

# The Association between Social Determinants of Health and Self-Reported Diabetic Retinopathy: An Exploratory Analysis

Silverberg EL, Sterling TW, Williams TH, et al. The Association between Social Determinants of Health and Self-Reported Diabetic Retinopathy: An Exploratory Analysis. *Int J Environ Res Public Health*. 2021;18:792-792. doi:10.3390/ijerph18020792

One-third of Americans with diabetes will develop diabetic retinopathy (DR), the leading cause of blindness in working-age Americans. Social determinants of health (SDOHs) are conditions in a person's environment that may impact health. The objective of this study was to determine whether there is an association between SDOHs and DR in patients with type II diabetes.

**Data for this study were obtained from the 2018 Behavioral Risk Factor Surveillance System and included 14,810 total participants.**

This study utilized a cross sectional study design and consisted of a secondary analysis of data obtained from the 2018 Behavioral Risk Factor Surveillance System (BRFSS). A total of 14,810 participants were included in the final analysis.



## Inclusion criteria:

- Age of 18 years or over
- Participation in the 2018 BRFSS
- Self-reported diagnosis of diabetes



## Exclusion criteria:

- Missing data in any of the variables in the analysis, for DR, demographics, BMI, or SDOHs
- Gave one of the following responses to any of the relevant BRFSS items: "Don't know/Not sure" or "Refused"

**Alaskan Native/Native Americans had the strongest association of having DR compared to other races and compared to most other SDOH categories.**

## Unadjusted and adjusted associations of social determinants of health and diabetic retinopathy

Legend: ■ Unadjusted OR (95% CI) ■ Adjusted Full Model OR (95% CI) ■ Adjusted Reduced Model OR (95% CI)

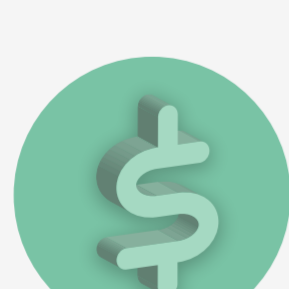
Characteristics	Odds Ratio (95% CI)
<b>Age (years)</b>	
18-44	Reference
<b>DR</b> 45-64	1.52 (1.07-2.17) 1.50 (1.02-2.21) 1.52 (1.05-2.21)
65+	1.14 (0.80-1.63) 1.38 (0.89-2.14) 1.45 (0.94-2.33)
<b>Sex</b>	
Male	Reference
Female	0.84 (0.67-1.06) 0.80 (0.64-1.00) 0.80 (0.64-1.00)
<b>Race</b>	
White	Reference
Black	1.25 (0.99-1.59) 1.21 (0.96-1.53) 1.18 (0.93-1.49)
<b>DR</b> AN/NA	2.39 (1.16-4.93) 2.15 (1.16-3.98) 2.11 (1.14-3.90)
Other	1.39 (0.91-2.11) 1.11 (0.64-1.90) 1.11 (0.64-1.93)
<b>Ethnicity</b>	
Non-Hispanic	Reference
Hispanic	1.74 (1.15-2.65) 1.61 (1.02-2.53) 1.56 (0.99-2.46)
<b>BMI</b>	
Underweight/Normal Weight	Reference
Overweight	1.12 (0.79-1.59) 1.13 (0.80-1.58)
Obese	1.01 (0.74-1.37) 0.94 (0.69-1.29)
<b>Home Ownership</b>	
Own	Reference
Rent	1.37 (1.06-1.76) 1.16 (0.91-1.48)
Other	1.53 (1.04-2.24) 1.27 (0.85-1.89)
<b>Marital Status</b>	
Married/Coupled	Reference
Divorced/Separated	1.14 (0.88-1.49) 0.87 (0.68-1.12)
Widowed	0.99 (0.71-1.37) 0.97 (0.69-1.35)
Never Married	1.05 (0.72-1.51) 0.80 (0.57-1.12)
<b>Employment Status</b>	
Employed/Self-employed	Reference
<b>DR</b> Out of Work	3.04 (1.69-5.47) 2.93 (1.67-5.13) 2.82 (1.62-4.92)
Retired	1.04 (0.80-1.34) 1.02 (0.73-1.43) 1.03 (0.74-1.44)
<b>DR</b> Unable to Work	2.53 (1.86-3.44) 2.12 (1.57-2.89) 2.14 (1.57-2.91)
Homemaker/Student	0.53 (0.34-0.84) 0.45 (0.26-0.79) 0.47 (0.27-0.80)
<b>Healthcare Coverage</b>	
Yes	Reference
No	1.12 (0.75-1.69) 0.90 (0.59-1.38)
<b>Education Levels</b>	
Graduated College/TS	Reference
<b>DR</b> Did Not Graduate HS	2.77 (1.95-3.93) 1.86 (1.26-2.73) 1.91 (1.30-2.79)
<b>DR</b> Graduated HS	1.66 (1.28-2.14) 1.40 (1.07-1.83) 1.43 (1.08-1.97)
<b>DR</b> Attended College/TS	1.56 (1.21-2.00) 1.40 (1.07-1.83) 1.42 (1.09-1.86)
<b>Urban or Rural</b>	
Urban	Reference
Rural	1.23 (0.91-1.67) 1.27 (0.94-1.72)

**DR** Factors associated with DR in patients with diabetes

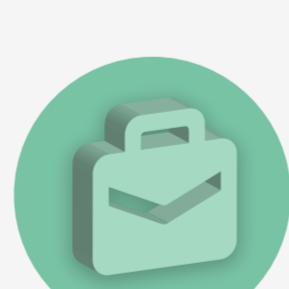
OR, odds ratio; CI, confidence interval; AN/NA, Alaskan Native/Native American; TS, technical school; HS, high school.

**Multiple studies have shown strong relationships between economic status and DR.**

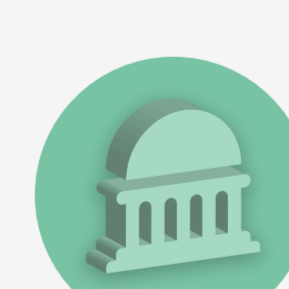
In general, past research has shown that a low socioeconomic status presents a higher risk of having DR.



Low income

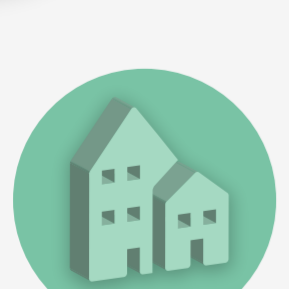


Receiving public assistance

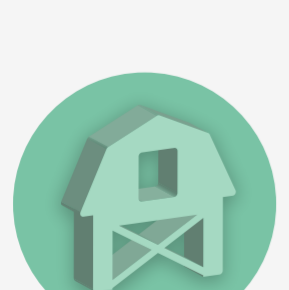


Inconsistent access to employment

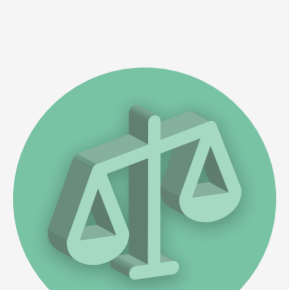
**Neighborhood and built environments are difficult to measure, and can include some bias between urban versus rural environments.**



Neighborhood and built environment is a complicated SDOH that is difficult to measure and study but is an important factor that has the potential to affect one's health.



For instance, assuming that urban or rural status conveys all the resources available within one's built environment may introduce some additional bias.



Contrary to previous thought, it has been shown that impoverished areas within urban environments can be more deficient in resources than rural areas. These subtleties were not addressed through the survey question on "urban or rural status."

**Conclusions**

In conclusion, our data showed that some SDOHs, such as education, economic stability, and race in a social context, can be associated with the outcome of DR in diabetic patients. Thus, it is recommended to identify these determinants when treating patients with diabetes mellitus since delayed screenings can increase the risk of developing DR. While this study has identified SDOHs that may contribute to the outcome of having DR, future studies should be conducted to figure out why this is. Obtaining a better understanding of the mechanisms behind the SDOHs recognized as having an association with DR could aid greatly in a more comprehensive treatment plan for diabetic patients.