The Effect on Medical Care Utilization of Extending Public Insurance to Low-Income Adults without Dependent Children

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Abstract

Context: Under the Affordable Care Act (ACA), states must decide whether to expand Medicaid eligibility to include low-income adults without dependent children. This expansion decision will depend in part on how public coverage is expected to affect the use of medical care among this population.

Objective: To determine whether the State of Wisconsin's 2009 newly created public insurance program for low-income uninsured childless adults – the BadgerCare Plus Core Plan (Core Plan) led to changes in the use of medical care.

Design: Administrative claims and encounter data spanning 2008 and 2009 on a population of low-income uninsured childless adults who were automatically enrolled into the Core Plan in January 2009 were analyzed using a case-crossover study design.

Participants: A population-based sample of 9,619 out of 12,941 low-income adults without dependent children who resided in Milwaukee County, were uninsured, received uncompensated care in 2008, and who were automatically enrolled into the Core Plan. Those not included in the analysis were dropped because of non-matching social security numbers.

Interventions: Uninsured individuals were automatically enrolled into a publically financed managed care benefit that is similar to, but less generous than, Wisconsin's existing Medicaid program.

Main Outcome Measures: The main outcomes were selected prior to analysis and include outpatient visits for primary, specialty, and emergency department (ED) care, hospital admissions, and preventable hospitalizations.

Results: In the 12 months following enrollment into the Core Plan, outpatient visits increased 29% (IRR 1.293, 95% CI, 1.276 – 1.310) and ED visits increased 46% (IRR 1.460, 95% CI, 1.374 – 1.552). Inpatient hospitalizations declined 59% (IRR 0.412, 95% CI, 0.368 – 0.461) as did measures of preventable hospitalization.

Conclusions: Wisconsin's insurance program for low-income childless adults led to a substantial decline in hospitalizations alongside an increase in usage of outpatient services and the ED. The benefits of such coverage expansions are evident in the decline in hospitalizations. As other states expand coverage to childless adults, achieving these benefits while avoiding increasing emergency department utilization and its associated inefficiencies will depend on there being sufficient access to primary care.

Introduction

The Affordable Care Act (ACA) was anticipated to expand Medicaid coverage in 2014 to an estimated 16 million new enrollees, 12 million of whom would be adults without dependent children.[1] The U.S. Supreme Court ruling, however, made any expansion optional for states.[2] As states decide whether to expand Medicaid eligibility, it is more important than ever to understand the potential impact on medical utilization of covering uninsured childless adult populations with public insurance. Among many factors, states will consider whether this expansion will lead newly covered childless adults to receive more or different types of medical care and, in particular, receive it in an appropriate and efficient manner.

In 2009, the State of Wisconsin created a new public health coverage program – the BadgerCare Plus Core Plan (the Core Plan) – for adults without dependent children who have incomes up to 200% of the Federal Poverty Line (FPL) and who do not have access to other forms of health insurance. The Core Plan's managed care benefit is similar to, but less generous than, Wisconsin's existing Medicaid/CHIP program (called BadgerCare Plus). Open enrollment for this program began in July 2009 and was ultimately capped at approximately 65,000 enrollees. In January 2009, prior to opening enrollment to all eligible persons, the State automatically enrolled 12,941 poor and uninsured childless adult residents of Milwaukee County into the Core Plan.

This study uses the natural experiment arising from the State's automatic enrollment of this large number of poor uninsured childless adults into public insurance to evaluate the effect of public insurance coverage on the use of medical care.

Previous studies have documented that uninsured populations are likely to delay or not receive preventive screenings[3,4,5,6,7], delay seeking medical care[8,9,10], use the emergency department (ED) on an episodic basis[11,12], have a preventable hospitalization[13], and present with greater severity of illness.[14] Efforts to cover the uninsured tend to rely on the expectation that greater access to outpatient care would lead to more appropriate and timely use of medical care and, ultimately, to an improvement in health.[15] However, the vast majority of the research to date underlying this expectation is based on associations fraught with serious internal validity limitations.[16] Simple comparisons of the uninsured to the insured do not demonstrate how the health and use of medical care of the uninsured would change should they be covered by health insurance because, for example, those who anticipate needing higher levels of health services may be more likely to be insured already.

A number of studies employing credibly causal research designs find that private insurance coverage tends both to increase rates of hospitalization and ED use[17] and to improve health outcomes.[18] Similarly, studies find that Medicare coverage increases the use of health care services and improves health among the elderly.[19] Other studies have examined the impacts of expansions in children's Medicaid eligibility and health care utilization,[20,21] with one[20] finding declines in preventable hospitalizations following eligibility expansions and one[21] finding increases in hospitalizations following eligibility expansions. Medicaid expansions for children have been found to reduce infant death[22] but have not been found to improve the health of older children even as they increase the use of preventive care.[23]

Two recent studies examine Medicaid coverage expansions to childless adults. One uses vital statistics mortality files and data from the Current Population Survey and the Behavioral Risk Factor Survey to compare across several states before and after expansions, finding reduced

mortality as well as improved coverage, access to care, and self-reported health. [24] Another compares uninsured low-income adults (including childless adults) in Oregon who were selected by lottery to be given the chance to apply for Medicaid with those that entered the lottery but were not selected.[25] Those who won the lottery were 25 percentage points more likely to have any source of insurance coverage a year later, had higher health care utilization overall, higher probability of a hospital admission, increased outpatient care, and a statistically insignificant increase in the probability of an ED visit.

Data and Methods

The data for this study are drawn from Wisconsin's Medicaid administrative claims database and enrollment databases. We also use encounter data for calendar year 2008 on the population of uninsured Milwaukee County residents who were automatically enrolled into the Core Plan on January 1, 2009. These encounter data exist because Milwaukee County's (now defunct) General Assistance Medical Program (GAMP) partially compensated hospitals and providers in Milwaukee County for uncompensated care provided to uninsured indigent populations.

Encounter and claims records (hereafter collectively referred to as "claims") for GAMP and the Core Plan come in separate files. We match them using the common identifier of social security number. While we have data on approximately 13,000 individuals in both the GAMP and Core files, we are only able to match a subset of enrollees and we limit our analysis to a balanced panel of these 9,619 enrollees. We compare outcomes for the matched and unmatched individuals in both 2008 and 2009 and find no differences, on average. In addition, we run the main regression models without fixed effects on the full (12,941) population and find no

important differences in the results. Thus, restricting our analysis to the matched sample does not appear to lead to bias.

The claims and encounter data come from two different sources, raising concerns about possible differential data quality. In particular, the GAMP program only provided for partial compensation to participating providers, so we must ensure that the data appear to be complete. Conversations with former program administrators indicate that the program funds typically ran out in the summer months, but we find no corresponding decline in the number or type of claims submitted in the data, suggesting that providers submitted claims under the program even when they suspected they would not be subsequently paid. Program funding was partly dependent on previous years' expenditures, so participating providers had an incentive to record all relevant claims.

The claims-based utilization measures we examine are outpatient visits (including visits by provider type and by procedure type), ED visits, ambulatory care sensitive (ACS) ED visits, inpatient hospitalizations, and preventable hospitalizations. For each person in each month, we construct a "visits per month" measure of utilization for each outcome.

We measure outpatient visits as the number of provider-day visits. Total outpatient visits are defined using a procedure code that is used only for outpatient visits (which includes skilled nursing visits). We differentiate between preventive, episodic, therapeutic, PT/OT, and mental health visits using procedure codes. We break down outpatient visits by type of provider: primary care, specialist, or unknown.

We measure ED visits as a day with an ED claim, identified using procedure billing codes. We also define ACS ED using a method developed for claims data.[26]

We measure hospitalizations as the number of hospital stays, identified using revenue codes. We are careful to distinguish between new admissions and transfers between hospitals, as transfers should not be considered new hospitalizations. We measure preventable hospitalizations following the AHRQ Preventive Quality Indices (PQIs) method.[27]

The administrative data have a limited set of demographic characteristics: age, sex, and race / ethnicity. Program administrators, such as a caseworker, classify race / ethnicity in the administrative data. The demographic characteristics of our sample are reported in Panel A of Table 1. Forty-two percent of our sample is female. The average age is 43.5 with 26.5% being less than age 35, 55% being between 35 and 55, and 18% being age 55 or older. As the race and ethnicity of a public health program member is not relevant to program eligibility, it is often not reported in the administrative file. Race / ethnicity is missing for 41% of the sample. 23% of the sample is reported as White, 36% as Black, and 7% as Hispanic. We report the demographic characteristics, including race/ethnicity, of the study population and compare them with the population of BadgerCare parents in order to assess the representativeness of that population. We also note that the former GAMP sample is in particularly poor health as measured by prevalence of self-reported chronic illnesses (see Panel B of Table 1).

We estimate the effect of public insurance coverage on medical care use using individual level fixed effects Poisson models and fixed effects linear regression models[28 29] with seasonal controls. These models can determine, at the individual level, whether the number of visits for an individual in a given month in 2009 (when individuals were enrolled in public insurance) differs from the number of visits in that same month in 2008 (when individuals were uninsured). This a particularly strong design, as each individual serves as his/her own control. The fixed effects Poisson model is best used for count outcomes (outpatient visits, ED visits,

hospitalizations) and is consistent even if these outcomes display over-dispersion.[28] Linear regression with fixed effects are used when the outcomes are continuous (ACS ED visits).

The key aspect to our research design is that we are examining a population that was automatically enrolled into public insurance. Thus, public insurance status for the individuals in our study can be considered exogenously determined – i.e. the key exposure of interest (insurance coverage) is free of the self-selection bias that leads to concerns about internal validity in some previous studies.

In addition to the pre-post individual fixed effects models, we also estimated models with a comparison group of parents from Milwaukee County with incomes under 150% FPL who were enrolled in Medicaid from 2008-2009. The comparison group allows us to control for overall differences in trends of healthcare use among low-income populations in Milwaukee County. All results were qualitatively similar. However, as these adults are different in some important ways from the Core Plan population (see Table 1), our preferred estimates come from the pre-post models.

Our research protocol was approved by the University of Wisconsin-Madison's IRB.

Results

In this section, we report the impact of enrolling uninsured low-income childless adults into public insurance on medical care use (outpatient visits, ED visits, and hospitalizations) and on preventable hospitalizations.

a. Outpatient Visits

Compared with months uninsured, public insurance coverage led to an increase in total outpatient visits per month of 29 percent (IRR 1.293, 95% CI, 1.276 – 1.310), from a base of 0.691 visits per month (see Table 2). We disaggregate these visits by type of provider (primary care provider, specialist, and unclassified) and by type of service provided (preventive care, episodic care, physical or occupational therapy, mental health, and other therapeutic care).[1] When sorting by type of provider, we see the overall increase in outpatient visits was primarily due to an increase in visits to specialists (IRR 1.782, 95% CI, 1.689 – 1.881) while visits to primary care physicians increased more moderately (IRR 1.164, 95% CI, 1.132 – 1.196). We also see an increase in preventive visits (IRR 1.550, 95% CI, 1.395 – 1.722) and in all types of therapeutic care and smaller increases in episodic care (IRR 1.135, 95% CI, 1.106 – 1.164).

b. Emergency Department Use

Compared with months uninsured, individuals covered by public insurance increased their number of ED visits by 46 percent (IRR 1.460, 95% CI, 1.374 – 1.552, see Table 3). This increase in ED visits is from a baseline in 2008 (when uninsured) of 0.096 visits per month.

This increase in ED visits occurred primarily for visits that are ambulatory care sensitive (ACS). These types of visits include non-emergent visits, visits that are emergent but that could have been treated in an clinical office visit setting, and visits that would have been avoidable had the person had access to good primary care. ACS visits increased 38.7% in the year following enrollment into public insurance (95% CI, 31.6% - 45.7%) from a baseline of 0.049 visits per month when uninsured.

[1] The provider codes in claims data sometimes refer to the provider group, not the physician. In these cases we are unable to differentiate between primary and specialty care providers.

We see no increase in the number of visits that are emergent, not primary care treatable, and not avoidable (predicted percent change 0.5%, 95% CI -7.7% - 8.7%) and no increase in visits due to injuries (predicted percent change -1.8%, 95% CI -11.3% - 7.7%), which is reassuring to the validity of the research design as these types of visits are unlikely to be responsive to changes in insurance coverage.

c. Hospitalizations and Inpatient Days

Individuals moving from being uninsured into public coverage had a 59% decline in the number of hospitalizations per month (IRR 0.412, 95% CI 0.368 – 0.461, see Table 4). This decline is from a baseline, in 2008 (when uninsured), of 0.036 hospitalizations per month.

Declines also occur for preventable hospitalization. Following enrollment into public insurance, declines occurred in 10 out of the 11 measures of preventable hospitalization. The incidence of any preventable hospitalization fell 47% (IRR 0.525, 95% CI 0.419 – 0.657).

Discussion

Introducing a Medicaid-like public insurance program to cover a low-income, uninsured childless adult population with a high prevalence of chronic illness in Wisconsin had dramatic effects on the use medical care.

Public insurance overage led to a large increase in outpatient office visits and visits to the ED. The increase in outpatient visits comprises both an increase in primary care visits and an increase in specialty visits, though the percentage increase in specialty visits is substantially larger. This finding is consistent with this previously uninsured population already having had some access to primary care through community health centers, but having had limited access to

specialists. These findings support previous studies that have found that public insurance enrollment increases the use of non-hospital care.[25] Our study is also consistent with studies that have found that private insurance increases the use of the ED,[17] although this finding is not universal in the literature.[25] The finding that ED use increases once uninsured individuals gain insurance coverage could indicate insufficient access to primary care.

Public insurance coverage also led this population to have a sizeable reduction in the rate of hospitalizations. This decline may have resulted from an improvement patients' access to specialist referrals. In the absence of insurance coverage, ED physicians may have resorted to admitting patients in order to provide them specialist consultation or follow-up diagnostics. In addition, the observed decline in preventable hospitalizations – for example, admissions for hypertension – suggests that the underlying health of this population may have improved as a result of increased access to outpatient care.

Either way, this finding of a decline in hospitalization is a striking difference from that of several previous studies, which tend to find that insurance coverage leads to increased inpatient hospitalizations among young adults and children[17,21] and increased hospitalizations among low-income adults.[25] While we do not examine costs in this study, this finding is especially intriguing because of the possibility that a coverage expansion may not be as expensive as previously assumed for particular populations or may even reduce costs.

Differences between our findings and those of previous studies are likely due to important differences in the characteristics of the populations studied and in the nature of the intervention. For example, other studies examine non-poor young adults[17], poor children,[20,21] or

poor adults including both parents and childless adults who seek to enroll in public insurance and, therefore, tend to have lower rates of chronic illness than the individuals in our study.[25]

Several features of our study make it very likely that its findings translate well into what one should expect to see from Medicaid expansions under the ACA. First, the study population is relatively low-income; even though the Core Plan was available to individuals with family incomes up to 200% FPL, those automatically enrolled had incomes up to only 125% FPL, which is close to the new income eligibility threshold that states can expand to under ACA. Second, the study population was automatically enrolled into public insurance, rather than enrolling voluntarily. This feature may more closely mimic the expansions under the ACA, which are combined with an individual coverage mandate that should substantially drive up take-up. Previous studies examine expansions in eligibility that are not coupled with a mandate, resulting in study populations who voluntarily enroll or seek to enroll.[25]

Wisconsin's experience in covering low-income childless adults suggests that the Medicaid expansions enacted by the ACA have the potential to lead to declines in hospitalizations and increased access to outpatient office visit services along with increased utilization of the ED. The possible benefits of a Medicaid coverage expansion are evident in the decline in hospitalizations found here. Obtaining maximum benefits from the expansion, however, may depend on whether there exists sufficient access to primary care, which may mitigate any increase in emergency department utilization and its associated inefficiencies.

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Table 1. **Characteristics of the Study Population and Comparison Sample**

	Study Population	Comparison Sample: BadgerCare Parents
Panel A: Demographic Characteristics		
Number of Enrollees	9,619	67,045
Female	41.98%	79.30%
Age	43.50	31.72
Age < 35	26.50%	66.59%
Age>=35 & Age < 55	55.17%	31.38%
Age>=55	18.33%	2.03%
White	23.28%	24.56%
Black	35.54%	54.03%
Hispanic	6.74%	15.21%
Race / Ethnicity Missing	41.48%	3.20%
Panel B: Prevalence of Chronic Illness		
Asthma	20.28%	13.14%
Cancer	5.44%	2.12%
COPD	18.87%	5.40%
Emphysema	2.92%	0.28%
Depression	26.91%	14.26%
Diabetes	27.42%	8.87%
Heart Problems	27.89%	6.88%
High Blood Pressure	49.78%	16.48%
Stroke	6.19%	1.27%
AODA	26.02%	7.08%
Mental Health Problem	20.99%	10.35%
No Chronic Illness	18.49%	58.06%

Source: BadgerCare Plus Administrative Enrollment and Claims Files

Table 2. **Average Outpatient Visits per Month and Predicted Incident Rate Ratio of Visits Following Enrollment into Public Insurance to Visits when Uninsured**

	(1)	(2)	(3)	(4)
	Average Visits Per Month When Uninsured (Core Plan Participants)	Average Visits Per Month When Insured (Core Plan Participants)	Pre-Post Model (Core Plan Participants Only)	Difference-in-Difference Model (BC+ Parents comparison)
Total Outpatient Visits	0.691	0.783	1.293	1.100
			[1.276, 1.310]	[1.085, 1.116]
By Provider Type				
Primary provider	0.387	0.378	1.164	0.629
			[1.132, 1.196]	[0.618, 0.640]
Specialty provider	0.181	0.277	1.782	1.282
			[1.689, 1.881]	[1.190, 1.380]
Unclassified provider	0.123	0.128	1.016	2.719
			[.926, 1.115]	[2.496, 2.962]
By Type of Visit				
Preventive	0.032	0.039	1.550	1.121
			[1.395, 1.722]	[1.015, 1.238]
Episodic	0.578	0.573	1.135	0.991
			[1.106, 1.164]	[0.966, 1.016]
PT/OT	0.069	0.108	1.669	1.285
			[1.464, 1.901]	[1.079, 1.529]
Mental Health	0.005	0.047	11.244	9.254
			[9.212, 13.724]	[1.504, 56.938]
Other therapeutic	0.007	0.017	3.320	2.470
			[2.511, 4.389]	[1.452, 4.201]
Number of Individuals	9,619	9,619	9,619	76,664

Notes:

Columns (1) and (2) report average visits per month for all former-GAMP Core plan members. Columns (3) and (4) report Incident Rate Ratios calculated using fixed effects poisson models that adjust for calendar month and length of enrollment. Confidence intervals are calculated to account for the possibility of overdispersion. Column (4) uses a group of 67,045 low-income BC+ parents in Milwaukee County as a comparison group for the adults in the Core plan. 95% confidence intervals in brackets.

Table 3. **Average Emergency Department Visits and ACS Visits per Month and Predicted Incident Rate Ratio of Visits and Predicted Percent Change in ACS Visits Following Enrollment into Public Insurance**

	(1)	(2)	(3)
Panel A: Total Emergency Department Visits			
	Average Visits Per Month When Uninsured (Core Plan Participants)	Pre-Post Model (Core Plan Participants Only)	Difference-in-Difference Model (BC+ Parents comparison)
Total ED Visits	0.096	1.460	1.331
		[1.374, 1.552]	[1.263, 1.403]
Panel B: Ambulatory Care Sensitive Emergency Department Visits			
	Average Visits Per Month When Uninsured (Core Plan Participants)	Pre-Post Model (Core Plan Only)	Predicted Percent Change in Visits [95% CI]
Ambulatory Care Sensitive ED Visits	0.049	38.7%	34.1%
		[31.6%, 45.7%]	[27.1%, 41.1%]
Of which:			
Non-Emergent	0.015	54.3%	78.8%
		[41.7%, 66.8%]	[66.1%, 91.6%]
Primary Care Treatable	0.024	20.2%	14.4%
		[12.5%, 27.9%]	[6.9%, 21.9%]
Avoidable	0.010	20.7%	15.1%
		[9.0%, 32.4%]	[3.9%, 26.4%]
Non ACS ED Visits	0.019	0.5%	-2.0%
		[-7.7%, 8.7%]	[-10.0%, 6.0%]
Otherwise classified	0.029	54.5%	59.9%
		[40.3%, 68.7%]	[47.2%, 72.6%]
Of which:			
Injury	0.019	-1.8%	-1.2%
		[-11.3%, 7.7%]	[-10.5%, 8.0%]
Mental Health / Drug / Alcohol	0.003	343.9%	378.5%
		[249.8%, 438.0%]	[294.5%, 462.6%]
Unclassified	0.007	89.8%	100.8%
		[66.8%, 112.8%]	[-96.8%, 298.3%]
Number of Individuals	9,619	9,619	76,664

Table 3. **Average Emergency Department Visits and ACS Visits per Month and Predicted Incident Rate Ratio of Visits and Predicted Percent Change in ACS Visits Following Enrollment into Public Insurance (continued)**

Notes:

Column (1) reports average visits per month for all Core plan members in 2008. Columns (2) and (3) report Incident Rate Ratios calculated using fixed effects poisson models and predicted percent changes from fixed effects linear regressions that adjust for calendar month and length of enrollment. Confidence intervals are calculated to account for the possibility of overdispersion. Column (3) uses a group of 67,045 low-income BC+ parents in Milwaukee County as a comparison group for the adults in the Core plan.

Table 4. **Average Acute Care Hospital Admissions per Month and Predicted Incident Rate Ratio of Visits Following Enrollment into Public Insurance to Admissions when Uninsured**

	(1)	(2)	(3)
	Average Visits Per Month When Uninsured (Core Plan Participants, per 1000)	Pre-Post Model (Core Plan Participants Only)	Difference-in-Difference Model (BC+ Parents comparison)
Hospitalizations	36.323	0.412	0.583
		[0.368, 0.461]	[0.553, 0.615]
Preventable Hospitalizations (PQIs)			
Diabetes Short-term complications	1.224	0.581	0.607
		[0.369, 0.914]	[0.433, 0.852]
Perforated Appendix	0.042	1.817	2.795
		[0.141, 23.370]	[0.127, 61.300]
Diabetes Long-term complications	0.497	0.547	0.399
		[0.262, 1.143]	[0.271, 0.586]
COPD	0.252	0.591	0.413
		[0.229, 1.527]	[0.249, 0.684]
Hypertension	0.602	0.203	0.089
		[0.085, 0.484]	[0.081, 0.098]
Congestive Heart Failure	0.800	0.599	0.382
		[0.332, 1.078]	[0.287, 0.509]
Dehydration	0.168	0.130	0.103
		[0.027, 0.622]	[0.088, 0.121]
Bacterial Pneumonia	0.546	0.609	0.439
		[0.331, 1.121]	[0.324, 0.594]
Urinary Tract Infection	0.231	0.264	0.357
		[0.073, 0.945]	[0.244, 0.523]
Angina	0.063	0.370	0.796
		[0.045, 3.034]	[0.083, 7.628]
Asthma	1.127	0.623	0.576
		[0.395, 0.983]	[0.413, 0.805]
Any PQI	6.061	0.525	0.432
		[0.419, 0.657]	[0.384, 0.486]
Number of Individuals	9,619	9,619	76,664

Notes:

Column (1) reports average hospitalizations per month for all former-GAMP Core plan members. Columns (2) and (3) report Incident Rate Ratios calculated using fixed effects poisson models and predicted percent changes from fixed effects linear regression models that adjust for calendar month and length of enrollment. Confidence intervals are calculated to account for the possibility of overdispersion. Column (3) uses a group of 67,045 low-income BC+ parents in Milwaukee County as a comparison group for the adults in the Core plan. 95% confidence intervals in brackets.