Impact of Health Reform on Young Adult Prescription Medication Utilization

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Among the major objectives of the Affordable Care Act (ACA) legislation, passed in March 2010, was greater access to healthcare services through increasing insurance coverage and decreasing the number of uninsured Americans—estimated to be more than 41 million before enactment.[1] The consequences of being uninsured are well documented and, besides financial considerations, include delays in care for serious conditions and receiving fewer preventive services.[2-4] Greater access was accomplished through several provisions, including expansion of Medicaid and establishment of insurance marketplaces. Another strategy was the dependent coverage provision that specified that young adults, who had a high uninsured rate prior to the ACA,[5,6] were eligible to stay on their parents' plans until the start of the first plan year after they turn 26, regardless of residency, marital status, and financial dependency, effective September 23, 2010.

Previously, investigators showed that the provision led to an increase in young adults who were insured, had a primary care doctor, and had coverage for emergency care.[7-13] Others have documented the provision's spillover effects in terms of increasing dental insurance rates.[14] Chua and colleagues evaluated the provision's effects on medical spending, healthcare use, and overall health.[15] They found significant increases in the probabilities of insurance coverage and the reporting of excellent physical and mental health and a significant decrease in out-of-pocket (OOP) expenditures among young adults aged 19 to 25 years in the first whole-implementation year, 2011, compared with a group aged 26 to 34 years. However, they did not find an increase in healthcare utilization in the form of primary care, emergency department, or hospital visits, nor changes in prescription medications filled. Look et al[16] evaluated the ACA's impact on health and medication insurance coverage, medication utilization, and expenditures among young adults. They found that in 2011, compared with a control group, health and medication coverage increased by 4.9 and 5.5 percentage points, respectively, among young adults. There was no change in total medication utilization as measured

ABSTRACT

OBJECTIVES: To assess the impact of the Affordable Care Act dependent coverage provision on outpatient prescription expenditures among young adults and to characterize medication types that are prescribed for young adults.

STUDY DESIGN: Quasi-experimental.

METHODS: Using data from the Medical Expenditure Panel Survey from 2007 to 2009 and 2011 to 2013, difference-in-differences (DID) analyses estimated the provision's impact among young adults aged 19 to 25 years versus those aged 26 to 34 years. Five outcomes related to prescription medication access and utilization were evaluated, including whether young adults were unable to get necessary medications in the past year due to cost and whether there were changes in total, out-of-pocket (OOP), and private expenditures and the share of total expenditures paid OOP. DID analyses were also carried out for medication expenditures by class.

RESULTS: There were a total of 19,165 young adults aged 19 to 25 years and 23,892 aged 26 to 34 years. After adjusting for demographic and socioeconomic factors, provision implementation (DID coefficient $P \le .05$) was associated with an increase in total expenditures (by 3.8 percentage points), including those paid by private insurance (7.6 percentage points), and decreases in OOP expenditures and the share of total expenditures paid OOP (4.4 and 1.2 percentage points, respectively). Commonly used medications were anti-infectives, central nervous system agents, and hormones. Expenditures significantly increased for anti-infectives and decreased for hormones and psychotherapeutics.

CONCLUSIONS: The dependent coverage provision was associated with an increase in prescription medication expenditures, especially for anti-infectives, among young adults. The amount of expenditures paid by private insurers increased, whereas they decreased for OOP spending.

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by fills, although there was a 30% decrease in OOP medication expenditures. Shane et al evaluated changes in health insurance and prescription medication utilization through 2012 and found increases in insurance coverage among young adults, but no significant changes in fills in 2012 compared with 2011.[17]

Using a nationally representative sample, the Medical Expenditure Panel Survey (MEPS), this study builds on the work of others[16,17] in evaluating changes in medication utilization among young adults in the longer term. Specifically, using a difference-in-differences (DID) approach, this study assessed the ACA's impact on young adult healthcare services utilization regarding facets of outpatient medication utilization, including overall expenditures, through 2013. MEPS includes data regarding the medication name and expenditure amounts by payer, offering a dataset well suited to investigate this topic. Further, as there are few data that assess medication use patterns among young adults, a secondary aim was to examine the types that are commonly prescribed and whether or not expenditures by type were affected by the ACA.

METHODS

Data Source

The data source for this study was the Household Component Public Use Files of MEPS, a nationally representative sample of the noninstitutionalized civilian population. In 2013, close to 14,000 households were interviewed, representing 35,068 individuals.[18] The MEPS data include healthcare utilization, expenditures, medications, insurance coverage, and demographic and health characteristics.

This was a retrospective analysis that used data pooled from 2007 to 2009 and from 2011 to 2013 representing pre- and post-implementation periods of the dependent coverage provision, respectively. 2010 was not used because the dependent coverage provision was implemented during this year. Young adults aged 19 to 25 years served as the target group, whereas those aged 26 to 34 years were the comparison group, as defined previously.[15] This age group is close in age to the target group and presumably similar on aspects related to health utilization, but is not affected by the provision.

Prescription Medicine Utilization and Expenditures

During each survey round, respondents were asked about outpatient medications they obtained, both new and refills; this information is included in the Prescribed Medicines file. Data collected included medication name, quantity dispensed, and expenditure amounts. Information was verified by pharmacy

TAKEAWAY POINTS

▸ The dependent coverage provision was associated with increased prescription total expenditures by 3.8 percentage points among young adults aged 19 to 25 years in the 3-year time period following implementation versus prior. This included an increase in expenditures paid by private insurance (7.6 percentage points) and decreases in out-of-pocket (OOP) expenditures (4.4 percentage points) and share of total expenditures paid OOP (1.2 percentage points).

▸ Provision effects were especially noted among young adults with higher household income levels. For total expenditures, there was a significant 11.3 percentage-point increase among young adults in the highest income group (≥300% of federal poverty level [FPL]), while significant decreases of 13.2 and 13.0 percentage points were noted among the ≤100% and 101% to 299% of FPL groups, respectively. Among young adults, 6 therapeutic classes composed more than 80% of all outpatient prescription medications: anti-infectives; central nervous system agents; and hormone, respiratory, psychotherapeutic, and topical medications.

providers (provided that interviewees give permission to contact their pharmacies and the pharmacies respond to requests; about three-fourths of pharmacies responded in 2011) who relay information concerning medication fill/refill dates, the National Drug Code, medication name, strength and quantity dispensed, total expenditures, and payment sources.[19] For nonresponses, expenditures were imputed from pharmacy data for another person's obtainment of the same medication. Using a Generic Product Identifier code, MEPS coders classified medications into 16 major categories according to Lexicon Plus (Cerner Multum Inc; Denver, Colorado): anti-infective, antineoplastic, central nervous system (CNS), hormonal, topical, cardiovascular, gastrointestinal, respiratory, nutritional, metabolic, psychotherapeutic, genitourinary, coagulation, immunologic, alternative, and miscellaneous agents.[20]

The MEPS medication data have been validated. When MEPS data were matched with Medicare Part D claims data to validate prescription data, it was found that household respondents were good at reporting the total number of fills/refills and that they overreported the number of fills per drug, but underreported the number of drugs filled.[21] Concordance between sources was greater for chronic as opposed to intermittently used medications, such as anti-infective and pain medications.

Dependent Variables

There were 5 dependent variables related to medications. These included 1 binary (yes/no) variable related to medication access (whether or not there was a time in the past year that they were unable to get necessary prescribed medications due to cost) and 4 continuous variables related to utilization: total prescription expenditures, total paid by self/family (OOP), total paid by private insurance, and share of total expenditures paid OOP.

Analyses

DID methods tested the impact of the dependent coverage provision. Specifically, a multivariate DID model was used:

$Outcome = B_0 + B_1\ group + B_2\ time\ period + B_3\ (group) \times (time\ period) + other\ covariates$

The coefficient B_1 group represents the target group, young adults aged 19 to 25 years, and B_2, the postpolicy period, 2011 to 2013. The B_3 coefficient is the output of interest, representing an interaction term that captures the difference of the provision effect on the target and comparison groups.

Other demographic and health status factors that may affect medication utilization were included: age (continuous), gender, race/ethnicity (white non-Hispanic, Hispanic, black non-Hispanic, Asian/Pacific Islander, or other), region (Northeast, Midwest, South, or West), marital status (married, single/never married, widowed, or divorced/separated), household income (poor: ≤100% of the federal poverty level [FPL]; near-poor to low income: 101%-299% of the FPL; or middle to high income: ≥300% of FPL), self-perceived health and mental health status (excellent, very good, good, fair, or poor), education (less than high school diploma, high school diploma or General Educational Development credential, some college, or degree), health insurance (none, private, or public), having usual source of healthcare (yes/no), having chronic conditions (yes/no; asthma, high blood pressure, high cholesterol, or arthritis), and employment status (yes/no).

Separate models were constructed for the different outcomes. For expenditures, log transformed ordinary least squares regressions were conducted, adjusting for covariates. Analyses were also carried out in which individual postpolicy years (2011, 2012, 2013) were treated as an interaction term [(group) × (year)] to assess whether the ACA's impact on outcomes studied increased, decreased, or leveled off throughout postpolicy years. To discern whether the ACA had a differential impact depending upon household income, the outcomes were stratified by income levels, as outlined previously, in additional models. Multivariate DID models were also carried out for expenditures by medication class.

Descriptive analyses characterized medication use patterns by quantifying the proportion of different classes out of total medications prescribed to target and comparison group members before and after dependent coverage provision implementation. Chi-square and Student's *t* tests were used, as appropriate, to ascertain for differences in demographic and socioeconomic factors between groups. Given that the members of the target population of the provision were those covered by private insurance, sensitivity analyses were carried out whereby all individuals who were publicly insured were removed from the sample to evaluate result robustness.

To obtain nationally representative estimates, appropriate survey-weighting procedures accounting for the MEPS national probability design were used, as well as procedures to generate robust standard errors and estimates to take into account the complex survey design. Expenditures were adjusted to 2013 US$ based on the MEPS Personal Healthcare Expenditure Component Index, as recommended when pooling prescription medication expenditures.[22] Statistical tests were 2-tailed with alpha level of 0.05.

RESULTS

For all years, there were 19,165 (weighted = 177,426,653) young adults aged 19 to 25 years and 23,892 (weighted = 221,590,555) aged 26 to 34 years. **eAppendix I** (eAppendices available at **ajmc.com**) displays population characteristics for both groups. There were several significant differences across marital status, education, and income groups. For example, there was a lower proportion of comparison group members who were single/never married (42%), who had less than a high school diploma (11%), and who had an income ≤100% FPL (14%) compared with target group members (85%, 22%, and 19%, respectively; *P* <.001). There were also differences across health measures, with more target individuals having self-perceived health and mental health statuses of "excellent" (42% and 52% vs 33% and 47%, respectively; *P* <.001).

Table 1 displays adjusted differences in outcomes between the groups (full regression results are available in **eAppendix II**). For total expenditures, by the DID estimate, there was a significant increase of 3.8 percentage points among young adults aged 19 to 25 years compared with those aged 26 to 34 years. There was also a significant increase in private expenditures (7.6 percentage points) among young adults compared with those aged 26 to 34 years. The provision was associated with significant decreases in OOP expenditures (4.4 percentage points) and in the share of total expenditures paid OOP (1.2 percentage points). No differences were found in regard to whether or not there was a time in the past year they were unable to get medications due to cost.

With regard to the evaluation of postpolicy trends by year, the DID estimates showed that for total expenditures, significant increases were seen by those aged 19 to 25 years in years 2012 and 2013 only (17.4 and 3.4 percentage points, respectively, compared with those aged 26-34 years). Private expenditures increased in each postpolicy year by 14.0, 5.5, and 3.8 percentage points, respectively, for 2011, 2012, and 2013. For expenditures paid OOP, a significant decrease was seen only for 2013 (12.8 percentage points), whereas the share of total expenditures paid OOP significantly decreased in 2 years (3.1 and 2.5 percentage points, respectively, for 2012 and 2013).

For most outcomes, there were differences across income categories (Table 1). For example, for total expenditures, there was a significant 11.3 percentage-point increase among young adults in the highest income group (≥300% of FPL), whereas significant decreases were noted among lower-income groups (13.2 and 13.0 percentage points for ≤100% and 101%-299% of FPL groups, respectively). Among the income levels, individual-year DID estimates were largely similar to the pooled-year estimates for expenditures in terms of direction (increase, decrease) and significance, but were not consistent in magnitude over time (Table 1).

Overall, DID estimates were similar in direction and significance in sensitivity analyses, whereby the study sample was restricted

TABLE 1. Difference-in-Differences Adjusted Coefficients (SE) for the 5 Affordable Care Act–Related Outcomes[a,b]

	All Groups (unweighted n = 43,057)	Income ≤100% of FPL (unweighted n = 10,009)	Income = 101%-299% of FPL (unweighted n = 10,781)	Income ≥300% of FPL (unweighted n = 22,267)
Total prescription expenditures[c]	Unweighted n = 16,760 Weighted n = 177,720,058	Unweighted n = 4049 Weighted n = 28,659,142	Unweighted n = 3711 Weighted n = 31,783,447	Unweighted n = 9000 Weighted n = 117,277,469
Young adults × 2011-2013	0.038*** (0.009)	−0.132*** (0.201)	−0.130*** (0.021)	0.113*** (0.014)
Young adults × 2011	−0.010 (0.009)	−0.264*** (0.020)	−0.054* (0.021)	0.034* (0.014)
Young adults × 2012	0.174*** (0.009)	0.0165 (0.022)	−0.210*** (0.020)	0.282*** (0.0140)
Young adults × 2013	0.034** (0.009)	−0.040* (0.019)	−0.182*** (0.021)	0.113*** (0.014)
Prescription expenditures, private insurance[d]	Unweighted n = 4733 Weighted n = 61,601,743	Unweighted n = 314 Weighted n = 3,342,562	Unweighted n = 728 Weighted n = 7,414,725	Unweighted n = 3691 Weighted n = 50,844,456
Young adults × 2011-2013	0.076*** (0.004)			0.048*** (0.005)
Young adults × 2011	0.140*** (0.004)	N/A	N/A	0.090*** (0.004)
Young adults × 2012	0.055*** (0.003)			−0.104*** (0.004)
Young adults × 2013	0.038*** (0.004)			0.119*** (0.005)
Prescription expenditures paid by self/family[e]	Unweighted n = 13,495 Weighted n = 151,160,655	Unweighted n = 2600 Weighted n = 19,860,585	Unweighted n = 2867 Weighted n = 25,578,044	Unweighted n = 8028 Weighted n = 105,722,026
Young adults × 2011-2013	−0.044*** (0.002)	0.078*** (0.002)	−0.110*** (0.003)	−0.062*** (0.003)
Young adults × 2011	0.001 (0.002)	−0.024 (0.222)	−0.160*** (0.015)	−0.071*** (0.014)
Young adults × 2012	0.016*** (0.002)	0.297*** (0.024)	−0.219*** (0.015)	0.206*** (0.013)
Young adults × 2013	−0.128*** (0.002)	−0.029 (0.020)	−0.174*** (0.016)	−0.090*** (0.015)
Share of total prescription expenditures paid by self/family	Unweighted n = 13,489 Weighted n = 151,101,119	Unweighted n = 2598 Weighted n = 19,837,142	Unweighted n = 2867 Weighted n = 25,578,044	Unweighted n = 8024 Weighted n = 105,685,933
Young adults × 2011-2013	−0.012*** (0.0006)	0.045*** (0.0008)	0.025** (0.0008)	−0.030*** (0.0009)
Young adults × 2011	0.006*** (0.0006)	0.085** (0.0009)	0.019*** (0.0008)	−0.001*** (0.0009)
Young adults × 2012	−0.031*** (0.0006)	0.008** (0.0008)	−0.004*** (0.001)	−0.044*** (0.0009)
Young adults × 2013	−0.025*** (0.0006)	0.0008 (0.008)	0.044*** (0.0008)	−0.043*** (0.0009)
Unable to get necessary medications due to cost (% yes)	Unweighted n = 37,249 Weighted n = 351,573,227	Unweighted n = 8623 Weighted n = 56,188,550	Unweighted n = 9231 Weighted n = 68,409,944	Unweighted n = 19,395 Weighted n = 226,974,733
Young adults × 2011-2013	−0.156 (0.108)	−0.346 (0.292)	0.216 (0.215)	−0.226 (0.136)
Young adults × 2011	−0.131 (0.095)	−0.262 (0.256)	−0.112 (0.217)	−0.104 (0.132)
Young adults × 2012	−0.021 (0.222)	−0.839 (0.773)	0.498 (0.432)	0.013 (0.266)
Young adults × 2013	−0.243 (0.187)	−0.165 (0.369)	0.411 (0.302)	−0.459 (0.243)

FPL indicates federal poverty level; N/A, not available (estimates not available due to sample size); SE, standard error.
"*" indicates P <.05; "**" indicates P <.01; "***" indicates P <.001.
[a]Adjusted coefficients of the interaction between postimplementation status and target group (models adjusted for gender, ethnicity, age, marital status, education level, census region, income as percentage of FPL, self-perceived health and mental health status, health insurance status, chronic conditions, whether there is a usual source of healthcare, employment status). Expenditures were log-transformed and adjusted to 2013 US$ based on the Medical Expenditure Panel Survey Personal Healthcare Expenditure Component Index.
[b]Young adult is defined as being aged 19 to 25 years.
[c]Of those who had any nonzero expenditures (n = 10,035 for comparison group; n = 6725 for target group).
[d]Of those who had any nonzero expenditures (n = 2994 for comparison group; n = 1739 for target group).
[e]Of those who had any nonzero expenditures (n = 8247 for comparison group; n = 5248 for target group).

TABLE 2. Outpatient Medication Prescription Drug Use by Major Therapeutic Class

Percent of Prescriptions Filled (of total)	Target Group (aged 19-25 years)		Comparison Group (aged 26-34 years)	
	Pre-implementation	Post implementation	Pre-implementation	Post implementation
Anti-infectives	25	23	22	21
Antineoplastics	0.8	0.7	0.5	0.8
Cardiovascular agents	1.9	2.1	3.8	4.1
Central nervous system agents	24	26	25	26
Coagulation modifiers	0.2	0.1	0.3	0.1
Gastrointestinal agents	2.0	2.4	2.7	3.3
Hormones	18	19	17	17
Miscellaneous	0.7	0.5	1.0	0.7
Genitourinary agents	0.1	0.3	0.1	0.3
Nutritional products	3.9	3.9	3.8	4.2
Respiratory agents	7.6	6.4	6.4	5.4
Topical agents	7.9	8.1	6.7	6.6
Alternative medicines	0.5	0.0	0.3	0.0
Psychotherapeutic agents	5.4	5.1	6.5	7.4
Immunologic agents	0.2	0.4	0.2	0.2
Metabolic agents	0.7	1.3	2.7	2.9

TABLE 3. Difference-in-Differences Coefficients (SE) for Therapeutic Class Medication Expenditures[a,b,c]

	Anti-infectives	CNS Agents	Hormone	Respiratory	Topical	Psychotherapeutic
Young adults × 2011-2013	0.147*** (0.017)	−0.014 (0.018)	−0.096*** (0.018)	0.039 (0.026)	0.061 (0.040)	−0.148*** (0.017)
Young adults × 2011	−0.050** (0.017)	0.050** (0.017)	0.017 (0.019)	0.066** (0.022)	0.142*** (0.036)	−0.109*** (0.016)
Young adults × 2012	0.164*** (0.017)	−0.104*** (0.019)	−0.062** (0.017)	−0.024 (0.031)	0.811*** (0.042)	0.075*** (0.016)
Young adults × 2013	0.319*** (0.017)	−0.042** (0.018)	−0.244*** (0.018)	0.033 (0.030)	−0.422*** (0.046)	−0.351*** (0.0186)

CNS indicates central nervous system; SE, standard error.
"*" indicates P <.05; "**" indicates P <.01; "***" indicates P <.001.
[a]Adjusted coefficients of the interaction between postimplementation status and target group (models adjusted for gender, ethnicity, age, marital status, education level, census region, income as percentage of FPL, self-perceived health and mental health status, health insurance status, chronic conditions, whether there is a usual source of healthcare, employment status). Expenditures were log-transformed and adjusted to 2013 US$ based on the Medical Expenditure Panel Survey Personal Healthcare Expenditure Component Index.
[b]Estimates provided for the most commonly used 6 medication classes, which account for more than 80% of outpatient prescription medication expenditures in both target and comparison groups.
[c]Young adult is defined as being aged 19 to 25 years.

to those who were privately insured (**eAppendix III**). There were some notable differences in the magnitude of some estimates. For example, total expenditures increased by 5.7 and fell by 23.4 percentage points for all groups and the middle income level for young adults aged 19 to 25 years, respectively, for the reduced sample. An increase of 3.8 and decrease of 13.0 percentage points, respectively, was found for the full sample.

Proportions of prescriptions for major therapeutic classes out of all medications filled by the target and comparison groups are displayed in **Table 2**. In both groups, the most commonly used agents were anti-infective, CNS, hormone, respiratory, psychotherapeutic, and topical medications. These classes composed more than 80% of total prescriptions (88% and 87% of total, for

the pre- and postperiods, respectively, for the target group, and 84% and 83%, respectively, for comparisons). For both groups, the proportion of use of some of the commonly used classes changed modestly, by −8.0% and +8.3% (for anti-infectives), +5.5% and −4.5% (for CNS agents), and +4.0% and 0% (for hormones), for pre-post periods and target and comparison groups, respectively. However, the proportion of respiratory and metabolic agents decreased by 16% and 8%, respectively, for the target group. **Table 3** displays DID estimates for expenditures by class. There were significant increases in anti-infective expenditures, whereas there were decreases for hormone and psychotherapeutic expenditures among young dependents in the postperiod compared with the pre-implementation period. DID estimates for different classes

by year were not always significant or consistent in direction of pooled estimates (Table 3).

DISCUSSION

Findings of the dependent coverage provision's impact on medication expenditures show that it was associated with increases in total and private insurance expenditures of 3.8 and 7.6 percentage points, respectively, and decreases in OOP and share of total expenditures OOP of 4.4 and 1.2 percentage points, respectively, among young adults aged 19 to 25 years versus a slightly older group. Increases in total and private expenditures and decreases in OOP were concentrated in groups with higher incomes. Opposite effects were observed in lower-income groups. The ACA's effect by postpolicy year was, to a large degree, consistent in direction as to pooled estimates, but the effect was not found to be either increasing or decreasing consistently over time. Results were generally robust in terms of direction and significance when comparing DID estimates generated from a reduced study sample not inclusive of publicly insured persons, although some estimates were larger, such as those for total and OOP expenditures.

Regarding the impact of the provision on prescription medication utilization, Chua et al[15] found no difference between young adults aged 19 to 25 years and those aged 26 to 34 years in the proportion that had at least 1 medication fill within the previous year when evaluating the provision for 2011. Shane et al[17] found no differences in medication fills when examining MEPS data through 2012. In the current study, there were no significant differences in total expenditures in 2011, but there were significant increases in 2012 (17.4 percentage points) and in 2013 (3.4 percentage points). The impact may be more evident by medication expenditures, as in the current study, compared with utilization measured by fills. Look et al[16] evaluated total and medication expenditures by payment source. In unadjusted analyses, it was found that OOP medication expenditures significantly decreased from 2009 to 2011 among those in the age group affected by the provision, but there were no differences in private insurance expenditures.

Previous work[16] has shown that increases in medication insurance coverage (in 2011) were observed predominantly among young adult higher-income groups (14.5 percentage points) compared with nonsignificant increases and decreases in coverage among middle- and lower-income groups, respectively. The differential impact of the provision on expenditures by income in the current study is not unexpected, given that it primarily affected higher-income groups, with changes in coverage due to Medicaid expansion among lower-income groups occurring later in the ACA-implementation timeline (2014).[23]

We found that anti-infectives, CNS agents, and hormones were commonly used among young adults. Look et al[16] noted that medication fills for asthma increased significantly in 2011 compared

with 2009 among young adults affected by the ACA provision, and anti-infective medication fills increased for a control group, but no differences were seen for others. We found that expenditures for respiratory agents increased significantly (by 6.6 percentage points), whereas hormone expenditures increased by 1.7 percentage points (not significant) and psychotherapeutic expenditures significantly decreased (by 10.9 percentage points) in 2011. Overall decreases in hormone-related expenditures are likely due to the ACA provision mandating that private health insurance include oral contraceptives with no cost sharing.[24] Further research is needed to determine what agents in particular, and for what indications, are associated with prescription coverage due to the dependent coverage provision.

It is possible that there could be unintended consequences of increased coverage. In the case of anti-infectives, for example, it was estimated that approximately half of the time, they are prescribed inappropriately during ambulatory care visits, especially for acute respiratory infections.[25] Given that MEPS data were found to be more accurate for medications used to treat chronic conditions compared with intermittently used medications, including anti-infectives,[21] exploration of facets of anti-infective drug use in particular by young adults, including indications and agent selection, is warranted. Overall, medication types prescribed to young adults in both age groups in the current study differed from those that are prescribed to older adults, in that medications for hypertension, diabetes, and hyperlipidemia account for a large proportion of medications used among those aged 40 to 64 years.[26] This can be explained by the lower prevalence of these conditions in younger adults.

Limitations

There are limitations to this study. First, although MEPS medication data are self-reported, the data were validated and shown to have a high agreement rate with matched Medicare Part D claims data.[21] The medication types that did not match as well were designed for short-term use, such as anti-infectives, which were among the more highly used medications among young adults in the current study. It is possible that the ACA had an even higher impact on medication utilization if anti-infective expenditures were underreported. Second, although the models were adjusted for socioeconomic and employment status factors, other economic conditions during the study period, such as the recession beginning in 2008, may have differentially affected the 2 groups in terms of medication use behaviors and coverage.

CONCLUSIONS

The ACA dependent coverage provision was associated with an increase in total prescription expenditures, predominantly among those with higher incomes. Further, the young adult age group affected by the ACA had decreased prescription OOP medication

expenditures, particularly in the middle-income group. In analyses of the policy's impact through each postpolicy year across outcomes, there were not consistencies regarding level and direction of the ACA's impact. Further data are needed regarding the impact of the ACA provision on increased prescription medication access over time, including the specific types of agents being used more frequently and their impact on the health of young adults. ∎

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eAppendix I. Difference-in-Differences (DID) Adjusted Coefficients for the 5 Affordable Care Act-Related Outcomes

	Total prescription expenditures	Prescription expenditures, private insurance	Prescription expenditures paid by self/family	Share of total expenditures paid by self/family	Unable to get necessary medications due to cost (% yes)
Interaction term (DID estimate)	0.038*** (0.009)	0.076***(0.004)	–0.044** (0.002)	–0.030*** (0.0023)	–0.156 (0.108)
Female	0.55 (0.006)***	0.10*** (0.002)	–0.08*** (0.002)	0.53*** (0.006)	0.22*** (0.05)
Race/ethnicity					
White non-Hispanic (reference group)					
Hispanic	–0.53*** (0.006)	–0.08*** (0.006)	–0.07*** (0.001)	–0.43*** (0.006)	–0.50** (0.18)
Black non-Hispanic	–0.65*** (0.008)	–0.05*** (0.001)	–0.22***(0.0008)	–0.67*** (0.01)	0.11 (0.14)
Asian/Pacific Islander	–0.38*** (0.013)	0.11*** (0.008)	0.047*** (0.001)	–0.34*** (0.01)	–0.43 (0.31)
Other	–0.003 (0.016)	0.002 (0.002)	0.077*** (0.001)	–0.05 (0.02)	0.40 (0.28)
Age	0.033*** (0.001)	0.004*** (0.000)	0.003*** (0.0006)	0.01*** (0.001)	0.02 (0.02)
Marital status					
Married	–0.23*** (0.013)	–0.10*** (0.02)	–0.028*** (0.003)	–0.19*** (0.01)	–0.25 (0.30)
Single/never married	0.06*** (0.013)	0.08* (0.02)	0.052 *** (0.002)	0.01 (0.01)	0.19 (0.29)
Widowed	0.19*** (0.014)	1.54*** (0.02)	0.044 *** (0.004)	0.18*** (0.01)	–0.29 (0.83)
Divorced/ separated (reference group)					
Education					
Less than high school diploma	–0.28*** (0.017)	–0.07*** (0.002)	–0.0129*** (.001)	–0.24*** (0.01)	–0.005 (0.07)
At least high school diploma/GED	–0.11*** (0.008)	–0.09*** (0.003)	–0.051*** (0.001)	–0.08*** (0.006)	–0.006 (0.11)
Some college or degree (reference group)					
Census Region					
Northeast	0.12*** (0.007)	0.15*** (0.005)	–0.028*** (0.004)	–0.00 (0.007)	–0.09 (0.13)
South	0.19*** (0.008)	–0.09*** (0.005)	–0.007** (0.002)	0.16*** (0.007)	0.20* (0.10)
Midwest	0.12*** (0.007)	0.03*** (0.007)	0.005** (0.002)	0.05*** (0.008)	0.06 (0.11)

West (reference group)					
Income as % of federal poverty level					
≤100 % FPL (reference group)					
101-299% FPL	0.18*** (0.006)	−0.20*** (0.006)	0.038*** (0.002)	0.11*** (0.007)	0.14 (0.09)
≥300% FPL	0.33*** (0.005)	0.05*** (0.001)	0.081*** (0.002)	0.27*** (0.007)	−0.45*** (0.10)
Self-perceived health status					
Excellent	−0.91*** (0.011)	−0.22*** (0.008)	0.145*** (0.003)	−0.36*** (0.009)	−0.80*** (0.14)
Very Good	−0.87*** (0.012)	−0.16*** (0.005)	0.078*** (0.001)	−0.35*** (0.008)	−0.09 (0.10)
Good	−0.65*** (0.012)	−0.17*** (0.01)	0.084*** (0.002)	−0.26*** (0.009)	0.23** (0.08)
Fair or poor (reference group)					
Self-perceived mental health status					
Excellent	−0.94*** (0.01)	−0.03*** (0.009)	0.002 (0.002)	−0.58*** (0.01)	−0.31** (0.11)
Very Good	−0.88*** (0.01)	−0.15*** (0.01)	0.022*** (0.003)	−0.52*** (0.01)	−0.11 (0.10)
Good	−0.67*** (0.01)	0.04*** (0.008)	0.022*** (0.002)	−0.37*** (0.01)	0.04 (0.10)
Fair or poor (reference group)					
Health insurance status					
None (reference group)					
Private	0.39*** (0.007)	—	0.362*** (0.0009)	−0.17*** (0.008)	−0.27* (0.09)
Public	0.40*** (0.007)	—	−1.08*** (0.003)	−1.09*** (0.009)	−0.41*** (0.11)
Chronic condition (yes)					
Asthma	0.62*** (0.007)	0.24*** (0.01)	0.099*** (0.002)	0.46*** (0.006)	0.36*** (0.07)
High blood pressure	0.19*** (0.008)	0.03*** (0.008)	−0.013*** (0.001)	0.21*** (0.007)	0.21** (0.08)
High cholesterol	0.35*** (0.01)	0.03*** (0.01)	−0.064*** (0.002)	0.24* (0.009)	0.10 (0.09)
Arthritis	0.38*** (0.01)	0.33*** (0.02)	0.051*** (0.002)	0.25*** (0.01)	0.12 (0.10)
Have a usual source of healthcare (yes)	0.45*** (0.007)	−0.04*** (0.003)	−0.076*** (0.001)	0.27*** (0.006)	−0.27*** (0.07)
Employed (yes)	−0.22*** (0.004)	−0.12*** (0.003)	0.043*** (0.0007)	−0.04*** (0.005)	−0.06 (0.07)

*P <.05; **P <.01; ***P <.001.

Note. Standard errors in parentheses.

eAppendix II. Difference-in-Difference Adjusted Coefficients for the Five Affordable Care Act-Related Outcomes Among Those With No Public Insurance Coverage[a,b]

	All Groups	Income ≤100% of Federal Poverty Level	Income = 101%-299% of Federal Poverty Level	Income ≥300% of Federal Poverty Level
Total prescription expenditures	Unweighted n = 13,460 Weighted n = 153,111,575	Unweighted n = 2269 Weighted n = 17,323,075	Unweighted n = 2858 Weighted n = 25,572,065	Unweighted n = 8333 Weighted n = 110,216,436
Young Adults 19-25 × 2011-13	0.057*** (0.004)	–0.105*** (0.002)	–0.234*** (0.003)	0.130*** (0.005)
Young Adults 19-25 × 2011	0.057*** (0.003)	–0.208*** (0.002)	–0.053*** (0.003)	0.093*** (0.004)
Young Adults 19-25 × 2012	0.156*** (0.003)	0.175*** (0.002)	–0.394*** (0.003)	0.232*** (0.004)
Young Adults 19-25 × 2013	0.022*** (0.003)	–0.008*** (0.002)	–0.386*** (0.004)	0.119*** (0.004)
Prescription expenditures, private insurance	Unweighted n = 4612 Weighted n = 60,378,422	Unweighted n = 286 Weighted n = 3,081,844	Unweighted n = 700 Weighted n = 7,199,821	Unweighted n = 3626 Weighted n = 50,096,757
Young Adults 19-25 × 2011-13	0.070*** (0.004)	NA	NA	0.046*** (0.005)
Young Adults 19-25 × 2011	0.129*** (0.004)	NA	NA	0.085*** (0.005)
Young Adults 19-25 × 2012	0.019*** (0.003)	NA	NA	–0.173*** (0.004)
Young Adults 19-25 × 2013	0.059*** (0.004)	NA	NA	0.154*** (0.005)
Prescription expenditures paid by self/family	Unweighted n = 12,574 Weighted n = 145,891,725	Unweighted n = 1953 Weighted n = 15,313,793	Unweighted n = 2614 Weighted n = 23,862,383	Unweighted n = 8007 Weighted n = 106,715,549
Young Adults 19-25 × 2011-13	–0.051*** (0.002)	0.096*** (0.007)	–0.284*** (0.004)	–0.029*** (0.003)
Young Adults 19-25 × 2011	–0.067*** (0.002)	0.032*** (0.007)	–0.227*** (0.004)	–0.055*** (0.003)

Young Adults 19-25 × 2012	0.097*** (0.002)	0.374*** (0.006)	−0.338*** (0.003)	0.140*** (0.002)
Young Adults 19-25 × 2013	−0.111*** (0.002)	0.105*** (0.007)	−0.347*** (0.004)	−0.096*** (0.003)
Share of total prescription expenditures paid by self/family	Unweighted n = 12,574 Weighted n = 145,891,725	Unweighted n = 3219 Weighted n = 23,840,282	Unweighted n = 3231 Weighted n = 28,416,136	Unweighted n = 8509 Weighted n = 112,133,328
Young Adults 19-25 × 2011-13	−0.035*** (0.001)	0.020*** (0.006)	0.012** (0.004)	−0.045*** (0.003)
Young Adults 19-25 × 2011	−0.040*** (0.002)	0.043*** (0.003)	−0.048*** (0.002)	−0.058*** (0.001)
Young Adults 19-25 × 2012	−0.012*** (0.002)	0.032*** (0.003)	0.024*** (0.001)	−0.016*** (0.001)
Young Adults 19-25 × 2013	−0.031*** (0.002)	0.057*** (0.003)	0.035*** (0.001)	−0.057*** (0.001)
Unable to get necessary medications due to cost (% yes)	Unweighted n =31,841 Weighted n = 314,073,559	Unweighted n = 5815 Weighted n = 39,306,663	Unweighted n = 7751 Weighted n = 58,606,063	Unweighted n = 18,275 Weighted n = 216,160,834
Young Adults 19-25 × 2011-13	−0.157 (0.112)	−0.253 (0.294)	0.177 (0.215)	−0.235 (0.143)
Young Adults 19-25 × 2011	−0.112 (0.110)	0.059 (0.289)	0.206 (0.232)	−0.119 (0.141)
Young Adults 19-25 × 2012	−0.083 (0.238)	−1.709 (1.094)	0.511 (0.487)	0.014 (0.283)
Young Adults 19-25 × 2013	−0.231 (0.192)	0.043 (0.344)	−0.388 (0.312)	−0.464 (0.251)

NA indicates estimates not available due to sample size.

*P <.05; **P <.01; ***P <.001.

[a]Standard errors in parentheses.

[b]Adjusted coefficients of the interaction between post-implementation status and target group (models adjusted for gender, ethnicity, age, marital status, education level, census region, income as % of Federal Poverty Level, self-perceived health and mental health status, health insurance status, chronic conditions, whether there is a usual source of healthcare, employment status).

Expenditures were log-transformed and adjusted to 2013 US dollars based on the MEPS Personal Healthcare Expenditure Component Index.

eAppendix III. Difference-in-Difference Adjusted Coefficients for the Five Affordable Care Act-Related Outcomes[a]

	All Groups	Income ≤100% of Federal Poverty Level	Income 101%-299% of Federal Poverty Level	Income ≥300% of Federal Poverty Level
Unable to get necessary medications due to cost (% yes)	Unweighted n = 31,841 Weighted n = 314,073,559	Unweighted n = 5815 Weighted n = 39,306,663	Unweighted n = 7751 Weighted n = 58,606,063	Unweighted n = 18,275 Weighted n = 216,160,834
Interaction term	−0.157 (0.112)	−0.253 (0.294)	0.177 (0.215)	−0.235 (0.143)
2011	0.037 (0.081)	0.012 (0.049)	0.160 (0.208)	0.005 (0.098)
2011 × group	−0.112 (0.110)	0.059 (0.289)	0.206 (0.232)	−0.119 (0.141)
2012	0.149 (0.160)	1.450 (1.050)	−0.096 (0.122)	0.030 (0.162)
2012 × group	−0.083 (0.238)	−1.709 (1.094)	0.511 (0.487)	0.014 (0.283)
2013	0.220 (0.167)	0.008 (0.085)	−0.183 (0.203)	0.359 (0.233)
2013 × group	−0.231 (0.192)	0.043 (0.344)	−0.388 (0.312)	−0.464 (0.251)
Total prescription expenditures[b]	Unweighted n = 13,460 Weighted n = 153,111,575	Unweighted n = 2269 Weighted n = 17,323,075	Unweighted n = 2858 Weighted n = 25,572,065	Unweighted n = 8333 Weighted n = 110,216,436
Interaction term	0.057*** (0.004)	−0.105*** (0.002)	−0.234*** (0.003)	0.130*** (0.005)
2011	−0.232*** (0.003)	−0.014*** (0.0001)	−0.002 (0.004)	−0.301*** (0.004)
2011 × group	0.057*** (0.003)	−0.208*** (0.002)	−0.053*** (0.003)	0.093*** (0.004)
2012	−0.280*** (0.003)	−0.150*** (0.0001)	0.070*** (0.004)	−0.352*** (0.004)
2012 × group	0.156*** (0.003)	0.175*** (0.002)	−0.394*** (0.003)	0.232*** (0.004)
2013	−0.228*** (0.003)	−0.057*** (0.0003)	0.030*** (0.004)	−0.276*** (0.004)
2013 × group	0.022*** (0.003)	−0.008*** (0.002)	−0.386*** (0.004)	0.119*** (0.004)
Share of total prescription expenditures paid by self/family[b]	Unweighted n = 12,574 Weighted n = 145,891,725	Unweighted n = 3219 Weighted n = 23,840,282	Unweighted n = 3231 Weighted n = 28,416,136	Unweighted n = 8509 Weighted n = 112,133,328
Interaction term	−0.035*** (0.001)	0.020*** (0.006)	0.012** (0.004)	−0.045*** (0.003)
2011	0.053*** (0.002)	−0.046*** (0.0002)	−0.003*** (0.001)	0.087*** (0.0004)
2011 × group	−0.040*** (0.002)	0.043*** (0.003)	−0.048*** (0.002)	−0.058*** (0.001)
2012	0.029*** (0.002)	−0.039*** (0.0001)	−0.065*** (0.001)	0.056*** (0.0003)
2012 × group	−0.012*** (0.002)	0.032*** (0.003)	0.024*** (0.001)	−0.016*** (0.001)
2013	0.013*** (0.002)	−0.094*** (0.0007)	−0.043*** (0.001)	0.032*** (0.0003)

2013 × group	−0.031*** (0.002)	0.057*** (0.003)	0.035*** (0.001)	−0.057*** (0.001)
Prescription expenditures, private insurance[b]	Unweighted n = 4612 Weighted n = 60,378,422	Unweighted n = 286 Weighted n = 3,081,844	Unweighted n = 700 Weighted n = 7,199,821	Unweighted n = 3626 Weighted n = 50,096,757
Interaction term	0.070*** (0.004)	NA	NA	0.046*** (0.005)
2011	−0.446*** (0.004)			−0.485*** (0.004)
2011 × group	0.129*** (0.004)			0.085*** (0.005)
2012	0.074*** (0.003)			0.156*** (0.004)
2012 × group	0.019*** (0.003)			−0.173*** (0.004)
2013	0.096*** (0.004)			0.125*** (0.004)
2013 × group	0.059*** (0.004)			0.154*** (0.005)
Prescription expenditures paid by self/family[b]	Unweighted n = 12,574 Weighted n = 145,891,725	Unweighted n = 1953 Weighted n = 15,313,793	Unweighted n = 2614 Weighted n = 23,862,383	Unweighted n = 8007 Weighted n = 106,715,549
Interaction term	−0.051*** (0.002)	0.096*** (0.007)	−0.284*** (0.004)	−0.029*** (0.003)
2011	−0.124*** (0.004)	−0.265*** (0.001)	−0.010* (0.005)	−0.132*** (0.005)
2011 × group	−0.067*** (0.002)	0.032*** (0.007)	−0.227*** (0.004)	−0.055*** (0.003)
2012	−0.264*** (0.004)	−0.321*** (0.0003)	−0.248*** (0.005)	−0.266*** (0.005)
2012 × group	0.097*** (0.002)	0.374*** (0.006)	−0.338*** (0.003)	0.140*** (0.002)
2013	−0.347*** (0.003)	−0.491*** (0.002)	−0.220*** (0.005)	0.342*** (0.004)
2013 × group	−0.111*** (0.002)	0.105*** (0.007)	−0.347*** (0.004)	−0.096*** (0.003)

NA indicates estimates not available due to sample size.

*P <.05; **P <.01; ***P <.001.

[a]Adjusted coefficients of the interaction between post-implementation status and target group (models adjusted for gender, ethnicity, age, marital status, education level, census region, income as % of Federal Poverty Level, self-perceived health and mental health status, health insurance status, chronic conditions, whether there is a usual source of healthcare, employment status). Expenditures were log-transformed and adjusted to 2013 US dollars based on the MEPS Personal Healthcare Expenditure Component Index.

[b]Of those who had any expenditures.