



Published in final edited form as:

*Ann Epidemiol.* 2012 June ; 22(6): 379–387. doi:10.1016/j.annepidem.2012.04.012.

## The Consequences of Foreclosure for Depressive Symptomatology

Theresa L. Osypuk, ScD<sup>1</sup>, Cleopatra Howard Caldwell, PhD<sup>2</sup>, Robert Platt, PhD<sup>3</sup>, and Dawn Misra, PhD<sup>4</sup>

Cleopatra Howard Caldwell: cleoc@umich.edu; Robert Platt: robert.platt@mcgill.ca; Dawn Misra: dmisra@med.wayne.edu

<sup>2</sup>Associate Professor, Department of Health Behavior and Health Education, School of Public Health, University of Michigan, Ann Arbor, MI 48109

<sup>3</sup>Professor, Departments of Epidemiology, Biostatistics and Occupational Health and of Paediatrics, McGill University, Montreal, QC, Canada

<sup>4</sup>Associate Professor, Department of Family Medicine and Public Health Sciences, Wayne State University, Detroit, MI 48201

### Abstract

**Purpose**—We tested whether experiencing the stressful event of a home mortgage foreclosure was associated with depressive symptomatology.

**Methods**—Data derive from a cohort study of 662 new mothers in the Life-course Influences on Fetal Environment (LIFE) Study. Eligibility included age 18-45 Black/African American mothers who had just given birth to a singleton baby. Mothers enrolled June 2009 to December 2010 were interviewed immediately after giving birth. Our outcome measure was depressive symptoms based on the Center for Epidemiologic Studies-Depression Scale, dichotomized to measure severe depressive symptomatology during the week prior to the interview.

**Results**—8% of the sample experienced foreclosure in the past 2 years. Covariate-adjusted Poisson regression models showed that women experiencing a recent foreclosure had 1.76 times higher risk for severe depressive symptoms during the week prior to birth compared to women not experiencing foreclosure (95%CI: 1.25 to 2.47,  $p=.001$ ); foreclosure was also associated with higher excess absolute risk for depressive symptoms (adjusted risk difference =0.173, 95%CI: 0.044 to 0.301,  $p=.008$ ).

**Conclusions**—Women who have recently experienced foreclosure are at risk for severe depressive symptoms. The mental health needs of pregnant women experiencing foreclosure or other housing stressors should be considered in clinical practice.

### 3 - 10 MeSH heading key words

housing; depressive symptoms; childbirth

---

© 2012 Elsevier Inc. All rights reserved.

<sup>1</sup> Corresponding Author, Assistant Professor, Northeastern University, Bouve College of Health Sciences, Department of Health Sciences, 360 Huntington Avenue, RB 316, Boston, MA 02115. Phone: 617-373-3667, Fax: 617-373-2968. tosyuk@neu.edu.

**Publisher's Disclaimer:** This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Major depression is a public health problem and a leading cause of disability worldwide(1). Women face twice the lifetime risk for major depressive disorder (MDD) as men(2, 3), with onset of depression peaking among women during their childbearing years(3, 4). The best evidence from meta-analyses suggests that as many as 18% of women are depressed during pregnancy, with 13% having an episode of major depression(5). The health care and social costs of depression are high(6), since depression among mothers specifically is associated with worse outcomes for their children including birth outcomes(7, 8), child growth (9), interpersonal interactions between mothers and children(10), psychological disturbance, and social and academic competence(11, 12).

The US has recently experienced a collapse of its mortgage industry and a rash of foreclosures which precipitated the recent economic downturn and falling housing prices. Foreclosure is initiated by a lender when a borrower breaches the payment contract with the lender; the lender initiates legal action, the purpose of which is the sale of the property to recoup some balance of the loan(13). The foreclosure experience may or may not culminate in the borrower's loss of the property, depending on state laws and circumstances surrounding the proceedings.

Michigan and the Detroit metropolitan area have been hit particularly hard by foreclosures and the economic downturn(14). Detroit remains among the top 20 large metro areas with the highest serious mortgage payment delinquency rates-- a leading indicator of foreclosure(15)-- with approximately 6% of mortgages currently in some stage of foreclosure, and another 6% of mortgages over 90 days delinquent for payment(15). Moreover, Black homeowners, and residents of high % Black neighborhoods, have been disproportionately more likely than white residents and residents in high % white neighborhoods to experience home foreclosure(16). Given the high recent incidence of foreclosures, the population mental health implications of the foreclosure crisis may be large, especially among Black residents. Yet few studies have considered the mental health effects of foreclosure (17).

As an exception, Pollack and colleagues conducted a health survey among homeowners with delinquent mortgages attending mortgage counseling in Philadelphia, and compared prevalences of health conditions and health care/health insurance coverage in this sample to those of a community based sample(17). However this sample was not population based, and did not include an unexposed comparison group, relying instead on sampling those who experienced foreclosure, and comparing those estimates to the general population, thereby introducing potential selection bias (selection into mortgage counseling) and differential measurement error (when measures are different across surveys) as potential explanations for results.

Although the evidence linking foreclosure per se to adverse health outcomes is limited, different dimensions of housing have been documented as influencing health. In addition to the strong historical legacy that the public health discipline has cultivated in improving substandard housing slums (e.g. from the late 19<sup>th</sup> century sanitation movement)(18), the majority of contemporary housing-health literature focuses on the health and mental health effects of homelessness, or of pathological physical housing exposures like lead paint, damp, mold, cold, pests, and overcrowding(18, 19). Housing tenure, housing affordability (including foreclosure), and housing displacement are less well studied but may be strong housing-related social determinants of health (18, 19). For example, homeowners enjoy considerable tax benefits, and homeownership is the primary source of American family wealth(18, 19). Housing therefore is an expression of and pathway to socioeconomic advancement. Like other socioeconomic indicators, housing tenure displays a socioeconomic gradient in health whereby renters have worse health than homeowners (19,

20). However the financial strain of homeownership may offset health benefits (21), especially among low-income households, and the health effects of this potentially-adverse dimension of homeownership is understudied.

Housing lack of affordability(18, 22), including falling into mortgage arrears(21), is linked with worse health and mental health, aligning with a stream of literature finding major life stressors are associated with poor health and mental health(23). Moreover, chronic stressors like financial strain and job loss both cause(24) and are affected by(13, 25) health. Losing a home to foreclosure represents an extreme outcome of housing affordability problems, and represents a huge financial deficit, since property constitutes the largest capital investment for most households(26). The loss is also of high emotional intensity(27), which may be due to the psychosocial benefits of “home” that accrue above and beyond the provision of shelter(28), as well as to the cultural meaning attached to homeownership in America as representing success(18).

We therefore sought to test whether experiencing the stressful, prolonged experience of home foreclosure was associated with worse depressive symptomatology using a sample in a location with particularly high foreclosure rates (the Detroit MI metro area), during a particular point in the life course (during or recently preceding pregnancy) when women's health might be more vulnerable to housing shocks, and during a period when foreclosure dramatically increased in the US due to housing market-related factors.

## Methods

In the Life-course Influences on Fetal Environments (LIFE) study, we conducted a retrospective cohort study of self-reported Black/African American women aged 18-45 who had just given birth to a singleton baby in a Detroit, MI suburban hospital (Providence Hospital, Southfield MI). Women were recruited from the hospital's labor and delivery and postpartum unit logs. All eligible women were approached for study enrollment during their postpartum hospitalization, and written informed consent was obtained if they enrolled. The study participation rate was 70%. A \$50 giftcard to a local store was provided as an incentive for completing the interview. Enrollment began in June 2009 and this analysis is based on enrollment through December 31, 2010. Women were interviewed by trained interviewers in their hospital room during the immediate postpartum hospitalization. The final analytic sample size was 662 women. The study was approved by our university and hospital institutional review boards.

The main outcome of interest for this analysis was severely high depressive symptomatology, measured by the 20-item Center for Epidemiological Studies Depression Scale (CES-D). This is a reliable, valid scale for measuring depressive symptoms and symptom severity in community samples(29) (30), as well as in subgroups such as Black populations(29), pregnant women, and pregnant Black women(31-33). Women reported depressive symptoms during the past week for 20 items, each rated on a Likert scale 0-3 (rarely, some of the time, occasionally, most of the time) (29). We reverse-coded the positive valence items, summed CES-D items, and confirmed the scale's internal consistency reliability (Cronbach's  $\alpha=.87$ ). We imputed the few missing CES-D item values to the item-specific mean for the sample. The range of the CES-D scale is theoretically 0-60. We modeled a binary CES-D variable with a cutoff of 23 or higher (severe depressive symptomatology, SDS), which is suggestive of major depressive disorder (MDD),(33-35) and used a continuous CES-D score as a secondary outcome. Prior research has demonstrated the content, concurrent, and discriminant validity of the CES-D. High CES-D values are associated with clinical assessments of MDD, with self-rated need for professional help, and individuals in treatment for depression exhibit decreases in CES-D

scores over time(29, 30, 33, 36). Sensitivity analyses using the psychological distress measure K6 (37) as an alternate outcome found comparable results as CES-D (not shown). Since the CES-D scale items include some items that are common symptoms during pregnancy, consistent with prior literature(31, 33), we conducted sensitivity models to omit somatic items of poor appetite, distractedness, everything was an effort, and restless sleep, and re-summed the CES-D (range: 0-48). We found almost identical results for the 16-item compared with the 20-item CES-D, suggesting that our results are not explained by pregnancy specific symptoms; we therefore used the 20-item measure for analyses presented here.

The exposure of interest was a woman's retrospective self-report of experiencing foreclosure on her house during her pregnancy or in the 2 years before giving birth. This was asked of all respondents, regardless of current housing tenure (rent vs. own), so renters could have experienced foreclosure of their rental unit. We tested the two foreclosure time periods (during pregnancy, vs. in the 2 years before giving birth) as separate variables (compared to not experiencing foreclosure) but associations with depressive symptomatology were not significantly different from each other so we combined the classification into one variable.

We adjusted for several potential demographic confounders including age, marital status, as well as potential confounders that may be common causes of both foreclosure and depressive symptomatology, including education, family income, employment, use of income support policies(e.g. Temporary Assistance to Needy Families), and self-report of chronic health problems experienced before pregnancy (specifically asthma, hypertension, diabetes, or thyroid problems) (See Table 2 for additional covariate coding detail). The sample is 99% insured (including Medicaid), so health insurance was controlled in this sample essentially by restriction; results may not therefore be generalizable to the uninsured. Missing data was modeled by contrast-coded indicator variables. Aside from income (8% missing), few variables had substantial amounts of missing data.

Since we have a common outcome, we applied multiple Poisson regression with robust standard errors for the dichotomous main outcome of SDS to obtain the risk ratio with 95% confidence intervals (CI) (38); we derived the absolute risks and risk differences in SDS from marginal predicted probabilities from the Poisson model, to illustrate the associations on the absolute scale. We confirmed model fit using the chi-squared goodness of fit test. We used multiple linear regression for the continuous outcome of depressive symptoms, and report the mean difference in CES-D with 95% confidence intervals.

## Results

As indicated in Table 1, 90% of our sample women had earned some college education or higher, and the modal annual household income was \$20-40,000 for 31% of the sample. Forty-two percent of the sample was single at the time of the infant's birth, 27% reported pre-pregnancy health problems, 54% were on an income support policy (e.g. food stamps), 49% were currently working, and their mean age was 27.5 years.

Eight percent of women in our sample experienced a foreclosure during pregnancy or in the two years before giving birth. Further, 24% exhibited severe depressive symptomatology (CES-D 23+), with a mean CES-D score of 16.7 one week prior to delivery. These levels of depressive symptoms align with prevalence estimates from other samples or subsamples of pregnant Black women, as does the internal consistency reliability of our CES-D scale(31, 33). Our bivariate analysis found that women who experienced foreclosure were more likely to experience severe depressive symptomatology ( $p=.001$ ) and higher mean CES-D scores ( $p=.01$ ) than women who did not experience foreclosure. Employment was the only other

covariate that exhibited significant bivariate differences across foreclosure levels, where women who experienced foreclosure had lower rates of current workforce participation than women who did not experience foreclosure ( $p=.02$ ).

Table 2 presents results from Poisson multiple regression models of severe depressive symptomatology. Women who experienced foreclosure within the past 2 years exhibited 1.88 times the risk of severe depressive symptomatology one week prior to delivery, compared to women who did not experience foreclosure (95% CI: 1.33-2.64,  $p<.001$ ) (Model 1, Table 2, unadjusted models). Adjusting for covariates (Model 2) reduced the risk ratio somewhat, but those experiencing foreclosure still exhibited 1.76 times significantly higher risk of severe depressive symptomatology than those who did not experience foreclosure (adjusted RR=1.76, 1.25-2.47,  $p=.001$ ).

The absolute crude risk difference was large, at 0.199 (95% CI: 0.063-0.335,  $p=.004$ ), indicating a 20 percentage point higher risk for SDS among those experiencing foreclosure. The adjusted risk difference did not differ substantially from the unadjusted risk difference (adjusted RD=0.173, 95% CI: 0.044-0.301,  $p=.008$ ), with a 17 percentage point higher adjusted risk for severe depressive symptomatology among those experiencing foreclosure. Specifically, the adjusted risk for SDS among the nonforeclosed was 0.228 (95% CI: 0.196-0.261  $p<.001$ ), and among the foreclosed the adjusted risk for SDS was .401 (95% CI: .277-.525  $p<.001$ ).

Table 3 presents results from linear regression models of continuous depressive symptom scores. In unadjusted models (Model 1), women who experienced foreclosure exhibited a 4.45 point higher mean CES-D score (95% CI: 1.64-7.25,  $p=.002$ ). In models adjusted for covariates (Model 2), foreclosure was associated with a 4.04 point higher CES-D score (95% CL: 1.24-6.84  $p=.005$ ). This effect size is equal to 40% of a standard deviation in the CES-D score.

## Discussion

Our study found that women who experienced a foreclosure in the prior two years exhibited adjusted 76% higher relative risk, and 0.17 excess absolute risk, of severe depressive symptoms, as well as higher mean depressive scores, prior to delivery. The effect size was substantial on the absolute scale, as the foreclosed population had a SDS risk that was 17 percentage points higher than the nonforeclosed. These results suggest that the population burden of mental health from foreclosure may be substantial, especially for Black women, particularly during a vulnerable time in a woman's life course.

Although the housing and health literature has traditionally focused on the health effects of homelessness and pathological features of the physical housing structure, issues such as housing affordability, including devastating experiences like foreclosure, are important understudied social determinants of health(18, 19). Since the average household in foreclosure has not made a payment in 17 months(39), foreclosure is not only a stressor of long duration, but also one of high intensity, as households endure periods of extended uncertainty and financial strain(40). In qualitative research findings, participants undergoing foreclosure expressed intense emotional reactions including anger; bitterness; helplessness; and feeling cheated, severely heartbroken and like a failure. The foreclosure experience instigated a decline in social status, accompanied by shame and embarrassment. The foreclosure experience is therefore associated with high amounts of stress(27).

Mental health is only one discrete domain of life affected by foreclosure. Other consequences include displacement and instability of housing or, for children, schools, downgrading in housing unit or neighborhood quality, damaged credit ratings, loss of

wealth, and exacerbation of household conflict or adverse behaviors precipitated by the stress of the foreclosure such as marital conflict, child abuse, or addiction(41). Innovative programs like medical-legal partnerships serve the needs of low-income households in health care settings by combining medical care with other unmet service needs across sectors (legal counseling, housing, income support)(42); such a multipronged approach is promising for addressing both prevention and treatment of foreclosure problems and mental health. Such integrated services may be particularly appropriate when screening postpartum women for unmet joint medical and legal needs as they interact with the health care system for their newborns. However foreclosure is not occurring exclusively among low-income households, laying bare the dearth of service systems serving vulnerable moderate-income populations. While all of the women in our cohort are African-American, a substantial number are middle class according to education. Recent federal funds have been deployed to support homeowners with foreclosure prevention programs, which restructure the loan terms to be more affordable for families, offer unemployment income assistance, or devise arrangements where the homeowners can remain in their home as renters(41, 43). However typically there is considerable negotiation and bureaucratic navigation required that behooves drawing on legal expertise(27).

## Limitations

Like all observational cohort studies, causal inference is limited by potential confounding by unmeasured covariates, including financial strain that preceded the foreclosure event and may cause both the foreclosure and poor mental health, or by reverse causation where depression may cause foreclosure via income declines. Some evidence supports medical problems as a cause of foreclosure(13) (44, 45) while other evidence reports non-health related factors as primary causes, including financial strain from job loss, or structural features of the loan like increases in the mortgage payment amount (e.g. by adjustable rate loan resets, including from deceptive lending practices)(17, 44-46). We did not control for history of depression, which would have mitigated risk of reverse causation. However we did adjust for pre-pregnancy chronic health problems, marital status, unemployment, and financial strain to attempt to control such prior causes. Yet these were measured at the time of the birth, and may not have represented the household situation before foreclosure. Despite that we cannot technically rule out reverse causation, the period of time during which our study was executed is unique for understanding effects of economic shocks on health, and strengthens the findings' internal validity. Foreclosures are much more likely to occur when homeowners have negative equity (e.g. owing more on the house than the house is worth) which interacts with an adverse event (like job loss)(47). The rise in foreclosures occurring in the last half-decade was disproportionately due to exogenous factors such as declining housing prices (driving more homeowners into negative equity), and aggressive loan terms, such that homeowners experiencing unexpected income loss could not simply sell their house to resolve the debt(47). Therefore the causes of foreclosure during this time were less likely to be endogenous to a woman's mental health prior to foreclosure.

This cohort was recruited from African-American women giving birth at a suburban Detroit hospital, and therefore has highest generalizability to middle-class suburban African American populations. However we anticipate the foreclosure and depressive symptomatology patterns documented here would be comparable among other racial/ethnic groups and populations, especially during this economic period. Lastly, we did not utilize a diagnostic measure of mental health in this study. The CES-D scale is a screening tool, and as such, severe depressive symptomatology may capture symptoms that are not necessarily specific to only depression. However a CES-D cutoff above 23 has been documented as discriminating probable caseness of clinical depression(36). Moreover, although elevated

levels of depressive symptoms are often used as a proxy for MDD, they are also important in and of their own right including as a prodrome to future clinical depression(4, 32, 48).

## Conclusion

We found that recent experience of foreclosure was associated with higher risk of severe depressive symptomatology in a cohort of new mothers, even after adjusting for potential confounders. The population health impact of foreclosure may be especially large for mental health until the housing market recalibrates. In the meantime, integrated services across medical, legal, and housing sectors may be warranted to assist those who suffer through prolonged stressors associated with the foreclosure experience.

## Acknowledgments

Study funding was provided by NIH NICHD grant R01HD058510 (PI, Dr. Misra). The NIH funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript. All authors had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Dr. Osypuk had full access to all aspects of the research and writing process, and takes final responsibility for the paper. Dr. Osypuk conceived of the research question, conducted the data analysis, wrote the majority of the manuscript, and contributed to the design of the study questionnaire. Dr. Misra oversaw the study design, study enrollment and data collection, edited the manuscript and contributed to the interpretation of results. Drs. Caldwell and Platt contributed to the study design, interpretation of results, and edited the manuscript, and Dr. Platt advised on the statistical methods. All authors declare that none of us have conflicts of interest, financial or non-financial interests to declare that may be relevant to the current work. We are grateful to all of our participants who trusted us to use these data to better understand the problem of adverse birth outcomes for African-American women. We appreciate the hard work of our research assistants who conducted the interviews and medical record abstractions. We also acknowledge the work of our project manager, Dr. Rhonda Dailey, MD (Research Associate, Wayne State University), whose careful attention to collection of valid and reliable data was essential to development of this manuscript.

## References

1. Murray, C.; Lopez, A. World Health Organization. World Health Report 2002: Reducing Risks, Promoting Healthy Life. 2002.
2. Kessler R. Epidemiology of women and depression. *Journal of Affective Disorders*. 2003; 74(1):5–13. [PubMed: 12646294]
3. Weissman MM, Olfson M. Depression in Women: Implications for Health Care Research. *Science*. 1995; 269(5225):799–801. [PubMed: 7638596]
4. Eaton WW, Anthony JC, Gallo J, et al. Natural History of Diagnostic Interview Schedule/ DSM-IV Major Depression: The Baltimore Epidemiologic Catchment Area Follow-up. *Arch Gen Psychiatry*. 1997; 54(11):993–999. [PubMed: 9366655]
5. Gavin NI, Gaynes BN, Lohr KN, Meltzer-Brody S, Gartlehner G, Swinson T. Perinatal Depression: A Systematic Review of Prevalence and Incidence. *Obstetrics & Gynecology*. 2005; 106(5, Part 1): 1071–1083. [PubMed: 16260528]
6. Simon G, Ormel J, VonKorff M, Barlow W. Health care costs associated with depressive and anxiety disorders in primary care. *Am J Psychiatry*. 1995; 152(3):352–357. [PubMed: 7864259]
7. Yonkers KA, Wisner KL, Stewart DE, et al. The management of depression during pregnancy: a report from the American Psychiatric Association and the American College of Obstetricians and Gynecologists. *Gen Hosp Psychiatry*. 2009; 31(5):403–13. [PubMed: 19703633]
8. Orr ST, Miller CA. Maternal Depressive Symptoms and the Risk of Poor Pregnancy Outcome. *Epidemiologic Reviews*. 1995; 17(1):165–171. [PubMed: 8521934]
9. Rahman A, Iqbal Z, Bunn J, Lovel H, Harrington R. Impact of Maternal Depression on Infant Nutritional Status and Illness: A Cohort Study. *Arch Gen Psychiatry*. 2004; 61(9):946–952. [PubMed: 15351773]
10. Stein A, Gath D, Bucher J, Bond A, Day A, Cooper P. The relationship between postnatal depression and mother-child interaction. *The British Journal of Psychiatry*. 1991; 158(1):46–52. [PubMed: 2015451]

11. Downey G, Coyne JC. Children of Depressed Parents: An Integrative Review. *Psychological Bulletin*. 1990; 108(1):50–76. [PubMed: 2200073]
12. Weinberg MK, Tronick EZ. The Impact of Maternal Psychiatric Illness on Infant Development. *Journal of Clinical Psychiatry*. 1998; 59(Supp 2):53–61. [PubMed: 9559760]
13. Robertson CT, Egelhof R, Hoke M. Get Sick, Get Out: The Medical Causes Of Home Mortgage Foreclosures. *Health Matrix*. 2008; 18:65–104. [PubMed: 19161126]
14. Michigan State Housing Development Authority. News Release: Obama Administration Approves Granholm Plan to Help Homeowners Avoid Foreclosure with \$154.5 million in Federal Funds Banks, credit unions will partner to help more than 17,000 Michigan households starting July 12. Lansing, MI: Jun 23. 2010 Wednesday
15. Foreclosure-Response.org, Center for Housing Policy, Institute U. Metropolitan Delinquency and Foreclosure Data, March 2010-Dec 2010. Vol. 2011. Washington DC: Urban Institute; 2011.
16. Gerardi, KS.; Willen, PS. Federal Reserve Bank of Boston. Subprime Mortgages, Foreclosures, and Urban Neighborhoods. Presented at the UCLA-Berkeley Mortgage Meltdown Symposium; October 30–31, 2008; 2008. Report No. 08-6
17. Pollack CE, Lynch J. Health Status of People Undergoing Foreclosure in the Philadelphia Region. *Am J Public Health*. 2009; 99(10):1833–1839. [PubMed: 19696373]
18. Dunn JR. Housing and Health Inequalities: Review and Prospects for Research. *Housing Studies*. 2000; 15(3):341–366.
19. Acevedo-Garcia D, Osypuk TL, Werbel RE, Meara ER, Cutler DM, Berkman LF. Does Housing Mobility Policy Improve Health? *Housing Policy Debate*. 2004; 15(1):49–98.
20. Dunn JR, Hayes MV. Social Inequality, Population Health, and Housing: A Study of Two Vancouver Neighborhoods. *Social Science & Medicine*. 2000; 51:563–587. [PubMed: 10868671]
21. Nettleton S, Burrows R. Mortgage Debt, Insecure Home Ownership and Health: An Exploratory Analysis. *Sociology of Health & Illness*. 1998; 20(5):731–753.
22. Smith CA, Smith CJ, Kearns RA, Abbott MW. Housing stressors, social support and psychological distress. *Social Science & Medicine*. 1993; 37(5):603–612. [PubMed: 8211274]
23. Finlay-Jones R, Brown G. Types of stressful life event and the onset of anxiety and depressive disorders. *Psychol Med*. 1981; 11:803–815. [PubMed: 7323236]
24. Angel R, Frisco M, Angel J, Chiriboga D. Financial strain and health among elderly Mexican-origin individuals. *J Health Soc Behav*. 2003; 44:536–551. [PubMed: 15038148]
25. Himmelstein DU, Warren E, Thorne D, Woolhandler S. MarketWatch: Illness And Injury As Contributors To Bankruptcy. *Health Affairs*. 2005; 10.1377/hlthaffw5.63
26. Ford J, Burrows R. The Costs of Unsustainable Home Ownership in Britain. *Journal of Social Policy*. 1999; 28(2):305–330.
27. Nettleton S, Burrows R. When a capital investment becomes an emotional loss: the health consequences of the experience of mortgage possession in England. *Housing studies*. 2000; 15(3): 463–479.
28. Kearns A, Hiscock R, Ellaway A, Macintyre S. Beyond Four Walls'. The Psycho-social benefits of home: Evidence from West Central Scotland. *Housing Studies*. 2000; 15(3):387–410.
29. Radloff LS. The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. *Applied Psychological Measurement*. 1977; 1(3):385–401.
30. Weissman MM, Sholomskas D, Pottenger M, Prusoff BA, Locke BZ. Assessing Depressive Symptoms In Five Psychiatric Populations: A Validation Study. *American Journal of Epidemiology*. 1977; 106(3):203–214. [PubMed: 900119]
31. Canady RB, Stommel M, Holzman C. Measurement properties of the Centers for Epidemiological Studies Depression Scale (CES-D) in a sample of African-American and non-Hispanic White pregnant women. *J Nurs Meas*. 2009; 17(2):91–104. [PubMed: 19711708]
32. Orr ST, James SA, Blackmore Prince C. Maternal Prenatal Depressive Symptoms and Spontaneous Preterm Births among African-American Women in Baltimore, Maryland. *American Journal of Epidemiology*. 2002; 156(9):797–802. [PubMed: 12396996]
33. Orr ST, Blazer DG, James SA, Reiter JP. Depressive Symptoms and Indicators of Maternal Health Status during Pregnancy. *Journal of Women's Health*. 2007; 16(4):535–542.



34. Radloff, L.; Locke, B. The community mental health assessment survey and CES-D scale. In: Weissman, M.; Myers, J., editors. *Community surveys of psychiatric disorders*. New Brunswick, NJ: Rutgers University Press; 1986. p. 177-189.
35. Mora PA, Bennett IM, Elo IT, Mathew L, Coyne JC, Culhane JF. Distinct Trajectories of Perinatal Depressive Symptomatology: Evidence From Growth Mixture Modeling. *American Journal of Epidemiology*. 2009; 169(1):24–32. [PubMed: 19001135]
36. Husaini BA, Neff JA, Harrington JB, Hughes MD, Stone RH. Depression in Rural Communities: Validating the CES-D Scale. *Journal of Community Psychology*. 1980; 8:20–27.
37. Kessler R, Andrews G, Colpe L, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*. 2002; 32(06):959–976. [PubMed: 12214795]
38. Zou G. A Modified Poisson Regression Approach to Prospective Studies with Binary Data. *Am J Epidemiol*. 2004; 159(7):702–6. [PubMed: 15033648]
39. Schmit, J. USA Today; 2011. Foreclosures stretch to an average 17 months, may get longer. [http://www.usatoday.com/money/economy/housing/2011-02-21-unpaidmortgages21\\_ST\\_N.htm2/21/11](http://www.usatoday.com/money/economy/housing/2011-02-21-unpaidmortgages21_ST_N.htm2/21/11)
40. Bennett GG, Scharoun-Lee M, Tucker-Seeley R. Will the Public's Health Fall Victim to the Home Foreclosure Epidemic? *PLoS Med*. 2009; 6(6):e1000087. [PubMed: 19529755]
41. Kingsley, GT.; Smith, RE.; Price, D. The Urban Institute. *The Impacts of Foreclosures on Families and Communities: A Primer*. 2009. [http://www.urban.org/UploadedPDF/411910\\_impact\\_of\\_foreclosures\\_primer.pdf](http://www.urban.org/UploadedPDF/411910_impact_of_foreclosures_primer.pdf) July 2009
42. Cohen E, Fullerton DF, Retkin R, et al. Medical-Legal Partnership: Collaborating with Lawyers to Identify and Address Health Disparities. *J Gen Intern Med*. 2010; 25(Suppl 2):136–9.
43. McArdle, M. U.S. Department of the Treasury. HFA Hardest-Hit Fund program Summary. Hardest Hit Fund Initiative Overview from National Council of State Housing Agencies. 2010. <http://www.ncsha.org/resource/treasurys-hardest-hit-fund-initiative-overview-powerpoint11/3/10>
44. Collins JM. Exploring the design of financial counseling for mortgage borrowers in default. *Journal of Family and Economic Issues*. 2007; 28(2):207–226.
45. Freddie Mac. 2006 Drop in Delinquencies Show Shifting Reasons Behind Single Family Late Payments, says Freddie Mac. 2007. [http://www.thefireelibrary.com/\\_/print/PrintArticle.aspx?id=162567838](http://www.thefireelibrary.com/_/print/PrintArticle.aspx?id=162567838)
46. Quercia, R.; Cowan, S.; Moreno, A. The Cost-Effectiveness of Community-Based Foreclosure Prevention. 2004.
47. Foote, C.; Fuhrer, J.; Mauskopf, E.; Willen, P. Federal Reserve Bank of Boston. A Proposal to Help Distressed Homeowners: A Government Payment-Sharing Plan. 2009. July 9, 2009
48. Horwath E, Johnson J, Herman GL, Weissman MM. Depressive Symptoms as Relative and Attributable Risk Factors for First-Onset Major Depression. *Arch Gen Psychiatry*. 1992; 49(10): 817–823. [PubMed: 1417435]

## List of abbreviations

<b>MDD</b>	Major Depressive Disorder
<b>LIFE</b>	Life-course Influences on Fetal Environments
<b>CES-D</b>	Center for Epidemiological Studies Depression
<b>SDS</b>	Severe Depressive Symptomatology
<b>RR</b>	Risk Ratio
<b>CI</b>	Confidence Interval

Table 1

Descriptive Statistics, LIFE Study.

Construct	Total			Foreclosed (n=54)		Not Foreclosed (n=608)		p <sup>1</sup>
	N	Mean (SD) or %	Mean (SD) or %	Mean (SD) or %	Mean (SD) or %			
<u>Continuous Variables</u>								
Depressive Symptoms	662	16.7 (10.1)	20.8(12.5)	16.3(9.8)	0.014 *			
Age	662	27.5(6.0)	28.4(6.4)	27.4(6.0)	0.258			
Psychological Distress	662	13.4(4.1)	14.7(4.8)	13.2(4.0)	0.014 *			
<u>Categorical Variables</u>								
Severe depressive symptoms <sup>2</sup>	161	24.3%	42.6%	22.7%	0.001 **			
Foreclosure <sup>2</sup>	54	8.2%	100.0%	0.0%	-- --			
Mothers Education	20	3.0%	3.7%	3.0%	0.176			
	37	5.6%	7.4%	5.4%				
	366	55.3%	63.0%	54.6%				
	227	34.3%	22.2%	35.4%				
	12	1.8%	3.7%	1.6%				
Family Income	164	24.8%	29.6%	24.3%	0.785			
	202	30.5%	27.8%	30.8%				
	141	21.3%	24.1%	21.1%				
	105	15.9%	11.1%	16.3%				
	50	7.6%	7.4%	7.6%				
Marital Status	182	27.5%	37.0%	26.6%	0.357			
	173	26.1%	22.2%	26.5%				
	24	3.6%	0.0%	3.9%				
	280	42.3%	40.7%	42.4%				
	3	0.5%	0.0%	0.5%				
Age	57	8.6%	9.3%	8.6%	0.243			
	206	31.1%	24.1%	31.7%				
	194	29.3%	33.3%	28.9%				
	117	17.7%	13.0%	18.1%				

Construct	Total			Foreclosed (n=54)		Not Foreclosed (n=608)		p <sup>1</sup>
	N	Mean (SD) or %	Mean (SD) or %	Mean (SD) or %	Mean (SD) or %			
Age 35-39	64	9.7%	18.5%	8.9%				
Age 40-45	24	3.6%	1.9%	3.8%				
Pre-pregnancy Chronic Health Problems <sup>2</sup>	178	26.9%	25.9%	27.0%	0.868			
Income Support Policy	357	53.9%	61.1%	53.3%	0.126			
	260	39.3%	27.8%	40.3%				
	45	6.8%	11.1%	6.4%				
Employment	322	48.6%	42.6%	49.2%	0.020 *			
	257	38.8%	53.7%	37.5%				
	74	11.2%	1.9%	12.0%				
	9	1.4%	1.9%	1.3%				

\*\*\* p<.001

\*\* p<.01

\* p<.05

# p<.10

<sup>1</sup> p-value calculated from T-test for continuous variables, and chi-squared test or Fisher's exact test for categorical variables.

<sup>2</sup> For binary variables, only one category is presented in the table.

**Table 2**

Risk Ratios of Severe Depressive Symptomatology (CES-D Score 23+), associated with Foreclosure, Poisson Regression, LIFE Study.

Construct	Model 1: unadjusted				Model 2: adjusted			
	RR	95% CI	P		RR	95% CI	P	
Foreclosure	1.88	(1.33, 2.64)	<.001	***	1.76	(1.25, 2.47)	0.001	**
	1.00	---			1.00	---		
Education								
No Foreclosure					1.63	(0.99, 2.68)	0.05	#
Less than high school					0.93	(0.56, 1.53)	0.77	
High School Graduate					1.00	---		
Some College					0.82	(0.56, 1.19)	0.29	
College or more					1.35	(0.69, 2.65)	0.38	
Missing					1.00	---		
Family Income								
<\$20K					1.05	(0.74, 1.49)	0.78	
\$20-40K					1.08	(0.72, 1.62)	0.70	
\$40-70K					0.93	(0.53, 1.63)	0.80	
\$70K+					1.27	(0.81, 2.01)	0.30	
Missing					1.21	(0.79, 1.85)	0.39	
Age					1.00	---		
18-19					0.98	(0.67, 1.43)	0.93	
20-24					1.05	(0.68, 1.62)	0.82	
25-29					1.22	(0.79, 1.90)	0.37	
30-34					0.68	(0.46, 1.01)	0.05	#
35+					0.94	(0.69, 1.27)	0.67	
Marital Status								
Married					1.00	---		
Partnered					1.14	(0.86, 1.52)	0.37	
Single, Divorced, Separated, Widowed, or missing					1.00	---		
Pre-pregnancy Chronic Health Problems								
Yes					1.00	---		
No					1.71	(1.19, 2.44)	0.003	**
Income Support Policy								
Yes					1.63	(0.98, 2.73)	0.06	#
Missing					1.00	---		
No					1.00	---		
Employment								
employed					1.00	---		
not working					1.12	(0.82, 1.51)	0.48	

Construct	Model 1: unadjusted			Model 2: adjusted		
	RR	95% CI	p	RR	95% CI	p
temporarily laid off				1.15	(0.73, 1.81)	0.55
Missing				0.83	(0.24, 2.84)	0.76

\*\*\*  
p<.001

\*\*  
p<.01

\*  
p<.05

#  
p<.10

N=662; RR=Risk Ratio

The reference group for regression was women who did not experience foreclosure in the past 2 years, Age 20-24, Single/widowed/separated/ divorced/missing, Income less than \$20,000/year, some college education, employed, no chronic health problems, no income support policies

**Table 3**  
Adjusted mean CES-D Score associated with Foreclosure, Linear Regression, LIFE Study.

Construct	Model 1: unadjusted				Model 2: adjusted			
	Beta	95% CI	P		Beta	95% CI	P	
Intercept	16.33	(15.53, 17.13)	<.001	***	13.79	(11.14, 16.44)	<.001	***
Foreclosure	4.45	(1.64, 7.25)	0.002	**	4.04	(1.24, 6.84)	0.005	**
	0.00	---			0.00	---		
Education								
Less than high school	2.38	(-2.15, 6.90)	0.30		2.38	(-2.15, 6.90)	0.30	
Education: High School Grad	0.91	(-2.65, 4.46)	0.62		0.91	(-2.65, 4.46)	0.62	
Some College	0.00	---			0.00	---		
Education: College or more	-0.57	(-2.48, 1.34)	0.56		-0.57	(-2.48, 1.34)	0.56	
Missing	4.42	(-1.31, 10.15)	0.13		4.42	(-1.31, 10.15)	0.13	
Family Income								
<\$20K	0.00	---			0.00	---		
\$20-40K	-0.53	(-2.65, 1.60)	0.63		-0.53	(-2.65, 1.60)	0.63	
\$40-70K	0.07	(-2.37, 2.51)	0.96		0.07	(-2.37, 2.51)	0.96	
\$70K+	-0.09	(-2.96, 2.77)	0.95		-0.09	(-2.96, 2.77)	0.95	
Missing	0.64	(-2.59, 3.87)	0.70		0.64	(-2.59, 3.87)	0.70	
Age								
18-19	2.37	(-0.64, 5.37)	0.12		2.37	(-0.64, 5.37)	0.12	
20-24	0.00	---			0.00	---		
25-29	0.51	(-1.65, 2.66)	0.65		0.51	(-1.65, 2.66)	0.65	
30-34	0.03	(-2.41, 2.47)	0.98		0.03	(-2.41, 2.47)	0.98	
35+	1.69	(-1.03, 4.41)	0.22		1.69	(-1.03, 4.41)	0.22	
Marital Status								
Married	-1.81	(-3.92, 0.30)	0.09	#	-1.81	(-3.92, 0.30)	0.09	#
Partnered	0.02	(-1.86, 1.90)	0.98		0.02	(-1.86, 1.90)	0.98	
Single, Divorced, Separated, Widowed, or missing	0.00	---			0.00	---		
Pre-pregnancy Chronic Health Problems								
Yes	1.92	(0.17, 3.66)	0.03	*	1.92	(0.17, 3.66)	0.03	*
No	0.00	---			0.00	---		
Income Support Policy								
Yes	2.80	(1.06, 4.55)	0.002	**	2.80	(1.06, 4.55)	0.002	**
Missing	0.71	(-2.54, 3.95)	0.67		0.71	(-2.54, 3.95)	0.67	
No	0.00	---			0.00	---		
Employment								
employed	0.00	---			0.00	---		

Construct	Model 1: unadjusted			Model 2: adjusted		
	Beta	95% CI	p	Beta	95% CI	p
not working	0.88	(-0.94, 2.70)	0.34	0.88	(-0.94, 2.70)	0.34
temporarily laid off	1.61	(-0.97, 4.18)	0.22	1.61	(-0.97, 4.18)	0.22
missing	-1.03	(-7.68, 5.62)	0.76	-1.03	(-7.68, 5.62)	0.76

\*\*\*  
p<.001

\*\*  
p<.01

\*  
p<.05

#  
p<.10

N=662. CI=Confidence interval. Reference category: Not foreclosed on in the past 2 years, some college, income less than \$20,000, Age 20-24years, marital status single/divorced/separated/missing, no chronic health problems, not on income support policy, and employed.