

Leveraging Population-Level and Multi-Payer Claims Data to Estimate Changes in Prostate Cancer Screening at the Small-Area Level

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Background

In 2018, the U.S. Preventive Services Task Force (**USPSTF**) revised its prostate cancer screening recommendation from Grade D (not recommended) to Grade C (individualized decision-making for men aged 55–69). A prior study using commercial claims reported increased prostate-specific antigen testing rates following the 2017 USPSTF draft statement, reversing previous declines. However, that evidence was limited to individuals with commercial insurance. **Objective:** Estimate changes in prostate cancer screening rates before and after the USPSTF revisions and to examine changes by payer type and area-level social determinants of health (SDOH) using a 100% sample of Colorado’s All-Payers Claims Database (CO APCD), covering 75% of the population in the state.

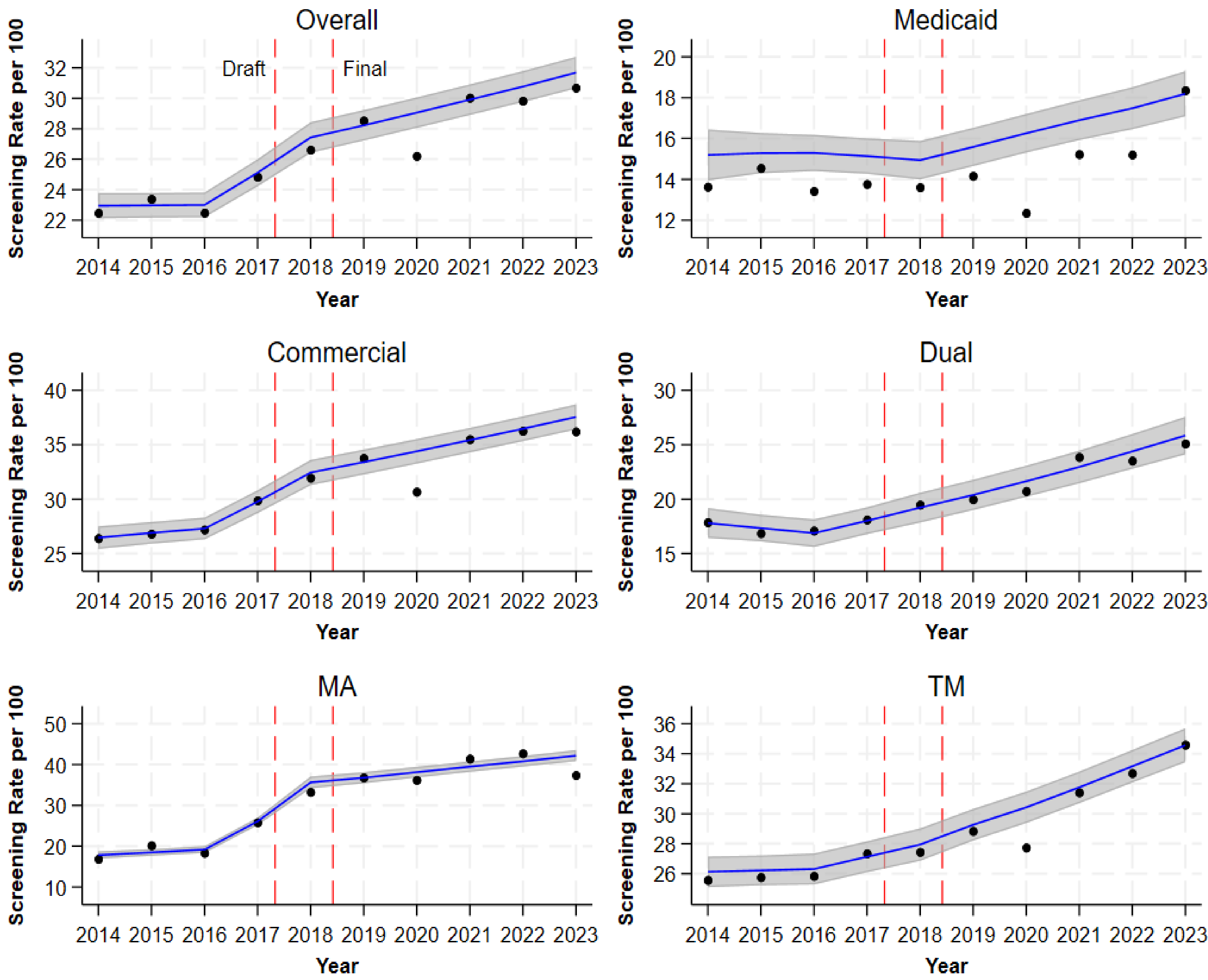
Population

Sample (Screened=595,107 vs Not screened=1,542,425), %		
Age, years	Yes	No
55-59	23.1	29.5
60-64	28.6	28.7
65-69	48.3	41.8
Payer		
Medicaid	8.7	17.6
Commercial Insurance	42.4	34.9
Dual Medicare-Medicaid	4.3	6.2
Medicare Advantage	16.2	13.8
Traditional Medicare	28.4	27.5
Social Deprivation Index		
Below 25th percentile (least deprived)	25.6	18.5
25th-49th percentile	26.3	22.6
50th-74th percentile	22.6	23.4
75th percentile and above (more deprived)	25.4	35.4

Methods

Estimate the impact of USPSTF revisions on screening rates and examine heterogeneity by payer: We estimated negative binomial models with linear splines; two knots (2017 and 2018) corresponding to the USPSTF draft and final recommendations. Analyses were stratified by payer type, with Medicare analyses limited to men aged 65–69. Enrollment in CO-APCD was the denominator (model offset).

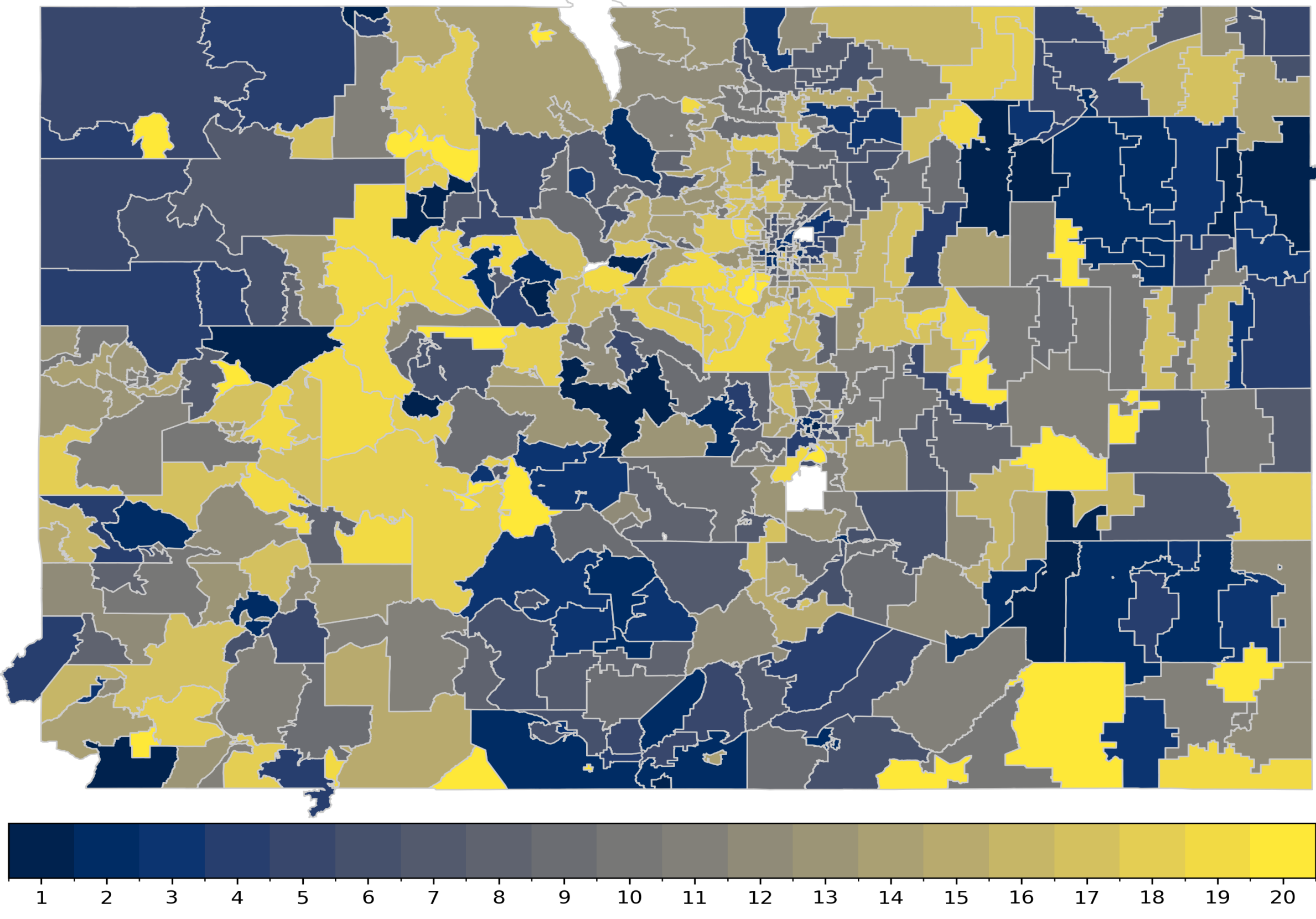
Estimate associations with area-level SDOH, accounting for small-area estimates: We implemented multilevel negative binomial models with random intercepts at the Zip code level, allowing for differential slopes to estimate the change in rates before and after the policy change (empirical Bayes predictions). The Social Deprivation Index (SDI) and its components were then correlated with predicted changes in screening rates to assess the influence of area-level SDOH.



Note: Dual, enrolled in Medicare and Medicaid; MA, Medicare Advantage; TM, Traditional Medicare. Results show age-adjusted screening rates (black dots), predicted rates (blue lines), and corresponding 95% confidence intervals (grey areas). Year 2020 not include in regression models.

Results

Screening rates increased significantly following the 2017 draft guideline, with a continued but slower rise after the 2018 final guideline, controlling for age, with **heterogenous effects by payer**. At the geographic level, predicted gains in screening rates (comparing pre-2019 to 2019 and later) varied across small areas. Areas with higher SDI scores, indicating greater deprivation, generally showed smaller increases. This pattern was especially evident for SDI components related to **poverty, limited access to vehicles, and crowded housing**, all of which were significantly negatively associated with predicted changes.



Note: The color scale represents 20 quantiles of predicted differences, with higher values indicating larger increases. White areas reflect locations with missing data (e.g., Woods Landing–Jelm, Rocky Mountain Arsenal National Wildlife Refuge, and Fort Carson ZIPs).

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