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Comparison of Insurance Status and Diagnosis Stage Among Patients With Newly Diagnosed Cancer Before vs After Implementation of the Patient Protection and Affordable Care Act

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IMPORTANCE Having health insurance is a strong determinant of cancer outcomes in the United States, and Medicaid expansion under the Patient Protection and Affordable Care Act (ACA) may have reduced the prevalence of uninsured patients. Prior research has only assessed the aggregate effects of expansions, and little is known about changes in uninsured patients by state and key sociodemographic groups, including sex, race/ethnicity, census tract–level poverty, and rurality.

OBJECTIVE To examine changes in the percentage of uninsured patients and stage at diagnosis among nonelderly patients with cancer by state and key sociodemographic groups after implementation of the ACA.

DESIGN, SETTING, AND PARTICIPANTS This study used difference-in-differences analysis to determine the percentage of uninsured patients and early-stage cancer diagnoses among patients aged 18 to 64 years from the population-based cancer registries of 40 states before (January 1, 2010, to December 31, 2013) and after (January 1, 2014, to December 31, 2014) the ACA Medicaid expansion. Data analysis was performed from November 2017 to April 2018.

MAIN OUTCOMES AND MEASURES Changes in the percentage of uninsured patients and early-stage diagnoses.

RESULTS A total of 2 471 154 patients (mean age, 52.7 years; age range, 18-64 years; 51.4% female; 70.9% non-Hispanic white) were included from Medicaid expansion (n = 1 234 156) and nonexpansion (n = 1 236 998) states. In 2014, the percentage of uninsured patients decreased in almost all states. However, decreases were greater in expansion than nonexpansion states and were greatest in expansion states with high baseline uninsured rates. For example, the percentage of uninsured patients decreased from 8.3% before implementation of the ACA to 2.1% (−6.2 difference) after implementation of the ACA in the expansion state of Kentucky compared with 9.1% to 7.5% (−1.5 difference) in the nonexpansion state of Tennessee. In expansion states, the decreases in the percentage of uninsured patients were higher among minorities and patients in high-poverty or rural areas, diminishing or eliminating disparities. In contrast, sociodemographic disparities in the percentage of uninsured patients remained high in nonexpansion states. Stage at diagnosis shifted slightly to earlier stage for most cancer types in Medicaid expansion states.

CONCLUSIONS AND RELEVANCE This study found state variation in reductions in the percentage of uninsured patients among nonelderly patients with cancer after implementation of the ACA, with larger decreases in expansion than nonexpansion states. Disparities in the percentage of uninsured patients by race/ethnicity, census tract–level poverty, and rurality were diminished or eliminated in Medicaid expansion states but remained high in nonexpansion states, highlighting the promising role of Medicaid expansion in reducing disparities among sociodemographic subpopulations. Future studies should monitor changes in cancer presentation, treatment, and outcomes after implementation of the ACA.

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Supplemental content

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Having health insurance is one of the strongest indicators of outcomes among patients with cancer in the United States.[1] The Patient Protection and Affordable Care Act (ACA) contained multiple provisions to improve health insurance coverage, including expansion of state Medicaid program eligibility in 2014. Not all states opted to expand Medicaid coverage, however. National surveillance data show that the implementation of the ACA brought the uninsured rate among Americans to a record low: 9.0% in the first 9 months of 2017 compared with 16.0% in 2010 when the ACA was signed into law.[2] Because increased insurance eligibility may improve access to cancer screening, diagnostic follow-up, and treatment, several studies[3-5] have explored the effects of Medicaid expansions on insurance and early-stage diagnosis in patients with cancer. A recent study[3] that used the National Cancer Database reported substantial reductions in the percentage of uninsured among nonelderly patients with cancer in 2014 in Medicaid expansion states in aggregate. Significant, albeit smaller, reductions in the percentage of uninsured patients were observed among patients residing in nonexpansion states.[3] Another study[4] used the Surveillance, Epidemiology, and End Results (SEER) Program cancer registry data from 13 states and found a slightly increased percentage of uninsured patients in the nonexpansion states. Both data sources showed an increase in early-stage cancer diagnosis in 2014.[3,5] These studies[3-5] assessed only the aggregate effects of Medicaid expansion, and little is known about the extent of changes in the percentage of uninsured patients by state and key sociodemographic groups, including sex, race/ethnicity, census tract–level poverty, and rurality. We extended those previous studies[3-5] using a newly available population-based cancer registry data set from 40 states provided by the North American Association of Central Cancer Registries (NAACCR) to examine changes in the uninsured rate and the percentage of early-stage diagnoses after implementation of the ACA by state and sociodemographic groups.

Key Points

Question After implementation of the Patient Protection and Affordable Care Act, how did insurance status and stage at diagnosis change by state and sociodemographic factors among patients with newly diagnosed cancer?

Findings In this population-based registry study of 2.5 million nonelderly patients with cancer diagnosed from 2010 to 2014 from 40 states, the percentage of uninsured patients decreased in almost all states; the largest decreases were in Medicaid expansion states with high baseline uninsured rates. Sociodemographic disparities in uninsured rate were diminished or nearly eliminated in expansion states but remained high in nonexpansion states.

Meaning Medicaid expansion may mitigate disparities among sociodemographic subpopulations.

Methods

Patients

The NAACCR compiles cancer incidence data from member registries in North America that meet all quality and completeness requirements.[6] The data are used in population-based descriptive cancer epidemiologic studies, including the Annual Report to the Nation on the Status of Cancer.[7,8] Insurance status is a required NAACCR field. With improvements in uniformity and data completeness, this field recently became available to researchers.[9,10] In this study, we included cancer cases from population-based registries of 40 states that had more than 85% completeness for the health insurance field. Specifically, we obtained information on 2 471 154 patients aged 18 to 64 years with a new diagnosis of a first primary malignant cancer from January 1, 2010, to December 31, 2014, from 21 Medicaid expansion states (n = 1 234 156) and 19 nonexpansion states (n = 1 236 998). These states account for more than 80% of the cancer population in the United States.[11] Patients were categorized by sex, race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and other), census tract–level poverty (<5%, 5%-9.9%, 10%-19.9%, or ≥20% of persons below the federal poverty line), and rurality (rural, urban) according to residence at the time of diagnosis. Stage at diagnosis was categorized as 0/I (early), II to IV (late), or unknown according to the seventh edition of the American Joint Committee Classification (AJCC).[12] In the analysis of stage at diagnosis, 712 774 patients diagnosed with cancers without applicable AJCC staging scheme or from registries in which the missing rate of stage was 15% or higher were excluded (eTable 1 in the Supplement), leaving 1 758 380 patients from 34 states in the stage analysis. The study was based on deidentified database data and exempt from institutional review board and informed consent by the NAACCR Institutional Review Board.

Statistical Analysis

We calculated the percentage of uninsured patients by calendar year for each state and socioeconomic subgroup by states' Medicaid expansion status. The percentage of uninsured patients by sex was examined among racial/ethnic groups. We used standard statistical approaches for evaluating the influence of health policy changes in quasi-experimental studies.[13-16] The changes in the percentage of uninsured before (January 1, 2010, to December 31, 2013) and after (January 1, 2014, to December 31, 2014) implementation of the ACA was calculated for each state and socioeconomic subgroup. We conducted difference-in-differences (DD) analyses to assess the association of the ACA with the percentage of uninsured patients, with patients from nonexpansion states serving as the control group and patients from expansion states as the intervention group. Crude and multivariable linear probability models were fitted, adjusting for age, sex, state, race/ethnicity, census tract–level poverty, and rurality when applicable. Sensitivity analysis that excluded patients from Michigan (expanded Medicaid eligibility on April 1, 2014) or New Hampshire (expanded Medicaid eligibility on August 15, 2014) showed similar results (eTable 2 in the Supplement). Sensitivity analysis that included only cases from 29 states that had more than 90% completeness of the health insurance field did not change the findings (eTable 3 in the Supplement). The data analyses were conducted from November 2017 to April 2018.

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Table 1. Sociodemographic Characteristics of Patients Aged 18 to 64 Years With Newly Diagnosed Cancer

Characteristic	No. (%) of Patients		
	Total (N = 2 471 154)	Medicaid Expansion States (n = 1 234 156)	Nonexpansion States (n = 1 236 998)
Year of diagnosis			
2010	492 562 (19.9)	246 331 (20.0)	246 231 (19.9)
2011	500 618 (20.3)	250 887 (20.3)	249 731 (20.2)
2012	492 430 (19.9)	245 738 (19.9)	246 692 (19.9)
2013	491 451 (19.9)	244 743 (19.8)	246 708 (19.9)
2014	494 093 (20.0)	246 457 (20.0)	247 636 (20.0)
Age group, y			
18-44	434 709 (17.6)	220 239 (17.8)	214 470 (17.3)
45-54	733 827 (29.7)	365 508 (29.6)	368 319 (29.8)
55-64	1 302 618 (52.7)	648 409 (52.5)	654 209 (52.9)
Sex			
Male	1 201 512 (48.6)	593 685 (48.1)	607 827 (49.1)
Female	1 269 642 (51.4)	640 471 (51.9)	629 171 (50.9)
Race/ethnicity			
Non-Hispanic white	1 751 551 (70.9)	874 977 (70.9)	876 574 (70.9)
Non-Hispanic black	321 895 (13.0)	115 884 (9.4)	206 011 (16.7)
Hispanic	250 365 (10.1)	140 888 (11.4)	109 477 (8.9)
Other or unknown	147 343 (6.0)	102 407 (8.3)	44 936 (3.6)
Persons below federal poverty line, %			
<5.0	388 120 (15.7)	229 409 (18.6)	158 711 (12.8)
5.0-9.99	536 376 (21.7)	298 077 (24.2)	238 299 (19.3)
10.0-19.99	706 574 (28.6)	344 904 (27.9)	361 670 (29.2)
≥20.0	554 010 (22.4)	252 410 (20.5)	301 600 (24.4)
Unknown	286 074 (11.6)	109 356 (8.9)	176 718 (14.3)
Urban or rural status			
Urban	2 049 111 (82.9)	1 023 180 (82.9)	1 025 931 (82.9)
Rural	236 510 (9.6)	112 893 (9.1)	123 617 (10.0)
Unknown	185 533 (7.5)	98 083 (7.9)	87 450 (7.1)

Similarly, the changes in the percentage of early-stage diagnoses before and after ACA implementation were calculated, and DD analysis was conducted to examine the association between Medicaid expansion and shifts in stage at diagnosis for all cancers combined and for the 20 most common cancers in the nonelderly population. The changes in percentage of early-stage diagnoses for all cancer combined were also calculated by state and sociodemographic factors.

SEER*Stat, version 8.3.4, and SAS statistical software, version 9.4 (SAS Institute Inc), were used to perform the analyses. Wald χ^2 tests were used, and a 2-sided $P < .05$ was considered to be statistically significant.

Results

A total of 2 471 154 patients (mean age, 52.7 years; age range, 18-64 years; 51.4% female; 70.9% non-Hispanic white) were included from Medicaid expansion (n = 1 234 156) and nonexpansion (n = 1 236 998) states. Distributions of year of diagnosis, age group, sex, and rurality were similar in expansion and nonexpansion states (**Table 1**). Patients in expansion states were more likely to be Hispanic (11.4% vs 8.9%) and less likely to be black (9.4% vs 16.7%) or reside in the poorest census tracts (20.5% vs 24.4%).

Table 2 and eFigure 1 in the Supplement provide the changes in the percentage of uninsured patients by year before and after implementation of the ACA for each of the 40 states. The percentage of uninsured patients decreased in almost all states, although the decreases were substantially higher in expansion than nonexpansion states (eFigure 2 in the Supplement), especially in expansion states with high baseline uninsured rates. For example, the percentage of uninsured patients decreased from 8.3% before implementation of the ACA to 2.1% after implementation of the ACA in the expansion state of Kentucky but from only 9.1% to 7.6% in the neighboring nonexpansion state of Tennessee. Similarly, the percentage of uninsured patients decreased from 9.6% to 4.0% in the expansion state of Arkansas but from only 10.4% to 8.8% in the neighboring nonexpansion state of Mississippi.

Table 3 provides DD estimates of changes in the percentage of uninsured patients overall and by sociodemographic groups. Overall, after adjustment for sociodemographic factors, Medicaid expansion states experienced a 1.3-percentage point (ppt) greater reduction in the percentage of uninsured patients compared with the nonexpansion states (crude 2.6 vs 1.0 ppt; $P < .001$). In Medicaid expansion states, the reduction in the percentage of uninsured patients was larger among males than females (2.8 vs 2.4 ppt), especially among Hispanic patients (4.5 vs 3.6 ppt)

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Table 2. Comparison in the Percentage of Uninsured Patients by State Among Patients Aged 18 to 64 Years With Newly Diagnosed Cancer Before vs After ACA Implementation

State	Uninsured Patients, %		
	2010-2013	2014	Difference
Expansion States			
Arizona	4.2	2.7	−1.5
Arkansas	9.6	4.0	−5.7
California	3.9	1.9	−2.0
Colorado	6.8	2.8	−4.1
Connecticut	3.3	3.1	−0.2
Delaware	2.0	2.0	0.1
District of Columbia	2.2	1.3	−1.0
Hawaii	1.8	1.1	−0.7
Illinois	7.2	4.0	−3.2
Iowa	5.2	2.5	−2.7
Kentucky	8.3	2.1	−6.2
Massachusetts	1.2	0.6	−0.6
Michigan[a]	3.2	1.8	−1.4
New Jersey	7.9	5.0	−2.9
New Mexico	7.2	3.8	−3.4
North Dakota	4.9	2.3	−2.5
Ohio	6.9	3.7	−3.1
Oregon	7.3	1.7	−5.6
Rhode Island	5.2	2.0	−3.3
Washington	3.3	1.5	−1.8
West Virginia	5.3	2.5	−2.8
Nonexpansion States			
Alaska	5.0	4.7	−0.4
Florida	9.3	8.0	−1.3
Georgia	9.7	8.8	−0.9
Idaho	5.8	4.9	−0.9
Indiana	7.1	6.1	−1.0
Louisiana	8.8	10.0	1.2
Maine	6.2	4.9	−1.3
Mississippi	10.4	8.8	−1.6
Montana	9.2	6.4	−2.8
Nebraska	6.0	4.8	−1.2
New Hampshire	6.5	4.5	−2.0
North Carolina	7.5	5.8	−1.6
Oklahoma	8.4	6.4	−2.1
Pennsylvania	2.2	1.9	−0.4
South Carolina	10.4	9.9	−0.5
Tennessee	9.1	7.6	−1.5
Texas	13.8	12.7	−1.1
Utah	5.9	5.2	−0.8
Virginia	8.2	7.6	−0.6

Abbreviation: ACA, Patient Protection and Affordable Care Act.

[a] Patients from Michigan included only those from the Detroit cancer registry because of completeness of the health insurance field, accounting for approximately half of all Michigan cases.

(eFigure 3 in the Supplement), minority groups (>4 ppt for non-Hispanic blacks and Hispanics vs 2.3 ppt for non-Hispanic whites), those living in higher census tract-level poverty areas (4.6 ppt for the lowest-income individuals vs 1.3 ppt for the highest-income individuals), and rural residents (4.3 ppt for rural vs 2.5 ppt for urban), resulting in narrowing or elimination of disparities among the groups.

In contrast, the reductions in the percentage of uninsured patients in nonexpansion states were small (approximately 1 ppt) and similar across sociodemographic subgroups, and sociodemographic disparities remained high (Table 3, **Figure**, and eFigure 4 in the Supplement). As a result, disparities in the percentage of uninsured patients between expansion states and nonexpansion states within each subpopulation increased, most prominently among those who were socioeconomically disadvantaged (eFigure 5 in the Supplement). For example, before implementation of the ACA, the percentage of uninsured patients in nonexpansion states was 4.9 ppt higher than that in expansion states among those living in the lowest-income census tracts, and this difference widened to 8.5 ppt in 2014; similarly, the difference among rural residents widened from 2.1 ppt to 5.6 ppt after implementation of the ACA (Table 3). In addition, the difference in the percentage of uninsured patients between those residing in the lowest-income neighborhoods in expansion states and in affluent neighborhoods in nonexpansion states was nearly eliminated after implementation of the ACA, from 4.7 ppt to 0.9 ppt (Table 3).

Table 4 gives the DD estimates of changes in the percentage of early-stage diagnoses for all cancers combined and for the most common cancer sites. Medicaid expansion was associated with a slight but significant (0.4 ppt) increase in the percentage of early-stage diagnosis for all cancers combined. For colorectal, lung, and female breast cancer, which can be detected through screening (and covered by most insurers without patient cost sharing), and for melanoma, which can be detected through early symptoms, the percentage of early-stage diagnoses increased in both expansion and nonexpansion states, but the differences between expansion and nonexpansion states were not significant. Significant shifts to early stage in expansion states compared with nonexpansion states were observed for only non-Hodgkin lymphoma (adjusted DD, 1.8 ppt) and pancreatic cancer (adjusted DD, 1.5 ppt). For liver cancer, a significant 2.7-ppt decrease in early-stage diagnosis was observed in expansion states compared with nonexpansion states. The highest shift to early-stage diagnosis for all cancers occurred in the expansion states of Oregon and Connecticut and the nonexpansion state of Maine (eTable 1 in the Supplement). Few changes in sociodemographic disparities in stage at diagnosis were observed in the first year of Medicaid expansion (eTable 4 in the Supplement).

Discussion

Using population-based cancer registry data for nearly 2.5 million patients with new cancer diagnoses from 40 states during 2010 to 2014, we found that the percentage of uninsured patients decreased in almost all states after implementation of the ACA in 2014. However, the decreases were substantially greater in expansion than nonexpansion states and were greatest in expansion states with high baseline uninsured rates, such as Kentucky, Arkansas, and Oregon. In expansion states, the decrease in the percentage of uninsured patients were larg-

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Table 3. Changes in the Percentage of Uninsured Patients Associated With Medicaid Expansion Among Patients Aged 18 to 64 Years With Newly Diagnosed Cancer

	Patients in Expansion States, ppt			Patients in Nonexpansion States, ppt			Model			
							Crude		Adjusted[b]	
Characteristic[a]	2010-2013	2014	Difference	2010-2013	2014	Difference	DD, ppt	*P* Value	DD, ppt	*P* Value
Total	5.2	2.6	−2.6	8.7	7.8	−1.0	−1.6	<.001	−1.3	<.001
Sex										
Male	5.7	2.9	−2.8	9.2	8.4	−0.8	−2.0	<.001	−1.6	<.001
Female	4.8	2.4	−2.4	8.3	7.2	−1.1	−1.3	<.001	−1.0	<.001
Race/ethnicity										
Non-Hispanic white	4.4	2.1	−2.3	6.7	5.7	−1.0	−1.4	<.001	−1.1	<.001
Non-Hispanic black	7.6	3.5	−4.1	11.3	10.2	−1.1	−3.0	<.001	−2.4	<.001
Hispanic	9.5	5.5	−4.0	20.3	18.9	−1.4	−2.6	<.001	−2.1	<.001
Persons below federal poverty line, %										
<5.0	2.8	1.6	−1.3	4.0	3.2	−0.9	−0.4	.003	−0.4	<.001
5.0-9.99	4.1	2.2	−1.9	6.1	5.1	−1.0	−0.9	<.001	−0.9	<.001
10.0-19.99	5.9	2.9	−3.0	9.0	7.9	−1.1	−1.9	<.001	−1.7	<.001
≥20.0	8.7	4.1	−4.6	13.6	12.6	−1.0	−3.6	<.001	−3.1	<.001
Urban or rural status										
Urban	5.3	2.7	−2.5	8.7	7.8	−0.9	−1.6	<.001	−1.3	<.001
Rural	7.1	2.8	−4.3	9.2	8.4	−0.7	−3.5	<.001	−2.9	<.001

Abbreviations: DD, difference in differences; ppt, percentage points.

[a] Data for other and unknown categories not shown.

[b] Models were adjusted for age, sex, race/ethnicity, census tract–level poverty, rurality, and state.

est among minority patients, those residing in high-poverty neighborhoods, and those residing in rural areas, leading to narrowing or near elimination of the disparities among these sociodemographic groups. In contrast, the sociodemographic disparities in the percentage of uninsured patients remained high in the nonexpansion states. Consequently, socioeconomic disparities in the percentage of uninsured patients between expansion and nonexpansion states were widening. We also observed a small shift to early stage at diagnosis associated with Medicaid expansion. Because health insurance coverage is associated with receipt of effective treatment[17] and survival after diagnosis,[1] our findings have important implications for future disparities in state mortality rates.

We observed some contrasts between neighboring states. For example, Kentucky and Tennessee had similar percentages of uninsured (8.3%-9.1%) before implementation of the ACA; in January 2014, Kentucky adopted Medicaid expansion and the percentage of uninsured patients decreased to 2.1%, whereas Tennessee maintained its existing 2013 Medicaid eligibility policy[18] and the percentage of uninsured patients remained high (7.6%) in 2014. Similar contrasts were observed between other expansion and nonexpansion neighboring states of Arkansas vs Mississippi, Oregon vs Idaho, and New Mexico vs Texas. Future research should examine and compare the trajectories of access to and use of effective cancer care and patient outcomes between these neighboring states.

Our finding of diminishing racial/ethnic disparities in the percentage of uninsured patients among those diagnosed with cancer is similar to previous findings among the general population of narrowing racial/ethnic disparities in noninsurance and access to care after implementation of the ACA.[19] However, the narrowing in racial/ethnic disparities among the general population was seen in both Medicaid expansion states and nonexpansion states, whereas in our study of patients with cancer, the narrowing of disparities was seen only in Medicaid expansion states. This finding suggests that marketplace exchanges, which were available nationwide, may have led to reduced racial/ethnic disparities in nonexpansion states among the general population, but this effect might be minimal among the population of patients with cancer, which tends to be older and have higher baseline insurance rates.

Even before implementation of the ACA, residents of nonexpansion states were more likely to be uninsured and to have worse access to care, lower preventive services use, and higher out-of-pocket medical costs than were residents of expansion states.[10,20] The emerging widening disparity in the percentage of uninsured patients between the nonexpansion and expansion states after implementation of the ACA will likely exacerbate the inequalities in access to care and health outcomes because of differential state policies in expanding Medicaid eligibility.

Although it may take a longer time to observe any association of reduced noninsurance with cancer treatment, survival, and financial hardship, using these 1-year post-ACA data, we found a small yet significant shift to early-stage cancer diagnosis associated with Medicaid expansion for all cancers combined, non-Hodgkin lymphoma, and pancreatic cancer. Our patient-level findings are consistent with recent research that evaluated the aggregate effects of Medicaid expansions using the National Cancer Database and SEER and reported

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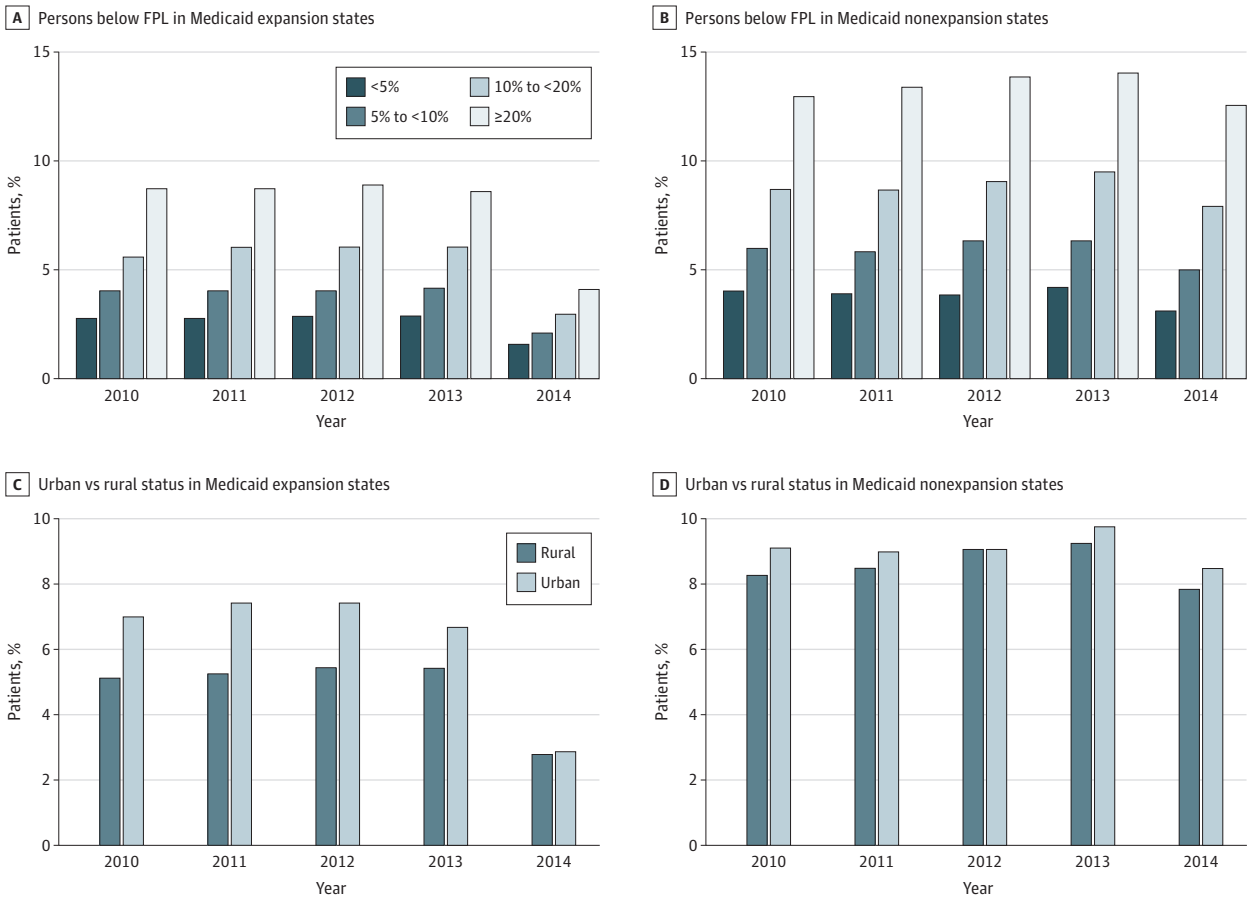
Figure. Percentages of Uninsured Patients by Sociodemographic Factors Among Patients With Newly Diagnosed Cancer in Medicaid Expansion and Nonexpansion States



FPL indicates federal poverty line.

shifts or increases in early-stage diagnoses in expansion states.[3,5] Taken together, these findings suggest improved access to screening services and symptom assessment in expansion states.

However, the changes in stage at diagnosis should be interpreted with caution and warrant future monitoring. There are several possible reasons for the small changes observed and null findings of other cancer types. First, power to detect differences might be small for specific cancer types because of the short period after implementation of the ACA. The DD estimates for most cancer types were positive although not statistically significant. Second, the influence of Medicaid expansion may be diluted by the large number of national and local programs that provide breast, cervical, and colorectal cancer screening for low-income, uninsured and underinsured populations, such as the Centers for Disease Control and Prevention's National Breast and Cervical Cancer Early Detection Program[21] and the Colorectal Cancer Control Program.[22] Third, the decrease in percentage of early-stage diagnoses of prostate cancer and cervical cancer may reflect the changes in screening guidelines, for which the recommendation of routine prostate-specific antigen testing was discontinued[23] and the recommended frequency of Papanicolaou tests was reduced.[24] However, the difference in early-stage diagnosis of liver cancer between expansion and nonexpansion states may reflect differences in surveillance for persons at high risk of the disease, those with cirrhosis, and those with chronic hepatitis B infection. Fourth, increases in insurance coverage may be necessary but not sufficient to guarantee improvements in access to care and quality of care. The type of health insurance coverage is also important. For example, a recent study[25] from California found that improvements in cancer survival from 1997 to 2014 were limited to patients with private or Medicare insurance but not public insurance at diagnosis. Patients with cancer may gain public insurance coverage at cancer diagnosis and then lose eligibility for insurance coverage after completion of initial treatment, with adverse effects on access to high-quality survivorship care. In addition to encouraging states to expand eligibility for Medicaid, the ACA also has provisions to improve care quality for Medicaid enrollees, such as providing funding to support medical homes, increasing primary care payment rates, and promoting preventive services and vaccinations.[26] It is important to monitor disparities in stage at diagnosis and other long-term

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Table 4. Changes in Percentage of Early-Stage Diagnoses Associated With Medicaid Expansion Among Patients Aged 18 to 64 Years With Newly Diagnosed Cancer

	Patients in Expansion States, ppt			Patients in Nonexpansion States, ppt			Model			
							Crude		Adjusted[a]	
Cancer Site	2010-2013	2014	Difference	2010-2013	2014	Difference	DD, ppt	*P* Value	DD, ppt	*P* Value
All cancer sites combined	39.0	39.9	0.8	37.0	37.4	0.4	0.4	.03	0.4	.02
Colon and rectum	25.1	25.8	0.6	23.0	23.3	0.4	0.3	.63	0.2	.67
Lung and bronchus	14.0	15.1	1.1	13.3	14.2	0.9	0.1	.73	0.1	.80
Female breast	44.7	45.6	0.9	44.5	44.8	0.4	0.5	.20	0.6	.14
Cervix uteri	49.2	48.6	−0.6	45.2	46.2	1.0	−1.6	.27	−2.0	.15
Prostate	25.2	23.0	−2.2	24.1	22.1	−2.0	−0.2	.72	0.1	.89
Thyroid	74.2	73.9	−0.2	75.8	75.4	−0.4	0.2	.77	0	.96
Melanoma of the skin	69.1	71.0	1.9	64.6	65.5	0.8	1.1	.14	0.7	.29
Corpus and uterus NOS	74.2	74.6	0.4	73.6	72.8	−0.8	1.2	.13	0.9	.24
Kidney and renal pelvis	59.6	60.1	0.6	60.6	61.8	1.2	−0.6	.48	−0.9	.32
Non-Hodgkin lymphoma	27.2	28.3	1.1	27.5	26.5	−1.0	2.0	.02	1.8	.03
Oral cavity and pharynx	15.8	15.3	−0.5	14.8	13.8	−1.0	0.5	.50	0.2	.75
Urinary bladder	75.2	75.3	0.1	74.2	73.6	−0.7	0.8	.43	0.8	.39
Pancreas	7.9	9.9	2.0	7.8	8.8	1.0	1.1	.12	1.5	.03
Liver and intrahepatic bile duct	31.9	30.8	−1.1	28.2	29.8	1.6	−2.7	.02	−2.7	.02
Ovary	31.1	31.1	0	30.3	29.1	−1.2	1.2	.36	0.8	.56
Stomach	16.6	17.6	1.0	18.8	18.5	−0.3	1.4	.26	1.4	.22
Testis	67.2	69.2	2.0	67.6	67.1	−0.5	2.4	.11	2.4	.11
Hodgkin lymphoma	14.8	14.0	−0.8	14.8	12.3	−2.5	1.7	.20	1.7	.16
Larynx	27.3	25.9	−1.4	25.5	25.8	0.3	−1.7	.32	−1.4	.42
Esophagus	12.1	11.4	−0.7	12.7	11.7	−1.0	0.3	.79	0.3	.83

Abbreviations: DD, difference in differences; NOS, not otherwise specified; ppt, percentage points.

[a] Models were adjusted for age, sex, race/ethnicity, census tract–level poverty, rurality, and state.

cancer outcomes between the expansion and nonexpansion states. Moreover, the recently approved and proposed Section 1115 waivers grant states more flexibility in Medicaid benefit design and requirements for working status and cost sharing[27]; thus, future studies that evaluate the changes and disparities in health outcomes within Medicaid expansion states will be of great interest.

Strengths and Limitations

A strength of our study is the use of population-based cancer registry data for nearly 2.5 million patients with newly diagnosed cancer from 40 states to examine changes in insurance coverage after implementation of the ACA by state. However, our study is limited by availability of only 1 year of post-ACA data, and we could not assess changes for late Medicaid expansion states, including Pennsylvania (January 1, 2015), Indiana (February 1, 2015), Alaska (September 1, 2015), Montana (January 1, 2016), Louisiana (July 1, 2016), Maine (to be determined), and Virginia (January 1, 2019).[28] Future studies with more recent data are warranted to monitor the changes in these states. Moreover, future studies are needed to examine the effects of the ACA on changes in care for cancer survivors, for whom we were not able to examine gains in insurance coverage or access to care using the incidence data from cancer registries.

Conclusions

We found large state variation in reductions in the percentage of uninsured patients among nonelderly patients with cancer after implementation of the ACA, with larger decreases in expansion vs nonexpansion states and in socioeconomically disadvantaged vs nondisadvantaged patients. Disparities in the percentage of uninsured patients by race/ethnicity, census tract–level poverty, and rurality were diminished or eliminated for patients in Medicaid expansion states but remained high in nonexpansion states, suggesting that Medicaid expansion may be an effective strategy in mitigating health disparities. Future studies that monitor the effect of Medicaid expansion on cancer outcomes and health disparities are warranted.

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