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Authors

Veldhuis, Cindy
Maki, Pauline
Molina, Kristine

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Psychological and Neighborhood Factors Associated with Urban Women's Preventive Care Use

Cindy B. Veldhuis, Ph.D.[1,2,3], **Pauline Maki, Ph.D.**[2,3,4], **Kristine Molina, Ph.D.**[5]

[1]School of Nursing, Columbia University, New York, NY

[2]Department of Psychology, University of Illinois at Chicago, Chicago, IL

[3]Center for Research on Women and Gender, University of Illinois at Chicago, Chicago, IL

[4]Department of Psychiatry, University of Illinois at Chicago, Chicago, IL

[5]Department of Psychology, University of California Irvine, Irvine CA

Abstract

Women are more likely than men to forego care—including preventive care. Understanding which factors influence women's preventive care use has the potential to improve health. The focus of this study is the largely understudied areas of psychological barriers (depression) and neighborhood factors (support and stressors) that may be associated with women's preventive care use through secondary analysis of the Chicago Community Adult Health Study. Across models, 30–40% of the variance in preventive care adherence was explained by the neighborhood. Depressive symptoms were not associated with preventive care use when neighborhood factors were included. However, stratified models showed that associations varied by race/ethnicity. Previous research has tended to focus on individual determinants of care, but this study suggests that barriers to care are far more complex. Efforts aimed at improving care utilization need to be multipronged, and interventions need to take an individual's demographics, mental health, and context into account.

Keywords

Preventive care use; women; depression; neighborhood factors; racial/ethnic differences

Introduction

Preventive care is a key factor in reducing heath issues like cancer (Khoury, 2019; McPhee, Bird, Fordham, Rodnick, & Osborne, 1991; Wardle, Robb, Vernon, & Waller, 2015). Yet, only approximately 50% of adults in the United States (US) get the recommended preventive care services (Farley, Dalal, Mostashari, & Frieden, 2010; Maciosek, Coffield, Flottemesch, Edwards, & Solberg, 2010; McGlynn et al., 2003). The low rates of preventive care use may

be partially due to lack of access (e.g., geographic distance from healthcare, no insurance coverage, inability to pay for care, lack of culturally competent care) but may also be due to delaying or going without care, which is discrete from actual access to care (Nonzee et al., 2015). Difficulty in paying for care, despite adequate health insurance coverage, plays a role in use of care; however, even when cost is not a factor these disparities persist (Hofer & Katz, 1996). Reasons for delaying or forgoing care (e.g., not filling a prescription, not getting a needed test or treatment, not getting recommended care, or having a medical problem but not seeking care) may be related to lack of knowledge of resources, language barriers, fear or denial, competing obligations, or embarrassment (Nonzee et al., 2015).

It is widely believed that women use healthcare more frequently and incur significantly higher health expenditures than men (Kent, Patel, & Varela, 2012); Mustard, Kaufert, Kozyrskyj & Mayer, 2000). However, when sex-specific services such as gynecologic, prenatal, and obstetrical care are parceled out, rates of health care utilization and costs are similar for men and women (Johnson & Fitzgerald, 2013); Mustard, Kaufert, Kozyrskyj & Mayer, 2000). Women are more likely than men to forego care (Rustgi, Doty, & Collins, 2009)—including preventive care (e.g., checkups, pap smears)—with three out of five women foregoing care compared to half of men (Institute of Medicine, 2011; Rustgi et al., 2009). Indeed, women's rates of forgoing care are higher than men's despite similar health insurance coverage; these differences persist even among those with moderate, middle, and high incomes (Rustgi et al., 2009), suggesting that use of care may be multifactorial.

Delaying or forgoing care has been associated with higher morbidity and mortality. For example, cervical cancer, which could be prevented through increased screening and HPV vaccination, is the second leading cause of death among women in the US ages 20–39 (Siegel, Miller, & Jemal, 2018). Rates of health care utilization are particularly low among certain subgroups of women (Frost, 2013; Taylor, Larson, & Correa-de-Araujo, 2005; Ward, Dahlhamer, Galinsky, & Joestl, 2014; Worthington, McLeish, & Fuller-Thomson, 2012), and depression may deleteriously affect women's use of care.

Depression and Preventive Care

Women are almost twice as likely to experience lifetime depression compared to men (21.3% vs. 12.7%; (Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993; National Center for Health Statistics, 2018); are twice as likely to report past year depression (Weinberger et al., 2017); and are almost twice as likely to experience current depression across every racial/ethnic group (National Center for Health Statistics, 2018). People with depression use more healthcare, are more likely to visit the emergency department, have higher rates of inpatient hospitalizations (Himelhoch, Weller, Wu, Anderson, & Cooper, 2004), and have healthcare costs that are higher than people who are not depressed (Robinson, Grabner, Palli, Faries, & Stephenson, 2016; Shvartzman et al., 2009; Unutzer et al., 2009). However, the association between depression and preventive healthcare (e.g., cholesterol checks, mammograms) is more mixed (Himelhoch et al., 2004; Lord, Malone, & Mitchell, 2010; Unutzer et al., 2009). People who are depressed are significantly more likely to seek care from their primary care provider than from mental health professionals (Vasiliadis, Tempier, Lesage, & Kates, 2009). However, domains of preventive care vary; people with depression

have higher rates of usage in some domains (e.g., colonoscopy rates) but lower rates of screening in others (e.g., mammography and cholesterol screening; Lord et al., 2010). The preponderance of research in this area has relied on clinical samples (Lord et al., 2010) which may overestimate preventive care use among depressed individuals. Further, actual utilization of preventive care by women with depression is not well-characterized, and there is conflicting evidence as to whether or not use of healthcare differs by race/ethnicity among those with depression (Husaini, Miller, Novotny, & Levine, 2017a; Husaini, Taira, Norris, Moonis, & Levine, 2017b; Jimenez, Schmidt, Kim, & Cook, 2016).

Neighborhood Effects

Social ecological and contextual theories contend that individual factors do not fully explain health and health behaviors; instead, behaviors and risks need to be examined within the individual's social context (Sorensen et al., 2003; Stokols, 2004). One contextual factor implicated in health disparities is the neighborhood in which an individual resides (Beckie, 2017; Diez Roux, 2001), yet the role that neighborhood context has on health behaviors— including the use of preventive care—remains unclear.

Neighborhoods influence access to resources, including access to healthcare. (Cronholm & Bowman, 2009; Kirby & Kaneda, 2005; McCall-Hosenfeld, Weisman, Camacho, Hillemeier, & Chuang, 2012; Prentice, 2006). Supportive neighborhoods (e.g., socially cohesive and connected) are associated with higher rates of preventive care use, whereas stressful neighborhoods (e.g., decayed, with violence and disorder) are associated with lower rates of preventive care use (Cronholm & Bowman, 2009; Prentice, 2006). There are also geographic differences in women's use of healthcare that are unrelated to proximity to medical care that seem to vary by race/ethnicity (M. M. Davis et al., 2017; Stiel, Soret, & Montgomery, 2017) and may be related to localized disadvantage (e.g., neighborhood-level). This disproportionately affects racial/ethnic minorities in part because they are more likely to live in areas with higher levels of disadvantage (Booth, Teixeira, Zuberi, & Wallace, 2018; Mujahid et al., 2017). Neighborhood-level disadvantage is theorized to affect healthcare utilization by impeding actual use of care (e.g., through fear of leaving one's house due to potential victimization or difficulty getting to care due to poor public transportation services; Cronholm & Bowman, 2009; Davey-Rothwell, Bowie, Murray, & Latkin, 2016; Kirby & Kaneda, 2005). Neighborhoods that have lower levels of advantage may also lack social networks that share health information (Kirby & Kaneda, 2005; Prentice, 2006), social support that encourages health (Prentice, 2006), and social capital that may improve and individual's efficacy and self-esteem (Prentice, 2006).

Neighborhood stressors, both objective (Stockdale et al., 2007) and perceived (Mair, Roux, & Morenoff, 2010), have also been positively associated with depressive symptoms. Conversely, higher levels of perceived neighborhood support are associated with lower levels of depressive symptoms (Mair et al., 2010). These associations have been found to be stronger among women than men (Mair et al., 2010; Stockdale et al., 2007). However, we do not yet know whether depression and neighborhoods may synergistically play a role in health behaviors and specifically in women's preventive care use.

Current Study

Illinois has a higher incidence, morbidity, and mortality of cancers among women than the national average, and the third highest racial disparity in cancer mortality in the US, including among people younger than 65 (Siegel et al., 2018). Illinois also ranked 47 out of 51 states (including District of Columbia) in older women's use of preventive screenings, with only 21.8% of women up to date on preventive screenings (compared to 27.2% nationally; Multack, 2013). Further, relative deprivation at the neighborhood-level has been implicated in cancer incidence, stage of diagnosis, and survival, and this neighborhood disadvantage seems to disproportionately affect Black/African-American women (Singh & Jemal, 2017). Together, these highlight the importance of preventive care; the need to better understand preventive care use among women, particularly among a racially and ethnically diverse sample of women; and the need to contextualize women's use of preventive care within the environment. The goal of the current study is to use multilevel modeling to understand the psychological (depressive symptoms) and neighborhood factors (support and stressors) that may inhibit or increase the use of sex-specific and general preventive care among women using a representative sample of Chicagoans from the Chicago Community Area Health Study (CCAHS), taking into account the neighborhood in which they live. For preventive care, use of sex-specific and general preventive care were analyzed by looking at each type of care separately because patterns of utilization differ (Salloum et al., 2014; Sambamoorthi & McAlpine, 2003).

We tested three hypotheses in this study: 1) higher levels of depressive symptoms would be associated with lower levels of preventive care use (both sex-specific and general); 2) higher levels of neighborhood stress would be associated with lower levels of preventive care use and that higher levels of perceived neighborhood support would be associated with higher levels of preventive care use; and 3) neighborhood support and stressors would moderate the association between depressive symptoms and preventive care use.

We also conducted stratified analyses to test the models separately among Latina, Black/African-American, and White women. We had no a priori hypotheses for these analyses but did anticipate that neighborhood factors would play a larger role in Latina and Black/African-American women's use of preventive care than White women given the high levels of segregation and concentrated disadvantage in Chicago. We also anticipated that depression might be associated with segregation and other social determinants of health for women of color, but would play less of a role for White women (Assari, 2017; Yang & Park, 2019).

Methods

Dataset and Procedures

Conducted in 2001–2003, the CCAHS (House et al., 2011) is a multistage cluster probability sample of 3,105 adults ages 18 and older residing in Chicago, Illinois. The CCAHS methodology has been described elsewhere (Mair, 2009; Sampson, Raudenbush, & Earls, 1997), but briefly it included face-to-face interviews (71.8% response rate), systematic social observation, a community survey, and linkage with archival census data. Data were

weighted to correspond with 2000 Census estimates for the city of Chicago population and to account for selection methods. Weights additionally account for the oversampling of Black/African-American women and people with annual household incomes less than $50,000 (Morenoff et al., 2007). Women comprise 60% (*n*=1,870) of the total sample, and all were included in this study.

Measures

Demographics.—Demographics included age at time of survey, marital status, employment status, household income, and education. Participants' race/ethnicity was coded as: Latina, non-Latina Black/African-American, non-Latina White, and other races/ethnicities.

Health and healthcare.—Health and healthcare-related variables included health insurance status, having a primary care physician, perception of health, and number of chronic illnesses in past year.

Depressive symptoms.—Depressive symptoms were measured using a brief version of the Center for Epidemiological Studies-Depression Scale (CES-D). The modified version of the CES-D, developed and validated for use in the Established Populations for Epidemiological Studies of the Elderly (EPESE), asks respondents to complete 11 of the 20 items from the full CES-D with a reference time frame of the past week (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993). Scores from the 11-item CES-D were transformed to scores corresponding to those on the original 20-item CES-D using a previously validated method (Pennix et al., 1998). Higher scores indicate higher levels of depressive symptoms. Although this measure has been found to be valid and reliable among older adults, to our knowledge it has not yet been tested among representative samples and in samples of women across the lifespan.

Neighborhoods.—Consistent with the Project on Human Development in Chicago Neighborhoods (PHDCN), an intensive longitudinal study of Chicago neighborhoods initiated in 1995, the CCAHS sample was stratified into 343 neighborhoods based on knowledge of Chicago's neighborhoods as well as geographic boundaries (Sampson et al., 1997). The resulting neighborhood clusters typically included two contiguous census tracts that approximated local neighborhoods and included an average of 9.1 people per cluster (range 1–21; Mair, 2009).

Objective and perceived neighborhood factors.—The CCAHS survey team conducted systematic social observations of each of the 343 neighborhoods to measure objective and perceived neighborhood factors. For objective neighborhood factors, interviewers walked along each respondent's street and noted observations related to physical disorder and decay, risk behaviors, residential security, and other objective factors (e.g., noxious odors, presence of trees, noise level, presence of bars/liquor stores). Consistent with other CCAHS studies (e.g., Mair et al., 2010; Mair, Diez Roux, & Galea, 2008), two objective scores, *physical disorder* (range = −7.1, 1.8) and *physical decay* (range = −4.6, −0.7), were used due to their high reliability. For perceived neighborhood factors,

participants completed a series of questionnaires that yielded two variables that were created for the original CCAHS study (Sampson et al., 1997). The first, *perceived neighborhood support* (range = 3.5, 12.0), comprised three subscales: informal social ties (e.g., "How likely are your neighbors to intervene if they see children skipping school?"), community cohesion (e.g., "People in this neighborhood can be trusted"), and intergenerational connectedness (e.g., "There are adults in this neighborhood that children can look up to"; α = .91). The second, *perceived neighborhood stressors* (range = 0.6, 15.4), comprised four subscales: victimization (e.g., "Have you ever been a victim of mugging, robbery or sexual assault?"), perceived violence (e.g., "Have you witnessed fights in which a weapon was used?"), perceived disorder (e.g., amount of trash in the neighborhood, amount of graffiti, the number of deserted houses, and number of children hanging around), and hazards (e.g., mice, rats, and roaches in their neighborhood; traffic dangers; α = .75). For both of the perceived neighborhood factors scores, mean scores were computed for each subscale, and the means were summed to create the composite scores.

Census variables.—Consistent with prior CCAHS studies, four variables from the 2000 census were used to measure key neighborhood factors (Mair et al., 2010): (1) *residential stability* (percent of people who had lived at the same address for at least five years and percent owner occupied homes; higher scores indicate higher stability); (2) *family structure* (higher scores indicate lower proportions of female-headed households with children and higher percent married people ages 15 and up); (3) *affluence* (higher scores indicate higher percentage with a bachelor's degree, percentage in managerial/professional positions, and higher median home value); and (4) *disadvantage* (percent unemployed, people with household incomes less than $10,000/year, percent with incomes over $50,000/year [reverse scored], poverty rate, unoccupied home rate, and percent on public assistance).

Sex-specific and general preventive care.—Women reported on each of three sex-specific screens: pap tests ("Have you had a Pap smear within the last two years?"); breast exams ("How old were you when you had your last breast exam done by a doctor, nurse or physician assistant?"; breast exam in past three years considered adherent), mammograms ("Have you had a mammogram - that is, an x-ray of the breast to look for cancer or other breast problems - in the last 5 years?"; asked of women age 40 and over only; past year mammogram considered adherent for women 50 and over; mammogram in past 2 years considered adherent for women 40–49); and each of three general preventive care screens: checkup ("Have you had a general physical exam by doctor/health professional in last 2 years?"), blood pressure check ("Have you had your blood pressure checked in last 2 years?"), and cholesterol check ("Have you had your cholesterol checked in last 2 years?"). They were considered adherent to sex-specific preventive care if they were adherent to each of the three health screens based on preventive screening recommendations for their age by the US Preventive Services Task Force at the time of the survey. Otherwise they were assigned a score of 0. A similar approach was used to calculate adherence to general preventive care. In this way, the participants earned a 0 or a 1 summary score for adherence to sex-specific preventive care and a 0 or 1 summary score for adherence to general preventive care. Some participants (n = 13, 1.5% of total sample) had missing data on some

of the preventive care variables. If a participant had at least 2 out of 3 possible responses to each type of preventive care, the participant's data were included.

Covariates.—Covariates included variables that have demonstrated associations with preventive care utilization and with depression. We adjusted analyses for the potentially confounding effects of race/ethnicity (White [referent]; Black/African-American, Latina, other), age (continuous), education (< high school, high school, some college, bachelor's degree [referent]), marital status (married [referent], separated /divorced/widowed, never married), income (<5,000, $10,000–$29,000 [referent]; $30,000–49,999, $50,000–74,999), having a primary care provider (yes; no [referent]), number of chronic health conditions in the past year (continuously measured), perception of health (continuously measured), and health insurance (yes; no [referent]). Anxiety was used as a covariate given its associations with higher utilization of healthcare (Roy-Byrne et al., 2008; Stanley, Roberts, Bourland, & Novy, 2001) and high co-occurrence with depression (Kessler, Merikangas, & Wang, 2007). Anxiety was measured using a subset of five items from the Hopkins Symptom Checklist (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974). Higher scores indicated higher levels of anxiety.

Data Analysis

Bivariate analyses were conducted to compare non-depressed and depressed women by race and by preventive care use. Logistic regressions were conducted to examine the association between depression and preventive care use adjusting for covariates. Further, multilevel models (weighted hierarchical logistic regressions) were fit, with a random intercept for each neighborhood cluster, to test the associations between depressive symptoms and preventive care use, the association between neighborhood factors and preventive care use, and the potential moderating role of neighborhood factors in the association between depressive symptoms and preventive care use. To do so, the effects of individual- and neighborhood-level variables were tested separately to determine whether they were significantly associated with preventive care use before including the other variables. First, for each type of preventive care (sex-specific and general preventive care) hierarchical logistic regressions were used to examine the association between individual-level predictors and preventive care use, nested in neighborhood cluster. Second, hierarchical logistic regression was used to test the associations between depressive symptoms and neighborhood characteristics on use of preventive care. Third, to test for moderation, interactions between depressive symptoms and each neighborhood factor were examined separately. Of note, analyses were run with neighborhood cluster and with neighborhood (77 Chicago community areas) separately on level two, and no differences were found. We thus used neighborhood cluster for greater precision in estimating neighborhood effects.

Because race/ethnicity was a significant predictor of adherence to sex-specific and general preventive care, we ran stratified models for Latina, Black/African-American, and White women. To test associations between depression and neighborhood factors on preventive care use, hierarchical logistic regressions were employed using the same methods as were used for the entire sample.

Because less than 5% of the data was missing, missing data at level one (individual-level) in multilevel modeling were handled with listwise deletion, with the exception of preventive care missing variables (see Measures section). Missing data at level two (neighborhood-level) was estimated using Bayes scale scores, consistent with previous research using this dataset (Mair, 2009). Data were weighted and accounted for clustering and strata, and analyses were conducted using SPSS (Version 23).

Results

Description of the Sample

Table A (see Appendix 1) shows the sociodemographic characteristics of the 1870 women in the study overall and by racial/ethnic category. Most (44.1%) were Black/African-American, 29.5% were White, 24.3% were Latina, and 2.1% were other race/ethnicities. Table 1 shows the mean neighborhood factors and preventive care use overall and by race/ethnicity. Latinas reported the highest level of perceived neighborhood support and lived in neighborhoods with the lowest level of residential stability. Black/African-American women reported the highest levels of perceived neighborhood stressors and highest census-derived level of disadvantage, but also the highest level of census-derived residential stability. Whites reported the lowest number of perceived neighborhood stressors, the lowest census-derived disadvantage, and the highest census-derived affluence. Most women in the sample reported that they had a regular physician or clinic where they sought care (83.6%). Overall, 55.7% of women were fully adherent to sex-specific preventive care, and 58.9% of women were fully adherent to their general preventive care.

Racial/Ethnic Differences in Depression

Table 2 shows the means for depression by race/ethnicity. Depressive symptoms varied by race/ethnicity ([CESD ≥ 16], X^2 [2, n = 1584] 29.515, p < .001). Black/African-American women and Latinas were more likely to be depressed than White women (CESD ≥ 16), with 28.8% of Black/African-American women (n = 165), 27.4% of Latinas (n = 113), and 16.3% of White women (n = 98) indicating they were depressed.

Sex Specific Preventive Care

In an unadjusted analysis across all racial/ethnic categories, depression was a significant predictor of lower adherence to sex-specific preventive care use (B = −0.23, X^2 [1, n = 1870] 6.714, p <.01, OR = .80, 95% CI: 0.67–0.95). When covariates were added into the model, depression was still significant (X^2 [19, n = 1870] 267.310, p < .05).

Hierarchical logistical models.—When analyzing the association between depression and sex-specific preventive care use nested within neighborhood and adjusting for covariates, neither depressive symptoms nor perceived neighborhood support were significantly associated with sex-specific preventive care. There were no statistically significant interactions between depressive symptoms and neighborhood variables and adherence to preventive care. See Table 3 for the results of the hierarchical logistic regression on sex-specific preventive care. Perceived neighborhood stress (OR = 1.07; 95% CI: 1.01, 1.13) significantly increased the likelihood of sex-specific preventive care use.

The direction of this effect was such that the more stressful the neighborhood, the higher the likelihood of being adherent to sex-specific preventive care. Of the census variables, census-derived neighborhood affluence (*aOR* = 1.38; 95%*CI*: 1.05, 1.81) significantly increased the likelihood and census-derived poorer family structure (*aOR* = .61; 95%CI: 0.44, 0.85) decreased the likelihood of sex-specific preventive care adherence.

General Preventive Care

In both unadjusted and adjusted logistic regression models, depression was not significantly associated with adherence to general preventive care use.

Hierarchical logistical models.—Perceived neighborhood support (*aOR* = 1.13; 95%*CI*: 1.02, 1.25) and census-derived residential stability (*aOR* = 1.44; 95%*CI*: 1.12, 1.83) increased the likelihood of adherence with general preventive care (see Table 3).

Post-Hoc Analyses

Because race/ethnicity was a significant predictor of adherence to sex-specific and general preventive care, we ran stratified models for Latina, Black/African-American, and White women. Tables 4–5 report on analyses stratified by race/ethnicity. Among Latinas, depression was not associated with adherence to sex-specific care. Higher perceived neighborhood support was associated with lower likelihood of being adherent to sex-specific preventive care. There was also an interaction between perceived neighborhood support and depressive symptoms on the likelihood of being adherent to general preventive care. Neighborhood support moderated the association between depressive symptoms and general preventive care adherence; higher levels of perceived neighborhood support and higher levels of depressive symptoms were associated with increased likelihood of using general preventive care, whereas low neighborhood support and low depression were associated with lower likelihood of using preventive care.

In unadjusted analyses, Black/African-American women who had higher depressive symptomatology had a higher likelihood of adherence to sex-specific preventive care. However, when the covariates were added to the model, depression was no longer significant. Not having a primary care physician decreased the likelihood of adherence to both sex-specific and general preventive care. None of the neighborhood variables nor interactions between neighborhood and depressive symptoms were associated with sex-specific nor general preventive care.

Among White women, depression was not associated with sex-specific care adherence. However, higher levels of objective neighborhood disorder and higher levels of census-derived affluence were associated with increased likelihood of adherence to sex-specific preventive care. In terms of adherence to general preventive care, depressive symptoms were significantly associated with lower likelihood of adherence to general preventive care even when neighborhood factors and the interactions between neighborhood and depressive symptoms were added to the model.

Discussion

Previous research has tended to solely focus on individual determinants of care, but our study suggests that barriers to care are far more complex and include both neighborhood and larger contextual factors. The overarching aim of this study was to further our understanding of the association between depression and preventive health care utilization among women by taking into account their neighborhood context.

Adherence to preventive care varied by neighborhood factors, type of preventive care, and race/ethnicity. Among all women in the study, those who perceived their neighborhoods as more stressful and who lived in more affluent neighborhoods were more likely to be adherent to sex-specific preventive care, whereas women who lived in neighborhoods with lower family structure (i.e., more female-headed households and lower proportions of married couples) were less likely to be adherent to sex specific preventive care. Among Latinas, higher neighborhood support was associated with lower likelihood of using sex-specific care. None of the neighborhood or psychological variables were associated with Black/African-American women's use of care. Among White women, living in a more affluent neighborhood and neighborhoods with higher levels of neighborhood disorder (e.g., objective ratings of levels of trash, graffiti) were associated with higher likelihood of adherence to sex-specific care.

In terms of general preventive care, among all women in the study, higher likelihood of adherence was associated with higher levels of census-derived residential stability and perceived neighborhood support. Among Latinas, higher neighborhood support increased the likelihood of adherence to general preventive care among those with higher levels of depressive symptoms. Similar to the findings related to sex-specific care, none of the psychological or neighborhood factors were associated with use of general preventive care among Black/African-American women. Among White women, depressive symptoms were associated with lower likelihood of adherence to general preventive care.

Depression

Overall, the rates of depression in this sample were high and varied by race/ethnicity. Almost 25% of the sample had probable depression, which is triple the rate of current depression (8.2%) among women in the National Comorbidity Study (NCS; Blazer, Kessler, McGonable, & Swartz, 1994) and more than double the CDC rate (10.4%; National Center for Health Statistics, 2014). The rates were even higher among Latinas and Black/African-American women, almost triple the CDC rates of current depression among Latina (10.5%), and Black/African-American women (11.0%; (National Center for Health Statistics, 2014). Thus, these findings suggest that depression may be a highly prevalent problem among women in Chicago and more prevalent than in the general population.

The high rates of depression may partially be related to sociocultural factors among women in Chicago. Depression is associated with poverty and psychosocial stressors (Brown, Abe-Kim, & Barrio, 2003) which are significant issues among Chicagoans. At least 20% of households in Chicago live below the poverty rate. Those who live in the poorest neighborhoods in Chicago have higher levels of stress, higher unemployment, poorer

schools, and poorer overall health (Joint Center for Political and Economic Studies, 2012). That these issues disproportionately affect Blacks/African-Americans and Latinos may partially explain the overall high rates of depression in this sample and the significantly higher rates of depression and severe depression among Black/African-American women and Latinas. Depression among Black/African-American and Latina women is additionally robustly associated with race-related stressors such as discrimination (H. Lee & Turney, 2012) and the cumulative effects of multiple intersecting sources of oppression like racism, sexism, and homophobia (Crenshaw, 1991; Else-Quest & Hyde, 2016; Moradi & Risco, 2006; Parent, DeBlaere, & Moradi, 2013).

Neighborhoods

Across models, 30–40% of the variance in adherence with both sex-specific and general preventive care was explained by the neighborhood cluster (approximately two census tracts). Specific neighborhood factors (e.g., affluence and stress) were implicated in this association; however, actual neighborhood explained the bulk of variance. Thus, where a woman lives in Chicago, more than other sociodemographic factors (e.g., individual income, race) and more than depressive symptoms, appears to have a strong association with her utilization of preventive care. This may be partially due to unmeasured neighborhood factors such as segregation (White, Haas, & Williams, 2012; Williams, Lawrence, & Davis, 2019) and cultural (community-level) racism (Williams et al., 2019), social capital (Cronholm & Bowman, 2009; Kirby & Kaneda, 2005; Prentice, 2006), quality of neighborhood healthcare facilities (Williams et al., 2019), neighborhood-level trust in healthcare (Yang, Chen, & Noah, 2015), or neighborhood-level hopelessness (Mair, Kaplan, & Everson-Rose, 2012).

Specific neighborhood factors were significantly associated with preventive care adherence: affluence, family structure, residential stability, and neighborhood support and stress. Neighborhood affluence (percent with a bachelor's degree, percent in managerial/ professional positions, and median home value) was associated with higher likelihood of sex-specific care, as were individual socioeconomic factors such as having a higher income and higher level of education. Neighborhood-level high socioeconomic status is associated with improved health behaviors, including higher use of preventive care, possibly due to increased knowledge, access, and social capital (Adler, 2009). High socioeconomic status may additionally afford the ability to obtain jobs with high quality health insurance and other health benefits (Phelan, Link, & Tehranifar, 2010). Women who reported that their neighborhoods were more stressful were also more likely to use sex-specific preventive care. Living in more stressful neighborhoods may mean encountering place-based cumulative exposures (e.g., exposure to harmful toxins and pollutants) and psychosocial stressors that may manifest as physiological stress responses (e.g., autonomic arousal, hormonal changes) resulting in poor health (Hill, Ross, & Angel, 2005), and which in turn may increase one's likelihood of seeking health care. Further, living in disadvantaged neighborhoods has been associated with poorer self-rated health, psychological distress, and impaired physical functioning (Steptoe & Feldman, 2001). Together, this might increase the likelihood that women residing in stressful neighborhoods will seek medical care, including preventive care. Moreover, Hussein et al. (2016) found that living in a low-income neighborhood was associated with greater reliance on safety net health care (e.g., community health care

centers and outpatient centers). It may be that individuals residing in stressful neighborhoods (which are more likely to be low-income) are more likely to adhere to preventive care, as these safety nets are more culturally diverse, more likely to accept Medicaid recipients, and more likely to understand the challenges faced by the people they serve (Hussein, Roux, & Field, 2016). Use of sex-specific preventive care may be partially associated with higher risks for sexual violence, sexual coercion, higher risk sexual behaviors, and more unintended pregnancies in more stressful neighborhoods (Berman et al., 2013; Browning, Burrington, Leventhal, & Brooks-Gunn, 2008; E. Miller et al., 2011; Rojas et al., 2016), which may increase women's needs for reproductive healthcare generally.

Higher levels of neighborhood support and stability were associated with higher likelihood of adherence with general preventive care. This finding is consistent with prior research demonstrating that highly supportive neighborhoods are associated with higher rates of preventive care use compared to neighborhoods low on support (Cronholm & Bowman, 2009; Prentice, 2006). Residing in more stable, socially cohesive, and connected neighborhoods is associated with better mental and physical health (see Thoits, 2011 for a review) and may buffer against the negative effects of stress (Thoits, 2011; Umberson & Montez, 2010).

Race/Ethnicity

Stratified analyses revealed that different factors were associated with use of preventive care by race/ethnicity. Among Latinas, higher levels of neighborhood support were associated with a lower likelihood of adherence with sex-specific preventive care. One possible explanation for Latinas' lower use of care in highly supportive neighborhoods may be related to social networks and social learning processes (Molina, Alegría, & Chen, 2012). Health behaviors can spread across social networks (Galster, 2011); if others in the network have low use of sex-specific care, in a supportive, close environment, this could lower overall use of care (Umberson & Montez, 2010). Indeed, in a Pew study of Hispanic healthcare utilization, 70% of those surveyed reported that they received most of their health information from their social networks, and this was particularly true among women (Livingston, Minushkin, & Cohn, 2008). Further, lower use of care by Latinas/os overall has been linked to lack of bilingual and racial/ethnic minority providers, language discordance with providers, bias and discrimination, and low cultural competency in healthcare systems (Rodriguez & Vega, 2009). Embarrassment has also been suggested to play a role in Latinas' lower use of sex-specific care, particularly with male providers or if a translator is needed (Julliard et al., 2008; Nonzee et al., 2015). More research is needed to better understand the associations between neighborhood support and lower sex-specific care among Latinas and to examine whether improving health education and literacy at the neighborhood and social networks levels, particularly in supportive neighborhoods, may improve overall adherence with sex-specific preventive care.

In the current study, Black/African-American women had the highest rates of adherence with both sex-specific and general preventive care. This finding is consistent with CDC data from 2010 in which Black/African-American women had among the highest rates of both breast and cervical cancer screenings. Data from older adults in Illinois (Multack, 2013)

suggests that Black/African-American (21.5%) and White (21.9%) women have similar rates of preventive care screening rates (aggregated across all preventive care screenings). Despite findings that Black/African-American women have similar or better rates of screening (Purc-Stephenson & Gorey, 2008; Wharam et al., 2015), there is little research to explain this. A qualitative study among women obtaining care for cancer suggested that for Black/African-American women in particular, encouragement and support from friends and family was a large motivator in getting care (Nonzee et al., 2015).

Not having a primary care provider lowered the likelihood of adherence with both sex-specific and general preventive care among Black/African-American women. This finding is consistent with previous research showing that having a primary care provider improves use of preventive care among all women, but particularly among women of color (Corbie-Smith, Flagg, Doyle, & OBrien, 2002; Sambamoorthi & McAlpine, 2003). Further, among Black/African-American women, having a trusted primary care provider has been found to significantly improve rates of preventive care utilization (Copeland, 2005; Henderson, Madrigal, & Handler, 2018; O'Malley, Sheppard, Schwartz, & Mandelblatt, 2004) perhaps particularly when physicians are perceived as advocates or supporters (Nonzee et al., 2015).

Among White women, depression was significantly associated with lower likelihood of adherence to general preventive care. In the current study, White women were more likely to have health insurance, but less likely to have a primary care physician, had fewer chronic diseases, and rated their health more positively compared to Latina and Black/African-American women. Together these may decrease the likelihood of compliance with general preventive care. Because they rate their overall health positively, they may be less likely to seek medical care overall—which combined with not having a primary care physician, likely lowers their use of general preventive care.

The lower rate of compliance with general preventive care among White women with depression may also be associated with differential presentations or symptom profiles of depressed women by race/ethnicity. Depression is not a homogeneous disorder, and as such, discrete subtypes or clusters of symptoms may differentially be associated with unique etiologies which may in turn be associated with heterogeneous behaviors and outcomes (Carragher, Adamson, Bunting, & McCann, 2009; Ellis, Orom, Giovino, & Kiviniemi, 2015; S. Y. Lee, Xue, Spira, & Lee, 2014). For example, the etiology of depression among Black/African-American women has been linked to social context (e.g., negative life events, racism, poverty, discrimination; (Brown et al., 2003), which may have differential associations with health and healthcare utilization. Further, there is some evidence that White women are less likely than Latinas or Black/African-American women to experience somatic symptoms of depression, and as a result, when depressed, they are more likely to seek mental health treatment rather than medical care (Borowsky et al., 2000).

Implications and Future Directions

Findings suggest that several factors are critical when considering women's use of preventive care use, and these have implications for public health, population health, and health disparities research. First, women's adherence to preventive care and the barriers to preventive care vary by the type of care (i.e., sex-specific versus general). Second, it is

important to take into account race/ethnicity in studies aimed at understanding factors influencing the use of preventive care use as well as in strategies to improve use of care. For example, among Latinas, efforts at improving sex-specific preventive care utilization may need to be aimed at social networks or neighborhoods in order to address possible factors that lower use of care such as misinformation or discomfort with talking to physicians about sexual health.

More research is needed to understand why Black/African-American women across studies have among the highest rates of preventive care use, and yet concomitantly experience some of the largest health disparities. Indeed, Black/African-American women are more likely to be diagnosed with late stage-diseases, and have higher rates of morbidity and mortality than White women (Allen, Shelton, Harden, & Goldman, 2008). The higher rate of adherence with preventive care among African American women in the current study may be consistent with previous research that has found that disparities arise not during preventive care, but occur after an abnormal screening due to delays in care or early termination of treatments (George et al., 2015; Ramachandran et al., 2015; Tejeda et al., 2013). Among Black/African-American women, reducing health disparities may depend on ensuring women have trusted and supportive healthcare providers—not just for preventive care but for more specialized care as well.

Uniquely, this study found that not only are specific neighborhood factors associated with preventive care use, but that a large proportion of the variance in both sex-specific and general preventive care use is associated with the neighborhood itself and suggests that interventions to reduce disparities in use of preventive healthcare use should be aimed at neighborhoods (Quiñones, Talavera, Castaneda, & Saha, 2014). Future research should explore further the relationship between neighborhood and healthcare utilization to ascertain what exactly about neighborhoods may deleteriously affect preventive care use, and how to leverage neighborhood support to improve use of care. Future research should also longitudinally examine women's patterns of healthcare utilization as a function of individual and neighborhood factors while examining the differential utilization patterns between general preventive care and sex-specific preventive care.

Limitations and Strengths

This study has several limitations. First, the study design is cross-sectional, which precludes the determination of causality and temporality. For example, participants were asked about symptoms of depression in the past week; however, preventive care use was measured in the past few years or ever. Although CES-D scores are appreciably reliable over a year (Radloff, 1977), it is not possible to rule out the likelihood that for some individuals a new onset of elevated depressive symptoms may have occurred after a missed preventive care screening, and would thus be causally unrelated to preventive care use. A subsample of participants in the CCAHS were given the CIDI ($n = 549$) which measures past 12-month symptoms of depression. Number of depressive symptoms, as measured by the CESD and the CIDI, were significantly and positively correlated in this sample, but the absolute correlation was still relatively low, indicating that depressive symptoms in the past week may be a somewhat limited proxy for depressive symptoms over the past year. Future research should

longitudinally examine the associations between psychological and neighborhood factors with preventive care to better ascertain temporality. Second, the measure of depressive symptoms, the CES-D, was a brief version (11-items) of the full measure (20-items) that was tested and found to be a valid and reliable measure of depression among older adults (Kohout et al., 1993). However, to our knowledge this shorter measure has not been used among representative samples, nor in samples of women across the lifespan. Thus, it is possible that it may have over- or underestimated depression in the current sample. Third, the data were collected between 2001 and 2003 and may not fully generalize to current times. Policies such as the Affordable Care Act increased access to preventive care (Sommers, Maylone, Blendon, Orav, & Epstein, 2017), but engagement in care remain problematic among some populations and insecurity in regards to the Affordable Care Act's future may have effects on healthcare utilization. Fourth, self-report data on preventive care use tend to overestimate the use of preventive care (Howard, Agarwal, & Lytwyn, 2008). Indeed, the rate of reported preventive care use in this study was high and the variability was limited, which could lead to a lack of precision in the estimate of the relationships between neighborhood factors and use of preventive care. Fifth, other factors which likely influence preventive care use were not measured in this study, including women's relationships with their healthcare providers, trust in the health system (Yang et al., 2015), and discrimination in the healthcare setting and elsewhere (Borrell, Kiefe, Diez Roux, Williams, & Gordon-Larsen, 2013). Measurement of these and other factors might lower the variance explained by neighborhood.

Despite these limitations, this study makes several contributions to our understanding of women's use of preventive care. First, the CCAHS sample is large, diverse, and representative of Chicago. CCAHS was designed and conducted by experienced survey research methodologists along with experts on Chicago's neighborhoods and health; thus, it is an optimal dataset for understanding barriers to healthcare utilization and the contextual factors involved in healthcare utilization. Second, the inclusion of neighborhood variables in CCAHS enabled multilevel modeling. Much of the research on preventive care utilization has focused solely on individual factors or larger geographic factors (such as comparisons between different urban areas, or comparing urban versus rural populations) and has relied on more homogenous samples (Calo, Vernon, Lairson, & Linder, 2016; Pruitt, Shim, Mullen, Vernon, & Amick, 2009). Third, the CCAHS used gold standard approaches to measure neighborhood factors, including perceived and objective neighborhood characteristics (Calo et al., 2016; Pruitt et al., 2009), and the use of valid and reliable measures enables a richer understanding of their associations with health care utilization.

Conclusion

This study is one of the first to examine preventive healthcare use and the association between depression and neighborhood factors among a representative and diverse sample of women. The large sample size allowed stratification by race/ethnicity. As such, it makes unique contributions to our understanding of the social determinants of preventive care use in Black/African-American, Latina, and White women. Much of the focus on preventive care use has been on the individual, yet our findings demonstrate that both individual processes and the broader social context affect health behaviors and disparities in healthcare.

These factors, identified through a multilevel approach, can inform policies that can effectively improve overall utilization of care and can direct future intervention efforts.

Acknowledgments:

Appendix 1

Table 1

Demographics of Study Participants by Race/Ethnicity and Overall

	White $n = 551$		Latina $n = 455$		African American $n = 824$		Other $n = 40$		Total	
	%	n	%	n	%	n	%	n	%	n
Marital Status										
Married	43.7	262	54.9	226	23.6	135	37.3	19	39.3	642
Separated/Widowed/Divorced	22.7	136	22.6	93	36.8	240	17.6	9	27.4	448
Never Married	33.7	202	22.6	93	39.6	226	45.1	23	33.3	544
Income										
Less than $5,000	2.2	13	2.7	11	4.2	24	2.0	1	3.0	49
$5,000 to $9,999	3.8	23	6.3	26	12.8	73	7.8	4	7.7	126
$10,000 to $29,999	18.3	110	35.4	146	35.0	200	9.8	12	28.6	468
$30,000 to $49,999	18.3	110	17.7	73	16.6	95	15.7	8	22.4	366
$50,000 or more	33.1	199	15.0	62	17.0	97	15.7	8	22.4	366
Missing on Income	24.3	146	23.1	95	14.4	82	35.3	18	20.9	341
Age (M/SD)	44.95	18.0	39.88	15.61	44.49	16.94	40.46	15.55	43.37	17.10
No. of Children in home (M/SD)	0.45	0.95	1.51	1.41	1.28	1.67	0.82	1.16	0.92	1.34
Employment Status										
Employed	63.4	380	52.8	218	55.5	317	76.0	38	58.4	953
Unemployed	5.7	34	6.3	26	11.6	66	6.0	3	7.9	129
Out of Workforce	30.9	185	40.9	169	32.9	188	18.0	9	33.7	551
Education										
Less than HS	10.8	65	47.6	196	23.6	135	3.9	2	24.3	437
Has GED/HS Diploma	22.2	133	23.3	96	23.7	136	17.6	9	24.3	398
Some College	23.8	143	19.2	79	34.0	195	19.6	10	26.1	427
Has college degree	43.2	259	10.0	41	18.7	107	58.8	30	26.7	437
Health Conditions	0.80	1.23	0.84	1.31	1.15	1.46	0.42	0.79	0.92	1.34
Self-rated health	2.25	0.96	2.79	1.09	2.68	1.02	2.26	0.85	2.53	1.04
Health Insurance	86.6	519	71.3	293	84.2	481	72.0	36	81.5	1329
Insurance Type										

	White $n = 551$		Latina $n = 455$		African American $n = 824$		Other $n = 40$		Total	
	%	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**	***n***
Medicare	17.2	103	11.9	49	22.3	127	10.0	5	17.4	284
Medicaid	4.2	25	9.0	37	14.4	82	0	0	8.8	149
Veterans'	0	0	0	0	0.2	1	0	0	0.10	1
HMO	18.7	112	26.0	107	27.9	159	30.0	15	24.1	393
PPO	35.2	211	16.8	69	13.9	79	28.0	14	22.9	373
Fee for service	10.5	63	4.4	18	3.3	19	4.0	2	6.3	102
Other	1.0	6	3.2	13	2.3	13	0.0	0	2.0	32

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Table 1

Neighborhood Support and Neighborhood Stressors (Weighted) and Preventive Care Use by Race/Ethnicity

	White n = 551		Latina n = 455		African American n = 824		Other n = 40		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Perceived Neighborhood										
Support	9.35	1.33	9.36	1.44	9.15	1.53	9.00	1.32	9.27	1.43
Stressors	4.87	2.67	5.94	2.86	6.23	2.75	4.54	2.28	5.48	2.80
Objective Neighborhood										
Disorder	−3.57	0.51	−3.17	−2.86	6.23	2.75	4.54	2.28	−3.15	0.82
Decay	−2.76	1.28	−1.74	1.43	−1.43	1.30	−2.68	1.00	−2.03	1.45
Census Variables										
Disadvantage	−0.72	0.45	−0.27	0.55	0.46	0.88	−0.58	0.33	−0.19	0.82
Affluence	0.78	1.09	−0.16	0.85	−0.30	0.60	0.90	1.14	0.17	1.02
Family Structure	0.63	0.57	0.55	0.60	−0.68	0.74	0.53	0.49	0.15	0.88
Residential Stability	0.07	1.02	−0.08	0.72	0.20	0.89	−0.40	0.79	0.01	0.91
	%	n	%	n	%	n	%	n	%	n
Sex-Specific Preventive Care										
Last pap within last 2 years	78.0	412	84.1	307	86.1	471	76.9	30	82.5	1220
Breast exam	69.7	417	55.9	231	75.4	429	52.0	26	67.7	1103
Mammogram (over 40)	64.5	256	65.0	158	74.6	297	53.3	16	68.1	727
Overall adherence	56.3	338	46.1	190	63.5	363	40.0	20	55.8	911
General Preventive Care										
Have PCP	79.0	473	84.0	346	86.5	494	60.8	31	82.3	1344
Checkup	74.0	443	75.0	309	86.9	497	660	33	78.5	1282
BP Check	92.5	555	87.9	362	95.5	546	82.4	42	92.0	1505
Cholesterol Check	62.5	369	63.5	258	72.1	408	60.8	31	66.1	1066
Overall adherence	53.3	320	53.6	221	66.4	379	54.9	28	58.0	948

Table 2

Rates (Weighted) of Depression by Race/Ethnicity and Preventive Care Use

| | Not Depressed | | Depressed | | Depression Level | | | |
| | | | | | CESD 16 | | CESD 23 | |
	n	%	n	%	n	%	n	%
Race/Ethnicity								
Latina	299	72.6%	113	27.4%	90	21.8%	23	5.6%
White	502	83.7%	98	16.3%	92	15.3%	6	1.0%
Black/African-American	407	71.2%	165	28.8%	132	23.1%	33	3.9%
Total	1208	76.3%	376	23.7%	314	19.8%	62	39%
Sex-Specific Preventive Care								
Adherent	723	79.5%	187	20.5%	160	17.6%	27	3.0%
Not adherent	525	72.6%	198	27.4%	164	22.7%	34	4.7%
General Preventive Care								
Adherent	729	76.9%	219	23.1%	187	19.7%	32	3.4%
Not adherent	519	75.7%	167	24.3%	137	20.0%	30	4.3%

Note. Because this study did not use the full version of the CES-D, scores from the 11-item CES-D were transformed to standardize scores to correspond to the original 20-item CES-D. This transformation allowed for the use of the typical cut-off score (16; (Pennix et al., 1998). Thus, for the current study, scores were transformed and a cutoff score of 16 was used to identify those with probable depression and 23 indicated severe depression. Previous research has demonstrated that these scores are appropriate for diverse populations (J. A. Cook et al., 2004). Depression level percentages represent those within the racial/ethnic or preventive care category with a CESD score indicating probable depression or severe depression.

Table 3

Preventive Care Final Multilevel Models for Sex-Specific and General Preventive Care Separately with Nonsignificant Variables from Previous Models Removed

	Sex-Specific Care			General Preventive Care		
	OR	95%CI	p	OR	95%CI	p
Anxiety	-	-	-	1.02	0.97–1.07	.403
Age	0.97*	0.96–0.98	.000	1.03***	1.02–1.04	.000
Race						
White (ref)	1			1		
Latina	0.91	0.63–1.31	.620	1.24	0.90–1.74	.200
Black	1.57*	1.01–2.45	.046	2.01***	1.43–2.80	.000
Other	0.45*	0.22–0.91	.026	1.83	0.90–3.69	.093
Education				-		
College (ref)	1			-	-	-
Some college	0.79	0.55–1.02	.188	-	-	-
High School	0.37***	0.25–0.54	.000	-	-	-
Less than HS	0.48***	0.32–0.72	.000	-	-	-
Marital Status				-		
Married (ref)	1			-	-	-
Separated/Divorced/Widowed	0.64*	0.50–0.91	.011	-	-	-
Never Married	1.06	0.74–1.43	.866	-	-	-
Income				-		
$10–29,999 (ref)	1			-	-	-
<$5,000	1.19	0.74–1.92	.481	-	-	-
$5,000–9,999	0.92	0.45–1.86	.813	-	-	-
$30,000–49,999	1.39	0.95–2.02	.087	-	-	-
$50,000+	1.72**	1.17–2.51	.006	-	-	-
Missing	1.34	0.94–1.92	.103	-	-	-
Has PCP				1		
No PCP	0.36***	0.26–0.51	.000	0.26**	0.19–0.36	.000

	Sex-Specific Care			General Preventive Care		
	OR	95%CI	p	OR	95%CI	p
Has Insurance	1.76**	1.28–2.43	.001			
Chronic Health Conditions/Year	-	-	-	1.20**	1.06–1.36	.008
Health Perception	-	-	-	0.80**	0.70–0.91	.001
Neighborhood factors	-	-	-			
Perceived Stress	1.05	0.99–1.12	.069	-	-	-
Perceived Support				1.02	0.92–1.13	.700
Census-derived Affluence	1.29**	1.08–1.53	.005	-	-	-
Census-derived Family Structure	.79*	0.63–0.98	.032	-	-	-
Intercept	4.49***	2.25–8.95	.000	0.59*	0.36–0.96	.034
Model Fit	76.3%			77.3%		
ICC	.335			.384		

*
p<.05

**
p<.01

***
p<.001

The final model for sex-specific preventive care included age, race/ethnicity, education, marital status, income, having a PCP, and having insurance, as well as neighborhood stress, affluence, and family structure.

The final model for general preventive care included age, race/ethnicity, having a PCP, number of chronic conditions in the past 12 months, perception of health, neighborhood support, and having health insurance.

Table 4

Multilevel Models of Individual and Neighborhood Factors on Sex-Specific Preventive Care Stratified By Race/Ethnicity

	White n = 551				Latina n = 455				African American n = 824			
	OR	95%CI Lower	95%CI Upper	p	OR	95%CI Lower	95%CI Upper	p	OR	95%CI Lower	95%CI Upper	p
Depression	1.36	0.75	2.44	0.309	1.07	0.55	2.07	0.843	0.87	0.49	1.55	0.628
Anxiety	0.99	0.88	1.11	0.807	1.01	0.89	1.15	0.84	0.98	0.88	1.08	0.635
Age	0.97***	0.95	0.98	0.000	0.98	0.95	1.00	0.064	0.98**	0.96	0.99	0.007
Education												
College (ref)	1				1				1			
Some college	0.63	0.37	1.08	0.092	0.74	0.25	2.22	0.587	1.05	0.53	2.05	0.896
High School	0.36***	0.20	0.65	0.001	0.25*	0.08	0.77	0.016	0.61	0.30	1.26	0.179
Less than HS	0.25***	0.11	0.58	0.001	0.50	0.17	1.46	0.206	0.55	0.25	1.17	0.120
Marital Status												
Married (ref)	1				1				1			
Separated/Divorced/Widowed	0.95	0.52	1.73	0.861	1.08	0.50	2.33	0.846	0.83	0.45	1.54	0.556
Never Married	0.77	0.44	1.35	0.361	0.64	0.28	1.47	0.294	0.59	0.30	1.14	0.116
Income												
$10–29,999 (ref)	1				1				1			
$0–9,999	1.91	0.61	6.01	0.269	9.12**	2.58	32.26	0.001	0.67	0.34	1.31	0.240
$30,000–49,999	1.94	0.93	4.03	0.078	1.75	0.77	3.97	0.182	1.03	0.54	1.95	0.930
$50,000+	1.79	0.91	3.50	0.090	3.62**	1.47	8.87	0.005	1.53	0.72	3.26	0.270
Missing	0.86	0.44	1.68	0.653	3.07**	1.42	6.652	0.004	1.43	0.71	2.89	0.321
Has PCP	1				1				1			
No PCP	0.32**	0.19	0.55	0.000	0.22***	0.10	0.51	0.0001	0.47**	0.25	0.88	0.019
Chronic Health Conditions/Year	1.08	0.88	1.34	0.454	1.25	0.94	1.767	0.130	1.12	0.93	1.34	0.242
Health Perception	0.77	0.59	1.01	0.059	0.78	0.59	1.03	0.081	0.90	0.71	1.15	0.395
Insurance	2.35*	1.22	4.51	0.011	1.219	0.63	2.25	0.601	1.87	1.04	3.36	0.038

	White n = 551				Latina n = 455				African American n = 824			
	OR	95%CI Lower	95%CI Upper	p	OR	95%CI Lower	95%CI Upper	p	OR	95%CI Lower	95%CI Upper	p
Neighborhood factors												
Perceived neighborhood factors												
Stress	1.08	0.97	1.21	0.169	1.02	0.90	1.17	0.735	1.05	0.95	1.16	0.323
Support	.993	0.81	1.22	0.947	0.73**	0.58	0.91	0.007	1.10	0.93	1.31	0.271
Census-derived												
Disadvantage	1.47	0.51	4.19	0.472	1.16	0.29	4.66	0.831	1.15	0.55	2.39	0.717
Affluence	1.59*	1.02	2.48	0.040	1.34	0.59	3.03	0.479	1.02	0.57	1.85	0.941
Family Structure	0.73	0.33	1.61	0.431	0.82	0.32	2.09	0.676	1.11	0.56	2.18	0.769
Residential Stability	1.09	0.71	1.67	0.686	0.94	0.52	1.71	0.845	1.22	0.79	1.87	0.363
Objective neighborhood factors												
Physical Disorder	1.26*	1.01	1.57	0.037	0.83	0.62	1.10	0.182	0.85	0.67	1.07	0.162
Physical Decay	1.10	0.69	1.76	0.681	1.28	0.77	2.13	0.340	1.12	0.76	1.65	0.574
Depression x Neighborhood												
Perceived neighborhood factors												
Stress x depression	0.94	0.74	1.19	0.602	1.11	0.88	1.39	0.399	0.95	0.80	1.14	0.597
Support x depression	0.83	0.55	1.25	0.377	1.11	0.88	1.39	0.399	0.90	0.65	1.26	0.550
Census-derived												
Disadvantage x depression	1.14	0.13	10.14	0.910	0.83	0.09	7.35	0.866	0.72	0.20	2.67	0.597
Affluence x depression	1.12	0.45	2.76	0.808	0.90	0.24	3.40	0.874	0.62	0.20	1.97	0.550
Family Structure x depression	1.90	0.38	9.57	0.435	0.57	0.14	2.28	0.424	1.28	0.37	4.38	0.597
Residential Stability x depression	0.80	0.37	1.76	0.582	1.24	0.50	3.08	0.649	0.74	0.34	1.60	0.550
Objective neighborhood factors												
Physical Disorder x depression	0.97	0.62	1.50	0.875	1.13	0.74	1.74	0.575	1.33	0.90	1.95	0.15
Physical Decay x depression	0.47	0.18	1.21	0.118	0.85	0.41	1.77	0.658	0.88	0.49	1.58	0.660
Intercept	10.42***	2.97	36.59*	0.000	4.77	0.84	26.98*	0.077	8.33	1.98	34.98	0.004

*
p < .05

Table 5

Multilevel Models of Individual and Neighborhood Factors on General Preventive Care Stratified By Race/Ethnicity

	White n = 551			Latina n = 455			Black/African-American n = 824		
		95%CI			95%CI			95%CI	
	OR	Lower	Upper	OR	Lower	Upper	OR	Lower	Upper
Depression	0.50*	0.28	0.91	0.93	0.45	1.93	0.77	0.40	1.49
Anxiety	1.09	0.97	1.23	1.10	0.95	1.27	1.06	0.95	1.17
Age	1.04***	1.02	1.05	1.02	0.99	1.05	1.01	1.00	1.03
Education									
College (ref)	1			1			1		
Some college	1.31	0.75	2.28	0.42	0.12	1.44	0.65	0.34	1.27
High School	0.51*	0.28	0.95	0.55	0.16	1.86	0.57	0.28	1.18
Less than HS	0.77	0.33	1.83	0.41	0.12	1.35	0.62	0.29	1.32
Marital Status									
Married (ref)	1			1			1		
Separated/Divorced/Widowed	1.36	0.72	2.56	0.75	0.31	1.78	1.35	0.74	2.47
Never Married	0.87	0.51	1.50	0.96	0.40	2.32	1.51	0.79	2.86
Income									
$10–29,999 (ref)	1			1			1		
$0–9,999	3.51	0.92	13.39	1.83	0.45	7.50	0.94	0.48	1.85
$30,000–49,999	1.07	0.51	2.27	0.50	0.20	1.27	1.76	0.93	3.33
$50,000+	1.18	0.59	2.37	0.50	0.18	1.39	3.30**	1.54	7.08
Missing	1.00	0.50	1.97	0.68	0.29	1.60	1.25	0.64	2.43
Has PCP	1			1			1		
No PCP	0.19***	0.11	0.34	0.43	0.18	1.05	0.22***	0.12	0.42
Chronic Health Conditions/Year	1.12	0.88	1.42	1.70**	1.19	2.44	1.14	0.93	1.38
Health Perception	1.12	0.85	1.47	0.62**	0.45	0.86	0.87	0.68	1.11
Insurance	1.80	0.94	3.47	2.55*	1.22	5.33	0.92	0.51	1.67
Perceived									

| | White n = 551 | | | Latina n = 455 | | | Black/African-American n = 824 | | |
	OR	95%CI Lower	95%CI Upper	OR	95%CI Lower	95%CI Upper	OR	95%CI Lower	95%CI Upper
Stress	0.98	0.88	1.10	1.01	0.88	1.17	0.94	0.86	1.04
Support	1.06	0.86	1.31	0.86	0.66	1.11	1.11	0.94	1.32
Census									
Disadvantage	1.46	0.52	4.07	1.14	0.19	6.93	1.05	0.51	2.18
Affluence	1.17	0.74	1.86	2.45	0.82	7.33	1.06	0.58	1.93
Family Structure	1.37	0.61	3.08	0.60	0.18	1.97	0.80	0.42	1.55
Residential Stability	0.87	0.57	1.34	1.87	0.89	3.94	0.95	0.62	1.46
Objective									
Physical Disorder	1.12	0.90	1.40	1.07	0.76	1.52	1.10	0.88	1.37
Physical Decay	0.96	0.60	1.53	0.78	0.43	1.42	1.22	0.85	1.75
Depression x Neighborhood									
Perceived									
Stress x depression	0.81	0.64	1.04	1.01	0.77	1.32	0.99	0.83	1.17
Support x depression	1.12	0.72	1.72	1.70*	1.04	2.78	0.96	0.69	1.33
Census									
Disadvantage x depression	1.33	0.17	10.33	0.23	0.02	3.52	1.36	0.35	5.23
Affluence x depression	1.17	0.48	2.83	0.93	0.18	4.83	2.53	0.75	8.59
Family Structure x depression	2.76	0.53	14.38	0.43	0.07	2.54	0.71	0.20	2.49
Residential Stability x depression	0.75	0.34	1.67	0.60	0.21	1.74	1.00	0.45	2.23
Objective									
Physical Disorder x depression	1.34	0.86	2.09	0.70	0.43	1.15	1.25	0.85	1.84
Physical Decay x depression	0.37	0.14	1.01	1.00	0.44	2.25	0.71	0.39	1.28
Intercept	0.14	0.04	0.51	1.91	0.29	12.53	1.52	0.37	6.20

*
p < .05

**
p < .01

***
p < .001