Raleigh. Additionally, a new geographical pattern appeared in 1989. The most substantial increases in AIDS cases were being reported in both the inner city sections of the Piedmont Urban Crescent, but also in the poor rural counties of eastern North Carolina (i.e., Bladen, Halifax, and Hertford counties) (Pyle and Furuseth 1992). The high AIDS infection rate in these rural Eastern areas and in the cities of North Carolina is accentuated by the low rate of AIDS in the suburbs, small towns, and many of the mountain communities (Pyle and Furuseth 1992).

It is assumed that the initial infusion of HIV/AIDS in North Carolina was via homosexual and bisexual males as was true elsewhere in the United States (Pyle and Furuseth 1992). This explains the reports of early cases in counties such as New Hanover and Buncombe, since both Wilmington (New Hanover) and Asheville (Buncombe) contain sizable gay populations. Cities such as Charlotte and Raleigh were also reporting early cases of HIV/AIDS in North Carolina. More cases during the second wave could be attributed to needle-sharing and prostitution (Pyle and Furuseth 1992). These avenues led to the spread of the disease quickly in various poor, inner-city sections of some metropolitan areas of the state, especially Charlotte, but also Durham and Raleigh. This second wave is described by Pyle (1996, 143) as an "extension of a larger poverty syndrome... [including] poverty, crack, and HIV."

AIDS became reportable in North Carolina in 1984 and HIV infection was made reportable by name in North Carolina in 1990. There are two forms of HIV testing, anonymous and confidential. Anonymous allows the individual being tested to be recorded simply as a number, whereas confidential testing requires the individual's name. Stancil (2000) examined the elimination of anonymous testing in NC, which occurred in 1997. She found that those individuals at the highest risk for HIV were also those most affected by the change from anonymous and confidential testing to confidential testing only in NC. The CDC acknowledges the benefits of anonymous testing and encourages states that do not have anonymous testing available to reevaluate their programs.

Certain epidemiologic patterns can be seen in the spread of AIDS in North Carolina. First, the ethnicity has shifted from 48% African American among AIDS cases reported between 1984 and 1989 to 69% African American among cases reported between 1994 and 1996 (Division of Epidemiology 1997). This follows the national pattern in that, by 1996, African Americans accounted for more AIDS diagnoses than whites

Table1. Counties with the Highest Number of AIDS Cases Among Women in North Carolina and Cumulative Totals

County	'87	'88	'89	'90	'91	'92	'93
Mecklenburg	5	3	4	6	10	10	27
Wake	3	5	5	4	7	8	10
Guilford	1	1	3	8	11	10	10
Durham	3	4	5	8	15	9	14
Forsyth	1	1	0	3	7	7	5
Cumberland	3	1	3	1	3	3	12
Pitt	0	1	1	2	5	8	6

County	'94	'95	'96	'97	'98	'99	Total
Mecklenburg	10	40	20	20	29	20	204
Wake	17	20	20	24	19	26	168
Guilford	14	25	16	6	22	18	145
Durham	25	12	16	15	9	7	142
Forsyth	5	11	5	12	8	17	82
Cumberland	8	8	9	4	10	12	77
Pitt	9	11	9	8	2	6	68

Source: HIV/STD Control Section 1999

(CDC 2000b). Also, the proportion of male AIDS cases attributed to male to male sexual contact has decreased from 60% of cases reported between 1984 and 1989 to 41% of cases reported between 1994 and 1996. The proportion of male AIDS cases attributed to injecting drug use (IDU) has increased, while the proportion of female cases attributed to IDU has decreased. For females, the proportion attributed to heterosexual contact has increased slightly and the proportion of cases attributed to blood products among both sexes has decreased. The proportion of AIDS cases for which there is "no identified risk" for both sexes combined constituted 21% of cases from 1994 to 1996.

By the end of the 1990s, HIV/AIDS had impacted the majority of North Carolina's 100 counties. The highest rates continued to be in the urban counties with major metropolitan areas, such as Durham, Mecklenburg, Guilford, Wake and New Hanover. However, several rural counties in the coastal plain continued to have high rates also (e.g., Northampton, Duplin and Bertie). The pattern illustrates a concentration of cases in the urban crescent of North Carolina, with contagious diffusion to the surrounding counties, as well as high rates in the coastal plain. The mountain counties continue to contain the lowest HIV/AIDS rates.

Black women are 15 times more likely to have AIDS than white women, and their children 18 times more likely than white children (Rosin 1995). Minority women also have increased risks due to a higher incidence of injecting drug use by themselves and their sexual partners (Ickovics and Rodin 1992; Land 1994). Minority women may not perceive themselves to be at risk because they do not see themselves as having

anything in common with people in stereotypical high risk groups, especially white, gay males (Kalichman, Kelly, Hunter, Murphy and Tyler 1993; Land 1994). "Everyone knew AIDS was a disease of white boys...the community-board leaders in Harlem are saying 'AIDS is not a problem for us. AIDS is a white man's disease'" (Burkett 1995, 193).

Gould (1993) discusses the 'geography of the condom.' In the United States, using a condom for HIV-AIDS prevention is not acceptable for over 40% of Hispanic and Haitian women, and 20% of African American women, even if their partner is HIV-positive (Landau-Stanton and Clements 1993). One reason for this behavior is that minority women are fearful of driving away a person who may be the father of their children, as well as their only source of emotional and financial support (Land 1994; Osmond, Wambach, Harrison, Byers, Levine, Imershein and Quadagno 1994). Condoms are used by men, and women can only ask for their use. The female condom is technically an option for women, because it is similar to the male condom in that it prevents pregnancies and the transmission of sexually transmitted diseases. Much of the research, however, is still underway on the female condom's acceptability, affordability, and its consistent and correct use (CDC 1995). Thus, until heterosexual men become the focus of prevention efforts, AIDS cases among women will continue to rise.

The response of homosexual and bisexual men to the HIV-AIDS threat has been well documented, and there has been considerable behavior modification. On the other hand, risk reduction among women, especially minorities and others at high risk, is less common. Prevention efforts are aimed at women changing the behavior of men. This assumes that women have control over their health and bodies, but in many cases, this is not so. The lower level of literacy of women, especially among the urban poor, means that women are not easily reached by mass media campaigns and other forms of information about HIV-AIDS (Patton 1994).

Analysis

Analysis of new cases of AIDS among women in North Carolina from 1987 to 1999 is performed via assessment of the mapped patterns. For the most part (Figures 3 and 5-7), analysis is of the raw number of new cases reported; in other words, rates are not

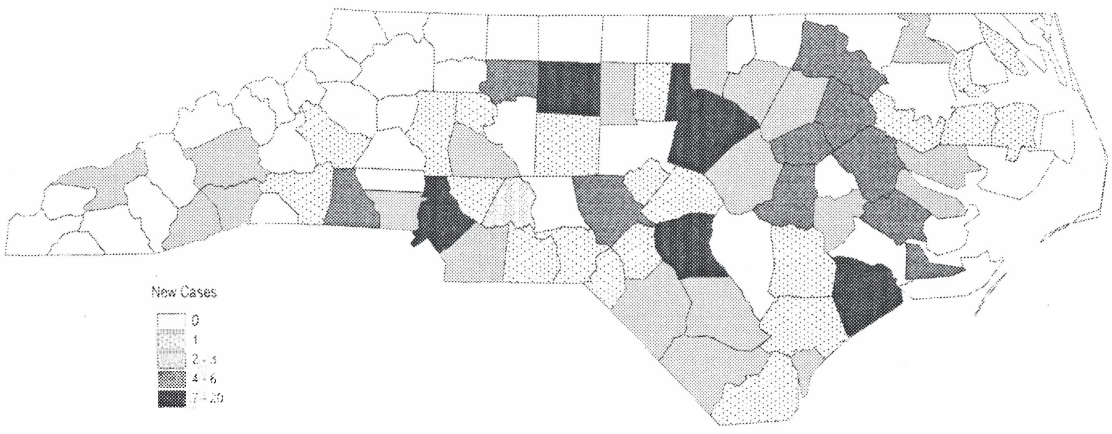

Figure 3. New AIDS Cases in NC Women, 1987-1990
Source: HIV/STD Control Section

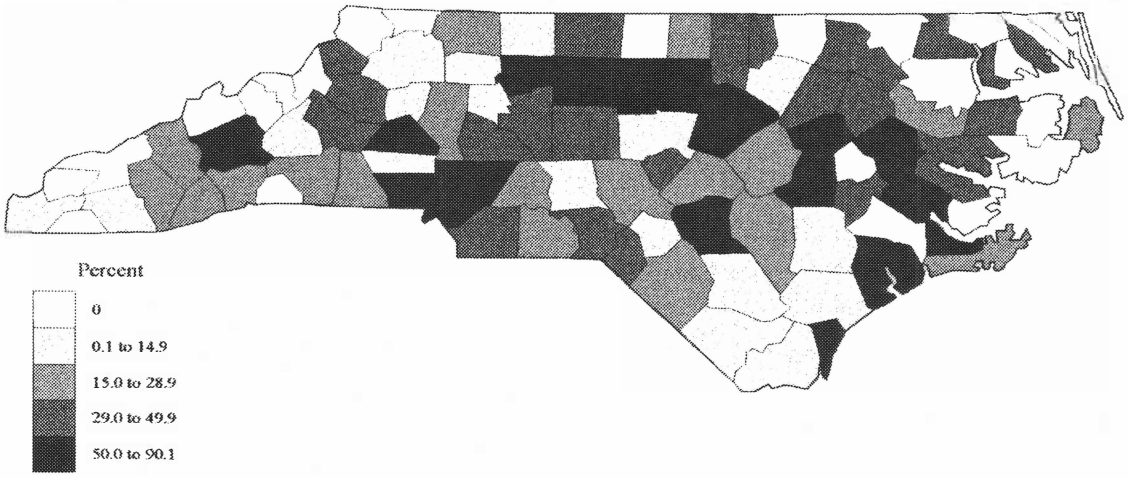

Figure 4. Population in Urban Areas.
Source: US Bureau of the Census 1990.

calculated due to low numbers. However, the final maps and analyses are of the entire time period, and both the total number and the rate per 100,000 women are calculated.

In 1987, Mecklenburg County reported five new cases of AIDS among women, and Cumberland, Durham, and Wake counties each reported three cases. At this time 50% of all women with AIDS in North Carolina were in these four counties (Table 1). This follows the United States-wide pattern of AIDS initially being a disease of major urban areas. In metropolitan areas such as Charlotte and Durham, many cases can be attributed to needle-sharing and prostitution (Pyle and Furuseth 1992).

Counties that only reported one new case of AIDS among women per year during the years from 1987 to 1990 are dispersed throughout the state, as are those with no new cases (approximately one-third of North Carolina counties). The counties with one new case are mainly located on the outskirts of the large urban areas. However, the counties with no new cases are primarily in the mountainous region of the state (Figure 3).

These initial years of the epidemic illustrate two clear patterns: the expansion of cases in the urban areas, especially in the Piedmont Urban Crescent, and a corresponding growth in the Coastal Plain regions. Durham (20 cases), Mecklenburg (18 cases), Wake (17 cases), and Guilford (13 cases) counties are the focus of AIDS among women in the Piedmont Urban Crescent. Of the 68 cases in these four metropolitan counties, 62 are black women. Also, along the Piedmont Urban Crescent, the counties adjacent to Mecklenburg, Guilford, Durham, and Wake counties show increased diffusion. This can be seen by examining the following counties: Gaston (3 cases), Union (2 cases), Rowan (3 cases), and Stanly (2 cases) counties from Mecklenburg County; Forsyth (5 cases) and Alamance (2 cases) counties from Guilford County; and Granville (2 cases), Franklin (2 cases), Nash (3 cases), and Johnston (2 cases) counties from Durham and Wake counties. At this time, many of the peripheral counties of the Piedmont reported no cases of AIDS among women.

There is a second pattern in the Coastal Plain Crescent, that now extends from Craven County on the coast, north to Halifax County, and then south to Onslow County on the coast. There was a total of 39 cases among women in these eight counties, 33 of them black women. Only five counties in the Inner

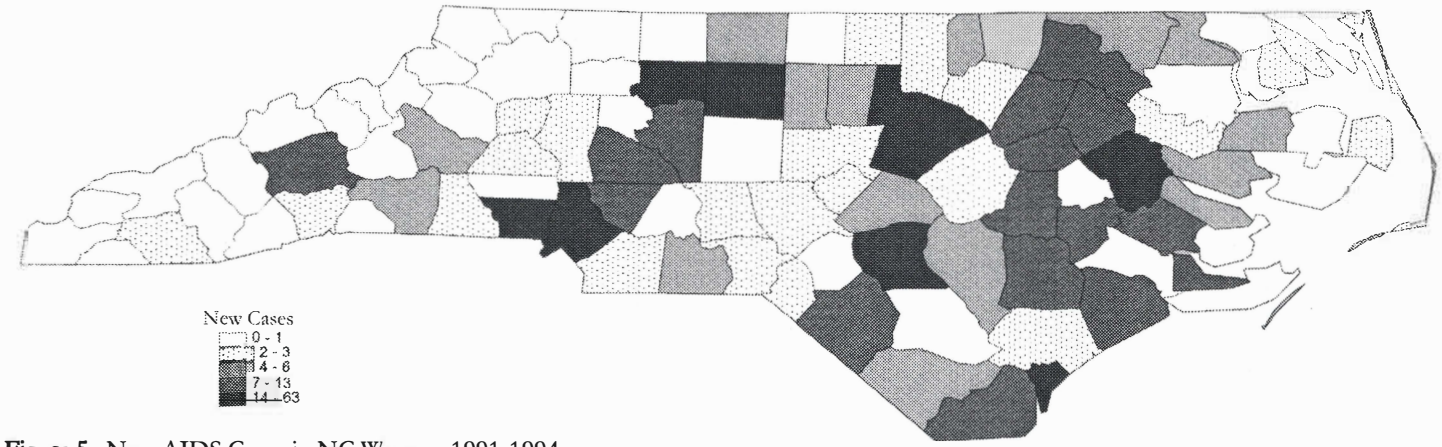

Figure 5. New AIDS Cases in NC Women, 1991-1994
Source: HIV/STD Control Section

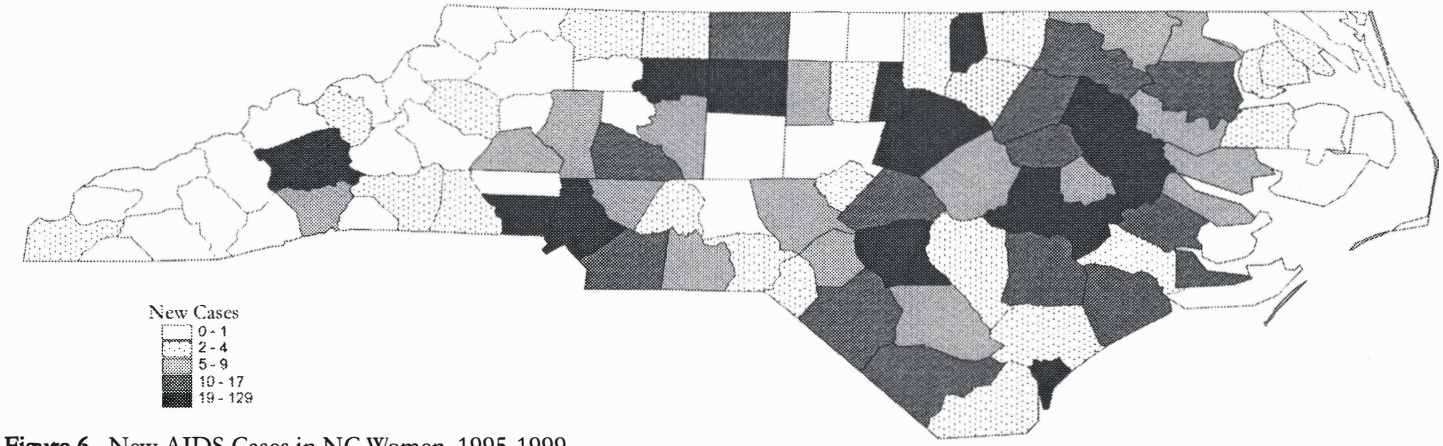

Figure 6. New AIDS Cases in NC Women, 1995-1999
Source: HIV/STD Control Section

Coastal Plain had not yet reported any cases, and eight of the Outer Coastal Plain counties had no cases from 1987 to 1990.

The mountainous region had the fewest total cases during these four years, only four of the counties having any reported cases. From 1987 to 1990, Swain reported two cases, Transylvania two cases, Henderson two cases, and Buncombe three cases; of these nine cases, four were black.

Statewide, during this time the majority of the counties with four or more AIDS cases among women were the counties that are more than 50% urban (Figure 4). Exceptions are Cleveland, Moore, Halifax, and Edgecombe counties. Edgecombe is 49.9% and Halifax is 38.5% urban. Cleveland and Moore, on the other hand, are only 26.8% and 28.7% urban, respectively.

In 1991, Durham County reported 15 new cases of AIDS among women. This was by far the peak incidence of cases, representing 13.6% of the state's 110 cases in 1991. The presence of Duke University's Medical Center may be attracting AIDS patients to the area. The Piedmont Urban Crescent counties showed an almost unbroken arc of concentration of new cases. Mecklenburg reported ten new cases, Forsyth seven, Guilford eleven, and Wake seven. The other counties forming the Urban Crescent reported two to three new cases. Several of the Coastal Plain counties were also reporting two to three new cases at this time, including Pitt County where there were five new cases in 1991. An explanation for this may be the presence of East Carolina University and its medical school. West of the Piedmont Urban Crescent, there were no new cases, with the exception of Macon and Avery counties with one case each.

Again in 1992, the metropolitan counties of Mecklenburg (with 10 new cases), Guilford (10), Durham (9), Wake (8), and Forsyth (7) had the highest number of new cases. Pitt (with 8), Duplin (7), and New Hanover (5) were added to this group; these counties all contain urban areas and/or are situated relatively close to the Interstate 95 and Interstate 40 corridors (Figure 1). Of the 64 cases reported by these eight counties, 55 were black women. Again in 1992, the western portion of the state primarily had counties with no new cases. Exceptions were the appearance of two new cases in Buncombe, Burke, and Catawba counties. Buncombe County contains a substantial gay population (in Asheville), so at this time, the disease had been spreading through the homosexual population for several years and now began to appear within the heterosexual community.

In 1993, Mecklenburg County had an increase of over two and one half times the number of new cases reported, with hierarchical diffusion appearing to take place as nearby counties of Union and Gaston begin to have increasing cases of women with AIDS. Durham and Cumberland were also reporting large numbers of new cases (14 and 12, respectively). Other focal points also began to appear (Figure 5). There is a definite concentration in the Coastal Plain, with many counties reporting at least two new cases. Five counties reported their first case of AIDS among women in 1993. Thus, by the end of 1993, AIDS has reached many of the rural, isolated areas of the state, such as Currituck County and Rockingham County.

One thing to keep in mind when examining AIDS statistics from this time period is that in 1993, after considerable controversy, the CDC further expanded its definition for an AIDS diagnosis to include all HIV-infected adults and adolescents who have less than 200 CD4 cells/øl, or who have been diagnosed with pulmonary tuberculosis, invasive cervical cancer, or recurrent pneumonia. This revision greatly increased the numbers of reported cases, primarily due to the addition of severe immunosuppression to the definition (CDC 1997).

From 1995 to 1999, Mecklenburg (129 new cases), Wake (109), Guilford (87) and Durham counties (59) reported the highest numbers of new cases (Figure 6). In 1995 alone, Mecklenburg County reported 40 new cases. By 1999, all of the coastal counties of North Carolina had reported at least one case of a woman with AIDS. During this time, the inner coastal plain had higher rates than the urban crescent (excluding the four peak counties mentioned previously).

Discussion: AIDS among North Carolina Women 1987 to 1999

One of the hypotheses of this paper is that over time, increases in the number of cases of AIDS have diffused from North Carolina's urban centers to its

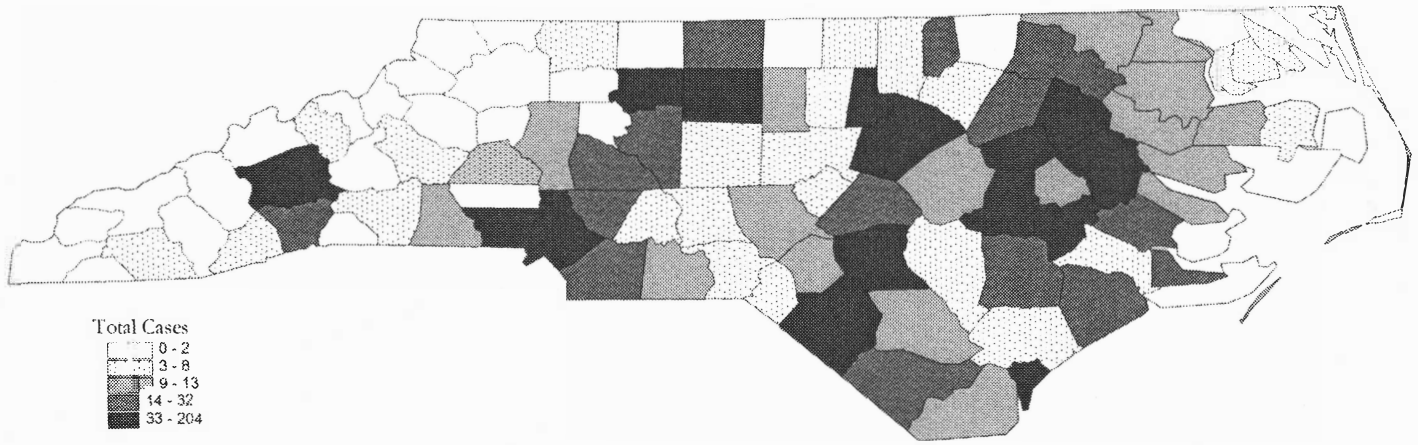

Figure 7. New AIDS Cases in NC Women, 1987-1999
Source: HIV/STD Control Section

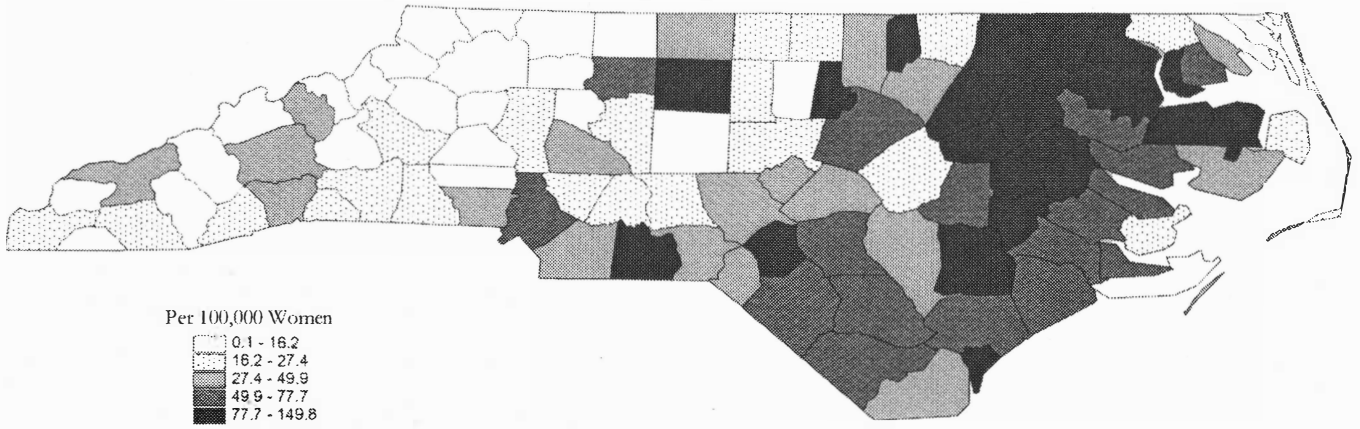

Figure 8. AIDS Rate in NC Women, 1987-1999
Source: HIV/STD Control Section

rural areas (Figures 3-5). The cumulative totals through 1999 show that only seven of North Carolina's 100 counties had yet to report a case of AIDS among women (Alleghany, Ashe, Camden, Clay, Graham, Mitchell and Watauga, Figure 7). As expected, the dominant urban areas of North Carolina have the highest AIDS totals: Mecklenburg with 204, Wake with 168, Guilford with 145 and Durham with 142 cases. Of these 659 cases, all but 74 are black women (89%). A similar rate is true for the rest of the state. Of almost 2000 total cases from 1987 to 1999, 1556 of these women with AIDS are African American (78%). This confirms a second hypothesis, that race is a factor in HIV/AIDS diffusion in North Carolina, the disease mainly impacts African American women.

During the late 1990s, other minority women in North Carolina also were contracting HIV/AIDS. For example, during 1998 and 1999, there were 9 new cases of AIDS among Hispanic women, 4 cases among Native American women and 2 cases among Asian women. Although these total numbers are low, the rates, particularly among Hispanic women, are higher than those for white women. Examining rates of HIV among different racial/ethnic groups, the rate of HIV disease among African Americans (65.1/100,000) is almost 10 times that of whites (6.8/100,000). Rates for Hispanics and Native Americans are almost three times that of whites (Division of Epidemiology 2000).

In North Carolina, minorities are disproportionately impacted by other diseases and by poverty, particularly in the coastal areas of the state; for example, infant mortality rates and tuberculosis rates are higher in eastern North Carolina than average state and national rates (Pyle 1996). Furthermore, "disadvantaged populations, living in urban ghettos or rural areas, have greater medical and health problems and less access to medical services than other Americans" (Pyle and Furuseth 1992, 1). Other important socio-economic variables impacting high HIV/AIDS rates in coastal North Carolina include high unemployment, high levels of drug and alcohol abuse and prostitution.

From 1988 to 1991, there was a statewide average annual increase in new cases of 34.3%. There was a sharp increase between 1992 and 1993, but this is probably due to the change in definition for AIDS. After 1993, however, the increase had leveled off to less than 5% annually and cases among North Carolina women even experienced a sight decline between 1996 and 1997.

When the rates are calculated per 100,000 women for each county, the resulting pattern is fairly similar to that for total cases (Figure 8). Looking back at Table 1, we can see that some of the counties with the highest numbers of AIDS cases also have the highest rates (i.e., Durham and Pitt counties). When rates/100,000

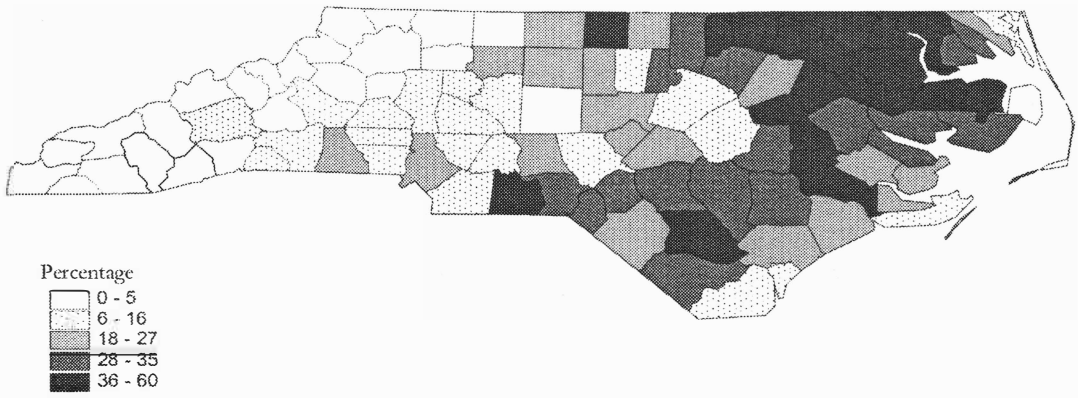

Figure 9. Percent of the Population African-American
Source: US Bureau of the Census, 1997

women are calculated, Tyrell County (along the coast) has the highest rate. Although it only had three total cases of AIDS among women, Tyrell has the lowest number of women of any of the counties (as well as the smallest overall population), causing this statistical anomaly.

AIDS cases among North Carolina women have occurred throughout the state, not only in the urban areas but also in the small, rural communities. This pattern of spread has also been observed in the United States as a whole. The Piedmont and Coastal Plain counties contain a higher incidence than the mountain counties, but with each passing year an added number of western counties are reporting AIDS cases.

Six of the nine counties that have reported no cases are in the mountains. Aside from Buncombe and Henderson counties, the area west of Mecklenburg County has low numbers of AIDS among women. This is a result of both the low levels of urbanization here, and also the high percentage of whites living in these counties (since AIDS in North Carolina is primarily affecting black women) (Figure 9). There is some speculation that a partial explanation of these low numbers may be the result of migration of these cases to other urban areas in North Carolina or even outside the state. However, HIV and AIDS cases are reported to the country of residence at time of diagnosis.

Conclusions

This paper builds upon work done by Pyle and Furuseth (1992), in which they discussed the diffusion of AIDS in North Carolina among both genders. The pattern of AIDS among women in North Carolina is similar to that of men in this state and this paper serves to continue that discussion through the late 1990s. For instance, whereas seven North Carolina counties have yet to report a case of AIDS among women, all but three have at least one case of AIDS among men (those being Alleghany, Clay and Tyrell). Furthermore, the AIDS data from 1999 show that the disease is spreading into the minority populations in both genders, not just African-Americans, but also Hispanics and to a lesser degree, Asians and Native Americans.

In summary, in North Carolina, HIV/AIDS first impacted women living in urban centers such as Charlotte, Raleigh and Durham in the mid- to late-1980s. Through the 1990s, HIV/AIDS diffused down the urban hierarchy and also intensified in the rural coastal plain. The counties in the coastal plain of North Carolina contain (relatively) high percentages of African-Americans, who are disproportionately infected with HIV in the United States and North Carolina. As mentioned previously, minorities in North Carolina are markedly impacted by other diseases (e.g., tuberculosis) and by poverty (e.g., high infant mortality rates), particularly in the coastal areas of the state.

Many people in the United States believe that AIDS is a disease of 'others.' White Americans believe AIDS is a disease of poor blacks, while African Americans think AIDS is a gay white man's disease. Rural residents think AIDS is a problem in "the city," and urban dwellers believe AIDS only afflicts the drug users. Because the public views AIDS as a disease of "others," AIDS victims become separated from their societies. People who are treated as outsiders from the mainstream of society may be denied vital life-saving information or public health tools. In this respect, a subgroup's marginalization may be a risk factor, just as much as a contaminated syringe or unprotected intercourse. As seen in this paper, AIDS has spread throughout North Carolina and is not a problem only affecting 'others.'

Much of the "geography of AIDS" research in the United States (including this paper) can be described as the geography of AIDS *diagnoses*. Since most AIDS funding is distributed based on the county of diagnosis, it is important to examine not only where people are living at the time of diagnosis, but to also investigate the subsequent movement of people with HIV/AIDS and the impact of this movement on the 'host' community. People with HIV are significantly mobile and health care needs may be underestimated in areas experiencing net increase in HIV/AIDS patients due to migration.

Other areas for future study include: the presence/absence/ strength/role of a 'gay community' in North Carolina's urban areas; the acceptance of or resistance to AIDS houses/hospices in North Carolina; rural vs. urban beliefs about HIV/AIDS; and, the

impact of southern culture on compliance with medication regimes. Many elements of HIV/AIDS are rapidly evolving, whether medical, social or educational; therefore, attitudes, lifestyles and knowledge of those infected, affected and uninfected are changing also. Consequently, conducting research on this disease is both challenging and rewarding.

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