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ORIGINAL ARTICLE

A difference-in-differences analysis of Medicaid expansion and state paid sick leave laws on colorectal cancer screening

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ABSTRACT

Background: Colorectal cancer (CRC) screening disparities persist among populations with limited health care access. Although Medicaid expansion and paid sick leave could address these barriers, there is limited data on the combined impact of these policies and CRC screening.

Methods: The authors conducted a difference-in-differences analysis using 2012–2018 Behavioral Risk Factor Surveillance System data. The study population included adults 50–75 years of age meeting preventive cancer screening guidelines during the study period. States were categorized into three groups: those with Medicaid expansion and paid sick leave (ME + SL), Medicaid expansion without paid sick leave (MEnoSL), and neither policy (NoME/NoSL). The pre-policy period was 2012–2014 and the post-policy period was 2015–2018. The outcome was the percent up-to-date with CRC screening. Survey-weighted logistic regression models accounted for individual- and state-level covariates and state-clustered standard errors.

Results: Post-policy implementation, CRC up-to-date screening was 2.9 percentage points greater in ME + SL states compared to MEnoSL states ($p < .001$) and 4.2 percentage points greater compared to NoME/NoSL states ($p = .018$). These changes correspond to an estimated 352,343 and 1,087,140 fewer missed screenings between ME + SL and MEnoSL and NoME/NoSL states, respectively. The increased percent of up-to-date CRC screenings was associated with a reduction in colorectal cancer deaths: 8456 from ME + SL versus MEnoSL and 26,091 from ME + SL versus NoME/NoSL.

Conclusions: Medicaid expansion combined with paid sick leave was associated with a greater likelihood of being up-to-date with CRC screening compared to Medicaid expansion alone or neither policy.

KEYWORDS
cancer screening, colorectal cancer, health insurance, health policy, sick leave

INTRODUCTION

Colorectal cancer (CRC) remains a leading cause of cancer-related mortality in the United States.[1–4] Screening for CRC, such as through colonoscopy, stool-based testing, or sigmoidoscopy, has been shown to significantly reduce both the incidence and mortality of the disease.[5–10] However, adherence to screening guidelines remains suboptimal, with persistent disparities for low income, rural, uninsured, and minoritized persons.[11–15] These gaps in CRC screening underscore the importance of addressing the logistical and financial barriers that prevent individuals from accessing preventive care.[16,17]

One of the most significant contemporary policy changes affecting health care access has been Medicaid expansion under the Affordable Care Act (ACA). By extending eligibility to low income adults, Medicaid expansion has substantially improved access to health insurance,[18,19] and by extension, improved access to primary care, reduced financial barriers to health care, and increased utilization of preventive services.[20–28] However, the extent to which Medicaid expansion has improved cancer screening remains an area of ongoing investigation.[29–37] For instance, a recent study examining the 2012–2018 Behavioral Risk Factor Surveillance System (BRFSS) found an association between Medicaid expansion and increased CRC screening, whereas another analysis covering 2012–2020 found no such association. Other studies have reported positive effects early after Medicaid expansion implementation.[38–42] These mixed results highlight the need for further exploration of factors that may influence the effectiveness of Medicaid expansion in improving CRC screening.[43]

One critical factor that may interact with Medicaid expansion is other state-level policies, such as paid sick leave. The inability to take paid time off from work, and resulting logistical constraints, can be a significant impediment to accessing preventive care in the United States.[44–46] Mandatory paid sick leave policies have been identified as a potential solution to these structural barriers. These policies provide workers with the flexibility to take paid time off for medical appointments, which is particularly important for low-wage and hourly workers who may otherwise forgo preventive care due to lost wages or job insecurity.[47–50] Despite growing evidence of the health benefits of paid sick leave, such as increased use of vaccinations and primary care services, there is limited research on its role in promoting cancer screening.[51–55]

Given the ongoing mixed findings about the relationship between Medicaid expansion and CRC screening, it is crucial to consider how state-level policies like paid sick leave, in concert with Medicaid expansion, may facilitate access to screening. The combination of Medicaid expansion and paid sick leave policies has the potential to improve access to CRC screening by addressing both financial and logistical barriers. However, only a subset of states has implemented both policies, creating substantial policy variation with potential implications for preventive care access across the United States.[56] Policymakers would benefit from insight about the potential impact of Medicaid expansion combined with paid sick leave policies on cancer screening—insight that is critical for informing future efforts to reduce disparities in cancer prevention and achieve national health goals. This study aims to fill critical knowledge gaps in understanding of the relationship between Medicaid expansion with or without paid sick leave policies and colorectal cancer screening.

MATERIALS AND METHODS

Data sources

This study used multiple data sets. The BRFSS provided individual-level health survey data, including preventive care utilization and demographic characteristics, for even years from 2012 to 2018.[57] The Area Health Resources File was used to include state-level data on health care resources, workforce, and socioeconomic indicators, although policy data on Medicaid expansion and paid sick leave laws were obtained from sources such as the Kaiser Family Foundation, the National Council of State Legislatures, and A Better Balance.[58–61] All data sets were linked using Federal Information Processing Standards codes, enabling the integration of individual and state-level variables.

Study population and study periods

Consistent with US Preventive Services Taskforce (USPSTF) guidelines for colorectal cancer screening, the study population included individuals who were employed adults 50–75 years old during the study period and who were eligible for Medicaid expansion (income less than 139% of the federal poverty level). Individuals missing data on key variables (e.g., CRC screening, treatment group, or covariates) were excluded.

Our analysis included 10 states, which were selected to reflect clear policy contrasts and strengthen the internal validity of the study. California (CA) and Massachusetts (MA) represented states that had implemented both Medicaid expansion and paid sick leave. Illinois (IL), Ohio (OH), Arkansas (AR), and Hawaii (HI) were chosen as states that expanded Medicaid, but did not implement paid sick leave policies. Texas (TX), Florida (FL), North Carolina (NC), and Georgia (GA) represented states that neither expanded Medicaid nor implemented paid sick leave policies.

In all states that expanded Medicaid, this policy was implemented uniformly in 2014, whereas states with paid sick leave included in the analysis enacted such policies in 2015. In turn, the pre-policy period was defined as 2012–2014, whereas the post-policy period was defined as 2015–2018. To isolate the effects of state policies, the primary analysis excluded pandemic years (2020–2022) due to significant disruptions in health care utilization during the COVID-19 pandemic.[62,63] To simplify treatment effect estimation, individuals were included in only one period, avoiding complications like autocorrelation.

Measures

Outcome

The primary outcome measure was CRC up to date screening data obtained from BRFSS. Consistent with USPSTF recommendations, screening was defined as having completed a colonoscopy in the past 10 years, a sigmoidoscopy in the past 5 years, or a stool-based test in the past year (although the USPSTF updated its guidelines in May 2021 to lower the starting age for CRC screening from 50 to 45 years, this occurred after the end of our study period).[64]

Exposure

The study exposure was defined based on state-level Medicaid expansion and paid sick leave policies. Both Medicaid expansion and paid sick leave policies were dichotomous measures indicating whether a state had implemented the policy (i.e., had expanded Medicaid under the ACA; had implemented paid sick leave policies). Expansion status was obtained from state policy databases, including those from the Kaiser Family Foundation. Paid sick leave policy data was obtained from sources such as the National Council of State Legislatures and A Better Balance. The study exposure was a state, three-level variable: Medicaid expansion with paid sick leave (ME + SL), defined as the full intervention group; Medicaid expansion without paid sick leave (MEnoSL), defined as the partial intervention group; and no Medicaid expansion or paid sick leave (NoME/NoSL), defined as the control group. There were no states that had a paid sick leave policy without also having Medicaid expansion.

Covariates

This study included individual-level variables, including age (categorized as 50–54, 55–64, and 65–75 years), sex (male, female), marital status (never married, formerly married, or married/cohabitating), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, or non-Hispanic other race), education (less than high school, high school graduate, more than high school), household income (categorized as <$25,000, $25,000–$74,999, or ≥$75,000), health insurance status (insured or uninsured), and having a personal health care provider. The analysis also included individuals' self-reported health status (good or better health vs. fair or poor health) and personal cancer history (yes, no). Our analysis also included time-varying state-level covariates including the density of gastroenterologists per 10,000 population, the percentage of adults 18–64 years old without health insurance, and Medicare Advantage penetration rates. We included the Medicare Advantage penetration rate as a covariate because Medicare Advantage plans differ from traditional Medicare and other forms of insurance in terms of product design, network configurations, and financial incentives, all of which can impact the utilization of preventive health care services.[65–67]

Statistical analysis

We employed multivariable generalized logistic regression models in a difference-in-differences (DiD) framework to evaluate the association between Medicaid expansion with or without paid sick leave policies and CRC screening. Survey weights were applied to account for the complex sampling design of BRFSS. Standard errors were clustered at the state level to account for intrastate correlation and yield robust variance estimates. Parallel trends in the proportion of CRC screening between treatment groups (full intervention, partial intervention, control) were tested using interaction terms between year and treatment group in the pre-policy period. Wald tests did not demonstrate statistically significant differences in between-group trends ($p = .86$). The DiD framework controls for unobserved, time-invariant differences between states and common time trends, whereas time-varying confounders are addressed by adjusting for state-level variables and individual characteristics, though residual unmeasured confounding may remain.

Adjusted margins were calculated to estimate predicted percent up to date with CRC screening for each treatment group and time period. Contrasts of predictive margins were used to derive DiD estimates, quantifying the differential changes in CRC screening across groups. All analyses were conducted using Stata 18.5. Statistical tests were two-tailed and considered significant at the 0.05 level.

We conducted multiple sensitivity analyses. First, we replicated our analysis employing multivariable linear probability, rather than logistic, regression. Second, we expanded the study population to include individuals not eligible for Medicaid expansion (income >139% federal poverty level) to assess the broader impact of the policies, including indirect benefits from health care system changes and paid sick leave. Third, we examined whether any observed associations varied by individuals' self-reported health care access by conducting analyses using separate models for insured individuals and individuals reporting a personal health care provider.

We sought to translate any observed differential changes in CRC screening associated with Medicaid expansion and paid sick leave policies in terms of potential lives saved through screening. To do so, we estimated the number of population-level CRC screenings associated with the presence or absence of Medicaid expansion and paid sick leave policies. These screening numbers were then combined with modeling estimates provided by the USPSTF on lives saved through screening. These steps allowed us to quantify preventable deaths associated with CRC screening nationwide.

RESULTS

Our study sample comprised 76,674 individuals, stratified by policy treatment and pre- and post-policy periods (Table 1). Pre-policy (2012–2014), 28% were in Medicaid Expansion with paid sick leave (ME + SL) states, 23% in Medicaid Expansion without paid sick leave (MEnoSL) states, and 49% in states with neither policy (NoME/NoSL). Post-policy (2015–2018), these proportions were similar: ME + SL

TABLE 1 Descriptive characteristics of the study population stratified by policy treatment and pre-/post-policy period (unweighted counts and weighted percentages): BRFSS, 2012–2018 (N = 76,674).

	ME + SL		MEnoSL		NoME/NoSL		Total	
Variable	**Pre-policy**	**Post-policy**	**Pre-policy**	**Post-policy**	**Pre-policy**	**Post-policy**	**Pre-policy**	**Post-policy**
Policy treatment, % (*N*)	28 (11,795)	28 (4760)	23 (13,686)	23 (11,743)	49 (16,094)	50 (18,596)	54 (41,575)	46 (35,099)
Colorectal cancer screening, % (*N*)								
Met USPSTF guidelines	72 (9087)	78 (3807)	68 (9554)	70 (8630)	71 (12,021)	72 (13,923)	71 (30,662)	73 (26,360)
Did not meet guidelines	28 (2708)	22 (953)	32 (4132)	30 (3113)	29 (4073)	28 (4673)	29 (10913)	27 (8739)
Age group, years, % (*N*)								
50–54	11 (821)	9 (345)	11 (859)	10 (737)	11 (1057)	10 (1268)	11 (2737)	10 (2350)
55–64	21 (1932)	25 (1009)	20 (2438)	25 (2392)	22 (2977)	26 (3908)	21 (7347)	25 (7309)
65+	68 (9042)	66 (3406)	69 (10,389)	65 (8614)	67 (12,060)	64 (13,420)	68 (31,491)	65 (25,440)
Sex, % (*N*)								
Male	44 (4544)	45 (2108)	45 (5213)	46 (4857)	46 (6025)	46 (7596)	45 (15,782)	46 (14,561)
Female	56 (7251)	55 (2652)	55 (8473)	54 (6886)	54 (10,069)	54 (11,000)	55 (25,793)	54 (20,538)
Marital status, % (*N*)								
Never married	9 (1362)	10 (578)	8 (1132)	10 (1143)	6 (1009)	8 (1294)	8 (3503)	9 (3015)
Formerly married	39 (5797)	36 (1950)	40 (6415)	38 (4941)	39 (7574)	38 (8168)	39 (19,786)	38 (15,059)
Married/cohabitating	52 (4636)	54 (2232)	52 (6139)	52 (5659)	54 (7511)	54 (9134)	53 (18,286)	53 (17,025)
Race/ethnicity, % (*N*)								
Non-Hispanic White	61 (9494)	55 (3292)	75 (10273)	73 (8522)	65 (11,820)	65 (14,027)	66 (31,587)	64 (25,841)
Non-Hispanic Black	8 (586)	6 (282)	14 (1207)	15 (1102)	16 (2250)	16 (2449)	13 (4043)	13 (3833)
Hispanic	21 (1103)	25 (841)	5 (307)	6 (349)	15 (1416)	15 (1352)	15 (2826)	16 (2542)
Non-Hispanic other	10 (612)	13 (345)	6 (1899)	6 (1770)	3 (608)	3 (768)	6 (3119)	7 (2883)
Education, % (*N*)								
Less than high school	21 (1453)	21 (601)	20 (1530)	17 (1017)	22 (2440)	20 (2238)	22 (5423)	19 (3856)
High school graduate	23 (3141)	20 (959)	38 (5167)	36 (4068)	32 (5032)	30 (5714)	31 (13,340)	29 (10,741)
More than high school	55 (7201)	59 (3200)	43 (6989)	47 (6658)	46 (8622)	50 (10,644)	48 (22,812)	52 (20,502)
Household income, % (*N*)								
$75000+	17 (1781)	21 (1092)	9 (1408)	12 (1689)	11 (2016)	13 (2811)	12 (5205)	15 (5592)
<$75000	83 (10,014)	79 (3668)	91 (12,278)	88 (10,054)	89 (14,078)	87 (15,785)	88 (36,370)	85 (29,507)
Health insurance coverage, % (*N*)								
Uninsured	8 (438)	5 (170)	7 (774)	5 (365)	12 (1337)	10 (1422)	10 (2549)	7 (1957)
Insured	92 (11,357)	95 (4590)	93 (12,912)	95 (11,378)	88 (14,757)	90 (17,174)	90 (39,026)	93 (33,142)
Personal health care provider, % (*N*)								
No	8 (645)	9 (348)	8 (887)	7 (777)	11 (1319)	11 (1743)	9 (2851)	10 (2868)
Yes	92 (11,150)	91 (4412)	92 (12,799)	93 (10,966)	89 (14,775)	89 (16,853)	91 (38,724)	90 (32,231)
Self-rated health, % (*N*)								
Fair/poor	34 (3695)	34 (1504)	36 (4701)	37 (3953)	38 (5550)	39 (6616)	36 (13,955)	38 (12,073)
Good/better	66 (8100)	66 (3256)	64 (8985)	63 (7790)	62 (10,535)	61 (11,980)	64 (27,620)	62 (23,026)
Personal cancer history, % (*N*)								
No	75 (8378)	76 (3581)	77 (10,229)	77 (8816)	75 (11,592)	74 (13,277)	75 (30,199)	75 (25,674)
Yes	25 (3417)	24 (1179)	23 (3457)	23 (2927)	25 (4502)	26 (5319)	25 (11,376)	25 (9425)

TABLE 1 (Continued)

Variable	ME + SL		MEnoSL		NoME/NoSL		Total	
	Pre-policy	Post-policy	Pre-policy	Post-policy	Pre-policy	Post-policy	Pre-policy	Post-policy
Gastroenterologists per 10,000 residents	0.24	0.28	0.01	0.01	0.14	0.09	0.14	0.12
Uninsured adults (%)	18	9	15	8	25	20	16	14
Medicare Advantage penetration (%)	12	15	21	26	20	29	18	25

Note: Pre-policy period = 2012–2014; post-policy period = 2015–2018.

Abbreviations: BRFSS, Behavioral Risk Factor Surveillance System; MEnoSL, Medicaid expansion and no state paid sick leave; ME + SL, Medicaid expansion and state paid sick leave; NoME/NoSL, no Medicaid expansion and no state paid sick leave; USPSTF, US Preventive Services Taskforce.

(28%), MEnoSL (23%), and NoME/NoSL (50%). The percent up to date with USPSTF CRC screening guidelines increased in ME + SL states from 72% pre-policy to 78% post-policy. Smaller increases were observed in MEnoSL states (from 68% to 70%) and NoME/NoSL states (from 71% to 72%).

Age distribution was largely consistent, with approximately two-thirds aged 65 or older across all groups. Females represented approximately 54%–56% of participants, with stable distributions across policy groups and periods. Marital status showed similar stability, with approximately 52%–54% married or cohabitating. Race and ethnicity differed notably by policy group; ME + SL states had higher proportions of Hispanic individuals (21%–25%) compared to MEnoSL (5%–6%) and NoME/NoSL (15%) states. Educational attainment was highest in ME + SL states, with 55%–59% having more than a high school education, compared to 43%–47% in MEnoSL and 46%–50% in NoME/NoSL states. ME + SL states had the highest proportion of household income of $75,000 or more annually (17%–21%) compared to MEnoSL (9%–12%) and NoME/NoSL states (11%–13%). Health insurance coverage was consistently high across all groups (88%–95%). Access to personal health care providers remained high (89%–93%) across groups. Self-rated health status was consistently reported as "Good/Better" by approximately 62%–66% across periods and groups. Approximately a quarter of respondents reported a personal cancer history across groups and periods.

State-level factors showed significant variation; notably, gastroenterologist density was highest in ME + SL states (0.24–0.28 per 10,000 residents) compared to MEnoSL (0.01 per 10,000) and NoME/NoSL (0.09–0.14 per 10,000) states. Percentages of uninsured adults declined substantially post-policy, especially in ME + SL states (from 18% to 9%) and MEnoSL states (from 15% to 8%). Medicare Advantage penetration increased across all groups post-policy, most significantly in NoME/NoSL states (from 20% to 29%).

The unadjusted association between policy treatment and percent up to date with CRC screening, before accounting for individual- and state-level control variables, is shown in Figure 1. In 2012, CRC screening was highest in the ME + SL group, at 74.1%, followed by the NoME/NoSL group at 70.9%, and the MEnoSL group at 68.1%. These differences persisted throughout the study period, with the ME + SL group consistently exhibiting the highest screening and the MEnoSL group exhibiting the lowest. By 2018, CRC screening increased in all groups, with the ME + SL group reaching 77.4%, the NoME/NoSL group at 74.5%, and the MEnoSL group at 71.9%.

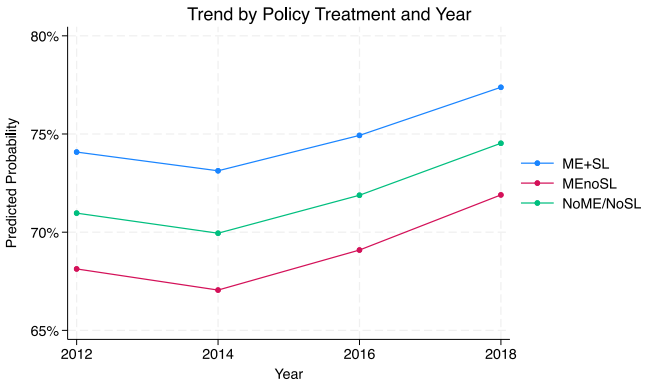

FIGURE 1 Unadjusted trends in percent up-to-date with colorectal cancer screening by policy treatment group and year: Behavioral Risk Factor Surveillance System, 2012–2018 (N = 76,674).

The adjusted percent up to date with CRC screening in the full intervention ME + SL group increased from 72.9% in the pre-policy period to 75.8% in the post-policy period (2.9 percentage point [pp] difference). Compared to other groups, the full intervention group exhibited differentially greater CRC screening, pre versus post policy interventions (Table 2). In particular, the full intervention group had differentially greater screening compared to the partial intervention MEnoSL group (adjusted Difference in Difference (aDID), 2.9 pp; 95% confidence interval [CI], 1.7%–4.0%, p = <.001). Similarly, the full intervention group had differentially greater screening compared to the control NoME/NoSL group (aDID, 4.2 pp; 95% CI, 0.9%–7.4%, p = .018). The percent up-to-date with CRC screening remained nearly unchanged in MEnoSL states, with a negligible 0.1% increase in the post-policy period, which was not statistically significant. In contrast, the NoME/NoSL group had a 1.2% decrease in the percent up-to-date with CRC screening, which was also not statistically significant.

Results from analyses using multivariable linear probability models were consistent with those generated from multivariable logistic regression used in primary analyses (Table S1). Similarly, results from analyses of a broader study population that included individuals with income greater 139% of the federal poverty level, as well as analyses using separate models based on health care access,

were qualitatively similar and consistent with results from our main analyses (Tables S2–S4).

We used weighted population size for the full intervention ME + SL group, which represented 28% of the population (approximately 14.8 million individuals); the partial intervention MEnoSL group, which represented 23% of the population (approximately 12.1 million individuals); and the control NoME/NoSL group, which represented 49% of the population (approximately 25.9 million individuals) (Table 3).

CRC screening was 2.9 percentage points greater in ME + SL versus MEnoSL states that corresponded to 352,343 greater CRC screenings, whereas the 4.2 percentage point differentially greater CRC screening in ME + SL versus NoME/No SL states corresponded 1,087,140 greater CRC screenings. Combined, these estimates suggest a potential of approximately 1.4 million more screenings in states that adopted versus did not adopt both Medicaid expansion and paid sick leave policies.

Combining these values with modeling estimates provided by the USPSTF, a greater proportion of CRC screenings were associated with a 34,548 reduction in colorectal cancer deaths (8456 prevented deaths in ME + SL versus MEnoSL states and 26,091 prevented deaths in ME + SL versus NoME/NoSL states).

DISCUSSION

This study filled key knowledge gaps by quantifying associations between Medicaid expansion with or without paid sick leave policies, on CRC screening among screening-eligible adults. States implementing both policies exhibited differentially higher percent up to date with screening compared to states implementing only Medicaid expansion or neither policy. The complementary effects observed in this study highlight the critical role of paid sick leave in enabling individuals to act on the financial access afforded by Medicaid. Previous research on paid sick leave has shown increases in health care utilization for services like vaccinations, primary care visits, and preventive screenings.[44,47,48] This study provides new evidence that these policies achieve greater public health benefit when implemented together. By tackling both financial and logistical barriers simultaneously, states with both Medicaid expansion and paid sick leave achieved significantly higher CRC screening, reflecting a comprehensive approach to improving preventive care.[50–52,55]

Our study builds on a robust body of evidence on the role of Medicaid expansion under the Affordable Care Act (ACA) in improving health care access and utilization, particularly for low-income and vulnerable populations.[18–23] Mixed findings from past research found improved cancer screening and control in Medicaid expansion states compared to nonexpansion states.[24,25,37] Our study advances this literature by focusing on the added value of combining Medicaid expansion with paid sick leave policies, which addresses logistical barriers such as the inability to take time off work for medical appointments. In the absence of paid sick leave, an appointment for preventive care when one otherwise feels well would be more likely to be skipped or postponed compared to acute, symptomatic concerns. Thus, these policies are particularly timely and relevant for the uptake of preventive care, given that newer CRC screening guidelines include a working age group (45–49 years old). Likewise, these findings align with previous research indicating the

TABLE 2 Difference-in-differences multivariable adjusted estimates of percent up to date with colorectal cancer screening by state policy group, BRFSS, 2012–2018 (N = 76,674).

Group	Pre-policy (2012–2014), % (95% CI)	Post-policy (2015–2018), % (95% CI)	Absolute change, %	Relative change compared to ME + SL, % (95% CI)	*p*
ME + SL	72.9 (72.3–73.5)	75.8 (73.9–77.8)	2.9	Reference	
MEnoSL	67.4 (65.9–68.9)	67.5 (64.6–70.3)	0.1	−2.9 (−4.0 to −1.7)	<.001
NoME/NoSL	73.4 (71.6–75.3)	72.2 (69.5–74.9)	−1.2	−4.2 (−7.4 to −0.9)	.018

Note: Control variables included age, sex, marital status, race and ethnicity, education, household income, health insurance coverage, personal health care provider, self-rated health, personal cancer history, gastroenterologists per 10,000 residents, % uninsured adults, and % Medicare Advantage penetration.

Abbreviations: BRFSS, Behavioral Risk Factor Surveillance System; CI, confidence interval; MEnoSL, Medicaid expansion and no state paid sick leave; ME + SL, Medicaid expansion and state paid sick leave; NoME/NoSL, no Medicaid expansion and no state paid sick leave.

TABLE 3 Estimated colorectal cancer screenings attributable to the combined effect of Medicaid expansion and state paid sick leave.

Policy group	Population size	Screening % reduction	Estimated fewer screenings
ME + SL	14.8 million	Reference	N/A
MEnoSL	12.1 million	−2.9%	352,343
NoME/NoSL	25.9 million	−4.2%	1,087,140
Combined Total	38.0 million		1,439,483

Abbreviations: MEnoSL, Medicaid expansion and no state paid sick leave; ME + SL = Medicaid expansion and state paid sick leave; NoME/NoSL, no Medicaid expansion and no state paid sick leave.

independent and positive effects of health insurance expansions on preventive care utilization, while also addressing the relatively understudied role of paid sick leave in improving access to cancer screening.[33–35]

These findings underscore the importance for policymakers to explore, test, and adopt strategies that improve health outcomes by addressing multiple barriers to health care access. For instance, the estimated 1.4 million more screenings and 33,000 potentially preventable CRC screening-related deaths emphasize the critical role of policies such as Medicaid expansion and paid sick leave in achieving national public health goals, such as those outlined in Healthy People 2030.

Our findings also suggest that such policy strategies should be multi-pronged. In our analysis, the combination of Medicaid expansion and paid sick leave was associated with differentially greater percent up to date with CRC screening than Medicaid expansion alone. Although Medicaid expansion addresses financial barriers to care, it fails to eliminate logistical barriers, particularly for hourly workers who may not have the flexibility to attend medical appointments or procedures in the case of a colonoscopy. Another logistical barrier for endoscopy is the common requirement for patients to secure a ride home from a family member or friend, who may have to take time off work and could use paid sick leave as well. The notion that such policies can complement each other and address different types of access barriers is consistent with the additive nature of associations observed in our analysis for the partial versus full treatment groups.

This study had limitations. Although the DiD approach and multivariable analyses helped reduce the risk of confounding, this analysis was still subject to unmeasured confounders, as with all observational analyses. The study used respondent self-reported data, which may be subject to recall or social desirability bias. However, a recent study comparing BRFSS with other national surveys found that the differences in estimates were minimal and not substantively meaningful for public health surveillance.[68] The BRFSS combines screening and diagnostic tests without differentiating between them, which may overestimate true screening prevalence as defined by the USPSTF guidelines. Related, using the "up-to-date" CRC screening measure, which includes past and recent screenings, may miss policy-driven changes in current behavior. This study included a select number of states with clear policy contrasts to strengthen internal validity, findings may have limited generalizability to other states with different socioeconomic or health care contexts. Although our analysis yields valuable insight from the pre-pandemic period, relationships between policies and screening s in post-COVID settings should be explored once more years of data are available.

An unexpected finding was the lower percent up to date with CRC screening in Medicaid expansion but no paid sick leave states (MEnoSL) compared to no Medicaid expansion (noME/noSL) and no sick leave. Although we controlled for gastroenterologist density and the health insurance market, other unmeasured state or local level factors not captured in the available data sets such as economic conditions, local health care infrastructure and practices, or workplace policies, may influence CRC screening and how they interact with Medicaid expansion and paid sick leave policies. Future research could explore these unmeasured factors.

Future research should explore the long-term effects of Medicaid expansion and paid sick leave on CRC outcomes, including early detection, survival rates, and health care costs. Additional studies are needed to assess whether other policy interventions, such as workplace protections, interact with Medicaid expansion and paid sick leave to influence preventive care utilization. Such research could help identify populations most likely to benefit from these policies, enabling more tailored interventions. Qualitative studies could provide deeper insights into how individuals perceive and navigate these policies. Understanding the lived experiences of those affected by Medicaid expansion and paid sick leave could inform strategies to address remaining barriers and enhance the effectiveness of these policies.[69] Cost-effectiveness analyses could help quantify the economic benefits of adopting these policies on a national scale, balancing the upfront costs against potential savings from improved health outcomes and reduced health care utilization. Finally, the dynamics observed for CRC screening could be explored in future work assessing other types of care, such as screening for other types of cancer or other preventive services.

This study demonstrates the potential benefits of combined effects of state Medicaid expansion with or without paid sick leave policies on CRC screening. By addressing both financial and logistical barriers to care, the combination of both policies can represent a promising approach for reducing structural barriers to health care access. Beyond prompting several areas for future research, these findings emphasize the need for policymakers to explore multiple policy solutions to achieve significant gains in preventive care utilization and desired health outcomes such as preventable deaths.

AUTHOR CONTRIBUTIONS

Jim P. Stimpson: Conceptualization; formal analysis; writing—original draft; writing—review and editing; funding acquisition; and methodology. **Joshua M. Liao**: Methodology; writing—review and editing; and conceptualization. **Anna M. Morenz**: Conceptualization and writing—review and editing. **Joseph H. Joo**: Writing—review and editing. **Fernando A. Wilson**: Methodology and writing—review and editing

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The Behavioral Risk Factor Surveillance System data are publicly available from the National Center for Health Statistics at https://www.cdc.gov/brfss, which includes detailed information about the survey. The AHRF data are publicly available from the Health Resources & Services Administration at https://data.hrsa.gov/topics/health-workforce/ahrf. The Kaiser Family Foundation data are publicly available at https://www.kff.org/status-of-state-medicaid-expansion-decisions/. The National Conference of State Legislatures data are publicly available from https://www.ncsl.org/labor-and-employment/paid-sick-leave. The Better Balance data are publicly available from A Better Balance at https://www.abetterbalance.org/paid-sick-time-laws/.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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