

# Connecting The Dots: When the Risks of HIV/STD Infection Appear High But the Burden of Infection Is Not Known—The Case of Male Latino Migrants in the Southern United States

Thomas M. Painter

© Springer Science+Business Media, LLC 2007

**Abstract** Between 1990 and 2000, the number of Latinos in Alabama, Arkansas, Georgia, North Carolina, South Carolina, and Tennessee, states that had no or small Latino populations in 1990, increased by more than 300% on average. Several of these states (referred to as rapid growth states) have high AIDS/STD case rates. Compared to Latinos in states with well-established Latino populations and Latinos nationwide, those in rapid growth states are more often males, young, foreign-born, and recent arrivals who travel without females. The typical Latino in rapid growth states is a young male migrant. Although these migrants may be at risk of HIV/STD infection, little is known about the risk factors that affect them. To clarify this picture, a database search was conducted to identify studies of HIV/STD infection and/or risk factors among rural and urban-based Latino migrants in the six rapid growth states. This qualitative review examines ten studies that were conducted in Alabama, Georgia, North Carolina, and South Carolina. Five of the studies screened for HIV

and/or syphilis infection and provide some information on risk factors; five studies describe risk factors only. Most of those studies that describe risk factors provide evidence that male Latino migrants in rural and urban settings of rapid growth states are vulnerable to HIV/STD infection through heterosexual contacts. However, many of the studies fail to provide sufficient information on other risk factors, and all but one of the studies that screened migrants for HIV or STD infection were conducted between 1988 and 1991. There is an urgent need for updated information on HIV/STD infection and the social-behavioral and situational risk factors that affect male Latino migrants in rapid growth states of the South.

**Keywords** HIV · STD · Latinos · Migrants · Risk behaviors · Southern United States

## Introduction

Latinos in the United States have been identified as a population at risk of HIV/AIDS (Nakashima & Fleming, 2003). Although Latinos represent 14% of the national population, they accounted for 20% of new AIDS diagnoses in 2004 and 19% of all cases diagnosed since the beginning of the epidemic in the United States. The rate of AIDS diagnosis for Latinos is the second highest in the nation: 25.0 cases per 100,000 persons, compared to African Americans, for whom the case rate is 72.1/100,000. For Latino males, the AIDS case rate is nearly four times greater than for Latino females; among Latinos aged 35–44, HIV/AIDS ranks second as a cause of death among males and fourth as a cause of death among females (CDC, 2002, 2004b). During the period 2001–2004, the causes of exposure by Latino males to HIV infection were male-to-male sex (59%),

**Electronic Supplementary Material** The online version of this article (doi:10.1007/s10461-007-9220-0) contains supplementary material, which is available to authorized users.

The findings reported here were presented in part at the 16th International AIDS Conference in Toronto, Canada (13–18 August 2006), abstract number TUPE0641, and the 19th Annual East Coast Migrant Stream Forum in Myrtle Beach, South Carolina (19–21 October 2006). The findings and conclusions in this report are those of the author and do not necessarily represent the views of the Centers for Disease Control and Prevention.

T. M. Painter (✉)  
Prevention Research Branch, Division of HIV/AIDS Prevention,  
National Center for Hepatitis, HIV, STD, and TB Prevention,  
Centers for Disease Control and Prevention, 1600 Clifton Road,  
NE, Mailstop E-37, Atlanta, GA 30333, USA  
e-mail: tcp2@cdc.gov

injection drug use (19%), heterosexual contact (17%), male-to-male sex and injection drug use (4%), and other causes (1%). For Latino females, the causes of exposure were heterosexual contact (73%), injection drug use (23%), and other causes (3%) (CDC, 2006b). Despite the high risks of HIV/AIDS that affect Latinos in the United States, and the large and growing number of Latinos who migrate periodically between their home countries and U.S. destinations in search of jobs, no comparable surveillance-based information is available on HIV infection or sexually transmitted diseases (STDs) and associated risk factors that affect Latinos who are also migrants.

#### Rapid Growth of Latino Populations in the Southeastern United States

From 1990 to 2000, Latino populations in the United States increased by 58%. This growth was caused by the increasing number of foreign-born Latino migrants coming to the United States in search of livelihood opportunities (Massey & Sana, 2003; Parrado, 2004; Passel, 2005; Polaski, 2003, 2004), enforcement policies of the U.S. Immigration and Naturalization Service (now the U.S. Citizenship and Immigration Services) that have made it more difficult for Latinos to re-enter the United States after returning to their countries of origin, thereby increasing the number who remain in this country (Porter & Malkin, 2005), and high fertility rates among Latino women in the United States, particularly those who are foreign-born (Kochhar, Suro, & Tafoya, 2005; Martin et al., 2005). Half of all Latinos in the United States live in California and Texas (Guzmán, 2001). These states and Florida, another well-established Latino destination, experienced increases in Latino populations, amounting to 43%, 54%, and 70%, respectively, from 1990 to 2000 (Brewer & Suchan, 2001). During the same period, the number of Latinos more than doubled in nine southern states that had no or small Latino populations in 1990 (Table 1). In six of these states—Alabama, Arkansas,

Georgia, North Carolina, South Carolina and Tennessee (referred to henceforth as rapid growth states)—the average increase in Latino populations was greater than 300% (Kochhar et al., 2005). These states experienced strong economic growth, which, according to Kochhar et al., contributed to an increase of 349% in Latino employment between 1990 and 2000, compared to a 15% increase in non-Latino employment in the same states, and an increase of 49% for Latino employment nationwide. Additional factors that have contributed to the rapid growth of Latino populations in the Southeast include saturation of labor markets in urban areas (e.g., Los Angeles and Houston) of states that have a long history of Latino immigration, and increased enforcement by the Immigration and Naturalization Service in the border states of California, Arizona, and Texas, resulting in a shift of undocumented Latino migrants away from these states to new destinations in the Southeast and Midwest (Kandel & Parrado, 2004). Although the percentage of Latinos with agricultural jobs in rapid growth states was greater overall in 2000 than for Latinos nationwide, much larger proportions of Latinos in these states were working in construction, manufacturing and services, outpacing Whites and African Americans in the same employment categories by nearly two to one (Kochhar et al., 2005). Latino populations have increased so much in some metropolitan areas of rapid growth states that the term hypergrowth has been used to describe the changes. These increases in Raleigh, Greensboro, and Charlotte, North Carolina, and Atlanta, Georgia, for example, ranged from 859% to 1180% between 1990 and 2000. By 2000, nearly two-thirds of all Latinos in Georgia were residing in metro-Atlanta (Suro & Singer, 2002).

#### Sociodemographic Characteristics of Latinos in Rapid Growth States

An analysis of sample 2000 census data by Kochhar et al. (2005) suggests that compared to Latinos in states with

**Table 1** Size and growth of Latino populations in nine southern states, 1990–2000

	1990		2000		1990–2000 % increase
	Number	% of state population	Number	% of state population	
North Carolina	76,726	1.2	378,963	4.7	394
Arkansas	19,876	0.8	86,666	3.2	337
Georgia	108,922	1.7	435,227	5.3	300
Tennessee	32,741	0.7	123,838	2.2	278
South Carolina	30,551	0.9	95,076	2.4	211
Alabama	24,629	0.6	75,830	1.7	208
Kentucky	21,984	0.6	59,939	1.5	173
Mississippi	15,931	0.6	39,569	1.4	148
Virginia	160,288	2.6	329,540	4.7	106

Source: Guzmán (2001) and Brewer and Suchan (2001).

well-established Latino populations and Latinos nationwide, Latinos in rapid growth states are more likely to be male, young, foreign-born, and to have arrived in the United States since 1995. Further, these Latino males are more likely to have traveled to the United States unaccompanied by women, and often live in communities where men outnumber women by 2–4:1. The typical Latino in rapid growth states of the South is a young male migrant (Kochhar et al., 2005).

#### Searching for Opportunities, Encountering Risks

Latino migrants travel from their home countries, in which livelihood opportunities are limited, to rapid growth states in the South in search of jobs. For many migrants, however, this search for opportunities in the United States also entails periodic travel between areas that have been affected differently by HIV infection. For example, the estimated HIV prevalence among adults in the Mexico (0.3%), the origin of most Latinos in the United States, is half the estimated prevalence among adults in the United States (CENSIDA, 2003; Magis-Rodriguez et al., 2004). Estimates of HIV seroprevalence rates for the South or for individual southern states, are not available, thus comparisons between the rates of infection in migrants' countries of origin, such as Mexico, and rapid growth states of the South are not possible. However, other information on HIV/AIDS in the South suggests that male Latino migrants may be at increased risk of HIV infection. An estimated 36% of the U.S. population lives in the South; however this region accounts for an estimated 40% of persons living with HIV/AIDS and 46% of new AIDS cases. The AIDS case rate per 100,000 population in the South (18.2) is higher than that for the United States as a whole (14.7) and ranks second in the nation only to the Northeast, with a case rate of 23.5 per 100,000 (Kates & Ruiz, 2002). During

the period from 2000 to 2004, the South had the largest estimated number (343,449) of AIDS cases of any region in the country (CDC, 2006a). Available information on AIDS and STD case rates for the individual rapid growth states also suggests that male Latino migrants may face substantial risk of infection once they arrive in those states. Among these six states, case rates for AIDS among adults and adolescents in Georgia and South Carolina, for chlamydia in Alabama and Georgia, for gonorrhea in Alabama, Georgia, North Carolina, South Carolina, and Tennessee, and for syphilis in four of these states and Arkansas, are among the ten highest in the country (CDC, 2004a; Hall et al., 2005) (Table 2).

Given the sociodemographic profile of Latino migrants in rapid growth states—young, male, foreign-born, and unaccompanied by women—and the burden of HIV/AIDS and STDs in these states, these migrants appear to be at risk of HIV or STD infection. Male Latino migrants in rapid growth states are of particular interest for several reasons. Although Latino males in the United States are disproportionately affected by HIV/AIDS relative to Latino females, HIV/AIDS surveillance systems do not provide information concerning Latinos who are also migrants. Many male Latino migrants are recent arrivals to U.S. destinations in which Latino communities are also relatively new. As a result, they may lack access to social support and sexual networks that can be found in Latino communities in states with larger, well-established, Latino populations (Apostolopoulos et al., 2006; Hirsch & Yount, 2001; Menjívar, 2000; Vega, Kolody, Valle, & Weir, 1991). The migrant men frequently live with other migrants in shared mobile homes or camp housing in rural areas, or in apartment complexes or houses in urban areas, forming communities in which men may far outnumber women (Grzywacz et al., 2004; Hirsch, Higgins, Bentley, & Nathanson, 2002; Kochhar et al., 2005; Parrado, Flippen, & McQuiston,

**Table 2** AIDS and Sexually Transmitted Diseases (STDs) in nine southern states: Rates per 100,000 population and national rank

State	AIDS and STD case rates per 100,000 population							
	AIDS (2001)		Chlamydia (2000)		Gonorrhea (2000)		Primary and secondary syphilis (2000)	
	Rate	Rank <sup>a</sup>	Rate	Rank <sup>a</sup>	Rate	Rank <sup>a</sup>	Rate	Rank <sup>a</sup>
North Carolina	11.5	18	287.4	14	233.0	6	6.3	3
Arkansas	7.4	30	243.8	26	142.7	18	4.1	10
Georgia	20.8	6	377.0	6	260.2	5	5.2	7
Tennessee	10.5	20	274.8	18	216.6	8	9.7	1
South Carolina	17.9	9	256.1	23	215.7	9	5.9	5
Alabama	9.8	23	350.7	7	276.0	4	2.8	15
Kentucky	8.2	26	203.6	38	88.4	28	2.1	17
Mississippi	14.6	12	458.6	2	332.9	2	4.9	8
Virginia	13.2	14	223.4	32	148.0	17	1.8	19

Source: Kates and Ruiz (2002)

<sup>a</sup> Ranking includes 50 states and the District of Columbia

2004). Family and community-based social controls that can moderate risk behaviors in the migrants' home countries and in well-established Latino communities in other areas of the United States may exert less influence in their new southern destinations (Apostolopoulos et al., 2006; Hirsch & Yount, 2001; Viadro & Earp, 2000). Finally, the cyclical movement of migrant men between their countries of origin and rapid growth states, in which the risks of HIV/STD may be high, may contribute to the spread of HIV infection to migrants' wives and other sex partners when they return home. There is some evidence that this is happening as a result of migration by Latino males to other areas of the United States. In Mexico, which is the largest source of Latino migrants to the United States, changing HIV transmission patterns linked to migrations of men to and from this country have contributed to changes in Mexico's HIV/AIDS epidemic. Initially associated primarily with urban male-to-male sex and drug use in border areas, HIV/AIDS in Mexico is becoming increasingly rural and heterosexual in nature (Bronfman, Sejenovich, & Uribe 1998; CONASIDA, 2000; Gayet, Magis-Rodriguez and Bronfman, 2000; Magis-Rodriguez et al., 2004; Parrado et al., 2004; Sanchez, Lempe, Rodríguez, Manichiello, & Garcia, 2003). Del Rio and Sepúlveda (2002) report that 25% of rural AIDS cases in Mexico occur among migrants, compared to 6.1% of AIDS cases in urban areas, and that 21.1% of rural AIDS cases are among women, compared to 14.4% of AIDS cases in urban cases. Overall, one-third of all AIDS cases in Mexico have been reported from those states that send the largest number of migrants to the United States (Sanchez et al., 2004).

### Connecting the dots

Despite the increased risks of HIV/STD infection that male Latino migrants may face in rapid growth states of the South, research on these issues has been limited. This lack of attention to Latino migrants in the South contrasts with states such as California and Florida, which have received considerable attention by researchers and students of migrant populations (Bronfman & Moreno, 1996; Carrier & Magaña, 1991; CDC, 1992; Fernández et al., 2004, 2005; Harawa, Bigham, Cochran, Greeland, & Cunningham, 2002; Levy et al., 2005; Magaña, 1991; Magaña, de la Rocha, & Amsel, 1996; Magis-Rodriguez et al., 2004; Martinez-Donate et al., 2005; McCoy, Weatherby, & Yu, 1999; Mena, 2002; Mishra & Conner, 1996; Organista, 2004; Organista, Carillo, & Ayala, 2004; Organista & Kubo, 2005; Organista, Balls Organista, Garcia de Alba, Castillo Moran, & Ureta Carillo, 1997; Organista et al., 2000; Ritieni, Bravo Garcia, Hutchins, & Mittal, 2005; Sanchez, Lempe, Rodríguez, Manichiello, & Garcia, 2003; Sanchez et al., 2004; Vera, 2005; Weatherby et al., 1997, 1999; Wong, Tambis, Hernandez, Chaw, & Klausner, 2003).

What do we know about HIV and STD infection and associated risk factors that affect male Latino migrants in rapid growth states of the South? To answer this question, a qualitative review was conducted of studies that examined these issues. Electronic bibliographic databases were searched to identify published studies of HIV and/or STD infection and/or risk factors among migrant farmworkers and urban-based migrants in these states. The searched databases included AIDSLine (1980 until closure in December 2000), the Cumulative Index to Nursing and Allied Health Literature (1982 through mid-August, 2006), MEDLINE (1966 through mid-August 2006), and PsycINFO (1967 to week 3 of August 2006). These databases were selected because they provide comprehensive coverage of published studies of potential interest to the present review. In addition, references in identified studies were examined for further possible sources of information. Key words that were used to locate studies in each of the six states included Hispanic or Latino migrant farmworkers, migrant and seasonal farmworkers, farmworkers, migrant workers, migrants, immigrants, HIV, AIDS, STDs, gonorrhea, and syphilis. The following characteristics were examined for all identified studies: location; nature of the population studied; data collection and publication dates; design; sampling method; sample size and composition; data collection methods; types of data reported (sex, race/ethnicity of migrants in study samples and HIV and/or STD infection rates and associated risk factors by race/ethnicity); and findings.

### Study Characteristics

Ten studies were identified in four of the six rapid growth states: Alabama (two studies), Georgia (2), North Carolina (4), and South Carolina (2). Five of the studies either screened migrants or blood specimens that had been previously collected from migrants for HIV and/or STD infection and provide some information on risk factors; five studies describe factors that could affect migrants' risks for infection, but did not screen for HIV and/or STD infection. Supplementary Table III describes the studies that were identified for this review, HIV or STD infection rates for the total study sample, for all Latinos, and for Latino males in those instances where data are reported from HIV and/or STD screening, and any risk factors that are described for Latino migrants. Supplementary Table IV summarizes the study characteristics.

### HIV and Syphilis Infection

Three of the reviewed studies screened migrant and seasonal farmworkers or blood specimens previously collected

from farmworkers for HIV infection. Two of the three HIV studies report infection rates of zero (none of 125 specimens screened) and 14% (one of seven migrants screened) among male and female Latino migrants combined at study sites in North Carolina and South Carolina (CDC, 1988; Jones et al., 1991). No information is available on the sex of the HIV-positive person in the South Carolina study. As part of a third, larger study of blood specimens from migrants in ten states, 680 specimens from North Carolina were tested, and two (0.3%) were found to be HIV-positive. However, no information is provided on the sex, race, or ethnicity of the infected individuals (Castro & Narkunas, 1989).

Two of the HIV screening studies also screened for syphilis infection. Thirteen percent of the migrant and seasonal farmworkers who were studied by the CDC (1988) in North Carolina and 16% of those who were studied by Jones et al. (1991) in South Carolina were infected. These studies do not report information on the race or ethnicity of the infected migrant workers. Two more recent studies were conducted as components of a syphilis outbreak investigation among male Latino migrants in Decatur, Alabama (Paz-Bailey, Teran, Levine, & Markowitz, 2004). The first of these studies reviewed the records of all syphilis cases that were identified during the outbreak; the second study consisted of door-to-door syphilis screening and a survey that were conducted by the Morgan County Health Department in the largely Latino community in which the infected men lived. Of the 43 syphilis cases identified during the outbreak, 21 were in Latinos; of these, 20 were males, all of whom had had sex with sex workers. Eleven of the 13 infected females who were identified during the outbreak investigation were sex workers; all of the sex workers were White or African American. Of the 173 individuals who were included in the door-to-door screening and survey, 5% were RPR-positive; however, no information is provided on the race or ethnicity of the infected individuals.

### Risk Factors

None of the three studies that screened migrants for HIV or HIV and syphilis describe risk factors for Latinos in the study samples (Castro & Narkunas, 1989; CDC, 1988; Jones et al., 1991). However, both components of the syphilis outbreak investigation in Alabama (Paz-Bailey et al., 2004) and those studies that did not screen migrants for HIV or STD infection in Georgia (Fouk, Lafferty, Ryan, & Robertson, 1989; Lafferty, Fouk, & Ryan, 1990–1991), North Carolina (Parrado et al., 2004; Viadro & Earp, 2000), and South Carolina (Apostolopoulos et al., 2006) provide some information on factors that can affect the risks of HIV/STD infection among male Latino

migrants. One or more of these studies describes sex with female sex workers and other females, use and non-use of condoms, male-to-male sex, substance use, therapeutic injections, needle-sharing, STDs, and other risk factors. Four of the studies (Apostolopoulos et al., 2006; Parrado et al., 2004; Paz-Bailey et al., 2004 [door-to-door screening and survey component]; Viadro & Earp, 2000) also describe factors that reflect the circumstances of the migrant men at their destinations which may affect their risks of HIV/STD infection. These include being unaccompanied by females or family, duration of residence, and access to social support networks.

### *Social-Behavioral Factors*

*Sex with Female Sex Workers* All of the 20 male Latino migrants who were identified as being infected during the Decatur, Alabama syphilis outbreak investigation had had sex with sex workers (Paz-Bailey et al., 2004 [case record review component]). Nearly one-fourth (27%) of those male Latino migrants who were included in the door-to-door screening and survey component of the syphilis outbreak investigation, the two North Carolina studies (28% and 23%, respectively), and one of the two Georgia studies (18%), reported sex with sex workers during periods of time ranging from the past six months to ever (Lafferty et al., 1990–1991; Parrado et al., 2004; Paz-Bailey et al., 2004 [door-to-door screening and survey component]; Viadro & Earp, 2000). Although Apostolopoulos et al. (2006) suggest that male Latino migrants in South Carolina use sex workers often, the authors do not describe the frequency of these contacts. Further, men in the Alabama, North Carolina and South Carolina studies describe visits by sex workers to migrants' lodgings during evenings, weekends, or around paydays, during which several migrant men have sex, frequently unprotected, in succession with a single sex worker (Apostolopoulos et al., 2006; Paz-Bailey et al., 2004 [case record review component]; Viadro & Earp, 2000). Some of the men studied by Viadro and Earp in North Carolina described sex workers as “prowling around or soliciting clients at trailer parks, apartment complexes, and labor camps known to harbor unaccompanied Hispanic men.” As one of the men expressed it, “the women show up ... on the weekend ... because they know that the men just got paid and because there is a need” (p. 729). According to one of the men interviewed by Apostolopoulos et al. in South Carolina, “a lot of the younger guys use the prostitutes to get blowjobs or hand jobs” (p. 297).

*Sex with Other Females* Only the study by Viadro and Earp (2000) in North Carolina describes sex between male Latino migrants and females other than sex workers. Of

those married Mexican men who were surveyed, 42% had had extramarital sex at some time, 21% had had two or more sex partners during the past year, and 21% had had twenty or more lifetime sex partners.

**Condom Use** Levels of condom use with sex workers can be high but variable. Of the migrants in the two North Carolina studies, 92% and 95%, respectively, said they used condoms every time with female sex workers (Parrado et al., 2004; Viadro & Earp, 2000). However, these men also described circumstances in which they were less likely to use condoms. Of those in the study by Parrado et al. who said they used condoms with sex workers every time, 87% indicated that they would do so if the sex worker had a good reputation, while only 64% would always use condoms if they knew the sex worker well. Two-thirds of the men studied by Viadro and Earp said they would not use condoms if they were careful about selecting their sex partners. All of the 20 Latino migrant men who were infected with syphilis in Alabama had had unprotected sex with sex workers, but no additional information is provided on the circumstances or frequency of condom use by those who were infected or by those men who were included in the door-to-door survey and who had had sex with sex workers during the previous six months (Paz-Bailey et al., 2004 [both components]). Condom use by male Latino migrant farmworkers in the South Carolina study is described as low; however, Apostolopoulos et al. (2006) do not describe the circumstances or frequency of condom use by the men.

Only the two North Carolina studies provide information on levels of condom use by migrant men with their wives, which were low. Of those married men who were interviewed by Viadro and Earp (2000), 75% never or rarely used condoms with their wives or other women. Parrado et al. (2004) also describe very low levels of condom use by the men with wives in their countries of origin.

**Male-to-Male Sex** The reviewed studies provide only limited information on male-to-male sex among Latino migrants. Four of the nine Latino migrant farmworkers who were interviewed by Apostolopoulos et al. (2006) in South Carolina self-identified as being gay or bisexual; however no information is provided on the frequency or circumstances of male-to-male sex or bisexual contacts by these men. Lafferty et al. (1990–1991) report that less than 1% of the 348 Latino men in their Georgia study had had insertive or receptive anal sex with other men. None of the Latino men in Alabama who were infected with syphilis described prior male-to-male sex, and no information is provided on male-to-male or bisexual contacts among the Latino men who were included in the door-to-door

screening and survey (Paz-Bailey et al., 2004). The two North Carolina studies report that none of the men in the study samples described these risk behaviors; however, the authors explain that this is because they were unable to obtain information about male-to-male sex from the men (Emilio Parrado, personal communication, March 2004; Viadro & Earp, 2000). Although the studies by Foulk et al. (1989) in Georgia and Jones et al. (1991) in South Carolina found that 15% and 10%, respectively, of the men in the study samples reported having had male-to-male sex at some time in the past, neither study describes the race or ethnicity of the men who were involved.

**Substance Use** As was the case with reports of male-to-male sex, the reviewed studies provide limited information on substance use among male Latino migrants. Both of the studies in North Carolina (Parrado et al., 2004; Viadro & Earp, 2000) and the syphilis outbreak investigation in Alabama (Paz-Bailey et al., 2004 [case record review component]), report that none of the male Latino migrants in the study samples had used alcohol or drugs. Apostolopoulos et al. (2006) describe alcohol and drug use (principally marijuana and crack cocaine) by male Latino migrants in their South Carolina sample as a means of coping with the social isolation that can result from living in farmworker camps. These authors note that although many of the men had used alcohol in Mexico, drug use often started after they arrived in the United States. Less than 3% of the Latino, mostly male, migrant farmworkers who were interviewed by Lafferty et al. (1990–1991) in Georgia, had injected heroin, cocaine, or speed.

**Therapeutic Injections, Needle Sharing** The use of injections to deliver doses of antibiotics and vitamins occurs frequently in some migrants' countries of origin (e.g., Mexico [McVea, 1997]); however, the study by Lafferty et al. (1990–1991; cf. Lafferty, 1991) in Georgia was the only one of those that were reviewed to examine this practice. Of those individuals who were interviewed in the all Latino, largely male sample, 21% reported self-injecting antibiotics or vitamins, and 22% knew of others who self-injected. A larger percentage of males (23%) than of females (9%) self-injected. Of those individuals who self-injected, 15% had shared needles. In a related study, not included in the present review, of lay injection practices among mostly Mexican migrant farmworkers in North Carolina, McVea (1997) found that 12% of the individuals had used lay injectionists to receive doses of antibiotics or vitamins. No self-injection is reported. Although McVea does not report needle-sharing, she describes the procedures used by the injectionists for cleaning the needles between clients as problematic. She notes that injectable antibiotics or vitamins can be obtained easily in Mexico

“without a prescription at pharmacies, from drug vendors or even in supermarkets” (p. 94), and that in North Carolina, some small grocery stores that catered to Latino workers occasionally sold these items on request.

*Sexually Transmitted Disease* Five of the 43 male Mexican migrants who were surveyed by Viadro and Earp (2000) reported having had unspecified STDs, but only one reported STDs during the last 5 years. The remainder had been infected earlier in Mexico. Of the 67 migrant farmworkers interviewed by Foulk et al. (1989) in Georgia (98% of whom were male and 39% of whom were Latino), 21% had had gonorrhea and 13% had had syphilis, but no information is provided on STDs among men who were Latinos.

*Other Factors: Perceived Risks of HIV Infection, HIV/AIDS Knowledge, Education* The male Latino migrants who were studied by Parrado et al. (2004) in Durham, North Carolina, and who perceived themselves to be at risk for HIV infection from sex with sex workers, visited sex workers less frequently than those who did not perceive themselves to be at risk (Odds Ratio [OR], 0.74; 95% Confidence Interval [CI], 0.51–1.07). However, greater knowledge about HIV/AIDS was not associated with fewer visits to sex workers. The men in the Durham study who were less educated visited sex workers more often than those who were better-educated (Incidence rate ratio [IRR], 0.93; 95% CI, 0.88–0.98). Although Foulk et al. (1989) describe frequent instances of inaccurate HIV/AIDS knowledge among migrants in their Georgia study, they do not examine knowledge levels among Latinos compared to other migrants in the study.

#### *Situational Factors*

*Being Unaccompanied* Three of the reviewed studies indicate that the likelihood of having sex with sex workers is greater among male Latino migrants who are unaccompanied in their destinations by females or family than among those who are accompanied. Parrado et al. (2004) found that 5% of the men in their Durham study who were married and accompanied by their wives had used sex workers during the past year, compared to 46% of single men (OR, 0.06; 95% CI, 0.03–0.14), while married men who were unaccompanied by their wives were nearly as likely as single men (40% vs. 46%) to have used sex workers (OR, 0.69; 95% CI, 0.37–1.28). Unaccompanied married men averaged six visits to sex workers during the past year, compared to single men, who averaged eight visits (IRR, 0.70; 95% CI, 0.45–1.07), while married men who were accompanied by their wives averaged nine visits to sex workers. No explanation is given for the relatively

high frequency of sex worker visits by married men who were accompanied by their wives. The authors note that financial responsibility to families at home may help explain the lower frequency of sex worker visits by married unaccompanied men compared to single men. More of the unaccompanied married men than of the single men (93% vs. 80%) remitted money to families in their home countries, and remitted larger amounts, averaging \$550 per month, compared to \$400 per month remitted by single men. Among the married Mexican migrant men who were surveyed by Viadro and Earp (2000) in North Carolina, a larger proportion of unaccompanied than of accompanied men reported having had sex with sex workers (37% vs. 13%), two or more sex partners during the past year (42% vs. 4%), 20 or more lifetime sex partners (32% vs. 13%), and extramarital sex (74% vs. 17%). As one of the interviewed men described it, unaccompanied married men frequently acted as if they were “single here and married there” (p. 728). Viadro and Earp remark that “the unaccompanied men’s social and economic circumstances in North Carolina allow some men to have extramarital relationships without necessarily experiencing dissonance between their behavior and their family obligations” (p. 731). The door-to-door survey described by Paz-Bailey et al. (2004) in Decatur, Alabama found that not having a regular sex partner (OR, 3.9; 95% CI, 1.1–14.3) and not living with a family member in the United States (OR, 4.5; 95% CI, 1.6–12.8) were associated with sex with female sex workers during the previous six months.

*Duration of Residence in U.S. Destinations, Access to Social Support Networks* Male Latino migrants who had lived in Durham, North Carolina for a longer period of time were less likely to use sex workers (OR, 0.93; 95% CI, 0.86–1.01) and to use sex workers less often than shorter-term residents (OR, 0.95; 95% CI, 0.88–1.02) (Parrado et al., 2004). Parrado et al. state that “every additional year in Durham was associated with a nearly 10% reduction in men’s odds of using a sex worker and in their frequency of visits [to sex workers]” (p. 154). Longer-term residence may result in less social isolation and greater opportunities for migrant men to have sex with women other than sex workers. Those men who were studied by Viadro and Earp (2000) in North Carolina and Apostolopoulos et al. (2006) in South Carolina who were recent arrivals in the United States, or who were described as less acculturated, were more likely to have multiple sex partners or engage in other risk behaviors, including substance use. By contrast, Paz Bailey et al. (2004 [door-to-door screening and survey component]) report that more of those Latino men in Decatur, Alabama who had lived in the United States for one year or more than of those who had lived in this country for less than a year (37% vs. 23%)

reported sex with sex workers, however, the difference was not statistically significant.

The qualitative study by Apostolopoulos et al. (2006) in South Carolina is the only one of the reviewed studies that examines the role of social support networks in the shaping of risk behaviors among migrants. This study is also the only one of those that were reviewed that provides comparative findings on risk factors among migrant men in a rapid growth state of the South and migrants in a state that has a long history of Latino migration and settlement (Arizona). The authors argue that the migrants in Arizona are likely to have greater access to social support because they live in a community that is less isolated, ethnically, than those living in farmworker camps in South Carolina. They suggest further that the social networks in the Arizona Latino community may act as a “protective buffer between migrants and potential risks,” while those in South Carolina may facilitate risk-taking because of “higher tolerance levels toward sexual activities and substance use” (p. 301).

### Summary of Findings, Implications for Prevention, and Methodological Considerations

#### HIV and STD Infection

With the exception of the case record review component of the Alabama syphilis outbreak investigation, those reviewed studies that examined HIV or STD infection do not provide a satisfactory picture of infection rates among male Latino migrants or the link between social-behavioral or situational risk behaviors and infection. Although one study in North Carolina reported that none of the 125 screened blood specimens from migrant and seasonal farmworkers were HIV-positive, a second study in South Carolina reported an infection rate of 14%. However, the South Carolina study included only seven Latinos. None of the HIV screening studies, including those that also screened for syphilis, provide information on the number of Latino males and females in the study samples. Of the four studies that examined syphilis infection, only those that were conducted during the Alabama syphilis outbreak investigation describe factors that may increase the risks of sexually transmitted infections among male Latino migrants. Only the case record review component of the outbreak investigation describes the number of male Latino migrants in the study and provides information on the link between a specific form of risk behavior—sex with sex workers—and a sexually transmitted infection. The syphilis outbreak among male Latino migrants in Alabama who had had sex with sex workers is the first such report of which the author is aware from a rapid growth state;

however, similar outbreaks have been described elsewhere in the country (Magaña, 1991). Finally, all of the reviewed HIV screening studies and two of the four studies that examined syphilis infection were conducted between 1988 and 1991.

There is an urgent need for up-to-date information on HIV and STD prevalence and associated risk factors that affect male Latino migrants and their sex partners in the rural and urban settings of rapid growth states in which they live, work, seek, and find sex partners. Studies that incorporate rapid-test technologies are needed to obtain better estimates of HIV and STD infection rates among male Latino migrants. Surveillance systems need to collect sociodemographic information that would further clarify the current picture of HIV and STD infection and risk factors that affect migrant populations. Some of this information is already being collected. All state and local HIV/AIDS surveillance systems collect information on country of birth, while HIV/AIDS behavioral surveillance includes date of entry into the United States, and HIV/AIDS clinical surveillance includes information on the length of time in the United States (Travis Sanchez, CDC, personal communication, September 2006). Information that would shed additional light on migrant populations includes the number of visits to home countries since entering the United States, last state of residence, marital status, whether accompanied by spouse, and occupation.

#### Social-Behavioral and Situational Risk Factors

Although those studies that report information on risk factors provide evidence of frequent heterosexual risk behaviors among male Latino migrants, they provide a mixed picture concerning both heterosexual and other risk behaviors. Some of the studies, for example, describe high levels of condom use by men with female sex workers, but they also report that condom use can decline as men’s perceptions of sex workers and other sex partners became more positive, based on, among other factors, degrees of acquaintance. Furthermore, several studies also describe unprotected sex by the migrant men, often involving several men in succession with a single sex worker. Only the study by Apostolopoulos et al. (2006) in South Carolina provides specific details on the nature of some migrants’ sexual contacts with sex workers—“blow jobs and hand jobs.” If further needed research in rapid growth states indicates that such relatively low-risk sexual contacts are common and that levels of condom use with sex workers are frequently high, the risks associated with migrants’ contacts with sex workers may be lower than might be expected. However, there is little evidence to support this hypothesis, which needs to be examined. Disparate findings of this kind, that describe what may be low-risk contacts by



male Latino migrants with female sex workers in one setting, and potentially high-risk behaviors with sex workers and other female sex partners in another, point to a need for additional information on the behaviors and circumstances that affect migrants' risks of HIV/STD infection.

The Alabama syphilis outbreak investigation illustrates the linkage that can occur between members of a possible core transmitter population—in this case, female sex workers—in which rates of sexually transmitted infection may be high, and a potential bridge population of young male Latino migrants. These infected men could potentially contribute to the spread of infection to sex partners in their home countries. The circumstances and nature of sexual contacts between male Latino migrants and sex workers that may be disproportionately affected by HIV/STD infection need to be better understood. Likewise, there is a need for information on the prevalence of sexually transmitted infections among the sex workers that service Latino migrant men.

In contrast to findings concerning sexual contacts by male Latino migrants with sex workers that were reported by several studies, only one of the reviewed studies provides information on the men's sexual contacts with women who are not sex workers. This constitutes an important gap in our knowledge about the circumstances and actions that can affect the vulnerability to HIV or STD infection of migrant men and other female sex partners. Furthermore, few of the reviewed studies provide information on condom use with females who are not sex workers, and these studies report that condom use with non-sex worker sex partners occurs very infrequently. These limited findings, and the observation by Parrado et al. (2004) in their Durham study, that the average number of visits to sex workers during the previous year was greater among accompanied married men than among married men who were not accompanied by their wives, further highlights the need to clarify the risks that are faced by migrants' wives and other female sex partners other than sex workers, as well as the risks that these contacts create for the migrant men.

As noted above, the reviewed studies provide only limited information on male-to-male sex among migrant men in rapid growth states. Only one of the studies, published during 1990–1991, describes this pattern of risk behavior among male Latino migrants. Because of its importance as a source of HIV infection among Latino males in the United States, and the potential role of male Latino migrants as a bridge for transmitting HIV and STD infection between populations in their destinations that engage in high-risk behaviors and sex partners in their home countries, more research is needed to examine the circumstances and prevalence of male-to-male sexual contacts among male Latino migrants in rapid growth

states. The shared perception, particularly among foreign-born Latino men, that penetrative as opposed to receptive anal sex with other men may not be considered homosexual behavior (Magaña, 1991), and the self-identification as heterosexual that occurs among some Latino men who engage in male-to-male or bisexual sex (Carillo, 2002) accentuates the need for more information on these risk behaviors. The lack of information on male-to-male or bisexual contact in the two North Carolina studies of social-behavioral risk factors that affect migrants, which otherwise provide a great deal of useful information on behavioral and situational risk factors, illustrates the challenges that researchers can face when attempting to elicit responses from male Latino migrants concerning these risk behaviors.

The small numbers of studies that describe substance use among male Latino migrants suggest that injection drug use may be limited, relative to the use of alcohol, marijuana, crack, or cocaine. Once again, the information on these issues is extremely limited. The finding that some migrant men in South Carolina started using drugs after entering the United States merits particular attention. The interpretation by Apostolopoulos et al. (2006) in the South Carolina study that drug use in the United States may be a means of coping with social isolation and difficult working conditions in rural areas in which Latino communities are not well-established is of interest and needs to be examined further. Increasingly easy access to drugs by Latino migrants in southern states may be another contributing factor in the apparent onset of drug use by migrants at their destinations. Increased access, in turn, may be caused in part by the growing presence in the Southeast of Mexican-based drug smuggling and regional distribution networks (Golden, 2002). The use of injections to deliver doses of antibiotics and vitamins is a common practice in many Latino migrants' countries of origin, and has been described among migrants in rapid growth states. The reports that self-injection or lay injection of vitamins and antibiotics may occur among Latino migrants in Georgia and North Carolina, and that shared or improperly cleaned needles may be used are also cause for concern. Because these actions can contribute to very efficient transmission of HIV, more attention needs to be given to the prevalence and circumstances of self-injection and lay injection of antibiotics and vitamins among Latino migrants. Information is also needed on the circumstances and frequency of sex between male Latino migrants and female (or male) sex partners who inject drugs or who have other sex partners who inject drugs.

Only one of the reviewed studies (Parrado et al., 2004) presents information on the association between perceived risks of HIV infection, compared to knowledge about HIV/AIDS, in the shaping of risk behaviors among male Latino

migrants, but this finding should be of interest to researchers and organizations that develop and deliver HIV/AIDS and STD prevention interventions to migrant populations. Operational and evaluation research are needed to assess the relative effects on risk behaviors of the different components of HIV/AIDS prevention interventions currently delivered to Latino migrants in rapid growth states. To date, no published reports have described investigations of this kind.

Few of the reviewed studies provide information on the possible relationship between past sexually transmitted infections and other HIV risk factors, and all but the Alabama syphilis outbreak investigation rely on migrants' self-reports of STDs. However, the two studies that provide information on prior STDs among migrants (Fouk et al. [1989] in Georgia and Viadro and Earp [2000] in North Carolina) suggest that infections may occur frequently. Given the facilitating role of STDs in the transmission of HIV infection, this is another topic that requires additional attention by researchers and prevention programs.

The situational factors that are identified as being associated with increased use of sex workers and substance use may reflect the migrants' lack of access to social/sexual support structures in their new surroundings. These factors, which broadly affect large numbers of male Latino migrants in the United States, need to be further clarified by formative research, and structural interventions may provide a useful approach for addressing these issues. These are considered below.

#### Prevention of HIV/STD Infection Among Latino Migrants

Although several of the reviewed studies recommended increased efforts to prevent HIV/STD infection among migrants, the number of behavioral interventions for Latino migrants that are known to be effective is limited (Herbst et al., 2007; Organista et al., 2004). Several of the reviewed studies that described situational factors that can affect migrants' risks of infection also identify possible structural interventions to address these issues, including organizational initiatives to reduce social isolation among migrants (Parrado et al., 2004; Viadro & Earp, 2000). These authors also recommend that HIV/STD prevention interventions target the most vulnerable migrant men—those who are single, who are recent arrivals in the United States, and who are less educated—and that interventions be binational in scope. Formative and operational research are needed to assess the feasibility and effectiveness of approaches such as these in the largely male Latino communities that are rapidly developing in the South. The potential role of migrants' social support networks in the shaping of risk behaviors is described by Apostolopoulos et al. (2006).

These networks, which are based on social ties having origins in the migrants' home countries and communities, or their shared ethnicity or nationality, have been described in other settings as forms of organization that facilitate migrants' efforts to cope in their new destinations (Gadon, Chierici, & Rios, 2001; Hirsch & Yount, 2001; Menjívar, 2000; Painter, 1999; Stoller, 2002; Vega et al., 1991). Although incorporating these community-based social support networks may be useful for HIV/STD prevention among migrants, and complement existing prevention outreach approaches, such as the widely used *promotores de salud* model (CDC, 2005a), there have been no published reports to date of efforts to incorporate migrants' social support networks in the delivery of HIV prevention interventions to migrant populations (CDC, 2005b; Painter, 2004). Formative research is needed to clarify the characteristics, functions, and effects of social support networks relative to HIV/STD risks among male Latino migrants. Operational research is needed to assess the feasibility and effectiveness of incorporating these networks in existing outreach programs for the prevention of HIV/STD infection among male Latino migrants and their sex partners.

#### Methodological Limitations of the Reviewed Studies

Many of the reviewed studies are affected in varying degrees by gaps in information concerning male Latino migrants in the study samples. These gaps include a lack of details on the number of male Latino migrants who are included and, where infection rates are reported for Latinos, infection rates among males compared to females. In other instances, studies may describe risk behaviors that occur among Latino migrants without specifying their sex, or that occur among migrant males without specifying their race or ethnicity. Other gaps in several of the studies concern the circumstances and frequency of condom use with sex workers and other female sex partners, male-to-male or bisexual contacts, substance use, use of therapeutic injections, possible needle-sharing, and past sexually transmitted infections. Progress with efforts to better understand HIV/STD risks among Latino migrants in southern states that are experiencing extremely rapid growth of Latino populations, and which also have some of the highest AIDS/STD case rates in the nation will require greater attention to details of this kind as more studies are conducted. The use of qualitative as well as quantitative information to describe risk factors in the more recent studies included in this review (Apostolopoulos et al., 2006; Parrado et al., 2004; Paz-Bailey et al., 2004; Viadro & Earp, 2000) is particularly informative, and those persons who wish to better understand and reduce HIV/STD risks among Latino migrants in rapid growth states would be well-served by a careful reading of these studies.

Most of the reviewed studies included migrant farmworkers only, although most Latino migrants in rapid growth states work, live, and have sex in metropolitan areas. Studies of HIV/STD risk and infection among male Latino migrants are needed in both rural and urban areas. Further, research and prevention interventions need to address the linkages between rural and urban areas and conceptualize their approaches more in terms of broader social or action spaces within which migrants seek opportunities for their livelihoods, and which may also shape their exposure to the risks of HIV/STD infection (Painter, 1996). These broader action spaces include the farms and the urban and suburban areas where migrants live, work, and have sex, the different migrant streams that have been described among migrants along the East and West Coasts and in the Midwest (Goldfarb, 1981), and the areas along the international borders that migrants must cross to reach their southern destinations and return home.

All of the reviewed studies were cross-sectional in design. Prospective studies of risk factors and HIV/STD infection are needed to better understand how Latino migrants manage HIV/STD risks over time. Only one of the ten reviewed studies used random sampling to select participants, and several of the studies included small numbers of Latinos. While migrants are well known for being difficult to study due to their mobility and social isolation, tools are available that may be useful for work with such hard-to-reach populations. Respondent-driven sampling has been used successfully to enlist members of populations of interest to recruit from among their own social networks, and has facilitated access, for example, to injection drug users and Latino men who have sex with other men in the United States (Ramirez-Valles, Heckathorn, Vázquez, Diaz, & Campbell, 2005) and hidden female sex workers in Vietnam (Johnston, Sabin, Hien, & Huong, 2006). This approach may be useful and cost-effective for obtaining samples of Latino migrants that are more representative of larger rural and urban-based migrant populations in rapid growth states of the South (Heckathorn, 1997; Magnani, Sabin, Saidel, & Heckathorn, 2005; Ramirez-Valles et al., 2005). Operational research is needed to assess the effectiveness of using respondent-driven sampling to access migrant workers for purposes of obtaining information on risk factors and HIV/STD infection.

This review also has several limitations. Although the search strategy used for the present review aimed to be comprehensive, it is possible that not all published studies of HIV/STD infection and risks among male Latino migrants in rapid growth states of the South were identified. However, this paper aims to provide the basis for continuing efforts by researchers and HIV/STD prevention

programs that are concerned with migrant populations in these states to improve the picture of what we know, do not know, and learn what more we need to know to reduce the vulnerability of male Latino migrants and their sex partners in the United States and their countries of origin to HIV and STD infection. The overview of risk factors among male Latino migrants in the states included in this review is limited by the quality and quantity of information that is provided by the reviewed studies. In effect, many dots in the picture—what may be described as an emerging picture—of HIV/STD infection and risk among these migrant populations, and the connections between the dots, have yet to be supplied.

## Conclusion

The sociodemographic profile of Latinos in the six rapid growth states—typically young, unaccompanied male migrants—and the high AIDS/STD case rates that affect many of these states, suggest that migrants may be entering social environments of increased risks for HIV/STD infection as they search for livelihood opportunities in the South. Several of the reviewed studies provide evidence suggesting that migrant men are engaging in frequent heterosexual contacts. However, the studies give conflicting reports concerning the frequency and circumstances of unprotected sex during these contacts. Further, the studies raise as many questions as they provide answers concerning the prevalence of other behaviors that can affect migrants' risks of HIV/STD infection. Reports by several studies of links between the circumstances in which Latino migrants live and work in rapid growth states and a range of risk behaviors are more consistent. Particularly troubling, however, is the scarcity of information that is currently available concerning the degree to which these behavioral and situational factors result in HIV or STD infection among the migrant men. Given the rapid increases in the number of male Latino migrants in the South, particularly in rapid growth states, who travel without female companions and live in communities where Latino men far outnumber Latino women, there is an urgent need to better understand the factors that affect their risks of HIV/STD infection, the manner in which these migrant men manage infection risks, and the rates of infection that occur among them and their sex partners. Finally, efforts to better understand the circumstances of this vulnerable, mobile population in rapid growth states need to be linked to prevention interventions that enable migrants to protect themselves and their sex partners in the United States and in their countries of origin from HIV or STD infection.

**Acknowledgments** This work was supported by the Prevention Research Branch, Division of HIV/AIDS Prevention and was not funded by any other organization. I wish to thank Karen Andes for assisting with the analyses of sample census data during the initial stages of this review project, and James Carey, Yuko Mizuno, Maria Carla Roncoli, and Richard Wolitski for their comments on earlier versions of this paper.

## References

- Apostolopoulos, Y., Somnez, S., Kronenfeld, J., Castillo, E., McLendon, L., & Smith, D. (2006). STI/HIV risks for Mexican migrant laborers: Exploratory ethnographies. *Journal of Immigrant and Minority Health, 8*, 291–302
- Brewer, C., & Suchan, T. A. (2001). Mapping census 2000: The Geography of U.S. Diversity. Census 2000 Special Report no. CENSR/01–1. Washington, D.C.: U.S. Census Bureau, June.
- Bronfman, B., & Moreno, S. L. (1996). Perspectives on HIV/AIDS prevention among immigrants on the U.S.-Mexico Border. In: S. I. Mishra, R. F. Conner, & J. R. Magaña (eds), *AIDS crossing borders: The spread of HIV among Migrant Latinos* (pp. 49–76). Boulder, CO: Westview Press.
- Bronfman, M., Sejenovich, G., & Uribe, P. (1998). Migración y SIDA en México y América Central. Mexico City: Ángulos del SIDA and CONASIDA [Consejo Nacional para la prevención y Control del VIH/SIDA].
- Carrier, J. M., & Magaña, J. R. (1991). Use of ethnosexual data on men of Mexican origin for HIV/AIDS prevention programs. *The Journal of Sex Research, 28*, 189–202.
- Carillo, H. (2002). *The night is young: Sexuality in Mexico in the time of AIDS*. Chicago: University of Chicago.
- Castro, K., & Narkunas, J. (1989). Seroprevalence of HIV infection in seasonal & migrant farmworkers: Preliminary results. *Migrant Health Clinical Supplement, 4*, 1
- CDC (Centers for Disease Control and Prevention). (1988). Epidemiologic notes and reports: HIV seroprevalence in migrant and seasonal farmworkers—North Carolina, 1987. *Morbidity and Mortality Weekly Report, 37*, 517–519.
- CDC (1992). HIV infection, syphilis, and Tuberculosis screening among migrant farm workers—Florida, 1992. *Morbidity and Mortality Weekly Report, 41*, 723–725.
- CDC (2002). HIV/AIDS surveillance report, Cases of HIV infection and AIDS in the United States, 2002, Vol. 14. Centers for Disease Control and Prevention, National Center for HIV, STD and TB Prevention, Division of HIV/AIDS Prevention. Available at <http://www.cdc.gov/hiv/stats/hasrlink.htm> (Accessed October 13, 2004)
- CDC (2004a). Assessment of increase in perinatal exposure to HIV among hispanics—20 counties, Georgia, 1994–2002. *Morbidity and Mortality Weekly Report, 53*, 944–946. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5340a4.htm> (Accessed October 15, 2004).
- CDC (2004b). *HIV/AIDS among hispanics*. Centers for Disease Control and Prevention, National Center for HIV, STD and TB Prevention, Division of HIV/AIDS Prevention, October.
- CDC (2005a). *Diabetes projects. Community health workers/promotores de salud: Critical connections in communities*. Atlanta, Georgia: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Diabetes Translation and Division of Adult and Community Health, Community Health Worker and Promotora de Salud Workgroup. Available at <http://www.cdc.gov/diabetes/projects/comm.htm> (Accessed November 15, 2006).
- CDC (2005b). Use of social networks to identify persons with undiagnosed HIV infection—seven U.S. cities, October 2003–September 2004. *Morbidity and Mortality Weekly Report, 54*, 601–605.
- CDC (2006a). Cases of HIV infection and AIDS in the United States, by race/ethnicity, 2000–2004. HIV/AIDS Surveillance Supplemental Report 2006, 12. Available at <http://www.cdc.gov/hiv/topics/surveillance/resources/reports/index.htm>. (Accessed November 6, 2006)
- CDC. (2006b). *HIV/AIDS among hispanics*. CDC HIV/AIDS fact sheet. Atlanta, GA: Centers for Disease Control and Prevention, National Center for HIV, STD and TB prevention, Division of HIV/AIDS Prevention. June. Available at <http://www.cdc.gov/hiv/resources/factsheets/PDF/hispanic.pdf>. (Accessed August 21, 2006)
- CENSIDA (2003). Epidemiología del VIH/SIDA en México en el año 2003. Mexico, D.F.: Centro Nacional para la prevención y control del VIH/SIDA, Secretaría de Salud. 01 noviembre. Available at <http://www.salud.gob.mx/conasida/estadis/pre2003.pdf> (Accessed November 10, 2006)
- CONASIDA (2000). El sida en México en el año 2000. Mexico, D.F.: Centro Nacional para la prevención y control del VIH/SIDA. Available at <http://www.ssa.gob.mx/conasida> (Accessed March 5, 2003)
- del Rio, C., & Sepúlveda, J. (2002). AIDS in Mexico: Lessons learned and implications for developing countries. *AIDS 16*, 1445–1457
- Fernández, M.I., Collazo, J.B., Bowen, G.S., Varga, L.M., Hernández, N., & Perrino, T. (2005). Predictors of HIV testing and intention to test among Hispanic Farmworkers in South Florida. *Journal of Rural Health, 21*, 56–64
- Fernández, M. I., Collazo, J. B., Hernández, N., Bowen, G. S., Varga, L. M., Vila, C. K., Arheart, K. L., & Perrino, T. (2004). Predictors of HIV risk among Hispanic Farm Workers in South Florida: Women are at higher risk than men. *AIDS and Behavior, 8*, 165–174
- Foult, D., Lefferty, J., Ryan, R., & Robertson, A. (1989). AIDS knowledge and behavior in a migrant farmworker population. *Migration World, 17*, 36–42
- Gadon, M., Chierici, R. -M., & Rios, P. (2001). Afro-American migrant farmworkers: a culture in isolation. *AIDS Care, 13*, 789–801
- Gayet, C., Magis-Rodriguez, C., & Bronfman, M. P. (2000). Aspectos conceptuales sobre la relación entre la migración y el SIDA en México. *Enfermedades Infecciosas y Microbiológicas, 20*, 134–140
- Golden, T. (2002). Mexican drug dealers turning U.S. towns into major depots. *New York Times*, November 16:11
- Goldfarb, R. L. (1981). *Migrant farmworkers: A caste of despair*. Iowa State University Press, Ames.
- Grzywacz, J. G., Quandt, S. A., Early, J. T., Tapia, J., Graham, C. N., & Arcury, T. A. (2004). Leaving family for work: Ambivalence & mental health among Migrant Latino farmworkers. Working Paper 04–01, Center for Latino Health Research, Department of Family and Community Medicine. Winston-Salem, NC: Wake Forest University School of Medicine.
- Guzmán, B. (2001). The Hispanic population. Census 2000 Briefing report no. C2KBR/01–3. Washington, D.C.: U.S. Department of Commerce, Economic and Statistics Administration, U.S. Census Bureau, May.
- Hall, H. I., Li, J., & McKenna, M. T. (2005). HIV in predominantly rural areas of the United States. *The Journal of Rural Health, 21*, 245–253
- Harawa, N. T., Bigham, T. A., Cochran, S. D., Greeland, S., Cunningham, & W. E. (2002). HIV prevalence among foreign- and US-born clients of public STD clinics. *American Journal of Public Health, 92*, 1958–1963
- Heckathorn, D. D. (1997). Respondent-driven sampling: A new approach to the study of hidden populations. *Social Problems, 44*, 174–199.

- Herbst, J. H., Kay, L. S., Passin, W. F., Lyles, C. M., Crepaz, N., Marin, B. V. for the HIV/AIDS Prevention Research Synthesis (PRS) Team. (2007). A systematic review and meta-analysis of behavioral interventions to reduce HIV risk behaviors of hispanics in the United States and Puerto Rico. *AIDS and Behavior*, *11*, 25–47.
- Hirsch, J. S., Higgins, J., Bentley, M. E., & Nathanson, C. A. (2002). The social constructions of sexuality: Marital infidelity and sexually transmitted disease—HIV risk in a Mexican migrant community. *American Journal of Public Health*, *92*, 1227–1237.
- Hirsch, J. S., & Yount, K. M. (2001). ‘Because he misses his normal life back home’: Social and cultural influences on Mexican migrants’ and HIV risk behaviors. Paper presented at the 2001 Meeting of the American Anthropological Association, Washington, D.C., 28 November–2 December.
- Johnston, L. G., Sabin, K., Hien, M. T., & Huong, P. T. (2006). Assessment of respondent driven sampling for recruiting female sex workers in two Vietnamese cities: Reaching the unseen sex worker. *Journal of Urban Health*, *83*, (Suppl. 7), 16–28.
- Jones, J. L., Rion, P., Hollis, S., Longshore, S., Leverette, & W. B., Ziff, L. (1991). HIV related characteristics of migrant workers in rural South Carolina. *Southern Medical Journal*, *84*, 1088–1090.
- Kandel, W., & Parrado, E. A. (2004). Hispanics in the American south and the transformation of the poultry industry. In: Arreola D. D. (Ed.), *Hispanic spaces, latino places: Community and cultural diversity in contemporary America* (pp. 255–276). University of Texas Press, Austin, TX.
- Kates, J., & Ruiz, S. (2002). HIV/AIDS and other Sexually Transmitted Diseases (STDs) in the Southern Region of the United States: Epidemiological overview. Report no. 6062. Menlo Park, CA: The Henry J. Kaiser Family Foundation.
- Kochhar, R., Suro, R., & Tafoya, S. (2005). The New Latino South: The context and consequences of rapid population growth. Report. Washington, D.C.: PEW Hispanic Center. July 26, 2005.
- Lafferty, J. (1991). Self-injection and needle sharing among migrant farmworkers. *American Journal of Public Health*, *81*, 221.
- Lafferty, J., Foulk, D., & Ryan, R. (1990–1991). Needle sharing for the use of therapeutic drugs as a potential AIDS risk behavior among migrant Hispanic farmworkers in the Eastern Stream. *International Quarterly of Community Health Education*, *11*, 135–143.
- Levy, V., Page-Shafer, K., Evans, J., Ruiz, J., Morrow, S., Reardon, J., Lynch, M., Raymond, H.F., Klausner, J.D., Facer, M., Molitor, F., Allen, B., Ajufo, B.G., Ferrero, D., Sanford, G.B., McFarland, W., for the HEYMAN Study Team (2005). HIV-related risk behavior among Hispanic immigrant men in a population-based household survey in low-income neighborhoods of Northern California. *Sexually Transmitted Diseases*, *32*, 487–490.
- Magaña, J. R. (1991). Sex, drugs and HIV: An ethnographic approach. *Social Science and Medicine*, *35*, 5–9.
- Magaña, J. R., de la Rocha, O., & Amsel, J. L. (1996). Sexual history and behavior of Mexican migrant workers in Orange County, California. In: S. I. Mishra, R. F. Conner, & J. R. Magaña (Eds.), *AIDS crossing borders: The spread of HIV among Migrant Latinos* (pp. 77–93). Boulder, CO: Westview Press.
- Magis-Rodriguez, C., Gayet, C., Negroni, M., Leyva, R., Barvo-Garcia, E., Uribe, P., & Bronfman, M. (2004). Migration and AIDS in Mexico. An overview based on recent evidence. *Journal of Acquired Immune Deficiency Syndromes*, *37*, S215–S226.
- Magnani, R., Sabin, K., Saidel, T., & Heckathorn, D. (2005). Review of sampling hard-to-reach and hidden populations for HIV surveillance. *AIDS*, *19*, S67–S72.
- Martin, J. A., Hamilton, B. E., Sutton, P. D., Ventura, S. J., Menacker, F., & Munson, M. L. (2005). Births: Final data for 2003. *National Vital Statistics Reports*, *54*, 1–116. Hyattsville, MD: National Center for Health Statistics. 08 September. Available at [http://www.cdc.gov/nchs/data/nvsr/nvsr54/nvsr54\\_02.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr54/nvsr54_02.pdf) (Accessed April 18, 2006).
- Martinez-Donate, A. P., Rangel, M. G., Hovell, M. F., Santibanez, J., Sipan, C. L., Izáola, J. A. (2005). HIV infection in mobile populations: the case of Mexican migrants in the United States. *Pan American Journal of Public Health*, *17*, 26–29.
- Massey, D. S., & Sana, M. (2003). Patterns of U.S. Migration from Mexico, the Caribbean, and Central America. *Migraciones Internacionales*, *2*, 5–39.
- McCoy, H. V., Weatherby, N., & Yu, Z. (1999). The effect of migration patterns on exposure to HIV prevention in a migrant community. *Population Research and Policy Review*, *18*, 155–168.
- Mc Vea, K. L. S. P. (1997). Lay injection practices among migrant farmworkers in the age of AIDS: Evolution of biomedical folk practices. *Social Science and Medicine*, *45*, 91–98.
- Mena, J. (2002). Cruel memento: Mexican migrant workers come back from the North with HIV. *San Francisco Chronicle*, Friday, September 29, 2002. Available at <http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2000/09/29MN17784.DTL> (Accessed November 18, 2002).
- Menjívar, C. (2000). *Fragmented ties: Salvadoran Immigrant Networks in America*. Berkeley: University of California Press.
- Mishra, S. I., & Conner, R. F. (1996). Evaluation of an HIV prevention program among Latino farmworkers. In: S. I. Mishra, R. F. Conner, & J. R. Magaña (Eds.), *AIDS crossing borders: The spread of HIV among Migrant Latinos* (pp. 157–181). Boulder CO: Westview Press.
- Nakashima, A. K., & Fleming, P. L. (2003). HIV/AIDS surveillance in the United States, 1981–2001. *Journal of Acquired Immune Deficiency Syndromes*, *32*, S68–S85.
- Organista, K.C. (2004). HIV prevention models for Mexican migrant farmworkers. In: R. J. Mancoske, & J. D. Smith (Eds.), *Practice issues in HIV/AIDS services: Empowerment-based models and program applications* (pp. 127–160). New York: Haworth Press.
- Organista, K., Balls Organista, P., Garcia de Alba, G., Castillo Moran, M., & Ureta Carillo L. (1997). Survey of condom-related beliefs, behaviors, and perceived social norms in Mexican Migrant laborers. *Journal of Community Health*, *22*, 185–198.
- Organista, K. C., Carillo, H., & Ayala, G. (2004). HIV prevention with Mexican migrants: Review, critique, and recommendations. *Journal of Acquired Immune Deficiency Syndromes*, *37*, S227–S239.
- Organista, K. C., & Kubo, A. (2005). Pilot survey of HIV risk and contextual problems and issues in Mexican/Latino migrant day laborers. *Journal of Immigrant Health*, *7*, 269–281.
- Organista, K. C., Organista, P. B., Bola, J. R., Garcia de Alba, G., Javier, E., & Moran, M. A. C. (2000). Predictors of condom use in Mexican migrant laborers. *American Journal of Community Psychology*, *28*, 245–265.
- Painter, T. M. (1996). Space, time, and rural-urban linkages in Africa: Notes for a geography of livelihoods. *African Rural and Urban Studies*, *3*, 79–98.
- Painter, T. M. (1999). Livelihood Mobility and AIDS Prevention in West Africa: Challenges and Opportunities for Social Scientists. In C. Becker, J.-P. Dozon, C. Obbo, & M. Touré (Eds.), *Vivre et penser le sida en Afrique / Experiencing and understanding AIDS in Africa* (pp. 645–665). Paris: Karthala, IRD; Dakar: CODESRIA.
- Painter, T. (2004). A missing link? Migrants’ social support networks as a potential resource for increasing migrants’ participation in HIV/STD-related and other health care services. Poster presentation at the 17th Annual East Coast Migrant Stream Forum, St. Petersburg, Florida, October 21–23.

- Parrado, E. A. (2004). U.S. migration, home ownership, and housing quality. In J. Durand, & D. S. Massey (Eds.), *Crossing the border: Research from the Mexican migration project* (pp. 63–85). New York: Russell Sage Foundation.
- Parrado, E. A., Flippen, C. A., & McQuiston, C. (2004). Use of commercial sex workers among hispanic migrants in North Carolina: Implications for the diffusion of HIV. *Perspectives on Sexual and Reproductive Health*, 36, 150–156.
- Passel, J. S. (2005). Unauthorized migrants: Numbers and characteristics. Background Briefing Prepared for Task Force on Immigration and America's Future. Washington, D.C.: Pew Hispanic Center. 14 June.
- Paz-Bailey, G., Teran, S., Levine, W., Markowitz, L. E. (2004). Syphilis outbreak among Hispanic immigrants in Decatur, Alabama. *Sexually Transmitted Diseases*, 31, 20–25.
- Polaski, S. (2003). Jobs, wages, and household income. In J. J. Audley, D. G. Papademetriou, S. Polaski, & S. Vaughan (Eds.), *NAFTA's Promise and Reality: Lessons from Mexico for the Hemisphere* (pp. 11–38). Washington, DC: Carnegie Endowment for International Peace.
- Polaski, S. (2004). *Brief submitted to the Canadian Standing Senate Committee on foreign affairs: Mexican employment, productivity and income a decade after NAFTA*. Washington, D.C.: Carnegie Endowment for International Peace, 25 February.
- Porter, E., & Malkin, E. (2005). Mexicans at home abroad. *New York Times*, Thursday, 4 August, p. C1 and C6.
- Ramirez-Valles, J., Heckathorn, D. D., Vázquez, R., Diaz, R. M., & Campbell, R. T. (2005). From networks to populations: The development and application of respondent-driven sampling among IDUs and Latino gay men. *AIDS and Behavior*, 9, 403–413.
- Ritieni, A., Bravo Garcia, L. E., Hutchins, J., Mittal, & S. (2005). An epidemic without borders: HIV/AIDS in California and Mexico. Sacramento: California Department of Health Services, October.
- Sanchez, M., Lempe, G. F., Magis-Rodriguez, C., Bravo-Garcia, E., Carter, S., Ruiz, J. D. (2004). The epidemiology of HIV among Mexican migrants and recent immigrants in California and Mexico. *Journal of Acquired Immune Deficiency Syndromes*, 37, S204–S214.
- Sanchez, M. A., Lempe, G., Rodríguez, C. M., Manichiello, S. N., & Garcia, E. B. (2003). The Epidemiology of HIV in Mexico and among Mexican migrants and recent immigrants in California. *National HIV Prevention Conference. Atlanta, Georgia, 27–30 July* [abstract M1-B1602].
- Stoller, P. (2002). *Money has no smell: The Africanization of New York City*. University of Chicago Press, Chicago
- Suro, R., & Singer, A. (2002). *Latino growth in Metropolitan America: Changing patterns, new locations*. Washington, D.C.: The Brookings Institution, Center on Urban & Metropolitan Policy and the Pew Hispanic Center, July.
- Vega, W. A., Kolody, B., Valle, R. & Weir, J. (1991). Social networks, social support, and their relationship to depression among Mexican women. *Human Organization*, 50, 154–162.
- Vera, A. (2005). Pilot project finds high prevalence of HIV and sexually transmitted infections among migrants in California. *Migrant Health NewsLine*, 22, 3.
- Viadro, C. I., & Earp, J. A. L. (2000). The sexual behavior of married Mexican immigrant men in North Carolina. *Social Science & Medicine*, 50, 723–735.
- Weatherby, N. L., McCoy, H. V., Bletzer, K. V., McCoy, C. B., Inciardi, J. A., McBride, D. C., & Forney, M. A. (1997). Immigration and HIV among migrant workers in Rural Southern Florida. *Journal of Drug Issues*, 21, 155–172.
- Weatherby, N. L., McCoy, H. V., Metsch, L. R., Bletzer, K. V., McCoy, C. B., & de la Rosa, M. R. (1999). Crack cocaine use in rural migrant populations: Living arrangements and social support. *Substance Use & Misuse*, 34, 685–706.
- Wong, W., Tambis, J. A., Hernandez, M. T., Chaw, J. K., & Klausner, J. D. (2003). Prevalence of sexually transmitted diseases among Latino immigrant day laborers in an urban setting-San Francisco. *Sexually Transmitted Diseases*, 30, 661–663.