

# Medicaid Expansion, Uninsurance Rates, and Catastrophic Costs at the Time of Emergency Gynecologic Surgery

Kristen Carrillo-Kappus, MD, MPH, Benjamin Albright, MD, MS, Shakthi Unnithan, MS, Alaattin Erkanli, PhD, and Haley Moss, MD, MBA

**OBJECTIVE:** To estimate the effect of Medicaid expansion on uninsurance rates and catastrophic charges from emergency surgical management of ectopic pregnancy and ovarian torsion using difference-in-difference analysis and to evaluate for racial and ethnic disparities.

**METHODS:** We conducted a retrospective cohort analysis using 2012–2018 State Inpatient Data and State Ambulatory Surgery and Services Databases in four states: Kentucky and Maryland (expansion) and Florida

and North Carolina (nonexpansion). Patients undergoing surgical management of ovarian torsion or ectopic pregnancy were included. Logistic regression models were used controlling for year and expansion type; a difference-in-difference treatment indicator was used to evaluate changes in uninsurance rates and catastrophic spending (hospital charges more than 10% of estimated annual median income) among those uninsured. We then examined race and ethnicity for those uninsured before and after expansion by state.

**RESULTS:** A total of 594,116 patients were included. Before expansion, the percent of patients uninsured was higher in nonexpansion states (6.5%) compared with expansion states (5.1%). After expansion, the percent uninsured decreased from 5.1% to 2.4% in expansion states compared with 6.5% to 5.3% in nonexpansion states. The interaction between expansion year and Medicaid expansion status was significant ( $P < .001$ ). Pre-expansion percent catastrophic charges among uninsured patients were higher in nonexpansion states compared with expansion states (96.7% vs 85.7%). After expansion, the percent catastrophic financial burden remained higher at 96.9% in nonexpansion states compared with 82.5% in expansion states. The interaction between expansion year and Medicaid expansion status was significant ( $P < .001$ ). The uninsured gap between Black or African American and White patients in expansion states after expansion was 0.5%—relatively unchanged—compared with 11.6% for Hispanic and non-Hispanic patients, an increase from 8.3% before expansion.

**CONCLUSION:** Medicaid expansion was associated with reductions in uninsured hospitalizations and catastrophic charges after gynecologic surgical emergencies and was associated with differences between Hispanic and non-Hispanic patients.

(Obstet Gynecol 2025;145:377–85)

DOI: 10.1097/AOG.0000000000005852

From the Women's Health Center, Isabella Citizens for Health, Inc, Mt. Pleasant, Michigan; and the Department of Obstetrics and Gynecology, University of North Carolina at Chapel Hill, Chapel Hill, and the Department of Biostatistics and Bioinformatics and the Department of Obstetrics and Gynecology, Duke University Medical Center, Durham, North Carolina.

Funding provided by the Charles B. Hammond Research Fund, Duke University School of Medicine, Durham, North Carolina. Statistical analysis and support provided by the Duke BERD (Biostatistics, Epidemiology, Research Design) Methods Core. Duke BERD Method Core support was made possible in part by CTSA Grant (UL1TR002553) from the National Center for Advancing Translational Sciences (NCATS) of the NIH and the NIH Roadmap for Medical Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NCATS or NIH. Sponsors had no financial involvement in this project.

Presented at the NC Obstetrical & Gynecologic Society Annual Meeting, March 8–10, 2024, Charlotte, North Carolina.

Each author has confirmed compliance with the journal's requirements for authorship.

Corresponding author: Kristen Carrillo-Kappus, MD, MPH, Women's Health Center of Isabella Citizens for Health, Inc, Mt. Pleasant, MI; kc.kappus@gmail.com.

## Financial Disclosure

Kristen Carrillo-Kappus reports receiving honorarium from the NC Obstetrical & Gynecologic Society in 2024. The other authors did not report any potential conflicts of interest.

Copyright © 2025 The Author(s). Published by Wolters Kluwer Health, Inc. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

ISSN: 0029-7844/25

The Patient Protection and Affordable Care Act, enacted in 2010, was intended to transform the U.S. health care system.<sup>1</sup> Medicaid expansion, a key policy reform, was meant to increase eligibility to those with income up to 138% of the federal poverty level.<sup>2</sup> For the gynecology patient population, this meant that nonpregnant women earning less than 138% of the federal poverty level could now qualify for Medicaid coverage outside of the pregnancy and postpartum periods that previously entitled them to Medicaid and would extend to gynecologic emergency care.<sup>3</sup> However, Medicaid expansion was made an optional program for states after a Supreme Court ruling in 2012.<sup>4</sup> The patchwork uptake created a natural experiment to study the effects of the policy on gynecologic patients undergoing emergency surgery.

For expansion states, studies have demonstrated increased utilization of preventive services such as cervical and breast cancer screenings and decreased uninsured medical hospitalizations.<sup>5–7</sup> Chiu et al<sup>8</sup> reported nearly \$3 million in averted costs from emergency general surgery, and some authors of this study contributed to prior work that estimated that nonexpansion states could have prevented more than 50,000 incidences of catastrophic financial charges to patients undergoing emergency surgeries.<sup>9</sup> The most common reasons for emergency gynecologic surgery are ectopic pregnancy and ovarian torsion,<sup>10</sup> and these patients tend to be younger and at higher risk of uninsurance and encountering catastrophic charges.<sup>11,12</sup>

The objectives of this study were to estimate the effect of Medicaid expansion on uninsured hospitalizations related to emergency surgical management of ectopic pregnancy and ovarian torsion, to assess changes in catastrophic charges, and to examine the rates of uninsurance by race and ethnicity. Using difference-in-difference analysis, a quasi-experimental study design, we compared the risk of uninsurance at the time of surgery and associated catastrophic charges among patients of reproductive age undergoing emergency gynecologic surgery in Medicaid expansion and nonexpansion states. We then examined uninsured hospitalizations in both nonexpansion and expansion states by race and ethnicity to assess for outcome disparities, including potential effects of Medicaid expansion.

## METHODS

We combined two data sources to perform a single retrospective cohort analysis using state inpatient and ambulatory data. The State Inpatient Database and data from the State Ambulatory Surgery and Services Database from 2012 to 2016 were accessible from

previous research. The State Inpatient Database and State Ambulatory Surgery and Services Databases represents a nearly 100% sample of surgery performed in a state in a given year. Approval to conduct this study using 2012–2018 data was granted by Healthcare Cost and Utilization Project, a comprehensive source of hospital care data sponsored by the Agency for Healthcare Research and Quality, before any analysis.

State Inpatient Database files included discharge records from state community hospitals and captured hospital inpatient stays with the ability to query for emergency encounters, diagnosis codes, procedure codes, and expected payer status. The Agency for Healthcare Research and Quality provided all State Inpatient Database files in a uniform format to facilitate multistate comparisons and analyses. State Ambulatory Surgery and Services Databases files included encounter-level data for procedures billed as ambulatory with associated diagnosis codes and expected payer status. In addition, the State Inpatient Database and State Ambulatory Surgery and Services Databases files included supplemental data with patient ZIP code, descriptive data elements, and charge data, adding to specificity and utility in examining patient outcomes as they related to race, ethnicity, and income. Median household income was extracted from the Census Bureau's American Community Survey.

State Inpatient Database and State Ambulatory Surgery and Services Databases data from North Carolina and Florida (nonexpansion) and Maryland and Kentucky (expansion) were analyzed. Maryland and Kentucky were selected because of early implementation of Medicaid expansion starting January 1, 2014, accessibility of data from a prior study, and uninsurance rates below the national average at the time of implementation, yet still opting to implement expansion efforts. North Carolina and Florida were selected given lack of adoption of Medicaid expansion<sup>13</sup> at the time of the origination of this study, accessibility from a prior study, and similar rates of uninsurance and population between 100% and 200% of the federal poverty level.<sup>14</sup> All states were generally located in a similar region (Midwest and South), avoiding coastal comparisons and major income variations.

To capture all patients who were eligible for Medicaid insurance and at risk of uninsurance without Medicaid expansion, we identified female patients between age 18 and 64 years with International Classification of Diseases, Ninth Revision (ICD-9) or Tenth Revision (ICD-10) codes for two acute

gynecologic conditions, ectopic pregnancy or ovarian torsion, in the State Inpatient Database. ICD-9 and ICD-10 procedure codes including operations of the ovary or the fallopian tube and specifically ectopic removal by any means were selected. Current Procedural Terminology (CPT) codes in the State Ambulatory Surgery and Services Databases were surgical procedures related to management of ectopic pregnancy and ovarian torsion such as ovarian cystectomy, oophorectomy, and salpingectomy. The ICD-9 and ICD-10 codes used for the State Inpatient Database and the CPT codes used for the State Ambulatory Surgery and Services Databases are provided in Appendices 1–5, available online at <http://links.lww.com/AOG/E12>.

Variables of interest included patient age, race, ethnicity, admission through the emergency department, expected payer status, and hospital charges from the State Inpatient Database and State Ambulatory Surgery and Services Databases. Those with missing information or classified as having other insurance (ie, TRICARE) were excluded.

The approach used in this study is based on prior work by Albright et al<sup>9</sup> that evaluated uninsured surgical discharges using similar methodology. Our primary outcome for the study was uninsurance at the time of surgery for ectopic pregnancy or torsion (dichotomous outcome vs Medicaid insurance or private insurance coverage). The secondary outcome was estimating risk of *catastrophic charges*. Given that no data were available on patients' specific incomes, we defined this outcome as the presence of uninsurance with reported hospital charges that were more than 10% of the median income of ZIP code of patients' residence.

To describe the population undergoing emergency gynecologic surgery in the four states, we compared demographic characteristics of patients with Medicaid coverage, primary coverage, and self-pay or no coverage using routine descriptive statistics. Continuous variables were summarized with mean (SD), median (interquartile range), and range (minimum, maximum).

We then assessed for Medicaid expansion effect on our primary (uninsurance) and secondary (catastrophic charges) outcomes. This was done by creating a quasi-experimental difference-in-difference framework. Difference-in-difference analysis attempts to isolate the effect of a policy by assessing the difference between the pre-expansion to postexpansion difference in expansion and nonexpansion states. This can be done with raw subtraction of proportions of patients with uninsurance or exposure to catastrophic

expenditures, as well as more formally with statistical adjustment using a logistic regression model with controls for time (before and after expansion) and state (expansion vs nonexpansion state), as well as an interaction term that is 1 for postexpansion in an expansion state and 0 for all other cases, as done in this study. Difference-in-difference analysis depends on satisfying the assumption of parallel trends, meaning that in absence of policy change, expansion and nonexpansion states would have been reasonably expected to have similar trends, which is generally extrapolated by observing and comparing the trends in the pre-expansion period. We assessed this assumption by plotting the coefficients of interaction terms between expansion status and individual years relative to expansion (nonexpansion state=0, expansion state=1).

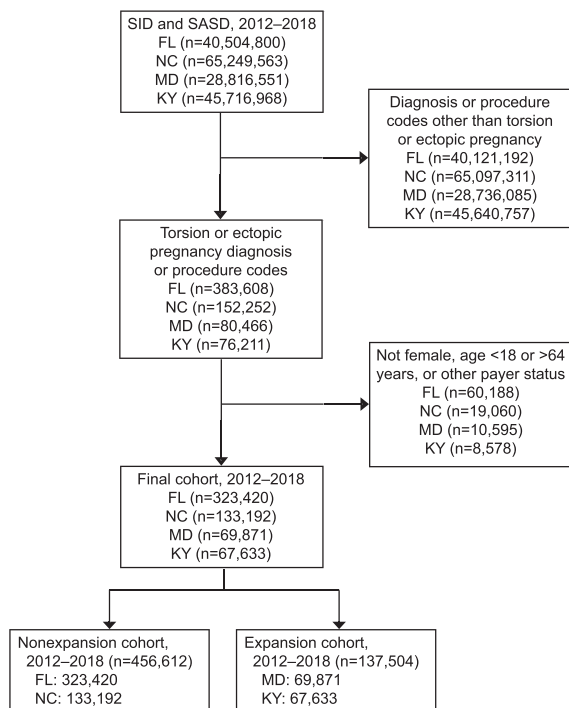
Because of mixed reports on the effect of expansion on race and ethnicity coverage disparities, we evaluated our study population for trends. For race and ethnicity data, categorical variables were summarized with frequency (percentages). We assessed for racial and ethnic associations by comparing proportions of uninsurance and catastrophic charges by patient race (White, Black, other or multiracial) and ethnicity (Hispanic vs non-Hispanic). We compared the differences before and after expansion and in expansion and nonexpansion states.

All analyses were conducted with SAS 9.4 at the .05 two-tailed level of significance. This study was determined to be nonhuman subject research and was deemed exempt from review by the Duke University Health System IRB for Clinical Investigations (IRB No. Pro00106652).

## RESULTS

A total of 594,116 patients were identified who underwent surgery for ectopic pregnancy or ovarian torsion in Kentucky, Maryland, Florida, and North Carolina from 2012 to 2018. We captured 23.1% (137,504) from the two expansion states and 76.9% (456,612) from the two nonexpansion states, as shown in the flow diagram (Fig. 1).

Patient demographic and clinical characteristics by payer status for 2012–2018 for both expansion and nonexpansion states are provided in Table 1. Patients with private insurance were more likely to be White, representing 69.0%. Hispanic patients were disproportionately represented among the uninsured (32.5%) population and the population with Medicaid insurance (23.4%) compared with the population with private insurance, representing 13.6%. In an examination of Medicaid coverage, 26.5% patients were Black or



**Fig. 1.** Flow diagram of cohort study identification. Based on data from State Inpatient Data (SID) and State Ambulatory Surgery and Services Databases (SASD) 2012–2018 from Florida (FL), Kentucky (KY), Maryland (MD), and North Carolina (NC). Includes female patients aged 18–64 years with International Classification of Diseases, Ninth or Tenth Revision codes for ectopic pregnancy or ovarian torsion and subsequent operations of the ovary or the fallopian tube and specifically ectopic removal by any means were identified by Current Procedural Terminology codes.

Carrillo-Kappus. Medicaid Expansion, Uninsurance Rates, and Costs. *Obstet Gynecol* 2025.

African American compared with 23.7% of those who were uninsured and 20.1% of those with private insurance. Uninsured patients were more likely to be admitted through the emergency department (26.1%) compared with those with private insurance (6.6%) and those with Medicaid insurance (12.3%). A larger portion of uninsured patients were admitted over weekends (11.2%) compared with patients with Medicaid insurance (9.4%) and those with private insurance (4.4%). Appendix 6, available online at <http://links.lww.com/AOG/E12>, provides patient demographic and clinical information stratified by expansion states compared with nonexpansion states.

First, we assessed the raw difference-in-difference risk of uninsurance, finding a greater decrease in the risk of uninsurance in the postexpansion compared with pre-expansion time in expansion states (−3.0%) and nonexpansion states (−1.0%). We calculated the

estimated probabilities from the interaction between expansion year (before vs after) and expansion state type (nonexpansion vs expansion), reported as percents. Before expansion, the percent uninsured was 6.5% in nonexpansion states and 5.1% in expansion states. After expansion, the percent uninsured remained higher in nonexpansion states compared with expansion states (5.2% vs 2.4%, respectively). These results are shown in Figure 2. To test the parallel trends assumption, the unadjusted logistic regression model with only the pre-Medicaid expansion policy years (2012–2013) was fitted. The trends between the two groups were roughly similar. The interaction between year and Medicaid expansion state status after 2013 was significant ( $P<.001$ ).

As shown in Appendices 7 and 8, available online at <http://links.lww.com/AOG/E12>, the simple pre-post differences of estimated proportions by type of states using raw frequencies and the difference of these differences as a difference-in-difference estimate (under the assumption of normality and statistical independence of proportions) parallel the results obtained with logistic regression models adjusted for expansion year, type of state, and their interaction ( $P<.001$ ).

Median visit charge among uninsured patients was \$26,148, and this group had a median household income of \$45,020. When evaluating charges to uninsured patients, we found that 86.8% of charges (24,726/28,490) exceeded the 10% income threshold, as shown by the red dashed line in Figure 3. Charges below the line are considered catastrophic. For torsion, we found that 97.3% of charges (3,973/4,085) exceeded the 10% threshold and for ectopic pregnancies, 57.2% (3,050/5,329) exceeded the 10% threshold. Appendices 9 and 10, available online at <http://links.lww.com/AOG/E12>, illustrate the charges for uninsured patients for nonexpansion and expansion states, respectively.

We calculated the estimated probabilities from the interaction between expansion year (before vs after) and expansion state type (nonexpansion vs expansion). Before expansion, the percent catastrophic financial burden was 96.7% of all charges for uninsured patients in nonexpansion states compared with 85.7% in expansion states. After expansion, the percent catastrophic financial burden remained higher in nonexpansion states compared with expansion states, 96.9% and 82.5%, respectively. The difference-in-difference model demonstrated the slightly increased probability of catastrophic financial burden in nonexpansion states and 3.4% drop in expansion states. The interaction between year and Medicaid expansion state status



**Table 1. Demographic and Clinical Characteristic of Patients Diagnosed With Ectopic Pregnancy or Ovarian Torsion by Payer Status, 2012–2018\***

Characteristic	Medicaid (n=208,400)	Private Insurance (n=355,410)	Uninsured, Self-Pay (n=30,306)
Age (y)			
18–34	141,489 (67.9)	109,858 (30.9)	13,049 (43.1)
35–54	63,259 (30.4)	210,767 (59.3)	14,850 (49.0)
55–64	3,652 (1.8)	34,785 (9.8)	2,407 (7.9)
Race			
American Indian or Alaska Native	1,616 (0.8)	1,574 (0.4)	168 (0.6)
Asian	1,885 (0.9)	7,714 (2.2)	504 (1.7)
Black or African American	55,273 (26.5)	71,412 (20.1)	7,195 (23.7)
Multiple races	123 (0.1)	225 (0.1)	47 (0.2)
Native Hawaiian, Pacific Islander	257 (0.1)	409 (0.1)	68 (0.2)
None of the above	22,129 (10.6)	23,028 (6.5)	5,205 (17.2)
Decline to answer, unknown, missing	3,892 (1.9)	5,985 (1.7)	752 (2.5)
White	123,225 (59.2)	245,063 (69.0)	16,367 (54.0)
Ethnicity			
Hispanic or Latina	48,692 (23.4)	48,387 (13.6)	9,862 (32.5)
Non-Hispanic or Latina	155,342 (74.5)	295,818 (83.2)	19,608 (64.7)
Declined to answer	45 (0.0)	141 (0.0)	6 (0.0)
Unknown	4,321 (2.1)	11,064 (3.1)	830 (2.7)
Weekend admission			
No	188,722 (90.6)	339,718 (95.6)	26,911 (88.8)
Yes	19,678 (9.4)	15,692 (4.4)	3,395 (11.2)
Admitted through ED			
No	182,817 (87.7)	332,012 (93.4)	22,385 (73.9)
Yes	25,583 (12.3)	23,398 (6.6)	7,921 (26.1)
Length of stay (d)			
Mean±SD	2.2±3.3	1.7±2.6	2.2±3.6
Median	2.0	1.0	2.0
Quartile 1, 3	0.0, 3.0	0.0, 2.0	0.0, 3.0
Range	0.0–347.0	0.0–134.0	0.0–270.0

ED, emergency department.

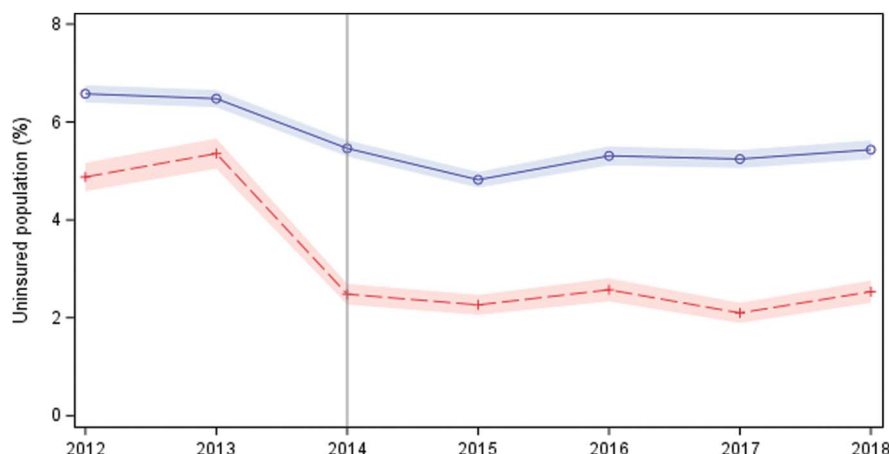
Data are n (%) unless otherwise specified.

\* From the State Inpatient Database and State Ambulatory Surgery and Services Databases for Kentucky, Maryland, Florida, and North Carolina. Patient demographic and clinical characteristics by payer status for 2012–2018 for Kentucky, Maryland, North Carolina, and Florida are provided.

was significant ( $P<.001$ ). Appendices 11 and 12, available online at <http://links.lww.com/AOG/E12>, provide the results of using raw (unadjusted) proportions to calculate the difference-in-difference estimate, also showing a significant difference between state types and expansion periods for catastrophic financial burden ( $P<.001$ ). Figure 4 displays the rates of uninsured patients by state from 2012 to 2018 according to the raw data from the State Inpatient Database and State Ambulatory Surgery and Services Databases. The study population was based on the inclusion and exclusion criteria as described previously. All states show reductions in overall uninsurance rates before and after implementation of expansion, although a larger decrease was seen in the uninsurance rates for expansion states, most notably between 2013 and 2014.

Table 2 provides the counts and percentages for the number of uninsured status hospitalizations before and after expansion policy for nonexpansion and expansion states by race and ethnicity. A larger proportion of Black or African American patients, 7.1%, were uninsured in the nonexpansion states before expansion compared with 5.5% after expansion. For expansion states, there was a larger 3.1% drop in the uninsured rate for Black or African American patients after expansion. When examining their White counterparts in nonexpansion states, we found a 1.3% drop in uninsured White patients compared with a 2.9% drop in expansion states. The uninsured gap between Black or African American and White patients in expansion states after expansion was 0.5%.

For Hispanic or Latina patients, 9.7% were uninsured in the nonexpansion states before



**Fig. 2.** Rates of uninsured patients in expansion vs nonexpansion states, 2012–2018. Rates of uninsured patients from 2012 to 2018 for patients aged 18–64 years with discharge diagnosis of torsion or ectopic pregnancies. Non-expansion states are represented by a blue solid line; expansion states are represented by a red dashed line; and the two lines diverge; the bands surrounding the lines are the 95% CIs. To test the parallel trends assumption, the unadjusted logistic regression model with only the pre-Medicaid expansion policy years (2012–2013) was fitted. The trends between the two groups were

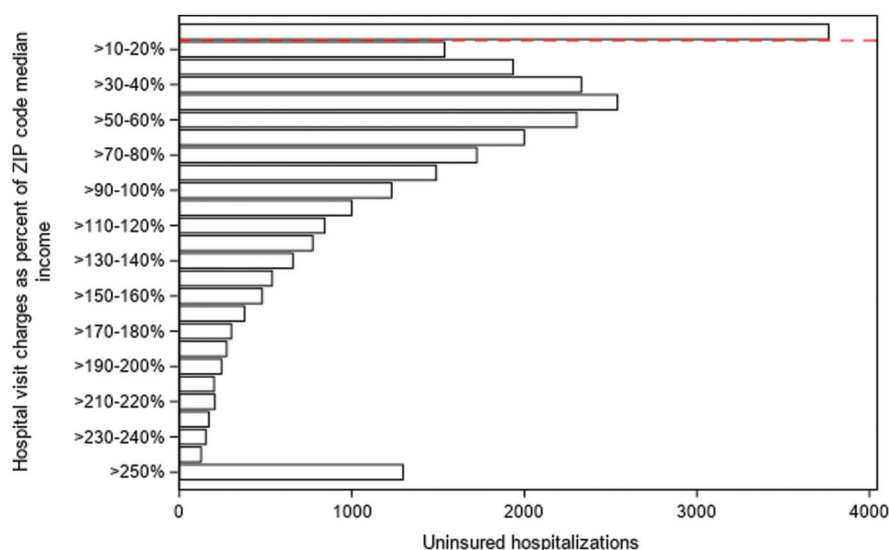
roughly similar. The interaction between year and Medicaid expansion state status after 2013 was significant ( $P < .001$ ). Uninsured patients include those categorized as self-pay or no charge. Based on data from the State Inpatient Data and State Ambulatory Surgery and Services Databases, 2012–2018, from Florida, Kentucky, Maryland, and North Carolina.

Carrillo-Kappus. Medicaid Expansion, Uninsurance Rates, and Costs. *Obstet Gynecol* 2025.

expansion compared with 8.4% after expansion. For expansion states, 12.8% were uninsured before expansion compared with 13.1% after expansion, with an increase in uninsured hospitalizations noted. When examining their non-Hispanic and Latina counterparts in expansion states, we found a decrease in percent uninsured from 4.5% before expansion to 1.5% after expansion. The uninsured gap between Hispanic and non-Hispanic patients after expansion was 11.6%, which was an increase from 8.3% before expansion.

## DISCUSSION

In this study, we used patient-level data to demonstrate that expansion states had significant reductions in uninsurance rates and catastrophic costs for two common gynecologic surgical emergencies, ectopic pregnancy and ovarian torsion. We also saw a reduction in the uninsured gap between Black and African American female patients and their White counterparts after expansion. The opposite was true for Hispanic non-White female patients in our study

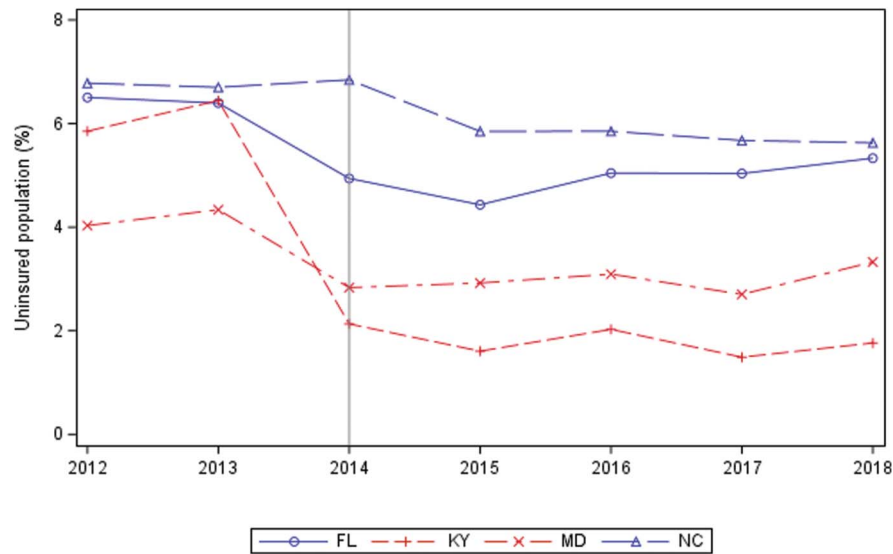


**Fig. 3.** Ratio of visit charges to annual ZIP code median household income for uninsured patients in four states, 2012–2018. *Catastrophic financial burden* is defined as visit charges in excess of 10% of annual income (estimated as ZIP code median household income). A total of 86.8% of charges (24,726/28,490) exceeded the 10% income threshold.

Carrillo-Kappus. Medicaid Expansion, Uninsurance Rates, and Costs. *Obstet Gynecol* 2025.

**Fig. 4.** Rate of uninsured patients in Florida (FL), Kentucky (KY), Maryland (MD), and North Carolina (NC) from 2012 to 2018. Based on hospitalizations for torsion or ectopic pregnancies for patient aged 18–64 years from the State Inpatient Data and State Ambulatory Surgery and Services Databases 2012–2018 in expansion states (denoted in red) and nonexpansion states (denoted in blue). Uninsured patients categorized as self-pay or no charge.

Carrillo-Kappus. *Medicaid Expansion, Uninsurance Rates, and Costs. Obstet Gynecol* 2025.



population, who experienced an increase in uninsurance rates after expansion.

Consistent with inpatient admission and surgical outcomes data outside of this population,<sup>15,16</sup> our experimental analysis demonstrated that Medicaid expansion reduces the probability of young, reproductive-aged women being uninsured at the time of emergency gynecologic surgery. Without adoption of Medicaid expansion, these patients would likely not have had coverage outside of pregnancy and the postpartum period. Even so, Medicaid expansion remains an area of ongoing controversy for the remaining non-expansion states. A 2019 Kaiser survey found that 61% of the surveyed population in nonexpansion states favored expansion to low-income uninsured people.<sup>17</sup> Meaningful predictive studies such as this one can inform women’s reproductive health policy in support of expansion.

An examination of costs indicated that patients with Medicaid insurance use emergency services more

frequently than patients with private insurance,<sup>18</sup> which is demonstrated in our findings in Table 1. In expansion states, Medicaid coverage was shown to decrease emergency department visits<sup>19</sup> and uncompensated hospital care.<sup>20</sup> Our findings demonstrate that these gains also may extend to patients undergoing emergency gynecologic surgery. Although patients with private insurance and those with Medicaid insurance experienced catastrophic charges like their uninsured counterparts, we focused our analysis on the uninsured given the longstanding burden that catastrophic charges have on their financial and personal future, often leading to bankruptcy. Medicaid expansion led to a 3.4% drop in catastrophic charges for patients diagnosed with either ectopic pregnancy (accounting for 57.2%) or ovarian torsion (accounting for 97.3%). Reduction in catastrophic charges for these gynecologic emergencies is critical given the rise in emergency services for ovarian torsion, now estimated at \$20,000 a visit compared with \$5,000 in previous decades.<sup>21</sup>

**Table 2.** Uninsured Status by Race and Ethnicity Before and After Medicaid Expansion Policy\*

Race and Ethnicity	Before Expansion (2012–2013)		After Expansion (2014–2018)	
	Nonexpansion States	Expansion States	Nonexpansion States	Expansion States
Black or African American	2,394 (7.1)	481 (5.1)	3,909 (5.5)	411 (2.0)
Other	1,707 (9.5)	305 (9.3)	3,294 (9.0)	686 (9.5)
White	5,581 (5.74)	1,337 (4.7)	8,450 (4.4)	999 (1.5)
Hispanic or Latina	2,973 (9.7)	343 (12.8)	5,628 (8.4)	918 (13.1)
Non-Hispanic or Latina	6,617 (5.7)	1,665 (4.5)	10,014 (4.3)	1,312 (1.5)

Data are n (% uninsured).

\* Representative of Kentucky, Maryland, North Carolina, and Florida, 2012–2018.

Furthermore, the prevalence of ectopic pregnancies is predicted to rise because of reduced access to reliable contraception, safe management of early pregnancies, and fragmented gynecologic care for women of reproductive age after the *Dobbs v. Jackson Women's Health Organization* decision.<sup>22–24</sup>

When examining trends in race and ethnicity, a 2020 report from the Center on Budget and Policy Priorities noted that expansion states with large proportions of low-income and historically underserved communities had seen the greatest narrowing in coverage gaps.<sup>25</sup> This was true of the trends observed in the Black and African American patients in our study but not Hispanic or Latina, non-White patients. This may be attributable to the link of Medicaid expansion to eligibility criteria, including being a citizen of the United States or certain qualified noncitizen such as a lawful permanent resident.<sup>26</sup> The Commonwealth Fund reported a 9.4% reduction in the coverage gap for Hispanic patients compared with their White non-Hispanic counterparts when 30 expansion states and 19 non-expansion states were studied.<sup>27</sup> Kaiser, however, reported that Hispanic individuals had the largest portion of ineligibility for Medicaid coverage through the Patient Protection and Affordable Care Act (because of immigration status) and were, in fact, negatively affected the most by coverage reversals that resulted in the highest uninsurance rates from 2018 to 2022.<sup>28</sup> Our data are representative of these mixed reports. We suspect that policies that expedite the path to citizenship and expand temporary access to emergency Medicaid coverage may need to be prioritized along with Medicaid expansion to maximize reach to Hispanic and Latina patients.<sup>29</sup>

Our analysis has limitations inherent to and common in the use of administrative databases. Aside from the accuracy of coding for specific diagnoses and procedures, the classification of surgery for ectopic pregnancy and ovarian torsion was based on ICD-9-Clinical Modification, ICD-10-Clinical Modification, and CPT coding, rendering procedural misclassification possible. Furthermore, as is the case when diagnoses and procedure codes are used, given that data were collected without the intent to answer our specific questions at the time of collection, there may be misclassified data, missing data, and unmeasured confounders such as the effects of Marketplace exchanges and dependent coverage until age 26 years that bias our results. Because of a lack of dependency status in our available data, we cannot isolate and select for patients

younger than age 26 years with coverage provided by their guardian, excluding a subset of the population for this particular study. We also recognize that our study includes only 2 years of preimplementation data and four states, limiting generalizability. The retrospective design of any study always allows for potential unobserved confounders that have biased our results, although given satisfaction of the parallel trends assumption, our quasi-experimental model offers unbiased estimates.

Future studies should include an examination of postoperative outcomes after emergency gynecologic surgery in expansion states and estimation of costs associated with negative outcomes to hospitals and the state. A pre-expansion study revealed that patients undergoing general surgery with government-sponsored insurance had worse outcomes, including major postoperative complications.<sup>30</sup> It was hypothesized that worse outcomes were the result of underlying social determinants contributing to disparities in health and were not resolved by a single policy alone. This study serves as a starting point providing evidence to support policies that expand insurance coverage to gynecologic patients and suggests that Medicaid expansion alone does not adequately reach the Hispanic and Latina gynecologic patients in the same way. As mentioned, additional studies can examine the outcomes for 18- to 26-year-old patients with dependency status that provides reliable health insurance coverage compared with uninsured 18- to 26-year-old patients who qualify for or would qualify for Medicaid expansion.

Our study improves existing literature by highlighting the importance of Medicaid expansion to reduce uninsurance rates and costs and possibly help narrow some racial gaps among reproductive-aged women. At the start of this study, 39 states, including the District of Columbia, had expanded Medicaid, with North Carolina adopting Medicaid expansion while this study was underway. As the debate continues, our findings support ongoing efforts to expand coverage and pass legislation such as Medicaid expansion to positively affect the lives of vulnerable gynecologic patients.

## REFERENCES

1. H.R. 3590. H.R.3590–111th Congress (2009-2010): Patient Protection and Affordable Care Act. Accessed December 28, 2022. <http://congress.gov/>
2. Blumenthal D, Collins SR. Health care coverage under the Affordable Care Act—a progress report. *N Engl J Med* 2014; 371:275–81. doi: 10.1056/NEJMhpr1405667
3. Bullinger LR, Simon K, Edmonds BT. Coverage effects of the ACA's Medicaid expansion on adult reproductive-aged



- women, postpartum mothers, and mothers with older children. *Matern Child Health J* 2022;26:1104–14. doi: 10.1007/s10995-022-03384-8
4. Justia Law. National Federation of Independent Business v. Sebelius, 567 U.S. 519. 2012. Accessed December 31, 2022. <https://supreme.justia.com/cases/federal/us/567/519/>
  5. Courtemanche C, Marton J, Ukert B, Yelowitz A, Zapata D. Early impacts of the Affordable Care Act on health insurance coverage in Medicaid expansion and non-expansion states. *J Policy Anal Manag* 2017;36:178–210. doi: 10.1002/pam.21961
  6. Dranove D, Garthwaite C, Ody C. The impact of the ACA's Medicaid expansion on hospitals' uncompensated care burden and the potential effects of repeal. Accessed January 2, 2023. <https://commonwealthfund.org/publications/issue-briefs/2017/may/impact-acas-medicaid-expansion-hospitals-uncompensated-care>
  7. Lee G, Dee EC, Orav EJ, Kim DW, Nguyen PL, Wright AA, et al. Association of Medicaid expansion and insurance status, cancer stage, treatment and mortality among patients with cervical cancer. *Cancer Rep (Hoboken)* 2021;4:e1407. doi: 10.1002/cnr2.1407
  8. Chiu AS, Jean RA, Ross JS, Pei KY. The early impact of Medicaid expansion on uninsured patients undergoing emergency general surgery. *J Surg Res* 2018;232:217–26. doi: 10.1016/j.jss.2018.06.037
  9. Albright BB, Chino F, Chino JP, Havrilesky LJ, Aviki EM, Moss HA. Medicaid expansion reduced uninsured surgical hospitalizations and associated catastrophic financial burden. *Health Aff (Millwood)* 2021;40:1294–303. doi: 10.1377/hlthaff.2020.02496
  10. Acharya I, Thapa S. Surgical emergencies among gynecological surgeries in a tertiary care center: a descriptive cross-sectional study. *JNMA J Nepal Med Assoc* 2020;58:1052–5. doi: 10.31729/jnma.5888
  11. Mann LM, Kreisel K, Llata E, Hong J, Torrone EA. Trends in ectopic pregnancy diagnoses in United States emergency departments, 2006–2013. *Matern Child Health J* 2020;24:213–21. doi: 10.1007/s10995-019-02842-0
  12. Glied SA, Zhu B. Catastrophic out-of-pocket health care costs: a problem mainly for middle-income Americans with employer coverage. *Commonwealth Fund* 2020 Apr. doi: 10.26099/x0cx-cp48
  13. House Bill 76/SL 2023-7 (2023-2024 Session)–North Carolina General Assembly. Accessed April 12, 2023. <https://ncleg.gov/BillLookup/2023/H76>
  14. KFF. Health insurance coverage of women 19-64. Accessed April 9, 2023. <https://kff.org/other/state-indicator/health-insurance-coverage-of-nonelderly-adult-women/>
  15. Loehrer AP, Chang DC, Scott JW, Hutter MM, Patel VI, Lee JE, et al. Association of the Affordable Care Act Medicaid expansion with access to and quality of care for surgical conditions. *JAMA Surg* 2018;153:e175568. doi: 10.1001/jamasurg.2017.5568
  16. Crocker AB, Zeymo A, Chan K, Xiao D, Johnson LB, Shara N, et al. The Affordable Care Act's Medicaid expansion and utilization of discretionary vs. non-discretionary inpatient surgery. *Surgery* 2018;164:1156–61. doi: 10.1016/j.surg.2018.05.007
  17. KFF. KFF health tracking poll: data note: 5 charts about public opinion on Medicaid. Accessed January 28, 2023. <https://kff.org/medicaid/poll-finding/data-note-5-charts-about-public-opinion-on-medicaid/>
  18. States strive to keep Medicaid patients out of the emergency department. Accessed April 15, 2023. <http://bit.ly/1FI9BUZ>
  19. Giannouchos TV, Ukert B, Andrews C. Association of Medicaid expansion with emergency department visits by medical urgency. *JAMA Netw Open* 2022;5:e2216913. doi: 10.1001/jamanetworkopen.2022.16913
  20. Dranove D, Garthwaite C, Ody C. Uncompensated care decreased at hospitals in Medicaid expansion states but not at hospitals in nonexpansion states. *Health Aff (Millwood)* 2016; 35:1471–9. doi: 10.1377/hlthaff.2015.1344
  21. Miranian D, Schwartz A, Jiang C, Kue Ndukwe J, Caldwell M, Lim C, et al. Emergency department utilization for adnexal torsion: an analysis of the nationwide emergency department sample from 2006 to 2018. *J Minim Invasive Gynecol* 2022;29: 1068–74. doi: 10.1016/j.jmig.2022.05.015
  22. Ranji U, Salganicoff A, Sobel L. *Dobbs*-era abortion bans and restrictions: early insights about implications for pregnancy loss. Accessed June 25, 2024. <https://kff.org/womens-health-policy/issue-brief/dobbs-era-abortion-bans-and-restrictions-early-insights-about-implications-for-pregnancy-loss/>
  23. Chernoby K, Acunto B. Pregnancy complications after *Dobbs*: the role of EMTALA. *West J Emerg Med* 2024;25:79–85. doi: 10.5811/westjem.61457
  24. Declerq E, Barnard-Mayers R, Zephyrin LC, Johnson K. The U.S. maternal health divide: the limited maternal health services and worse outcomes of states proposing new abortion restrictions. *Commonwealth Fund* 2022 Dec. doi: 10.26099/z7dz-8211
  25. Center on Budget and Policy Priorities. Medicaid expansion has helped narrow racial disparities in health coverage and access to care. Accessed April 15, 2023. <https://cbpp.org/research/health/medicaid-expansion-has-helped-narrow-racial-disparities-in-health-coverage-and>
  26. Medicaid.gov. Medicaid eligibility. Accessed March 30, 2024. <https://medicaid.gov/medicaid/eligibility/index.html>
  27. Baumgartner JC, Collins SR, Radley DC, Hayes SL. How the Affordable Care Act has narrowed racial and ethnic disparities in access to health care. *Commonwealth Fund* 2020 Jan. doi: 10.26099/kx4k-y932
  28. Hill L, Artiga S, Published AD. Health coverage by race and ethnicity, 2010-2022. KFF. 2024. Accessed March 30, 2024. <https://kff.org/racial-equity-and-health-policy/issue-brief/health-coverage-by-race-and-ethnicity/>
  29. North Carolina Justice Center. Immigrant access to health care & benefits in time of emergency. Accessed March 30, 2024. <https://ncjustice.org/publications/immigrant-access-to-health-care-benefits-in-time-of-emergency/>
  30. Schwartz DA, Hui X, Schneider EB, et al. Worse outcomes among uninsured general surgery patients: does the need for an emergency operation explain these disparities? *Surgery* 2014;156:345–51. doi: 10.1016/j.surg.2014.04.039

## PEER REVIEW HISTORY

Received September 18, 2024. Received in revised form November 22, 2024. Accepted December 5, 2024. Peer reviews and author correspondence are available at <http://links.lww.com/AOG/E13>.