Neighborhood Characteristics and Change in Depressive Symptoms Among Older Residents of New York City

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Objectives. We investigated the relationship between the depressive symptoms of older adults over time and the characteristics of the neighborhoods in which they live.

Methods. We surveyed a random sample of 1325 New York City residents aged 50 years or older in 2005 and conducted 808 follow-up interviews in 2007. We assessed the compositional characteristics of the respondents' neighborhoods at a census-tract level and determined the relationships between these characteristics and changes in respondents' depressive symptoms.

Results. In multivariable models that adjusted for individual-level covariates including income, a range of neighborhood characteristics predicted worsening depressive symptoms. Factor analysis suggested that these characteristics operated in 3 clusters: neighborhood socioeconomic influences, residential stability, and racial/ethnic composition, with positive neighborhood socioeconomic influences being significantly protective against worsening symptoms. Life stressors, personality trait neuroticism, African American race, and daily baseline contact with social networks were also associated with worsening symptoms.

Conclusions. An older adult's neighborhood of residence is an important determinant of his or her mental health. Those making efforts to improve mental health among the elderly need to consider the role of residential context in improving or impairing mental health. (*Am J Public Health.* 2009;99:1308–1314. doi:10.2105/AJPH.2007.125104)

Depression is an important cause of morbidity in the general community.[1] The prevalence of depression is high among elderly persons, and longitudinal studies have found modest increases in depressive symptoms with age.[2–4] The incidence of depression peaks in early adult life, but there appears to be a secondary peak in incidence among people in their 50s, suggesting that the transition to older age may present specific risks for depression.[5] Depression is associated with significant disability among older adults and may place their functional independence at risk.[6] At least 1 longitudinal study has also suggested that older African Americans may be at increased risk of symptoms of depression compared with older White adults.[7]

Although a number of individual-level factors are known to increase the risk of depression,[8–10] it has long been thought that the physical and social environments in which people live may also influence their mental health.[11–13] The environment may play a particularly important role in the mental health of older adults, who, compared with younger adults, are more likely to spend time in their neighborhood of residence, more likely to suffer from disabilities that may be exacerbated by their environments,[14] and are more vulnerable to threats to their safety.[15–17]

A number of theories have been proposed to explain this association between neighborhood characteristics and depression. Researchers have drawn on systemic theory to propose that neighborhoods characterized by higher levels of poverty and residential instability have lower levels of social cohesion and lower levels of control over deviant social networks.[18,19] The concomitant lack of social order may contribute to low levels of trust, which would impede collaborative efforts to control crime and reduce neighborhood disorder.[20] High levels of crime may generate higher levels of fear and stress, as could the deteriorating building conditions and high levels of physical disorder associated with disadvantaged neighborhoods.[20,21] In contexts of social isolation and limited social organization, residents may not benefit from the social networks necessary to buffer them from the stressors they face on a daily basis.[22]

These theories about the influence of the neighborhood context on collective and individual sources of stress agree with the "differential vulnerability" hypothesis and with social stress theory, both of which posit that environments can influence health by increasing the likelihood of personal stress events such as unemployment or traumatic events, or by providing resources to cope with such stressors.[23–26] Studies using multilevel analytic methods that can account for both individual-level and neighborhood-level effects suggest that neighborhood-level characteristics such as affluence, disadvantage, inequality, and residential stability have a significant impact on physical health, even after accounting for individual-level factors.[27–30] However, research into their possible influence on mental health has been more limited.

Cross-sectional studies using multilevel approaches have suggested that symptoms of depression are more prevalent in residents of disadvantaged neighborhoods[31–33] and that this association may be stronger in neighborhoods having less residential turnover[34,35] or higher population density.[36] Similar associations have been observed among older adults, for whom living in a neighborhood that is poor or has few elderly people has been associated with higher levels of depressive symptoms, after accounting for individual vulnerabilities.[37] The presence of stress-buffering support systems has been associated with lower levels of depression in cross-sectional research, whereas low levels of social support in neighborhoods with high social isolation were related to higher depression levels.[38,39] However, other research has failed to replicate these findings.[40] Furthermore, the cross-sectional

nature of this research means that even positive studies cannot exclude the possibility that the observed relationships simply reflect a tendency for depressed individuals to become disadvantaged or to live in disadvantaged neighborhoods.

Longitudinal research can better explore the causal mechanisms behind these relationships, but there have been few prospective studies in this field. A study of individuals who were screened for an HIV prevention intervention found that perceptions of neighborhood characteristics predicted change in depressive symptoms 9 months later.[41] The Alameda County Study found that living in a high-poverty area was associated with worse health status and more symptoms of depression; however, this association was lost when all individual-level covariates were included in multivariable analysis.[42] In previous research conducted by members of our own team, we identified a significant association between incident depression and neighborhoods classified as low socioeconomic status, even after adjusting for individual income, adverse life events, and educational status.[43] This kind of prospective research, although suggestive, has often been weakened by reliance on perceived neighborhood characteristics, limitations of the measures used, or absence of information on possible confounders.

To overcome these limitations, we examined the relationship between characteristics of the neighborhood of residence of older adults and symptoms of depression using longitudinal data from the New York City Neighborhood and Mental Health in the Elderly Study (NYCNAMES). We hypothesized that neighborhood socioeconomic status may either exacerbate or ameliorate the stressors confronting participants, thereby influencing levels of depression symptoms over the study period, even after accounting for key individual-level factors. We used information from the 2000 US Census to characterize neighborhoods, and we aggregated these characteristics into dimensions that might shed light on the mechanisms underlying observed relationships.

METHODS

NYCNAMES is a 2-year longitudinal study of older residents of New York City that commenced between June and December of 2005, when 4000 adults were recruited to a random-digit-dial telephone survey asking questions about the social environment of New York City. One randomly selected adult 18 years or older was interviewed in each household. Interviews were conducted in English or Spanish. The cooperation rate was 54%, representing the percentage of those contacted who agreed to participate in the study ([completed + screened out] / [completed + screened out + refused]).

In early 2007, we attempted to reinterview all 1325 survey participants from 2005 who were 50 years or older and who had indicated they would be prepared to be contacted again. A final total of 808 consenting respondents were administered a computer-assisted second telephone interview that included questions on their physical and mental health as well as key individual-level factors that may influence those health outcomes. Interviews were approximately 20 minutes long and were conducted by trained and supervised lay surveyors. Respondents were offered $10 in compensation for their participation.

Interviews included questions on age, race/ethnicity, gender, marital status, place of birth, education, income, employment, and years lived in the current neighborhood.

Depression

Symptoms of depression were measured in both waves with the Patient Health Questionnaire (PHQ), which includes a 9-item symptom severity rating scale for depression with acceptable psychometric properties and which gives a dimensional total score that is sensitive to change.[44] Telephone and in-person assessments that used the PHQ brief interview have been shown to yield similar results to one another.[45] The PHQ-9 measures a common conception of depression in African American, Chinese American, Hispanic, and non-Hispanic White patient groups.[46] We chose this dimensional depression instrument a priori to allow us to focus on symptom changes as the primary outcome, as opposed to focusing on a dichotomous diagnosis.

Individual-Level Covariates

Physical limitation was measured at follow-up with the Functional Status Questionnaire component that measures physical function in activities of daily living.[47] Physical activity levels were determined at follow-up with the Physical Activity Scale for the Elderly (PASE).[48] PASE was specifically designed for use with older people by mail or telephone.[49] PASE scores have been significantly correlated with 3-day accelerometer readings[50] and with physiological and performance characteristics.[48,51]

A list of major life events that could have proven stressful in a person's life was used to measure stressors between each assessment.[52] We defined a continuous variable "change in stressor score" as the difference between the number of stressors at follow-up and the number of stressors at baseline. The frequency of each participant's contact with their social networks at baseline was measured by asking how often they were in contact with members of their family or friends who did not live with them.[53] We included personality trait neuroticism in our analysis, because numerous longitudinal studies suggest this trait is an individual-level predictor of incident depression.[54] This covariate was measured at wave 2 with the short neuroticism arm of the Eysenck Personality Questionnaire Brief Version.[55]

Neighborhood-Level Measures

Respondents provided information about their residential addresses or nearest cross-streets, allowing 97.6% of our sample to be geocoded to a US Census tract. Data on the socioeconomic characteristics of participants' census tracts of residence at baseline interview were derived from the 2000 US Census.[56] Socioeconomic status measures included in our analysis were chosen based on theoretical assumptions about the types of neighborhood socioeconomic constructs that may influence mental disorders (i.e., disadvantage, affluence, inequality), and based on the types of census measures used to operationalize such theoretical constructs in prior work (Table 1).

Analysis

Neighborhood measures are highly collinear because they reflect different characteristics that exist concurrently in neighborhoods, such as the proportion of residents living in poverty and the proportion receiving public assistance. To avoid the problem of multi-collinearity, a number of researchers have undertaken factor analysis to derive a parsimonious and uncorrelated set of factors that capture the key neighborhood socioeconomic and sociodemographic measures of interest.[57] We adopted a

similar approach to determine the specific dimensionality of the individual measures in our study context and time period. We conducted a principal factor analysis with an orthogonal varimax rotation of the measures we derived from the 2000 Census.[58] The factor scores were standardized to have a mean of 0 and a standard deviation of 1. Variables included in the factors were those that loaded 0.4 or more onto at least 1 factor. When variables loaded 0.4 or more on more than 1 factor and there was a clear difference in the magnitude of loading between factors, we included it within the factor onto which it loaded the highest. This is standard practice in epidemiological applications of factor analysis.[59] Women-headed households loaded almost identically to 2 dimensions and were therefore dropped from analysis.

The factor analysis supported a 3-factor solution with distinct dimensions based on an eigenvalue of 1 and the scree plot (Table 1). The first factor, which we interpret as socioeconomic influences, denotes "high affluence and low disadvantage" neighborhoods characterized by a high concentration of residents who have a high school diploma, earn at least $50 000, work in professional or managerial occupations, and have an undergraduate degree, and a low concentration of residents who are unemployed, on public assistance, or living in poverty. The second factor, interpreted as residential stability, is characterized by a high proportion of residents living in the same house for the previous 5 years and a high proportion of owner-occupancy. The third factor, interpreted as racial/ethnic composition, is denoted by a higher proportion of foreign-born residents and a lower proportion of African Americans.

The first factor, socioeconomic influences, loaded highly on the affluence dimension. To examine the relative influence of affluence and disadvantage, we also constructed 2 composites from the first factor: (1) those measures loading positively onto the first factor and thus denoting affluence, and (2) those measures loading negatively onto the first factor and denoting disadvantage (Table 1).

Analysis of a model including all individual-level variables showed a significant intraclass correlation coefficient (ICC=0.06). We therefore used generalized estimating equation (GEE) models for both bivariate and multivariate analyses.[60]

We first examined associations at the bivariate level. Multivariable analysis was then used to build a model with individual-level covariates that had significant bivariate associations with the outcome. We also included gender, age, and household income in these models because theory and previous literature suggest these factors may confound the relationship between neighborhood and depression. We examined the relationship of neighborhood-level factors with change in depression score by separately entering them into multilevel linear GEE models adjusted for individual-level confounders. Neighborhood-level factors were further examined in multivariable models that adjusted for all neighborhood-level and individual-level characteristics. We used a similar approach to examine new onsets of depression using logistic regression in place of linear regression.

RESULTS

A total of 808 participants were reinterviewed, with 13 more reported as deceased. The gender (P=.940) and age (P=.789) structure of this sample was similar to that of New York City residents aged 51 years or older. Hispanic and Asian participants were underrepresented, however (P=.007). The follow-up rate (interviewed/[total−number died]) was 61.6%. Of those not completing the interview, 83 refused. Loss to follow-up was nondifferential on gender or borough of residence, but White, older, and wealthier participants were more likely to be interviewed in both waves (Table 2). Participants lost to follow-up had

TABLE 1—Factor Analysis of Socioeconomic Variables: NYCNAMES, 2005–2007

Census Tract Characteristics	Factor Pattern				
	Factor 1: Socioeconomic Influences	Factor 2: Residential Stability	Factor 3: Racial/Ethnic Composition	Factor 1 Composites	
				Affluence	Disadvantage
High school graduates (aged ≥25 y), %	0.921	0.116	−0.025	0.916	. . .
Have undergraduate degrees or more (aged ≥25 y), %	0.882	−0.366	−0.040	0.873	. . .
Households with annual income above $50 000, %	0.878	0.223	0.099	0.913	. . .
Working in managerial, professional, or related occupations, %	0.875	−0.266	−0.184	0.871	. . .
Unemployed, %	−0.612	−0.190	−0.496	. . .	0.802
Latino, %	−0.671	−0.396	0.159	. . .	0.731
Households with public-assistance income, %	−0.757	−0.197	−0.383	. . .	0.885
Live in poverty (individuals), %	−0.793	−0.335	−0.336	. . .	0.914
Live in owner-occupied housing, %	0.513	0.724	0.100	0.585	. . .
Living in same house as 5 years ago, %	−0.161	0.659	−0.113	. . .	. . .
Residents per square meter	−0.182	−0.672	0.024	. . .	. . .
Foreign born, %	−0.215	−0.042	0.798	. . .	. . .
African American, %	−0.300	0.354	−0.546	. . .	. . .

Note. NYCNAMES = New York City Neighborhood and Mental Health in the Elderly Study. Ellipses indicate that a score was not applicable.

higher depression scores but were not more likely to have a diagnosis of depression. At baseline, approximately 90% of participants had lived in their neighborhood (defined as "an area within a 20-minute walk of your house") for at least 5 years. At follow-up, only 18 participants (2.4% of analyzed sample) had moved more than 3 census tracts away from their baseline address.

The results of analyses of the relationship between individual-level variables and changes in symptoms of depression are shown in Table 3. When individual-level factors were considered together in multivariable analysis, high neuroticism score, high stressor score prior to follow-up, worsening of stressor score between baseline and follow-up, African American race, and less frequent contact with social networks at baseline predicted a worsening depression score.

When the 3 neighborhood constructs we had previously identified were included in this multivariate model, the socioeconomic influences factor was protective against worsening depression score (b=−0.48; 95% confidence interval [CI]=−0.83, −0.12) after adjusting for individual-level factors (Table 4). Neither residential stability nor ethnicity of neighborhood was associated with symptoms of depression. When the socioeconomic influences factor was replaced by the affluence and disadvantage composites, affluence remained strongly protective against worsening of depression symptoms (b=−0.45; 95% CI=−0.78, −0.12), whereas disadvantage was a marginally significant predictor of a worsening score (b=0.37; 95% CI=−0.02, 0.75).

At the follow-up interview, there were only 26 new cases of depression (as defined by responses to the PHQ) among participants who did not meet these criteria at baseline. This precluded meaningful analysis of the factors associated with the new diagnoses. However, unadjusted GEE showed a pattern of associations broadly similar to that found for changes in symptom levels.

TABLE 2—Characteristics of Participants Interviewed in Both Study Waves and Those Lost to Follow-up: NYCNAMES, 2005–2007

	Baseline and Follow-Up	Baseline Only	*P*
Gender, no. (%)			
Men	342 (42.33)	243 (47)	.095
Women	466 (57.67)	274 (53)	
Race/ethnicity, no. (%)			
Hispanic	74 (9.22)	64 (12.6)	.003
African American	218 (27.15)	164 (32.28)	
White	485 (60.4)	253 (49.8)	
Asian/Pacific Islander	15 (1.87)	17 (3.35)	
Other	11 (1.37)	10 (1.97)	
Borough, no. (%)			
Queens	235 (29.08)	145 (28.05)	.515
Brooklyn	225 (27.85)	158 (30.56)	
Bronx	117 (14.48)	85 (16.44)	
Manhattan	180 (22.28)	100 (19.34)	
Staten Island	51 (6.31)	29 (5.61)	
Income, no. (%)			
≤$40 000	328 (40.59)	236 (45.65)	<.001
$40 000–$80 000	205 (25.37)	138 (26.69)	
>$80 000	232 (28.71)	72 (13.93)	
Missing	43 (5.32)	71 (13.73)	
Depression, no. (%)			
No	781 (96.66)	489 (94.58)	.065
Yes	27 (3.34)	28 (5.42)	
Depression score, mean (range)	3.09 (0–25)	3.68 (0–27)	.018
Age, y, mean (range)	62.09 (47–93)	59.51 (47–92)	<.001

Note. NYCNAMES = New York City Neighborhood and Mental Health in the Elderly Study.

DISCUSSION

This is one of the first longitudinal studies to investigate and demonstrate a significant association between characteristics of the neighborhood in which one lives and the person's subsequent risk of depression after accounting for key individual-level characteristics, including household income. It provides some of the strongest evidence yet that a person's neighborhood of residence contributes to their mental health, at least for older adults.

Most previous research in this field has been cross-sectional, and the longitudinal research that has been done has only been able to take account of limited individual-level determinants of depression. We included in our analysis all widely accepted individual-level confounders. Of these, personality trait neuroticism and worsening of life stressors were significant determinants of worsening symptoms of depression. These findings are broadly consistent with previous research.[54]

Being of African American race was also associated with an increased risk of worsening depression symptoms in multivariate individual-level analysis (adjusted for individual-level income). At least 1 other study has identified an increased prevalence of depression among older African Americans, with this racial difference increasing slightly over time.[7] In our final model, race lost significance when neighborhood-level factors were included. This may be a consequence of sample size limitations. However, this finding also suggests that at least part of the observed association between African American race and increased risk of depression in this sample of older adults may be explained by contextual factors rather than individual-level factors. This would be consistent with previous research that found that the stressors associated with neighborhood disorder and discrimination influenced depressive symptoms among African American women, independent of household income.[19] Lack of access to socioeconomic resources has also been suggested as a key driver

TABLE 3—Unadjusted and Adjusted Associations Between Individual-Level Covariates and Change in Depression Score: NYCNAMES, 2005–2007

	Crude Associations, b (95% CI)	Associations Adjusted for Individual-Level Covariates, b (95% CI)	Final Model,[a] b (95% CI)
Women	–0.01 (–0.04, 0.02)	–0.50 (–1.08, 0.09)	–0.49 (–1.08, 0.10)
Age	–0.01 (–0.04, 0.02)	0.01 (–0.02, 0.03)	0.01 (–0.02, 0.04)
Black	0.91 (0.28, 1.55)	1.11 (0.44, 1.78)	0.41 (–0.78, 1.60)
Less than high school diploma	0.97 (–0.01, 1.95)		
≤ $ 40 000 household income	0.35 (–0.33, 1.02)	–0.06 (–0.77, 0.65)	–0.38 (–1.15, 0.39)
Divorced or separated	0.50 (–0.23, 1.24)		
Personality trait neuroticism	0.09 (0.05, 0.12)	0.10 (0.04, 0.16)	0.10 (0.04, 0.16)
Stressor score (follow-up)	0.45 (0.17, 0.72)		
Change in stressor score	0.31 (0.11, 0.53)	0.31 (0.07, 0.55)	0.29 (0.05, 0.54)
Physical activity score	0.00 (0.00, 0.00)		
Basic ADL score	–0.02 (–0.04, 0.01)		
Intermediate ADL score	–0.01 (–0.04, 0.01)		
Body mass index	0.03 (–0.02, 0.08)		
Social support scores	0.08 (–0.02, 0.17)		
Frequency of contact with social network[b]			
3–4 d/wk	–0.76 (–1.51, –0.02)	–0.91 (–1.67, –0.14)	–0.91 (–1.67, –0.14)
1–2 d/wk	–0.93 (–1.72, –0.14)	–1.10 (–1.85, –0.35)	–1.03 (–1.78, –0.28)
1–3 d/mo	0.00 (–0.98, 0.97)	–0.27 (–1.42, 0.89)	–0.26 (–1.39, 0.88)
Less than once per mo	0.10 (–1.16, 1.35)	–0.12 (–1.85, 1.60)	–0.04 (–1.71, 1.63)

Note. NYCNAMES = New York City Neighborhood and Mental Health in the Elderly Study; CI = confidence interval; ADL = activities of daily living. Crude and adjusted associations were calculated with linear regression in a generalized estimating equation model. Analysis was limited to 745 to 765 participants who could be geocoded, had complete data, and still lived in New York City at follow-up. See "Methods" section for details on scales.

[a]Includes both individual covariates and neighborhood factors.

[b]Compared with 5 or more days per week.

of racial disparities in health.[61,62] Our findings suggest that some of these resources may exist at a neighborhood level rather than an individual level.

We also found some evidence for an association between depression and the contact participants reported having at baseline with family or friends, with everyday contact predicting subsequent worsening of depression score. There are a number of possible explanations for this observation. It may reflect the tendency of individuals who suffer recurring depression symptoms to have a greater need for support even when their symptoms are in abatement. Alternatively, this finding is consistent with the hypothesis that received (as distinct from anticipated) social support for the elderly may reinforce a sense of dependence, rather than buffering the impact of life stressors, leading to feelings of helplessness and exacerbating symptoms of depression.[63] Not all social contact is positive, and it has also been suggested that negative interactions may be more predictive of depression than supportive interactions.[64] Strain arising from social ties may be particularly important for individuals with fewer resources.[65] For example, elderly people in a disadvantaged family may be required to provide a distressing amount of child care.

When we included the 3 neighborhood dimensions in multivariate analysis, socioeconomic influences were protective against worsening symptoms of depression. Of the 2 composites we had constructed denoting positive and negative aspects of this dimension, affluence appeared to exert the strongest effect, although there was also borderline evidence that disadvantage increased the risk of worsening depression. This is an important distinction, because it suggests that the observed relationship between neighborhood socioeconomic status and depression does not simply result from exposure to increased levels of stressors associated with poor neighborhood conditions. Rather, affluent neighborhoods appear to exert a protective effect, presumably through increasing an individual's resilience to the stressors he or she faces.

The protective effect of neighborhood affluence was observed even after accounting for participants' individual socioeconomic status, which suggests that the observed association was not simply the result of participants with recurring depression symptoms having reduced incomes and a greater likelihood of living in a poor area. This conclusion is reinforced by sensitivity analysis that included baseline depression score in our models. The observed protective effect of neighborhood affluence was little changed in this model.

Cross-sectional research has previously suggested that residential stability may be protective against depression.[9] Although our findings were not inconsistent with this research, the trend observed in our study was not statistically significant, which may be a reflection of our limited sample size. Racial/ethnic composition of the neighborhood also had little influence on levels of depression after accounting for individual race.

The number of new PHQ-defined depression cases in our study was too small to allow us to investigate the influence of individual-level and neighborhood-level factors on depression incidence. However, the unadjusted multilevel logistic regression we did undertake was broadly consistent with our findings. In any case, there is considerable evidence suggesting that dimensional measures of depression may be a more appropriate outcome measure than diagnoses in population-based research.[66]

Strengths and Limitations

This study has many strengths. Its longitudinal nature allowed investigation of temporal relationships that could not have been investigated in cross-sectional research. The cohort was nested in a randomly selected sample of the general population. The relationship between neighborhood characteristics and depression was examined using analytic methods that account for clustering and that included key individual-level determinants of depression. Dependent and independent

TABLE 4—Unadjusted and Adjusted Associations Between Neighborhood-Level Covariates and Change in Depression Score: NYCNAMES, 2005–2007

	Unadjusted Associations, b (95% CI)	Neighborhood Factors,[a] b (95% CI)	Final Multivariate Model,[b] b (95% CI)
Factor 1: Socioeconomic influences	–0.52 (–0.80, –0.25)	–0.47 (–0.81, –0.12)	–0.48 (–0.83, –0.12)
Factor 2: Residential stability	0.23 (–0.03, 0.49)	0.22 (–0.04, 0.48)	0.18 (–0.08, 0.44)
Factor 3: Ethnicity	0.41 (0.10, 0.08)	–0.03 (–0.37, 0.31)	–0.19 (–0.55, 0.16)
Factor 1 affluence composite	–0.52 (–0.80, –0.25)	–0.45 (–0.78, –0.12)	
Factor 1 disadvantage composite	0.50 (0.18, 0.83)	0.37 (–0.02, 0.75)	

Note. NYCNAMES = New York City Neighborhood and Mental Health in the Elderly Study; CI = confidence interval. Both crude and adjusted associations were calculated using linear regression in generalized estimating equation models.
[a]Adjusted separately for all individual covariates.
[b]Includes all individual covariates and neighborhood factors.

variables were measured using well-validated instruments, and neighborhood characteristics were estimated using census data, which helped avoid problems with recall bias. Neighborhood characteristics were assigned by census tract, a fine-grained spatial level that accounts for socioeconomic heterogeneity better than data aggregated at larger population levels.[67]

The major weaknesses of this study relate to the sample and the follow-up rate. Although even this small sample was large enough to allow for identifying neighborhood effects, it would have been interesting to explore in more detail whether these effects were consistent for different age and racial groups or gender. Unfortunately, this was not possible. Although neither the baseline sample nor the follow-up sample differed from the broader older population of New York City in terms of age or gender, both were underrepresentative of Hispanics and Asians. Slightly fewer Whites were lost to follow-up than were those from other races. All analyses were adjusted for race, and the small absolute differences resulting from loss to follow-up seem unlikely to bias the overall study findings. However, the limited Hispanic sample means caution should be taken when extrapolating our results to this group. There was also no systematic difference between participants lost to follow-up with respect to the key independent variable: neighborhood of residence. Participants who were lost to follow-up were not more likely to have a diagnosis consistent with depression, but they did have slightly higher baseline depression scores.

Conclusions

Despite their limitations, these findings suggest that the neighborhood in which an older person lives has a significant impact on his or her mental health, even after accounting for individual-level determinants. It is important to identify neighborhood characteristics that make older persons more or less likely to be depressed so that structural interventions may be better targeted toward improving the health of this population. ■

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This article was accepted April 16, 2008.

Contributors

J.R. Beard originated and designed the study, oversaw the study's longitudinal aspects, and led article preparation. M. Cerdá initiated and supervised the factor analysis and contributed to article development. S. Blaney performed the analysis and contributed to article preparation. J. Ahern supervised the initial phases of the study and contributed to article preparation. D. Vlahov contributed to all phases of the study and to article preparation. S. Galea supervised the initial phases of the study and contributed to the analysis and to article preparation.

Acknowledgments

Magda Cerdá was funded under the Robert Wood Johnson Health and Society Scholars Program. This research was funded, in part, by the National Institute on Drug Abuse (grant 1 R21 DA025343).

Human Participant Protection

The protocol for this study was approved by the New York Academy of Medicine institutional review board.

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