# Post-ACA Racial Disparity of Eye Examinations Among the U.S. Noninstitutionalized Population With Diabetes: 2014–2015

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Diabetic retinopathy (DR), a microvascular complication of diabetes, is the leading cause of blindness among adults aged 20 to 74 years (1). Between 2010 and 2014, ~4.2 million adults aged >40 years were diagnosed with DR (2,3). Of these, 655,000 suffered from advanced DR, which can cause blindness if left untreated (2). The American Diabetes Association recommends eye examinations for people with diabetes based on the evidence of DR present (i.e., if any level of DR is present, then exams should be repeated at least annually; if there is no evidence, then exams every 2 years may suffice) (3). Regardless of stipulations, it is evidenced that racial and ethnic minorities have been previously shown to have fewer exams than recommended (4). This study assesses the racial and ethnic disparities of eye examination rates among U.S. adults with diabetes after the increased access initiatives of the Affordable Care Act (ACA).

Annual data from the 2014–2015 Medical Expenditure Panel Survey (MEPS) Household Component data files were analyzed. The study population included adults aged 18 years and older with a self-reported diagnosis of diabetes from a health care professional. The primary outcome was the annual eye examination rate, defined as having at least one dilated eye examination in that year.

Minorities (i.e., respondents not self-identified as "non-Hispanic white") were compared with non-Hispanic whites. Ordinary least squares and logistic regression models were used to assess the likelihood of receiving an eye examination based on sociodemographic characteristics.

The total sample included 1,228 adults diagnosed with diabetes, weighted to represent 25,071,197 of the nationwide population with diabetes. The average age was 59 years old (SD 13.95). A total of 57% were female, and 65.22% were minority. Almost 50% of the population had private insurance coverage, while roughly 40% had some form of public insurance (i.e., Medicare and/or Medicaid) and less than 10% were uninsured. A total of 66% of people received at least one eye examination in 2 years, while the remaining 34% of people did not receive an eye examination in 2014 or 2015.

From 2014 to 2015, minorities increased their eye examination rates by 15.48 percentage points from 36.58% to 52.06%, respectively (*P* value <0.001). Non-Hispanic whites increased their eye examination rates by 10.31 percentage points from 47.07% to 57.38% (*P* value <0.005). Thus, the racial/ethnic disparity was reduced from a significant difference of 10.49% (*P* value <0.001) in 2014 to a nonsignificant difference of 5.32% (*P* value = 0.075) in 2015.

Controlling for covariates, we found that race was still significant in 2014 (adjusted odds ratio [OR] 1.26 [95% CI 1.02, 1.63]). However, in 2015, race was no longer a significant factor in determining eye examinations received (adjusted OR 1.07 [95% CI 0.83, 1.39]) (Table 1). A sensitivity analysis of the likelihood of at least one dilated eye examination in 2 years showed similar results and race was a significant factor (adjusted OR 1.24 [95% CI 1.02, 1.50]) (Table 1).

In summary, our results show that following the implementation of the ACA, racial/ethnic and socioeconomic disparities in eye examination rates for adults with diabetes were no longer significant. A previous study by Shi et al. (4), who also examined racial/ethnic differences in eye examination rates between 2002 and 2009 using MEPS data, found that minority populations had significantly "consistently lower crude eye examination rates than their white counterparts," with the largest gap in 2008 of about 15% difference, 62.76% compared with 47.64%, for non-Hispanic whites and minorities, respectively (4). Seven years later, our results found that in 2014 there was a 10.49% difference in eye examination rates. This difference further decreased in 2015 to only 5.32%.

In conclusion, racial and ethnic minority populations still have lower crude eye

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**Table 1—Demographic characteristics and impact on eye examination utilization for adults with diabetes in the U.S. (2014–2015)**

| Variables | Total 2014 | Total 2015 | Model 1 Having at least one exam in that respective year 2014 OR (95% CI) | Model 1 Having at least one exam in that respective year 2015 OR (95% CI) | Model 2 Having at least one exam within the 2 years 2014–2015 OR (95% CI) |
|---|---|---|---|---|---|
| Unweighted, n† | 1,228 | | | | |
| Weighted, N (%)† | 25,071,197 (100) | | | | |
| Age, mean (SD), years | | | | | |
| >45 (ref: 18–45 years)‡ | 59.42 (13.95) | 59.83 (14.89) | 1.462* (1.016, 2.103) | 1.884*** (1.337, 2.655) | 1.737*** (1.366, 2.208) |
| Race, N (%) | | | | | |
| Minority (ref) | 801 (65.22) | | | | |
| Non-Hispanic white | 427 (34.78) | | 1.257* (1.018, 1.627) | 1.073 (0.832, 1.386) | 1.236* (1.018, 1.500) |
| Sex (%) | | | | | |
| Female (ref) | 57.41 | | | | |
| Male | 42.59 | | 0.851 (0.664, 1.090) | 0.925 (0.727, 1.177) | 0.756** (0.632, 0.904) |
| Education (%) | | | | | |
| No degree‖ (ref)§ | 1.06 | | | | |
| Less than high school (ref)§ | 27.44 | | | | |
| GED/high school¶ | 56.84 | | 1.759*** (1.268, 2.441) | 1.255 (0.902, 1.746) | 1.418** (1.095, 1.837) |
| Bachelor's degree | 9.37 | | | | |
| Professional degree | 5.29 | | | | |
| Marital status (%) | | | | | |
| Not married (ref) | 49.35 | 49.27 | | | |
| Married | 50.65 | 50.73 | 1.112 (0.864, 1.431) | 1.206 (0.944, 1.541) | 1.216* (1.013, 1.459) |
| Insured (%) | 90.39 | 92.51 | | | |
| Insurance type (%) | | | | | |
| Uninsured (ref) | 9.61 | 7.49 | | | |
| Private | 47.48 | 48.37 | 3.050*** (1.824, 5.102) | 2.159*** (1.340, 3.478) | 2.209*** (1.616, 3.020) |
| Medicare | 12.38 | 12.62 | 3.766*** (2.100, 6.753) | 3.013*** (1.727, 5.257) | 2.526*** (1.719, 3.711) |
| Medicaid | 21.17 | 20.6 | 2.962*** (1.703, 5.153) | 1.657* (1.005, 2.761) | 1.689** (1.206, 2.365) |
| Dual-eligible# | 9.36 | 10.91 | 2.564** (1.367, 4.812) | 2.060* (1.172, 3.620) | 1.497* (1.017, 2.205) |
| Economic status (%) | | | | | |
| Below poverty line (ref) | 21.58 | 21.25 | | | |
| Above poverty line | 78.42 | 78.75 | 1.282 (0.928, 1.771) | 0.95 (0.696, 1.296) | 1.088 (0.870, 1.362) |
| Region (%) | | | | | |
| Northeast (ref) | 15.07 | 15.07 | | | |
| Midwest | 17.67 | 17.43 | 1.03 (0.681, 1.559) | 0.883 (0.586, 1.331) | 0.813 (0.598, 1.104) |
| South | 43.81 | 44.14 | 1.056 (0.741, 1.504) | 0.894 (0.631, 1.267) | 0.913 (0.703, 1.186) |
| West | 23.45 | 23.37 | 0.805 (0.544, 1.192) | 0.822 (0.561, 1.204) | 0.803 (0.604, 1.067) |

†Row percentages used. Column percentages used elsewhere. ‡Age was dichotomized into two groups for multivariate analysis: 1) reference group 18–45 years and 2) comparison group >45 years. §Education was dichotomized into two groups for multivariate analysis: 1) reference group below GED/high school and 2) comparison group at or above GED/high school. ‖No specific level of education was recorded on the survey. ¶High school diploma with or without ≥1 year of college. #Those >65 years old with Medicaid and Medicare. Ref, reference category for multivariate analysis. Significance levels indicated at the following levels: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

examination rates than their white counterparts; however, this gap is shrinking and there is no longer a significant difference in rates compared with the years before ACA implementation. Further, insurance coverage was the most significant factor for whether a person received an eye examination. Regardless of insurance type, if a person was insured, the likelihood of them receiving an eye examination was significantly greater compared with those uninsured ($P$ value <0.001). This correlates with previous literature stating that as insurance coverage expands, people who were previously uninsured now have insurance coverage through the new policy and thus have access to services not previously used (4,5).

These findings demonstrate the effects of insurance coverage on health care utilization and preventive services for people with diabetes. With the uncertainty regarding the future of the ACA, it is imperative we evaluate and identify the policy's true direct effects on access and health outcomes in an effort to provide evidence that can assist in shaping the future of health care at the policy level.

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