

June 2008

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(2008) "Profile and Trends of HIV-Infected Patients Who Use Health Department Services in Hillsborough County, Florida," *Florida Public Health Review*: Vol. 5 , Article 8.

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Profile and Trends of HIV-Infected Patients Who Use Health Department Services in Hillsborough County, Florida

Jennifer L. Logan, MD
Lynette J. Menezes, PhD
Yiliang Zhu, PhD,
Karina M. D'Souza, MPH
Hyungtae Kim, MS
Yangxin Huang, PhD,
Gloria P. Santayana, MS

ABSTRACT

The Hillsborough County Health Department (HCHD) provides care for one-third of persons living with HIV/AIDS in Hillsborough County, Florida, who relied on public assistance for medical treatment. This study describes the demographic profile and trends for these patients. Data were obtained retrospectively from the HCHD's electronic database for 2,298 patients who enrolled for HIV/AIDS care between January 1, 2000 and December 31, 2006. The patient sample included 32.6% women, 48.7% African Americans, 19.0% Hispanics, and 30.9% Whites, with mean age 39.7 ± 9.6 years. The proportion of Hispanic enrollees increased annually ($p < 0.001$), exceeding the Hispanic population growth rate in Hillsborough county during that same period ($p = 0.006$). African Americans and Hispanics were more likely to have AIDS at enrollment ($p < 0.001$). Minority women were much more likely to rely on this public-assisted HIV care compared with White female patients. Minority enrollees were also more likely to have AIDS at enrollment to the service. Nearly 98% of patients depended on government-funded health insurance. Whereas the coverage of the Ryan White increased, Medicaid and Medicare decreased for all ethnic groups ($p < 0.001$). The rapid increase in Hispanic enrollment, the increasing dependence on the Ryan White funding, and ethnicity-gender disparities require further investigations. Monitoring demographic profiles and trends of this underserved patient cohort helps the health department assess service needs and effectively allocate existing resources to better serve this HIV-infected population.

Florida Public Health Review, 2008; 5, 53-59.

Introduction

The HIV/AIDS epidemic is 27 years old. It remains a serious public health problem. Globally, nearly 33.2 million persons are infected (UNAIDS/WHO, 2007). In 2007, about 1.3 million people were living with HIV/AIDS (PLWHA) in the United States (UNAIDS/WHO, 2007). Since the early 1990s, the annual incidence of HIV in the United States has been approximately 40,000 new cases per year (CDC, 2003). However, the profile of these patients has changed. In 1985 only 8% of new diagnoses in the United States were among females; in 2005, that percentage was 27% (CDC, 2007b). African American women account for 66% of females in the United States newly diagnosed, a disproportionate proportion (KFF, 2007).

According to the CDC, 64% of PLWHA in the United States are African American or Hispanic (CDC, 2007b). In 2005, the AIDS case prevalence among African Americans was nine times that of the White population (54 per 100,000 vs. 5.9 per 100,000) (CDC, 2007b), despite African Americans accounting for only 13% of the United States population (UNAIDS/WHO, 2007). A similar

disparity has been noted in Florida, where African Americans account for 14% of the population but 52% of PLWHA (CDC, 2007a).

Between 2001 and 2005, the southern United States consistently reported the highest number of new AIDS cases, the highest number of AIDS-related deaths, and the highest number of people living with AIDS in the United States (CDC, 2007b). Florida ranks third in the nation for the number of AIDS cases (CDC, 2007b). The HIV/AIDS Epidemiology and Surveillance unit of Hillsborough County Health Department (HCHD), Florida reports that as of December 31, 2007, there were 5,282 persons living with HIV in Hillsborough County (including 2,983 diagnosed with AIDS) (T. Patrick, personal communication, March 3, 2008). As of March 2008, approximately 1700 PLWHA were receiving care at the Specialty Care Clinic (SCC) of the HCHD (S. Palermo, personal communication, March 7, 2008). The SCC provides HIV care through an academic-community partnership involving nurse practitioners, and University of South Florida infectious disease faculty and fellows. Through federal funding allocated by the Ryan White Care Council, the SCC

provides comprehensive HIV care and services to any HIV-infected Floridian, regardless of citizenship status or ability to pay (J. Roth, personal communication, March 6, 2008).

County health departments such as the HCHD serve as a “safety net” to provide care to HIV/AIDS patients who are otherwise unable to obtain health services. These patients typically come from underserved communities, including ethnic minority groups, substance users, and the poor (Cunningham et al., 2006). These same groups are disproportionately affected by HIV/AIDS (Cunningham et al., 2006).

With the goal of enhancing services to these PLWHA in underserved communities in Hillsborough County, this study describes the current profile and trends in the demographics of HIV-infected patients receiving care at HCHD. Gender, ethnicity-related disparity with respect to HIV risk behaviors, insurance status, and disease status, and how the patient profile has changed over a seven-year period are of particular interest. A timely characterization of PLWHA who rely on health department services helps determine service needs, inform resource allocation efforts within the agency, and guides targeted outreach and services.

Methods

Data on HIV-infected patient receiving care at the SCC are collected at enrollment and at each subsequent visit, and entered to an electronic database, LabTracker. This study included data of 2,298 patients enrolled between January 1, 2000 and December 31, 2006.

De-identified patient data were analyzed using statistical software SAS and S-PLUS to profile the patients with respect to age at enrollment, ethnicity, gender, reported primary HIV risk behavior, insurance status, and disease status. Chi-square tests were performed to assess associations between demographic factors, and trend analyses were conducted to assess the changes over time in the patient profile.

Institutional Review Board approval was obtained from both the University of South Florida and the Florida Department of Health.

Study Sample

Of the 2,298 patients included in the study, 129 patients were deceased, 945 patients were inactive (no visit during previous 12 months), and 1,224 patients were active (had received care at SCC at least once during previous 12 months). At enrollment 784 patients (34.1%) had AIDS, whereas 287 patients (12.5%) were diagnosed with AIDS after enrollment. At the end of the study period, 1,227 patients (53.4%)

remained AIDS-free. Information on HIV treatment (if any) received prior to enrollment to SCC and the date of AIDS diagnosis prior to enrollment were not available.

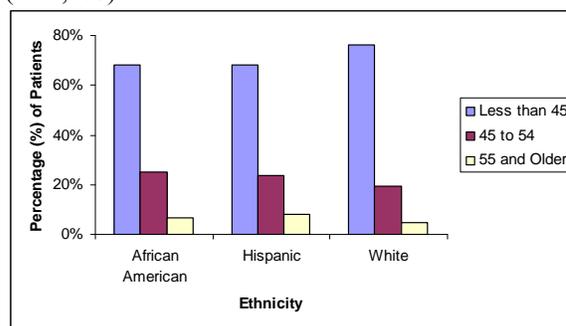
Among the enrollees, 1,532 (66.7%) were male, 748 (32.6%) were female, 15 (0.7%) were transsexual, and gender was unknown for 3 patients. Gender ratio did not vary over the study period. Patients’ age at enrollment ranged from 16 to 77 years (mean= 39.7, SD= 9.6); 1,627 (70.8%) were 45 or less, 528 (23.0%) were aged 45 to 54 years, and 143 (6.2%) were 55 or older. There were 1,118 African Americans (48.7%), 437 Hispanics (19.0%), 711 White non-Hispanics (30.9%), and 32 “Other,” which included 10 American Indian / Aleutian / Eskimo, 6 Asian / Pacific Islanders, and 16 of unreported ethnicity. Table 1 contains further details.

Results

Enrollment Trends

Enrollment ranged from 234 to 420 patients per year during the study period. As shown in Figure 1, patients’ age at enrollment varied significantly by ethnicity ($\chi^2=15.654, p=0.004$). The percentage of enrollees less than 45 years of age was the highest among Whites (76.0%), followed by African Americans (68.3%) and Hispanics (68.2%). The percentage of enrollees 55 and older was highest among Hispanics (8.0%), followed by African Americans (6.5%) and Whites (4.8%).

Figure 1. Patient Age at Enrollment by Ethnicity (N=2,266)



The ethnic distribution of new enrollees changed significantly over the study period ($p=0.016$). As shown in Table 1, the proportion of Hispanic enrollees increased steadily, from 13.2% in 2000 to 23.3% in 2006. A general statistic test for trend (Zhu & Fung, 1996) revealed a significant increasing trend ($p<0.001$) from 2000 to 2006. Using a linear model, we found that the increasing enrollment among Hispanics exceeded the Hispanic population growth rate in Hillsborough county during the same period ($F=15.03, p=0.006$).

Table 1. Demographic Characteristics of HIV/AIDS Patients: 2000-2006 (N=2,298)

	Number of patients (percent) by enrollment year						
	2000	2001	2002	2003	2004	2005	2006
Age at enrollment							
Less than 45	190(70.6)	308(73.3)	311(77.8)	159(68.0)	243(69.8)	222(68.1)	194(64.5)
45 to 54	62(23.1)	97(23.1)	66(16.5)	58(24.8)	80(23.0)	84(25.8)	81(26.9)
55 and older	17(6.3)	15(3.6)	23(5.8)	17(7.3)	25(7.2)	20(6.1)	26(8.6)
Gender^a							
Female	82(30.6)	142(33.9)	131(32.8)	76(32.5)	118(33.9)	111(34.1)	88(29.2)
Male	185(69.0)	275(65.6)	266(66.7)	156(66.7)	227(65.2)	212(65.0)	211(70.1)
Transsexual	1(0.4)	2(0.5)	2(0.5)	2(0.9)	3(0.9)	3(0.9)	2(0.7)
Ethnicity							
African American	143(53.2)	194(46.2)	201(50.3)	111(47.4)	163(46.8)	163(50.0)	143(47.5)
Hispanic	35(13.0)	62(14.8)	81(20.3)	45(19.2)	71(20.4)	73(22.4)	70(23.3)
White	87(32.3)	154(36.7)	111(27.8)	75(32.1)	108(31.0)	88(27.0)	88(29.2)
Other ^b	4(1.5)	10(2.4)	7(1.8)	3(1.3)	6(1.7)	2(0.6)	0(0.0)
Total ^c	269(100)	420(100)	400(100)	234(100)	348(100)	326(100)	301(100)

^a One patient was excluded from each of 2000, 2001, and 2002 due to unreported gender.

^b "Other" includes American Indian/Aleutian/Eskimo, Asian/Pacific Islanders, and unknown or unspecified ethnicity.

^c Totals may not equal 100% due to rounding.

HIV/AIDS Status

Overall, 34.1% of patients had AIDS at enrollment, and 12.5% developed AIDS over the course of the study; 53.4% remained AIDS-free during the study. As shown in Table 2, AIDS status varied significantly by ethnicity ($\chi^2=21.405, p<0.001$). African Americans (36.9%) and Hispanics (34.8%) were more likely than Whites (29.1%) to have AIDS at enrollment. Whites (10.5%) were less likely to develop AIDS during the study period compared to African Americans (13.1%), and Hispanics (14.7%). At the end of the study period, 60.3% of Whites were AIDS-free compared with 50% for African Americans and 50.6% for Hispanics. AIDS status also varied significantly by age at enrollment ($\chi^2=21.636, p<0.001$). Patients aged 45 to 54 were more likely to have AIDS at enrollment (40.7%) compared to those aged 55 and older (37.7%), or those aged less than 45 (31.6%). In the 45 to 54 years group, 14.2% progressed to AIDS during the study period, compared to 9.8% of those aged 55 and older, and 12.2% of those under age 45.

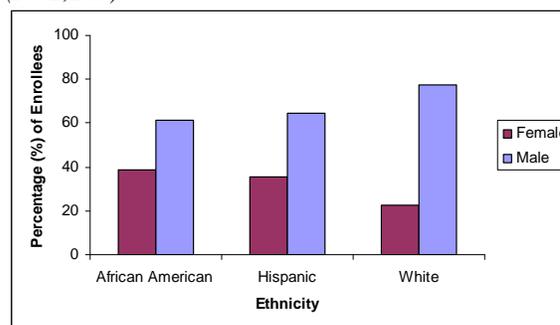
Table 2. AIDS Status by Ethnicity

	African American	Hispanic	White
AIDS at enrollment	413 (36.9%)	152 (34.8%)	207 (29.1%)
AIDS during study period	146 (13.1%)	64 (14.6%)	75 (10.5%)
Total	1,118	437	711

Gender

Excluding transsexuals and those of unknown gender, 38.7% of African American patients and 35.6% Hispanic patients were women, compared with 22.6% of White patients. This gender-ethnicity disparity, illustrated in Figure 2, is statistically significant ($\chi^2=52.29, p<0.001$).

Figure 2. Patient Gender Distribution by Ethnicity (N=2,249)



Note. Forty-nine patients were excluded with 'other' ethnicity, or transsexual or unknown gender.

HIV Risk Behaviors

Primary HIV risk behaviors were reported as heterosexual contact, injection drug use (IDU), men who have sex with men (MSM), both MSM and IDU, vertical transmission, or blood products. Heterosexual contact was the leading risk behavior reported by 53.3% of patients, whereas MSM was reported by 30.1% and IDU by 7.9%. MSM in conjunction with IDU was reported by 39 patients (1.7%), vertical transmission by 1 patient, and blood

products by 15 patients. Primary HIV risk behavior was unknown for 145 patients (6.3%).

AIDS status varied by primary HIV risk behavior ($\chi^2=11.570, p=0.021$). Patients reporting MSM were less likely to have AIDS at enrollment (31.7%), compared to heterosexuals (38.5%) and IDUs (41.4%). The MSM group also had the highest proportion of AIDS-free patients at the study conclusion (54.9%), compared to 48.6% of heterosexuals and 45.3% of IDUs.

As shown in Table 3, primary HIV risk behaviors varied significantly between males and females ($\chi^2=530.65, p<0.001$). Heterosexual contact was the predominant HIV risk behavior among females (91.5%), whereas MSM was the leading HIV risk behavior among males (48.8%). The prevalence of IDU was similar among males and females (8.8% and 8.5%).

Primary HIV risk behavior also varied for males by age (Table 4). Patients less than 45 years old were more likely to report MSM (56.3%) than those aged 45 to 54 (33.1%), or those 55 and older (27.3%)

($p<0.001$). In contrast, those aged 45 to 54 were more likely to report IDU (16.4%) than those aged less than 45 (6.0%). Heterosexual contact was the leading risk behavior among those 55 and older (61.6%), but this risk behavior decreased to 50.5% among those aged 45 to 54, and to 37.7% for those under age 45.

There were different patterns in HIV risk behavior across ethnicity for both males ($\chi^2=322.83, p<0.001$, Table 5a) and females ($\chi^2=12.65, p=0.002$, Table 5b). African American males were nearly four times as likely to report heterosexual contact (63.5%) as White males (16.8%). White males were more than twice as likely to report MSM (77.2%) compared to African American males (30.4%). African American females reported heterosexual contact (94.2%) more often than Hispanic females (90.7%) or White females (84.6%). White females were more likely to report IDU (15.4%) than Hispanic females (9.3%) or African American females (5.8%).

Table 3. HIV Primary Risk Behavior by Gender (N=2,082)

	Heterosexual	IDU	MSM	Total
Female	638(91.5%)	59(8.5%)	--	697(100.0%)
Male	587(42.4%)	122(8.8%)	676(48.8%)	1,385(100.0%)

Note. IDU= injection drug use. MSM= men who have sex with men. Of 2,298 patients, 216 were excluded, including transsexuals or those with unreported gender, or those reporting MSM plus IDU, blood products, vertical transmission, or unknown risk behavior.

Table 4. Primary HIV Risk Behavior among Males by Age (N=1,385)

	Less than 45	45 to 54	55 and older
Heterosexual	363 (37.7%)	163 (50.5%)	61 (61.6%)
IDU	58 (6.0%)	53 (16.4%)	11 (11.1%)
MSM	542 (56.3%)	107 (33.1%)	27 (27.3%)

Note. Of 1,532 males, 147 were excluded with risk behavior of MSM plus IDU, blood products, vertical transmission, or unknown.

Table 5a. Primary HIV Risk Behavior among Males by Ethnicity (N=1,360)

	African American	Hispanic	White
Heterosexual	393(63.5%)	102(39.5%)	81(16.8%)
IDU	38(6.1%)	55(21.3%)	29(6.0%)
MSM	188(30.4%)	101(39.2%)	373(77.2%)

Note. Of 1,532 males, 172 were excluded including those with MSM plus IDU, blood products, vertical transmission, or unknown risk behavior, or those of American Indian/Aleutian/Eskimo, Asian/Pacific Islander, or unknown ethnicity.

Table 5b. Primary HIV Risk Behavior among Females by Ethnicity (N=693)

	African American	Hispanic	White
Heterosexual	376(94.2%)	137(90.7%)	121(84.6%)
IDU	23(5.8%)	14(9.3%)	22(15.4%)

Note. Of 748 females, 55 were excluded, including those who reported blood products, vertical transmission or unknown risk behavior, or who reported American India/Aleutian/Eskimo, Asian/Pacific Islander, or unknown ethnicity.

Insurance

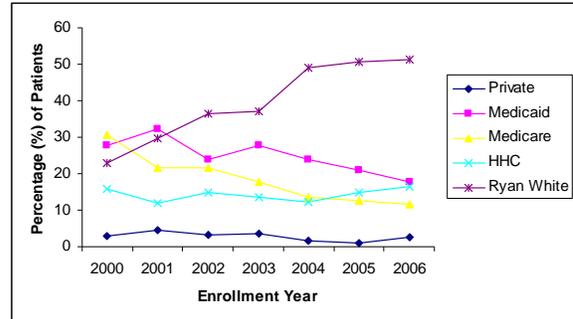
Primary insurance data were available for 1837 patients (80.0%). Of these, 48 (2.6%) had private insurance, 1023 (55.7%) had publicly-funded insurance (Medicare, Medicaid or Hillsborough HealthCare (HHC)), and 766 (41.7%) were uninsured at enrollment. All uninsured patients were eligible to receive SCC services through the federal Ryan White program. The Ryan White program is a federally-funded program that provides health care services to uninsured, low-income PLWHA (HRSA, 2008). Therefore, 97.4% of study patients received government-sponsored health care coverage for HIV services. The Ryan White coverage was highest for patients less than 45 (47.4%), and dropped to 30.1% for those aged 45 to 54, and to 23.9% for those aged 55 and older.

Primary insurance varied significantly by ethnicity ($p < 0.001$). The Ryan White program provided coverage for 49.8% of Whites, 42.8% of Hispanics, and 36.4% of African Americans. In contrast, 15.1% of Whites had Medicaid coverage, compared to 29.1% of African Americans and 25.1% of Hispanics. Medicare coverage levels were comparable for Whites (18.9%), Hispanics (17.7%), and African Americans (15.9%).

The Ryan White coverage increased significantly over the study period, from 22.9% in 2000 to 51.2% in 2006 (trend test $\chi^2 = 104.56$, $p < 0.001$). Because insurance data was missing for a total of 461 patients during 2000, 2001, 2002, and 2003, trend tests for Ryan White coverage were performed separately for 2000 to 2003, and 2004 to 2006. The increase in the Ryan White coverage from 2000 to 2003 was

significant ($\chi^2 = 10.70$, $p = 0.001$), but was insignificant from 2004 to 2006 ($\chi^2 = 0.35$, $p = 0.551$). Figure 3 shows the increasing trend of the Ryan White coverage as well as trends for other insurance programs. Whereas private insurance and HHC levels remained somewhat constant, Medicare coverage decreased over the study period ($\chi^2 = 38.48$, $p < 0.001$), as did Medicaid ($\chi^2 = 14.20$, $p < 0.001$).

Figure 3. Trend of Primary Insurance: 2000-2006 (N=1,837)



Note. Of 2,298 patients, 461 were excluded because of missing insurance data.

Moreover, the Ryan White coverage increased significantly over the study period for all ethnic groups (Table 6). It increased from 23.0% to 42.0% for African Americans (trend test $\chi^2 = 25.83$, $p < 0.001$), from 23.3% to 57.1% for Hispanics (trend test $\chi^2 = 8.88$, $p = .003$), and from 23.1% to 61.4% for Whites (trend test $\chi^2 = 7372$, $p < 0.001$).

Table 6. Coverage by the Ryan White Program by Ethnicity and Enrollment Year

	Number of patients (percent) enrolled in Ryan White program						
	2000	2001	2002	2003	2004	2005	2006
African American	23/100 (23.0)	31/111 (27.9)	34/125 (27.2)	34/108 (31.5)	72/163 (44.2)	78/163 (47.9)	60/143 (42.0)
Hispanic	7/30 (23.3)	17/48 (35.4)	25/53 (47.2)	14/45 (31.1)	32/71 (45.1)	32/73 (43.8)	40/70 (57.1)
White	9/39 (23.1)	16/64 (25.0)	28/60 (46.7)	34/71 (47.9)	64/108 (59.3)	53/88 (60.2)	54/88 (61.4)

Discussion

This study examined the demographic characteristics and the changing profile of patients who received HIV/AIDS care from the Hillsborough County Health Department. Several findings warrant further discussion.

Over the seven-year study period, the proportion of Hispanic enrollees increased significantly from 13.2% to 23.3%. This was a 76.5% relative increase in enrollment, compared with a 22.8% increase in the county's Hispanic population during the same period

(Hispanics accounted for 18% of the total population in 2000, and 22.1% of total population in 2006.) (U.S. Census Bureau, 2007). The growth in Hillsborough's Hispanic population could not fully account for the increase in Hispanic patient enrollment during the study period.

Several factors may have contributed to the increase in Hispanic enrollment noted in this study. According to the Florida Department of Health, HIV diagnoses increased 13% among Hispanics in Florida between 1999 and 2006 (FDOH, 2006). In 2006, 20%

of incident HIV cases, and 18% of incident AIDS cases in Florida occurred in Hispanics (FDOH, 2006). Thus the increase in Hispanic enrollment to SCC may reflect an increased incidence of HIV or increased screening. This increase might also reflect improved access among the Hispanic patients to publicly-financed HIV services at the county health department.

A second notable finding from this study was the patients' increasing reliance on publicly-funded services. Almost all patients in this study were enrolled in government-funded health insurance plans or received HIV care through the Ryan White program.

Although insurance coverage for the patients in this study may not be reflective of that for the general HIV-infected population, its distribution and trend provide insight regarding the public costs of HIV care for underserved populations. The increasing reliance on the Ryan White program over time was a direct result of increasing number of HIV-infected patients who lacked health insurance (public or private). It may also be a result of increased access to this resource because of increased awareness by patients and those who work with low-income PLWHA. The decrease in Medicare and Medicaid coverage over time among the patients in this study may reflect that an increasing number of these HIV-infected patients failed to meet the eligibility criteria for these federal assistances. These observations have significant implications on federal financial resource allocations for HIV care.

Although the patient sample of this study may not represent national HIV-infected populations, or a local one, the data revealed startling ethnic and gender disparities regarding dependence on public services, risk behavior, and AIDS development status. While we observed that the proportion of female enrollees was particularly higher among minority women, and AIDS prevalence was also high among minority enrollees, the available data in such a secondary database disallowed any further investigation.

Data related to patient disease and care history were also unavailable in this database, limiting our ability to addressing HIV care access and service utilization. For example, we were unable to capture when the patients were first diagnosed HIV, the type of service, if any, they received prior to contacting SCC, and the rate at which patients declined SCC services. Including additional data elements that are easy and inexpensive to collect would increase the usefulness of this administrative database for future clinical research and management studies.

This study has resulted in better understanding of the PLWHA in Hillsborough County, Florida, who

Florida Public Health Review, 2008; 5:53-59.
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rely on publicly-funded programs for HIV care. There are significant ethnic, gender, and age disparities regarding enrollment, insurance coverage, risk behaviors, and disease status. Among these disparities, the rapid increase in Hispanic enrollment, the high proportion of minority women enrolled and the high prevalence of AIDS among minorities at enrollment demand further investigation to determine causes, and design intervention and targeted services. The increasing dependence on the federal Ryan White funding is also of concern in a time of widespread budget cuts to health programs. Any future resource allocation to Medicaid, Medicare or the Ryan White funding that fail to recognize and anticipate the need of these underserved PLWHA will place an immense burden on the local Health Departments, which may result in compromised HIV care services. To ensure that underserved PLWHA communities receive appropriate HIV services, public health providers must continuously evaluate local needs and respond promptly to changing demographic trends.

Acknowledgements

We thank Bradley Biggers and William Lapcevic for their assistance in exporting variables from the LabTracker database. We thank Charurut Somboonwit for her assistance in understanding clinical issues related to HIV/AIDS.

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Jennifer L. Logan (JLogan1@health.usf.edu), Lynette J. Menezes (LMenezes@health.usf.edu), Karina M. D'Souza (kdsouza1@health.usf.edu), and Gloria P. Santayana (GSantaya@gmail.com) are with the Division of Infectious Disease and International Medicine, University of South Florida College of Medicine, Tampa, FL. Yiliang Zhu (YZhu@health.usf.edu), Hyungtae Kim (HKim1@health.usf.edu), and Yangxin Huang (YHuang@health.usf.edu) are with the Department of Epidemiology and Biostatistics, University of South Florida College of Public Health, Tampa, FL. This paper was submitted to the FPHR on April 18, 2008, revised and resubmitted, and accepted for publication on June 25, 2008. Copyright 2008 by the *Florida Public Health Review*.