

Neighborhood Income and High Sensitivity C-Reactive Protein Among Young Adults: Differences by Sexual Orientation and Gender

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Background

- C-Reactive Protein (CRP) has emerged as a powerful biomarker for cardiovascular health (Blake & Ridker, 2001; Cesari et al., 2003).
- Sexual orientation differences in CRP (Hatzenbuehler et al., 2013; Everett et al., 2014):
 - Gay/bisexual men *higher* CRP than heterosexual men
 - Lesbian/bisexual women *lower* CRP than heterosexual women
- Lower socioeconomic status associated with higher CRP (Nazmi, 2007).



Background

- Neighborhood effects on stress and health are well-documented. Lower-income neighborhoods associated with:
 - Higher depression (Aneshensel & Sucoff, 1996)
 - Lower self-rated health (Kobetz et al., 2003)
 - Lower physical quality of life (Sallis et al., 2009)
 - Higher BMI (Sallis et al., 2009, Chen & Patterson, 2006)
 - Higher blood cortisol (Chen & Patterson, 2006)
 - Higher incidence of myocardial infarction (Stjarne et al., 2006) and hypertension (Cozier et al., 2007)



Background

- Overall, lesbian, gay, bisexual (LGB) men and women more likely to experience victimization, discrimination, stigma (Meyer, 2003).
- Stigmatizing social environments (e.g. states with discriminatory laws, neighborhoods with low LGB acceptance) negatively impact health of LGB individuals (Hatzenbuehler et al., 2010; Hatzenbuehler, 2011).
- Limited research about how/whether socioeconomic attributes of neighborhoods are associated with health of LGB residents.
 - LGB victimization increases as poverty within school district increases (Kosciw, 2009).
 - Compared to middle class lesbians, working-class lesbians felt greater need to hide sexual identities at work, a source of psychological stress (McDermott, 2006).



Research Questions

1. Is neighborhood income (median Census tract income) associated with CRP?
1. Does this association differ between LGB and heterosexual residents?



Data

National Longitudinal Study of Adolescent to Adult Health (Add Health), Wave IV

- Final analytic sample: $n = 9,860$

Excluded:

- Missing CRP score or CRP >10
- Missing neighborhood income score
- “Mostly heterosexual” sexual identity
- Pregnant women
- Invalid age
- “Other” race
- No sample weights



Measures

High sensitivity CRP

- Collected via dried blood spot
- LogCRP used for analysis

Median household income (Census tract), past 12 months

- Linked from 2009 American Community Survey

Sexual identity

- “Please choose the description that best fits how you think about yourself”
 - Heterosexual = “100% heterosexual”
 - LGB = “bisexual,” “mostly homosexual,” or “100% homosexual”



Measures

Covariates

- Gender
- Age
- Race/ethnicity (non-Hispanic White, non-Hispanic Black, non-Hispanic Asian, Hispanic)
- Nativity status
- Educational attainment (less than high school, high school/GED, some college, 4-year college, more than college)
- Annual household income (less than \$24,999, \$25,000-\$49,999, \$50,000-\$74,999, \$75,000 +)
 - Missing income values were imputed using regression imputation.



Data Analysis

- Demographic differences assessed between heterosexual and LGB respondents:
 - Wald tests assessed continuous variables
 - Design-based F tests assessed categorical variables
- Linear regressions assessed differences in CRP by sexual orientation and neighborhood income.
- All models were stratified by gender & survey weights were applied.



Results

Table 1: Weighted Characteristics by Gender and Sexual Identity

| | Men | | | Women | | |
|--|-------------------------------------|--|-------------|-------------------------------------|--|-----------------|
| | Heterosexual (n=5,128) 97.12% | Gay or Bisexual (n=176) 2.88% | p-value | Heterosexual (n=4,318) 94.61% | Lesbian or Bisexual (n=238) 5.39% | p-value |
| C-Reactive Protein (mean, range = 0-10) | 2.21 | 2.26 | 0.83 | 2.86 | 2.57 | 0.13 |
| Age (mean) | 28.93 | 28.91 | 0.88 | 28.81 | 28.41 | 0.00 |
| Race/Ethnicity (%) | | | 0.13 | | | 0.29 |
| White | 0.70 | 0.68 | | 0.69 | 0.69 | |
| Black | 0.15 | 0.09 | | 0.16 | 0.15 | |
| Hispanic | 0.12 | 0.18 | | 0.11 | 0.15 | |
| Asian | 0.04 | 0.05 | | 0.03 | 0.01 | |
| Nativity (Born a US Citizen) (%) | 0.96 | 0.95 | 0.92 | 0.95 | 0.97 | 0.40 |
| Education (%) | | | 0.01 | | | 0.06 |
| < High School | 0.10 | 0.09 | | 0.07 | 0.15 | |
| High School Degree | 0.31 | 0.17 | | 0.23 | 0.27 | |
| Some College/Technical Degree | 0.33 | 0.32 | | 0.35 | 0.35 | |
| Bachelor's Degree | 0.17 | 0.27 | | 0.21 | 0.17 | |
| > Bachelor's Degree | 0.09 | 0.15 | | 0.14 | 0.06 | |
| Household Income (%) | | | 0.30 | | | <0.01 |
| < \$25,000 | 0.15 | 0.15 | | 0.20 | 0.33 | |
| \$25,000 - \$49,999 | 0.32 | 0.29 | | 0.31 | 0.33 | |
| \$50,000 - \$74,999 | 0.24 | 0.25 | | 0.23 | 0.16 | |
| > \$75,000 | 0.30 | 0.30 | | 0.26 | 0.18 | |
| Health Index (mean, range = 0-4) | 2.46 | 2.50 | 0.68 | 2.29 | 2.27 | 0.82 |
| BMI (mean) | 29.00 | 27.74 | 0.05 | 29.11 | 31.02 | 0.03 |
| Anti-Inflammatory Medication Usage (%) | 0.26 | 0.29 | 0.57 | 0.33 | 0.40 | 0.09 |



Results

Table 2: Log C-Reactive Protein Differences by Gender and Sexual Orientation, Linear Regression Results

| Men (n=5,304) | | | | |
|-------------------------------|-------------|----------------|------------------|--------------|
| | Coefficient | Lin. Std. Err. | 95% CI | p-value |
| Model 1: Gross Effects | | | | |
| Heterosexual | Reference | - | - | - |
| LGB | 0.080 | 0.107 | (-0.132, 0.292) | 0.459 |
| Model 2: Net Effects | | | | |
| Heterosexual | Reference | - | - | - |
| LGB | 0.188 | 0.091 | (0.008, 0.369) | 0.041 |
| Women (n=4,556) | | | | |
| Model 1: Gross Effects | | | | |
| Heterosexual | Reference | - | - | - |
| LGB | -0.117 | 0.091 | (-.296, 0.063) | 0.200 |
| Model 2: Net Effects | | | | |
| Heterosexual | Reference | - | - | - |
| LGB | -0.204 | 0.084 | (-0.370, -0.039) | 0.016 |



Results

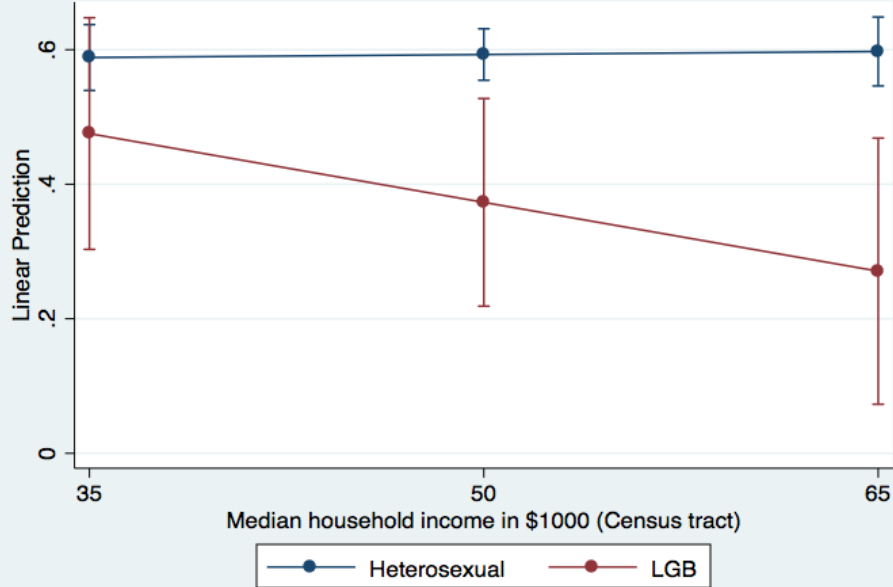
Table 3: Log C-Reactive Protein Differences by Gender and Median Household Income (Census Tract), Linear Regression Results

| | Men | | | |
|---------------------------------|-------------|----------------|------------------|-----------------|
| | Coefficient | Lin. Std. Err. | 95% CI | <i>p</i> -value |
| Model 1: Gross Effects | | | | |
| Median HH Income (Census Tract) | -0.003 | 0.001 | (-0.005, -0.001) | 0.003 |
| Model 2: Net Effects | | | | |
| Median HH Income (Census Tract) | 0.000 | 0.001 | (-0.002, 0.002) | 0.943 |
| | Women | | | |
| Model 1: Gross Effects | | | | |
| Median HH Income (Census Tract) | -0.003 | 0.001 | (-0.005, -0.002) | 0.000 |
| Model 2: Net Effects | | | | |
| Median HH Income (Census Tract) | 0.000 | 0.001 | (-0.002, 0.002) | 0.729 |

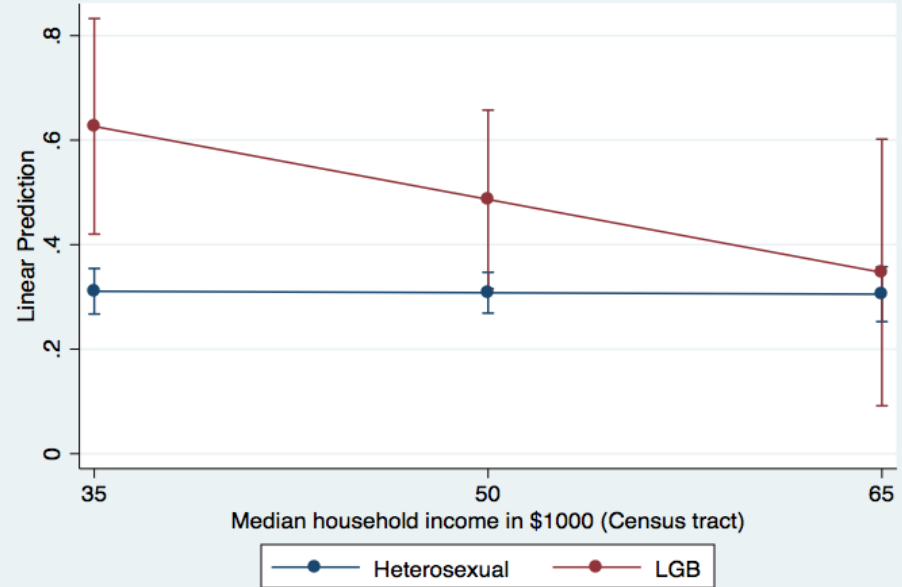


Results

Women: CRP by Median Household Income, Heterosexual vs. LGB



Men: Median Household Income, Heterosexual vs. LGB



Results

- Results suggest that increasing neighborhood income has little effect on heterosexuals, but that lesbian/bisexual women experience significant decrease in CRP within higher-income neighborhoods.



Discussion

- Residents of high income neighborhoods have greater access to health-benefitting and stress-reducing resources (Phelan et al., 2010).
- LGB residents of higher-income neighborhoods (women in particular) may be better able to take advantage of flexible resources afforded them through:
 - Reduced exposure to classic minority stressors (e.g. discrimination, victimization) (Kosciw, 2009).
 - Greater ability to cope with stress that does arise.



Discussion

- Gender nonconformity hypothesis (Everett et al., 2014):
- Overall, LGB men and women more likely to be gender nonconforming (GNC) (Bailey, 1995).
 - GNC individuals exposed to more sources of stress (Roberts, 2013), **BUT...**
 - GNC *responses* to stress might differentially impact LGB men and women
 - GNC stress responses may be more beneficial for women than men



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Thank you!

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