Essays on Disruptions in Medicaid Coverage

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Abstract

This dissertation presents three empirical papers investigating how disruptions in Medicaid coverage affect enrollees. Medicaid is unique among public insurance programs in the United States because eligibility is means tested and, in most states, enrollment in private managed care plans is mandatory. Medicaid enrollees are low-income adults, children, and seniors, as well as people with disabilities, and these populations often face barriers to navigating the complexities of Medicaid enrollment, eligibility, and managed care. Changes in personal circumstance or state and federal policies can lead Medicaid enrollees to experience unanticipated changes to their health insurance coverage.

Most Medicaid enrollees receive coverage through publicly financed, privately administered Medicaid managed care plans. States contract with Medicaid managed care organizations and offer most enrollees a choice of several plans. The high dollar amount of managed care contracts has led most states to select Medicaid plans using competitive bidding. When states conduct competitive bidding to select which plans to offer, enrollees may be forced to change managed care organizations if their plan's contract is not renewed. There is a sizable literature about plan switching in private insurance, but this type of disruption has not been extensively studied in Medicaid.

Chapter 1 investigates how being forced to switch Medicaid managed care plans affects health care use and continuity of care for Medicaid enrollees. In 2016, Minnesota's state government used competitive bidding to contract with a new set of

Medicaid managed care organizations. More than half of enrollees in the state were forced to change plans as a result of the bidding. I use data from the Minnesota All Payer Claims Database to show that enrollees who were forced to switch plans used fewer health care services after enrolling in their new plan. Plan switching also led to increased new provider visits, which is a sign of disrupted continuity of care. The effects on health care use were large, representing 30 percent reductions across a wide range of health care services, but were concentrated among enrollees who joined a specific managed care organization. These findings suggest that while states may be able to leverage competition between managed care plans to generate financial savings, being forced to switch insurers can be disruptive for Medicaid enrollees.

Disenrollment from Medicaid is a second type of disruption. Some people lose Medicaid benefits because changes in their income or circumstances make them ineligible for the program, but others are disenrolled despite remaining eligible. This can occur when enrollees do not complete the necessary steps to renew or re-certify their Medicaid eligibility. Many people who are disenrolled later return to Medicaid. Losing Medicaid may result in uninsurance, even if benefits are restored in subsequent months. Transitioning in and out of Medicaid coverage may make it difficult for some people to receive regular medical care.

Chapter 2 uses ten years of Medicaid enrollment data to measure the frequency of disenrollment and coverage disruption in Minnesota. I estimate the rate at which individuals disenroll from Medicaid, the share of disenrollments that result in uninsurance, and the share of enrollees who disenroll but return to the program within twelve months, which is called churn. I use medical and pharmacy claims data to

show that the adults and children who experience disruptions in coverage are a lower spending population and leverage a unique feature of the Minnesota All Payer Claims Database to show that most enrollees do not have private insurance coverage during periods outside of Medicaid. This chapter demonstrates the role that All Payer Claims Databases can play in understanding coverage transitions in the fractured American health insurance system. I discuss state and federal policies that can help streamline Medicaid renewal and enrollment, with the goal of improving retention in the program and reducing the frequency of churn.

Chapter 3 expands on Chapter 2 by examining how health care spending and use patterns differ between Medicaid enrollees who churn. I show that re-enrollment is highly correlated with short-term increases in medical spending and health care use and that enrollees who churn back into Medicaid coverage have higher spending throughout the re-enrollment period. This is the first paper to use administrative data to estimate the association between Medicaid churn and spending among non-elderly adults and shows how Medicaid enrollment policies like retroactive eligibility interact with disenrollment and churn.

Contents

Acknowledgements **i**

Abstract **ii**

List of Tables **viii**

List of Figures **ix**

1 The effect of changing Medicaid managed care organizations on health care use and continuity of care **1**

1.1 Introduction 2

1.2 Background 5

1.3 Conceptual Framework 8

1.4 Research Design 10

1.4.1 Medicaid in Minnesota 10

1.4.2 Data and Study Population 15

1.4.3 Outcomes 17

1.4.4 Estimation 21

1.5 Results 25
1.5.1 Descriptive Statistics 25
1.5.2 Health care use 28
1.5.3 Continuity of Care 38
1.6 Discussion 41
1.7 Conclusion 46

2 Estimates of Medicaid disenrollment, coverage loss, and churn in Minnesota from 2010 - 2019 47

2.1 Introduction 48
2.2 Research Design 51
2.2.1 Medicaid in Minnesota 51
2.2.2 Data 52
2.2.3 Methods 54
2.3 Results 56
2.4 Discussion 62
2.5 Conclusion 67

3 Health care use before and after Medicaid churn 68

3.1 Introduction 69
3.2 Research Design 73
3.2.1 Empirical Strategy 73
3.2.2 Data 77
3.2.3 Outcomes 79

3.2.4 Estimation 80
3.3 Results 83
3.3.1 Descriptive Statistics 83
3.3.2 Event Study Results 86
3.3.3 Average change in use 90
3.4 Discussion 91
3.5 Conclusion 95

References **96**

Appendix A. Appendices to Chapter 1 **106**

Appendix B. Appendices to Chapter 2 **113**

Appendix C. Appendices to Chapter 3 **116**

List of Tables

1.1 Characteristics of treatment and comparison groups in 2015 25

1.2 Treatment effects - health care use 30

1.3 Treatment effects - continuity of care 39

2.1 Coverage, disenrollment, and churn in Minnesota, 2010 - 2019 57

3.1 Enrollee characteristics and health care use during the index spell . . 84

3.2 Difference-in-differences regression estimates 91

A.1 Primary care, mental health, and other providers by NPPES classification, 2015-2016 108

A.2 Key providers by NPPES classification, 2015 109

A.3 Age-stratified treatment effects - health care use 110

A.4 Chronic condition stratified treatment effects - health care use 111

A.5 Age-stratified treatment effects - continuity of care 112

A.6 Chronic condition stratified treatment effects - continuity of care . . . 112

List of Figures

1.1 Conceptual Model 9

1.2 Monthly PMAP enrollment by MCO, 2015 - 2016 13

1.3 December 2015 enrollment exposed to plan exit 14

1.4 Frequency of plan switching 27

1.5 Event study - outpatient encounters 31

1.6 Event study - outpatient primary care encounters 31

1.7 Event study - outpatient mental health encounters 32

1.8 Event study - emergency department visits 32

1.9 Event study - inpatient admissions 35

1.10 Event study - prescription fills 35

1.11 Event study - medical spending 36

1.12 Event study - prescription drug spending 36

1.13 Cumulative distribution of outpatient encounters across networks . . 38

2.1 Annual disenrollment, coverage loss, and churn rates, 2010 - 2019 . . 58

2.2 Adjusted spending by disenrollment status 59

2.3 Coverage before and after Medicaid spells 61

3.1 Trend in Medicaid spending 85

3.2 Event study - medicaid spending 87

3.3 Event study - outpatient encounters 88

3.4 Event study - emergency department visits 89

3.5 Event study - hospital admissions 90

A.1 Treatment group switching by MCO combination 107

A.2 Share of total spending by network membership 107

B.1 Annual disenrollment, coverage loss, and churn rates - children 113

B.2 Annual disenrollment, coverage loss, and churn rates - adults 114

B.3 Annual disenrollment, coverage loss, and churn rates - seniors 115

C.1 Trend in outpatient encounters 116

C.2 Trend in emergency department visits 117

C.3 Trend in hospital admissions 118

Chapter 1

The effect of changing Medicaid managed care organizations on health care use and continuity of care

1.1 Introduction

Medicaid is the second largest public insurance program in the United States, covering more than 20 percent of the non-elderly population.[1] While Medicaid coverage is jointly funded by state and federal governments, benefits are increasingly delivered through private managed care plans. The first Medicaid managed care (MMC) policies were piloted in the 1980s and focused on applying utilization management and primary care case management to low-income adults and children.[2] Today, the most common approach to MMC is enrolling Medicaid beneficiaries in risk-bearing managed care plans, with over 70 percent of enrollees receiving coverage through a Medicaid managed care organization (MCO).[3]

States pay Medicaid MCOs a fixed, per-enrollee-per-month fee, called a capitation rate, in exchange for the plan managing provider payment, benefits administration, provider network construction, and other managed care functions. In 2019, these fees accounted for 46 percent of the more than $600 billion in nationwide Medicaid spending.[4] Medicaid MCOs bear the expenditure risk for enrollees whose health spending exceeds the risk-adjusted capitation rate paid by the state.[5] This means that plans will earn profits when enrollees have lower health care spending than the capitation rate and incur losses when spending is higher than the capitation rate. This structure creates incentives for Medicaid MCOs to keep their enrollees healthy, but some plans may also maximize profits by making it difficult for enrollees to access care.[6]

States derive three key benefits from contracting with private plans. First, paying Medicaid MCOs with capitation creates budget predictability by transferring health

expenditure risk from the state to private Medicaid MCOs. Second, contracting out coverage relieves states of the responsibility for maintaining provider networks, monitoring provider quality, and other administrative functions of managed care plans. Third, contracting with MCOs presents an opportunity for states to foster "regulated competition" between health plans, which can encourage innovation, improve quality of care, and lead to greater efficiency.[7]

There are several challenges to fostering plan competition in Medicaid. Most Medicaid enrollees do not pay premiums or cost sharing, which limits the ability for states to steer enrollees toward efficient plans.[8] Medicaid plans must also comply with state and federal regulations that include mandated benefits and provider network adequacy requirements, which limits the degree to which plans can differentiate themselves from one another. Budget constraints also mean that provider payment rates are lower in Medicaid than Medicare or private insurance, and finding providers who are willing to participate in Medicaid MCOs' provider networks can be challenging.[9] This means that Medicaid plans' provider networks are often similar to one another.[10]

Recognizing these limitations, most states use competitive bidding to select which MCOs will participate in their Medicaid program.[11] Competitive bidding can facilitate managed competition by allowing states to set minimum standards for plan quality and having Medicaid MCOs compete with each other to offer the highest quality coverage at capitation rates that meet states' budget goals. Winning bidding is desirable for insurers because MMC markets are profitable, with net premiums (the excess of premium revenue over claims and administrative expenses) averaging 1.2 percent from 2015-2020.[12]

Competitive bidding, may however, come with a cost. In an effort to select lower cost, more efficient plans, states may exclude incumbent plans that submit less competitive bids. Most concerningly, efforts to minimize the capitation rate could exclude plans that offer high-quality coverage but are more expensive. When states remove incumbent Medicaid MCOs from their programs, enrollees in those plans will be forced to switch to a new Medicaid MCO. Excluding plans poses a trade-off for Medicaid programs. On the one hand, the threat of termination may encourage MCOs to operate more efficiently, invest in innovations that improve enrollee health, and reduce their capitation rates. On the other hand, terminating MCO contracts may disrupt care for enrollees by forcing them to switch MCOs.

This study is the first to investigate how forced plan switching caused by competitive bidding affects Medicaid enrollees' health care use and continuity of care. In 2015, Minnesota concluded a competitive bidding process for its two largest Medicaid programs and excluded three incumbent Medicaid MCOs from counties where they had previously operated. When the new contracts when into effect in January 2016, approximately 475,000 enrollees were forced to choose a new Medicaid MCO because their plan was no longer available.[13] Using data from the Minnesota All Payer Claims Database,[14] I show that the plan exits were the primary driver of plan switching among Medicaid enrollees during this period. I then compare health care use and continuity of care outcomes between enrollees who were forced to switch plans and enrollees whose plans continuously available.

In the first year after being forced to switch plans, enrollees had 0.25 fewer monthly outpatient visits, including 0.10 fewer primary care visits and 0.05 fewer visits to

mental health care providers. Use of emergency department and inpatient services also decreased and per-member-per-month spending fell by $62. I also estimated changes in claims-based continuity of care measures and found that plan switching increased the share of outpatient visits that were between new patient-provider pairs.

These findings highlight a key trade-off for states seeking to leverage managed competition; that transitioning enrollees from one Medicaid managed care plan to another could disrupt health care access and continuity of care. These issues have grown more salient since 2016, as a higher percentage of Medicaid enrollees are covered by managed care and states increasingly look to use managed care organizations to implement new and innovative approaches to health care delivery and finance in Medicaid.

1.2 Background

The original goal of Medicaid managed care was to improve health care access and slow the growth rate of Medicaid spending.[15] MMC expanded rapidly throughout the 1990s as states transitioned enrollees from fee-for-service (FFS) coverage, where the state provides benefits and pays claims, to "comprehensive managed care plans," where the state pays MCOs a per-member-per-month payment to manage some or all health benefits for the covered population.[16] Early enrollees in comprehensive managed care plans were mostly children and non-elderly adults without disabilities, but more recent expansions of MMC have enrolled individuals with disabilities and older adults who are dual eligible for Medicare and Medicaid into private plans.[17]

Despite the widespread adoption of Medicaid MCOs as a mechanism for providing benefits, the evidence that MMC improves access or quality of care relative to traditional FFS Medicaid is mixed. Surveying the empirical literature suggests that MMC may have modest effects on health care use but the direction and size of these effects conflicts across states, populations, and outcomes.[18] The ability of MMC to reduce Medicaid costs is similarly unclear. Few peer-reviewed studies have identified cost savings from MMC transitions and estimates of the budgetary impact of MMC vary substantially across states.[19] Recent research suggests that the success or failure of managed care to improve patient outcomes depends on which managed care plans are providing benefits[20] and the institutional details of the FFS program.[17]

The growth of Medicaid MCOs occurred alongside a broader movement toward regulated competition in health insurance markets. Regulated competition describes settings where private health plans compete for enrollees on price and non-price attributes, within boundaries set by a public regulator.[21] The goal of regulated competition is to promote the efficient aspects of health plan competition while ensuring the availability of insurance coverage that offers meaningful financial protection and access to care. Medicare Advantage, Medicare Supplemental policies, and the Affordable Care Act marketplaces for individual coverage are all settings where private health plans compete for enrollees within regulatory guard rails. Plans differentiate themselves on premiums, covered benefits, provider networks, and enrollee experience while consumers are protected by regulations that standardize product offerings and mandate a minimum level of coverage.

Competition in MMC markets occurs in two stages. In the first stage, health

plans compete for state contracts to provide publicly-funded Medicaid benefits in a particular geographic market. In the second stage, the plans compete to enroll beneficiaries, who can choose between any of the MMC plans offered in their market. Plan choice has not been successful in encouraging competition because Medicaid enrollees do not systematically use information about plan quality when selecting plans, which blunts the incentive for MCOs to compete for patients by improving their quality metrics.[22,23,24] In many states, fewer than half of enrollees actively choose a plan and are instead automatically assigned to a Medicaid MCO.[25] After making an initial choice or being assigned, enrollees rarely change their plan selections, even when a higher quality alternative is available at no additional cost.[26]

The ability for states to foster competition through the contracting process is also unclear. There is no consensus on how many Medicaid MCO choices states should offer to enrollees or on what types of plans perform the best. Providing enrollees with more plan choices does not improve market-level quality[27] and removing low-quality plans from the program does not lead to higher average quality in the market.[28] For-profit and non-profit plans perform similarly in their ability to retain enrollees in Medicaid coverage[29] and comparisons of access and spending between Medicaid-focused insurers and multi-market firms are inconclusive.[30]

The ambiguity around how to design competitive MMC markets poses a challenge for regulators because Medicaid MCOs play an important role in shaping enrollees' health care use and health outcomes. Managed care policies can create barriers to access and that negatively affect the sickest enrollees who are least able to navigate administrative hurdles to accessing care.[20] Plans differ in average spending by as

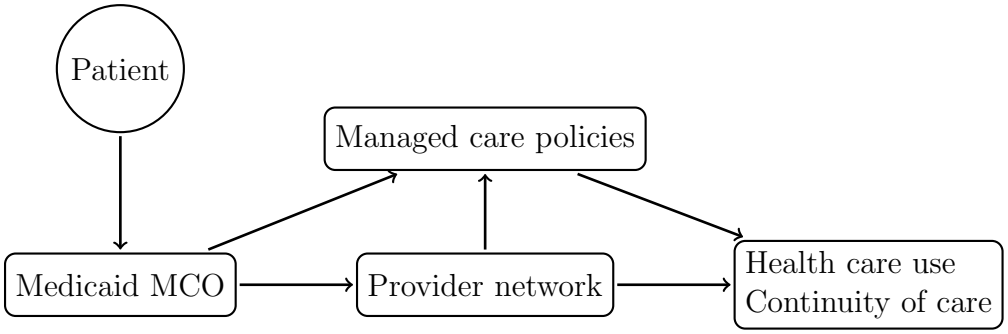
much as 30 percent and low-spending plans provide less of all types of care, not just "wasteful" services, and also have lower patient satisfaction and worse outcomes.[31] Which managed care plan an enrollee chooses will be a significant determinant of what providers they can see and their ability to access health care services.

Some degree of voluntary or forced plan switching may be a necessary condition for competitive MMC markets, as states seek to continuously improve plan quality and efficiency by contracting with the highest performing Medicaid MCOs. Competition that causes some plans to leave the Medicaid program risks disrupting enrollees' access to care and continuity of care. Prior studies of plan switching in Medicaid have found that changing Medicaid MCOs is associated with delays in seeking care and a lower likelihood of having a usual source of care.[32,33] Medicaid enrollees who voluntarily changed MCOs made more new provider visits and emergency department visits in subsequent months.[34] When one state forced enrollees to switch plans in order to balance enrollment, children with asthma made fewer outpatient primary care visits, though this did not lead to negative short-term health effects.[35] While these studies show that Medicaid plan switching can disrupt enrollees access to care, no work to date has evaluated the effect of forced plan switching induced by competitive bidding.

1.3 Conceptual Framework

Manged care plans use provider networks and care management policies that make it difficult, or more expensive, for enrollees to access care outside of a set of preferred providers. Provider networks are especially binding for Medicaid patients, who lack

Figure 1.1: Conceptual Model



the financial means to pay out-of-pocket for health care that their Medicaid MCO will not cover. Switching plans is most likely to affect enrollees' use of health care and continuity of care if they move to a new plan that does not include their providers in the network. When this happens, enrollees need to find a new primary care provider and may also be unable to access speciality providers to whom they had previously been referred.

Being forced to change providers disrupts continuity of care, which is the degree to which a patient and provider have a persistent care relationship over time.[36] Continuity of care is positively associated with regular use of primary care, medication adherence, better self-reported health, and patient satisfaction.[37] Enrollees who switch MCOs may also experience barriers to accessing care. Plans may have different utilization management strategies like prior authorization or referral requirements and people who switch plans may find it difficult to make appointments, get referrals to specialists, or obtain authorization for treatments. New enrollees may need to review plan documents, speak with customer service representatives, or navigate plan websites, all of which cause them to forgo or delay seeking care.

I hypothesize that forced plan switching between Medicaid MCOs will reduce

health care use and disrupt continuity of care. However, enrollees who switch from plans that lost bidding to plans that won bidding may receive more efficient or higher quality care in the new plan. States design their contracting processes to pick high-quality, efficient plans and the MCOs that the state chooses to exclude may be worse at achieving these goals. Moving enrollees from low-performing to higher-performing plans could reduce use of inefficient care, increase use of efficient care, and shift Medicaid enrollees to higher quality providers. The effect of bidding-induced plan switching on health care use is ultimately an empirical question. The degree of disruption will depend on the institutional specifics of the MCOs operating in a market, especially the degree of network overlap.

1.4 Research Design

1.4.1 Medicaid in Minnesota

Minnesota's Medicaid program for non-elderly adults and children is called Medical Assistance. With few exceptions, all Medical Assistance enrollees are required to enroll in a Medicaid MCO through the Prepaid Medical Assistance Program (PMAP). Minnesota is a Medicaid expansion state and PMAP covers childless adults up to 138 percent of the Federal Poverty Line (FPL) and children and pregnant women up to 283 percent of FPL. The state operates other MMC programs for enrollees who qualify through disability, dual-eligible enrollees, and higher-income childless adults.[38]

When an enrollee is deemed eligible for Medical Assistance, they are enrolled in

the state's FFS plan and given thirty days to select an MCO, after which they are converted to PMAP. The set of MCOs that enrollees can choose from is determined by their county of residence. Enrollees who do not make an active choice within thirty days are automatically assigned to a plan based on their previous history in PMAP, other household members' plan selections, or a "default plan." From 2015 to 2016, about 25 percent of PMAP enrollees were automatically assigned to plans, with the state making an effort to assign people to the plan with the highest quality scores.[39] Enrollees can change their MCO without cause during their first year of enrollment, after which they may only change MCOs during their annual plan selection period or due to a qualifying event such as a move or inability to access care.

Prior to 2012, PMAP contracts were negotiated on an individual basis between the state and non-profit Medicaid MCOs. In 2011 Minnesota issued its first Request for Proposals (RFP) for PMAP plans that would be selected by competitive bidding. The RFP covered the seven-county Twin Cities metro area and the stated goals for the new bidding program were to "help control rising health care costs while improving health care outcomes for public program enrollees."[40] Bidding was expanded to 27 other counties in 2013 and implemented statewide in 2015.

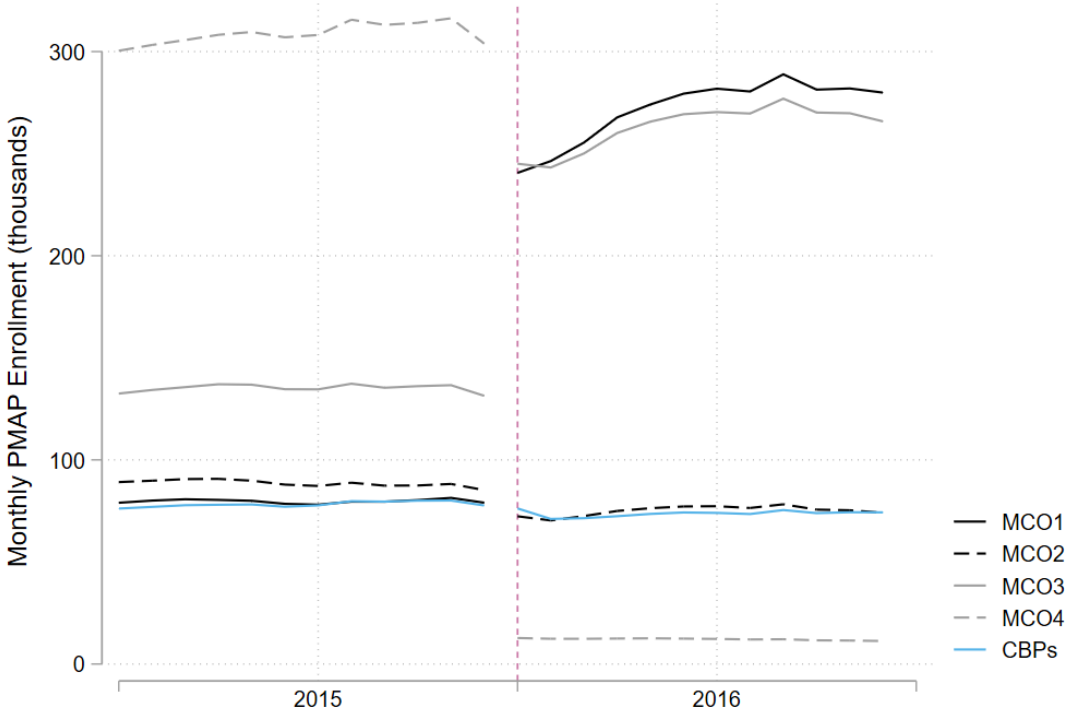
This study focuses on the outcomes of statewide bidding for PMAP contracts in 2015. The Minnesota Department of Human Services (DHS) solicited bids from non-profit health plans and public County-Based Purchasers (CBPs) to offer coverage in each of the state's 87 counties starting in January 2016. This was the first bidding cycle that included CBPs, which are health plans operated by county governments in less populous regions of Minnesota. Four incumbent plans and four CBPs submitted

proposals. The bidding was conducted in eleven geographic regions and the proposals included the plans' benefit structure, provider network, strategies for implementing health care reform initiatives (e.g., reducing maternal mortality), and a capitation bid for each county within the region. The capitation bids determined the base payment rate that the state would use in its risk adjustment and pay-for-performance formulas when calculating the final payments to plans. The bids were evaluated by a panel of state and county officials and scored on a hundred-point rubric, where 45 points were allocated to the capitation bid and the remaining points were distributed among non-price attributes of the plans.[40]

The results of the bidding were announced in July 2015 and DHS made substantial changes to the set of plans that would participate in PMAP. The largest change was the decision to terminate all contracts with one of the private plans. While the other three plans were awarded contracts, the set of counties they covered changed. Two of the three winning plans were excluded from counties where they were they had previously operated. Though the results of the bidding would be slightly amended through litigation, the outcome of the bidding was that one private MCO was effectively excluded from PMAP and the other three plans experienced large changes in their market share.

Figure 1.2 shows average monthly PMAP enrollment across the four private plans and the CBPs in 2015 and 2016. I refer to the four private, non-profit plans as MCO1, MCO2, MCO3, and MCO4 while pooling all CBP plans together due to their low individual enrollment. MCO1 retained all 30 of its counties and also expanded into 35 new counties, growing its enrollment from 79,000 people in December 2015 to

Figure 1.2: Monthly PMAP enrollment by MCO, 2015 - 2016

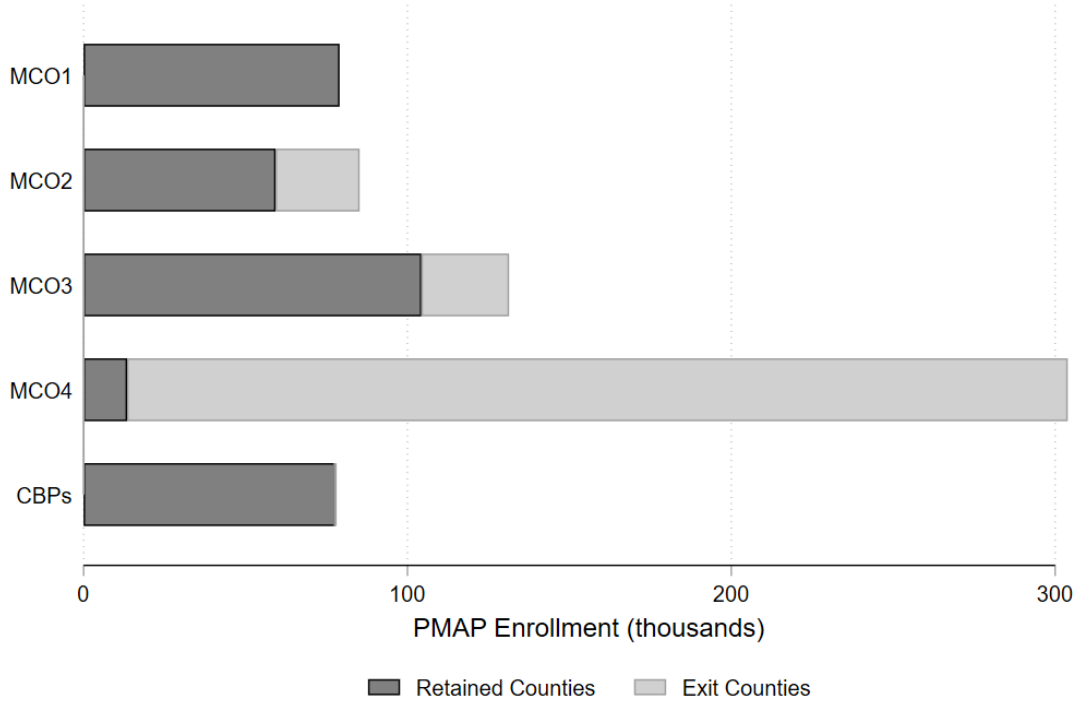


Note: Author's analysis of Minnesota Department of Human Services public enrollment data. Enrollment in County-Based Purchasers pooled together due to small sample size.

240,500 people in January 2016. MCO2 lost its largest contract, but was awarded 21 new contracts in other counties. On net, average monthly enrollment in MCO2 fell from 85,000 to 72,000 enrollees. MCO3 exited 14 counties, retained eight counties, and won 36 new counties, which resulted in statewide enrollment growth of about 109,000 people. MCO4 was the excluded plan and lost all but one of its 2015 counties, reducing its enrollment from 303,000 to 12,700. The CBPs were largely unaffected by bidding and their enrollment fell slightly from 77,000 to 76,000.

Figure 1.3 shows December 2015 enrollment in each MCO in counties that the MCO would retain or lose in 2016. MCO1 did not exit any counties and all 79,000 of

Figure 1.3: December 2015 enrollment exposed to plan exit



Note: Author's analysis of Minnesota Department of Human Services public enrollment data

its enrollees could continue to be covered by MCO1 in 2016. MCO2 lost its contract for Hennepin county, the most populous county in the state, and 30 percent of MCO2's enrollment (25,950 people), was forced to switch plans. MCO3 exited 14 counties where it covered 27,000 people, accounting for 27 percent of its total enrollment. MCO4 exited nearly all counties and 96 percent of its enrollment was forced to choose a new plan in January 2016. Across all MCOs, 343,469 people had coverage through an exiting plan in December 2015 compared to 333,706 enrollees in plans that were re-contracted.

1.4.2 Data and Study Population

This paper compares health care use and continuity of care outcomes for PMAP enrollees who were forced to change Medicaid MCOs in 2016 to enrollees whose 2015 plan remained available. I estimated this comparison using a difference-in-differences (DID) study design where the treatment was being enrolled in an exiting PMAP plan in 2015. PMAP contracts were set at the county-level, so the units of treatment were MCO-county combinations, which I subsequently refer to as "plans." All treatment occurred simultaneously in January 2016.

The data come from the Minnesota All Payer Claims Database (MN APCD), a repository of health care claims and enrollment data operated by the Minnesota Department of Health.[14] The MN APCD collects claims and enrollment data from the PMAP plans as well as Minnesota's FFS Medical Assistance plan. A third-party vendor standardizes the data and links enrollees data across different payers into a harmonized 'member identifier.' In addition to Medicaid data, the MN APCD contains claims and enrollment data from commercial health plans and Medicare for most Minnesotans, which allows me to observe health care use prior to, and following, enrollment in Medicaid. This unique features means that I can observe enrollees' health care use and patient-provider encounters across payers and plan types, which motivated my approach for developing claims-based measures of continuity of care.

The primary analytic sample was a monthly panel of PMAP enrollees from January 2015 to December 2016. There were 961,148 unique children and non-elderly

adults enrolled in Medical Assistance for at least one month during 2015. Restricting the sample to individuals who were enrolled for at least eleven months during both 2015 and 2016 reduced the population to 377,734 people. The eleven month continuous enrollment requirement corresponds with average enrollment among "full year" Medicaid enrollees.[3] I imposed two further restrictions on the sample; that all individuals had at least nine months of PMAP enrollment (excluding 71,565 people) and that individuals had the same county of residence in 2015 and 2016 (excluding a further 16,738 people). The second requirement ensured that plan switching was not due to relocation to other parts of Minnesota that were served by different Medicaid MCOs. After applying these criteria, the analytic sample included 289,431 PMAP enrollees, each of whom was observed for 22 to 24 months.

Each person-month observation in the panel included a variable indicating which MCO the member was enrolled in. Let MCO_{it} represent the MCO for $enrollee_i$ in $month_t$. I used the ability to observe MCO_{it} to construct a plan switching outcome; $switch_{it} = 1$ when $MCO_{it} \neq MCO_{it-1}$. I ignored months were $enrollee_i$ was covered by FFS Medical Assistance when calculating $switch_{it}$.

To identify the treatment and comparison groups, I had to assign individuals to an MCO in 2015 and 2016. I defined MCO_i^{2015} as the last PMAP MCO for $enrollee_i$ in 2015 and MCO_i^{2016} is the first observed MCO for $enrollee_i$ in 2016. Next, I defined $Plan_i$ as the combination of an enrollee's county of residence and their observed MCO_i^{2015}. I assigned enrollees to the treatment group if $Plan_i$ was dropped from PMAP as a result of the competitive bidding. The comparison group includes enrollees where $Plan_i$ had its contract renewed in 2016 so that it was continuously

available throughout the study period. I constructed the list of exiting plans by identifying MCO-county combinations where enrollment decreased to zero in the January 2016 Manged Care Enrollment Reports published by the Minnesota Department of Human Services.[41]

1.4.3 Outcomes

I used Medicaid claims from both FFS and Medicaid MCOs to construct monthly health care use and continuity of care outcomes. The health care use outcomes included outpatient encounters, emergency department visits, hospitalizations, prescription fills (measured as thirty day equivalents), medical spending, and prescription drug spending. The continuity of care outcomes measured the share of patients' visits to new providers, their key provider who was responsible for most care, and providers who were likely in their 2015 MCO's provider network.

Health care use

I adapted a claims-based measure of outpatient encounters from a recent study of continuity of care in Medicaid managed care.[42] I defined encounters as unique combinations of a patient identifier, provider identifier, and date of service where the claim(s) were for provider payments (not facility fees) and the place of service was an office, outpatient hospital, ambulatory surgical center, federally qualified health center, rural health clinic, or mental health clinic. I identified providers using their National Provider Identifier (NPI) when available (98.2 percent of encounters) or the MN APCD provider identifier when no NPI was available. I excluded all encounters

where the enrollee had any emergency department claims on the date of service, as well as claims that were tied to an inpatient admission. I defined two sub-types of outpatient encounters – encounters with primary care providers and mental health care providers. I identified provider types using the National Plan & Provider Enumeration System (NPPES) classification codes associated with each NPI. Appendix table A.1 reports the classification codes that I categorised as primary care and mental health care providers, as well as the number of providers and visits for each classification.

The MN APCD claims included a flag for emergency department (ED) care that was derived from place of service and procedure codes. I calculated ED visits as the number of unique days with at least one claim for ED care. Inpatient admissions were similarly constructed using MN APCD "inpatient discharge identifiers," which group facility claims into inpatient says. I assigned hospitalizations to a month based on the admission date. The MN APCD pharmacy claims include a variable reporting the "thirty-day equivelent" of each prescription drug claim so that fills are the monthly count of 30-day prescriptions filled. Medical and prescription drug spending are the sum of all paid amounts (not charge amounts) during the month, including both FFS and MMC claims. I windsorized the spending outcomes at the 99^{th} percentile of the spending distribution to account for outlier claims.

Continuity of care

Continuity of care is conceptually difficult to measure in claims data because billing data cannot represent concepts like patient-provider trust, history, and communication. Most claims-based measures of continuity of care define a "focal provider,"

frequently the provider with the plurality of visits, and calculate the density of visits with that provider over a given time period.[43] The ability to observe enrollees over time and across insurance types in the MN APCD allowed me to define three different continuity of care measures – new provider visits, visits to focal providers, and visits to providers who were likely in-network for enrollees during 2015.

New provider visits may be indicative of disruptions to continuity of care, as they suggest that patients are seeing a provider with whom they do not have an established relationship. Previous research used "first encounter" procedure codes to measure new provider visits,[34] but these codes were sparsely used in the MN APCD Medicaid claims. I leveraged the ability to observe both Medicaid and non-Medicaid claims for the study population to construct patient-provider histories: the set of providers who saw an enrollee over the past three years. I defined new provider visits as outpatient encounters where the patient-provider pair was not observed during the previous three years. For encounters in 2015, this means that the patient and provider had no encounters from 2012-2014. For 2016 encounters, the lookback period was 2013-2015.

The second continuity of care measure was the share of outpatient visits that were with patients' "key providers." I define the key provider as the provider with whom an enrollee had the plurality of their outpatient encounters during 2015.[42] If multiple providers met this definition, I broke ties by designating the provider with the most recent encounter as the key provider. I did not impose any requirements on what types of health care providers could be identified as a key provider. Appendix table A.2 reports the frequency of the different NPPES classification codes that were

designated as key providers.

The third continuity of care outcome attempts to reconstruct MCOs' provider networks. I extracted all Medicaid encounters from 2014 for the four Medicaid MCOs and CBPs for all PMAP enrollees in the MN APCD, not just those included in the study sample. I used 2014 data so that the networks were identified by visits made outside the study period. The provider network for MCO_j is the set of providers who had encounters with at least two unique patients enrolled in MCO_j. Obtaining out of network care is difficult in PMAP and setting this low threshold for network inclusion meant that more than 96 percent of 2015 spending was "in-network." Requiring five unique patients lowered the share of in-network care slightly, but even under this more restrictive definition, more than 86 percent 2015 claims spending went to "in-network" providers. I used the derived provider network files to flag the encounters in the study sample as "in-network" or "out-of-network" based on each enrollees' observed MCO_i^{2015}.

I analyzed all three continuity of care outcomes by calculating the share of annual encounters that were new provider/key provider/in-network provider encounters. While these measures could be treated as count outcomes, the counts of specific visit types are sensitive to overall health care use, which I also hypothesized to be affected by plan switching (Figure 1.1). For example, if switching plans creates barriers to access, it could manifest as decreased use of both new provider and existing provider visits. Analyzing continuity of care at the annual, rather than monthly, level allows me to see how the relative frequency of these types of visits changed due to plan

switching. If the share of new provider visits increased in 2016, that would be indicative of enrollees seeing different providers, even if the average number of outpatient encounters was falling. Similarly, decreases in the share of key provider visits would be evidence that enrollees no longer had access to their key provider and decreases in the share of in-network visits (using baseline provider networks) would suggest that patients were using providers who were not in their 2015 provider network.

1.4.4 Estimation

I estimated the effect of plan switching by comparing the change in the outcome variables from 2015 to 2016 between the treatment and comparison group. I estimated this change using DID model, with the following linear estimating equation:

$$y_{ipt} = \delta Treat_{pt} + \alpha_i + \tau_t * MCO_{it} + \epsilon_{ipt} \tag{1.1}$$

y_{ipt} is the outcome for $enrollee_i$, enrolled in $plan_p$ in 2015, at $month_t$. $Treat_{pt}$ is the treatment indicator equal to 1 if $plan_p$ exited PMAP in 2016 and $month_t$ is January 2016 or later. α_i is an individual fixed effect that controls for static differences across enrollees, including their baseline PMAP plan. $\tau_t * MCO_{it}$ are MCO-specific time fixed effects that flexibly control for time-varying differences in the outcome variable across MCOs. The inclusion of MCO-time effects means that the treatment effect, δ, is estimated by comparing enrollees in the same MCO who lived in treatment and comparison counties. I estimated Equation 1.1 and all subsequent models using a maximum-likelihood linear estimator that efficiently estimates high-dimensional fixed

effects models.[44] I clustered the standard errors at the baseline plan level because this was the unit of treatment assignment.[45]

The three continuity of care outcomes are measured as the share of new provider/key provider/in-network provider visits per year. I estimated the effect of plan switching on continuity of care by using a yearly panel of data and modifying Equation 1.1 so that t refers to years rather than months.

For Equation 1.1 to estimate a valid average treatment effect on the treated (ATT), the timing of plan exit must be uncorrelated with health care use and continuity of care. Put another way, treatment must be uncorrelated with time trends in the outcome variables. The DID study design uses the comparison enrollees to construct the "missing counterfactual" for the treatment group; what would have happened had their plan remained available in 2016. In this setting, the timing of plan exit was determined by DHS, not enrollees themselves, so the timing of plan switching is arbitrary from an enrollee's perspective. A threat to this assumption is that the plan exits were announced in July 2015 and enrollees in exiting plans may have been able to anticipate needing to switch plans and modified their behavior. Anticipatory effects could include increasing health care use at the end of 2015 or preemptively moving to a new MCO prior to 2016.

One way to investigate both whether enrollees anticipated treatment and the appropriateness of the comparison group as a counterfactual is to estimate whether the trends in health care use across the two groups differed in 2015, prior to the plan exits. While this is not a sufficient condition to guarantee the identifying assumptions, using the non-exiting plans as a counterfactual for the treatment group is more reasonable

if the outcome trends were similar in 2015. If enrollees did adjust behavior after the results of the bidding were announced, examining the relative difference between the treatment and comparison groups at the end of 2015 may shed light on this behavior.

Equation 1.2 is an event study model that estimates differences between the treatment and comparison groups in each month of the study period. The time-varying post-period coefficients (dynamic effects) allow the effect of plan switching to change as enrollees spend more time enrolled in their new MCO. Let t^* denote the treatment month, January 2016, and all other notation be consistent with Equation 1.1:

$$y_{ipt} = Treat_p * [\sum_{k=-12}^{11} \pi_k 1[t - t^* = k] + \alpha_i + \tau_t * MCO_{it} + \epsilon_{ipt} \tag{1.2}$$

$Treat_p$ is an indicator variable that equals one if p is an exiting plan and $1[t-t^* = k]$ is an indicator function that takes a value of one when t is the k^{th} month before/after treatment. Equation 2 produces 23 π_k terms (December 2015 is omitted) that each estimate the difference between the treatment and comparison groups in the k^{th} month before/after January 2016, normalizing the difference to zero in December 2015. The π_k coefficients where $k \geq 0$ trace out the dynamic effects of the treatment in the post period and the π_k where $k \leq -2$ estimate the difference in the pre-period trend in the outcome between the treatment and comparison groups. Note that I was unable to estimate event studies for the continuity of care outcomes because they were measured annually rather than monthly.

The treatment effects from Equations 1.1 and 1.2 calculate the average change in utilization and continuity of care across the entire treatment group. The effect of plan

switching likely depends on what plan enrollees switch into. If effects differ across the different destination MCOs, Equation 1.1 calculates the ATT as the weighted average of the MCO-specific effects, where the weights are derived by the relative size of the treatment group and the relative number of pre- and post-periods across different plans.[46] In this setting, treatment is simultaneous so all plans have twelve pre-treatment months and twelve post-treatment months, meaning that effects are weighted only by the relative size of the treatment groups. To better understand which MCOs are driving the effect, I estimated a model that interacts the treatment parameter ($Treat_{pt}$) with indicators for MCO1, MCO2, and MCO3 – the three MCOs that enrollees switched into:

$$y_{ipt} = \delta Treat_{pt} * MCO_i^{2016} + \alpha_i + \tau_t * MCO_{it} + \epsilon_{ipt} \tag{1.3}$$

The effect of plan switching may also differ across enrollee demographic characteristics. The relatively short study period means that the individual fixed effects account for most demographic characteristics that might affect health care use, like age and medical need. To understand whether plan switching causes more issues for particular types of enrollees, I estimated Equations 1.1 on samples stratified by age and chronic condition burden. I used two age stratifications; children (0-17) and and adults (18-64). I measured chronic condition burden using the Johns Hopkins ACG System[47] and split the samples based on whether enrollees had no recorded chronic conditions in 2015 versus one or more recorded conditions in 2015.

1.5 Results

1.5.1 Descriptive Statistics

The final sample included 145,720 enrollees in the comparison group who were enrolled in 71 unique MCO-county combinations (plans) in 2015. The treatment group included 143,711 enrollees in 76 different plans (Table 1.1).

Table 1.1: Characteristics of treatment and comparison groups in 2015

	Comparison	Treatment	p-value
Enrollees	145,720	143,711	
Plans	71	76	
Mean age	21.0	20.5	0.437
Adult enrollees (%)	40.8	40.5	0.865
Female (%)	54.5	54.9	0.209
One or more chronic condition (%)	50.7	48.3	0.013
Health care use - per member per month			
Outpatient encounters	0.71	0.68	0.294
Outpatient encounters - primary care	0.27	0.28	0.581
Outpatient encounters - mental health	0.15	0.14	0.306
Emergency department visits	0.05	0.05	0.295
Inpatient admissions	0.006	0.006	0.023
Thirty-day prescription fills	0.9	1.0	0.052
Medical spending	$208	$198	0.164
Prescription drug spending	$45	$49	0.373
Continuity of care - annual share of encounters			
Visits to new providers (%)	36.0	36.8	0.709
Visits to key provider (%)	45.9	46.9	0.087
Visits to in-network providers (%)	91.6	93.5	0.032

Notes: Values represent monthly averages measured during 2015. p-values are from a regression-based comparison of group means with standard errors clustered at the plan level. Continuity of care outcomes are the share of all outpatient encounters during 2015.

Enrollees in the treatment and comparison plans were similar at baseline. The only significant difference in the demographics of the two groups was the share of enrollees

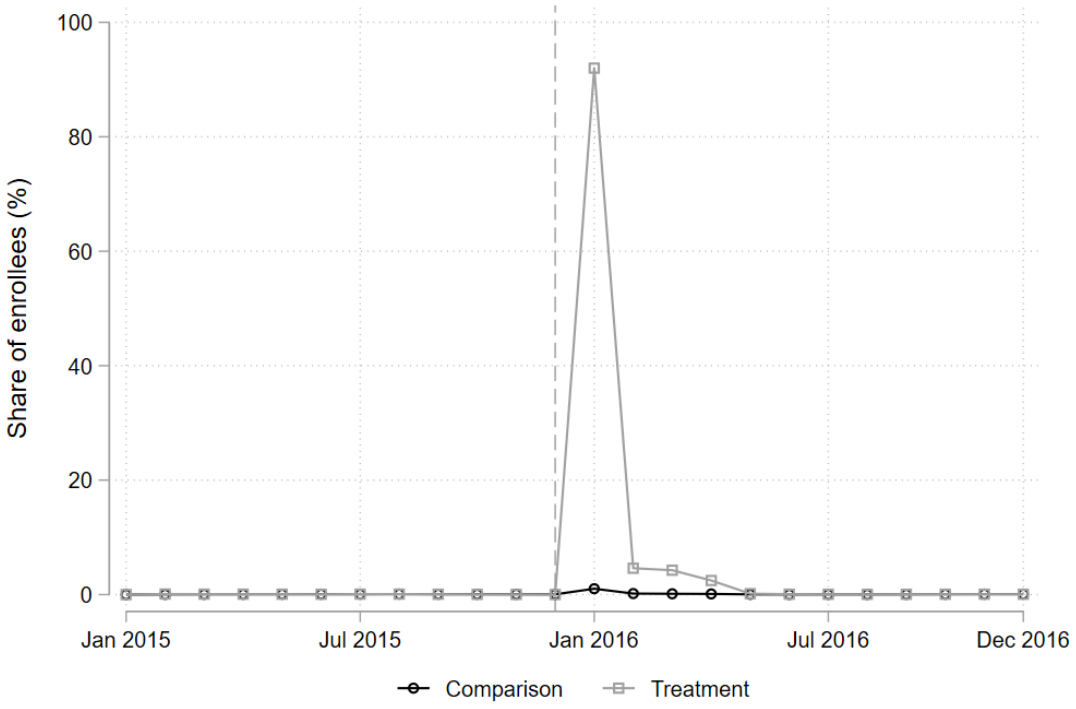
who had at least one chronic condition, which was 50.7 percent in the comparison group and 48.3 percent in the treatment group. Average monthly health care use was similar, though the treatment group had significantly more inpatient admissions during 2015. This difference was 0.0004 admissions per-member-per-month (PMPM), or less than one additional admission per 100 enrollee-years. Medical spending was about $200 PMPM in both groups.

During 2015, 36 percent of outpatient encounters in both groups were with new providers who the patient had not seen in the previous three years. Less than half of enrollees' visits were to their key providers but the density of key provider visits did not differ significantly between the two groups. Significantly more treatment group encounters were with providers who were identified as "in-network" using 2014 PMAP claims, but the share of visits to in-network providers exceeded 91 percent in both groups.

Switching between PMAP plans was rare during the study period, except during the three months after the new set of plans went into effect. Figure 1.4 shows the share of treatment and comparison enrollees who changed MCOs in each month of the study. In every month of 2015, fewer than one percent of enrollees in both groups switched MCOs. In January 2016, 92.0 percent of treatment group changed MCOs. This share is less than 100 percent because some people were temporarily enrolled in FFS while DHS assisted with re-enrolling them in a new plan. February and March 2016 saw 4.6 and 4.2 percent of treatment group enrollees change MCOs as the moves that were not completed in January took effect. January 2016 had the highest rate of comparison group plan switching, but this rate was only 1.0 percent

of enrollees. Figure 1.4 supports the assumption that the timing of switching was related to plan exits rather than enrollee choice and there is also no evidence that enrollees anticipated the exits by switching plans prior to 2016.

Figure 1.4: Frequency of plan switching



Appendix Figure A.1 shows the number of treatment group enrollees who switched between different combinations of MCOs. The most common switch was from MCO4 to MCO1 (60,042 people), followed by MCO4 to MCO3 (54,908 people). Overall, the majority of treatment group enrollees switched to either MCO1 (72,680) or MCO3 (62,900).

1.5.2 Health care use

Average treatment effects

Table 1.2 reports the average treatment effect estimates for the health care use outcomes. The "Pooled" DID estimates of plan switching represent the average effect across all treatment group enrollees. The columns "MCO1–MCO3" report the disaggregated treatment effect of switching to a particular MCO from Equation 1.3.

Plan switching that resulted from competitive bidding reduced health care use among enrollees. Outpatient encounters fell in the treatment group by 0.25 visits PMPM, a 36 percent reduction from the baseline mean of 0.69 visits. Both primary care visits and mental health visits decreased significantly by about 33 percent relative to their baseline average. Emergency department use also fell in the treatment group by -0.02 visits PMPM, a decrease of about 35 percent from baseline. Inpatient admissions fell by 0.002 admissions PMPM, or about 2.4 admissions per 100 person-years. Medical spending decreased by $62 PMPM, a relative effect of -31 percent from the baseline of $203. There were not significant effects on prescription drug fills or spending.

The pooled effects were driven by enrollees who joined MCO3 in 2016. This population had largest treatment effect for outpatient visits (-0.41 visits), primary care visits (-0.17), mental health provider visits (-0.07), emergency department visits (-0.03), inpatient admissions (-0.003), and medical spending (-$96). While effects were most prominent among enrollees who switched to MCO3, individuals who switched into MCO1 did experience a significant reduction in spending of $34 per month, about

one third the size of the effect among MCO3 switchers. The decrease in primary care encounters (-0.12) was also significant in MCO1. Though not all treatment effects were precisely estimated, the magnitude of the switching effect was generally largest for enrollees who switched to MCO3, followed by MCO1, with small or non-significant effects among the smaller sample of enrollees who switched to MCO2.

Table 1.2: Treatment effects - health care use

	Baseline Mean	Pooled	MCO1	MCO2	MCO3
Outpatient encounters	0.69	-0.25^{**}	-0.12	0.04	-0.41^{***}
		(0.05)	(0.06)	(0.03)	(0.04)
Outpatient encounters - primary care	0.28	-0.10^{***}	-0.04^{*}	0.04	-0.17^{***}
		(0.02)	(0.02)	(0.01)	(0.02)
Outpatient encounters - mental health	0.15	-0.05^{**}	-0.05	-0.02	-0.07^{***}
		(0.01)	(0.03)	(0.01)	(0.01)
Emergency department visits	0.05	-0.02^{*}	-0.01	0.00	-0.03^{***}
		(0.003)	(0.004)	(0.003)	(0.003)
Inpatient admissions	0.006	-0.002^{*}	-0.001	-0.001^{**}	-0.003^{***}
		(0.0003)	(0.0013)	(0.0005)	(0.0004)
Thirty-day prescription fills	0.96	0.02	0.05	-0.01	0.04
		(0.02)	(0.04)	(0.02)	(0.02)
Medical spending	\$203	-62^{***}	-34^{**}	-1	-96^{***}
		(10.3)	(12.1)	(7.0)	(7.2)
Prescription drug spending	\$47	0	-2	-2	2
		(1.1)	(2.0)	(1.1)	(1.5)
Observations			6,892,397		

Table reports treatment effect estimates from Equation 1.1 (Pooled) and Equation 1.3 (MCO1–MCO3). Standard errors clustered by baseline plan and reported in parentheses. Models included individual and MCO*month fixed effects. All effects represent per-member-per-month changes in the treatment group, relative to the comparison group.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Figure 1.5: Event study - outpatient encounters

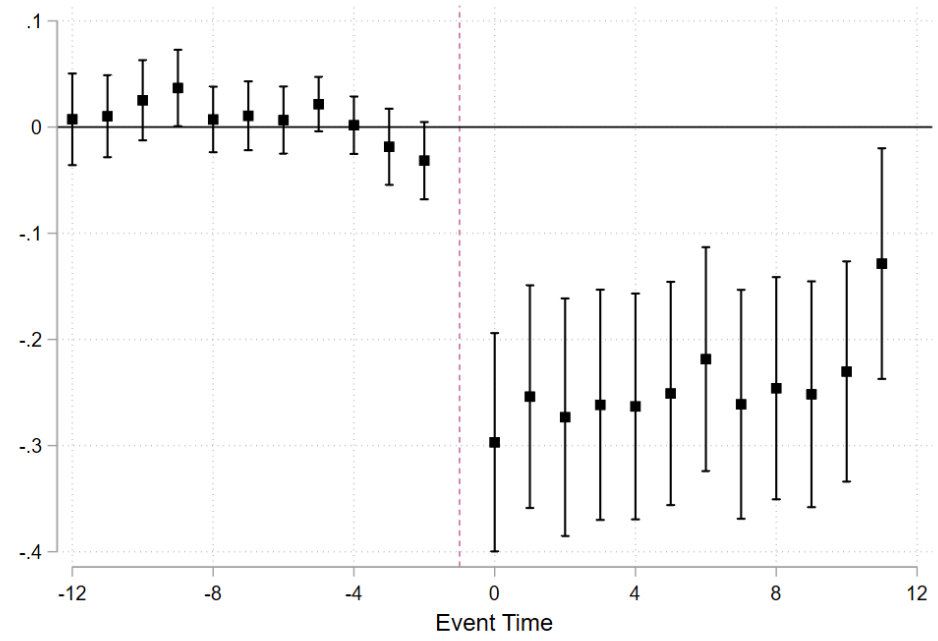


Figure 1.6: Event study - outpatient primary care encounters

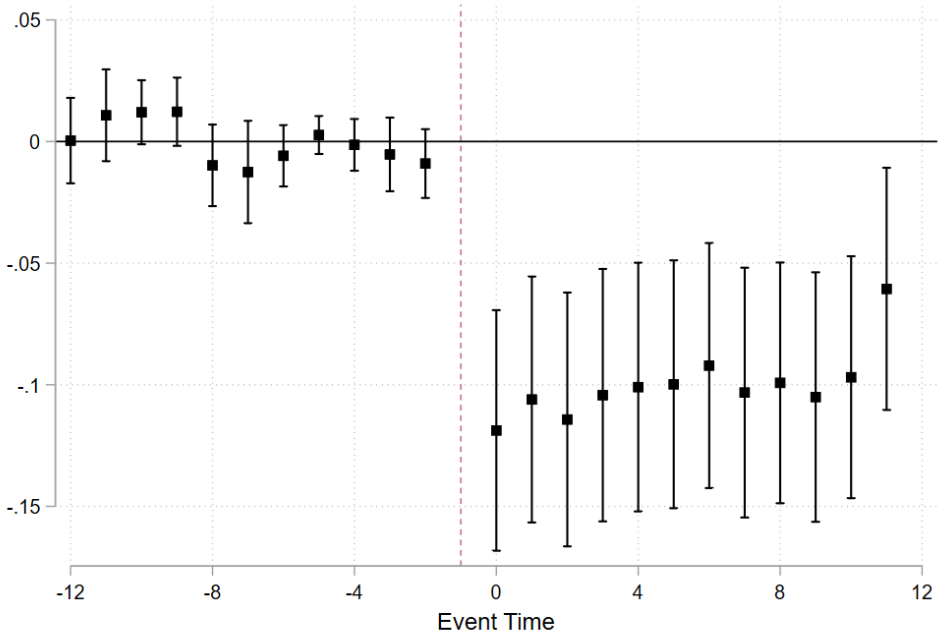


Figure 1.7: Event study - outpatient mental health encounters

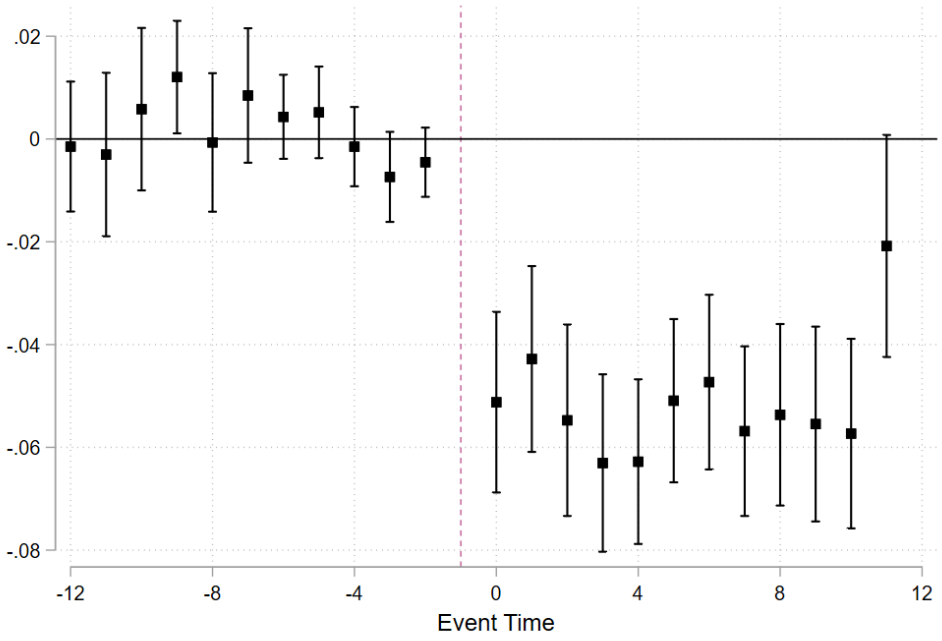
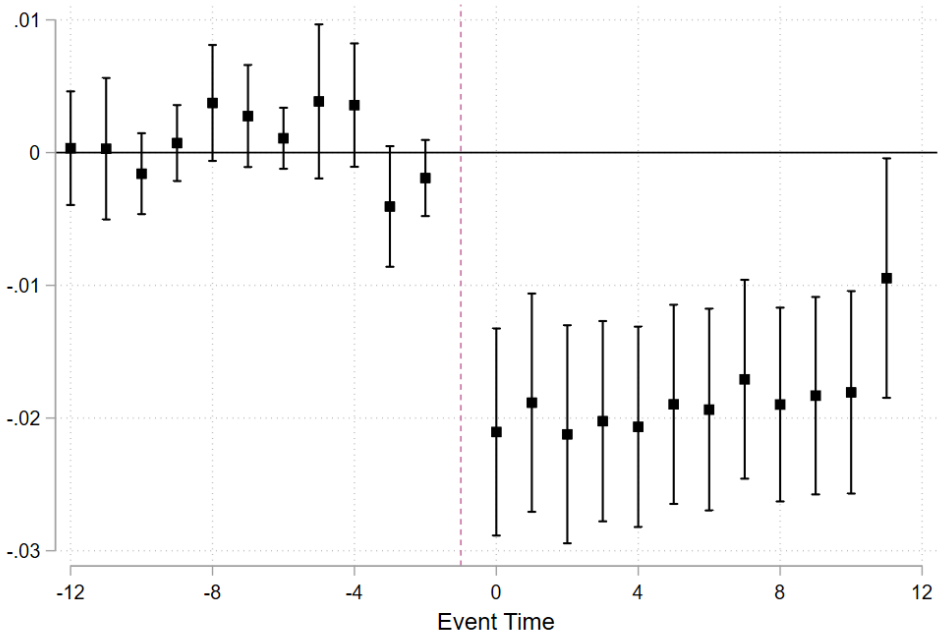


Figure 1.8: Event study - emergency department visits



Event studies

The event study plots (Figures 1.5 through 1.12) show the dynamic effect of plan switching on health care use. Each figure plots the π_k coefficients from Equation 1.2, which estimate the adjusted difference between the treatment and comparison group in the k^{th} month relative to December 2015 (marked by the vertical line). The vertical bars show the 95 percent confidence interval of each month-specific estimate.

Outpatient encounters decreased significantly as a result of treatment in every month of 2016 (Figure 1.5). The pre-period effects suggest that the treatment and comparison groups had similar trends in outpatient visits during 2015, lending support to the parallel trends assumption. There is some evidence that outpatient visits were falling in the treatment group in the last quarter of 2015, but these differences were small and not statistically significant. Plan switching decreased outpatient encounters in the treatment group by -0.30 visits PMPM in January 2016 and the treatment effect remained at roughly this size through November 2016. The effect attenuated in December, but was still negative and significant at -0.13 visits PMPM. The results for primary care visits (Figure 1.6) and mental health visits (Figure 1.7) largely track those for outpatient visits. In both cases, the effect was relatively consistent until December, when the magnitude of the effect fell by about half.

Figure 1.8 shows the event study results for emergency department visits. The treatment caused a reduction of 0.021 emergency department visits PMPM in January 2016 that persisted at a similar level through June 2016. Like outpatient visits, the December estimate was the smallest effect (-0.009 visits PMPM). Plan switching also

caused significant reductions in inpatient admissions (Figure 1.9). The average effect during the first three months of 2016 was a decrease of 0.003 admissions PMPM, or about 3.6 fewer hospitalizations per 100 person-years.

The results for prescription drug fills (Figure 1.9) and spending (Figure 1.12) are difficult to interpret because the monthly effects are imprecisely estimated and the pre-period trends are not comparable between the treatment and comparison groups. This is consistent with the null findings for prescription drug outcomes in Table 1.2.

Plan switching caused medical spending to fall by $81 PMPM in January 2016 and the effect was larger than -$70 through May 1.11). Spending was $59 lower in November $29 lower in December. The coefficients from 2015 lend support to the parallel trends assumption, though the effects at $t = -3$ and $t = -2$ show that spending was decreasing in the treatment group during the two months before plan exit.

Figure 1.9: Event study - inpatient admissions

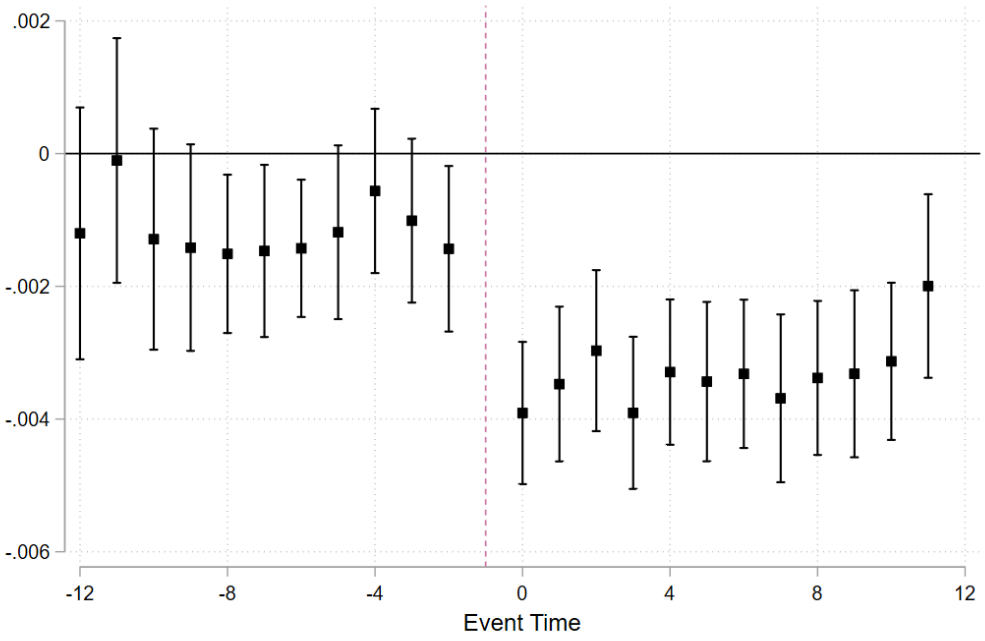


Figure 1.10: Event study - prescription fills

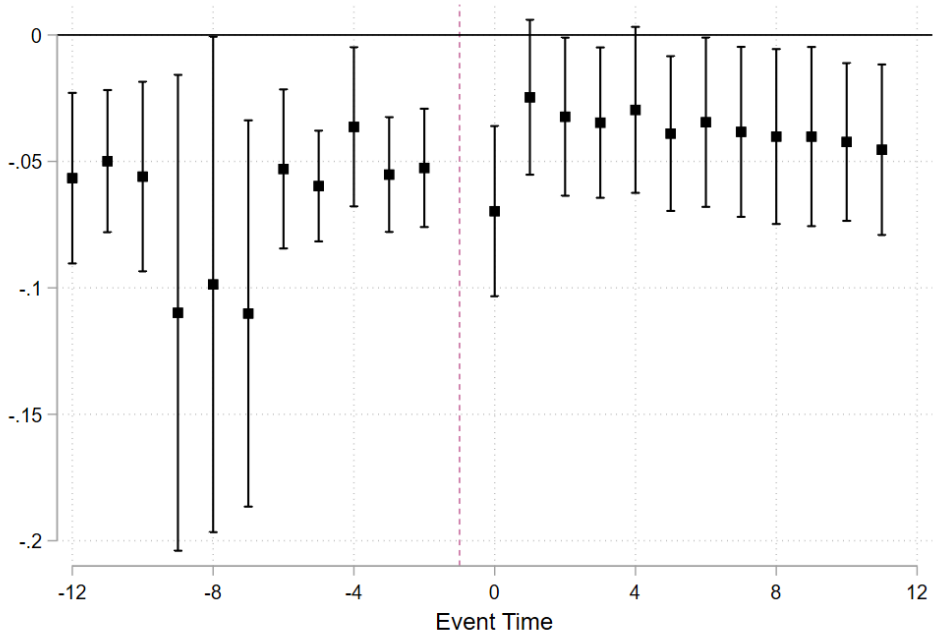


Figure 1.11: Event study - medical spending

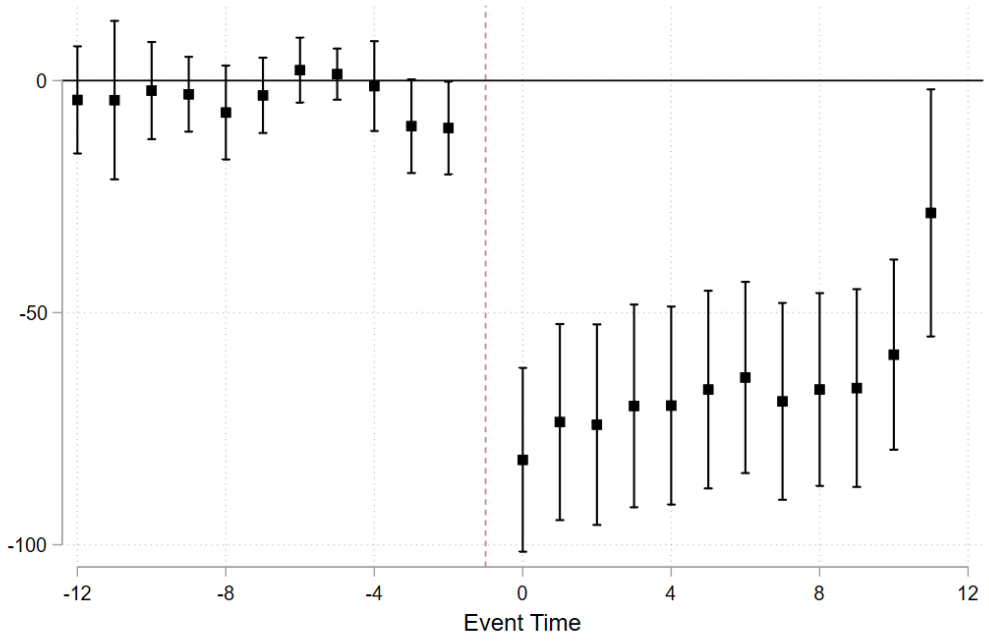
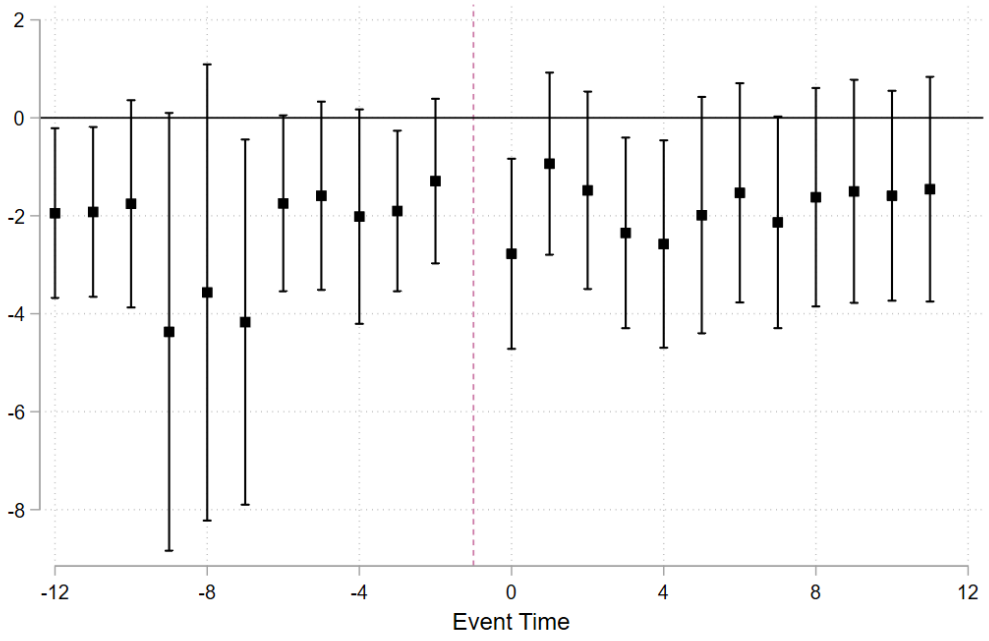


Figure 1.12: Event study - prescription drug spending



Stratified models

Appendix tables A.3 and A.4 show the pooled treatment effects estimated on the stratified samples for children (0-17), adults (18-64), and enrollees who had at least one chronic condition during 2015. Age was measured as the oldest observed age in 2015, so enrollees who turned 18 in 2016 are included in the results for children.

The absolute effect sizes were larger among adults, but that population also had higher use at baseline (Appendix Table A.3). The relative effects were more comparable across the two groups, with outpatient encounters falling by about 35 percent for both adults and children. The outcome with the biggest gap in the relative effect size was inpatient admissions, which fell by 25 percent among children and 40 percent among adults.

Stratifying the sample on whether or not enrollees had at least one chronic condition in 2015 shows that the effects of plans switching were larger among enrollees with chronic conditions (Appendix Table A.4). Outpatient encounters fell by 0.48 visits PMPM in the chronic condition sample, which is a decrease of 43 percent from baseline. The analogous change in the population without a chronic condition was -34 percent. Visits to mental health providers fell by more than 50 percent among enrollees with a chronic condition, and the higher levels of use in this population during 2015 suggest that plan switching may have been a particular impediment to accessing mental health providers.

1.5.3 Continuity of Care

Network Overlap

Outpatient provider networks were largely overlapping across the four MCOs, with most provider participating in at least two different networks. Figure 1.13 shows the cumulative share of 2015 and 2016 outpatient encounters that were with providers who were members of multiple MCOs' provider networks. Providers were deemed to be in-network for an MCO if they saw at least two patients from that MCO. Appendix Figure A.2 shows analogous results using spending shares rather than visit shares.

Figure 1.13: Cumulative distribution of outpatient encounters across networks

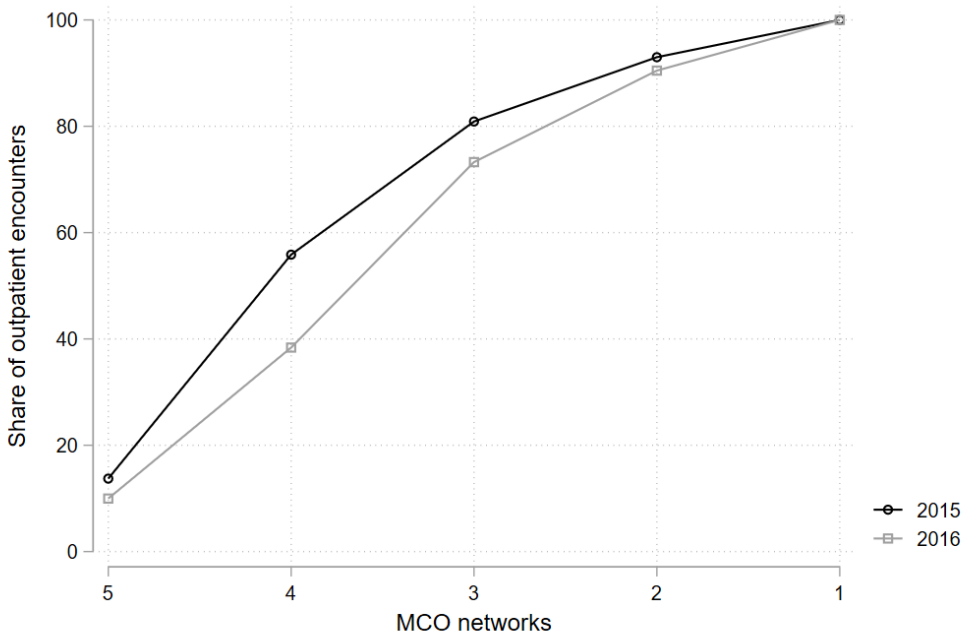


Figure shows the cumulative share of visits in 2015/2016 with providers who were included in one or more MCOs derived provider networks. Network identification is described in Section 1.4.3. Results for 2015 used 2014 claims to identify provider networks and results for 2016 used claims from 2015. CBPs are pooled into a single plan.

Providers who were in-network for all five Medicaid MCOs accounted for 14 percent of encounters in 2015. Moving rightward on the x-axis, providers who were a

11.5

Table 1.3: Treatment effects - continuity of care

	Baseline Mean	Pooled	MCO1	MCO2	MCO3
Visits to new providers	36.4	6.0***	0.7	3.4**	7.7***
		(0.8)	(2.0)	(1.0)	(1.2)
Visits to 2015 key provider	46.4	0.8	3.3	−2.3*	2.1
		(0.9)	(2.1)	(1.0)	(1.3)
Visits in 2015 network	92.5	−4.9***	2.5	−4.6***	−5.5***
		(0.6)	(2.0)	(0.8)	(1.0)
Observations			414,524		

Table reports treatment effect estimates from Equation 1.1 (Pooled) and Equation 1.3 (MCO1–MCO3). The unit of analysis is the enrollee-year and only observations with at least one outpatient visit are included. All effects are measured in percentage points and represent the change in the annual share of all outpatient visits. Standard errors clustered by baseline plan and reported in parentheses. Models included individual and MCO*year fixed effects.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

part of three or more networks delivered 81 percent of visits in 2015. Only seven percent of encounters were with providers who were exclusive to a single MCO. Networks overlapped less in 2016, but most care was still delivered by providers who were identified in multiple MCOs derived networks. Providers who were observed in three or more networks accounted for 73 percent of visits in 2016 and only ten percent of visits were with providers exclusive to one network.

Average treatment effects

Table 1.3 reports the treatment effect estimates for the three continuity of care outcomes. As with Table 1.2, the "Pooled" column reports the average treatment effect (Equation 1.1) and the "MCO1–MCO3" columns report the destination MCO-specific treatment effects (Equation 1.3). The unit of analysis was the enrollee-year and only observations with at least one encounter during the year were included.

The share of outpatient encounters that were with new providers increased by 6.0 percentage point due to plan switching. This effect was driven primarily by a 7.7 percentage point increase among enrollees who switched to MCO3, though new provider visits also increased by 6.0 percentage points among people who switched to MCO1 and 3.4 percentage points among people who switched to MCO2.

Plan switching had no significant effects on the concentration of visits with key providers, except among people who switched to MCO2 (-2.3 percentage points). The share of visits with providers who were in patient's 2015 provider networks fell by 4.9 percentage points, with significant decreases among people who switched to MCO2 (-4.6 percentage points) and MCO3 (-5.5 percentage points). The effects on in-network visits suggest that enrollees may have been steered toward different providers after switching plans. Enrollees who switched to MCO1 did not experience significant changes in any of the continuity of care outcomes.

Stratified models

The effects on continuity of care were similar for both adults and children (Appendix Table A.5). The two groups had similar rates of new provider visits at baseline and plan switching increased the share of new provider visits by 5.7 percentage points amongst children and 6.4 percentage points amongst adults. There was more divergence in the effect size among enrollees with and without a chronic condition (Appendix Table A.6). New provider visits increased by 6.3 percentage points among treatment group enrollees who were coded as having at least one health condition in 2015 and just 4.4 percentage points in the population with no chronic conditions

at baseline. The relative effect sizes were a 19 percent increase in the chronic condition sub-sample and a 9 percent increase in the no-chronic conditions sub-sample. The effects on key provider visits and network visits were comparable across all the sub-samples.

1.6 Discussion

The role of private plans in Medicaid continues to grow and the contracting process between states and Medicaid MCOs is an increasingly important domain for regulated competition. Few studies have examined how states' plan selection and contracting mechanisms shape enrollees' access to care, continuity of care, and health outcomes. This paper evaluated a trade-off inherent in competitive bidding; states' desire to exclude low-performing plans may come at the cost of forcing enrollees change their Medicaid MCO. I found that non-elderly Medicaid enrollees in Minnesota who were forced to switch plans used fewer health care services during the first year after switching. Outpatient visits, emergency department use, and spending all fell by more than 30 percent. The effects on continuity of care were smaller, but the share of outpatient visits to new provider increased significantly among enrollees who switched MCOs.

While recent research suggests that MMC plans can have large effects on enrollees' spending and use,[20,26] the reductions in health care use that I estimated are unlikely to be driven by differences in MCO "plan effects." The treatment effect models I used included MCO*time fixed effects, which controlled for differences in spending and

use that were common across enrollees in the same MCO. This means that the large effects found for people who switched to MCO3 represent reductions in use in MCO3's new counties relative to the counties MCO3 retained. While it is possible that MCO3 managed care differently in new and incumbent counties, MCO features like provider networks, utilization management policies, and customer service resources generally apply to all enrollees, not specific counties.

An alternative explanation is that switching plans created barriers to access or "hassle costs" that were unique to the treatment group. Enrollees may have had MCO-specific knowledge about how to use their benefits, such as knowing which providers are in their network, how to schedule appointments, or who to contact at their MCO if they experience difficulties using their benefits. Changing plans could have forced enrollees to rebuild this knowledge, which costs both time and effort.[48] This explanation is also consistent with the concentration of the treatment effects among enrollees switching to MCO3. The effect of plan switching may have mediated by destination MCOs' ability to managed the transitions, with MCO1 and MCO2 performing these functions better than MCO3.

The differences in the effect of switching across plans speak to the role that Medicaid MCOs can play in mitigating the potential negative effects of plan competition. The trade-off between promoting plan competition and disrupting access may not be as stark if states select high-quality plans that proactively assist enrollees in maintaining access and continuity of care. Transition assistance could be incorporated into the Request for Proposals that states issue during Medicaid contracting, and the ability for plans to manage these transitions could be used as a component of bid

evaluation. States could also facilitate smooth transitions by staggering the implementation of new managed care contracts. Roughly half the PMAP population was forced to switch plans simultaneously in January 2016, and this large disruption may have overburdened enrollee assistance resources at DHS and MCO3. Staggering the switches over the first half of 2016 could have helped reduce this crunch and mitigated the negative effects of plan switching on health care use.

The effects of forced plan switching on continuity of care were smaller, likely because the MCOs in this study had provider networks that were highly overlapping. I found that outpatient visits were concentrated among providers who participated in multiple networks, which echos recent research that found that one quarter of primary care providers account for more than 80 percent of Medicaid visits.[49] Safety net providers like Federally Qualified Health Centers and Community Health Centers play a large role in delivering care to Medicaid patients; one out of every seven Medicaid enrollees received primary care at a safety net provider in 2014.[50] If all MMC plans include these high-volume providers in their networks, movement between plans may not lead to disruptions in continuity of care. Network adequacy and breadth requirements in Medicaid may also reduce disruptions in continuity when enrollees move between plans. MMC plans have increasingly used broader networks, with the share of plans offering narrow networks declining from 42 percent in 2011 to 26 percent in 2014.[51]

Voluntary switching between PMAP plans was very rare in 2015. Medicaid enrollees in Minnesota generally remained in the same MCO over the two year study period unless that MCO was no longer available in 2016. While I was not able to

observe which enrollees chose an MCO and which were automatically assigned, the rate of auto-assignment was about 25 percent in Minnesota during the study period. Other states reported that more than 70 percent of their enrollees were automatically assigned to an MCO because they did not make an active choice.[39] If insurer investments in quality do not make enrollees more likely to select their plan, states may need to find alternative mechanisms to encourage Medicaid MCOs to offer high-quality coverage, like automatically assigning enrollees to high-performing plans.[25]

Shortly after the end of the study period, the Centers for Medicare and Medicaid Services published a rule instructing states to develop and maintain continuity of care policies for enrollees moving from FFS to MMC or between MMC plans. The rule requires states to allow enrollees to continue receiving care from their previous provider for a period of time, even if the provider is out-of-network in the new plan. States were required to comply this this rule starting in July 2018.[52] An evaluation of whether this policy reduced the disruptive effects of plan switching would be a valuable contribution to this nascent literature.

My finding also have implications for how the potential savings from managed care accrue to different parties. States have a strong incentive to select plans with lower capitation rates, because even small differences in per-member costs can add up to millions of dollars of budgetary savings when extrapolated over the entire Medicaid population. If competition succeeds in steering enrollees to efficient Medicaid MCOs, states can claim a portion of these savings by obtaining a lower capitation rate from efficient plans. However, my results show that plans may capture additional savings

at the expense of enrollees if switching effects reduce the use of efficient health services. Both Medicaid MCOs and the state may also accrue savings at the expense of providers if MCOs reimburse providers less in order to maintain their margin while reducing their capitation bid. Future research should investigate the degree to which MMC plans efficiently ration care and how the costs and savings from bidding and competition accrue to MCOs, states, patients, and providers.

This study has several limitations. First, none of the outcomes in this study evaluated the effect of plan switching on enrollee health. While the evidence that changing MCOs in 2016 reduced utilization is strong, it does not necessarily mean that enrollees' health was meaningfully affected. Understanding whether the reductions in service use led to worse health outcomes is an important next step. Second, the effects of forced switching on use and continuity of care may have been specific to the MCOs operating in Minnesota during the study period. Third, provider network data were unavailable for PMAP plans during this period and the continuity of care results rely on "networks" derived from observed claims. This means that there may have been in-network providers who were not counted as such because they did not generate claims for enrollees in the MN APCD. Linking the claims data to full provider networks would provider a more complete picture of network overlap and continuity of care. Finally, this study examined a single MMC program and the results may not generalize to other settings. Medicaid research presents a difficult trade-off; single state studies may not generalize to other programs, but national studies are forced to pool data from disparate programs that may not be comparable.

1.7 Conclusion

States use contracting and plan choice as tools for encouraging insurer competition in their Medicaid Manged Care programs. Regulated competition can improve quality, reduce costs, and provide broader coverage to low-income, disabled, and otherwise vulnerable populations, but these benefits must be measured against the potential for plan switching to disrupt access and continuity of care. This study found that health care use fell significantly when enrollees were forced to change Medicaid MCOs after competitive bidding. These findings speak to the need for more evidence on how insurer competition affects Medicaid enrollees and research that better defines the costs and benefits of competitive bidding in Medicaid.

Chapter 2

Estimates of Medicaid disenrollment, coverage loss, and churn in Minnesota from 2010 - 2019

2.1 Introduction

Starting in 2014, the Medicaid expansion provision of the Affordable Care Act (ACA) allowed states to offer Medicaid coverage to adults with incomes up to 138 percent of the Federal Poverty Level. This policy was responsible for the majority of the coverage gains achieved by the ACA,[53] as average monthly enrollment in Medicaid and the State Children's Health Insurance Program (CHIP) increased from 56.5 million people in 2010 to 71.1 million people in 2019.[54] Enrollment grew among both newly eligible adults and previously eligible adults and children,[55] and coverage gains were associated with improved access to care.[56]

Medicaid expansion also brought renewed interest in continuity of coverage for Medicaid/CHIP enrollees. Medicaid and CHIP are means-tested public insurance programs and federal law requires enrollees to re-certify eligibility and renew benefits at least every twelve months. States can also impose more frequent re-certification and renewal requirements. Enrollees can lose their Medicaid benefits if they are no longer eligible when their renewal date comes or if they fail to complete the renewal process. When people are disenrolled from Medicaid, they must find alternative sources of coverage or risk becoming uninsured.

Some people who disenroll from Medicaid return to the program in future months. Moving in and out of Medicaid coverage over a short time period in this way is called "churn." Churn may occur because of short-term loss of eligibility that is restored in future months, or because an individual was disenrolled but remained eligible and later re-enrolled in Medicaid.

Measuring Medicaid disenrollment and churn is important because interruptions in coverage are associated with barriers to health care access. People who experience gaps in Medicaid coverage are less likely to report having a usual source of care[57] and more likely to report cancelling or delaying medical appointments.[58] Loss of Medicaid coverage is also associated with problems servicing medical debt and worse medication adherence.[59] Policies that reduce churn and improve retention in Medicaid are linked to improved self-reported health.[60]

Prior to the ACA, it was estimated that 21 percent of adults and 12 percent of children covered by Medicaid experienced at least one disenrollment per year and most disenrollments resulted in a period of uninsurance.[61] The high degree of coverage instability among Medicaid enrollees motivated concerns that the disenrollment and churn rates could rise to as high as 30-50 percent when a larger share of low-income adults became eligible for Medicaid through the ACA.[62] Fortunately, these concerns did not come to fruition, as recent estimates suggest that Medicaid expansion led to lower rates of disenrollment and better continuity of Medicaid coverage. From 2014 through 2016, the adult disenrollment rate in expansion states fell to 13.7 percent compared to 23.8 percent in non-expansion states.[63]

These estimates of disenrollment were produced using the Medical Expenditure Panel Survey. Administrative data from Medicaid agencies and Medicaid managed care plans are an alternative source of information about disenrollment and churn. The most recent analysis of national Medicaid enrollment data found that 21 percent of children and 23 percent of adults were disenrolled in 2018, with 8 percent of children and 7 percent of adults churning back into Medicaid within twelve months.[64] These

statistics imply that more than 30 percent of disenrolled Medicaid beneficiaries spend less than a year outside the program. High rates of churn have also been observed in state-specific Medicaid enrollment data. A ten-state analysis from 2007 - 2012 estimated that among children who disenrolled from Medicaid, 23 percent returned to the program within seven months.[65]

Survey and administrative data both have unique strengths and limitations for measuring disenrollment, coverage loss, and churn. Survey data can provide a complete picture of respondents' health insurance coverage over time, but are subject to recall bias and survey response bias. This is particularly concerning for Medicaid enrollees, who may mistakenly identify Medicaid managed care plans as private insurance.[66] Administrative data from Medicaid agencies more reliably report coverage, but do not contain information about type of insurance, or uninsurance, that people have when they leave Medicaid.

State All Payer Claims Databases (APCDs) can address some of the limitations of Medicaid administrative data.[67] APCDs collect enrollment and claims records from public and private insurance plans, linking enrollees across these different sources of coverage. APCDs combine the accuracy of administrative data with the ability to observe coverage outside of Medicaid. While 21 states report having an APCD or being in the process of implementing one,[68] Colorado and Utah are the only states whose APCDs have been used to measure disenrollment and churn. The disenrollment rate among adults was estimated to be 10.8 percent in Colorado and 38.1 percent in Utah from 2014 - 2015.[69]

This paper aims to further demonstrate the usefulness of APCDs in understanding

coverage instability by using data from the Minnesota All Payer Claims Database (MN APCD)[14] to estimate rates of disenrollment, coverage loss, and churn in Minnesota from 2010 through 2019. In addition to producing the first state-specific estimate of disenrollment and churn for Minnesota, I make three other new contributions to this literature. First, I estimate disenrollment rates for seniors (65+) with Medicaid coverage, a group that has not been examined in previous work. Second, I leverage the unique features of APCD data to show what types of coverage enrollees had during the twelve months preceding and following periods of Medicaid enrollment. Finally, I compare average monthly spending between people who were continuously enrolled, people who disenrolled, and people who churned. My findings suggest that coverage instability remains a significant issue even after Medicaid expansion and that state and federal policies can play a role in improving continuity of coverage for Medicaid enrollees.

2.2 Research Design

2.2.1 Medicaid in Minnesota

Minnesota operates a combined Medicaid/CHIP program called Medical Assistance and a Basic Health Plan called MinnesotaCare. Medical Assistance is available to adults with incomes up to 133 percent of the Federal Poverty Level (FPL), children (2-18) up to 275 percent FPL, infants (under 2) up to 283 percent FPL, and qualified Medicare beneficiaries up to 100 percent FPL. MinnesotaCare is available to adults

with incomes under 200 percent FPL who do not qualify for Medical Assistance.[38]

From 2010-2014, Minnesotans entered Medicaid by contacting the Minnesota Department of Human Services or being enrolled via a health care provider. Starting in 2014, enrollment was also facilitated through the state's individual market insurance exchange. Once determined eligible, most people must enroll in a Medicaid managed care plan within one month. In Minnesota, enrollees must re-certify eligibility annually.[70] The state processes some renewals automatically and otherwise mails enrollees a renewal notice if they need to submit documentation to verify ongoing eligibility. Enrollees have 45 days to supply the information requested by the renewal notice or they risk being disenrolled from the program. Changes in income or status that occur outside of renewal periods must be reported to the state and can affect eligibility.

2.2.2 Data

The data for this analysis are claims and enrollment records from the MN APCD. The study population includes Minnesota residents who were enrolled in Medical Assistance or MinnesotaCare at any point between January 2010 and December 2019. Both public and private health plans submit data to the MN APCD. For Medicaid enrollees, this includes records from the Minnesota Department of Human Services, which administers the state's fee-for-service Medicaid plan, and Medicaid managed care plans that contract with the state to provide benefits. The MN APCD does not include personal information, but assigns enrollees a "member identifier" that is consistent across different submitters. The member identifier is constructed by the

MN APCD data vendor from data elements that are not observable in the final data, including name, date of birth, and plan contract number. This feature allowed me to follow a person as they move between different types of coverage.

To construct the study sample, I extracted all available monthly enrollment data from January 2010 through December 2019 for any member identifier that was observed in Medical Assistance or MinnesotaCare for at least one month during that period. Each of these records included up to three possible types of coverage per month; Medicaid, Medicare, and commercial insurance. Months where a member identifier was not observed in one of these plans types show up as gaps in the enrollment data and I filled these gaps by assigning those months a status of "no coverage."

I used medical and prescription drug claims to calculate monthly spending for each observation in the panel. The claims data in the MN APCD report the "allowed amount" - the actual payment amount between payers and providers for medical services and retail drugs. I summed all Medicaid claims (fee-for-service and managed care) to calculate monthly Medicaid spending. I also calculated "other spending" as the sum of Medicare and commercial claims during each month. Total spending is equal to the sum of Medicaid spending and other spending. I adjusted all three measures for inflation by converting allowed amounts to constant 2012 dollars using the GDP index.[71,72]

2.2.3 Methods

The primary outcomes for this study are disenrollment from Medicaid, coverage loss, and churn. Let $Medicaid_{it}$ be an indicator variable equal to one if $person_i$ has a Medicaid enrollment record in $month_t$. Disenrollment occurs in $month_t$ when $Medicaid_{it} = 1$ and $(Medicaid_{it+1} + Medicaid_{it+2}) = 0$. Coverage loss and churn are subsets of disenrollment. Coverage loss occurs when an individual is disenrolled and is not observed in another type of coverage in the subsequent months. Let $NoCoverage_{it}$ be an indicator variable equal to one if $person_i$ has "no coverage" in $month_t$. $CoverageLoss_{it} = 1$ when $Medicaid_{it} = 1$ and $(NoCoverage_{it+1} + NoCoverage_{it+2}) = 2$. I defined churn as disenrollment followed by re-enrollment in Medicaid within one year. $Churn_{it} = 1$ when $Medicaid_{it} = 1$, $(Medicaid_{it+1} + Medicaid_{it+2}) = 0$, and $(Medicaid_{it+3} + ... + Medicaid_{it+12}) \geq 1$. Note that all three definitions mean that disenrollment, coverage loss, and churn are all indexed to the last month of Medicaid coverage preceding the event.

I coded the three disruption outcomes for each observation in the person-month panel. Then, I collapsed the data to the person-year level, summing the three disruption outcomes, the spending outcomes, and total months of Medicaid, Medicare, and commercial coverage. I categorized observations into age groups – children (age 0-17), adults (18-64), and seniors (65+) – based on the the youngest observed age during the year. I restricted the person-year data to include only observations where the individual had at least one month of Medicaid coverage during the year.

The MN APCD does not contain data from the Veterans Administration, TRICARE, or Indian Health Service. It also lacks death records or complete data for people living outside of Minnesota. Starting in 2016, self-funded commercial insurance plans were no longer mandated to submit their data to APCDs, and the ability to observe enrollment in these plan types is severely limited from 2016-2020.[73] These data limitations mean that months where I observe "no coverage" could mean that the individual is uninsured, deceased, enrolled in a non-reporting health plan, or no longer residing in Minnesota.

To address the inability to distinguish uninsurance from other reasons for "no coverage," I made two sample restrictions. First, I used enrollment data from 2008 - 2020 to exclude any person-year observation that included the first or last time a member identifier was observed in the MN APCD. Second, I excluded any observations that included periods where a member identifier had no coverage for at least 24 consecutive months. These restrictions help to excluded observations from people who were potentially deceased, outside of Minnesota, or covered by a non-reporting plan.

The disenrollment, coverage loss, and churn rates are equal to the number of person-year observations with at least one instance of the event, divided by the number of individuals who had any Medicaid coverage during the year. I also calculated the share of disenrollments that resulted in coverage loss and churn by dividing the number of enrollees who experienced coverage loss and churn by the number of enrollees who experienced disenrollment.

I estimated differences in average monthly Medicaid and total spending between

individuals who disenrolled, individuals who churned, and individuals who experienced neither event during the year. I calculated average monthly Medicaid spending and average monthly total spending by dividing the annual spending measures by the number of months of Medicaid enrollment during the year. I used a Poisson regression model to adjust spending for age, sex, and calendar year, stratifying the models by age group.

Finally, I used the original person-month panel data to observe what type of coverage individuals had during the twelve months before and after they enrolled in and disenrolled from Medicaid. I restricted this analysis to periods of Medicaid enrollment of at least six months where a twelve months pre- or post-period was observable after applying the the sample restrictions above. I calculated the average number of months that individuals had no coverage, commercial coverage, Medicare alone, Medicaid alone, or both Medicare and Medicaid simultaneously. Having Medicaid coverage during the pre- or post-periods occurs when enrollees churn and have multiple spells of Medicaid enrollment that occur within one year of each other. Note that because of the staggered nature of Medicaid spells, a single member-month observation can be part of the pre- and post-periods for multiple spells of Medicaid coverage.

2.3 Results

The final sample included 11,076,787 person-years contributed by 2,552,638 unique individuals (Table 2.1). Average annual Medicaid enrollment was highest among children at 10.7 months, followed by adults at 10.0 months and seniors at 8.7 months.

The majority of Medicaid enrollment among seniors was during periods of dual enrollment in Medicaid and Medicare. Commercial coverage was relatively rare, with children and adults averaging 1.2 months of enrollment in commercial insurance plans during years that included at least one month of Medicaid enrollment

Table 2.1: Coverage, disenrollment, and churn in Minnesota, 2010 - 2019

	Children (0-17)	Adults (18-64)	Seniors (65+)
Person-year observations	4,365,586	5,840,532	870,669
Unique individuals	992,845	1,450,505	310,029
Mean age	7.9	37.7	77.8
Female (%)	49.0	58.1	66.3
Annual Medicaid months	10.7	10.0	8.7
Annual Medicare months	0.0	1.5	11.2
Dual enrolled	0.0	1.3	8.0
Annual commercial months	1.2	1.2	0.5
Disenrollment (%)	17.0	24.4	28.7
Coverage loss (%)	13.5	16.9	1.6
Share of disenrollment	79.4	69.3	5.6
Churn (%)	11.2	12.9	8.4
Share of disenrollment	65.9	52.9	29.3

Sample includes all person-years with at least one month of Medicaid enrollment where the enrollee did not enter the MN APCD data later than January, did not exit the MN APCD during the year, and was not lost to follow-up during the year. All three types of disruption are reported as the share of person-years that experienced at least one instance of disenrollment, coverage loss, and/or churn. Coverage loss and churn are also reported as the share of disenrolled observations.

The disenrollment rate was highest among seniors (28.7 percent), followed by adults (24.4 percent), and then children (17.0 percent). More than ten percent of adults and children experienced coverage loss each year, with more than 75 percent of disenrollments among children resulting in coverage loss. The churn rate was 11.2 among children and 12.9 percent among adults, which means that more than half of disenrollments among these groups resulted in churn. Seniors had a higher disenrollment rate than adults and children but had lower rates of coverage loss and

Figure 2.1: Annual disenrollment, coverage loss, and churn rates, 2010 - 2019

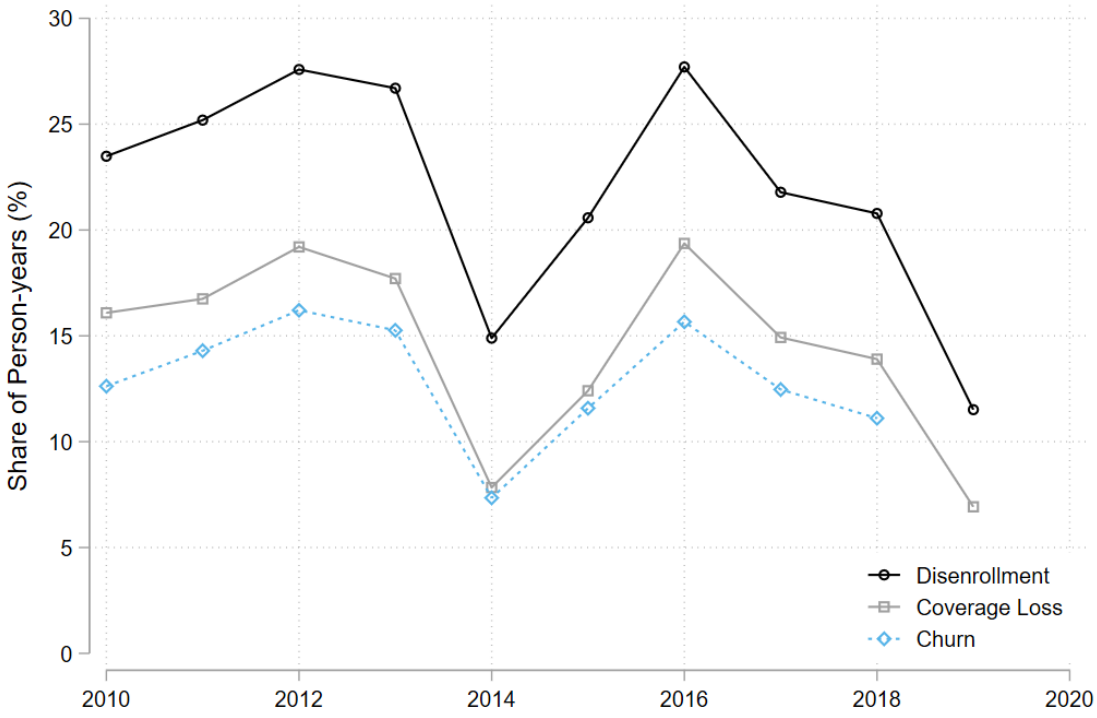


Figure shows the annual disenrollment, coverage loss, and churn rate across all three age groups from 2010 - 2019. The churn rate for 2019 is omitted because the sample did not include a full year of data after disenrollment to observe churn. All three rates represent the share of annual enrollees who experienced at least one instance of disenrollment, coverage loss, and churn.

churn. Only 5.6 percent of seniors who left Medicaid were observed without a source of coverage two months later and the churn rate was only 8.4 percent. These results are reflective of the high rates of Medicare and dual enrollment amongst seniors, which protected them from coverage loss when they disenrolled from Medicaid.

Figure 2.1 shows the annual rates of disenrollment, coverage loss, and churn across all three age groups. Appendix B includes age group-specific plots for children (Appendix Figure B.1), adults (Appendix Figure B.2), and seniors (Appendix Figure B.3).

In 2010, 23.5 percent of enrollees experienced at least one disenrollment, 16.1

Figure 2.2: Adjusted spending by disenrollment status

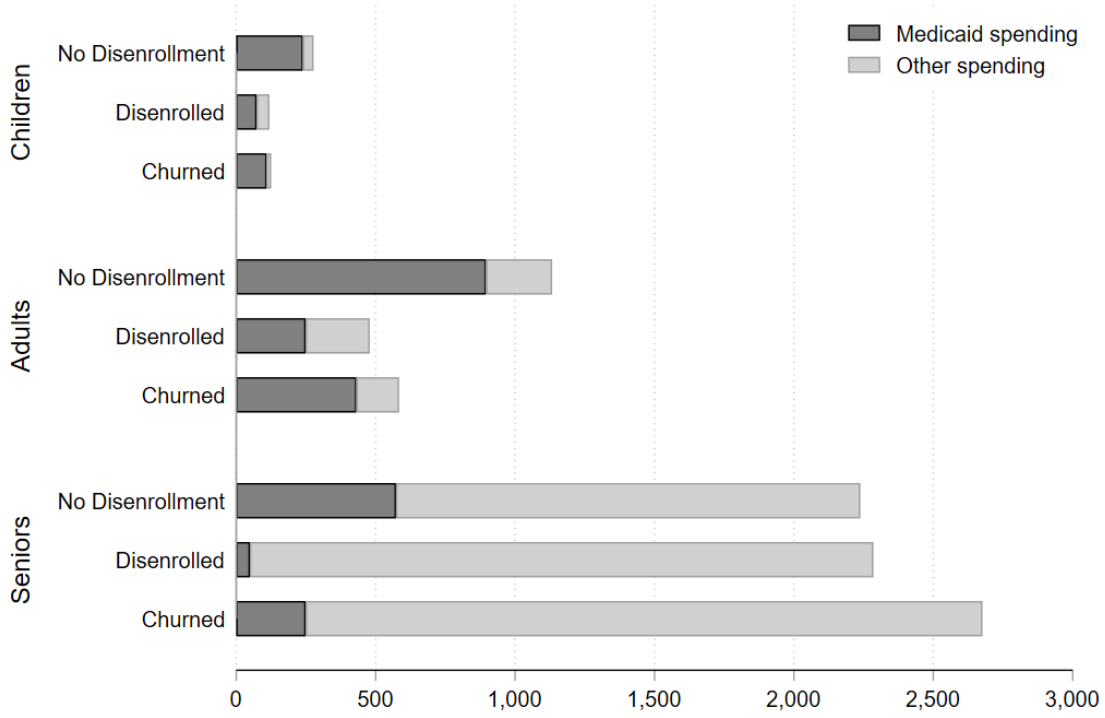


Figure shows adjusted average monthly spending, by age group, on medical and prescription drug claims. Adjustment was performed using a Poisson regression model with standard errors clustered at the individual level, 95% confidence intervals reported in the text. "No Disruption" refers to person-years with neither disenrollment nor churn, "Disenrolled" refers to person-years with disenrollment but no churn, and "Churned" refers to person-years with churn. Separate regressions were run for children (N=4,365,586), adults (N=5,840,307), and seniors (N=870,665).

percent experienced coverage loss, and 12.6 percent churned. All three types of disruption became more common from 2010 - 2012 before dropping sharply in 2014. These reductions were not sustained, as disenrollment (27.7 percent), coverage loss (19.4 percent), and churn (15.7 percent) increased to their highest levels during the study period in 2016. Disruptions were lowest in 2019, when 11.5 percent of enrollees experienced disenrollment and 6.9 percent experienced coverage loss. Note that the loss of self-funded insurer data does not seem to be affecting these results. If enrollees

were appearing to have no coverage because they were leaving Medicaid for a non-reporting self-funded plan, the gap between the disenrollment rate and the coverage loss rate should narrow from 2016 through 2019 as a higher share of disenrollments are erroneously categorized as coverage loss. This is not the case in Figure 2.1, where the ratio of coverage loss to disenrollment is relatively constant over the entire study period.

Figure 2.2 shows that enrollees who experienced disruptions had lower monthly spending while they were enrolled in Medicaid. The bars show average monthly Medicaid and other spending, adjusted for age, sex, and calendar year. Children and adults with uninterrupted Medicaid coverage had the highest monthly spending in their age groups at $277 (95% CI: $274, $281) and $1133 (95% CI: $1126, $1140) respectively. Spending by individuals who were disenrolled but did not churn averaged $119 (95% CI: $115, $122) for children and $479 (95% CI: $475, $484) for adults. Children who churned averaged $125 (95% CI: $122, $127) of spending per month and adults who churned averaged $584 (95% CI: $580, $589) of spending per month.

Seniors were a higher spending population than adults and children, but the majority of their claims were paid by Medicare. Seniors with Medicaid disruptions had higher average monthly spending than those who were not disenrolled from Medicaid but their Medicaid spending was lower. Spending in the no disenrollment group was $2238 (95% CI: $2224, $2253) compared to $2285 (95% CI: $2271, $2300) in the disenrollment group and $2676 (95% CI: $2652, $2701) in the churn group.

Figure 2.3 shows that most Medicaid spells were preceded and followed by periods of no coverage or other Medicaid spells. Children averaged six months of Medicaid

Figure 2.3: Coverage before and after Medicaid spells

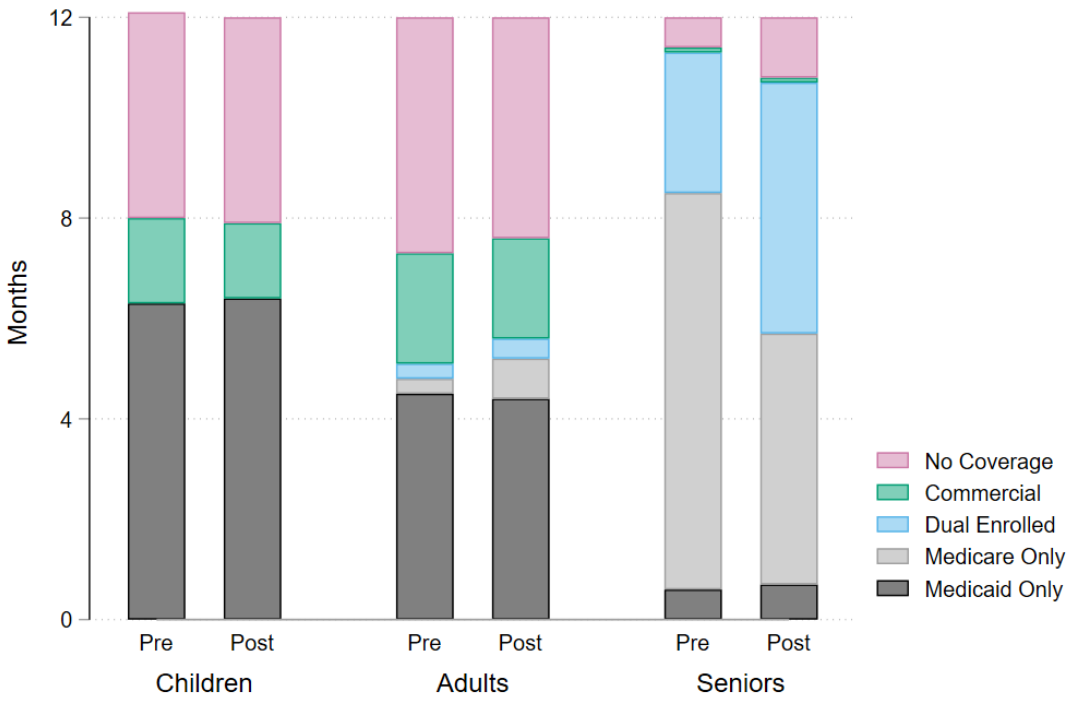


Figure reports the mean number of months that enrollees spent in different types of coverage during the twelve months before ("Pre") and after ("Post") periods of Medicaid coverage. The analysis includes only pre/post periods were all twelve months were observable in the final sample and where the Medicaid spell was at at least six months long. Pre/post sample sizes are 793,625/863,129 for children, 1,314,837/1,193,733 for adults, and 94,959/38,381 for seniors.

enrollment during both the pre- and post-periods, which is consistent with the high rates of churn in this age group (Table 2.1). Medicaid coverage was less common among adults (4.5 months pre / 4.4 months post). Children averaged less than two months of commercial coverage during the pre/post windows and adults averaged 2.2 months of commercial coverage prior to Medicaid enrollment and 2.0 months during the year following disenrollment. Both adults and children averaged more than four months of no coverage before and after Medicaid spells.

Medicare was the most common type of coverage for seniors during the pre- and post-periods. Prior to Medicaid spells, seniors averaged 7.9 months of Medicare

enrollment and 2.8 months of dual enrollment in Medicaid and Medicare. After disenrolling, they averaged 5.0 months of dual enrollment and 5.0 months of Medicare alone. Commercial coverage was rare and periods of no coverage were shorter for seniors than adults and children.

2.4 Discussion

Using 2010-2019 data from Minnesota, I estimated a disenrollment rate of 21.8 percent, a coverage loss rate of 14.4 percent, and a churn rate of 11.9 percent of annual enrollees. 65.8 percent of disenrolled beneficiaries experienced coverage loss and more than half (54.5 percent) churned back into Medicaid within one year. The annual disenrollment rates estimated from the MN APCD data are comparable the most recent national estimates from administrative data, which measured a 19 percent disenrollment rate among children and a 23 percent disenrollment rate among adults.[64] The churn rate was higher in Minnesota than nationwide, but this may be due to the inclusion of MinnesotaCare in this analysis. Expanding the Medicaid population to include adults with higher incomes increases the population "at-risk" for disruption and churn can also occur when individuals are disenrolled from Medical Assistance, experience a gap in coverage, and later enroll in MinnesotaCare.

These findings are timely, as the COVID-19 pandemic has brought disenrollment and churn to the forefront of health policy discussions. The federal Public Health Emergency (PHE) is scheduled to expire in late 2022 and this will have large effects on Medicaid enrollees. The Families First Coronavirus Recovery Act of 2020

instructed states to cease disenrollment for the duration of the PHE. When this policy ends, state Medicaid agencies will need to re-certify eligibility for Medicaid rolls that have grown to record levels.[74] Estimates suggest that more than ten million enrollees could lose coverage when the PHE ends,[75] underscoring the need for states to take steps to ensure eligible beneficiaries do not experience coverage disruptions. The federal government can support state efforts to smoothly re-determine and renew benefits by supplying enhanced funding to support states' administrative and enrollee outreach functions.[76] Enrollees who are no longer eligible for Medicaid will also require assistance in finding new insurance coverage and the federal government should offer special enrollment periods for the individual market, enhanced subsidies, and support for states in providing navigator services to people who lose Medicaid coverage.[77]

While I was not able to observe the reasons for disenrollment, prior research suggests that administrative burden and hassle costs contribute to disenrollment from Medicaid.[78] While some disenrollment is due to loss of eligibility, Medicaid beneficiaries also lose coverage because barriers to renewal or recertification lead them to drop out of the program. These barriers include communication problems with managed care organizations, difficulties understanding enrollment forms, and the inability to document income.[79] The ACA included federal funding to support efforts to reduce administrative barriers to Medicaid enrollment and renewal, such as simplified sign-up and renewal forms, automatic processing of renewals and redeterminations, and integrating eligibility and enrollment data across state agencies.[80]

Minnesota had wider Medicaid eligibility requirements than most states during the

study period. In 2016, the state ranked eighth nationally in the Composite Medicaid Policy Index, which measures states' adoption of policies to expand Medicaid/CHIP eligibility, reduce administrative burden, reduce cost sharing, and make Medicaid accessible to immigrant populations.[81] While the composite index identifies Minnesota as a national leader in Medicaid policy, the state ranked 46th out of 51 Medicaid programs on the administrative burden component of the index. Minnesota has an online application system, but does not allow enrollees to renew coverage, report changes in income, or upload verification documents using the online platform. The application platform is also not compatible with mobile devices. Fewer than 50 percent of eligibility determinations are made in "Real Time" (less than 24 hours) and fewer than half of renewals are completed using the state's automated processes.[82] Adopting more burden reduction policies, modernizing online resources, and automatically processing more renewals could reduce the disenrollment and coverage loss rates in Minnesota.

If easing administrative burdens is not sufficient for retaining people in Medicaid coverage, states can also reduce the frequency with which benefits need to be renewed.[83] Since the establishment of CHIP in 1997, states have been able to implement "continuous eligibility" policies for children. These policies guarantee twelve months of Medicaid/CHIP coverage upon enrollment, even if children lose eligibility during the year. The American Rescue Plan Act gave states the ability to offer pregnant women guaranteed Medicaid eligibility for twelve months after giving birth and 16 states have implemented this change.[84] States can use continuous eligibility waivers to protect populations who may be more vulnerable to coverage loss, including

pregnant women, children, and people with disabilities.

States that are interested in reducing coverage loss can promote policies that make it more likely that enrollees will transition out of Medicaid into alternative insurance coverage. Multi-market plans, insurance plans that follow enrollees across different insurance markets, can help keep people enrolled with similar benefits and provider networks after they leave Medicaid.[85] In Minnesota, three of the Medicaid managed care plans that operated in the state during the study period also sold individual market coverage on the state-based exchange, but five did not. States have the opportunity to encourage multi-market participation when they issue requests for proposal for MCOs to participate in Medicaid.

States interested in breaking the link between Medicaid disenrollment and uninsurance could also allow enrollees to buy into Medicaid as a form of "bridge coverage." This coverage would operate similarly to COBRA, where eligible people can pay for their old plan, in this case, a Medicaid plan, for a set period after losing eligibility. There are challenges to ensuring that this coverage would be affordable for people exiting Medicaid, who likely have lower income, but states could partially subsidize this coverage by building payments for bridge coverage into the capitation payments paid to Medicaid managed care plans. Using Medicaid as bridge coverage is a narrower version of Medicaid buy-in plans, which have been proposed in Minnesota and other states.[86]

Losing Medicaid benefits can create barriers to accessing care for seniors, as Medicaid helps to pay for Medicare premiums and cost sharing.[87] Many Medicaid-eligible seniors never enroll in the program,[88] and policies that automatically enroll seniors

in Medicaid coverage based on presumptive eligibility could increase Medicaid uptake and retention in this population.[89] Retaining seniors in Medicaid coverage is also important because Medicaid is responsible for paying for long-term services and supports and disenrollment can affect the ability of seniors to access services like home health aids, mobility assistance, and other social supports.[90]

I found that adults and children who were disenrolled or churned had lower spending than the continuously enrolled population. This may be indicative of a link between disruption and difficulties accessing care, even during periods of Medicaid enrollment. Alternatively, populations that experience disenrollment/churn may have fewer health care needs or lower demand for care. If the second explanation is true, retaining this group in Medicaid more consistently could bring more low-cost individuals into Medicaid's risk pool. Evaluations of New York's continuous eligibility policy for adults, which increased Medicaid retention, showed that per-member-per-month costs fell as a result of the policy, though total Medicaid spending increased as more people were enrolled in the program.[91] Improving retention and reducing churn can also generate administrative savings by reducing the costs associated with disenrolling and re=enrolling people in coverage, which are estimated to be $400 to $600 per churn event.[83]

This study is subject to several limitations. First, it is a single-state study of Medicaid disruption in Minnesota from 2010 - 2019 and the findings may not generalize to other states or time periods. Second, I am unable to verify that individuals did not have insurance during periods of no coverage in the MN APCD data. This means that some instances of disenrollment and coverage loss may have been due to people

leaving Medicaid for non-reporting plans or exiting the sample due to relocation outside of Minnesota or death. Third, the data lack information about enrollees' income or eligibility criteria and I cannot assess why people were disenrolled or churned and whether administrative difficulties or loss of eligibility is a larger contributor to disenrollment. Finally, the current analysis is descriptive and does not establish a causal relationship between Medicaid disruption and spending or access.

2.5 Conclusion

Medicaid disenrollment and churn were common across all age groups in Minnesota from 2010 - 2019. Most enrollees who left Medicaid were not enrolled in insurance during the following months, unless they churned back into Medicaid. Disenrollment and churn represent significant challenges to states aiming to ensure access and continuity of care to low-income and disabled residents. Policies that guarantee longer periods of Medicaid enrollment and that ease administrative burdens to enrolling in and renewing Medicaid show promise for decreasing churn.

Chapter 3

Health care use before and after Medicaid churn

3.1 Introduction

Medicaid is a vital part of the social safety net in the United States, insuring more than 27 million non-elderly adults.[1] Medicaid coverage provides a pathway to health care access for low-income and people with disabilities and there is an extensive literature showing that enrolling in Medicaid improves health and increases the use of health care services.[56,92,93,94] Conversely, losing Medicaid coverage decreases health care use and is associated with worse self-reported health and access to care.[95,96,97]

Despite the well-documented benefits of Medicaid, states face persistent challenges in enrolling and retaining eligible individuals in Medicaid coverage.[98,99] Estimates of the Medicaid participation rate among adults, the percentage of eligible adults who enroll in coverage, are below 50 percent in both expansion and non-expansion states.[100] Dropout is also a significant issue, with 43 percent of adults leaving coverage within twelve months of enrolling in Medicaid.[61] Some enrollees who drop out of Medicaid enroll in other forms of coverage, but more than half of adults who experience a change in Medicaid coverage spend at least one month uninsured.[57]

Dropout occurs, in part, because Medicaid is a means-tested program and enrollees must demonstrate that their income and assets do not exceed the eligibility thresholds established by their state. Changes in income or circumstance cause people to lose Medicaid eligibility. Even small fluctuations in income can move individuals over eligibility thresholds.[62] Income limits vary by family status and eligibility group, so changes in household composition like becoming a parent, having a dependent leave the household, or becoming a caretaker for an elderly adult can affect eligibility. States

vary in the frequency with which enrollees must certify their ongoing eligibility, but federal regulations require re-certification at least annually.[82]

While some Medicaid exit can be traced to loss of eligibility, enrollees who remain eligible can also be disenrolled if they are unable to complete the administrative tasks required to renew benefits and re-certify their eligibility with their state.[101] Renewal and re-certification involves coordination between enrollees, state agencies, and Medicaid manged care (MMC) plans, which now provide benefits to almost 70 percent of Medicaid enrollees,[3] leaving many opportunities for cases to fall through the cracks. Enrollees may struggle to understand renewal forms,[102] a challenge which is particularly acute for enrollees whose first language is not English.[103]

About one quarter of enrollees who lose Medicaid coverage return to the program within one year.[65,104] This pattern of exiting Medicaid and returning within a short period is called "churn." Despite the high frequency of churn, there are few studies that evaluate how losing and re-gaining Medicaid coverage affects access to care or use of health care services. People who lose Medicaid coverage are more likely to report difficulties accessing care and worse continuity and quality of care[57] and continuous enrollment in Medicaid is associated with better health outcomes.[60,105] While these studies establish an association between Medicaid enrollment and health care access, they focus on losing or maintaining Medicaid coverage rather than churn.

Two prior studies have attempted to estimate the effect of churn on health care use among non-elderly adults. The first used the Medical Expenditure Panel Survey (MEPS) from 2000 - 2004 to compare utilization outcomes use between enrollees experienced "multiple coverage transitions" (Medicaid enrollment and disenrollment

events) and those who maintained continuous coverage. Adults beneficiaries who had two or more transitions over a two year period had higher rates of office and emergency department use compared to those who had Medicaid coverage for two full years.[106] The study design was unable to identify whether churning increased utilization or whether enrollees re-enrolled because their demand for care increased.

The second paper used MEPS data from 2006-2012 and a difference-in-differences design to estimate how former Medicaid enrollees' utilization changed when a coverage gap ended and they re-enrolled in Medicaid.[107] Adults who churned visited office-based providers at lower rates during periods when they did not have Medicaid coverage and it took multiple months of re-enrollment in Medicaid before visit rates became comparable to the continuously enrolled. This study showed that enrollees deferred care until they re-entered Medicaid, but did not estimate whether utilization changed relative to the initial period of Medicaid enrollment.

Estimating the effect of churn on utilization is difficult because retroactive and presumptive eligibility policies make it possible for people to enroll in Medicaid after accessing care.[108] Retroactive eligibility allows patients or providers to submit claims for Medicaid-covered services that were delivered up to three months before enrollment. This means that, conditional on enrolling in Medicaid within three months, people who are eligible but unenrolled have a form of *de facto* insurance coverage. Presumptive eligibility is similar and allows certain providers, predominantly hospitals, to submit Medicaid claims for patients who they deem likely to qualify for benefits. Together, retroactive and presumptive eligibility policies that the timing of Medicaid enrollment is likely to be correlated with periods of acute health care need.

Observational changes in utilization among people who churn may be driven by the timing of re-enrollment rather than churn itself.

This paper aims to bring new evidence to this question by comparing health care use during the first two years of Medicaid coverage between enrollees who do not experience an interruption in coverage and those who exit Medicaid after one year but later return and to the program for a second year. This approach allows me to identify the period during which retroactive/presumptive eligibility occurred and controls for secular trends in health care use that were also evident among continuously enrolled individuals. In addition to using a new empirical approach, this is the first paper to use administrative data from a recent period (2016 - 2019) to evaluate patterns of health care use among non-elderly Medicaid enrollees who churn.

I find that enrollees whose second year of enrollment was preceded by a gap in Medicaid coverage had higher monthly spending upon re-entering Medicaid. The spending change was driven by an increase in outpatient provider visits and inpatient hospitalizations. I observed the largest increases in spending and use during the two months following re-enrollment, which is likely to include periods of retroactive eligibility. Increased spending and use persisted throughout the second year of enrollment enrollment, suggesting that patients had higher demand for care due to medical need or greater attachment to their Medicaid benefits. These findings help shed light on how Medicaid disenrollees time their re-entry into the program and on differences in spending patterns between people who churn and those who maintain continuous coverage.

3.2 Research Design

3.2.1 Empirical Strategy

The objective of this study is to estimate how health care use changed for enrollees who experienced a gap in Medicaid coverage that lasted less than one year. I study this question by using Minnesota's Medicaid program from 2016 through 2019 as the setting, with data from the Minnesota All Payer Claims Database (MN APCD).[14] Minnesota's two Medicaid programs for non-elderly adults are called Medical Assistance (MA) and MinnesotaCare (MnCare) and are operated by the Minnesota Department of Human Services (DHS). MA is available to adults with incomes up to 133 percent of the Federal Poverty Level (FPL) and MnCare is the state's implementation of the Basic Health Plan, which provides "Medicaid-like" benefits to adults with incomes between 133 to 200 percent of the FPL.[38] The covered benefits are similar between the two plans, but MnCare enrollees must pay modest premiums and cost sharing that increase with enrollees' income. All non-elderly MA and MnCare adults who do not have a disability are required to enroll in a Medicaid managed care plan within one month of entering the program.

Enrollees in both programs must re-certify eligibility and renew benefits every twelve months.[70] Many MA enrollees do not have to actively renew coverage because DHS is able to ascertain their continued eligibility using other state data sources. When this is not possible, MA enrollees receive a notice in the mail and must provide documentation to the state demonstrating their eligibility within 45 days. The process is similar for MnCare, but all enrollees receive a notice in the mail and must

re-certify. People in both programs can be disenrolled if they are found to be no longer eligible or if they fail to submit the necessary documentation within 45 days. MnCare enrollees can also lose coverage if they do not pay their premium in a timely manner. Individuals can return to MA or MnCare after disenrollment by re-applying for benefits through the state's insurance exchange, enrolling directly through the DHS, or enrolling with the assistance of a provider at the point of service.

I estimated how trends in monthly health care use differed over the first two years of PMAP/MnCare enrollment between continuously enrolled beneficiaries and beneficiaries who had a gap between their first and second year of coverage. Specifically, I estimated the differential change in use following a coverage gap using a difference-in-differences framework that compares the change in use from year one to year two (first difference) across the two groups (second difference). I defined the treatment group as enrollees who had PMAP/MnCare coverage for one year, dropped out of the program for three to twelve months, and re-enrolled for a subsequent year. I compared their outcomes to enrollees who were continuously enrolled in PMAP/MnCare for two years with no gaps.

Let $Y_{1,0}$ be average health care use in the treatment group before disenrolling and $Y_{1,1}$ be average use in the treatment group after re-enrolling. $Y_{0,0}$ is average use in the comparison group during the first year of enrollment and $Y_{0,1}$ is the same mean during the second year of enrollment. The average change in health care use among individuals who churn relative to those who do not is:

$$\delta^{use} = (Y_{1,1} - Y_{1,0}) - (Y_{0,1} - Y_{0,0}) \tag{3.1}$$

I hypothesize that experiencing a gap in benefits between the first and second year of Medicaid enrollment will lead to higher health care use upon returning to the program. First, enrollees health may deteriorate during the gap in coverage if they are forgoing or delaying needed care. This could lead to "pent-up demand" for services in the short term, as patients attempt to "catch up" on missed appointments, drugs, and services. It could also lead to longer term increases in use if the health effects of the coverage gap persist beyond the first few months of re-enrollment in Medicaid. Churn could also increase demand for care if enrollees place greater value on health insurance and health care services after experiencing a coverage gap. Being uninsured, even temporarily, could lead some individuals to better understand the link between Medicaid benefits and access to care, which may motivate greater use of medical care. On the other hand, it is possible that coverage gaps disrupt patient-provider relationships or established sources of care, which may lower demand for care upon re-enrollment.

There are two important assumptions required for δ^{use} to estimate the causal effect of churning on health care use. First, $(Y_{0,1} - Y_{0,0})$ be a valid counterfactual for what would have happened to the treatment group had enrollees not experienced a gap in coverage. This is sometimes called the "parallel trends" assumption because, in practice, researchers attempt to verify that the trends in the outcome were similar between the treatment and comparison group during the pre-period (the first year of Medicaid enrollment). There are several reasons why this study design is unlikely to meet the parallel trends assumption. Disenrollment from Medicaid is correlated

with unobservable factors that affect health care use, such as income and employment, changes in underlying health or medical need, and the availability of preferred providers. People who churn and people who seamlessly renew coverage may have different valuations of health insurance and medical care. Enrollees who are less attached to continuous coverage may form weaker relationships with providers or have a preference for care in settings like urgent care or emergency departments. These unobserved differences cast doubt on the assumption that treatment group enrollees would have behaved like comparison group enrollees had they remained continuously enrolled in Medicaid.

A second assumption needed for a causal interpretation of δ^{use} is that the timing of treatment (re-enrollment in Medicaid) was not correlated with health care use. Retroactive and presumptive eligibility policies (Section 3.1) make this assumption unlikely to hold. If eligible adults re-enroll in Medicaid coverage through a provider after seeking care, the timing of re-enrollment is will mechanically line up with periods of higher health care use. This is a form of adverse selection, where the people with the highest demand for care are most likely to enroll in insurance.[109] The correlation of demand for care and re-enrollment mean that an association between churn and health care use may be attributable to "reverse causality," where higher demand for care is actually causing Medicaid re-enrollment. The timing issues also interact with omitted variables discussed above, as unobserved changes in social situation or medical need may also be temporally correlated with disenrollment, re-enrollment, and health care consumption.

An ideal study design would use an exogenous shock to the timing of disenrollment,

re-enrollment, or both, to address the omitted variables bias and endogenous timing issues. To my knowledge, no such shock exists in Minnesota and federal and state regulations around Medicaid entitlements make it difficult to conceive of a policy change that could be used to estimate the causal effects of churn. These limitations mean that my results are best interpreted as descriptive; I show how disenrollment and re-enrollment were temporally correlated with health care use, net of changes in utilization and spending that were common across all enrollees.

3.2.2 Data

This analysis uses Medicaid enrollment and medical claims records from the MN APCD. The primary data for this study come from January 2016 - December 2019, though I used enrollment records from as early as 2010 to apply exclusion restrictions to the sample.

The study population includes non-elderly adults (ages 18-64) residing in Minnesota who initiated MA or MnCare coverage between January 2016 and March 2018. I excluded individuals who were enrolled in Medicare at any point from 2010 - 2019, as well as anyone who was enrolled in a Minnesota Health Care Program other than MA or MnCare during the study period. Enrollment in these types of plans is indicative of severe health conditions such as disability, HIV/AIDS, or substance use disorder and enrollment policies differ for some of these special programs.

I extracted monthly enrollment records for the study population and grouped

periods of continuous Medicaid enrollment into "spells." The treatment group included enrollees who were observed in MA or MnCare for one year, experienced a period without Medicaid coverage lasting three to twelve months, and re-enrolled in MA/MnCare for a subsequent year. The comparison group included individuals who were continuously enrolled in MA/MnCare for two years. I defined a full year of coverage as eleven months to correspond with the average duration of enrollment among "full year" Medicaid enrollees.[64]

I refer to the first year of Medicaid enrollment in both groups as the "index spell" and the second year of coverage as the "subsequent spell." To ensure that index spells were not subsequent spells for previous enrollment periods, I required that individuals have no Medicaid enrollment during the twelve months prior to the index spell. There were 7,076 pairs of spells in the treatment group and 150,949 pairs in the comparison group. No enrollee contributed more than one index-subsequent spell pair and there was no overlap between treated and comparison enrollees.

The MN APCD data do not include details about the timing of renewals or any information about eligibility. I was unable to observe whether disenrollment occurred due to loss of eligibility or other reasons. Similarly, I was forced to assign the 13^{th} month of coverage as the start of the subsequent spell in the comparison group. This means that all index spells in the comparison group were mechanically twelve months long, and subsequent spells vary in length between eleven and twelve months. This had little effect on the analysis, as health care use in the comparison group was relatively constant after the first three months of the index spell.

I applied two more minor restrictions on the analytic file to identify "clean" Medicaid spells for analysis. I removed 159 spells where the enrollee was observed with dual enrollment in Medicaid and commercial insurance for at least one month and an additional 114 spells where the enrollee had commercial insurance coverage during the gap between the index and churn spells. The final sample included 6,803 index-subsequent spell pairs from the treatment group totaling 197,127 enrollment months and 150,949 comparison group pairs totaling 1,811,388 months.

3.2.3 Outcomes

I used the medical claims data in the MN APCD to construct outcomes measuring health care use. I extracted enrollees' medical claims that had service dates during the index or comparison spells and used these claims to construct monthly counts of outpatient encounters, emergency department visits, hospital admissions, and Medicaid spending. MN APCD claims are submitted by both public (fee-for-service) and private (Medicaid managed care) payers and include the actual transaction amount between the payer and provider.

I identified outpatient encounters by grouping claims by patient, date of service, and provider. I included only professional claims (paid to providers) where the place of service was an office, outpatient hospital, ambulatory surgical center, federally qualified health center, rural health clinic, or mental health clinic. I identified providers, when possible, using the National Provider Identifier from the National Provider Payment Enumeration System files available in the MN APCD. This was not possible

for about 5.5 percent of claims, and in these cases I used the provider's MN APCD provider identifier. I required that outpatient encounter claims were not tied to an inpatient admission and were not on the same day as a claim with an emergency department place of service or procedure code.

I constructed counts of emergency department (ED) visits by summing the number of days during the month where a patient had at least one claim with an emergency department place of service or procedure code. Similarly, the monthly measure of hospital admissions is the sum of inpatient hospitalizations in acute care hospitals with an admission date during the month. Finally, I calculated medical spending by summing all paid amounts each enrollees' on medical claims paid by fee-for-service Medicaid or a Medicaid managed care plan during the month.

3.2.4 Estimation

I estimated changes in health care use following coverage gaps using both traditional difference-in-differences models and event study models that estimate a separate effect for each time period after treatment occurs. The canonical regression approach for estimating the DID treatment parameter is:

$$y_{it} = \delta D_{it} + \alpha_i + \gamma_t + \epsilon_{it} \tag{3.2}$$

where y_{it} represents the outcome for $individual_i$ at $time_t$ and D_{it} is an indicator variable that equals one when $individual_i$ is in the treatment group and $time_t$ is a period after the treatment occurred. The individual (α_i) and time (γ_t) fixed effects

control for time-invariant differences between the treatment and control groups and common shocks to both groups respectively.

Event study models modify Equation 3.2 to estimate the relative difference between the treatment and comparison groups in each period prior to, and following treatment.[110] This is usually implemented by interacting the D_{it} term with indicator variables for leads and lags of treatment. Let $t = 1$ be the first month of the index spell and t^0 denote the first month of the subsequent spell. In the comparison group, $t^0 = 13$ for all observations. In the treatment group, t^0 is the month of re-enrollment, corresponding to $t = 12$ or $t = 13$ depending on whether the index spell was eleven or twelve months long. The event study model can be estimated using a linear estimating equation of the form:

$$y_{it} = (Treat_i * \sum_{k=-m}^{n} \delta^k 1[t - t^0 = k]) + \sum_{k=-m}^{n} \beta^k 1[t - t^0 = k] + \alpha_i + \gamma_t + \epsilon_{it} \quad (3.3)$$

where $Treat_i$ is an indicator for being in the treatment group and all other notation is described above. The β^k terms estimate the change in the outcome that is common across both groups in each of the k periods prior to and following t^0 and the δ_k terms are the differential change in the outcome in the treatment group.

In my setting, the first month of the subsequent spell occurs at different calendar times depending on the start date of the index spell and the duration of the gap between the index and subsequent spells. This means that the δ terms in Equations 3.2 and 3.3 are weighted averages of the differences observed across groups with different values of t^0. The weights are proportional to the size of the timing groups and

the relative number of pre/post observations within each timing group.[46] One solution to this problem is to standardize the number of pre- and post-period observations within each timing group so that the δ^k estimates in Equation 3.3 are weighted only by the sample size of the timing groups.[111,112]

Let $g \in G$ represent the set of calendar months that correspond to all the unique values of t^0 in the data. I added a level of notation to Equations 3.2 and 3.3 so that y_{igt} represents the outcome for $individual_i$ in enrollment $month_t$ who started their subsequent spell at $t^0 = g$. I modified the estimation sample by trimming the data so that each individual had eleven monthly observations for both the index and the subsequent spell. This amounted to dropping the first month of the index spell and last month of the subsequent spells for any spells that were twelve months long. This allowed me to estimate the following event study model using strongly balanced panel data set:

$$\begin{aligned} y_{igt} =& (Treat_i * \sum_{k=-m}^{n} \delta^k 1[t - t^0 = k]) + \sum_{k=-m}^{n} \beta_g^k 1[t - t^0 = k] + \\ & \alpha_i + \tau_t + \phi Plan_{it} + \epsilon_{igt} \end{aligned} \tag{3.4}$$

Equation 3.4 allows for differential time trends in each timing group (β_g^k) but estimates treatment effects (δ^k) that are pooled across the groups. Many implementations of this "stacking estimator" include timing-group-specific individual fixed effects (α_{ig}) but this was unnecessary because the comparison group also has a t_g^0 so that each comparison enrollee is assigned to a specific timing group. I included calendar-time fixed effects (τ_t) and a set of plan effects ($Plan_{it}$) to account for differences in use

between Medicaid managed care organizations and fee-for-service Medicaid. I estimated Equation 3.4 using a high dimensional fixed effects linear model, estimated by maximum likelihood.[44] I clustered the standard errors at the individual-level, since enrollees were the relevant unit of treatment assignment.[45]

In addition to the event study, I estimated a composite treatment effect pooled across periods using a regression equation similar to Equation 3.2. The pooled DID estimating equation is:

$$y_{igt} = \delta D_{igt} + \alpha_i + \gamma_{gt} + \tau_t + \phi Plan_{it} + \epsilon_{igt} \tag{3.5}$$

I estimated Equation 3.5 on two different samples, the full balanced panel and a trimmed data set that excluded observations where $-3 \leq g - t_g^0 \leq 2$. The trimmed data set removed the three-month retroactive enrollment period and a symmetrical three month period prior to disenrollment. These six months are likely to have the greatest degree of omitted variable bias and endogenous treatment timing issues, and removing them allowed me to compare effect sizes with and without this crucial period.

3.3 Results

3.3.1 Descriptive Statistics

Treatment and comparison enrollees differed significantly in across most demographic variables, but the magnitude of the differences was small (Table 3.1) . The average

Table 3.1: Enrollee characteristics and health care use during the index spell

	Comparison	Treatment	p-value
Enrollee & spell characteristics			
Spells	150,949	6,803	
Age at enrollment	33.9 (13.4)	32.5 (11.2)	< 0.000
Female (%)	56.0	55.8	0.691
One or more chronic conditions (%)	54.2	50.9	< 0.000
Spell duration	12.0 (N/A)	11.6 (0.5)	< 0.000
Managed care months	9.9 (2.7)	9.3 (2.3)	< 0.000
Coverage gap months		5.5 (2.4)	
Outcomes (monthly average)			
Medicaid spending	$391 (1,303)	$250 (606)	< 0.000
Outpatient encounters	0.76 (1.29)	0.50 (0.77)	< 0.000
Emergency department visits	0.06 (0.14)	0.08 (0.18)	< 0.000
Hospital admissions	0.012 (0.039)	0.009 (0.032)	0.052

Table reports the characteristics of the treatment and comparison groups during the index spell. Standard deviations are reported in parentheses. p-values come from an ordinary least squares regression of the outcome on an indicator for treatment group assignment, with robust standard errors.

age of treatment enrollees during the index spell was 32.5 years compared to 33.9 years in the comparison group. Across both groups, slightly more than half of spells were from female enrollees. The share of enrollees who had at least one chronic condition, measured using the Johns Hopkins ACG System,[47] was 54.2 percent in the comparison group and 50.9 percent in the treatment group. All comparison spells were twelve months long by construction and index spells averaged 11.6 months.

The comparison group had higher rates of health care use during the index spell. Treatment group enrollees averaged 0.26 fewer outpatient encounters per month than comparison enrollees and average monthly Medicaid spending was 36 percent lower in the treatment group ($250) than the comparison group ($391). The treatment group averaged fewer hospital admissions (0.009 per month) but more emergency

Figure 3.1: Trend in Medicaid spending

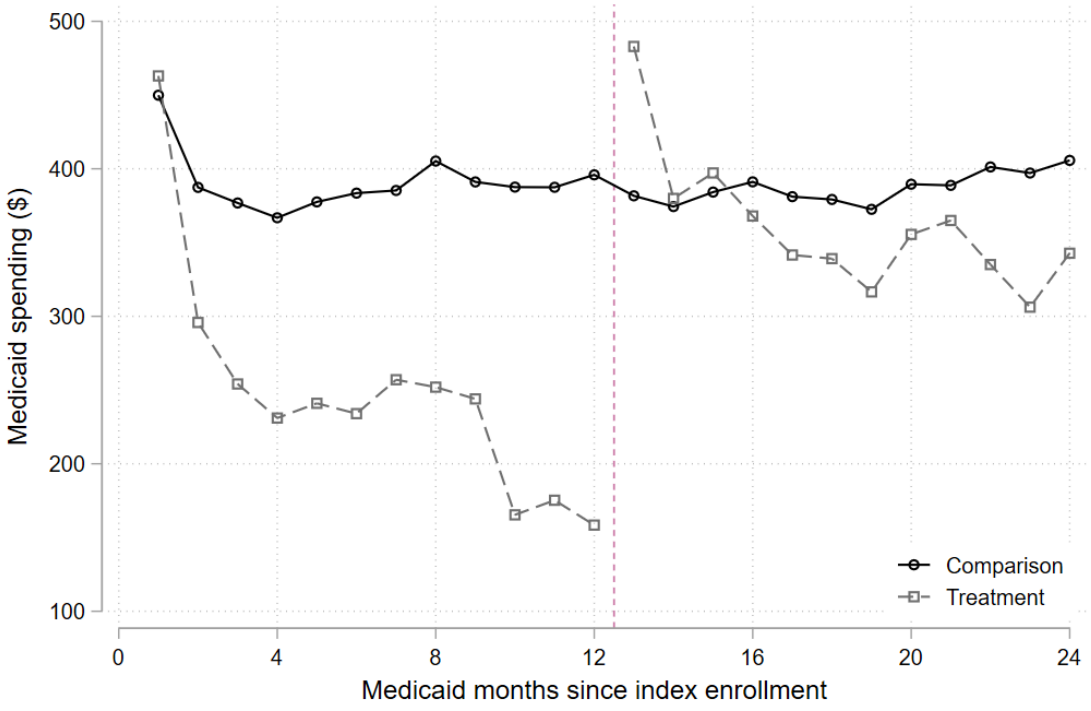


Figure shows average monthly spending in the treatment and comparison group during the index and subsequent spells. The points to the left of the red vertical line for the first year of enrollment (index) and points to the right are from the second year of enrollment (subsequent). For the comparison group, these observations are from a continuous time span. In the treatment group, there is an omitted gap of three to eleven months between the first and second enrollment year.

department visits (0.08 per month) than the comparison group.

Figure 3.1 shows how average Medicaid spending in the treatment and comparison groups changed over the course of the index and subsequent spells. Appendix C includes similar plots for outpatient encounters (Appendix Figure C.1), emergency department visits (Appendix Figure C.2), and hospital admissions (Appendix Figure C.3).

Enrollees in both groups had similar spending when they began their index spell – $450 in the comparison group and $463 in the treatment group. Spending fell in both groups over the first four months of enrollment, but the decrease was larger in the

treatment group, falling to $231 by the fourth month of the index spell. The treatment group experienced another drop in spending three months prior to disenrollment and spending averaged just $158 in the last month of the index spell.

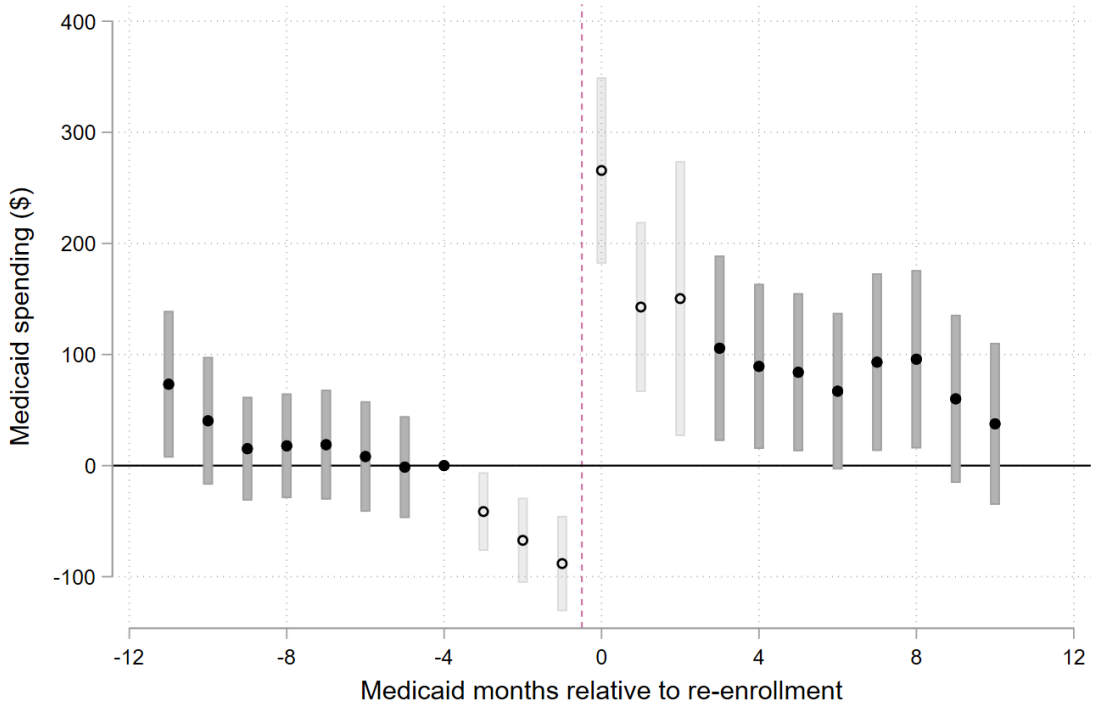
The data from the subsequent spells in the treatment group are consistent with people re-enrolling in Medicaid at times of higher medical need. Spending averaged $483 per-member-per-month (PMPM) and the treatment enrollees had higher rates of emergency department use (Appendix Figure C.2) and hospitalizations (Appendix Figure C.3). Spending in the treatment group fell as the subsequent spell wore on, but stabilized a level that was higher than nearly all months of the first spell. The spending trend in the comparison group trend was flat throughout the second year of coverage.

3.3.2 Event Study Results

Figures 3.2 through 3.5 show the event study coefficients estimated by Equation 3.4. The x-axis plots the months relative to the beginning of the subsequent spell and the scatter points show the adjusted difference between the treatment and comparison groups in each period. The shaded bars show the 95 percent confidence interval of these estimates. The difference between the two groups at $t = -4$ is normalized to zero so that the coefficients represent the difference between the treatment and comparison groups relative to $t = -4$. Figures 3.2 through 3.5 were all estimated on the full panel of data, but the six coefficients from $-3 \leq t \leq 2$ are shaded lighter to highlight that they are most affected by the pre-treatment decrease in use and

retroactive eligibility periods.

Figure 3.2: Event study - medicaid spending



The treatment group had higher PMPM spending after churning. During the first three months after re-enrolling into Medicaid, spending in the treatment group increased by $266, $143, and $150 respectively. These estimates are likely higher than the rest of the post-period due to retroactive/presumptive eligibility. Medical spending remained significantly higher in the treatment group throughout most of the subsequent spell, but the magnitude of the difference diminished during the latter half of the year. The difference was $67 at $t = 6$, $95 at $t = 8$, and not significantly different from zero for the remainder of the subsequent spell.

Outpatient provider use increased in the treatment group upon re-enrollment in Medicaid (Figure 3.3). The treatment group made 0.07 visits per enrollee in the

Figure 3.3: Event study - outpatient encounters

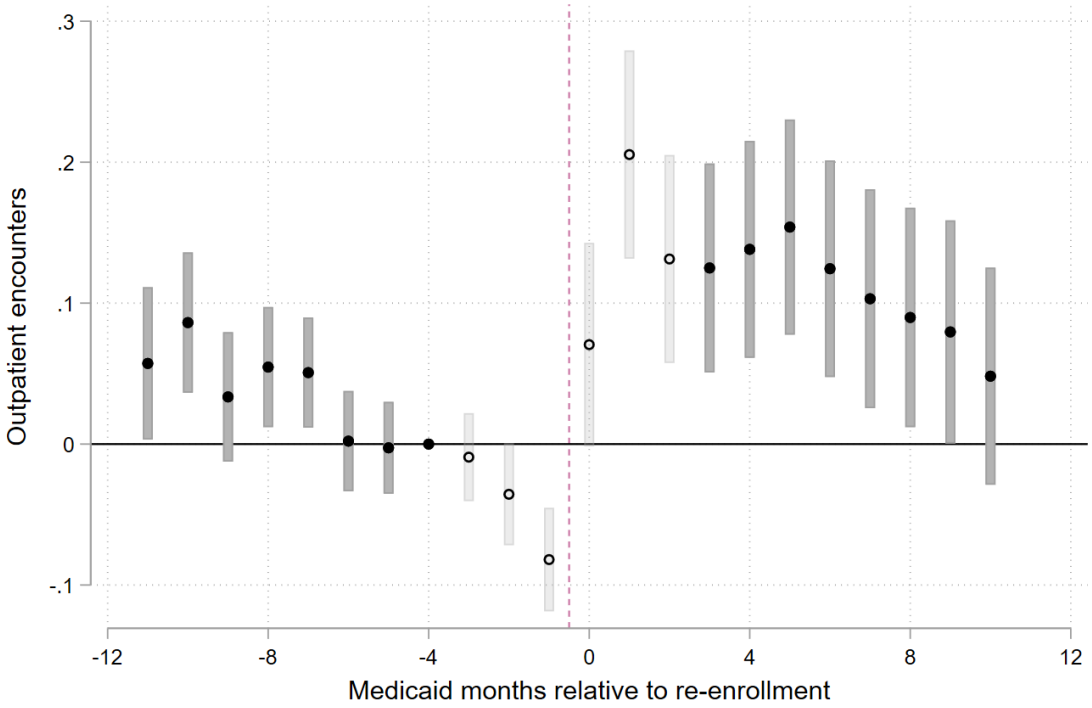
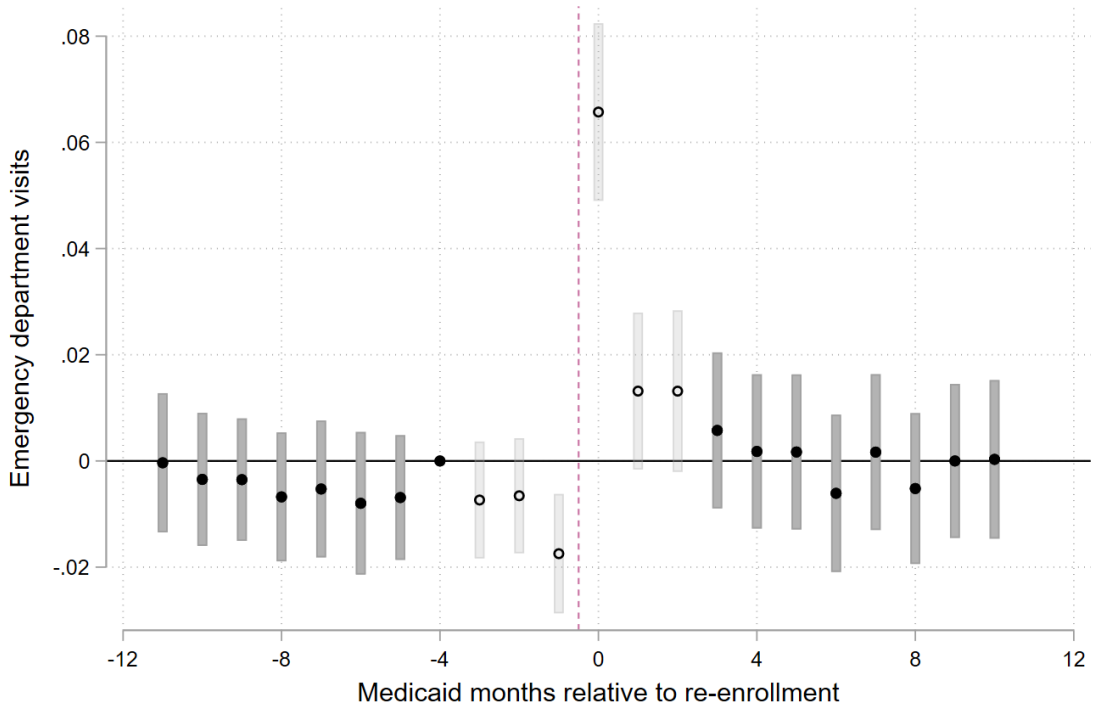


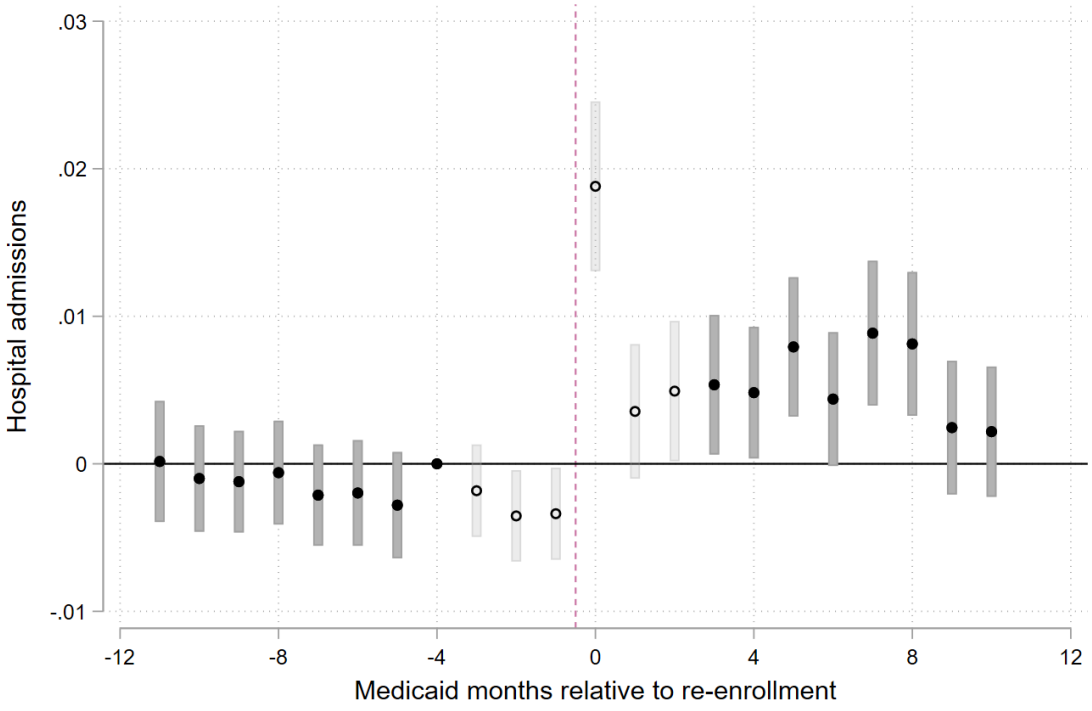
Figure 3.4: Event study - emergency department visits



month of re-enrollment ($t = 0$) and 0.21 more visits the following month. After this initial increase, the coefficients resume the decreasing pattern observed during the index spell and are no longer statistically significant at $t = 10$. Summing the monthly effects over the entire post period suggests that the cumulative change in outpatient use was 1.3 additional outpatient encounters per enrollee during the subsequent spell.

ED visits increased by 0.07 visits PMPM when treatment group enrollees re-entered Medicaid (Figure 3.4), which is consistent with re-enrollment after seeking emergency care. Unlike the spending and outpatient visit outcomes, ED use did not remain significantly higher past the first month of the subsequent spell. Hospital admissions increased by 0.019 admission per month (Figure 3.5) during the first month of the subsequent spell and remained significantly higher for much of the post-period,

Figure 3.5: Event study - hospital admissions



though the estimated differences are quite small, translating to less than three additional admissions per 100 person-years.

3.3.3 Average change in use

Table 3.2 shows the average change in use in the treatment group across all months of the subsequent spell. Column (1) shows the estimates using the full data set, and column (2) reports the corresponding estimates when $-3 \leq t \leq 2$ are omitted.

Experiencing a gap in coverage was associated with $57 higher PMPM spending during the subsequent spell, though I cannot rule out the null hypothesis of no effect at the 95 percent confidence level. After churning, outpatient encounters were significantly higher by 0.089 visits PMPM in the treatment group, but the unstable pattern

Table 3.2: Difference-in-differences regression estimates

	(1) Full Period	(2) Without $-3 \leq t \leq 2$
Medicaid spending	\$112	\$57
	(31)	(33)
Outpatient encounters	0.104	0.089
	(0.033)	(0.040)
Emergency department visits	0.014	0.004
	(0.005)	(0.006)
Hospital admissions	0.008	0.006
	(0.001)	(0.002)
Observations	3,368,354	2,449,712

Table reports the difference-in-differences coefficient (δ) from Equation 3.5 on the full sample (Column 1) and the sample excluding $-3 \leq t \leq 2$ (Column 2). Standard errors were clustered at the individual level and are reported in parenthesis.

in the pre-trends (Figure 3.3) makes this pooled estimate difficult to interpret. There was no significant difference in average emergency department use and the change in hospital admissions was a statistically significant increase of 0.006 visits PMPM, or about 7.2 more admissions per 100 enrollees.

3.4 Discussion

I found that enrollees who experienced a gap in Medicaid coverage between enrollment spells had higher spending, outpatient provider visits, and hospitalizations after they returned to the program. The increases were more pronounced during the first nine months after churning and attenuated as the second year of coverage ended. Use was especially high during the three month retroactive eligibility period upon initial enrollment, likely due to people re-enrolling in Medicaid coverage because they sought care for an acute health issue.

This study contributes to the literature on Medicaid disruption and continuity of coverage in three important ways. First, it is the only study to date that uses administrative data from after the implementation of the Affordable Care Act to measure changes in health care use among non-elderly adults who experience Medicaid churn. Second, it is only the second paper that employs an explicit comparison group to account for underlying changes in health care use that occur over the course of Medicaid enrollment spells. Third, I estimated the association of churn on PMPM Medicaid spending for non-elderly adults, which to date, had only been estimated for children.[104] This is an important contribution because PMPM spending forms the basis for setting capitation rates paid by states to Medicaid MCOs, which cover the majority of non-elderly adult beneficiaries in Minnesota and the United States more broadly.

A limitation of this study is that the design does not allow for a causal interpretation of the findings. I am unable to rule out that the increases in use observed upon re-enrollment were driven by unobserved factors, or that higher demand for medical care caused re-enrollment rather than churn affecting use. While the inability to produce causal estimates restricts the interpretation of my findings, there is value in understanding care consumption patterns among Medicaid enrollees who churn. The descriptive results can help Medicaid agencies and Medicaid managed care organizations anticipate which enrollees are at highest risk for disenrolling from the program and also point to the need for more care coordination and management following re-enrollment.

Higher spending during periods of retroactive eligibility or the month of re-enrollment

has important implications for managed care contracting. Enrollees in Minnesota are covered by fee-for-service Medicaid during the retroactive eligibility period and often do not enroll in a managed care plan until their second month of coverage. This means that the costs associated with increased health care use during the first month of enrollment are born directly by the state rather than transferred to private managed care plans via capitation arrangements. Managed care plans face competing incentives when it comes to retaining enrollees in coverage. On the one hand, allowing their members to be disenrolled reduces the total payments they receive from the state. On the other hand, disenrollment means that the plan will not be at risk for periods of higher medical spending. States could transfer some of this spending risk back to Medicaid plans by holding patient's previous Medicaid plan responsible for paying claims during the re-enrollment period.

The results also suggest that the costs of retaining enrollees in Medicaid coverage may be lower than the average PMPM spending in the continuously enrolled population. Two states, New York and Montana, have implemented continuous eligibility policies for adults, which guarantee twelve months of coverage even if enrollees eligibility changes after initial enrollment. A concern with these policies is that they increase the total cost of Medicaid, which already accounts for 29 percent of state budgets.[113] Table 3.2 shows that Medicaid spending increased by $57 PMPM during the re-enrollment spell. If a portion of this increase is attributable to the coverage gap, it would imply that retaining enrollees in coverage could moderate spending increases among enrollees who would otherwise churn. Retaining enrollees may increase

the number of individuals the state is covering at any given time, but this study suggests that the population who would be affected by continuous eligibility had lower spending at baseline. Avoiding churn would also eliminate the administrative costs associated with disenrolling and reenrolling beneficiaries, which are estimated at $400 to $600 per churn event.[83]

Understanding the link between disenrollment, re-enrollment and health care use is especially important in 2022, as the COVID-19 Public Health Emergency (PHE) is scheduled to expire at the end of the year. Provisions of the Families First Coronavirus Act of 2020 led all states to stop disenrolling Medicaid beneficiaries during the PHE. Estimates suggest that as many as 14.4 million people could be disenrolled from Medicaid when the PHE ends and requirements to re-certify eligibility resume.[75] While many of these enrollees will no longer be eligible for Medicaid, others may simply fail to re-certify in 2022 and will churn back into coverage at a later date. My findings suggest that many of these enrollees will return during times of high medical need. Given the sheer number of enrollees likely to churn, this could create difficulties for the providers caring for Medicaid populations and Medicaid agencies or managed care plans tasked with financing their care. States could help mitigate these challenges by preemptively contacting enrollees to "reset" their twelve month eligibility period prior to the end of the PHE and by increasing funding commitments to outreach and enrollment.

In addition to not allowing causal inference, this study has three other important limitations. First, it is a single state study of Medicaid churn in Minnesota from 2016-2019 and the results may not generalize to other states and time periods. Second,

the sample restriction to include only enrollees who churned after eleven or twelve months of coverage meant that there were only 6,803 unique enrollees in the treatment group. This is a small population relative to the size of the non-elderly adult Medicaid population, which averaged more than 500,000 people per month during the study period. Third, this study does not examine whether the effect of churn differed across subgroups of enrollees, which is an important dynamic to understand when translating these findings into policy recommendations.

3.5 Conclusion

Adults who experience gaps in coverage between periods of Medicaid enrollment have higher spending and make more outpatient visits when they re-enroll in Medicaid coverage. Some of this increase is likely due to the ability to enroll in Medicaid through a provider after seeking care, but higher spending persists throughout the first year of re-enrollment, even after the retroactive eligibility period has ended. Further research is needed to understand what types of enrollees and care are driving increased spending, and to better disentangle the effects of churn from changes in demand for care that lead to re-enrollment in Medicaid.

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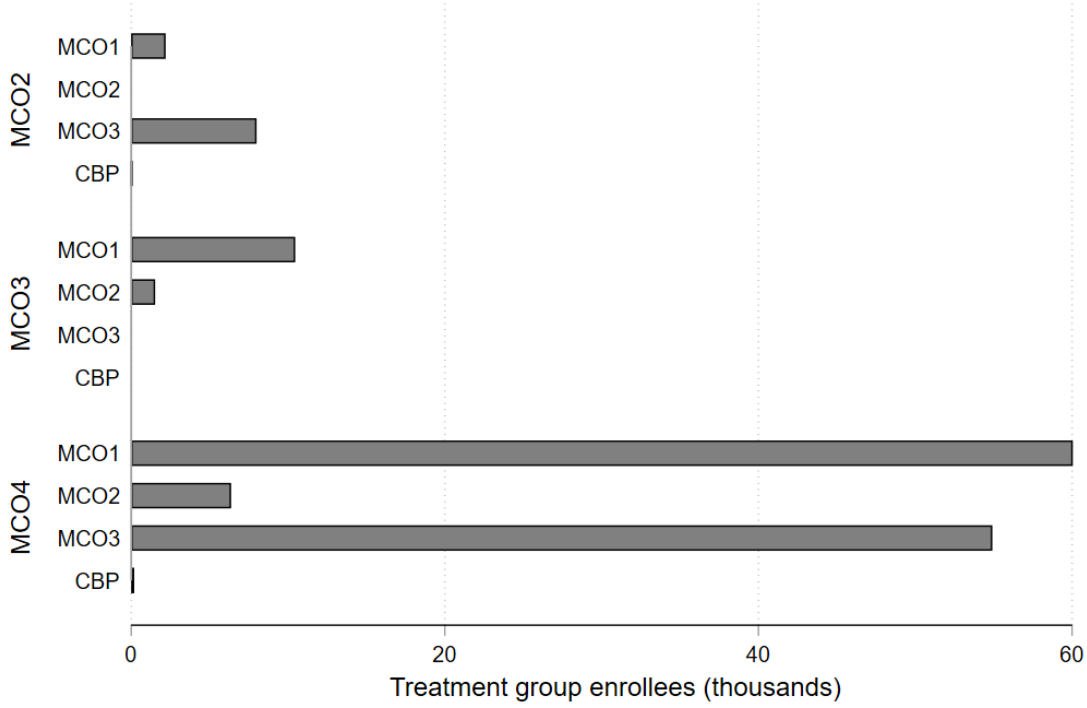
Appendix A

Appendices to Chapter 1

Figure A.1: Treatment group switching by MCO combination



Note: Figure shows the number of treatment group enrollees who switched from 2015 MCOs (vertical labels) to 2016 MCOs (horizontal label).

Figure A.2: Share of total spending by network membership

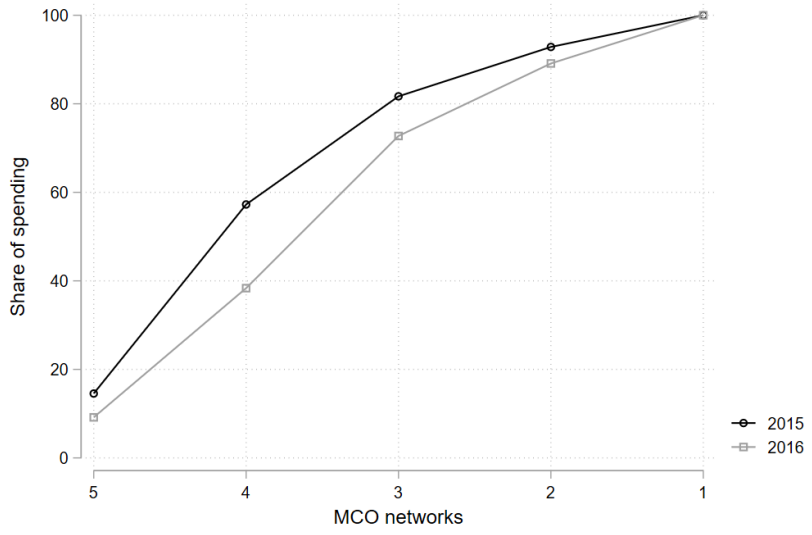


Figure shows the cumulative share of spending in 2015 with providers who were included in one or more MCOs derived provider networks. Networks were constructed from all PMAP claims and CBPs were pooled into a single MCO.

Table A.1: Primary care, mental health, and other providers by NPPES classification, 2015-2016

	Classification	Encounters	Providers
Primary Care			
1	Family Medicine	988,186	3,341
2	Nurse Practitioner	563,233	3,049
3	Pediatrics	533,203	1,342
4	Physician Assistant	360,788	2,259
5	Internal Medicine	333,573	4,001
6	Obstetrics & Gynecology	166,465	822
7	General Practice	6,784	60
Mental health			
1	Psychologist	537,624	2,160
2	Social Worker	476,731	1,743
3	Counselor	359,062	1,250
4	Marriage & Family Therapist	343,522	1,139
5	Psychiatry & Neurology	205,747	1,083
6	Community/Behavioral Health	39,829	65
7	Community Based Residential Treatment Facility	6,830	18
Other			
1	Chiropractor	418,392	1,930
2	Radiology	365,801	1,123
3	Optometrist	284,899	1,164
4	Physical Therapist	185,419	1,516
5	Student in a Health Care Training Program	167,908	1,661
7	Occupational Therapist	130,476	671

Table shows the seven most common NPPES classification codes for primary care and mental health providers. "Encounters" reports the number of visits by individuals in the study population during 2015 and 2016 and "Providers" reports the number of unique providers matching the classification during the same period.

Table A.2: Key providers by NPPES classification, 2015

Key provider classification	Children	Adults
Family Medicine	30,432	24,338
Pediatrics	3,8713	1,017
No Key Provider	21,220	14,463
Nurse Practitioner	17,282	9,380
Physician Assistant	9,261	6,312
Optometrist	9,291	4,991
Chiropractor	4,027	8,308
Internal Medicine	2,264	7,326
Psychologist	4,046	4,130
Social Worker	3,630	2,868
Student in a Health Care Training Program	4,410	2,077
Obstetrics & Gynecology	228	5,015
Marriage & Family Therapist	2,694	1,957
Radiology	1,702	2,475
Psychiatry & Neurology	1,374	2,367
Counselor	2,031	1,709
Physical Therapist	705	2,721
Eyewear Supplier	2,093	879
Orthopaedic Surgery	1,350	1,395
Specialist	1,510	1,093

Table shows the number of children (0-17) and adults (18-64) who had a key provider matching the NPPES classification type. An enrollee's key provider is the provider who accounted for the plurality of their 2015 outpatient encounters.

Table A.3: Age-stratified treatment effects - health care use

	Children (0-17)		Adults (18-64)	
	Baseline	Effect	Baseline	Effect
Outpatient encounters	0.49	-0.19^{***}	0.98	-0.33^{***}
		(0.04)		(0.08)
Outpatient encounters - primary care	0.22	-0.08^{***}	0.36	-0.13^{***}
		(0.02)		(0.03)
Outpatient encounters - mental health	0.12	-0.04^{***}	0.19	-0.07^{***}
		(0.01)		(0.01)
Emergency department visits	0.04	-0.01^{***}	0.06	-0.03^{***}
		(0.003)		(0.005)
Inpatient admissions	0.003	-0.001^{**}	0.011	-0.004^{***}
		(0.0002)		(0.0008)
Thirty-day prescription fills	0.38	0.01	1.80	0.02
		(0.01)		(0.03)
Medical spending	\$146	-42^{***}	\$285	-88^{***}
		(7.4)		(17.1)
Prescription drug spending	\$23	1	\$83	-2
		(0.7)		(1.6)
Observations	4,090,657		2,801,740	

Table reports regression results from the pooled treatment effects models for adults and children. Standard errors clustered by baseline plan and reported in parentheses. Models included individual and MCO*month fixed effects. All effects represent per-member-per-month changes in the treatment group, relative to the comparison group.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table A.4: Chronic condition stratified treatment effects - health care use

	No Chronic Conditions		Chronic Condition(s)	
	Baseline	Effect	Baseline	Effect
Outpatient encounters	0.28	-0.10^{***}	1.12	-0.48^{*}
		(0.03)		(0.10)
Outpatient encounters - primary care	0.17	-0.06^{***}	0.38	-0.13^{*}
		(0.02)		(0.03)
Outpatient encounters - mental health	0.02	-0.01^{*}	0.28	-0.16^{***}
		(0.00)		(0.03)
Emergency department visits	0.03	-0.01^{*}	0.07	-0.03^{***}
		(0.003)		(0.005)
Inpatient admissions	0.002	-0.001^{*}	0.010	-0.004^{***}
		(0.0003)		(0.0007)
Thirty-day prescription fills	0.32	0.1	1.62	0.09
		(0.01)		(0.04)
Medical spending	\$74	-20^{***}	\$334	-112^{***}
		(4.7)		(22.9)
Prescription drug spending	\$12	1^{**}	\$83	0
		(0.2)		(2.7)
Observations	3,930,136		2,962,261	

Table reports regression results from the pooled treatment effects models for individuals with no chronic conditions at baseline and individuals with at least one chronic condition in 2015. Chronic conditions were measured using the Johns Hopkins ACG System.[47] Standard errors clustered by baseline plan and reported in parentheses. Models included individual and MCO*month fixed effects. All effects represent per-member-per-month changes in the treatment group, relative to the comparison group.

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Source: Author's analysis of the MN APCD

Table A.5: Age-stratified treatment effects - continuity of care

	Children (0-17)		Adults (18-64)	
	Baseline	Effect	Baseline	Effect
Visits to new providers	37.7%	5.7***	36.1%	6.4***
		(0.9)		(0.9)
Visits to 2015 key providers	50.6%	0.0	43.3%	0.7
		(1.2)		(0.8)
Visits in 2015 network	92.4%	−5.0***	92.7%	−4.6***
		(0.9)		(0.6)
Observations	242,078		172,446	

Table reports regression results from the pooled treatment effects models for adults and children. The unit of analysis is the enrollee-year and only observations with at least one outpatient visit are included. All effects are measured in percentage points and represent the change in the annual share of all outpatient visits. Standard errors clustered by baseline plan and reported in parentheses. Models included individual and MCO*year fixed effects.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table A.6: Chronic condition stratified treatment effects - continuity of care

	No Chronic Conditions		Chronic Condition(s)	
	Baseline	Effect	Baseline	Effect
Visits to new providers	46.5%	4.4***	33.8%	6.3***
		(0.9)		(1.0)
Visits to 2015 key providers	53.3%	0.6	44.7%	−1.1
		(1.4)		(0.7)
Visits in 2015 network	94.2%	−4.9***	92.1%	−5.0***
		(0.8)		(0.5)
Observations	130,924		155,138	

Table reports regression results from the pooled treatment effects models for individuals with no chronic conditions at baseline, and individuals with at least one chronic condition in 2015. Chronic conditions were measured using the Johns Hopkins ACG System.[47] The unit of analysis is the enrollee-year and only observations with at least one outpatient visit are included. All effects are measured in percentage points and represent the change in the annual share of all outpatient visits. Standard errors clustered by baseline plan and reported in parentheses. Models included individual and MCO*year fixed effects.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Appendix B

Appendices to Chapter 2

Figure B.1: Annual disenrollment, coverage loss, and churn rates - children

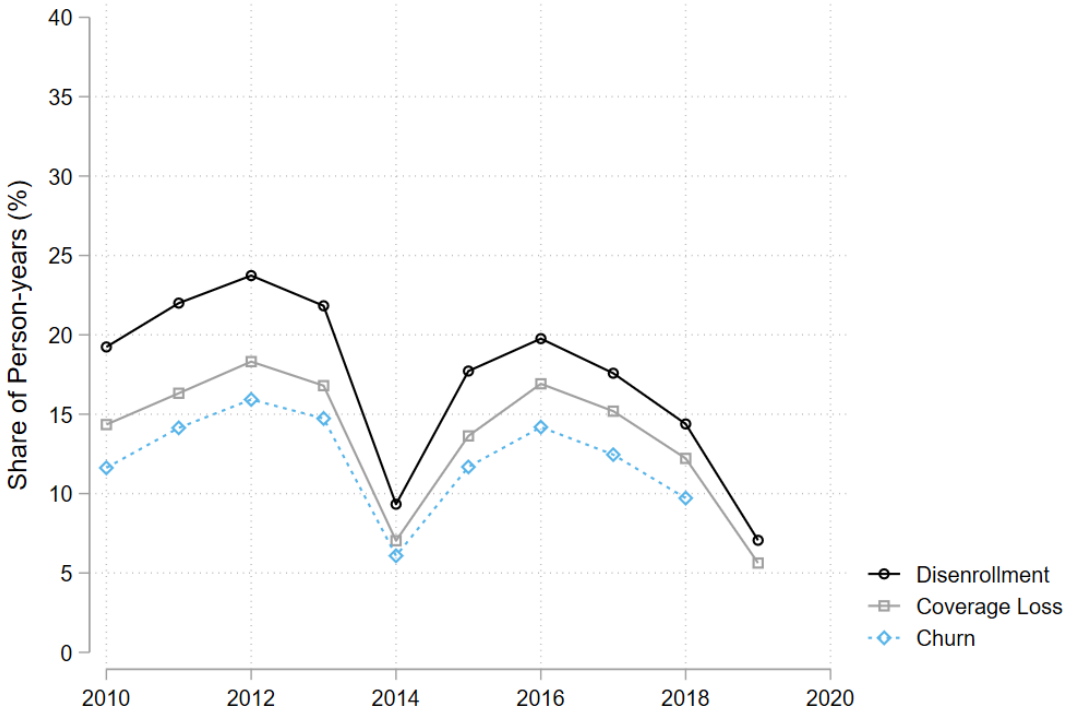


Figure shows the annual share of children (0-17) who experienced disenrollment, coverage loss, and churn. Churn was not measurable in 2019 because the full eleven month period after exit was not observable for months later than January.

Figure B.2: Annual disenrollment, coverage loss, and churn rates - adults

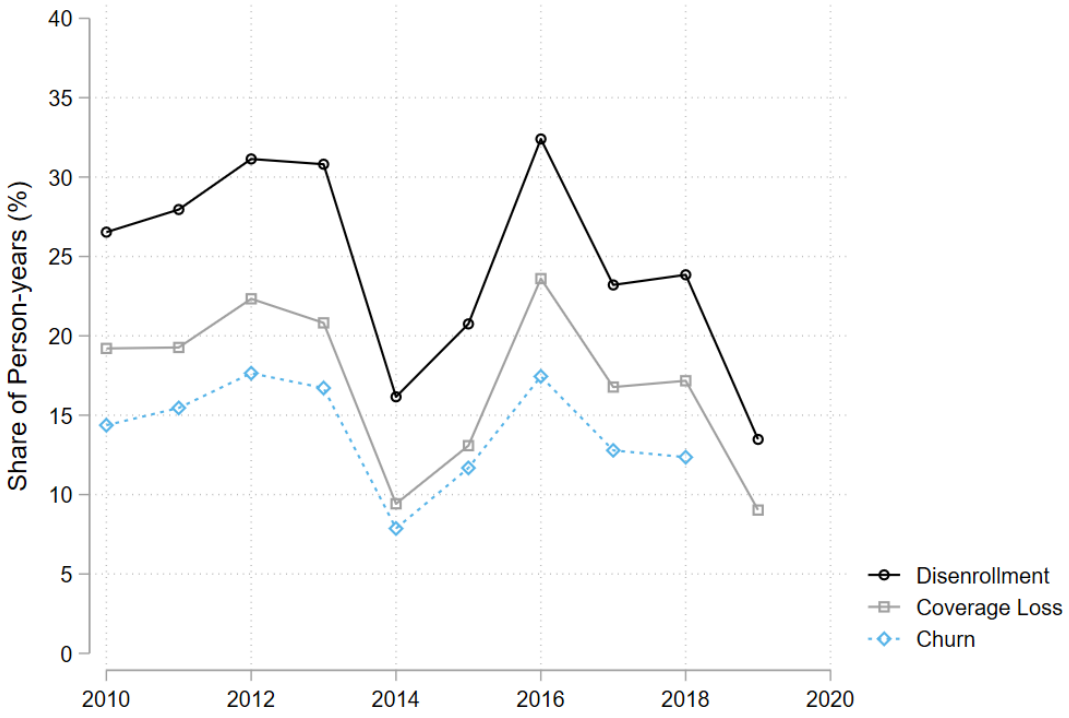


Figure shows the annual share of adults (18-64) who experienced disenrollment, coverage loss, and churn. Churn was not measurable in 2019 because the full eleven month period after exit was not observable for months later than January.

Figure B.3: Annual disenrollment, coverage loss, and churn rates - seniors

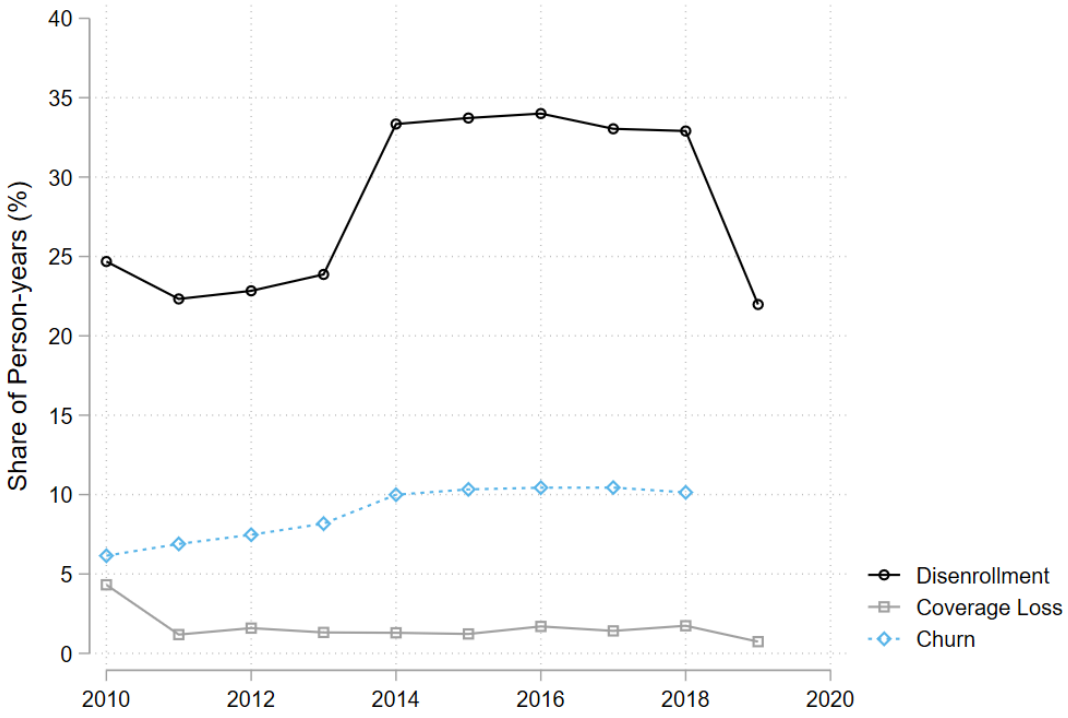


Figure shows the annual share of seniors (65+) who experienced disenrollment, coverage loss, and churn. Churn was not measurable in 2019 because the full eleven month period after exit was not observable for months later than January.

Appendix C

Appendices to Chapter 3

Figure C.1: Trend in outpatient encounters

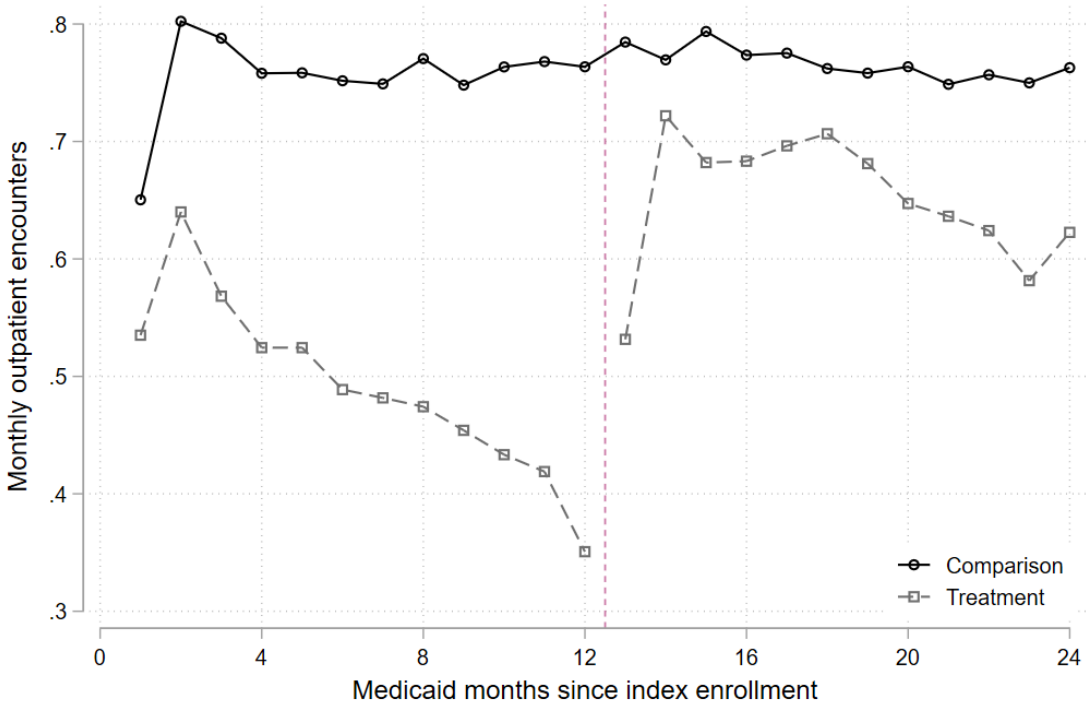


Figure shows average monthly outpatient visits in the treatment and comparison group during the index and subsequent spells. The points to the left of the red vertical line for the first year of enrollment (index) and points to the right are from the second year of enrollment (subsequent). For the comparison group, these observations are from a continuous time span. In the treatment group, there is an omitted gap of three to eleven months between the first and second enrollment year.

Figure C.2: Trend in emergency department visits

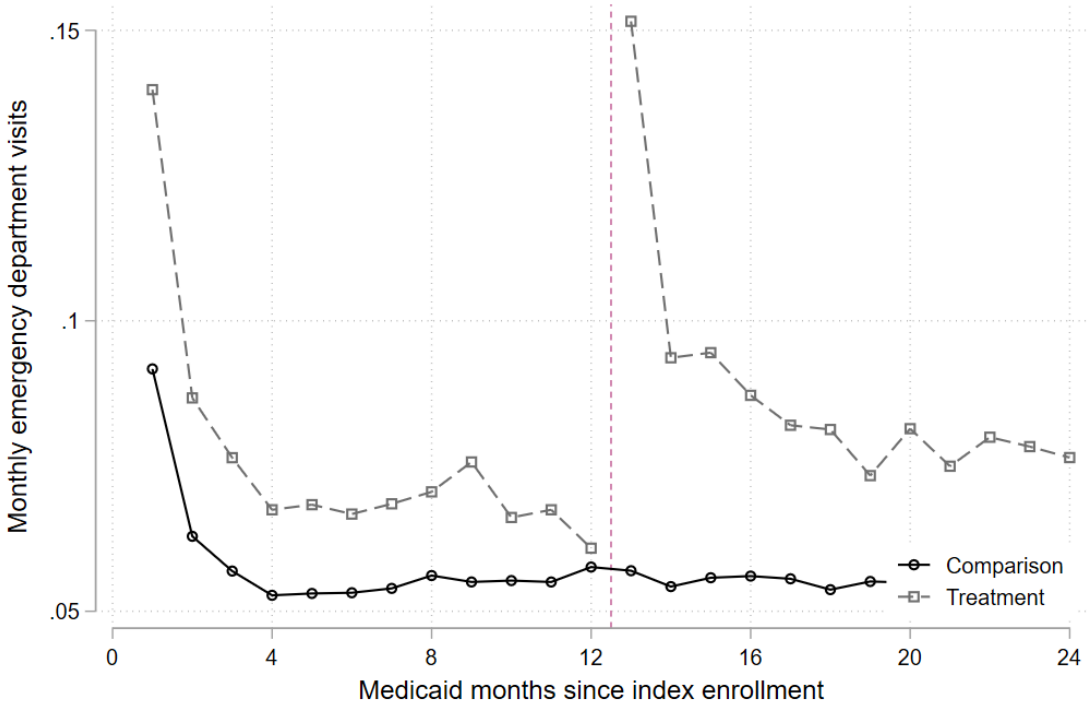


Figure shows average monthly emergency department visits in the treatment and comparison group during the index and subsequent spells. The points to the left of the red vertical line for the first year of enrollment (index) and points to the right are from the second year of enrollment (subsequent). For the comparison group, these observations are from a continuous time span. In the treatment group, there is an omitted gap of three to eleven months between the first and second enrollment year.

Figure C.3: Trend in hospital admissions

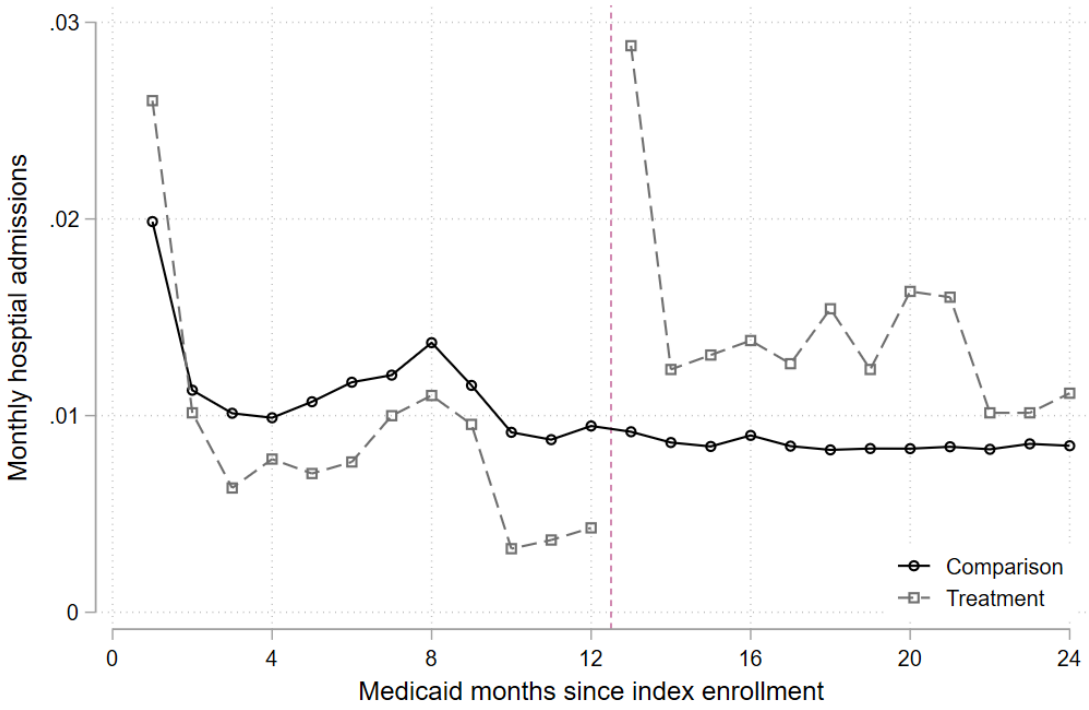


Figure shows average monthly hospital admissions in the treatment and comparison group during the index and subsequent spells. The points to the left of the red vertical line for the first year of enrollment (index) and points to the right are from the second year of enrollment (subsequent). For the comparison group, these observations are from a continuous time span. In the treatment group, there is an omitted gap of three to eleven months between the first and second enrollment year.