

County Level Demographics and Bystander CPR Rates for Out-of-hospital Sudden Cardiac Arrest

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Introduction

Out-of-hospital cardiac arrest (OHCA) is a major public health problem, claiming approximately 300,000 lives each year in the US. Survival rates average approximately 8% nationwide, but successful resuscitation is possible. Bystander CPR is necessary to increase survival rates as the chance of survival decreases by up to 10% for every minute before CPR is started.

Objective

To examine the association between county demographic data (e.g. median age, highest level of education, and median income) and the incidence of bystander CPR for victims of OHCA.

Methods

We hypothesized that the incidence of bystander CPR would increase with increasing quartiles of median income, educational attainment and median age.

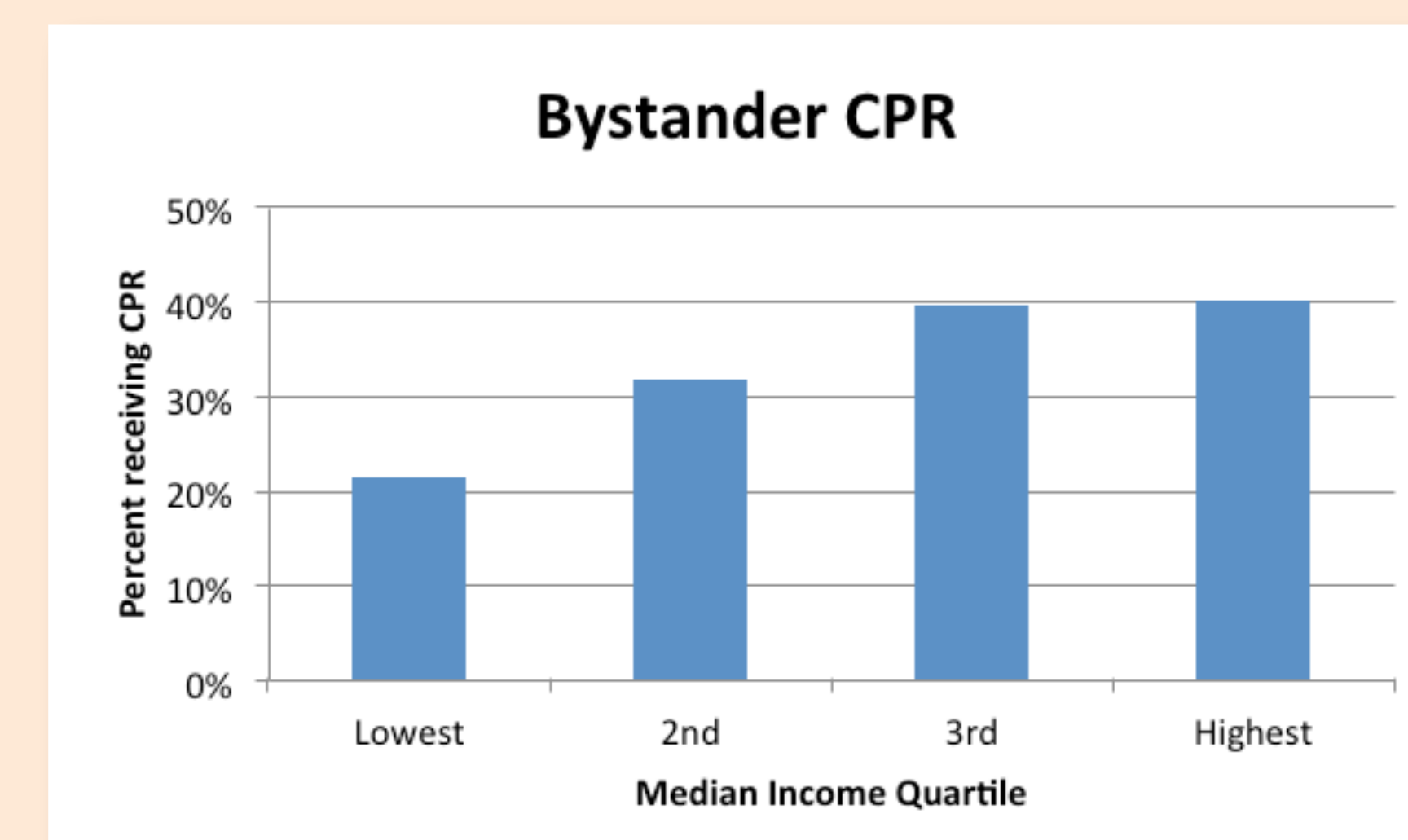
We used data from the 2011-2013 multi-state population-based Cardiac Arrest Registry to Enhance Survival (CARES) to record care and outcome for OHCA. Data from CARES was linked to county-based census information from the American Community Survey, 2008 – 2012 using State (89,213 records linked, 507 unlinked). Median income quartile, educational attainment and median age quartile was assigned to each event according to the county of the event. Incidence of bystander CPR was calculated at the aggregate for each quartile of the county demographic variables. We evaluated for a trend across the 4 quartiles.

Bystander CPR is defined as CPR provided by any person at the event that is not a medical professional dispatched to the scene. Education attainment is defined as the percentage of the population receiving a college degree.

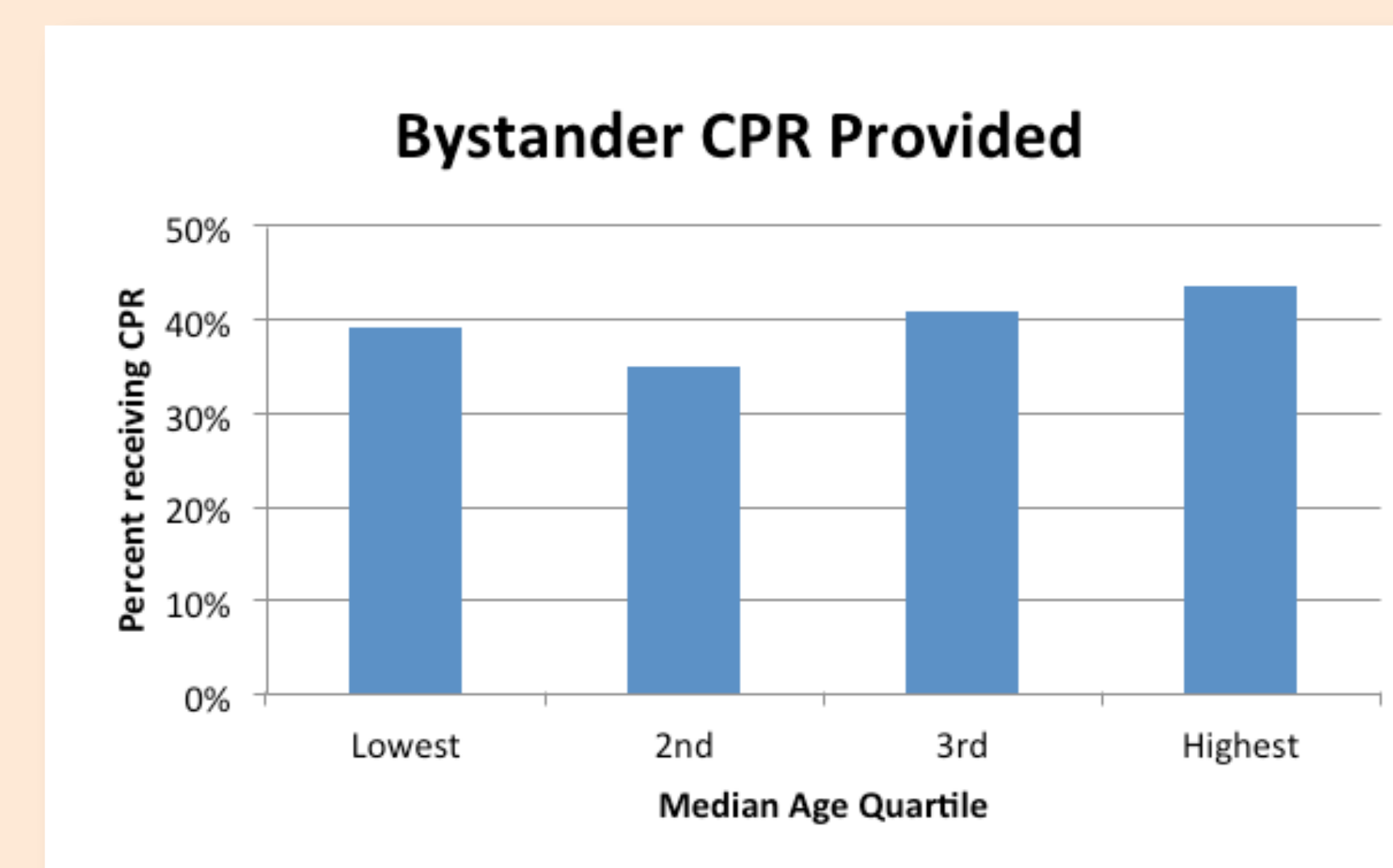
Results

Over the three year period, there were 85,743 OHCA events with complete data. Overall bystander CPR was provided in 38.0% of the OHCA events.

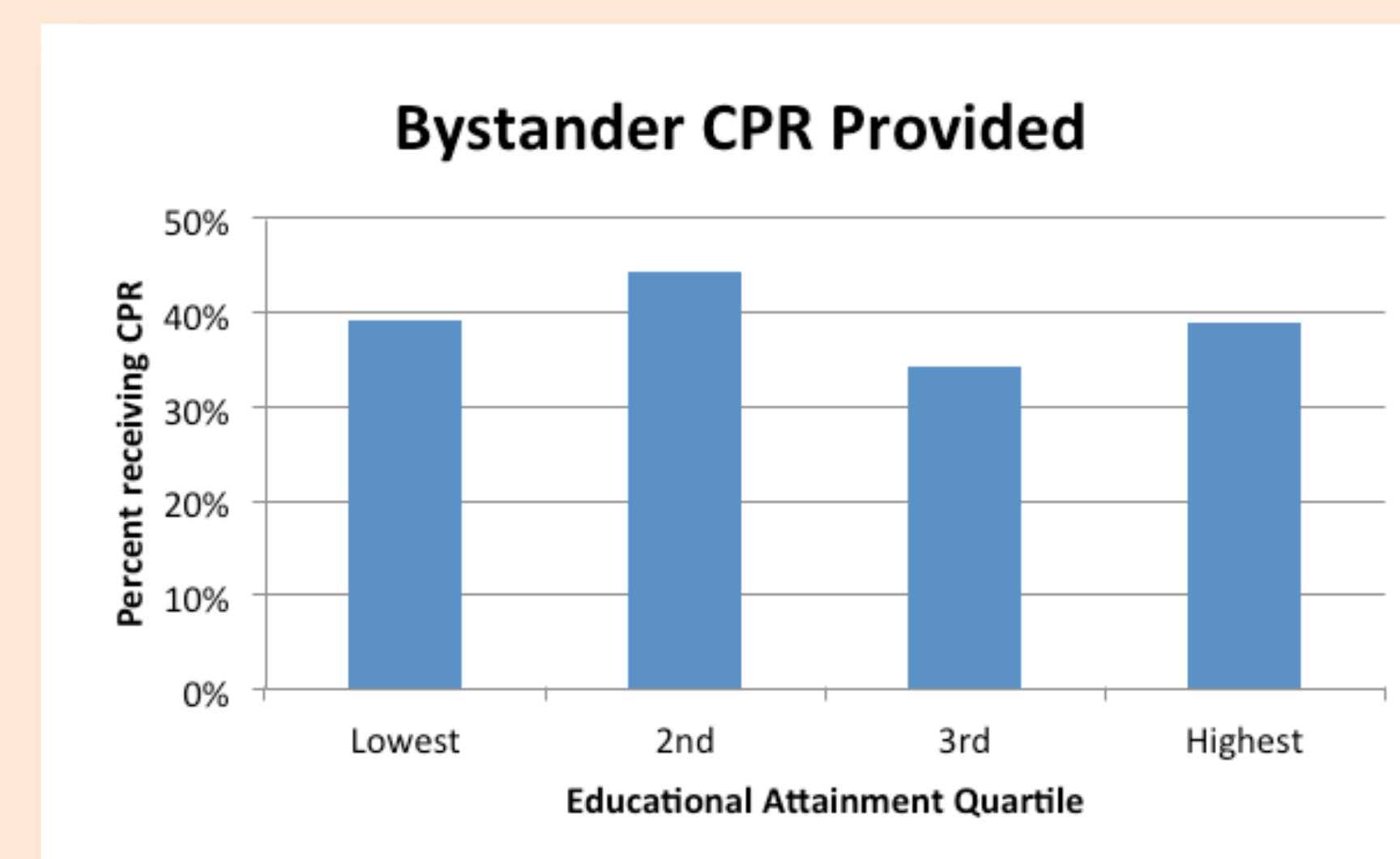
The percentage of cardiac arrest victims receiving bystander CPR increased in counties with increasing income quartile ($p < 0.05$). The incidence of bystander CPR was almost double in the highest compared to the lowest quartile of income.



Although the counties in the second quartile of median age had significantly lower incidence of bystander CPR, we did not observe any significant trend across quartiles between age and the likelihood of bystander CPR.



Although counties within the second quartile of education attainment provided bystander CPR most frequently ($p < 0.05$), we did not observe a significant trend across quartiles between education and bystander CPR.



Discussion

Counties with increasing median household income were associated with higher bystander CPR rates. However two other county-level demographic variables – education and age - were not correlated in a dose-dependent fashion with bystander CPR incidence.

These county-level data are insufficient to assist in focusing resources to improve bystander assistance rates across a large geographic area. Further analysis should be done that more tightly links the location of the event with the demographics of the area. In addition, the analysis should be separated for events that occur at a residence (where the location may be an improved descriptor of the bystander) and events that occur in public places, where the bystander has a higher chance of residing outside the current area. Ultimately a multivariable model that accounts for multiple characteristics simultaneously may provide for the truest understanding of what regional characteristics influence bystander CPR.

Conclusion:

While there are multiple confounding variables, this large population-based analysis of OHCA, bystander CPR and county level demographics found an association between higher income level and bystander CPR performance but no association for age level or education level. These data may help target specific segments of the populations for bystander CPR education.

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