



# Allostatic Load & Housing

RESEARCH COMPLETED IN JULY 2019, IN PARTNERSHIP WITH



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FUND

## STATE OF THE RESEARCH

Research using the concept of Allostatic Load (AL) exists in two primary areas. A relatively established body of literature has linked cumulative risk exposure and elevated AL to a range of adverse health conditions. On the other hand, emerging literature is beginning to make connections between elevated AL and neighborhood conditions associated with elevated poverty. While a small number of studies have established an observable association between elevated AL and living in poverty and/or impoverished neighborhoods, the causal mechanisms at work in these relationships are not well understood. The link between housing and allostatic load has not been deeply examined.





## BACKGROUND

Allostatic load was initially conceptualized as an indicator of the “cumulative physiological toll on multiple major biological systems over the life course” that results from exposure to stressful life circumstances.<sup>1</sup> Studies examining AL measure it in a variety of ways that tend to include some combination of the following measures: waist circumference, triglyceride concentrations, fasting glucose concentration, insulin resistance, high density lipoprotein (HDL) cholesterol concentration, low density lipoprotein (LDL) cholesterol concentration, glycosylated hemoglobin level, hypertension, asthma diagnosis, and C-reactive protein concentration. The observed effects of elevated AL in individuals are generally consistent: higher AL has been associated with an increased risk of cardiovascular disease, cognitive decline, physical limitations, and all-cause mortality. Indeed, the aggregate AL index can predict morbidity and mortality risks better than its individual components.

An increasing number of studies have found evidence suggesting that elevated AL levels may be influenced by household and neighborhood socioeconomic status (SES); however, due to a number of confounding variables and other issues, establishing a causal relationship, with understood pathways, has been challenging.

## SUMMARY OF RESEARCH FINDINGS

Most of the studies examining the relationship between AL and neighborhood conditions identify observable associations between living in distressed neighborhoods and elevated AL. A number of studies have also identified additional demographic characteristics associated with elevated AL, particularly: minorities, men, people living in poverty, and individuals with poor social support systems tend to have higher risk of an elevated AL.

While most studies do find significant associations between neighborhood conditions and elevated AL, there is no clearly understood pathway by which adverse neighborhood conditions directly influence AL which in turn threatens the wellbeing and mortality of people living in adverse conditions.

In discussions of findings, a number of authors explore plausible explanations to account for the association between AL and neighborhood distress that operate through multiple indirect pathways such as health-related behaviors, physical factors (pollution, degradation) and social environmental stressors (unsafety, discrimination, low trust and support) present in distressed neighborhoods.

<sup>1</sup> McEwen BS. Stress, adaptation, and disease. Allostasis and allostatic load. *Annals of the New York Academy of Sciences*. 1998; 840:33-44.



## ALLOSTATIC LOAD – SUMMARY OF KEY STUDIES

Schulz, A. J., Mentz, G., Lachance, L., Johnson, J., Gaines, C., & Israel, B. A. (2012). Associations between socioeconomic status and allostatic load: effects of neighborhood poverty and tests of mediating pathways. *American journal of public health, 102(9), 1706-1714.*

<b>STUDY FOCUS</b>	This study explores the relationship between neighborhood socioeconomic markers and allostatic load. Specifically, the authors assessed the relationship between neighborhood poverty and allostatic load, while controlling for demographics and household characteristics. The authors also examined whether this relationship is mitigated through individual stress and health-related behaviors.
<b>METHODOLOGY</b>	<p>The authors drew from the Healthy Environments Partnership Community Survey in Detroit, which collected health-related data on more than 900 residents; these responses were paired with census tract data (2000) based on the home addresses of the respondents.</p> <p>Allostatic load was measured using the following metrics: blood pressure, waist circumference, glucose levels, total cholesterol, lipid levels, and the use of medications for various diseases. The authors controlled for household socioeconomic status, using poverty to income ratio, and used census data to assess neighborhood distress.</p>
<b>SUMMARY OF FINDINGS</b>	The authors found that neighborhood poverty is correlated with increases in allostatic load. In establishing this finding, the authors controlled for individual demographic indicators, household poverty, and neighborhood racial/ethnic composition. Further, the authors did not find evidence that health-related behaviors mediated the increases in allostatic load associated with neighborhood poverty.
<b>IMPLICATIONS FOR PRACTITIONERS</b>	<p>The authors suggest that allostatic load may be mediated, to a degree, through addressing neighborhood conditions, particularly in addressing high concentrations of poverty. To address health inequities, these efforts will likely need to promote access to economic opportunity in distressed urban neighborhoods, and seek to address underlying economic, political, and social issues.</p> <p>While promoting health-related behaviors may be beneficial in other ways, they are likely to be inadequate in broadly achieving equitable health outcomes between affluent and distressed communities.</p>



Theall, K. P., Drury, S. S., & Shirtcliff, E. A. (2012). Cumulative neighborhood risk of psychosocial stress and allostatic load in adolescents. *American journal of epidemiology*, 176(suppl\_7), S164-S174.

<b>STUDY FOCUS</b>	This study seeks to determine the impact of cumulative neighborhood risk of psychosocial stress on allostatic load (AL) among adolescents, controlling for family and household characteristics.
<b>METHODOLOGY</b>	The authors used data derived from the National Health and Nutritional Examination Survey on adolescents aged 12 to 20 years old. The study examines individual level data, within family/household data, within census tracts, seeking to assess the effect of cumulative neighborhood risk on AL.
<b>SUMMARY OF FINDINGS</b>	<p>Within the survey, around 35 percent of adolescents demonstrated elevated AL; neighborhood factors accounted for a substantial amount of the observed difference in AL levels. The likelihood of an elevated AL increased continuously from low to very-high risk neighborhoods; adolescents in very high-risk neighborhoods were 84 percent more likely to have high AL. Further, individuals from the same neighborhoods were likely to have similar levels of ALs compared to individuals in other neighborhoods.</p> <p>A number of individual and household factors influenced the likelihood of elevated AL; these included demographics, poverty, age, and educational attainment. Boys, generally, and teens in higher poverty areas were likely to experience higher levels of risk.</p>
<b>IMPLICATIONS FOR PRACTITIONERS</b>	While household conditions may exert a greater influence on higher likelihood of elevated AL, neighborhood effects were also found to be meaningful. Promoting positive neighborhood changes, in such a way that addresses structural challenges, may provide an important pathway to reducing health disparities. However, a deeper understanding of the specific mechanisms by which these neighborhood effects influence health is needed to inform interventions.



Wallace, M., Harville, E., Theall, K., Webber, L., Chen, W., & Berenson, G. (2013). **Neighborhood poverty, allostatic load, and birth outcomes in African American and white women: Findings from the Bogalusa Heart Study.** *Health & place, 24, 260-266.*

<b>STUDY FOCUS</b>	This study explores the relationship between neighborhood poverty, race and allostatic load (AL) on maternal preconception health and adverse birth outcomes.
<b>METHODOLOGY</b>	The authors drew data from the Bogalusa Heart Study (BHS), which explored cardiovascular health in children and young adults in Bogalusa, Louisiana. The study began drawing data in 1973, and surveys were generally repeated every other year through 1994. Women in the study were linked to subsequent births to assess preconception maternal health across nine AL biomarkers and birth outcomes among the second-generation children. The sample was comprised of 352 African-American women and 514 women (total of 866).
<b>SUMMARY OF FINDINGS</b>	<p>While the researchers found that African-American women were more likely to live in high poverty neighborhoods and more likely to experience higher levels of allostatic load, the authors did not identify a statistically significant connection between preconception allostatic load and adverse birth outcomes (preterm birth and/or birthweights).</p> <p>When controlling for neighborhood conditions, African-American women tended to fare worse than their white counterparts, regardless of individual incomes; African-American women in neighborhoods with high poverty rates experience the greatest challenges.</p>
<b>IMPLICATIONS FOR PRACTITIONERS</b>	<p>The study findings suggest that controlling for socioeconomic markers does not mitigate racial disparities in adverse birth outcomes.</p> <p>The persistence of racial inequities suggests the need to develop a deeper understanding of the ways in which complex political, social, and economic processes combine to influence health disparities; such research will be relevant to individual interventions as well as general public health and social policy interventions.</p>



Sweet, E., Nandi, A., Adam, E. K., & McDade, T. W. (2013). The high price of debt: Household financial debt and its impact on mental and physical health. *Social Science & Medicine*, 91, 94-100.

<b>STUDY FOCUS</b>	This study examines the relationship between debt and health outcomes — both psychological and general — among individuals aged 24 to 32.
<b>METHODOLOGY</b>	<p>This study uses the National Longitudinal Study of Adolescent Health (<i>Add Health</i>), comprised of a national representative cohort that have provided data over 15 years. In using the longitudinal dataset, the researchers sought to assess the impact of indebtedness on health measures, using previous measures of health — reported within previous survey cycles — to control for preexisting states of health.</p> <p>The <i>Add Health</i> records contain multiple indices of debt, including total debt and subjective perception of debt-to-asset ratios. The <i>Add Health</i> records also provide data on various health measures, including perceived stress, depressive symptoms, and general health outcomes. Lastly, the dataset includes an array of demographic and socioeconomic factors that the researchers used as control variables via OLS multiple regression.</p>
<b>SUMMARY OF FINDINGS</b>	<p>The researchers found that subjective self-reporting of high levels of debt-to-assets is associated with high stress and depression, and reduced general health. These findings persist even after controlling for an array of factors, including prior socioeconomic status, health measures, and demographic factors.</p> <p>Individual levels of absolute debt (the total amount an individual or household owes) were not found to be as closely related to individual levels of stress or poor health. The authors suggest that this may reflect the reality that higher levels of debt may be associated with higher levels of income/wealth as those often serve as a precondition to borrowing. Further, the authors note that not all debt is the same: while mortgages and student loans may create higher absolute debt levels, they may be less impactful to health than credit card or payday loan debts.</p>
<b>IMPLICATIONS FOR PRACTITIONERS</b>	<p>The results suggest that debt may be an important determinant of health that bears further study. The authors suggest understanding how debt fits within the broader picture of an individual's or household's finances to better understand the impact household debt may have on health outcomes.</p> <p>While this study did not explicitly employ the Allostatic Load construct in the assessment of associations between debt and health, the multiple measures of psychological and physical health assessed conceptually move in the same direction as the other studies reviewed.</p>



## ADDITIONAL RECENT RESEARCH

Ribeiro, A., Amaro, J., Lisi, C., & Fraga, S. (2018). Neighborhood socioeconomic deprivation and allostatic load: A scoping review. *International journal of environmental research and public health*, 15(6), 1092.

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Robinette, J. W., Charles, S. T., Almeida, D. M., & Gruenewald, T. L. (2016). Neighborhood features and physiological risk: an examination of allostatic load. *Health & place*, 41, 110-118.

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Riva, M., Plusquellec, P., Juster, R. P., Laouan-Sidi, E. A., Abdous, B., Lucas, M., & Dewailly, E. (2014). Household crowding is associated with higher allostatic load among the Inuit. *J Epidemiol Community Health*, jech-2013.

Evans, G. W., & Kim, P. (2012). Childhood poverty and young adults' allostatic load: The mediating role of childhood cumulative risk exposure. *Psychological science*, 23(9), 979-983.

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