Research Square

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Minorities' Diminished Returns of Educational Attainment on Disability Among California Adults: CHIS 2025

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Research Article

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Abstract

Background.

Minorities' diminished returns (MDR) is the finding that socioeconomic resources, such as educational attainment, produce smaller health gains for racial and ethnic minority groups than for White Americans. Most MDR research uses national samples, and it is not known whether the pattern replicates in states such as California, which has more equity-oriented public and social policies. Disability is a useful test of MDR because it reflects accumulated physical, mental and emotional health and is tied to work and income. California has many equity-oriented public, social and health policies that may protect the health of minority populations. California's diverse population makes it possible to compare educational attainment gradients across several groups in one survey.

Methods.

We used survey-weighted prevalence estimates and 95% confidence intervals from the 2025 California Health Interview Survey (CHIS), a population-based probability sample of California households, accessed through the AskCHIS dashboard. The outcome was self-reported disability due to a physical, mental or emotional condition. We compared prevalence at high school, bachelor's and master's level for California White, Black, Latino, Asian and Two or More Races adults (all non-Latino except Latino) and for all California adults combined. We estimated each group's absolute and relative change with educational attainment and its difference-in-differences from White adults.

Results.

Among White adults in California, disability prevalence fell from 27.8% at high school to 13.6% at a bachelor's degree (− 14.2 points) and 9.5% at a master's degree, and among all California adults it fell from 21.8% to 13.5% and 10.3%. Among Black adults it was 20.8%, 22.3% and 13.5%, so disability prevalence did not fall between high school and a bachelor's degree. The high-school-to-bachelor's change in disability prevalence differed from White adults by + 15.7 points for Black (95% CI 6.4 to 25.0), + 10.9 for Latino (5.8 to 16.0) and + 7.1 for Asian adults (0.8 to 13.4), and the change to a master's degree differed for all four minority groups. At a bachelor's degree, disability prevalence was 8.7 points higher in Black adults than White adults (1.6 to 15.8), while Latino adults did not differ and Asian adults were 3.7 points lower. In relative terms Asian adults (− 42%) were close to White adults (− 51%), whereas Latino (− 18%) and Black adults (+ 7%) were not. Native Hawaiian/Pacific Islander and American Indian/Alaska Native estimates were too unstable to report.

Conclusions.

In California, we found some evidence in line with minorities' diminished returns for many racial and ethnic groups, particularly Black adults. Educational attainment was linked to smaller absolute reductions in disability for Black, Latino and Asian adults than for White adults, and only Black adults ended up worse off than White adults at the bachelor's level. These patterns appeared in a state with more equity-oriented public and social policies, which calls for additional research on how to reduce MDR and equalize the returns to educational attainment across racial and ethnic groups.

Introduction

Educational attainment is among the strongest social predictors of health, and the educational attainment gradient appears across mortality, chronic disease and health behaviors [1–5]. The benefits are not shared equally, because the gradient differs by race, ethnicity and nativity [6–10]. Minorities' diminished returns (MDR) describes the pattern in which a given level of educational attainment, income or other resource is linked to smaller health gains for Black, Latino and some other minority groups than for White Americans, and it has been reported for self-rated health, alcohol binge drinking and youth tobacco initiation [11–13]. If MDR is common, raising educational attainment alone will not close racial and ethnic health gaps, and the groups who gain least from educational attainment may carry the largest unmet burden.

Most MDR research uses national samples, in which minority subgroups are often small and state policy contexts are averaged together. It is therefore not known whether the pattern replicates in states such as California, which has adopted more equity-oriented public and social policies than many other states. One example is Medi-Cal, California's Medicaid program, which expanded under the Affordable Care Act and has since been extended to additional groups, including some noncitizens [14, 15], and state health coverage policies can affect insurance, access to care and health outcomes [16–19]. California also has a majority non-White population, and the California Health Interview Survey (CHIS) samples large numbers of Latino and Asian adults and enough Black adults to estimate educational attainment gradients for each group [8, 20].

Disability is a general health outcome that is shaped by a wide range of social, economic, environmental and health care factors, which makes it sensitive to the policy context in which people live [21, 22]. It reflects accumulated physical, mental and emotional health, it is tied to work and income, and it is also a possible cause of lower educational attainment [22]. Disability prevalence differs by race and socioeconomic position [23, 24], and earlier MDR work found smaller educational attainment returns for disability among Hispanic adults and for receipt of disability insurance [25, 26]. We ask whether the association between educational attainment and disability is weaker for minority adults than for White adults.

We tested two hypotheses among California adults. The first (H1, smaller gains) was that, from high school to a bachelor's or master's degree, the decline in disability prevalence is smaller in percentage points for Black, Latino, Asian and Two or More Races adults than for White adults. The second (H2,

worse outcomes) was that, at the same degree level, Black adults have higher disability prevalence than White adults, which is the stronger form of MDR. Support for H1 alone would indicate smaller gains, while support for H2 would indicate that a degree leaves Black adults in a worse position than their White peers.

Methods

Data source and sample. We used the 2025 California Health Interview Survey (CHIS), conducted by the UCLA Center for Health Policy Research. CHIS draws a random, population-based sample of California households and weights it to represent the state's noninstitutionalized population. We retrieved tables on 19 November 2026 from the AskCHIS dashboard, which applies the final CHIS survey weights and replicate weights to produce each prevalence estimate, its 95% confidence interval and its weighted population count. We did not have respondent-level microdata, so we did not apply weights ourselves. The weights are already built into every figure reported here.

Outcome. The outcome was disability status due to a physical, mental or emotional condition, classified by CHIS as disabled or not disabled. The measure is self-reported, which can differ across groups in how conditions are recognized and reported [27], and it covers a broad range of conditions rather than a specific diagnosis. We report the percentage of adults classified as disabled within each educational attainment and race or ethnicity cell, in the same way that survey-based disability prevalence is reported in national surveillance [21].

Exposure. Highest educational attainment completed. We focus on Grade 12 (high school), bachelor's (BA/BS) and master's (MA/MS), and show Grades 9–11, some college and AA/AS in the figure. Cells for Grades 1–8, vocational school, some graduate school, PhD and no formal educational attainment were too sparse or unstable to use.

Race and ethnicity. We used the CHIS categories based on the 1997 OMB standards: White, Black or African American, Asian, Native Hawaiian/Pacific Islander (NHPI), American Indian/Alaska Native (AIAN) and Two or More Races, all non-Latino, plus Latino. Because Two or More Races is its own category and the other groups are defined as non-Latino, the groups do not overlap. The Asian and NHPI categories each combine many subgroups with different histories and health profiles, which is a recognized limitation of aggregated data [28, 29]. NHPI and AIAN estimates were almost entirely unstable or missing and are not analyzed.

Analysis. For each group we calculated the absolute change in disability prevalence (percentage points) and the relative change from high school to a bachelor's degree and to a master's degree. We then compared each minority group with White adults in two ways. The first was a difference-in-differences (DiD), defined as the group's change minus the White change, so a positive value means a smaller decline in disability. The second was a level gap, defined as the group's prevalence minus the White prevalence at the same educational attainment level. We report both absolute and relative change because conclusions about interaction can differ by scale [30].

Standard errors were recovered from each 95% confidence interval (half-width divided by 1.96). Because educational attainment and race cells are disjoint subpopulations, we treated them as independent and combined standard errors as the square root of summed squares. The published intervals already reflect the survey design, but this approximation ignores any covariance between estimates. It is a screening test, not a replacement for a survey-weighted regression with an educational attainment-by-race interaction. We did not adjust for multiple comparisons.

Results

In California, every minority group gained less from a degree, in percentage points, than White adults did, and the difference was statistically significant for Black, Latino and Asian adults (Table 1).

Overall disability prevalence was 18.8% for White adults, 24.3% for Black adults, 18.6% for Latino adults, 12.8% for Asian adults and 24.3% for Two or More Races adults. Across all California adults combined, prevalence was 18.2% (95% CI 17.5–18.9) and fell from 21.8% at high school to 13.5% at a bachelor's degree (− 8.3 points) and 10.3% at a master's degree, which gives the pooled gradient against which the group-specific gradients can be read.

Source: 2025 California Health Interview Survey via AskCHIS, weighted estimates, adults 18+; six educational attainment levels, five groups

Table 1
Change in disability prevalence from high school, and difference from White adults (percentage points, 95% CI)

Group	To BA/BS: change	To BA/BS: relative	To BA/BS: DiD vs White	To MA/MS: change	To MA/MS: relative	To MA/MS: DiD vs White
All adults (pooled)	−8.3 (− 10.2, − 6.4)	−38%	not applicable	−11.5 (− 13.5, − 9.5)	−53%	not applicable
White	−14.2 (− 17.7, − 10.7)	−51%	reference	−18.3 (− 22.0, − 14.6)	−66%	reference
Black	+ 1.5 (− 7.1, 10.1)	+ 7%	+ 15.7 (6.4, 25.0)	−7.3 (− 14.0, − 0.6)	−35%	+ 11.0 (3.3, 18.7)
Latino	−3.3 (− 7.0, 0.4)	−18%	+ 10.9 (5.8, 16.0)	−5.4 (− 9.6, − 1.2)	−30%	+ 12.9 (7.3, 18.5)
Asian	−7.1 (− 12.3, − 1.9)	−42%	+ 7.1 (0.8, 13.4)	−9.1 (− 14.8, − 3.4)	−54%	+ 9.2 (2.4, 16.0)
Two or More Races	−4.7 (− 18.3, 8.9)	−21%	+ 9.5 (− 4.6, 23.6)	−1.3 (− 17.2, 14.6)	−6%	+ 17.0 (0.7, 33.3)
NHPI	not estimable	not estimable	not estimable	not estimable	not estimable	not estimable
AIAN	not estimable	not estimable	not estimable	not estimable	not estimable	not estimable

Table 2
Difference from White adults at the same educational attainment level (percentage points, 95% CI)

Group	High school	BA/BS	MA/MS
Black	−7.0 (− 13.1, − 0.9)	+ 8.7 (1.6, 15.8)	+ 4.0 (− 0.7, 8.7)
Latino	−9.7 (− 13.9, − 5.5)	+ 1.2 (− 1.8, 4.2)	+ 3.2 (− 0.5, 6.9)
Asian	−10.8 (− 16.6, − 5.0)	−3.7 (− 6.3, − 1.1)	−1.6 (− 5.2, 2.0)
Two or More Races	−5.7 (− 18.6, 7.2)	+ 3.8 (− 1.8, 9.4)	+ 11.3 (1.4, 21.2)

Black adults.

Disability did not fall between high school and a bachelor's degree (20.8% to 22.3%), and it was 8.7 points higher than for White adults at that level. The disparity reverses with educational attainment: Black adults were 7.0 points lower than White adults at high school. At the master's level the gap (4.0 points) was no longer statistically distinguishable from zero, though the interval is wide.

Latino adults.

The decline was small in points (3.3 to a BA, 5.4 to an MA) and in proportion (18% and 30%). Latino adults were below White adults at high school, and statistically similar to them from the bachelor's level up. The DiD is large because the White gradient is steep.

Asian adults.

Disability was lower than for White adults at high school and at a bachelor's degree, and similar at the master's level. The decline was half as large in points (7.1 vs 14.2 to a BA) but similar in proportion (42% vs 51% to a BA; 54% vs 66% to an MA).

NHPI and AIAN adults.

Educational attainment-specific estimates were unstable or suppressed in nearly every cell, so no comparison was made. Overall disability was 17.3% (unstable) for NHPI adults and 29.0% (CI 15.6–42.4) for AIAN adults. Earlier work on these groups has described overall disparities [32, 33], and larger pooled samples or several survey years would be needed to examine educational attainment gradients.

Two or More Races adults.

Estimates were noisy and non-monotonic, with a rate of 20.8% at the master's level that was 11.3 points above White adults (CI 1.4 to 21.2). Most other cells were unstable, including Grades 9–11 and AA/AS, which are shown as hollow markers. These data therefore support only a cautious reading, and the master's-level gap should be treated as suggestive. Health differences between multiracial subgroups have also been documented in California [31].

Discussion

In California, we found some evidence in line with minorities' diminished returns for many racial and ethnic groups, particularly Black adults. The results support H1 for Black, Latino and Asian adults (and for Two or More Races adults at the master's level) and, for Black adults only, H2. The pattern is therefore not uniform across groups, and the interpretation depends on whether MDR is defined by the size of the gain or by the outcome level.

The Black pattern fits MDR most closely. In California, the disability rate for Black adults does not fall between high school and a bachelor's degree, and the 8.7-point gap at that level is the one clearly detectable disadvantage among college graduates. The Black confidence intervals are wide, so the size of the gap is uncertain, but the direction is consistent with research on diminished returns among Black Americans [11, 26]. Proposed explanations in that literature include labor-market discrimination [34, 35], lower wealth and income at the same educational attainment [36–38], residential segregation and neighborhood stress [39, 40], cumulative weathering [41], and discrimination more broadly [42, 43]. Large

gaps in life expectancy between groups point in the same direction [44]. This study does not test any of these explanations.

Two mechanisms are often proposed for diminished returns of educational attainment, and this study did not test either one. The first is lower educational quality, because minority students are more likely to attend under-resourced and segregated schools, so the same degree may carry less knowledge, credential value and cognitive benefit, and state-level educational quality has been linked to later cognitive outcomes by race and educational attainment [9]. The second is lower availability of jobs and occupations for minority adults with the same educational attainment, through labor-market discrimination, occupational segregation, and implicit and explicit bias in hiring, pay and promotion [34, 35]. Field experiments show that racial discrimination in hiring has not declined over time [34], and residential segregation can further limit access to good schools and jobs [39, 40]. Together these pathways imply that a degree may convert into less income, wealth and job quality for minority adults, which may help explain why educational attainment is linked to smaller reductions in disability [36–38].

Latino and Asian adults also show MDR-consistent slopes, depending on the definition. Their lines are flatter in points, which is MDR-consistent if the definition is a smaller absolute gain, and earlier work found that educational attainment reduced disability less for Hispanic than for non-Hispanic Americans [25]. Two features argue for caution. First, both groups start with lower disability than White adults at high school, so there is less room to fall, and a flat line can reflect a floor. Second, in proportional terms Asian adults are much closer to White adults (− 42% vs − 51% to a BA), and neither group ends up worse off than White adults at the bachelor's level. For Latino adults, the Hispanic mortality paradox and selection of healthier migrants may flatten the educational attainment gradient [45–48], although barriers to care remain for some Latino groups in California [49, 50]. Aggregated Asian data may also hide differences between subgroups [28].

California has more equity-oriented economic, public health and social policies than most states, and Medi-Cal, its Medicaid program, is one example [14, 15]. State health coverage policies are linked to insurance, access to care and health outcomes, including by race and ethnicity [16–19]. If such policies narrow gaps in income, health care access and living conditions, diminished returns might be expected to be weaker in California than in national samples. Yet Black adults with a bachelor's degree still had higher disability prevalence than White adults, and every minority group still gained less in points from educational attainment, which suggests that diminished returns can persist even in a state with a stronger equity orientation. This study did not measure state policies or compare California with other states, so this interpretation is tentative and should be tested with multi-state data.

The conclusion may differ depending on whether MDR is defined by points, by proportion, or by the level at each degree. Effect modification should be presented and tested on more than one scale [30], and reports should state which definition is used. Under the strictest definition (worse outcomes than White adults at the same educational attainment), only Black adults, and Two or More Races adults at the master's level, qualify, and the latter estimate rests on small cells. Racial and socioeconomic disparities

in disability are well documented, including in older adults and in Hawaii, and they accumulate across the life course [22–24].

Using a California sample with large Latino and Asian subsamples, the study shows that diminished returns in absolute terms appear not only for Black adults but also for several other racial and ethnic groups. The pattern is strongest for Black adults, which is consistent with the history of slavery and anti-Black discrimination in the United States. MDR was partially observed for Latino and Asian adults, who are also marginalized but whose social and historical circumstances differ from those of Black Americans. We did not observe strong MDR evidence for multiracial adults, which was unexpected. These results argue for reporting group-specific educational attainment gradients and for testing more than one definition of diminished returns in future work.

Limitations

We used AskCHIS tables, which are already survey-weighted, so we could not fit a survey-weighted model with an educational attainment-by-race interaction. Our difference-in-differences intervals therefore assume independent cells and ignore covariance. Black, Two or More Races, NHPI and AIAN estimates are also imprecise, and several were unstable. In addition, aggregate groups such as Asian hide large differences between subgroups. Estimates in this paper are not adjusted for age, sex, nativity, income or marital status. Older adults have both less educational attainment and more disability, which can distort the gradient, and the age mix differs by group. The design is cross-sectional. The association between educational attainment and disability is bidirectional. Educational attainment protects individual and population health, while disability can limit how far people go in school, so the association does not show that educational attainment causes lower disability. Disability is self-reported, and we ran many comparisons without adjustment.

Future research

Future research should obtain the CHIS 2025 public-use file and fit survey-weighted logistic regressions with replicate-weight variance estimation. Models should be restricted to adults 25–64, include an educational attainment-by-race interaction, and standardize for age. The interaction should be tested on both the additive and the multiplicative scale, because the conclusion about diminished returns can differ between them.

Conclusion

In California in 2025, we found some evidence in line with minorities' diminished returns for many racial and ethnic groups, particularly Black adults. A bachelor's degree was linked to a much smaller drop in disability for Black, Latino and Asian adults than for White adults, and Black bachelor's graduates were about 9 points more disabled than White graduates. For Latino and Asian adults the pattern holds in absolute terms but not in outcome levels, and for multiracial adults the data are too thin to be sure. That

these patterns appear in a state with more equity-oriented public and social policies suggests that educational attainment alone may not close disability gaps. Model-based tests with the full CHIS microdata are the next step.

Declarations

Conflict of Interest

The authors declare no conflict of interest.

Use of Artificial Intelligence

Artificial intelligence (AI) was used for the presentation of the results, figures and tables. Shervin Assari supervised the use of AI. Both authors approved the final version.

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Figures

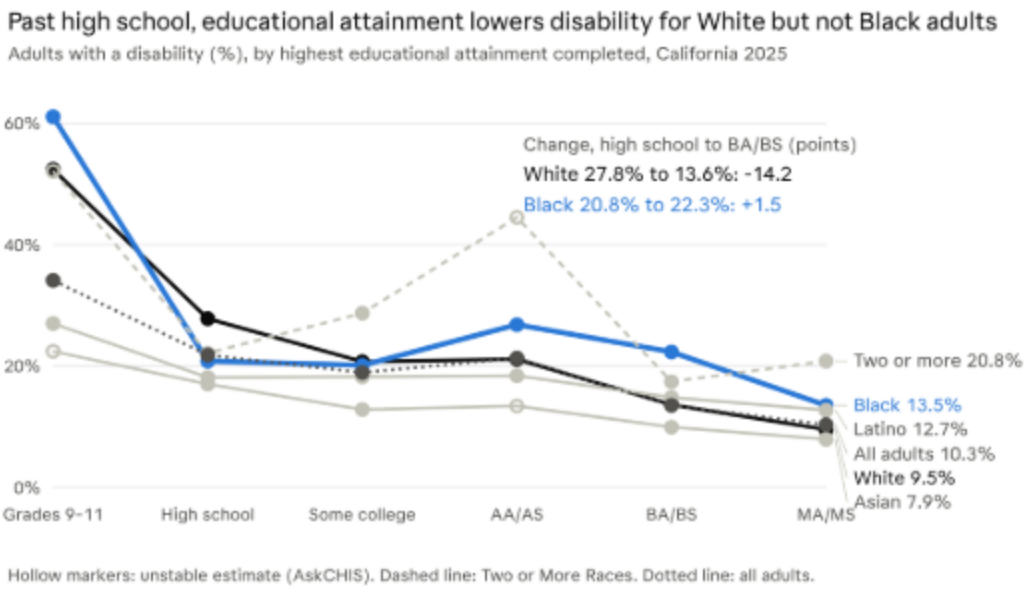


Figure 1

Source: 2025 California Health Interview Survey via AskCHIS, weighted estimates, adults 18+; six educational attainment levels, five groups