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# Racial residential segregation and risky sexual behavior among non-Hispanic blacks, 2006–2010

Khaleeq Lutfi [a], Mary Jo Trepka [a, *], Kristopher P. Fennie [a], Gladys Ibanez [a], Hugh Gladwin [b]

[a] Robert Stempel College of Public Health & Social Work, Florida International University, 11200 SW 8th St, Miami, FL, 33199, USA
[b] Global & Sociocultural Studies, Florida International University, 11200 SW 8th St, Miami, FL, 33199, USA

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ABSTRACT

Sexually transmitted infections (STIs) including human immunodeficiency virus (HIV) have disproportionately affected the non-Hispanic black population in the United States. A person's community can affect his or her STI risk by the community's underlying prevalence of STIs, sexual networks, and social influences on individual behaviors. Racial residential segregation—the separation of racial groups in a residential context across physical environments—is a community factor that has been associated with negative health outcomes. The objective of this study was to examine if non-Hispanic blacks living in highly segregated areas were more likely to have risky sexual behavior. Demographic and sexual risk behavior data from non-Hispanic blacks aged 15–44 years participating in the National Survey of Family Growth were linked to Core-Based Statistical Area segregation data from the U.S. Census Bureau. Five dimensions measured racial residential segregation, each covering a different concept of spatial variation. Multilevel logistic regressions were performed to test the effect of each dimension on sexual risk behavior controlling for demographics and community poverty. Of the 3643 participants, 588 (14.5%) reported risky sexual behavior as defined as two or more partners in the last 12 months and no consistent condom use. Multilevel analysis results show that racial residential segregation was associated with risky sexual behavior with the association being stronger for the centralization [aOR (95% CI)][2.07 (2.05–2.08)] and concentration [2.05 (2.03–2.07)] dimensions. This suggests risky sexual behavior is more strongly associated with neighborhoods with high concentrations of non-Hispanic blacks and an accumulation of non-Hispanic blacks in an urban core. Findings suggest racial residential segregation is associated with risky sexual behavior in non-Hispanic blacks 15–44 years of age with magnitudes varying by dimension. Incorporating additional contextual factors may lead to the development of interventions that promote healthier behaviors and lower rates of HIV and other STIs.



## 1. Introduction

An estimated 19 million new sexually transmitted infections (STIs) each year represent an estimated $16.4 billion burden on the U.S. healthcare system (CDC, 2012). STIs can also lead to reproductive health issues, cancer, fetal health problems, and facilitate the transmission of human immunodeficiency virus (HIV) (Satterwhite et al., 2007). Sexually transmitted infections, including HIV, have disproportionately affected the non-Hispanic black community in the United States. The HIV incidence rate among non-Hispanic black males was 6.6 times higher than that among non-Hispanic white males in 2010 (103.6 vs. 15.8 per 100,000, respectively) (CDC, 2013a). That same year the HIV incidence rate among non-Hispanic black females was 20.1 times higher than that among non-Hispanic white females (38.1 vs. 1.9 per 100,000 per year, respectively) (CDC, 2013a). From 2007 to 2012, the chlamydia prevalence among non-Hispanic blacks was seven times the prevalence seen among non-Hispanic whites (Torrone et al., 2014). In 2012, the chlamydia incidence rate among non-Hispanic black males was eight times the rate of non-Hispanic white males and six times higher among non-Hispanic black females compared with non-Hispanic white females (CDC, 2013b). From 1999 to 2008, the

* Corresponding author.
*E-mail addresses:* klutfi@fiu.edu (K. Lutfi), trepkam@fiu.edu (M.J. Trepka), kfennie@fiu.edu (K.P. Fennie), gladys.ibanez@fiu.edu (G. Ibanez), gladwin@fiu.edu (H. Gladwin).

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gonorrhea prevalence among non-Hispanic blacks was nearly five times the prevalence seen among other races (Torrone et al., 2013). In 2012, non-Hispanic black males had a gonorrhea incidence rate sixteen times higher than that of non-Hispanic white males; the non-Hispanic black females rate was fourteen times that of their non-Hispanic white counterparts (CDC, 2013b). In addition to racial disparities, females and younger age groups are disproportionately affected by STIs. Nearly half of all STI incident cases each year are attributable to individuals 15–24 years of age (Satterwhite et al., 2013). Similarly in 2012, non-Hispanic black females had chlamydia incidence rates that were twice as high as the rates for non-Hispanic black males (1613.6 vs. 809.2 per 100,000) (CDC, 2013b).

These large disparities may be partially attributable to individual behavioral and/or community factors. An individual's risky sexual behavior can be defined as an act that increases an individual's risk of contracting or transmitting a sexually transmitted infection. Research has found concurrent partnerships to be more prevalent among non-Hispanic blacks compared to non-Hispanic whites (Adimora et al., 2013). Concurrent partnerships increase the speed of STI transmissions throughout a sexual network (Adimora and Schoenbach, 2005). 'Number of partners during the last 12 months' is an important measure of risky sexual behavior; it has been demonstrated that the more sexual partners an individual has, the more likely they are to encounter an infected partner (Finer et al., 1999; Gerver et al., 2011). Lack of condom use is another important measure because an individual is not reducing their risk of STI transmission (Finer et al., 1999; Gerver et al., 2011).

Studies have found that individual risky behaviors alone do not fully account for the STI disparities (Hallfors et al., 2007; Dariotis et al., 2011). Community factors such as STI prevalence, poverty, male to female sex ratio, and racial residential segregation can affect an individual's risk of acquiring a sexually transmitted infection through several mechanisms (Adimora and Schoenbach, 2005). A low male-to-female sex ratio exists in many predominately non-Hispanic black communities, and this affects the structure and stability of sexual networks. Fewer males limit the power of women to choose monogamous relationships since males can more easily find another relationship than when the sex ratio is balanced (Adimora and Schoenbach, 2002, 2005). Previous research has found that a lack of males is associated with multiple partners within the last year (Pouget et al., 2010). Along with unemployment, poverty is associated with a lower number of marriageable males that are financially stable enough to support a family (Adimora and Schoenbach, 2005). The importance of community measures becomes more evident as an individual with risky sexual behavior may not encounter an infected person if they reside in a low STI prevalence community. Conversely, communities with a high STI prevalence create more opportunities for an individual to come into contact with an infected individual via an increased number of infected persons in their sexual network.

Hallfors et al. (2007) found that non-Hispanic blacks are at an elevated STI risk regardless of whether sexual behaviors are risky or not. This implies that within the non-Hispanic black community neighborhood-level factors, in addition to individual behavior, may be more useful to account for racial disparities. The residential environment may operate through pathways such as concentrated poverty, low sex ratio, and STI prevalence (Adimora and Schoenbach, 2005). Residential stability was associated with STD risk (Upchurch et al., 2004) and sexual initiation (Cubbin et al., 2005). However, Browning et al. (2004) found that residential stability was not significantly associated with sexual initiation. Previous research has also associated two or more partners with neighborhood structural inequality (Browning et al., 2008) as well as sex ratio and male incarceration rates (Pouget et al., 2010). These factors measure different aspects of the neighborhood environment. The use of racial residential segregation may provide a more complete depiction of the neighborhood through its associations with physical, economic, and social factors.

Racial residential segregation—the separation of racial groups in a residential context across spatial environments—is a ubiquitous pattern seen in the U.S. population and is considered a primary cause of racial disparities (Williams and Collins, 2001). Non-Hispanic blacks are the racial group most likely to experience high levels of racial residential segregation (Massey et al., 1996) with two thirds of non-Hispanic blacks residing in highly segregated areas (Williams and Collins, 2001). Previous research has associated residential segregation with negative non-Hispanic black health outcomes (Subramanian et al., 2005; Bell et al., 2006; Acevedo-Garcia et al., 2003; Collins and Williams, 1999). However, the consequences of residential segregation for non-Hispanic whites and Hispanics are not well understood or uniform (Collins and Williams, 1999; Lee and Ferraro, 2007). Evidence suggests high levels of residential segregation may be beneficial to non-Hispanic whites by isolating them from adverse conditions experienced by non-Hispanic blacks in segregated areas (Chang, 2006) and to Hispanics through higher levels of social resources (Lee and Ferraro, 2007). For these reasons, along with the disproportionate STI rates seen in the non-Hispanic black community, non-Hispanic blacks are the focus of this study.

Racial residential segregation is thought to impact risky behavior through direct and indirect pathways. Five distinct dimensions measure racial residential segregation: unevenness, exposure, concentration, centralization, and clustering. Directly, the clustering, concentration and exposure dimensions increase the density and level of contact of non-Hispanic blacks to only other non-Hispanic blacks, increasing transmission risks (Poundstone et al., 2004). The unevenness dimension is typically included in segregation and health literature for comparability since it is the most often used dimension despite the relationship with health not being as clear as it is for the other dimensions. Indirect pathways through which segregation operates include concentrated poverty (Polednak, 1997), overcrowding, housing deterioration, limited access to care, and social disorganization (Acevedo-Garcia, 2000). Concentrated poverty is associated with the loss of resources out of a neighborhood (Massey and Denton, 1993) resulting in the deterioration of neighborhood quality. These resources include quality medical care (Walker et al., 2011), quality education (Acevedo-Garcia et al., 2008), and employment opportunities (Poundstone et al., 2004). The loss of quality medical care hinders access to and quality of preventive services (Kim et al., 2010). The loss of quality educational opportunities may limit access to STI prevention courses generally received in schools. The lack of employment opportunities may impact the number of marriageable males, which is associated with partner instability, which is associated with partner concurrency as well as other risky sexual behaviors (Adimora and Schoenbach, 2002, 2005; Pouget et al., 2010). The centralization dimension measures how likely non-Hispanic blacks are to reside in the central city, which is typically the oldest and most deteriorated portion of a metropolitan area (Acevedo-Garcia, 2000). Deteriorated neighborhoods have been associated with negative health behaviors and outcomes such as mortality and gonorrhea rates, possibly due to the lack of a safe environment or suitable health care facilities (Cohen et al., 2003). Social disorganization is thought to encourage behaviors such as drug use (Furstenberg and Hugues, 1997), which has been associated with engaging in risky sexual behaviors (Cooper et al., 2007). Through these direct and indirect pathways, residential segregation may create differential access to economic, educational, and employment resources and exposures to negative environments for non-Hispanic blacks (Polednak, 1997).