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Neighborhood Evictions, Marital/Cohabiting Status, and Preterm Birth among African American Women

Shawnita Sealy-Jefferson, PhD, MPH[1]; Brittney Butler, MPH[1]; Shibani Chettri, MPH[1]; Hikma Elmi, MPH[1]; Allison Stevens, MPH[2]; Chinenye Bosah, BS[3]; Rhonda Dailey, MD[4]; Dawn P. Misra, PhD[4]

Introduction: Housing stability is an important determinant of health, but no studies to our knowledge have examined the spillover effects of neighborhood eviction rates on individual risk of preterm birth (PTB) among African American women.

Objective: We assessed whether living in a neighborhood with high eviction rates was associated with risk of PTB among African American women, and whether marital/cohabiting status modified the association.

Methods: We spatially linked interview, medical record, and current address data from the Life-course Influences on Fetal Environments Study (2009-2011, N=1386) of postpartum African American women from Metropolitan Detroit, Michigan, to publicly available data on block-group level rates of eviction filings and judgements. PTB was defined as birth before 37 completed weeks of gestation and occurred in 16.3% of the sample (n=226). Eviction rate variables were rescaled by their interquartile ranges (75th vs 25th percentiles). Women self-reported whether they were married to, or cohabiting with, the father of their baby during the in-person interview. We used Modified Poisson regression with robust error variance to estimate relative risks of PTB associated with each eviction variable separately and included an interaction term with marital/cohabiting status (P<.10 considered significant) in adjusted models.

Results: In the overall sample, neighborhood eviction filings and judgements did not predict PTB, but the associations were modified by marital/cohabiting status (P for interaction = .02, and .06, respectively). Among women who were married/cohabiting, those who lived in neighborhoods with high eviction filings (adjusted relative risk: 1.25, 95% CI: 1.06, 1.47) and eviction judgements (adjusted relative risk: 1.18, 95% CI: 1.05, 1.33) had higher risk of PTB than women who did not. Little evidence of an association was observed for women who were not married/cohabiting.

Conclusions: Future studies should examine the mechanisms of the reported associations to identify novel intervention targets (eg, addressing landlord discrimination) and policy solutions (eg, ensuring a living wage and providing affordable housing assistance to everyone who qualifies) to reduce the burden of PTB among African Americans. *Ethn Dis*. 2021;31(2):197-204; doi:10.18865/ed.31.2.197

Keywords: Preterm Birth; Neighborhood Evictions; African American; Marital/Cohabiting Status

Introduction

Preterm birth (PTB), or birth before 37 completed weeks of gestation, is a leading cause of infant death, and is a major cause of maternal and pediatric morbidity. Unfortunately, disturbing increases in overall PTB rates have occurred in recent years.[1] African American women are more than twice as likely as White women to have a PTB.[2] Notably, traditional risk factors for PTB (including behavioral and biologic factors) do not explain the disproportionate burden in African Americans.[2] Structural racism,[3] (as manifested by racial and economic residential segregation and associated housing insecurity), may help to explain the unequal burden of PTB among African Americans, given this group's 400-year history of racial oppression.[4]

Housing insecurity is an important and worsening public health issue and includes housing mobility, housing instability, disconnection from one's community, as well as lack of privacy and security.[5] Residential evictions are considered the most harmful source of housing instability[6] and could be a fundamental cause of population-level racial health inequities[7,8] and/or a pathway through which oppression is biologically embodied and results in poor health and mortality in affected communities.[9] Roughly 2.3 million low-in-

[1] Ohio State University, College of Public Health, Division of Epidemiology, Columbus, OH
[2] Ohio State University, College of Public Health, Division of Health Behavior Health Promotion, Columbus, OH
[3] Ohio State University, Columbus, OH
[4] Wayne State University, School of Medicine, Department of Family Medicine and Population Health Sciences, Detroit, MI

Address correspondence to Shawnita Sealy-Jefferson; Ohio State University, College of Public Health, Division of Epidemiology, 1841 Neil Avenue, 344 Cunz, Columbus, OH 43210; Sealy-jefferson.1@osu.edu

come renters are evicted in the United States every year.[10] Increasing housing costs, decreasing or stagnant income among the socioeconomically disadvantaged, and drastic cuts to federal housing assistance are contributing to the rising rates of residential evictions.[11]

Eviction is among the most understudied issue affecting urban minoritized residents,[12] and results in financial hardship, insecurity, powerlessness, depression, and even suicide.[12,13] African American mothers bear the greatest burden of formal evictions compared with all other population groups,[11,12] and women with children are more likely to be evicted and subjected to housing discrimination than women without children.[11,12] In poor African American neighborhoods, eviction is to women what mass incarceration is to men: highly likely and a cause and consequence of the multiplication of urban poverty. [12]

Our objective was to examine the independent and joint associations between neighborhood eviction filing and judgement rates, marital/cohabiting status … and risk of PTB among African American women.

A growing literature specific to African American women has shown PTB risk to be predicted by joint associations between neighborhood exposures and various other social factors including: 1) perceptions of neighborhood walkability, food availability, social disorder and safety and educational attainment [14,15]; 2) objective neighborhood sociodemographic disadvantage and religiosity[16]; 3) neighborhood tax foreclosures and educational attainment[17]; 4) early life neighborhood disorder and current perceptions of stress[18]; and 5) neighborhood mass incarceration and marital/cohabiting status.[4] This literature has illuminated which subsets of African Americans may be protected from, and have higher risk of, PTB as a result of living in racially segregated neighborhoods with various macro- and individual-level stressors. Further clarifying which specific features of urban neighborhoods are important risk and protective factors for adverse birth outcomes like PTB is crucial to the development of effective policy initiatives and successful interventions.

Prior scholarship documents joint associations between various neighborhood and sociodemographic factors and risk of PTB in African Americans. Yet, empirical documentation of whether the spillover effects of neighborhood evictions are associated with risk of PTB among African American women is lacking and an important gap in the literature. Decades of public health initiatives and research on disparities in PTB have not resulted in an elimination of these inequities; novel research questions aimed at policy relevant and modifiable structural factors are warranted. Our objective was to examine the independent and joint associations between neighborhood eviction filing and judgement rates, marital/cohabiting status (since unmarried mothers have increased risk of adverse birth outcomes, including PTB[9]) and risk of PTB among African American women.

Methods

Study Population

This study is a secondary analysis of data from the Life-course Influences on Fetal Environments Study (LIFE). The LIFE study is a retrospective cohort of African American women aged ≥18 years from Metropolitan Detroit, Michigan (2009-2011; N=1386).[15] The original aim of the LIFE study was to determine whether and how racism is associated with PTB. Women who did not speak English, had intellectual disabilities, serious cognitive deficits, or evidence of mental illness based on history or any prior records, were not eligible to participate. In-person interviews were completed during the postpartum hospital stay and medical records were abstracted. The final sample size of the LIFE study included 71% of the women who were approached for study participation. All procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants included in the study. The LIFE study was approved by all appropriate institutional review boards.

Exposure Ascertainment

A formal eviction occurs when a landlord files and subsequently wins

a judgement to force a tenant out of a residence through a court order.[10] Our exposure of interest for this analysis was neighborhood-level evictions (measured at the block-group level). The neighborhood-level eviction filing rate was defined as a ratio of all eviction cases filed, including multiple cases filed against the same address in the same year, divided by the number of renter-occupied homes in that block group. The neighborhood level eviction judgement rate was a ratio of the number of renter-occupied households in the block group that received an eviction judgement in which the renters were ordered to leave (only counting a single address once per year) divided by the number of renter-occupied homes in that block group.[10] The eviction rates were calculated using the original, non-rounded values to avoid inflation of the estimates, represent the number of evictions per 100 renter occupied homes, and were validated at the individual and aggregate levels. We used block-groups to proxy neighborhoods, and linked publicly available data (standardized to reflect Census 2010 boundaries) on court-ordered evictions occurring between 2009 and 2011 from the Eviction Lab at Princeton University to the latitude and longitude of current addresses of the LIFE study participants. We matched neighborhood level eviction rates to LIFE study participant addresses, interview data, and medical record data based on the year the women enrolled in the study (eg, eviction rates for 2009 were linked to LIFE study participants who enrolled in 2009). In this way, we were able to objectively measure the burden of neighborhood-level housing insecurity caused by formal eviction filings and judgements.

Subjective and Objective Neighborhood Measures

While not the focus of this study, we describe the subjective and objective neighborhood measures used in our prior studies and examine whether the neighborhood eviction rates describe neighborhood characteristics that are importantly different from our prior measures. Specifically, LIFE study participants reported perceptions of their current neighborhood using valid and reliable multi-item scales (subjective measures), including social cohesion and trust, healthy food availability, walkability, social disorder, and danger (details have been previously described[15]). We also created an objective neighborhood disadvantage index (NDI), using principal component analysis, to quantify racial and economic residential segregation using nine optimally weighted variables from the American Community Survey. Our NDI index was informed by and expanded on prior work,[19] and included percent: below poverty, unemployed, receiving public assistance, African American, college-educated, female headed households, owner-occupied homes, and median home values).[20] Factor loadings were highest for median income (84%) and lowest for percent of owner-occupied homes (42%).

Outcome Ascertainment

PTB was defined as birth before 37 completed weeks of gestation. We obtained gestational age from the medical records and used a hierarchical algorithm to categorize the birth as term or preterm.[15] We gave priority to the gestational age estimate based on early ultrasounds (between 6 and 20 weeks gestation), given that this is considered the most valid measure.[21]

Covariates

We considered self-reported marital/cohabiting status with the father of the baby (yes/no) as a potential effect modifier. Since where people live is non-random,[22] we adjusted our analyses for the following predictors of residential selection: age (< 35, 35+); income (dichotomized at $35,000 per year); educational attainment (≤12, >12 years). We also controlled for time lived in the current neighborhood (dichotomized at 2 years).

Statistical Analysis

We used univariable and multivariable statistics to describe the data, including chi-square and Wilcoxon rank sum tests to examine differences in categorical and continuous variables. We determined variable cut-points based on the distributions in the sample. We estimated Spearman correlations among all subjective and objective neighborhood measures, and missing data on all covariates ranged between 0-11%. Given that the prevalence of PTB in our sample was >10%,[23] and there was little block-group level variation in PTB, which precludes hierarchical modeling, we used Modified Poisson regression with robust error variance.[24] This modeling approach estimated unadjusted and adjusted relative risks (RRs) and associated 95% CI for the associations between neighborhood eviction filings and judgements and risk of PTB. The neighborhood eviction measures were modeled continuously but were rescaled by their interquartile ranges to allow us to interpret our findings as the risk of PTB

Table 1. Socio-demographic characteristics of study participants and bivariate modified Poisson regression results for associations with preterm birth; Life-course Influences on Fetal Environments Study 2009-2011, n=1386

	Term, N=1159	PTB, N=226		
	N (%)[a]	N (%)[a]	RR	95% CI
Age				
18-19	102 (8.8)	14 (6.2)	.83	.48, 1.45
20-24	354 (30.5)	73 (32.3)	1.18	.85, 1.63
25-29	313 (27)	53 (23.5)	referent	
30-34	223 (19.2)	43 (19)	1.12	.77, 1.61
35+	167 (14.4)	43 (19)	1.41	.98, 2.04
Marital status				
Single	543 (47.2)	102 (45.5)	referent	
Married/cohabiting	607 (52.8)	122 (54.5)	1.06	.83, 1.35
Education (years)				
≤12	333 (28.7)	62 (27.4)	.95	.73, 1.24
>12	826 (71.3)	164 (72.6)	referent	
Income				
<$35,000	496 (48.3)	85 (40.9)	1.29	1.00, 1.66
≥$35,000	530 (51.7)	123 (59.1)	referent	
Time in neighborhood				
< 24 months	532 (46.6)	107 (48.2)	referent	
≥24 months	609 (53.4)	115 (51.8)	.95	.75, 1.21
Study enrollment year				
2009	228 (19.7)	49 (21.7)	referent	
2010	411 (35.5)	81 (35.8)	.93	.67, 1.29
2011	520 (44.9)	96 (42.5)	.88	.64, 1.21

PTB, preterm birth.
a. Numbers do not add up to 1388; one participant had missing data.

in women who lived in neighborhoods with high (75th percentile) vs low (25th percentile) eviction filings and judgements. We included interaction terms between each eviction measure and marital/cohabiting status in adjusted models to test for heterogeneity of association, and present stratum specific results as warranted. Finally, non-positivity occurs when part of the study population only experiences one level of the exposure.[25] We examined the tabular distributions of quintiles of the neighborhood eviction measures by marital/cohabiting status and verified that both groups, women who were married/cohabiting and women who were single, had a positive probability of living in neighborhoods across the entire spectrum of eviction filing and judgement rates.[26] We used SAS version 9.4 for Windows (SAS Institute Inc., Cary, NC, USA) for all analyses.

Results

The LIFE study participants had a mean age of 27 years, and 16.3% had a PTB (n=226). More than half of the participants were married to/cohabiting with the father of their baby, and more than 70% had attained education beyond high school (Table 1). More than 50% had a yearly family income of at least $35,000 and 53% lived in their current neighborhood for at least two years. Twenty percent of the study sample enrolled in 2009, 35% in 2010, and 45% in 2011. Of these sociodemographic variables, only older age (>35 years) and low income (<$35,000 per year) were modest predictors of PTB. Our study participants lived in 740 block groups, with 1-21 women per block group (data not shown).

Across the study period (2009-2011), the overall rate of eviction filings increased over time in Wayne, Oakland, and Macomb Counties in Michigan (the tri-county region in which our study participants lived), as well as throughout the United States (data not shown, but available upon request). The eviction judgement rates for Michigan and the tri-county region were consistently higher than the overall rate in the United States from 2009-2011. Most of our study participants lived in Wayne county (n=855,

Table 2. Correlations between subjective and objective neighborhood variables; Life-course Influences on Fetal Environments Study 2009-2011 (n=1386)

Variable #	1	2	3	4	5	6	7	8
Objective neighborhood								
1 Eviction judgement rate	1							
2 Eviction filing rate	.69[a]	1						
3 NDI	.09[a]	.26[a]	1					
Subjective neighborhood								
4 Social disorder	-.07[a]	.09[a]	.49[a]	1				
5 Danger	.05	-.15[a]	-.48[a]	-.68[a]	1			
6 Walkability	.03	-.10[a]	-.33[a]	-.49[a]	.61[a]	1		
7 Food availability	-.05	-.10[a]	-.27[a]	-.33[a]	.39[a]	.49[a]	1	
8 Social cohesion	.04	-.04	-.11[a]	-.38[a]	.45[a]	.45[a]	.24[a]	1
Mean	9.00	26.05	0	11.70	21.20	23.33	7.40	24.15
Standard deviation	7.22	16.43	1	4.57	5.48	4.10	2.24	4.79
Median	7	24	-0.02	10	22	24	8	24
(Minimum, maximum)	(0, 78)	(0, 132)	(-2.73, 3.32)	(8, 24)	(6, 30)	(6, 30)	(2, 10)	(7, 35)

NDI, neighborhood disadvantage index.
a. P<.01.

61.7%), followed by Oakland County (n=474, 34.2%), and Macomb County (n=57, 4.1%). From 2009-2011, compared with Oakland and Macomb Counties, Wayne County had a higher poverty rate, proportion of renter occupied homes, rent burden, percent of African American residents, percent of Hispanic/Latinx residents, lower median property values, and lower median household income.

Eviction judgement and filing rates were weakly correlated with the individual variables that comprised the NDI. Among these weak correlations, the largest were: between eviction filings and percent African American (.26) and percent of female headed households (.25); and between eviction judgements and percent of owner-occupied homes (.14) and median income (.11) (data not shown). The eviction filing and judgement rates were strongly correlated (.69) but were weakly correlated with the objective NDI and our subjective neighborhood measures (Table 2). In the neighborhoods our study participants lived, eviction judgement rates ranged from 0-78 per 100 renter occupied homes (median 7), and eviction filing rates ranged from 0-132 per 100 renter-occupied homes (median 24).

In the overall study group, neighborhood eviction filing (RR, 95% CI: 1.09, .94, 1.25) and judgement rates (RR, 1.09, 95% CI: .97, 1.22) were not strongly associated with risk of PTB in adjusted models (Table 3). However, we observed evidence of effect modification by marital/cohabiting status for associations between PTB and neighborhood eviction filing (P=.02) and judgement rates (P=.06). Specifically, we observed higher PTB risk among women who were married/cohabiting with the father of their baby and living in a neighborhood

Table 3. Modified Poisson regression results for associations between number of tax foreclosed properties at the block group level, and risk of preterm birth; overall and stratified by marital/cohabiting status; Life-course Influences on Fetal Environments Study, 2009-2011

	Total study group, N=1386		Not married/cohabiting, n=646[a]		Married/cohabiting, n=729[a]	
	Unadjusted RR (95% CI)	Adjusted RR (95% CI)	Unadjusted RR (95% CI)	Adjusted RR (95% CI)	Unadjusted RR (95% CI)	Adjusted RR (95% CI)
Eviction filing rate	1.07 (.96 1.20)	1.09 (.94, 1.25)	.89 (.72, 1.10)	.88 (.69, 1.11)	1.24 (1.05, 1.45)	1.25 (1.06, 1.47)
Eviction judgement rate	1.09 (.95 1.24)	1.09 (.97, 1.22)	.94 (.76, 1.16)	.90 (.70, 1.16)	1.15 (1.02, 1.31)	1.18 (1.05, 1.33)

a. Numbers do not add up to total (1,386) due to missing data for covariates of interest.
Adjusted for age, income, educational attainment, and time in current neighborhood.
RR, relative risk, CI, confidence interval; eviction judgement rate X marital status P for interaction =.06; eviction filing rate X marital status P for interaction=.02.

with high eviction filing (RR: 1.25, 95% CI: 1.06 1.47) and judgement rates (RR: 1.18, 95% CI: 1.05 1.33), compared with their counterparts in neighborhoods with low eviction filing and judgement rates. Among women who were not married/cohabiting, the associations were not strong. Specifically, adjusted models suggest lower risk of PTB for single women who lived in neighborhoods with high vs low eviction judgement rates (RR: .90, 95% CI: .70, 1.16). A risk difference ranging from a 30% decrease to a 16% increase in PTB risk is also compatible with our data, given our assumptions. The adjusted association between eviction filing rates and PTB among this subset of women was similar to that for eviction judgements (RR: .88, 95% CI: .69, 1.11).

Discussion

In the overall study group, we found little evidence of an independent association between neighborhood eviction filing and judgement rates and PTB among African American women, but we did find evidence of effect modification by marital/cohabiting status. Specifically, women who were married/cohabiting with the father of their baby and lived in neighborhoods with high vs low eviction filings and judgements, had higher PTB risk. Among women who were not married/cohabiting, we observed little evidence of an association between neighborhood level eviction rates and PTB. We also report higher eviction rates in the neighborhoods that our participants lived, compared with the average eviction rates in the tri-county area, Michigan, and the United States. Finally, the neighborhood eviction rates were only weakly correlated with study participants' subjective reports of the safety, disorder, walkability, food availability, and social cohesion of their neighborhoods, as well as with our objective NDI. Interestingly, neighborhood eviction filing rates were correlated most strongly with neighborhood percent of African American residents and neighborhood percent of female-headed households. Neighborhood eviction judgements were correlated most strongly with neighborhood percent of owner-occupied homes and neighborhood median income.

Our results contribute novel evidence of the potential joint impact of marital or cohabiting status and residence in a neighborhood with high housing instability on risk of PTB among African American women. Prior research has shown that unmarried mothers have increased risk of adverse birth outcomes, including PTB,[27] since marriage may increase access to health services, financial security, and social support. However, researchers have also found that marital status is most protective against PTB among older women (36-40 years).[27] Future research using larger samples should consider the potential three-way interaction between age, neighborhood eviction rates, and marital/cohabiting status on risk of PTB among African American women, to further understand this association.

Prior research has shown that community socioeconomic disadvantage has an independent impact on relationships, over and above individual level socioeconomic characteristics.[28] Furthermore, familial economic stress may have different health consequences than individual level economic stress by placing structural constraints on the quality of day-to-day family activities and healthy relationship functioning.[29] Low income families experience stressors from unemployment, shift work, neighborhood disadvantage, lack of transportation, rising debt, and insufficient social networks.[30] Stress-inducing neighborhoods can shift relationship dynamics toward familial distress for those who live in socioeconomically disadvantaged areas.[30] This may explain why we found that African American women who were married/cohabiting and living in neighborhoods with high rates of eviction filings and judgements had elevated risk of PTB, while single women did not.

Evictions cause financial burdens to society by increasing court dockets, requiring law enforcement to forcibly remove families, and increasing demand on social services, homeless shelters, and health care.[31] Recent declines in federal spending for affordable housing programs has resulted in only 1 in 5 low income residents benefitting from subsidized rental assistance.[32] Worse still, having a history of eviction makes families ineligible for many affordable housing options.[33] Financial assistance to families experiencing a significant but short-term loss of income, as well as access to free legal representation could reduce evictions. Estimates suggest that more than half of low income renters spend at least half of their income on housing, while some dedicate more than 70% to housing costs.[34] While the majority of evictions occur because of nonpayment of rent,[35] individual risk of eviction has been positively associ-

ated with neighborhood eviction and crime rates, and this association is independent of eviction-warranting behavior.[36] In other words, women who live in neighborhoods with high eviction rates have a higher risk of eviction, not necessarily because of their own failure to pay rent, but possibly as a result of anti-Black racism from landlords and/or a normalization of residential evictions in these areas.

Our findings of a correlation between eviction filing rates and percent of African American residents and percent of female headed households is consistent with literature that shows that African American women with children have an elevated risk of housing discrimination and formal eviction.[12] Poor residents have high residential mobility, usually moving from one socially disadvantaged neighborhood to another, and neighborhood dissatisfaction, gentrification, and slum clearance do not account for their increased mobility.[12] Evictions should be considered an important determinant of residential selection for African American women.[11]

Study Limitations and Strengths

It is possible that the neighborhood-level eviction filing and eviction judgement rates included cases involving LIFE study participants. However, we do not have survey data on whether our study participants themselves experienced an eviction during their pregnancy. Formal evictions are also less common than informal processes of forced mobility, but in our study, the burden of formal eviction was sizeable. Future studies should examine whether informal evictions predict PTB risk jointly with other social determinants among African Americans.

To our knowledge, this study is the first to examine the magnitude of neighborhood eviction filings and judgements and their associations with risk of PTB, using data from a sizeable cohort of African American women from a large metropolitan area. Data from the Eviction Lab is the most comprehensive record of court-ordered eviction records worldwide. We examined correlations between our subjective and objective measures of the residential environment and document relatively small correlations with neighborhood eviction rates. These results suggest that the neighborhood eviction measures capture novel, and policy-relevant neighborhood exposures that may be related to PTB risk among African American women. Even though African Americans share a sociohistorical background, this group has substantial heterogeneity in terms of stressors and life circumstances. Race comparative research, with White populations as the referent, often pathologizes African Americans.[29] Our study leverages data from a unique cohort of African American women, and answers the question: among African Americans, whose PTB risk is associated with living in a neighborhood with high eviction filing and judgement rates? These within group analyses provide evidence that can be leveraged in future intervention studies (eg, addressing anti-Black racism among landlords), organized social activism (eg, Black Lives Matter), and policy initiatives (eg, ensuring a living wage for all, and providing affordable housing assistance to everyone who qualifies for it).

Conclusions

Court-ordered evictions have a clear policy relevance. Changes to eviction laws and funding for affordable housing programs are promising interventions to combat this widespread cause of housing instability. Our study of the association between neighborhood eviction rates and PTB risk leverages a policy-relevant geography (block groups), which may inform future community level interventions focused on families and landlords. Our findings document the burden and severity of the housing crisis, points to the urgency of action toward eliminating manifestations of structural anti-Black racism and highlights the interconnectedness and multi-level impact of systems of oppression on the health of African Americans. Future work should examine psychosocial factors (eg, perceived stress) and material deprivation (eg, access to social services) as potential mediators of the reported associations between neighborhood eviction rates, marital/cohabiting status, and PTB risk in African American women.

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Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: Sealy-Jefferson, Misra; Acquisition of data: Sealy-Jefferson, Misra; Data analysis and interpretation: Sealy-Jefferson, Butler, Chettri, Elmi, Stevens, Bosah, Misra; Manuscript draft: Sealy-Jeffer-

son, Butler, Chettri, Elmi, Stevens, Bosah, Misra; Statistical expertise: Sealy-Jefferson; Acquisition of funding: Sealy-Jefferson, Misra; Administrative: Butler, Chettri, Elmi, Stevens, Bosah, Misra

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