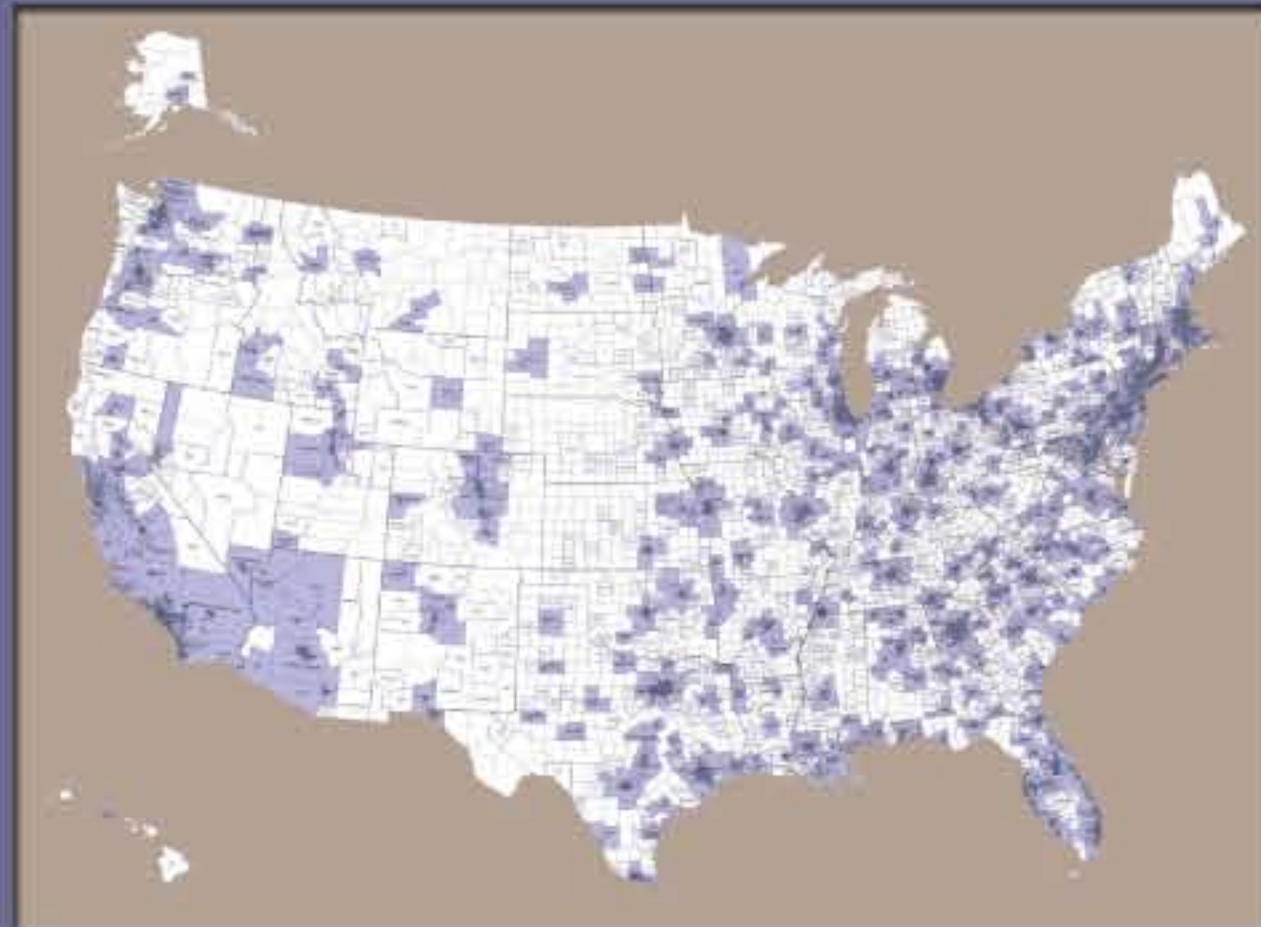


The Relationship Between Socioeconomic Status and Chronic Disease: Does it Matter Where Your Patient Lives?



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Background

- The inverse relationship between socioeconomic status and the prevalence of diabetes and coronary heart disease is well established in the literature.
- This inverse relationship is true irrespective of studying individual income or income in aggregate.
- Behavioral risk factors contribute to the development of diabetes and coronary heart disease. These risk factors, which are more prevalent among persons of low socioeconomic status, explain some of the inverse relationship but socioeconomic status may be an independent risk factor.
- It is unknown whether the relationship between socioeconomic status and diabetes or coronary heart disease is influenced by whether a person lives in a rural or urban area (i.e., population density).

Methods

- Data source is the US CDC's 2008 Behavioral Risk Factor Surveillance System, a population-based telephone survey.
- Participants reported their age, gender, ethnicity, income, education, height and weight (to calculate BMI), tobacco use, and whether they had been diagnosed with diabetes or coronary heart disease.
- For this analysis, persons living in a metropolitan statistical area (MSA) of more than 50,000 persons were classified as urban and persons living outside of a MSA were classified as rural. Persons living in near-urban, suburban, and near-rural counties were excluded.
- Logistic regression models were created using STATA. Prevalence odds ratios with 95% confidence intervals and *p* values are provided. Indicator variables were assigned for categorical answers. Results are considered significant when *p* is less than or equal to 0.05.

Results

- Persons living in rural areas are more likely to suffer from diabetes and coronary heart disease than persons living in an urban environment (9.5% higher odds of having diabetes and 47.6% higher odds of having coronary heart disease).
- As illustrated in Table 1, preliminary results suggest that the increased prevalence of common risk factors for diabetes and coronary heart disease in rural locations contributes to these findings.

Table 1. Demographics of Urban and Rural Populations

	Urban	Rural	<i>p</i>
Have diabetes	9.0%	9.7%	0.001
Have coronary heart disease (or angina)	2.8%	4.1%	0.000
Annual Household Income			
Less than \$25,000	27.5%	30.1%	0.000
\$25,000 to less than \$50,000	25.2%	31.4%	
\$50,000 or more	47.3%	38.5%	
High School Graduate	88.7%	88.2%	0.118
Age			
18 to 34	32.0%	27.7%	0.000
35 to 54	39.0%	38.2%	
55 or older	29.1%	34.1%	
Gender			
Male	51.1%	50.7%	0.446
Female	48.9%	49.3%	
BMI			
Less than 25	37.6%	32.6%	0.000
25 to less than 30	36.1%	36.7%	
30 and over	26.3%	30.7%	
Ethnicity			
Black, non-Hispanic	14.9%	6.3%	0.000
Hispanic	18.6%	5.8%	0.000
Smoking (every day or some days)	24.2%	30.7%	0.000

Notes: *n* = 105,103,780 based on 214,698 respondents for all statistics other than coronary heart disease and smoking, for which *n* = 80,663,224 based on 152,421 respondents.

Table 2 indicates that the odds of being diagnosed with diabetes:

- decrease as annual household income increases.
- increase as age increases.
- increase as BMI increases.
- are greater for Black non-Hispanics and Hispanics when compared to non-Hispanic Whites.
- are lower for women than for men.

Although the prevalence of diabetes in rural areas is higher than in urban areas, it is not as high as would be expected given the prevalence of the established risk factors.

Table 2. Logistic regression results for diabetes

	Odds Ratio	95% CI	<i>p</i>
Annual Household Income			
Less than \$10,000	1.0		
\$10,000 to less than \$15,000**	0.86	0.74 1.00	0.054
\$15,000 to less than \$20,000	0.76	0.66 0.89	0.000
\$20,000 to less than \$25,000	0.59	0.52 0.68	0.000
\$25,000 to less than \$35,000	0.54	0.47 0.62	0.000
\$35,000 to less than \$50,000	0.49	0.43 0.57	0.000
\$50,000 to less than \$75,000	0.40	0.35 0.47	0.000
\$75,000 or more	0.31	0.27 0.36	0.000
High School Graduate			
No	1.0		
Yes**	0.92	0.84 1.02	0.116
Population Density			
Urban	1.0		
Rural	0.94	0.89 0.99	0.032
Age			
18 to 24	1.0		
25 to 34**	1.45	0.88 2.39	0.148
35 to 44	3.97	2.45 6.45	0.000
45 to 54	8.90	5.52 14.35	0.000
55 to 64	16.81	10.44 27.07	0.000
65 or older	22.38	13.98 35.82	0.000
Gender			
Male	1.0		
Female	0.78	0.73 0.83	0.000
BMI			
Less than 25	1.0		
25 to less than 30	1.84	1.68 2.01	0.000
30 and over	5.00	4.58 5.46	0.000
Ethnicity			
White, non-Hispanic	1.0		
Black, non-Hispanic	1.57	1.43 1.72	0.000
Hispanic	1.32	1.16 1.50	0.000

Notes: CI: Confidence Interval, ** not significant at *p* < 0.05

Implications

- Interventions should focus on the root causes of the increased prevalence of diabetes and coronary heart disease in rural areas including poverty, obesity, and tobacco use.
- Clinicians practicing in rural environments need to be particularly vigilant screening their patients.
- Adequately caring for these patients in the future will be challenging due to the shortage of primary care clinicians in rural areas. Nurse practitioners can play an important role in filling this gap.
- From a public policy perspective, the distribution of scarce health care dollars should be targeted toward rural populations.

Table 3 indicates that the odds of being diagnosed with coronary heart disease:

- decrease as annual household income increases.
- increase as age increases.
- increase as BMI increases.
- are lower for Non-Hispanic Blacks when compared to non-Hispanic Whites.
- are lower for women than for men.
- are greater for smokers than for non-smokers.

Persons in rural areas are still more likely to be diagnosed with coronary heart disease, even after controlling for the established risk factors.

Table 3. Logistic regression results for coronary heart disease

	Odds Ratio	95% CI	<i>p</i>
Annual Household Income			
Less than \$10,000	1.0		
\$10,000 to less than \$15,000	0.80	0.64 0.99	0.041
\$15,000 to less than \$20,000	0.74	0.58 0.94	0.015
\$20,000 to less than \$25,000	0.64	0.52 0.80	0.000
\$25,000 to less than \$35,000	0.55	0.45 0.68	0.000
\$35,000 to less than \$50,000	0.42	0.33 0.52	0.000
\$50,000 to less than \$75,000	0.40	0.32 0.50	0.000
\$75,000 or more	0.31	0.25 0.39	0.000
High School Graduate			
No	1.0		
Yes**	1.11	0.94 1.30	0.221
Population Density			
Urban	1.0		
Rural	1.14	1.04 1.25	0.006
Age			
18 to 24	1.0		
25 to 34**	2.03	0.98 4.23	0.057
35 to 44	4.36	2.28 8.35	0.000
45 to 54	10.42	5.56 19.53	0.000
55 to 64	23.84	12.80 44.38	0.000
65 or older	47.44	25.61 87.86	0.000
Gender			
Male	1.0		
Female	0.61	0.55 0.68	0.000
BMI			
Less than 25	1.0		
25 to less than 30	1.19	1.04 1.35	0.012
30 and over	1.84	1.61 2.10	0.000
Ethnicity			
White, non-Hispanic	1.0		
Black, non-Hispanic	0.66	0.55 0.80	0.000
Hispanic**	0.84	0.65 1.08	0.169
Smoking			
Never smoked	1.0		
Every day or some days	1.74	1.56 1.95	0.000

Notes: CI: Confidence Interval, ** not significant at *p* < 0.05

Limitations

- BRFSS data is self-reported. No independent validation of answers is possible.
- Cross sectional survey does not allow for the determination of cause and effect.