Retrenchment of Wisconsin's Well Woman Program and changes in insurance coverage around the Affordable Care Act

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ABSTRACT

Since before the Affordable Care Act (ACA), states have partnered with the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) to support access to cancer screening and treatment for uninsured/underinsured women. The Wisconsin Well Woman Program (WWWP) was one such program, supporting low-income women across the state. With ACA introduction, Wisconsin substantially downsized/restructured the WWWP, expecting the reduction in services to be offset by the rise in ACA-provided insurance coverage. This study assesses whether retrenchment in the WWWP following the ACA indeed prompted a differential rise in insurance coverage among the program's target population. We use a difference-in-differences (DID) design to contrast changes in county-level, target-population insurance rates, over 2008–2018, in Wisconsin counties previously most served by the WWWP vs those least served, adjusting for systematic differences across counties, including pre-policy trends. Pre-ACA (2011–2013), most-served counties had lower insurance rates by 2.5 percentage points (pp) than least-served counties; WWWP services likely compensated for some of that gap. In 2014–2015, along with WWWP's steep contraction, insurance rates rose sharply across all counties. Our primary DID analysis and event study suggest that WWWP contraction might have differentially driven more insurance take-up in most-served counties, by 1.88 pp [95 % Confidence Interval: 0.23,3.54], thus narrowing the pre-ACA gap. Sensitivity analyses suggest much smaller gains. Notwithstanding such potential insurance gains following program contraction, continued support for care navigation and coordination remain necessary to truly meet the needs of the vulnerable women previously served by the WWWP and similar programs across states.

1. Introduction

The Affordable Care Act (ACA) increased insurance access via subsidized Marketplace coverage and, especially, Medicaid expansion (Kominski et al., 2017) and eliminated cost-sharing for preventive services. However, since 2014, mammogram and pap smear utilization has only increased nationwide by 1.5 and 4.3 percentage points (pp), respectively (Courtemanche et al., 2019). Following reforms, uninsured women across the United States (US) continue to present with more advanced breast and cervical cancers and are 1.3 times more likely to die from cervical cancer relative to insured women (Acharya and Grigsby, 2016; Amini et al., 2016). Since 1994, the Wisconsin Well Woman Program (WWWP) has improved access to critical cancer screening and treatment services for uninsured/underinsured women aged 45–64

years-old, with household incomes < 250 % of the federal poverty level (FPL). The WWWP, a part of the Centers for Disease Control & Prevention's (CDC) WISEWOMAN Initiative and the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), enables eligible women to obtain no-cost screenings, facilitates access to Medicaid coverage upon cancer diagnosis, and provides education and care coordination, all to reduce breast and cervical cancer morbidity and mortality (Lantz and Mullen, 2015). With ACA implementation, Wisconsin substantially downsized the WWWP, arguing that the reduction in services would be offset by rising insurance access (Wisconsin Department of Health Services, 2014). In December 2013, Wisconsin's Department of Health Services (DHS) announced that:

"It is anticipated that the CDC funding and the need for WWWP services will diminish as women gain access to health insurance coverage as a result of

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the Affordable Care Act and recent changes to Wisconsin's BadgerCare Plus [Medicaid] Program."(Wisconsin Department of Health Services, 2014).

While the DHS planned for downsizing by July 2014, advocacy efforts resulted in a year-long delay (see Appendix Table A.1. for a detailed timeline of program changes). By July 2015, the DHS officially restructured the WWWP into a "multi-jurisdictional service model," where 72 county-based case navigators were replaced by only 14, serving multi-county areas. Alongside this 80 % decline in case navigators, restructuring resulted in a 55 % decrease in approved providers, and a 65 % decrease in women served between 2013 and 2018 (see Appendix Fig A.1.) (Wisconsin Department of Health Services, 2015, 2018). The rural counties of Northern Wisconsin, historically most-served by the program, were most severely impacted (Fig. 1).

To our knowledge, there has been no empirical research to assess the state's premises of such substantial retrenchment, namely, that: (1) there would be a rise in insurance coverage among the program's target population that would offset the need for program services following restructuring, and (2) as a result, access to the kind of services the WWWP provides would not be much compromised. First, we hypothesize that a differential rise in insurance-seeking is likely given the availability of subsidized Marketplace coverage and documented anticipatory and compensatory insurance-seeking around impending policy changes (Alpert, 2016; Einav et al., 2015). However, that rise may be tempered by the fact that Wisconsin only partially expanded Medicaid to childless adults < 100 % FPL while shrinking parental eligibility (from 200 % to 100 % FPL) (McKeown, 2014). Eligible women would thus have had less opportunity to gain alternative insurance coverage for WWWP services. Second, evidence from other states (Bergo et al., 2019; Clark et al., 2014; Sabik et al., 2020) suggests that even after coverage expansions, low-income women, especially those who remain uninsured, still experience lower access to critical screenings and early cancer care, which are usually provided with coordination and navigation services by programs like the WWWP.

In this study, we focus on evaluating the primary hypothesis that WWWP retrenchment would drive previously served women in Wisconsin to seek alternative access to health services (i.e., insurance coverage through the ACA) at a greater rate than comparable populations that were less reliant on the WWWP. Early in this project, we attempted to assess changes in service utilization among women likely served by the WWWP pre-reform. However, evaluating feasibility in datasets with utilization variables, including the Behavioral Risk Factor Surveillance System and the Survey of the Health of Wisconsin, showed prohibitive deficiency in several important ways (e.g., data availability, statistical power). Aside from linking possibly kept DHS records of participants' prior program utilization with their claims from Medicaid and/or private insurance, an untenable undertaking, to the best of our knowledge, there is no population-based data that could be used to evaluate the effects of WWWP contraction on service utilization.

We assess the extent to which the WWWP target population experienced changes in insurance coverage specific to both the 2014 ACA rollout/WWWP reform proposals and the 2015 official WWWP restructuring. We accomplish this using a difference-in-differences design in county-level data over 2008–2018, contrasting changes in insurance coverage in the program's target population across Wisconsin counties most- vs least-served by the program. This enables us to identify possible differential rise in insurance coverage driven by WWWP retrenchment, net of broader ACA effects. If the state's WWWP retrenchment premise holds, we hypothesize a greater net rise in insurance coverage in most-served counties than in least-served ones. In an era of complex federal reform proposals, our findings can illuminate impacts of concurrent state policy changes on women's access to insurance coverage and healthcare services.

2. Methods

2.1. Data & measures

We evaluate changes in insurance coverage in the population eligible for enrollment in the WWWP: 45–64 year-old women, with household income < 250 % FPL (Wisconsin Department of Health Services, 2019). We used three sources of county-level data. First, data on county-level insurance coverage for the WWWP target population, our main outcome, come from the Census Bureau's Small Area Health Insurance Estimates (SAHIE) 2008–2018 files (United States Census Bureau, 2020). Partially funded by/for the NBCCEDP, SAHIE data provide consistent and precise model-based annual estimates of population denominators and insurance coverage rates across US counties and states, using the American Community Survey supplemented by data from administrative records, the decennial census, and postcensal population updates (United States Census Bureau, 2020; Walton and Willyard, 2020). Second, we obtained county-level WWWP service utilization data (2008–2018) from the Wisconsin DHS, including counts of eligible women who received WWWP services in each Wisconsin county in each year (Wisconsin Department of Health Services, 2020). We converted these counts into county-level service rates per 1,000 target population using county-level population denominators for women ages 40–64 with incomes < 250 % FPL, the closest available group from SAHIE (O'Hara et al., 2010). We use county-level WWWP service rates to identify Wisconsin counties historically most- and least-served by the program. SAHIE estimates of population denominators and insurance rates for all Wisconsin counties across 2008–2018 show reliable precision, with relative standard errors well below 20 %.

Third, we supplemented both data sources with rich, longitudinal (2008–2018) data we compiled for all US counties, including on: poverty (United States Census Bureau, 2019), personal income (Bureau of Economic Analysis, 2008-2018), unemployment (United States
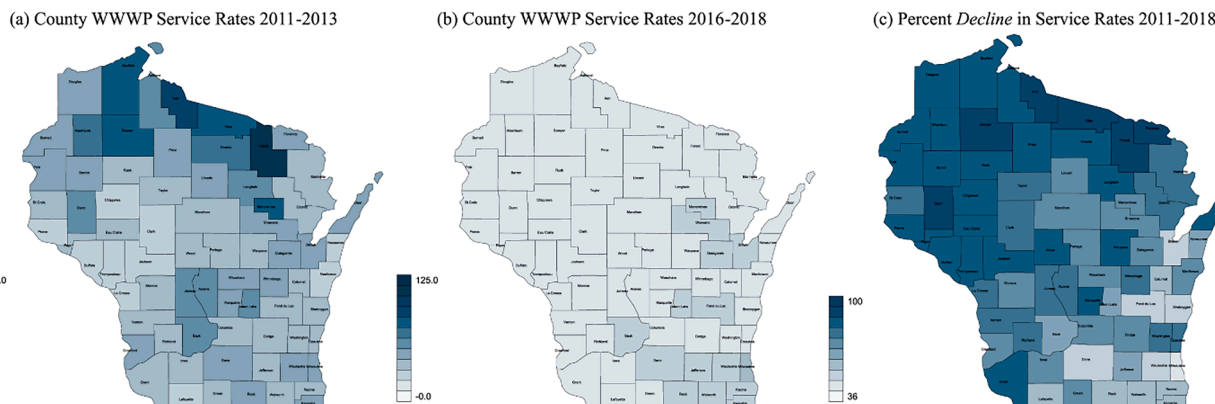

Fig. 1. Levels and Changes in the Annual Service Rate (N Enrollees Served per 1,000 Target Population) by the Well Woman Program across Wisconsin counties.

Bureau of Labor Statistics, 2011-2017), rural–urban classifications (United States Department of Agriculture Economic Research Service, 2013), population density (United States Census Bureau Census of Population and Housing, 2011), demographics (United States Census Bureau, 2008-2018), time-varying state Medicaid eligibility limits (Kaiser Family Foundation, 2011-2017) and county/state political partisanship and control (de Benedictis-Kessner and Warshaw, 2020). These covariates are employed as confounders in our analyses. Our analytical sample includes all 72 Wisconsin counties, observed for 11 years, 2008–2018, for a total n = 792 observations.

2.2. Study design

2.2.1. Likely treated & control counties

Using baseline (2011–2013) county-level WWWP service rates per 1,000 target population, we construct two groups of Wisconsin counties: counties with top-decile service rates as the "likely treated" group and counties with bottom-decile service rates as the "likely control" group, presumably most and least affected by WWWP changes, respectively. Identifying potential treated/control groups using continuous pre-policy variables is common in the impact evaluation literature, most notably in evaluations of the initial Medicare rollout (Finkelstein, 2007), Massachusetts 2006 reform (Mazumder and Miller, 2016; Miller, 2012), and ACA effects (Courtemanche et al., 2017). Unlike previous studies, the limited degrees of freedom preclude further interaction of treatment dummy variables with pre-treatment uninsurance rates. Instead, constructing least and most-served groups of counties using pre-reform service rates provides a more accurate picture of how a county's prior WWWP service history predicts the level and dynamics of insurance coverage post-reform. Out of Wisconsin's 72 counties, we identified seven most-served and eight least-served counties by the WWWP pre-ACA. Table 1 provides an overview of the two groups of counties and Wisconsin overall.

2.2.2. Difference-in-differences design

Between 2014 and 2018, two sets of contemporaneous shocks took place in Wisconsin: (1) the 2014 partial Medicaid expansion to childless adults and the Marketplace plan rollout, followed by annual changes in Marketplace plans up to 2018; in parallel to (2) December 2013 proposals for restructuring the WWWP, announcing upcoming declines in program capacity and potentially inducing greater-than-expected insurance take-up among the target population even before the official WWWP restructuring in July 2015. We see evidence of such decline and potential anticipatory rise in insurance take-up from 2013 to 2014–15 in Appendix Fig A.2.

We attempt to isolate effects of WWWP restructuring (2) on insurance coverage, net of ACA-driven changes (1), in two steps. First, we estimate changes over 2014–15 vs 2011–13 in most-served counties net of same-period changes in least-served counties. This difference-in-differences (DID1) estimate captures differential, likely anticipatory changes in insurance take-up that might be driven by *proposals* for WWWP restructuring and perceived service decline. Second, we estimate changes over 2016–18 vs 2011–13 in most-served counties net of same-period changes in least-served counties. This second DID (DID2) estimate captures differential changes in insurance take-up potentially driven by *both* proposed and official (2015) WWWP restructuring. Finally, we isolate the net differential changes (2018–16 vs 2014–15) in insurance take-up driven *only* by *official WWWP restructuring* in 2015 as the difference between DID2 and DID1, effectively a difference-in-difference-in-differences estimate. We generate all estimates from a single DID regression model that includes *all* Wisconsin counties over 2008–2018, adjusting for county and year fixed effects and the aforementioned time-varying economic, demographic, and political covariates. The model equation and analytical expressions are available in Appendix B. All modeled observations are weighted by the county's target population size. County fixed effects adjust for all time-invariant

Table 1
Characteristics of Wisconsin counties most and least served by the Well Woman Program.

Characteristics	Least Served Counties	Most Served Counties	Difference (p value)	Overall Wisconsin
N Counties	8	7		72
N Observations	88	77		792
Total Population, 2018	303,901	88,672		5,813,568
Target Population,[a] 2018	13,278	5,619		248,867
Average County WWWP Enrollees Served per 1,000 (target population)[a]				
2011–2013	18.31	86.46	68.15 (0.000)	40.65
2014–2015	6.11	24.46	18.35 (0.001)	14.75
2016–2018	3.35	7.97	−4.62 (0.027)	8.83
Average County Percent Insured (target population)[a]				
2011–2013	79.35	76.81	−2.53 (0.001)	78.88
2014–2015	85.98	84.27	−1.71 (0.204)	86.36
2016–2018	88.65	87.73	0.92 (0.152)	89.18
Average Baseline County Characteristics, 2011–2013				
Percent female	49.09	49.59	0.49 (0.068)	49.65
Percent non-white	6.59	23.84	17.25 (0.011)	10.00
Percent poor	11.96	17.24	5.28 (0.003)	12.96
Unemployment rate	6.88	11.21	4.34 (0.000)	7.83
Total personal income, millions	1.47	0.47	−1.00 (0.000)	3.34
RUC Code (higher more rural)	4.50	8.14	3.64 (0.000)	4.93
Population Density/ sq-mile	54.96	13.87	−41.09 (0.000)	165.68
Republican vote share, 2012 Presidential Elections	46.43	41.95	−4.48 (0.158)	46.61
Select Characteristics of Wisconsin State Politics & Medicaid (BadgerCare), 2011–2013				
Republican share of state senate seats				54.55
Republican share of state assembly seats				60.27
Party controlling state legislature				Republican
Governor's party				Republican
Overall state government control				Republican
BadgerCare eligibility limit-parents				200 %
BadgerCare eligibility limit-nonparents				n/a
Medicaid expansion status				Up to 100 % FPL

[a] Women 40–64, family income < 250 %FPL.

differences across counties, while time-varying covariates adjust for confounding by those characteristics since they likely predict insurance coverage and reliance on programs like the WWWP. Year fixed effects adjust for year-to-year fluctuations in insurance coverage and the drivers of those fluctuations. All standard errors are clustered at the county level. All analyses were performed using Stata 15.1 (StataCorp, College Station, Texas).

2.2.3. Robustness checks

Interpretation of the DID estimates above as effects of WWWP shocks on insurance coverage hinges on whether, conditional on fixed effects and covariates, changes in least-served counties represent valid counterfactuals for changes in most-served counties, absent WWWP shocks: the so-called parallel trends assumption (Angrist and Pischke, 2009). For example, in one group, ACA rollout might have led to greater insurance coverage gains due to factors other than WWWP retrenchment, e.g., greater navigator presence, greater exchange plan penetration, and premium affordability. We assess the plausibility of this assumption using an event-study model. An event study is a flexible specification of the basic DID model, in which the change in each preceding and following year relative to year zero (immediate pre-policy year; 2013) is estimated and contrasted across treated/control groups. This specification allows estimation and graphical inspection of pre-policy trends and post-introduction dynamics of policy effects (Borusyak and Jaravel, 2017; Mora and Reggio, 2015; Wing et al., 2018).

In addition to the fixed effects and covariates adjusted in our main model, we further control for county-specific changes in insurance rates using county-specific time trends. Though it reduces power, controlling for these trends more effectively rules out potentially residual differences across most- and least-served counties in ACA rollout. Finally, we employ alternative definitions of most- and least-served counties, using top/bottom quintiles and quartiles, instead of top/bottom deciles. Though they offer noisier classification of potentially treated/control groups, quintiles/quartiles provide greater cell sizes and likely more statistical power.

3. Results

3.1. Characteristics of most- and least-served counties

Table 1 provides an overview of the characteristics of counties most- and least-served by the WWWP. Wisconsin's 2018 population of 5.8 million included about 250,000 women eligible for WWWP services, ages 40–64, with incomes < 250 % FPL (United States Census Bureau, 2020). Between 2011 and 2013, 41 per 1,000 eligible women were served by the WWWP statewide, ranging between 86 and 18 per 1,000 in most- and least-served counties, respectively. By 2018, those rates fell precipitously to 8.83 per 1,000 statewide and to 7.97 and 3.35 per 1,000 in most- and least-served counties, respectively.Northern counties experienced particularly substantial declines (Fig. 1). In parallel, insurance rates among eligible women rose from 76.8 % and 79.4 % in 2011–13 to 87.7 % and 88.7 % in 2018 in most- and least-served counties, respectively (Table 1). Appendix Fig A.1. shows the contemporaneous decline over 2011–2018 in program services together with the rise in insurance coverage for both county groupings. Comparing baseline characteristics (Table 1), most-served counties had on average greater minority, poorer, less employed, more rural, and smaller populations than their least-served counterparts. We adjust for these and other systematic differences across counties in our DID models.

3.2. Average DID changes in insurance coverage

Our main DID estimates appear in Table 2. Overall, relative to 2011–2013, insurance coverage rose in most- and least-served counties by 11.29 pp [95 % Confidence Interval (CI): 9.34, 13.24] and 9.41 pp [7.98, 10.84], respectively, for a net differential rise of 1.88 pp [0.23, 3.54] in most-served counties. This rise appears to be substantially driven by a differential increase of 1.25 pp [−0.30, 2.80] in 2014–15, following WWWP restructuring proposals and ACA rollout, and only 0.64 pp [−0.3, 1.58] in 2016–18, following the official WWWP restructuring. Though imprecise, these component increases mirror the pattern of insurance rise in each group of counties.

Our robustness checks show smaller average DID estimates of differential change in most-served counties than in the primary analysis.

Table 2
Average adjusted changes in county-level insurance rate across counties most- and least-served by the Wisconsin Well Woman Program (WWWP).

	(1) Least Served (*Likely Control*)	(2) Most-Served (*Likely Treated*)	(3) Difference-in-Differences
	Percentage Points [95 % Confidence Intervals]		
All ACA + WWWP Changes			
2011–13	Ref	Ref	
2016–18	9.41 [7.98, 10.84]***	11.29 [9.34, 13.24]***	1.88 [0.23, 3.54]**
(a) ACA + Proposed WWWP Restructuring			
2011–13	Ref	Ref	
2014–15	9.39 [8.22, 10.56]***	10.64 [9.31, 11.96]***	1.25 [−0.30, 2.80]
(b) Official WWWP Restructuring			
2014–15	Ref	Ref	
2016–18	0.02 [−1.00, 1.04]	0.66 [−0.47, 1.79]	0.64 [−0.30, 1.58]

* p < 0.10 ** p < 0.05 *** p < 0.01 All estimates were adjusted for county and year fixed effects as well as county-level time-varying demographic, economic, and political characteristics. Observations are weighted by the county's target population size.

For example, adjusting for county-specific linear trends resulted in an overall differential change of 0.77 pp [95 % CI: −1.59, 3.12] in 2016–18 vs 2011–13, reflecting a 0.65 pp [−1.18, 2.47] change following ACA rollout and 0.12 pp [−1.18, 1.42] change following official WWWP restructuring (Appendix Table A.2.). Further, defining most- and least-served counties respectively as the top and bottom quintiles/quartiles, instead of deciles, also resulted in rather small estimates. In both analyses, however, the change in insurance coverage appeared larger following official WWWP restructuring, contrary to the pattern observed with decile groupings. In the quartile version, most-served counties had a net increase of 0.83 pp [0.03, 1.62] following the official restructuring in 2016–18 (vs 2014–15) (Appendix Table A.2.).

3.3. Annual changes (event study estimates)

Our event-study model estimates the changes in insurance coverage in each preceding and following year relative to 2013, across most- and least-served counties. These estimates are plotted in Fig. 2 (Appendix Table A.3. lists numerical estimates). Before 2013, most- and least-served counties appear to have had parallel trends, with the difference between them largely centered on zero. Following 2013, insurance
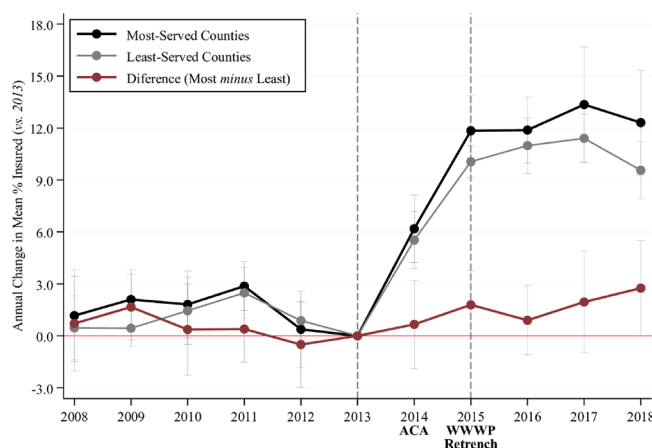

Fig. 2. Pre-ACA Trends and Changes in County-Level Percent Insured Across Counties Most- and Least-Served by Wisconsin's Well Woman Program.

coverage spikes in both groups of counties in 2014 and 2015, followed by less pronounced changes in 2016–2018. Most-served counties appear to have had some differential gains, particularly in 2017–18, with magnitudes consistent with the main average DID estimates reported above.

4. Discussion

This analysis evaluates the effects of retrenchment in the WWWP, Wisconsin's NBCCEDP program, on insurance coverage among women 40–64 years old with incomes < 250 % FPL, in the context of sweeping national healthcare reform. Program retrenchment includes both publicly announced restructuring proposals in the wake of the ACA in late 2013-early 2014 and the official program downsizing in 2015. We assess the hypothesis that counties most served by the program at baseline (2011–2013), the likely treated group, have experienced greater insurance gains than in least-served counties, likely controls. Across various DID specifications, we observe some net gains in insurance coverage in most-served counties in the 2014–2018 period, with most changes surrounding ACA rollout and accompanying WWWP restructuring proposals. Announcement of program retrenchment to participants in January of 2014 potentially pushed WWWP participants to preemptively seek ACA Marketplace coverage in anticipation of programmatic decline. In quantitative terms, pre-ACA insurance coverage in the WWWP target population in *least*-served counties was higher by about 2.5 pp than in most-served counties. While both groups of counties saw sharp rises in coverage, WWWP contraction might have driven differentially more insurance take-up in most-served counties, by up to 1.88 pp, thus narrowing the pre-ACA gap.

Further insurance gains in most-served counties may have been impeded by Wisconsin's only partial Medicaid expansion. Wisconsin's expansion had a possibly greater impact on most-served counties, in which 17 % of the target population had incomes < 100 % FPL at baseline, compared with 12% in least-served counties (Table 1). A full expansion of Medicaid to 138 % FPL would have further increased insurance coverage among previous WWWP participants with incomes between 100 % and 138 % FPL. Additionally, women, particularly in the 100–138 % FPL group, may not have been able to fully avail subsidized Marketplace coverage due to choice complexity (Baicker et al., 2012; Feher and Menashe, 2021) and limited insurance literacy (Bhargava et al., 2017), especially with severe cuts (85 % in Wisconsin) to ACA Navigator programs since 2017 (Allaire et al., 2019; Pollitz and Tolbert, 2020; Pollitz et al., 2020).

Significant changes around health reforms occurred only in Wisconsin and Massachusetts' NBCCEDP programs, with only Massachusetts being studied. Massachusetts's Women's Health Network (WHN) provided reproductive cancer screenings for low-income women, like the WWWP, until Massachusetts's 2006 health reform when WHN funding was cut (Clark et al., 2014; Sabik et al., 2020). Women were expected to obtain other insurance coverage. However, education and care coordination continued with the same capacity (Clark et al., 2014; Commonwealth of Massachusetts, 2020). A difference-in-differences analysis of Massachusetts vs other states found a 7 % decrease in the likelihood of advanced cervical cancer diagnosis after reforms, but no significant change in advanced breast cancer diagnosis (Sabik et al., 2020). Among pre-reform WHN participants, nearly 40 % gained coverage through MA Commonwealth Care, comparable to subsidized ACA Marketplace coverage, and 8 % enrolled in Massachusetts's expanded Medicaid program (Clark et al., 2014). Another 30.6 %, otherwise uninsured, enrolled in a limited coverage Health Safety Net (HSN) (Clark et al., 2014). Women insured by Commonwealth Care and the HSN post-reform subsequently had better access to reproductive screenings (Clark et al., 2014). However, women covered by Medicaid post-reform were somewhat less likely to obtain a mammogram or pap smear (Clark et al., 2014).

Illinois (a Medicaid-expansion state) did not make changes to its NBCCEDP-funded program following ACA expansions. Most women served by the Illinois program gained Medicaid coverage (56.7 %) post-reform, while the rest sought coverage through the Illinois Health Exchange (18.5 %), their employer (13.3 %), or remained uninsured (11.4 %) (Bergo et al., 2019). While no significant differences in preventive screenings were observed, women in Illinois with Exchange coverage were 4.58 times more likely than those with Medicaid to report past-year uncovered major medical costs (Bergo et al., 2019).

This evidence, taken together with our findings, suggests that gaining insurance coverage, while important, might not translate to better access to prevention and treatment among vulnerable populations. Healthcare system complexity, particularly in cancer, low literacy, and other socioeconomic and geographic challenges (e.g., transportation, sick leave, rurality) undermine access regardless of coverage (Nguyen-Pham et al., 2014). These factors potentially explain why women who were previously served by Massachusetts' WHN program, a WWWP counterpart, and switched to Medicaid ended up having lower utilization of mammograms and pap smears (Clark et al., 2014). Elimination of cost-sharing for preventive services in Marketplace plans should prompt more women to seek preventive care (Sabatino et al., 2012; Trivedi et al., 2008). Studies of ACA effects, however, find little such increase (Alharbi et al., 2019) despite solid coverage gains. Beyond preventive screening, pervasive underinsurance with Marketplace coverage, with significant out-of-pocket costs, remains concerning particularly for rural populations (Hoagland and Shafer, 2021). Nationwide, more than 25 % of individuals with incomes < 250 % FPL face deductibles and progressively high cost-sharing, and major unpaid medical bills, creating barriers to needed services, including cancer care, (Bergo et al., 2019; Collins et al., 2019). Given this evidence, we posit that even with significant insurance coverage gains among the population historically reliant on the WWWP, utilization of cancer screening and treatment services might still have been compromised. As we find no such significant gains, WWWP retrenchment possibly left previously served women in an untenable position, with likely unmet cancer care needs.

This study has notable strengths, including quasi-experimental analysis of reliable county-level panel data (2008–2018), multi-pronged confounding control using fixed effects and time-varying covariates, and a range of sensitivity analyses. However, our findings should be interpreted with key limitations in mind. First, this analysis focuses on Wisconsin, where the WWWP policy change occurred. Although observed patterns and the explanations we postulate may be broadly applicable, it is possible that our findings do not generalize to states systematically different from Wisconsin, particularly in the geographic variation of service and enrollment in NBCCEDP programming. Second, our analysis uses aggregate, county-level data of the target population of the WWWP, and not individual-level data from eligible women, limiting individual-level inference and restricting interpretation to the population level. Unfortunately, serious limitations (e.g., very small local-area samples, unavailable county identifiers, no repeated measures) in candidate individual-level datasets precluded their utility for evaluating the effects of WWWP retrenchment on insurance coverage or on screening and treatment utilization. Nonetheless, like most DID analyses of policy change, the changes in insurance coverage we estimate are average, intent-to-treat policy effects capturing potential population-level shifts in insurance uptake, and, by linking to relevant literature, we attempted to translate those shifts to potential, corresponding changes in service utilization. Third, although our study design and covariate control rule out major confounding, residual confounding due to measurement error, such as uncertainty in SAHIE population denominators, income levels, and insurance rates, particularly in less populous counties (O'Hara et al., 2010; United States Census Bureau, 2017), might remain problematic.

5. Conclusion

Our findings show that cuts in programs like the WWWP may drive

the population previously served by those programs to seek ACA insurance coverage. Such coverage, however, may be inadequate for the multifaceted needs of these populations (Allaire et al., 2019; Pollitz and Tolbert, 2020; Pollitz et al., 2020). Programmatic contractions may thus leave vulnerable women in a precarious position, with lower access to cancer screening and treatment, and potentially increased risk for advanced-stage cancers. This is especially concerning during the COVID-19 pandemic, with delayed access to cancer screening nationwide (DePolo, 2020), especially in rural areas (Carson, 2020). To avert these eventualities, presumption of expanded WWWP navigation and care coordination services and full expansion of Wisconsin's Medicaid eligibility to 138 % FPL are likely critical first steps moving forward.

CRediT authorship contribution statement

Mikaela M. Becker: Conceptualization, Data curation, Investigation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing. **Mustafa Hussein:** Conceptualization, Formal analysis, Writing – review & editing, Supervision, Validation, Software.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share WWWP data. However, analysis code and public-use data are available upon request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pmedr.2022.101996.

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