

# Impact of Social Determinants on Racial Differences in Carbapenem-Resistant Enterobacteriaceae Incidence, Atlanta, 2012-2018

Gillian Smith, MPH<sup>1,3</sup>, Chris Bower, MPH<sup>1,3</sup>, Scott Fridkin, MD<sup>1,4</sup>, Jesse T. Jacob, MD MSc<sup>1,4</sup>

<sup>1</sup> Georgia Emerging Infections Program, Atlanta, GA, <sup>2</sup> Atlanta Veterans Affairs Medical Center, Decatur, GA, <sup>3</sup> Foundation for Atlanta Veterans Education and Research, Decatur, GA, <sup>4</sup> Emory University School of Medicine, Atlanta, GA

Correspondence: gsmith@gaeip.org

## Introduction

- Public health now prioritizes addressing social determinants of health to promote health equity
- Carbapenem-resistant Enterobacteriaceae (CRE) can be highly transmissible and are often associated with healthcare exposure and high mortality
- Georgia Emerging Infections Program (GA EIP) performs active population-based surveillance for CRE in the metropolitan Atlanta Area (2017 population: 3.9 million, 23 clinical labs)
- Hypothesis:** Social determinants of health, including increased poverty, are associated with increased racial disparity in the CRE incidence

Case definition requires all of the following:

- Species: *E. coli*, *E. cloacae*, *K. oxytoca*, *K. pneumoniae*, or *K. aerogenes*
- Isolated from urine or a normally sterile site
- Reside in a private residence in metropolitan Atlanta

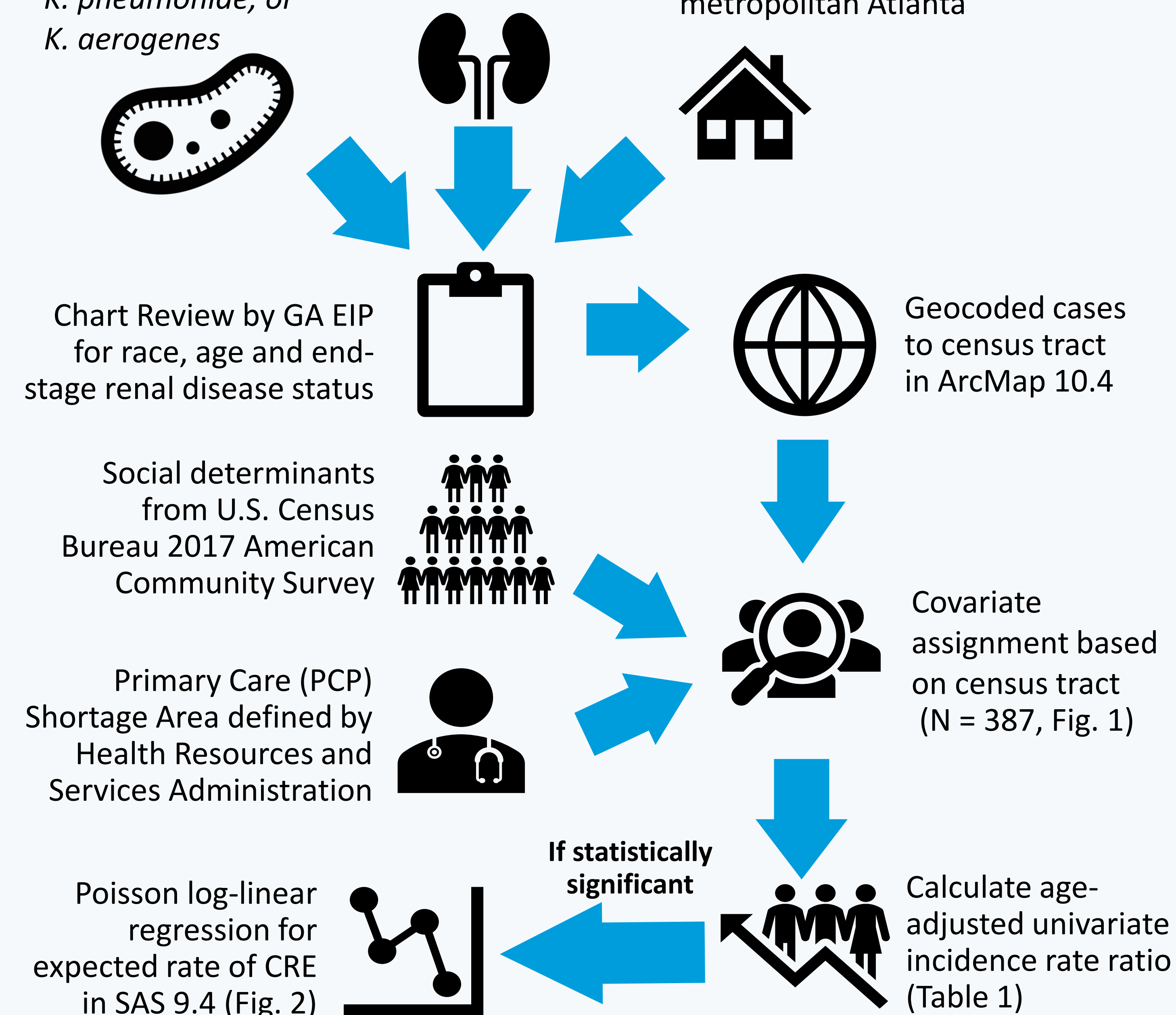


Figure 1. Race (a), Social Determinants (b-d, f), and ESRD (e) Described at the Census Tract Level

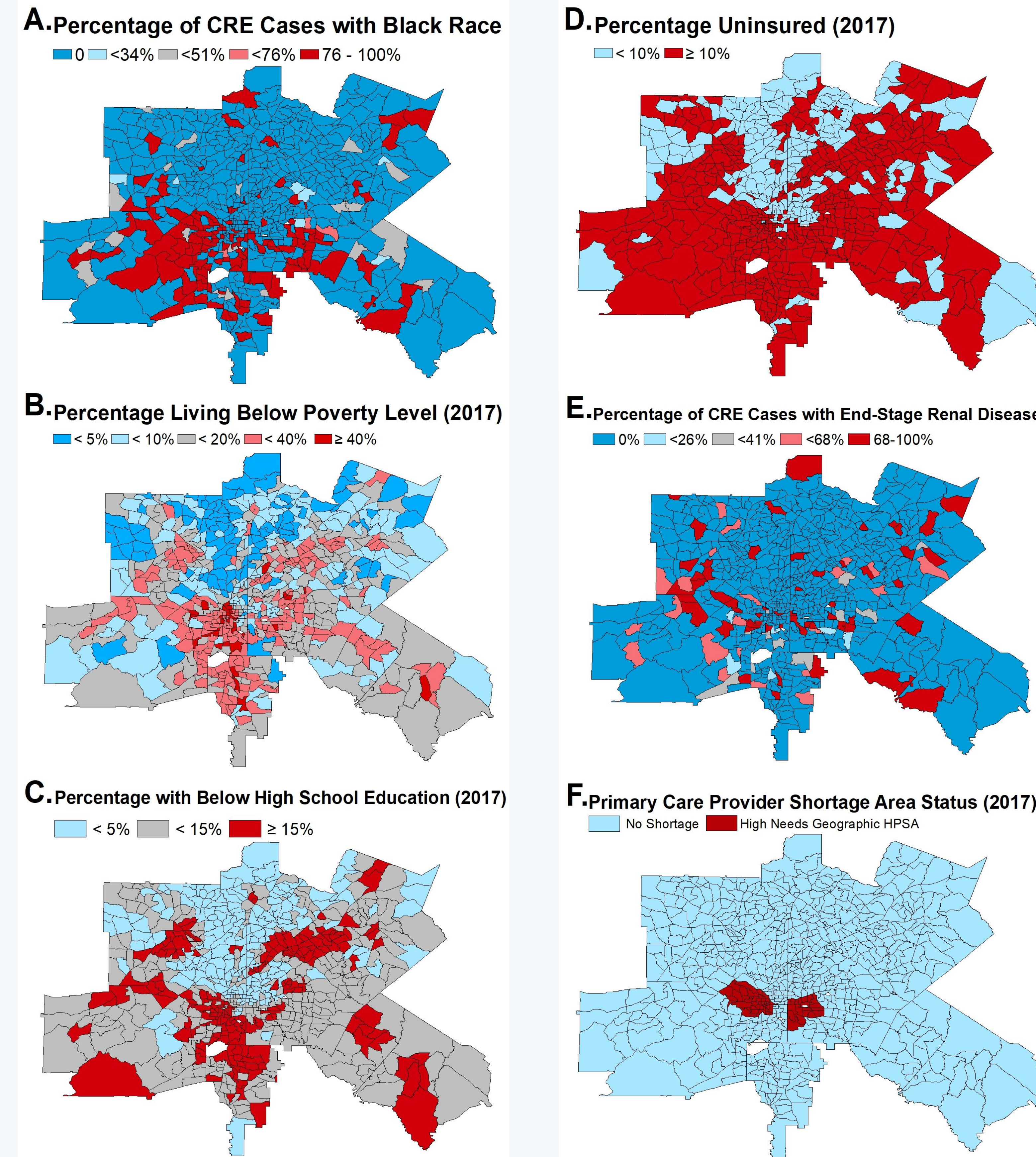
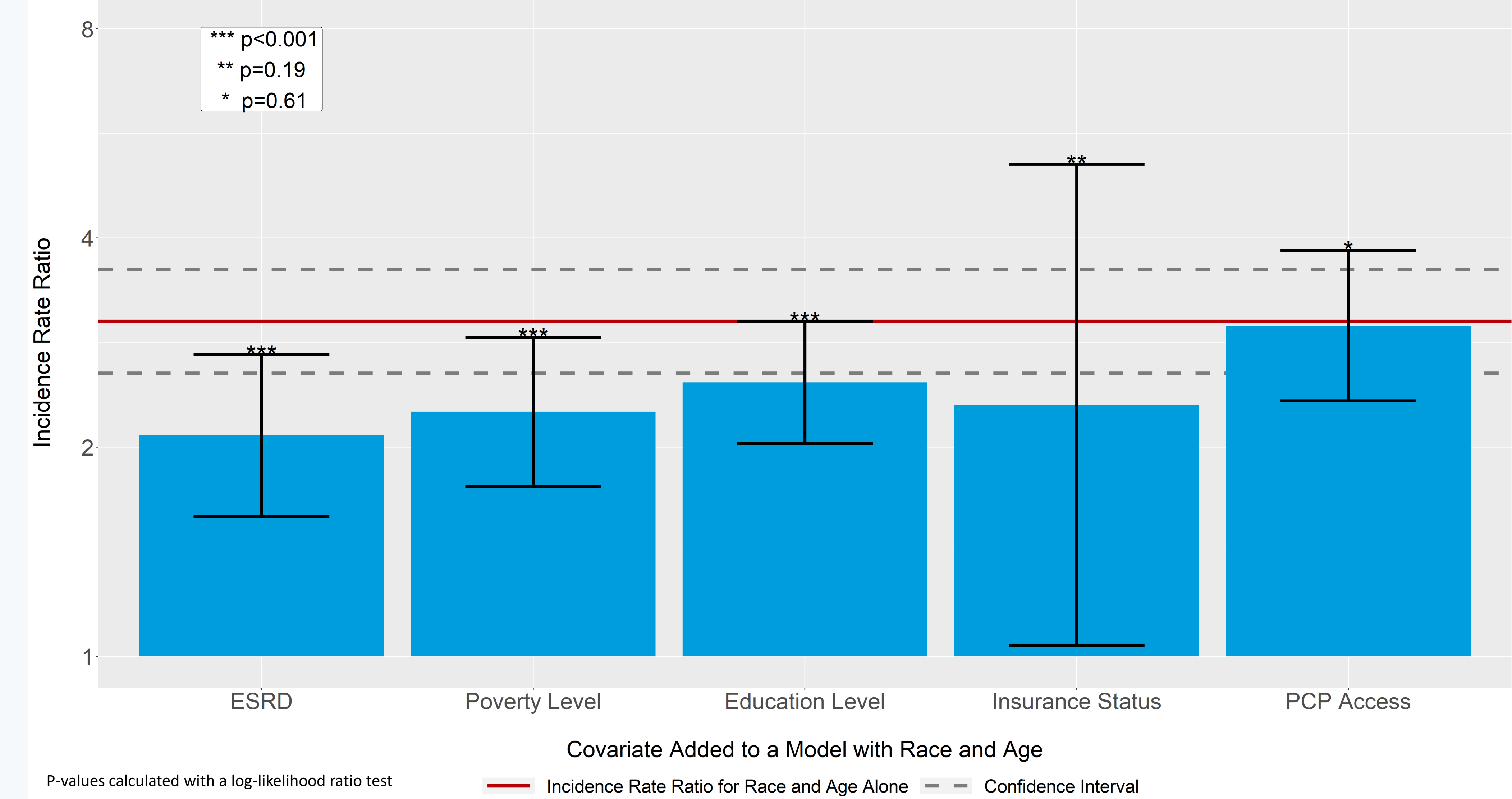


Table 1. Age-adjusted Univariate IRR

| Covariate                                    | IRR   | 95% CI        |
|--|-------|---------------|
| Race (black vs white)                        | 3.06  | 2.44, 3.83    |
| Increased poverty ( $\geq 40\%$ vs $< 5\%$ ) | 5.27  | 3.00, 9.24    |
| Low education ( $\geq 15\%$ vs $< 5\%$ )     | 3.34  | 2.42, 4.62    |
| Uninsured ( $\geq 10\%$ vs $< 10\%$ )        | 1.72  | 1.38, 2.13    |
| Primary Care Shortage Area                   | 1.78  | 1.23, 2.59    |
| End-Stage Renal Disease (ESRD)               | 58.15 | 26.86, 125.94 |

Figure 2. Comparison of Race-Specific CRE Rate Ratio Controlling for Individual Social Determinants



## Summary

- Carbapenem-resistant Enterobacteriaceae incidence is three times higher among blacks compared to whites in metropolitan Atlanta
- In a multivariable model the individual addition of education, poverty, or ESRD was statistically significant ( $p < 0.001$ )
- The impact of ESRD suggests comorbidities can contribute to racial differences in CRE
- Increased poverty level and lower education partially account for racial differences in CRE status suggesting the need for further public health interventions addressing social determinants of health
- The CRE incidence remains over two times higher among blacks compared to whites after adjusting for social determinants or ESRD suggesting the need for further investigation