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**Three Studies on Mental Health Implications of Discontinuous Insurance Coverage and Medicaid Eligibility Policies**

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Three Studies on Mental Health Implications of Discontinuous Insurance Coverage
and Medicaid Eligibility Policies

By

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An abstract of
A dissertation submitted to the Faculty of the
James T. Laney School of Graduate Studies of Emory University
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in Health Services Research and Health Policy

2017

Abstract

Three Studies on Mental Health Implications of Discontinuous Insurance Coverage
and Medicaid Eligibility Policies

By Xu Ji

Medicaid is the largest insurer of mental health services; however, little is known about how the instability of Medicaid coverage affects patients with mental disorders. This dissertation comprises two studies examining the effects of Medicaid coverage instability on healthcare services delivered in acute care and outpatient settings and one study examining how state eligibility polices impact Medicaid continuity and service utilization for this vulnerable population.

The first study examines the impact of Medicaid discontinuities on acute care utilization among adult beneficiaries with major depression.  To establish causality between coverage discontinuities and acute service use, I use an instrumental variables (IV) approach that addresses the sources of endogeneity in this relationship. I found that those experiencing coverage disruptions have, on average, significantly greater use of costly emergency department/inpatient services than those with continuous coverage.

In the second study, I evaluate the impact in two Southern states of Express Lane Eligibility (ELE) – a state-specific policy that streamlines children's eligibility recertification procedures – on coverage continuity and acute care utilization among Medicaid-insured children with depression. Using difference-in-difference analysis, I found substantial heterogeneity in ELE effects across these two states. While ELE in Louisiana generally had no effects, Alabama's implementation of ELE significantly reduced coverage disruptions and use of acute care for mental disorders.

The third study examines the impact of losing Medicaid coverage on outpatient service utilization among low-income adults with mental illness. Using national panel data and an IV approach to address key sources of endogeneity, this study provides evidence for a remarkable reduction in outpatient service use immediately after losing Medicaid with no alternative source of coverage. The results, however, do not lend support for a significant effect on outpatient care use among those who transition from Medicaid to private plans.

Combined, the three studies provide new information about the implications of insurance coverage discontinuities among Medicaid populations with mental health disorders, and about the importance of state policies aimed at streamlining eligibility recertification processes to increase Medicaid retention rates, improve access to healthcare and chronic condition management, and ultimately advance health outcomes among vulnerable populations with high need.

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# <u>CHAPTER 1</u>

## Introduction

### I. Background

*Significance of Mental Illness*

In the United States, approximately 20 percent of Americans suffer from mental illness each year, and nearly half of the population develops a mental disorder during lifetime.[1-3] Mental illness contributes to a myriad of negative consequences – including poverty, unemployment, homelessness, incarceration – and thus remains a serious threat to social well-being.[4,5] Mental illness has also become a tremendous economic burden;[3] in 2013 alone, mental illness cost the U.S. more than $200 billion in healthcare expenses.[6] Despite the high burden and prevalence, however, merely two-fifths of adults with any mental illness and less than seven-tenths of adults with serious mental illness receive any mental health (MH) services in a given year.[7] Similarly, less than half of youth with mental disorders receive any services in a given year.[8] Importantly, access to MH services is determined by a patient's ability to pay for care, which is closely related to access to continuous insurance coverage.[9]

*Significance of Discontinuous Medicaid Coverage*

Medicaid provides health insurance coverage to more than 97 million Americans of all ages and is the largest payer for MH services.[10,11] With the implementation of the Patient Protection and Affordable Care Act (ACA), millions more have gained insurance coverage through Medicaid.[12] However, lack of insurance coverage is still common

among those who are eligible for Medicaid, due in part to discontinuities in coverage for eligible individuals. Approximately 17% of children and nearly 30% of adults experienced discontinuous Medicaid coverage in 2011.[13]

Discontinuous coverage refers to periods of time when former enrollees lose Medicaid coverage and become either uninsured or privately insured; these episodes are often associated with a subsequent re-enrollment in Medicaid.[13] This process is often referred to as "churning."[14-16] Importantly, the majority of Medicaid beneficiaries become uninsured, at least for a short period, after losing Medicaid, rather than gaining other sources of insurance.[14,17] This is especially true for those with mental health problems who are more likely than other groups to be low-income and unemployed.[18]

Discontinuous Medicaid coverage is particularly problematic for beneficiaries with mental disorders. A lack of Medicaid coverage may impede access to MH care and disrupt treatment continuity during periods with no coverage.[9] Clinical research has shown that mental disorders can be controlled through effective and timely treatment, including pharmacologic and psychosocial interventions.[19] Consequently, discontinuity in these interventions may worsen patients' MH status and trigger acute episodes or complications, leading to costly emergency department (ED) visits and hospital admissions.[9]

Several other consequences of discontinuous coverage need to be considered as well. Administrative costs have also been shown to be higher for beneficiaries who experience discontinuous coverage, compared to those who were continuously enrolled.[20] It has been estimated that the administrative cost of reenrolling a person who dis-enrolled from Medicaid ranged from $400 to $600 per person in 2015.[21] Furthermore, coverage

discontinuities can create difficulties for providers in managing the care of those with

mental disorders and comorbidities, because of the discontinuity in ongoing treatment

and the inability to establish an enhanced patient-provider relationship.[20] Lastly, coverage

discontinuities also create challenges when trying to measure quality of care among

Medicaid enrollees, because the available quality measures for use with administrative

data typically require individuals to have continuous enrollment.[22] As a result, individuals

with discontinuous coverage, despite being a research priority, are not usually considered

in quality measurements. Thus, unstable Medicaid coverage for clients with mental

disorders, even if temporary, poses significant public health and policy problems.

*Why Discontinuous Medicaid Coverage Occurs*

   Historically, the political climate has played an essential role in Medicaid

disenrollment. During the recession in the early 2000s, fiscal pressure forced states to

make difficult policy choices to balance their state budgets.[23] While some states enacted

policies that directly reduced the number of beneficiaries, other states used more indirect

approaches to address the budget shortfalls.  More specifically, several states made the

Medicaid eligibility recertification processes more stringent, which led to fewer Medicaid

caseloads and ultimately resulted in lower Medicaid expenditures.[23,24] For instance, some

states changed annual eligibility recertification to biannual or quarterly recertification, or

decided to re-enforce the face-to-face interview requirements at renewal.[25,26] These

policies required Medicaid enrollees to revisit the social welfare office and provide

income and other documentation to prove their eligibility every six months or more

frequently, which imposed substantial burden on individuals and families in terms

increase time and paperwork. As a result, these more stringent eligibility re-certification policies significantly exacerbated disenrollment.[23] A number of other factors may also contribute to coverage discontinuities, including: incorrect paperwork or certification data, the lack of a timely reminder or notification of eligibility recertification from the program, and inadequate or non-existing application assistance and outreach efforts.[27-30]

Following the implementation of the ACA, a new cause of coverage discontinuity has been introduced. Specifically, a high proportion of low-income beneficiaries may experience frequent shifts in eligibility between Medicaid and health insurance Marketplaces, leading to the involuntary movement of beneficiaries from one system of coverage to another.[31] This issue specifically applies to the non-elderly adults who become newly eligible for Medicaid in states that have opted for ACA's Medicaid expansion. As of January 2017, 32 states have expanded Medicaid under the ACA.[32]

For patients with mental illness, disruptions in Medicaid coverage may also occur due to their worsening MH status.[9] Specifically, patients with chronic mental disorders may have difficulty responding to program communications, and may become too ill to complete the complicated paperwork required to maintain their coverage.[9] Patients with mental illness are also more likely to experience instability in their lives, particularly in housing, leading to high mobility.[30] These patients may drop out of Medicaid when they fail to receive notices of eligibility recertification due to address changes.[30]

*State Eligibility Recertification Policies*

To improve Medicaid continuity, some states implemented policies to simplify Medicaid administrative procedures prior to the implementation of the ACA.[33] Eligibility

recertification, which typically requires enrollees to visit the social services office in person and provide documentation, imposes a substantial burden on beneficiaries in terms of time and paperwork.[34] Generally, failure to provide the documentation or to complete this process leads to loss of enrollment and potentially cycling on and off the program from month to month.[34] Therefore, over the past 15 years, some states reduced the frequency of eligibility recertification from monthly or bi-annually to annually, while others eliminated the face-to-face interview requirements during the Medicaid renewal period.[35] State policies that reduce the frequency of this recertification procedure can decrease the possibility of disenrollment and improve continuity of Medicaid coverage. Similarly, mail-in or telephone recertification (versus face-to-face interviews) decrease the time burden on potential recipients.[34]

Since the rollout of the ACA, significant strides have been made to further reduce the administrative hassle of applying for and retaining Medicaid coverage. Specifically, the ACA prohibits eligibility recertification more frequently than annually for Medicaid beneficiaries in all states whose eligibility is determined using the "modified adjusted gross income methods (MAGI)" based income.[36,37] Furthermore, all states have been required to simplify redetermination processes to ensure seamless coordination between Medicaid and other health insurance programs.[38] Ultimately, the recertification process must be highly automated with few burdens imposed on individuals or families to prove their Medicaid eligibility.[39]

For children on Medicaid, additional policy options have been enacted by states to further protect against coverage discontinuities. For example, some states have adopted the "12-month continuous eligibility" option, which allows children to maintain Medicaid

coverage for 12 months, even if their family income fluctuates over the year.[13] In states

that opt for annual eligibility recertification period, enrollees are still required to report

changes in their income and family situations, and thus their coverage could be

discontinued over a year if these changes disqualify them from Medicaid.[40] In contrast,

the "12-month continuous eligibility" option offers guaranteed ongoing coverage to

children, regardless of any changes in income or family situation until the next

recertification period.[40] Another option for states is Express Lane Eligibility (ELE), a

policy that streamlines recertification processes through cross-agency data sharing.[41,42]

Originally authorized by the Children's Health Insurance Program (CHIP)

Reauthorization Act in 2009, ELE enables the use of another agency's data to determine

children's Medicaid eligibility, even if the agency uses different methods to assess

qualification.[43] These policies have been shown to be associated with administrative

savings and increases in enrollment among overall children on Medicaid.[44,45] To date,

however, there is a dearth of information about the effect of these policies on

beneficiaries with mental disorders, including how well these laws improve beneficiaries'

coverage continuity and the downstream policy effects on health services utilization.

*Three Studies*

Using administrative and survey databases to derive cohorts of Medicaid-enrolled

individuals, the three studies in this dissertation: (1) identify the relationship between

discontinuous Medicaid coverage and acute service utilization; (2) evaluate the impact of

Medicaid eligibility policies on discontinuous coverage and acute service utilization; and

(3) examine how churning off of Medicaid coverage affects utilization of outpatient care.
(**Figure 1.1**)

The first study examines the impact of Medicaid coverage discontinuities on service utilization and cost in acute care settings among adult beneficiaries with major depression. To establish causality between coverage discontinuities and acute service use, I used an instrumental variables (IV) approach that addresses the sources of endogeneity inherent in this relationship. The endogenous discontinuities were instrumented by a state-level policy indicator for annual Medicaid eligibility recertification (versus recertification every six months or more frequently). Using the IV framework, I found that those experiencing coverage disruptions have, on average, significantly greater per person per month utilization of costly ED/inpatient services than those with continuous coverage. These findings suggest that maintaining continuous Medicaid coverage, as a result of streamlined recertification procedures, is likely to facilitate access to care for those with MH needs and help prevent acute episodes requiring care delivered in high-cost hospital settings among this vulnerable population.

In the second study, I evaluate the impact of a state-specific policy related to eligibility recertification, the ELE processes, on the continuity of Medicaid coverage and acute care utilization among Medicaid-insured children with depression in two Southern states. Using a quasi-experimental difference-in-difference framework, in conjunction with a rigorous matching method, I found substantial heterogeneity in the effect of ELE in these two states. Specifically, Alabama's implementation of ELE significantly reduced Medicaid disenrollment rates and decreased the use of ED/inpatient services specific to mental disorders, while the ELE policy in Louisiana generally had no effects. As states

continue their efforts to streamline enrollment and promote retention, strategies similar to those implemented in Alabama's ELE processes merit consideration. The results in Louisiana also suggest that the large variation in how states operate ELE may result in a disparate impact on youth with MH needs.

The third study examines the impact of Medicaid churning on utilization of outpatient care among adults with mental illness. I specifically focused on two types of churning: (i) losing Medicaid coverage with no alternative source of insurance (i.e., being uninsured); and (ii) transitioning from Medicaid coverage to private insurance. An IV approach was used to address the sources of endogeneity in the relationship between Medicaid churning and access to care. Using panel data from a national survey database, this study provides evidence for a sizeable reduction in outpatient healthcare utilization immediately after losing Medicaid with no alternative source of coverage. The results, however, do not lend support for a significant effect on outpatient care use among those who transition from Medicaid to private insurance.

Combined, the three studies provide new information about the implications of insurance coverage discontinuities among Medicaid populations with mental health disorders, and about the importance of state policies aimed at streamlining eligibility recertification processes to increase Medicaid retention rates, improve access to care and chronic condition management, and ultimately advance health outcomes among low-income, vulnerable patients with high need.  The findings of this research also inform discussions around the direction of U.S. health insurance reform.

**II. Introduction to Study 1: Discontinuity of Medicaid Coverage: Impact on Cost and Utilization among Adult Medicaid Beneficiaries with Major Depression**

Major depression is a highly prevalent and costly condition among adult Medicaid beneficiaries.[46-49] A disruption in Medicaid coverage can result in a discontinuation of routine care and potentially exacerbate outcomes, leading the subsequent use of acute services.[9,50] However, little is known about the impact of discontinuous Medicaid coverage on acute care use in this vulnerable population.

Furthermore, recent studies examining the effects of Medicaid coverage disruptions on acute care utilization have been unable to address the endogeneity of this relationship due to reverse causality. Specifically, the use of hospital services can reduce the duration of coverage disruptions due to hospital staff efforts to increase payments by enrolling eligible patients in Medicaid.[51] Failing to address this endogeneity may bias the estimates of this relationship towards the null hypothesis. This study contributes to the literature by identifying the causal effect of discontinuous Medicaid coverage on acute care use among adults with major depression while addressing the endogeneity of this relationship with an instrumental variable approach. Acute care refers to health services that are used to treat sudden, often unexpected, urgent or emergent episodes of illness that can lead to death or disability without rapid intervention.[52] In this study, acute care specifically refers to services delivered in the emergency department (ED) and inpatient hospitalization.

*Conceptual Framework and Hypothesis of Study 1*

My conceptual framework draws upon Andersen's Behavioral Model of Health Services Use[53] and the theory of demand of health services.[54] I draw on evidence from

literature in health services research to inform the direction of the hypothesized relationship between constructs in the framework.

Andersen's model provides insight into the characteristics that influence both insurance coverage and health services use at the individual and contextual levels. Three sets of characteristics are considered in the model: (1) predisposing characteristics, which affect the inclination to use health services and can include demographic factors and social structure; (2) enabling characteristics, which are resources available to facilitate use of care and may include socioeconomic status (SES), provider supply, and health policy; and (3) need characteristics, which include both the evaluated and perceived health status that affect healthcare utilization.[53]

In addition, the theory of demand of health services suggests a mechanism through which Medicaid coverage status relates to acute care use.[54] In this theory, individuals' demand of health services can be conceptualized as a function of the price of care.[54] According to the theory of demand for health services, discontinued insurance coverage raises the out-of-pocket cost of health services, which in turn reduces the demand for routine healthcare and the continuity of outpatient treatment.[54,55] (**Figure 1.2**) This may be especially true for Medicaid enrollees who have limited financial resources. Major depression can be effectively treated and managed in an outpatient setting with either psychotropic medication or psychotherapy, or both.[56] Therefore, decreased outpatient care, such as skipped regular visits with MH specialists or unfilled antidepressant prescriptions, can worsen depression and raise the possibility of an episode of acute conditions.[9,57] The exacerbated depression symptoms can then lead to costly

hospital acute care services -- the hypothesized mechanism proposed in previous studies[9,50,58,59] through which discontinuous Medicaid coverage relates to acute care use.

Based on Andersen's model, several important individual-level confounding factors – predisposing sociodemographic factors and need-related characteristics – are associated with both coverage discontinuities and services utilization in my focal relationship.[14,28,60-71] Andersen's model also gives attention to contextual-level enabling factors, such as local socioeconomic status, healthcare infrastructure, and Medicaid benefit generosity. In my study, these contextual factors may be correlated with consumers' decisions about Medicaid participation and individuals' ability and need to receive care.[23,28,72-89]

Some unobserved factors may also be correlated with my focal relationship. Of particular concern is the unobserved heterogeneity in individual need characteristics. Furthermore, reverse causality may also exist from acute service use to coverage disruptions; providers at hospital acute care settings may be highly motivated to assist eligible patients to re-enroll in Medicaid to ensure reimbursement for services delivered.[51]

Because of the possibility of reverse causality and omitted variables, rigorous identification strategies are required; otherwise, the positive relationship between discontinuities and acute care use can be largely underestimated. In this study, an IV approach is implemented to address these potential sources of bias. My instrument is a state policy related to the frequency of eligibility renewal. Annual renewal requirements ("streamlined" policy, versus more frequent renewal) make recertification processes less onerous and reduce enrollees' burden in terms of time, information, and paperwork by

minimizing the frequency and need for visits with caseworkers in social welfare offices.[90] Importantly, this policy should only influence acute care use through its strong, direct association with reduced coverage gaps.[90-92] There is no reason to believe that there is a direct association between this Medicaid re-enrollment policy and acute care use, which meets the requirement for a valid instrumental variable.[93]

        The following hypotheses can be derived from this conceptual framework:

**H1.1:** Medicaid adult beneficiaries who had at least one disruption in coverage are *more* likely to utilize ED and/or inpatient services, compared to those with continuous enrollment.

**H1.2:** Medicaid adult beneficiaries who experienced *longer* disruptions in coverage use higher levels of ED and/or inpatient services, compared to those with shorter disruptions.

## III. Introduction to Study 2: Express Lane Eligibility, Medicaid Coverage, and Acute Care Use among Children with Depression in Two Southern States

        Medicaid provides the bedrock source of coverage for children in the U.S.[94] In 2014, approximately 36 million children were covered by Medicaid, accounting for more than half of low-income children.[94,95] Continuous Medicaid coverage facilitates access to primary care, medication, and other routine outpatient services, which are effective and timely interventions to manage chronic conditions, such as depression.[96-98] Depression is one of the most prevalent and disabling disorders treated among Medicaid-insured children.[99]

        Disruptions in Medicaid coverage can potentially exacerbate outcomes for depressed youth, leading to subsequent use of acute services through the same

mechanisms described above. During the past decade, various policies aimed at improving coverage continuity have been implemented in state Medicaid programs.[26,100,101] However, there is little empirical evidence for whether these policies actually improve Medicaid continuity and how they affect healthcare utilization among youth with chronic conditions, such as depression.

Express Lane Eligibility (ELE), originally authorized in 2009, provides states with a mechanism to simplify eligibility recertification processes for youth.[44] ELE allows Medicaid to use other agencies' data to certify and renew children's eligibility, even if agencies use different methodologies to determine income or other criteria.[43,44] These processes are expected to make re-enrollment easier, thereby reducing coverage disruptions. This study evaluates the impact of ELE on Medicaid coverage continuity and its downstream effect on acute care utilization among children with depression.

### *Conceptual Framework and Hypothesis of Study 2*

In this study, I draw upon the Andersen behavioral model of healthcare utilization, which provides a systematic perspective to integrate a range of individual and contextual determinants of a person's healthcare use.[53] (**Figure 1.3**) Contextual enabling determinants are defined as the policy environment and the organization of the healthcare system within which services are delivered.[53] These contextual factors can affect healthcare use by affecting individuals' enabling and need-related factors. The focus of this analysis is on one of the contextual determinants: the Medicaid eligibility recertification policy, specifically the Express Lane Eligibility (ELE). ELE encompasses various rules aimed to streamline the eligibility redetermination procedures for children insured with Medicaid.[100,102,103]

In his 2005 work, Sommers conceptualizes re-certification as a trade-off between the opportunity costs of renewing coverage versus the benefits of having Medicaid coverage.[23] More specifically, Medicaid eligibility redetermination is associated with numerous costs – particularly the time cost for parents to complete the re-enrollment process.[23] Children may drop out of Medicaid when parents perceive that the opportunity costs of recertifying their child's eligibility outweigh the marginal benefits of Medicaid coverage.[61] Consequently, families in states that have simplified re-enrollment procedures should have lower costs of recertification and therefore are more likely to have children continuously enrolled in Medicaid.

Furthermore, streamlined re-enrollment policies may indirectly impact healthcare use. These policies may improve the continuity of Medicaid coverage, decreasing the out-of-pocket price of care and increasing the utilization of outpatient services.[54] Continuous receipt of outpatient care could, in turn, prevent an exacerbation of children's depression symptoms and reduce the likelihood of acute episodes, thereby decreasing the number of costly ED visits and avoidable hospitalizations.[9,57]

Therefore, this study tests the following hypotheses:

**H2.1:** Adoption of ELE is associated with an improvement of coverage continuity in Medicaid-insured children with depression

**H2.1:** Adoption of ELE is associated with reductions in utilization of ED and inpatient services in Medicaid-insured children with depression

**IV. Introduction to Study 3: The Impact of Medicaid Churning on Healthcare Utilization Among Adults with Mental Health Disorders**

With the rollout of the ACA, recent research has underlined the potential for adults, particularly those with income near the ACA's Medicaid eligibility threshold, to move between Medicaid and subsidized private insurance offered through Marketplaces in states that expand Medicaid.[104,105] In states that opt out of Medicaid expansion, low-income adults may lose coverage entirely unless they qualify for Medicaid under the traditional eligibility categories.[105] Both types of "churning" – loss of coverage entirely and transition between insurance programs – can bring challenges. Complete loss of coverage may raise issues related to affordability of care. Transitions from Medicaid to private insurance programs may also create problems for beneficiaries and providers.[105] In this context, policymakers and researchers express concern that Medicaid churning can be a serious barrier to adequate access to care.[105]

The churning literature, nonetheless, primarily focuses on services utilization once an individual returns to the Medicaid program after a coverage gap among the overall adult population or using data from a single state.[9,50,106] Much less is known about patients' care seeking patterns during the periods of disenrollment immediately after losing Medicaid. There is also a dearth of information about churning and its impact on access to outpatient care among patients with mental disorders. Another empirical limitation of previous studies[107,108] is that point-in-time measures of health insurance and services utilization used in a large body of prior studies may not provide a comprehensive picture of the dynamic relationship between insurance status and healthcare utilization. Furthermore, the endogenous concerns inherent in this relationship (which are explained below) have not been fully addressed in previous research, which may seriously bias the estimated effect of churning on access to care.

To address these limitations of the literature, this study explores monthly trends in access to healthcare among the mentally ill who churn out of Medicaid with or without an alternative source of insurance, employing nationwide panel data. The use of survey data allowed a rigorous examination of individuals' care-seeking behavior during the periods when beneficiaries lost Medicaid coverage. In addition, I use an IV approach to address the endogeneity of the relationship between churning and access to care, using the exogenous, intertemporal and cross-state variations in state policies related to eligibility recertification procedures (i.e., frequency of recertification [annual versus more frequent] and face-to-face interview requirements [versus mail-in/phone/online] at recertification) for identification.

### Conceptual Framework and Hypothesis of Study 3

My conceptual framework is derived from the theory of demand of health services, which suggests a mechanism through which insurance churning relates to access to healthcare.[53,54] Specifically, loss of Medicaid coverage without an alternative source of insurance raises the out-of-pocket price of health services, which in turn reduces the demand for routine healthcare. (**Figure 1.4**) The reduced demand of care causes discontinuation of outpatient services – such as psychotherapy and psychotropic medications – that are effective interventions for treating mental disorders.[54,55]

When looking at the other type of churning, the transition from Medicaid to private insurance relates to healthcare utilization through several different pathways. (**Figure 1.5**) On the one hand, transition between Medicaid and private coverage may decrease access to care. The literature suggests that patients who churn out of Medicaid

and acquire a private plan may not obtain adequate insurance coverage in the private

market, where MH care benefits may be less generous than those provided by

Medicaid.[94] It is also possible that private plans may require high cost-sharing or fail to

cover the cost of expensive psychotropic medications.[109] Less generous coverage in

private plans, in turn, could increase patients' out-of-pocket price of care. Moreover,

patients who have churned between insurance programs may not have access to the same

network of providers across plans. Consequently, the difficulty in establishing a usual

source of care can cause discontinuities in the delivery of outpatient services.[20]

On the other hand, switching from Medicaid coverage to a private plan may

increase use of outpatient services. Many private plans may offer *broader* provider

networks than Medicaid.[110] In this case, patients with mental illness may find it easier to

see an available MH provider when they become privately insured. Furthermore, there

may be stigma associated with receiving public assistance; this stigma may be social,

bureaucratic, or self-generated, as suggested by Sommers (2005). When switching from

Medicaid to private insurance, patients may be more likely to use healthcare because they

no longer face the stigma of participating in public programs.[23]

Differences in outpatient healthcare utilization between those who experienced

churning and those who were continuously enrolled in Medicaid may reflect the

combination of an effect of churning as well as unmeasured individual characteristics.

Unobserved factors that may be correlated with both churning and outpatient healthcare

use include patient preferences and individuals' fluctuating income. Churning is likely

driven by income fluctuation. Higher income may increase food and housing quality,

neighborhood conditions, and work environments; therefore, income may affect

perceived health status, which, in turn, can influence people's care seeking behavior.  If these unobserved factors are not accounted for in an analysis, the estimated effect of churning on outpatient care utilization will be biased towards the null hypothesis. In addition to omitted variables, reverse causality may exist. Adequate access to care could improve patients' MH status, thereby reducing the value of remaining in Medicaid. The improved MH status may also enable patients to obtain and maintain employment and additional income, disqualifying them from Medicaid.

To address the potential sources of endogeneity in the relationship between churning and outpatient care use, I employ an IV approach using the exogenous variations in state-level policy measures for identification. The policy instruments selected are two state Medicaid policies related to eligibility recertification processes – i.e., the frequency of eligibility recertification (annual ["streamlined"] procedure, versus recertification more frequent) and the elimination of a face-to-face interview at renewal (["streamlined"] procedure, versus no elimination).  These policy instruments are chosen because a large body of literature has suggested that the streamlined renewal procedures are strongly associated with reduced rates of Medicaid churning,[15,111,112] and because these procedures only affect access to care through their strong impact on the reduced churning rate. Thus, the two policy measures meet the requirement of a valid instrument variable.[93]

Drawing upon this conceptual framework, this study examines the following hypotheses:

**H$_{3.1}$:**  Patients are *less* likely to use outpatient services during periods when they lose Medicaid and become uninsured, compared to periods when they are enrolled in Medicaid.

**H$_{3.2}$:**  Patients are *less* likely to use outpatient services during periods after transitioning from Medicaid to private insurance, compared to periods of Medicaid enrollment, if they receive less generous benefits in their private plans or experience discontinuity of care resulting from changes in the provider network.

**H$_{3.3}$:**  Patients are *more* likely to use outpatient services during periods after transitioning from Medicaid to private insurance, compared to periods of Medicaid enrollment, if they no longer face the stigma of receiving public assistance or they find it easier to see an available MH provider, as the provider network in their private plans are broader.

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**Figure 1.1:** Overarching Conceptual Framework
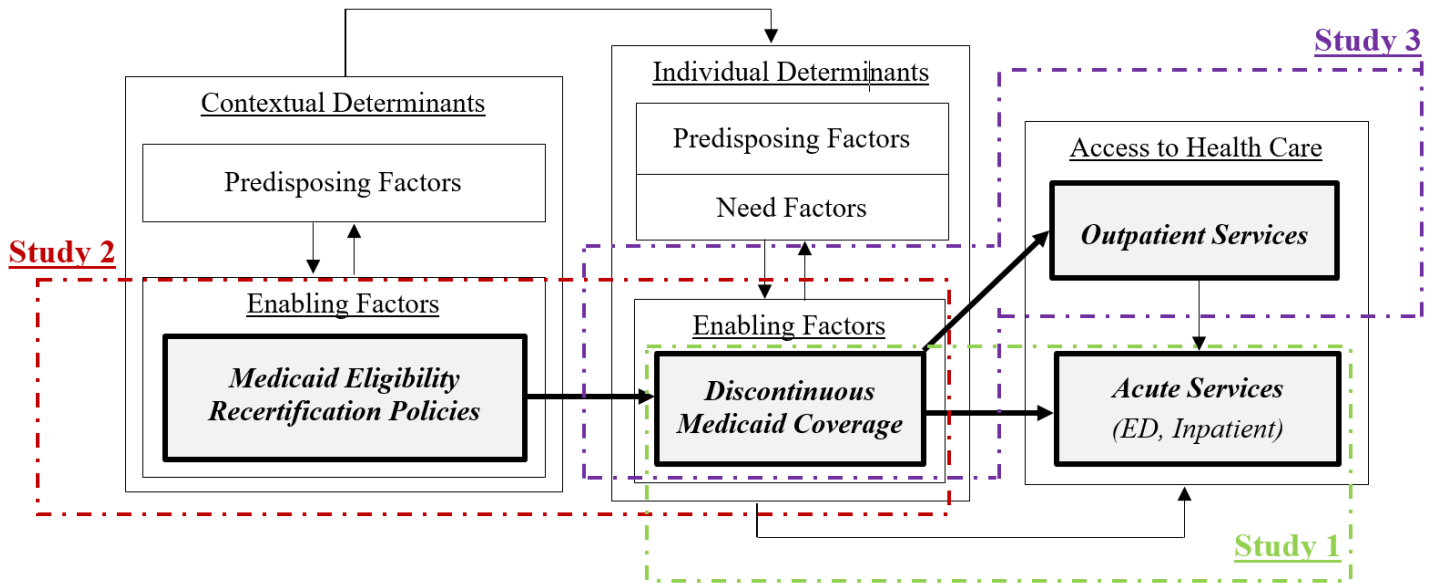
**Figure 1.2:** Conceptual Framework of Study 1
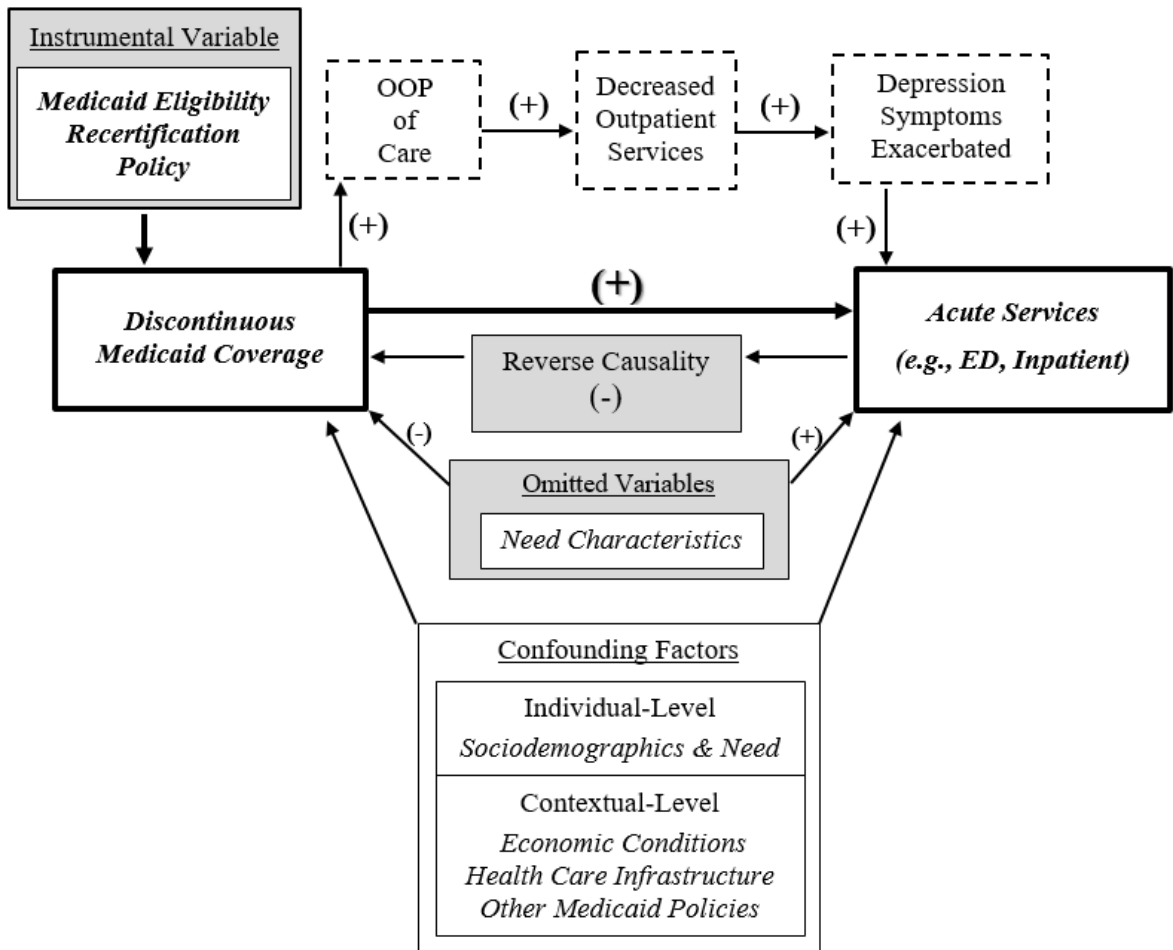
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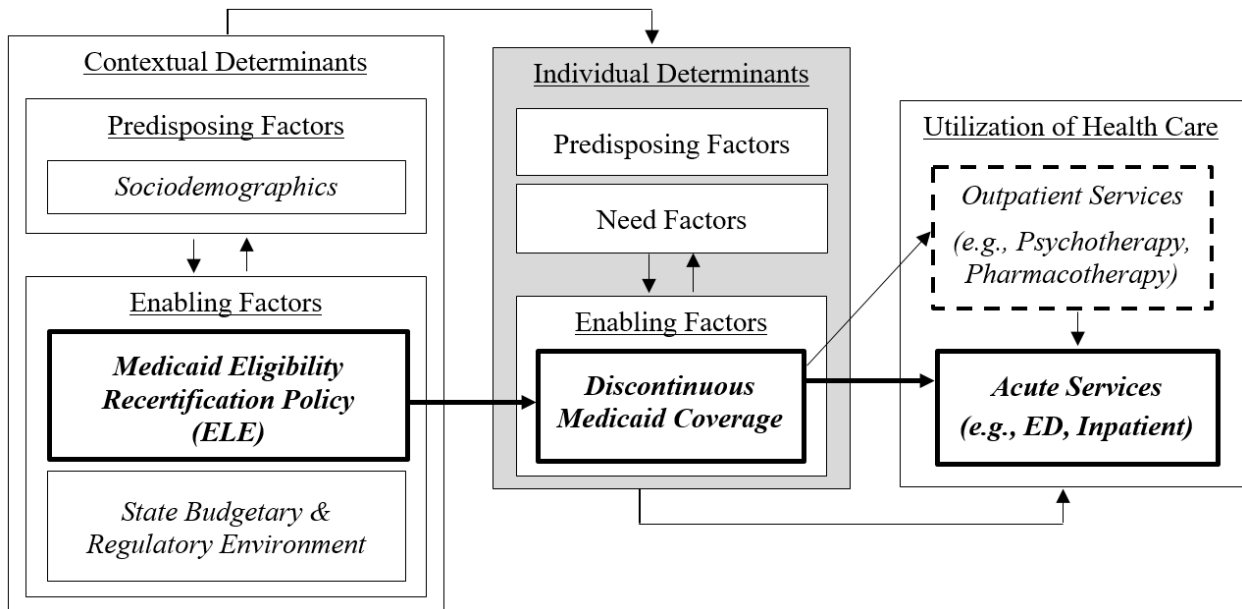
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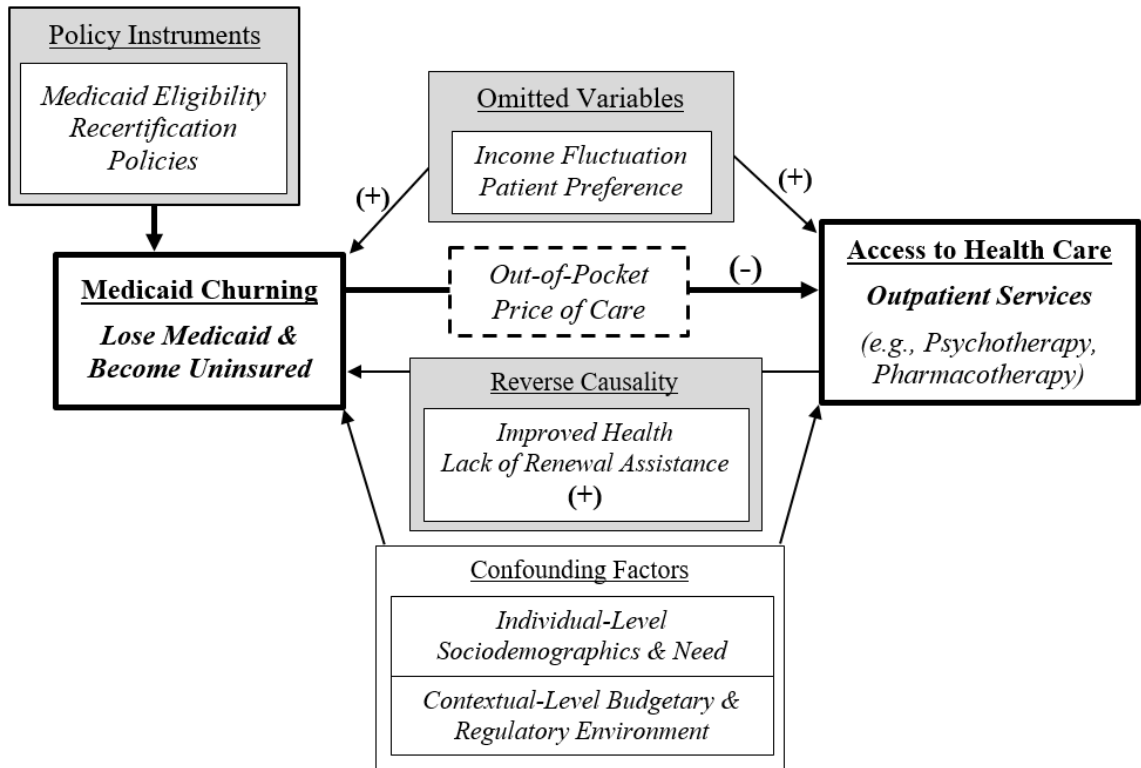
**Figure 1.5:** Conceptual Framework of Study 3 – Part B
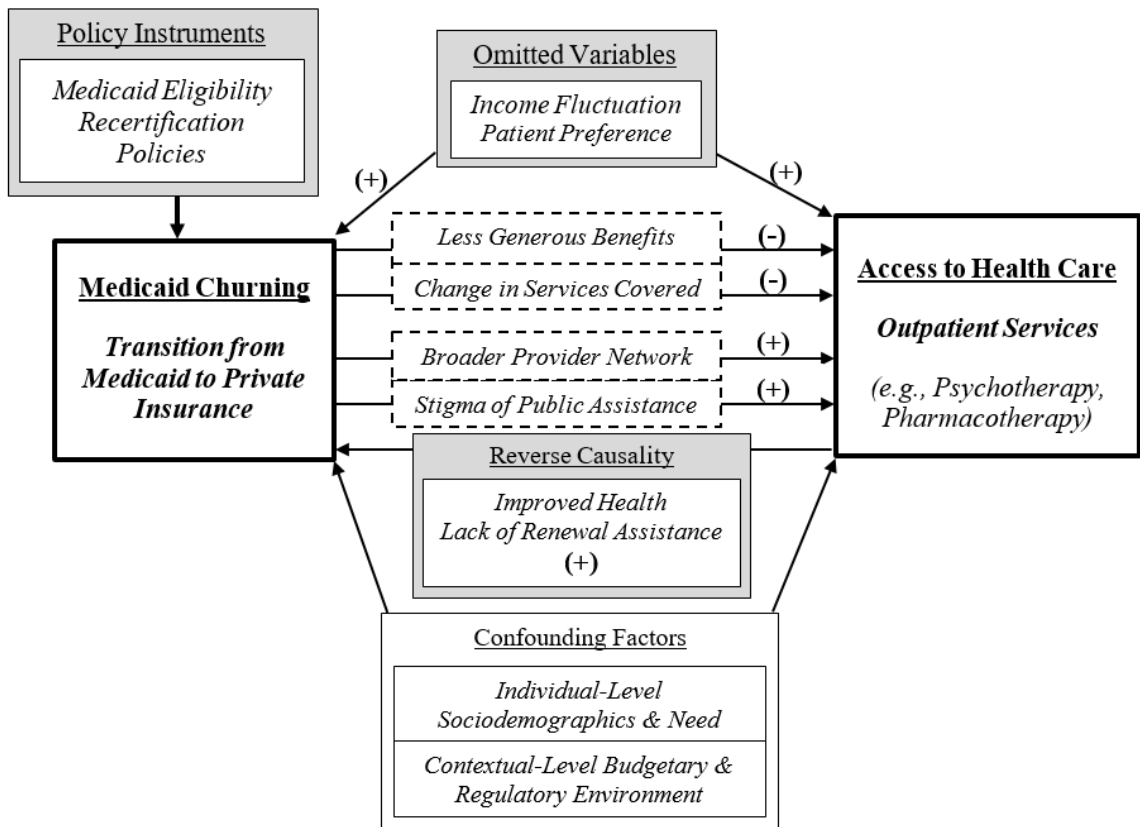
# CHAPTER 2

## Discontinuity of Medicaid Coverage: Impact on Cost and Utilization among Adult Medicaid Beneficiaries with Major Depression

### Abstract

**Background:** Gaps in Medicaid coverage may disrupt access to and continuity of care. This can be detrimental for beneficiaries with chronic conditions, such as major depression, for whom disruptions in access to outpatient care may lead to increased use of acute care. However, little is known about how Medicaid coverage discontinuities impact acute care utilization among adults with depression. **Objective:** Examine the relationship between Medicaid discontinuities and service utilization among adults with major depression. **Subjects:** 139,164 adults (18-64) with major depression was identified using the 2003-04 Medicaid Analytic eXtract Files. **Methods:** We used generalized linear and two-part models to examine the effect of Medicaid discontinuity on service utilization. To establish causality in this relationship, we used instrumental variables (IV) analysis, relying on exogenous variation in a state-level policy for identification. **Outcome Measures:** Emergency department (ED) visits, inpatient episodes, inpatient days, and Medicaid-reimbursed costs. **Results:** Approximately 29.4% of beneficiaries experienced coverage disruptions. In IV models, those with coverage disruptions incurred an increase of $650 in acute care costs per-person per Medicaid-covered month compared to those with continuous coverage, evidenced by an increase in ED use (0.1 more ED visits per-person-month) and inpatient days (0.6 more days per-person-month). The increase in acute costs contributed to an overall increase in all-cause costs by $310 per-person-month. (All *p-values*<0.001) **Conclusions:** Among depressed adults, those experiencing coverage disruptions have, on average, significantly greater use of costly ED/inpatient services than those with continuous coverage. Maintenance of continuous Medicaid coverage may help prevent acute episodes requiring high-cost interventions.

**Key Words**: Medicaid; discontinuity of coverage; major depression; acute care utilization

**I. Introduction**

Medicaid provides health insurance to 29 million non-elderly adults and serves as the largest payer of mental health (MH) services.[1,2] Yet, low-income Medicaid populations commonly experience coverage disruptions and may or may not regain coverage subsequently – approximately 30% of non-elderly adult beneficiaries experience such "churning" each year.[3-5] Previous studies of churning have found that, of those who lose Medicaid, the majority become uninsured, rather than gain private insurance.[3,6] This is especially true among those with MH needs, who are disproportionately likely to be low-income and unemployed.[7] These Medicaid enrollment dynamics are due, in part, to stringent re-enrollment procedures, which make coverage difficult to maintain over time.[8]

For patients with mental illness, Medicaid discontinuity may be a particular concern given the well-known barriers to MH treatment.[9] Major depression is a serious MH condition, afflicting 16 million U.S. adults.[10] Most patients with major depression experience periodic acute episodes throughout their lives.[11] Due to the condition's severity and chronic nature, these patients require continuous coverage to ensure timely care receipt. When such patients lose Medicaid, they may face elevated out-of-pocket payment for MH services. Consequently, depressed patients – especially low-income patients eligible or nearly-eligible for Medicaid, for whom even a "minor" health expense can create significant financial strain – may skip visits with MH specialists and experience disruptions in outpatient treatment. Guidelines for depression care, however, require regular adherence to recommended treatments.[12] Thus, gaps in these treatments caused by coverage disruptions can precipitate exacerbation of beneficiaries' depression

symptoms and increase the likelihood of acute episodes, leading to expensive and otherwise avoidable emergent department (ED) and inpatient care.[13,14]

State re-enrollment policies can affect coverage continuity among Medicaid beneficiaries. Federal regulations required states to recertify eligibility of Medicaid beneficiaries at least annually prior to the Affordable Care Act (ACA).[15-17] However, states had implemented different eligibility recertification protocols because of varying budgetary pressures and political circumstances.[15-17] By 2005, 14 states had required adults to recertify eligibility more frequently than annually.[8,16] Frequent eligibility redetermination, which typically requires enrollees to revisit the social services office and provide documentation, imposes substantial administrative burdens,[8] and therefore, can function as a barrier to Medicaid continuity.

Few studies have examined Medicaid discontinuity and its impact on service utilization among adults with mental disorders. One study of depressed adults in Florida found that persons with interrupted coverage were significantly more likely to have ED visits and hospitalizations.[14] Two other single-state studies examining adults with schizophrenia found a strong association between disenrollment and psychiatric hospital admissions.[13,18] National samples are required to obtain generalizable estimates and identify variation across states.[19] Further, this literature fails to recognize endogeneity in the relationship between coverage disruptions and service utilization, particularly concerns about reverse causality.[20] Use of ED/inpatient services can reduce the length of coverage disruptions, given hospitals' efforts to enroll potentially eligible patients in Medicaid to increase payments for services delivered.[21] Failing to address this

endogeneity can cause researchers to underestimate the effect of disenrollment on ED/inpatient care utilization.

We used national Medicaid data to examine the effect of coverage discontinuities on ED/inpatient services utilization among adults with major depression. Our study stands apart from previous studies of this relationship as we use national data to identify exogenous variation in states' re-enrollment policy and use this variation as an instrumental variable (IV) to address sources of endogeneity. Importantly, this IV approach yields unbiased estimates of the effects of disenrollment on acute care (i.e., inpatient and/or emergency care)[22] utilization, which prior studies cannot claim.

## II. Methods

*Study Population and Data Sources*

Our primary data source was the 2003-04 national Medicaid Analytic eXtract (MAX) Files. MAX is an administrative database that includes information on enrollment, eligibility, and healthcare utilization in Medicaid, as well as beneficiary socio-demographic characteristics. We merged MAX with the Area Health Resources Files – a county-level data file that includes measures of health professions, facilities, and socio-demographic characteristics – and state policy characteristics from data compiled in previous studies.[17,23,24]

Our MAX data consist of 629,711 adults (18-64) with a diagnosis of major depression between January 2003 and December 2004. Consistent with prior research,[25] we identified major depression diagnoses based on at least two claims with ICD-9 codes 296.2 or 296.3. Because of the incompleteness of encounter data from managed care

programs in MAX during our study timeframe, we excluded 255,897 persons who had

any managed care coverage.[19,26] We also excluded 3,824 persons living in states with

more than 75% managed care penetration, due to concerns that the relatively few

enrollees in fee-for-service may not be representative of the state Medicaid population.[27]

Additionally, persons qualified for Medicaid exclusively due to disability (N=217,168)

were excluded because such enrollees have fewer coverage discontinuities than other

beneficiary groups,[4,5,13] possibly resulting from different rules of eligibility

determination.[28] We further excluded individuals that had: (1) dual eligibility (N=6,611);

(2) private insurance (N=6,691); and/or (3) missing information on one or more

covariates (N=356). These exclusions yielded an analytic sample of 139,164 beneficiaries

across 35 states.

*Outcome Measures*

Our outcomes include Medicaid-reimbursed costs and acute services utilization

per-person per Medicaid-covered month for the period after we first observe a major

depression diagnosis.[13,14,29] Measures of acute care utilization include the numbers of all-

cause ED visits, inpatient episodes, and inpatient days per-person-month. We followed

recommended approaches for identifying ED visits from the Other Therapy and Inpatient

Files (Appendix).[30] The numbers of inpatient episodes and inpatient days were

determined using the start/end dates of inpatient claims to ensure that a single episode

was not counted as multiple hospitalizations.[29]

Costs were based on the dollar amounts paid by Medicaid as indicated in claims,

not on provider charges. Costs were classified as follows: (1) all-cause costs on all visits,

regardless of setting or diagnosis; (2) acute care costs on ED visits and hospitalizations; (3) medication costs on all filled prescriptions; and (4) outpatient costs on all visits except for acute care and filled prescriptions.

*Discontinuity of Coverage*

The primary predictor was a dichotomous variable identifying whether a beneficiary had at least one coverage disruption (versus continuous enrollment). A coverage disruption was defined as an enrollment gap of more than one month.[14,29] The secondary predictor was a continuous variable reflecting the total number of months without Medicaid coverage following initial enrollment; it was zero for persons with continuous enrollment.

*Other Covariates*

Measures of individual-level predisposing characteristics included age at the time we first observe a major depression diagnosis (in years), an indicator for female gender, and race/ethnicity.

We also included measures of individual-level need-related characteristics to adjust for observed differences in MH/medical comorbidities and disability status between individuals with continuous enrollment and those with disruptions. To control for MH comorbidities, we derived indicators for the presence of MH conditions (Appendix).[19,31] We also controlled for the count of comorbid medical conditions using the Elixhauser Comorbidity Index.[19,32] To control for disability, we included a ratio of beneficiaries' time on disability over their total Medicaid-enrolled time.

County-level socioeconomic status was assessed with median household income (2002). We included three county-level measures of geographic availability of MH care resources –numbers of (1) community health centers, (2) psychiatrists, and (3) general and family practice physicians (per 100,000 persons) (2002).

*Statistical Analyses*

Because acute care visits and costs are heavily skewed by zeroes (>30%), we estimated two-part models (TPMs) with a logit model in the first part and a generalized linear model (GLM) with a log link and gamma distribution in the second part. We estimated GLM with a log link and gamma distribution for other types of costs (e.g., all-cause cost) because they are skewed with few (<5%) zeroes. We chose these functional forms following previous research.[33,34]

A potential concern about this analysis is that coverage discontinuities may be endogenous to acute care utilization. First, reverse causality may exist as the use of hospital services can reduce coverage discontinuities. Hospitals are prohibited from turning away patients who seek emergency care;[35] accordingly, hospital staff have strong incentives to ensure that eligible patients are enrolled in Medicaid to reduce uncompensated charges.[21] Second, omitted variable bias may exist, especially in need-related characteristics. Poorer health status is associated with lower rates of disenrollment[36,37] and greater ED/inpatient services use.[38,39] To the extent that need characteristics are not captured by our measures of MH/medical comorbidities, this source of variation could induce a spurious negative correlation, resulting in an underestimate of disenrollment effect on utilization.[21,40]

To address the endogeneity of disenrollment with respect to acute care use, we used a two-stage residual inclusion instrumental variable (2SRI-IV) analysis.[34] The 2SRI-IV method relies on the exogenous variation in coverage disruption induced by the instrument to establish, statistically, an unbiased, causal estimate of the effects of disruptions on acute care use.[20] In an IV framework, 2SRI produces consistent estimators for nonlinear models, such as GLM with log link and gamma distribution.[41] In the first stage, we estimated linear models to instrument the endogenous disruptions; in the second stage, TPMs/GLMs were estimated to identify the effects of disenrollment on outcomes, adjusting for the residual predicted in the first stage. To account for the error in the included residual, we bootstrapped standard errors.[34,41]

The IV method requires that the instrument be strongly predictive of disruptions but not independently affect service utilization.[20] Thus, we employed a state-level indicator for whether the state required Medicaid recertification annually ("streamlined" re-enrollment) versus every six months or more frequently to instrument for endogenous disruptions. We classified this measure into these two categories because during our study period, all but one of the states in our sample required recertification either annually or every six months. The remaining state required monthly recertification. Our choice of instrument was guided by robust research indicating that streamlined re-enrollment is strongly associated with reduced coverage disruptions and is otherwise unrelated to service utilization.[4,8,42] We tested the strength of our IV based on partial $R^2$ and $F$-statistics for the instrument.[20] To enhance the credibility of our analysis, we also conducted a falsification test,[43] testing the direct "effect" of our IV on antibiotic

medication uses and cost, in lieu of our outcomes, in reduced form models. We would expect *no* significant effect on these alternative outcomes.

The protocol for this study was approved by the Emory Institutional Review Board.

## III. Results

*Sample Characteristics*

Of our sample, 40,857 (29.4%) individuals experienced one or more coverage disruptions (**Table 2.1**). Within the subpopulation experiencing disrupted coverage, 37,815 (92.6%) had a single disruption and 3,042 (7.4%) had multiple disruptions. Of those with a single disruption, 9,758 (25.8%) re-enrolled subsequently. Among those with any disruption, the average length of total disruptions per-person during our study period was 8.4 months.

Compared to individuals with continuous coverage, those with disruptions were slightly younger, experienced less disability-based coverage, had fewer MH and medical comorbidities, and lived in counties with slightly higher incomes (*p*-values<0.001). The unadjusted numbers and costs of ED visits and hospitalizations per-person-month were significantly higher for those with disrupted coverage, while their unadjusted all-cause cost and costs of medications and outpatient care per-person-month were slightly lower (*p*-values<0.001).

Individuals with disrupted coverage were less likely to reside in states with streamlined re-enrollment policies (*p*<0.001). During the two-year study period, eight

states maintained biannual certification-periods and one state maintained monthly recertification among the 35 states in our sample.

*Association between re-enrollment policy and coverage discontinuity*

In the first stage of our IV analyses, we found a strong association between re-enrollment policy and coverage disruptions (**Table 2.2**). Compared to those living in states requiring recertification every six months or more frequently, those living in states with streamlined re-enrollment were less likely to experience any disruption (25.8% versus 37.5%, p<0.001) and experienced fewer months without Medicaid coverage on average (2.1 months versus 3.2 months, p<0.001). The partial *F*-statistic for the policy indicator was 122.0 when estimating the likelihood of disruptions and 93.5 when estimating the length of disruptions, both well beyond conventional criteria for acceptably strong instruments.[44]

*Relationship of coverage discontinuity to service utilization and cost*

To examine the relationship between disenrollment and utilization, we first depicted trends in service utilization that were associated with coverage disruption, naively ignoring potential sources of endogeneity (**Figure 2.1**). We explored changes in all types of costs during the five-month period prior to a coverage disruption versus the five-month post disruption among a subsample who experienced a disruption and were continuously enrolled for at least five months before and after this disruption. We found that acute care costs increased markedly during the first two months after re-enrolling in Medicaid. Particularly, the acute care cost per-person in the first month immediately

following the disruption was more than double the cost in the month immediately preceding the disruption ($575 versus $238). A similar trend was found in all-cause costs. These trends remained similar when we required an alternative length (e.g., three-month) of enrollment pre- and post-disruption and when we examined acute care utilization, specifically inpatient episodes, inpatient days, or ED visits, in lieu of costs (not shown).

In 2SRI-IV analyses, both the likelihood of coverage disruptions and the length of disruptions were significantly and positively associated with acute services utilization and cost (**Tables 2.3-2.4**). Compared to individuals with continuous coverage, those with any disrupted coverage incurred 0.1 more ED visits per-person-month, nearly 0.1 more inpatient episodes per-person-month, and 0.6 additional inpatient days per-person-month (**Table 2.3**). Similarly, for each additional month of lost Medicaid coverage, patients incurred 0.01 more ED visits, nearly 0.01 more inpatient episodes, and 0.07 more inpatient days per-person-month (all $p$-values$<0.001$).

As evidenced by the increases in ED visits and inpatient services, those with any disrupted coverage also incurred higher acute care costs compared to those with continuous coverage ($945 versus $295 per Medicaid-enrolled person-month, $p<0.001$) (**Table 2.4**). On average, each additional month of lost Medicaid coverage led to an increase of $76 ($p<0.001$) in acute cost per Medicaid-enrolled person-month.

The magnitude of the aforementioned estimates was 2-4 times absent our IV method (**Tables 2.3-2.4**). For example, in the TPM that did not use the instrument, the estimated increase in acute cost per-person-month was $202 (versus $650 in the 2SRI-IV model) for individuals experiencing disruptions compared to those with continuous coverage (**Table 2.4**).

By contrast, both the likelihood and length of coverage disruptions were negatively associated with the costs of filled prescriptions and outpatient care (**Table 2.4**). Nevertheless, the increase in acute cost contributed to an overall increase in all-cause cost by $310 ($p<0.001$) per-person-month among those with disruptions, compared to those with continuous coverage. Similarly, a one-month increase in the total length of disruptions led to an overall increase in all-cause cost by $33 ($p<0.001$) per-person-month.

We conducted additional analyses to assess the robustness of our findings, including a sequence of models that (1) examined the costs specific to treatment for MH disorders and the costs specific to depression treatment; (2) included additional confounding variables, specifically county-level unemployment rates and state-level managed care penetration; (3) included those who were completely disabled during our study period; and (4) stratified our sample by state to identify whether findings vary across states (not shown). We also conducted reduced-form analyses to test the direct impact of the re-enrollment policy on service utilization (not shown). Our findings remained robust using these alternative specifications, sample, and outcomes. Finally, we found no significant relationship between our IV and antibiotic medication uses or cost in our falsification test (Appendix).[43]

**IV. Discussion**

This study provides the first national estimate of coverage discontinuities for adult Medicaid populations with major depression, and is the first to use an IV approach to identify the effect of Medicaid discontinuities on service utilization. Our results suggest

that for adults with severe depression, those experiencing disruptions in Medicaid coverage have, on average, significantly greater use of costly ED and inpatient services, compared to those with continuous coverage. Likewise, the longer length of coverage disruptions a patient experienced, the more intensive the patient's use of acute services when re-enrolled. Further, the increase in utilization of ED/inpatient services was associated with a significant increase in monthly acute care costs. Notably, adults with continuous coverage had more disabilities and comorbidities than those with disruptions, which aligns with prior studies reporting that sicker patients are less likely to dis-enroll.[36,37]

Our findings are also consistent with the literature reporting a positive association between Medicaid disenrollment and subsequent hospitalizations among patients with mental illness.[13,14,18] Our novel 2SRI-IV framework, relying on national data to identify variation in state-level re-enrollment policies, significantly reduces the bias associated with endogeneity in this relationship. Notably, 2SRI-IV estimates local average treatment effects, identifying the effect of disenrollment for the group of individuals whose coverage stability is sensitive to the instrument (i.e., state-specific re-enrollment policy). Our results may have limited generalizability to other groups.

Our IV estimates indicate that ED visits and inpatient episodes were 39% and 61% higher, respectively, among adults with disruptions than those with continuous enrollment. The lack of a constant source of coverage may cause patients to miss visits with providers until their depression symptoms and complications (e.g., suicidal ideation) worsen to the degree that emergency visits are required. Although we could not directly test these pathways, results from subgroup analyses provide evidence to support the

mechanism. Among the subsample who discontinued coverage and subsequently re-enrolled, utilization of acute services rose substantially after returning to coverage – possibly to stabilize the exacerbated, acute conditions – compared to the months preceding disruption. Notably, for many patients, costly hospital settings may function as an entry point for returning to treatment, which also triggers their re-enrollment in Medicaid.[14]

Increases in acute care utilization translated to an increase of $650 in acute cost per-person per Medicaid-covered month, driving up total Medicaid cost by $310 per-person-month among depressed adults. Nevertheless, while there is little robust evidence on this point, restrictive eligibility redetermination rules may reduce state outlays for all Medicaid-insured adults, due to reduced overall counts of Medicaid-covered patient-months.[5] For all Medicaid-insured adults, some evidence suggests that acute care use does not increase following disenrollment.[22] Our findings do not contradict this point; however, for certain small, vulnerable subgroups, such as adults with major depression, disenrollment may lead to adverse health events and elevated acute care use and cost during Medicaid-covered months. Similar observations have been raised in research focusing on ambulatory care sensitive conditions.[15,45] Future studies should investigate whether and what types of adverse outcomes occur as a result of frequent churning among vulnerable subgroups.

Prior to the ACA, state efforts to improve Medicaid continuity varied substantially.[17] Our data showed significant variation across states in disenrollment rates, ranging from 7.3% in Tennessee to 52.4% in Texas. This variation may be minimized if states' eligibility determination processes are simplified, as under the ACA.[46] Our

findings suggest that streamlined re-enrollment has the potential to increase Medicaid continuity, support adequate access to care, and improve outcomes among low-income adults with MH needs. In the current political landscape, however, the future of Medicaid and key ACA provisions remains uncertain.[47] If Medicaid churning is exacerbated by stricter, more frequent eligibility redetermination requirements, as states renew efforts to seek cost-savings in Medicaid,[23,48] this churning may lead to spillover adverse health consequences and associated acute care cost among select vulnerable subgroups, which would reduce these savings. More research is needed to understand how shifting eligibility rules and other changes affect coverage stability and outcomes moving forward.

Several study limitations are noted. As with any analysis of claims data, coding errors may introduce measurement error.[49] Also, the MAX files lack information for periods when Medicaid is discontinued. Therefore, we are unable to examine changes in outcomes, utilization, and insurance status during these periods, although a majority may become uninsured after losing Medicaid.[3,6] Similarly, no data are available on services not Medicaid-reimbursed, including out-of-pocket expenditure. Our analysis, therefore, can neither reflect all care experiences of Medicaid-insured adults with depression nor their total medical expenditures resulting from disenrollment. Further, our data do not support robust examinations of the appropriateness of acute care, especially ED visits and hospitalizations for MH conditions, or the reasons for acute care to determine appropriateness. The MAX files, however, remain our best source of information on Medicaid continuity and utilization among vulnerable populations.

Finally, because of the age of our data, the findings may not generalize to more recent years. Specifically, managed care mechanisms were more widely integrated into Medicaid following our study period. As our sample is limited to those in the fee-for-service program, our results may not generalize to those enrolled in Medicaid managed care plans, which may implement patient engagement strategies and outreach efforts that influence churning in ways traditional fee-for-service programs have not.[50] Nevertheless, we are not aware of evidence suggesting that the adoption of managed care changes the relationship between disenrollment and acute care use.

## V. Conclusion

These limitations notwithstanding, our findings suggest that maintenance of continuous Medicaid coverage, resulting from streamlined administrative procedures, is likely to facilitate access to care for those with MH needs and prevent acute episodes requiring care delivered in high-cost hospital settings. With the changing landscape of healthcare coverage in the coming years, it will be important to develop program- or policy-level strategies to improve the continuity of Medicaid coverage and ensure adequate access to care for vulnerable subpopulations.

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**Figure 2.1:** Monthly Cost in Pre-disruption Period versus Post-disruption Period
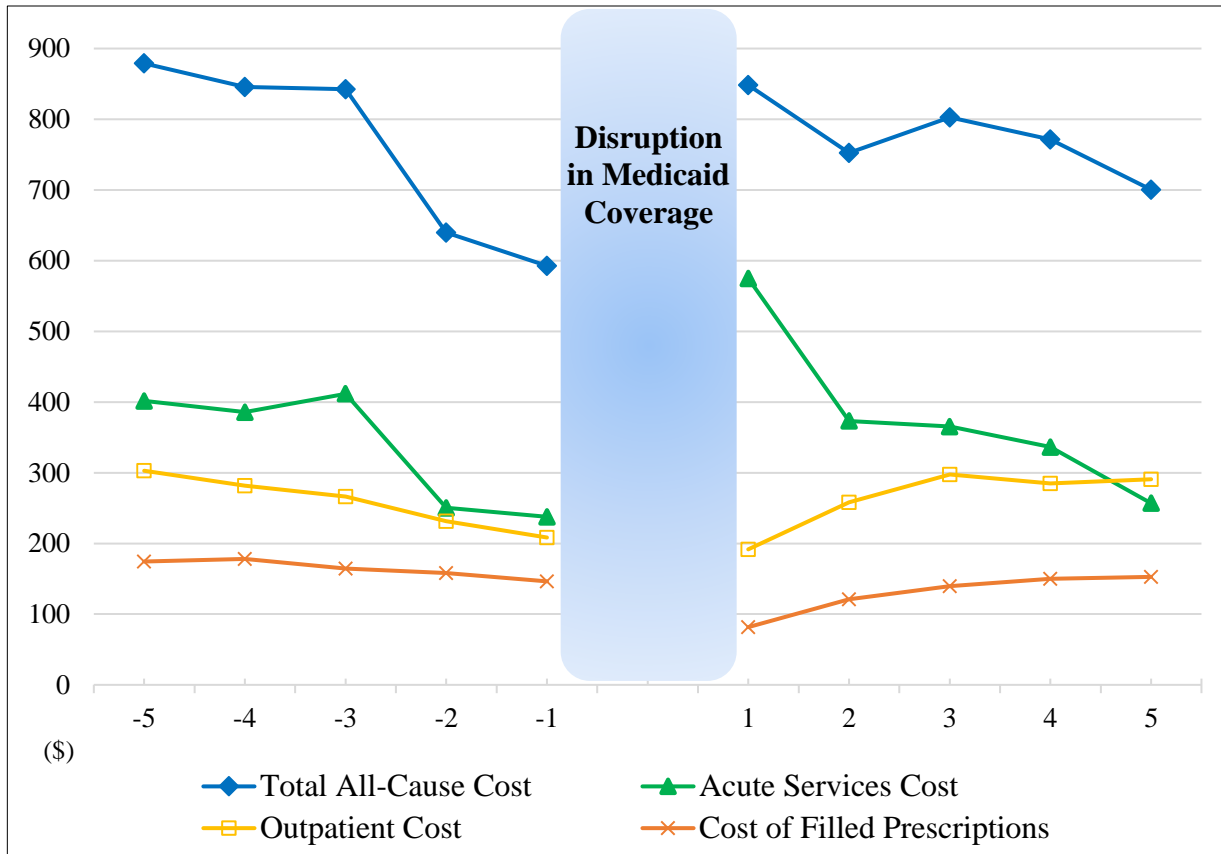


*Notes*: The cost of a specific type was calculated as the sum of costs per person per month during the first five months immediately before a coverage disruption and the first five months immediately after the disruption, among a subset of individuals who experienced a coverage disruption and also were continuously enrolled in Medicaid during the ten months before or after the disruption (N=3,207).

**Table 2.1:** Sample Characteristics of Adult Medicaid Beneficiaries with A Diagnosis of Major Depression, By Presence of Disruptions in Medicaid Coverage, N=139,164

| | Continuous Coverage[†] (n=98,307) | | | Single or Multiple Disruptions[†] (n=40,857) | | | P-value[§] |
|---|---|---|---|---|---|---|---|
| *Dependent variables, mean (SD[+])[#]* | | | | | | | |
| Acute services use per person per covered month | | | | | | | |
| No. of emergency department (ED) visits | 0.2 | ( | 0.5 ) | 0.3 | ( | 0.5 ) | <0.001 |
| No. of inpatient episodes | 0.06 | ( | 0.2 ) | 0.10 | ( | 0.2 ) | <0.001 |
| Inpatient days | 0.4 | ( | 1.4 ) | 0.6 | ( | 1.7 ) | <0.001 |
| Cost per person per covered month ($) | | | | | | | |
| Acute (i.e., ED and/or inpatient) services cost | 388 | ( | 1,307 ) | 536 | ( | 1,719 ) | <0.001 |
| Total all-cause cost | 1,104 | ( | 1,673 ) | 1,048 | ( | 1,956 ) | <0.001 |
| Cost of filled prescriptions | 288 | ( | 396 ) | 183 | ( | 308 ) | <0.001 |
| Cost of outpatient care | 428 | ( | 718 ) | 329 | ( | 535 ) | <0.001 |
| | | | | | | | |
| *State-level instrumental variable[±]* | | | | | | | |
| Streamlined Medicaid re-enrollment policy, % | | | | | | | <0.001 |
| Recertification every 6 months or more frequently | | 26.9 | | | 39.7 | | |
| Recertification every 12 months | | 73.1 | | | 60.3 | | |
| | | | | | | | |
| *County-level independent variables,[±] mean (SD)* | | | | | | | |
| Median household income ($10,000) | 3.8 | ( | 0.8 ) | 3.9 | ( | 0.9 ) | <0.001 |
| No. of psychiatrists per 100K | 17.3 | ( | 30.7 ) | 14.7 | ( | 27.0 ) | <0.001 |
| No. of community health centers per 100K[*] | 3.3 | ( | 6.2 ) | 3.4 | ( | 6.4 ) | 0.091 |
| No. of general & family practitioners per 100K | 30.1 | ( | 14.6 ) | 30.1 | ( | 14.6 ) | 0.841 |
| | | | | | | | |
| *Individual-level independent variables* | | | | | | | |
| No. of coverage disruptions, mean (SD) | | ---- | | 1.1 | ( | 0.3 ) | |
| Total months of coverage disruptions, mean (SD) | | ---- | | 8.4 | ( | 5.4 ) | |
| Total months on Medicaid after index[¶], mean (SD) | 12.7 | ( | 7.5 ) | 9.5 | ( | 5.6 ) | <0.001 |
| Demographics | | | | | | | |
| Age at index diagnosis date, mean (SD) | 34.7 | ( | 10.4 ) | 32.0 | ( | 9.7 ) | <0.001 |
| Female, % | | 81.0 | | | 78.5 | | <0.001 |
| Race/ethnicity, % | | | | | | | <0.001 |
| White | | 69.9 | | | 70.9 | | |
| Non-Hispanic Black | | 17.0 | | | 15.1 | | |
| Hispanic | | 9.2 | | | 9.7 | | |
| Other | | 2.0 | | | 2.1 | | |
| Unknown | | 1.9 | | | 2.2 | | |

**Table 2.1 (Continued):** Sample Characteristics of Adult Medicaid Beneficiaries with A Diagnosis of Major Depression, By Presence of Disruptions in Medicaid Coverage, N=139,164

| | Continuous Coverage[†] (n=98,307) | | | Single or Multiple Disruptions[†] (n=40,857) | | | P-value[§] |
|---|---|---|---|---|---|---|---|
| Need characteristics | | | | | | | |
| % of time on Medicaid due to disability, mean (SD) | 10.8 | ( 25.6 | ) | 5.3 | ( 19.1 | ) | <0.001 |
| Mental health comorbidity[‡], % | | | | | | | |
| Anxiety disorder | 27.0 | | | 19.9 | | | <0.001 |
| Bipolar disorder | 14.1 | | | 11.5 | | | <0.001 |
| Schizophrenia / other psychotic disorder | 5.7 | | | 4.8 | | | <0.001 |
| Substance abuse disorder | 24.4 | | | 23.5 | | | 0.001 |
| Depressive disorder not otherwise specified | 28.2 | | | 21.8 | | | <0.001 |
| Dysthymia | 7.3 | | | 5.2 | | | <0.001 |
| Other mental health disorder | 22.1 | | | 17.9 | | | <0.001 |
| No. of Elixhauser medical comorbidities[‡], mean(SD) | 0.9 | ( 1.3 | ) | 0.5 | ( 1.0 | ) | <0.001 |

*Notes*: [+] Standard deviations (SDs) were reported in parenthesis. [†] Statistics reported in the table were calculated at person level (i.e., the unit of analysis is one person).

[§] P-value from bivariate analysis: chi-square test for categorical variables and two-sample t-test for numerical variables.

[#] I calculated the outcome measures using the monthly average while participating in Medicaid because the total enrollment period varies among beneficiaries; also, because services paid by other payers are unobserved, my outcomes specifically refer to services reimbursed by Medicaid.

[±] County- and state-level measures were assessed with the most recent year of data available preceding 2004.

[*] Community health centers include federally qualified health centers and rural health clinics.

[¶] Total length in months that were covered under Medicaid after I first observed a diagnosis of major depression.

[‡] Mental health comorbidities and Elixhauser medical health comorbidities were measures during any time of my study period (i.e., 2003-04).

**Table 2.2:** Association Between State Re-enrollment Policy and Disruptions in Medicaid Coverage

| | Single or Multiple Disruptions (vs. Continuous Coverage)§ (Pct. = 37.5%)¶ | | Total Months of Coverage Disruptions‡ (Intercept = 3.2)† | |
|---|---|---|---|---|
| *State-level instrumental variable (IV)* | | | | |
| Streamlined Medicaid re-enrollment policy | | | | |
|   Recertification every 6 months or more frequently | (Reference) | | (Reference) | |
|   Recertification every 12 months | -11.7% | *** | -1.1 | *** |
|  *Partial F-statistic of IV* | *122.0* | *** | *93.5* | *** |
|  *Partial R-squared of IV* | *0.014* | *** | *0.010* | *** |
| *County-level independent variables* | | | | |
| Median household income ($10,000) | 1.2% | ** | 0.1 | * |
| No. of psychiatrists, per 100K | -0.2% | | -0.01 | |
| No. of community health centers, per 100K | 1.2% | ** | 0.1 | * |
| No. of general and family practitioners, per 100K | -0.1% | | 0.001 | |
| *Individual-level independent variables* | | | | |
| *Demographics* | | | | |
|  Age | -0.3% | *** | -0.02 | *** |
|  Female | -6.0% | *** | -0.7 | *** |
|  Race/ethnicity | | | | |
|   White | (Reference) | | (Reference) | |
|   Non-Hispanic Black | -2.6% | * | -0.3 | ** |
|   Hispanic | 2.1% | | 0.3 | |
|   Other | 1.6% | | 0.1 | |
|   Unknown | 4.1% | | 0.6 | |
| *Need characteristics* | | | | |
|  Percent of time on Medicaid due to disability, % | -2.9% | *** | -0.3 | *** |
|  Mental health comorbidity | | | | |
|   Anxiety disorder | -5.5% | *** | -0.7 | *** |
|   Bipolar disorder | -1.9% | *** | -0.3 | *** |
|   Schizophrenia / other psychoses | 2.6% | *** | 0.1 | |
|   Substance abuse disorder | 2.2% | *** | -0.02 | |
|   Depressive disorder not otherwise specified | -3.6% | *** | -0.5 | *** |
|   Dysthymia | -4.1% | *** | -0.5 | *** |
|   Other mental health disorder | -3.4% | *** | -0.5 | *** |
|  No. of Elixhauser medical comorbidities | -4.2% | *** | -0.5 | *** |

*Notes*: N=139,164; Marginal effects estimates reported. §Model estimated using a Linear Probability Model [*F-statistic*=146.5, *adjusted R-squared*=0.054]. ‡Model estimated using an Ordinary Least Square specification [*F-statistic*=118.6, *adjusted R-squared*=0.055]. ¶Model-adjusted percentage of experiencing single or multiple Medicaid coverage disruptions per person. † Model-adjusted mean length (in months) of Medicaid coverage disruptions per person. *p<0.05, ** p<0.01, *** p<0.001;

**Table 2.3:** Multivariate Regression Results for Number of Emergency Department Visits, Inpatient Episodes, and Length of Stay Per Person Per Medicaid-Covered Month, N=139,164

| | Emergency Department Visits[#§] | | Inpatient Episodes[#§] | | Inpatient Days[#§] | |
|---|---|---|---|---|---|---|
| | TPM[‡] | IV-TPM[+] | TPM[‡] | IV-TPM[+] | TPM[‡] | IV-TPM[+] |
| *Marginal Effects:* | | | | | | |
| Single or Multiple Disruptions (vs. Continuous Coverage) | 0.054 *** | 0.130 *** | 0.034 *** | 0.077 *** | 0.228 *** | 0.620 *** |
| | (0.003) | (0.015) | (0.001) | (0.004) | (0.005) | (0.037) |
| Total Months of Coverage Disruptions | 0.007 *** | 0.014 *** | 0.004 *** | 0.009 *** | 0.025 *** | 0.073 *** |
| | (0.0003) | (0.002) | (0.0001) | (0.001) | (0.001) | (0.004) |
| *Model-adjusted Mean of Outcomes:* | | | | | | |
| Single or Multiple Disruptions (vs. Continuous Coverage) | 0.230 | 0.205 | 0.060 | 0.049 | 0.375 | 0.297 |
| Total Months of Coverage Disruptions | 0.230 | 0.209 | 0.061 | 0.052 | 0.380 | 0.318 |

*Notes*: * $p<0.05$, ** $p<0.01$, *** $p<0.001$; [‡] TPM: Two-part model; [+] Two-part model with a two-stage residual inclusion instrumental variable (2SRI-IV) approach. [#] Standard errors were reported in parenthesis; marginal effects estimates were reported. [§] All regressions adjusted for individual-level socio-demographic and need characteristics, county-level socioeconomic status, and measures of local mental healthcare infrastructure.

**Table 2.4:** Multivariate Regression Results for Medicaid Reimbursed Costs Per Person Per Medicaid-Covered Month, N=139,164

| | Acute Services Cost[†#§] | | Total All-Cause Cost[#§] | | Cost of Filled Prescriptions[#§] | | Cost of Outpatient Care[#§] | |
|---|---|---|---|---|---|---|---|---|
| | TPM[¶] | IV-TPM[±] | GLM[‡] | IV-GLM[+] | GLM[‡] | IV-GLM[+] | GLM[‡] | IV-GLM[+] |
| *Marginal Effects:* | | | | | | | | |
| Single or Multiple Disruptions (vs. Continuous Coverage) | 202 *** | 650 *** | 110 *** | 310 *** | -57 *** | -303 *** | -45 *** | -89 ** |
| | (6) | (40) | (8) | (63) | (2) | (31) | (4) | (32) |
| Total Months of Coverage Disruptions | 23 *** | 76 *** | 20 *** | 33 *** | -2 *** | -34 *** | -1 | -10 ** |
| | (1) | (5) | (1) | (7) | (0.2) | (4) | (0.3) | (4) |
| *Model-adjusted Mean of Outcomes:* | | | | | | | | |
| Single or Multiple Disruptions (vs. Continuous Coverage) | 371 | 295 | 1,088 | 1,039 | 286 | 351 | 417 | 428 |
| Total Months of Coverage Disruptions | 377 | 316 | 1,076 | 1,050 | 278 | 361 | 407 | 429 |

*Notes*: *p<0.05, ** p<0.01, *** p<0.001; [¶] Two-part model; [±] Two-part model with a two-stage residual inclusion instrumental variable (2SRI-IV) approach. [‡] Generalized linear model; [+] Generalized linear model with a 2SRI-IV approach. [†] Acute services specifically refer to emergency department and inpatient services. [#] Standard errors were reported in parenthesis; marginal effects estimates were reported. [§] All regressions adjusted for individual-level socio-demographic and need characteristics, county-level socioeconomic status, and measures of local mental healthcare infrastructure.

# Appendix

**Appendix Table 2.1:** ICD-9 codes of mental health comorbidities

| Condition | ICD9-CM code |
|---|---|
| Mental health comorbidities | |
| Anxiety disorder | 300.0-300.3, 300.5-300.9 |
| Bipolar disorder | 296.0-296.1, 296.4-296.9 |
| Schizophrenia / other psychotic disorder | 295, 297.0-297.3, 297.8-298.4, 298.8-298.9 |
| Substance use disorders | 303, 304, 305 |
| Dysthymia | 300.4 |
| Depressive disorder NOS | 311 |
| Other mental health illness | 293, 294, 299, 301, 302, 306-310, 312-316 |

*Notes*: We measure a comorbid mental health condition using a dichotomous indicator for the presence of the diagnosis of this condition. We identified the diagnosis of a mental health condition based on at least two inpatient and/or outpatient claims with the respective ICD-9 codes (shown in Appendix Table 1) on two distinct dates.

**Appendix Table 2.2:** Codes used to identify emergency department claims from the Other Therapy and Inpatient Files of the MAX data

| Code Type | MAX File | Code Value |
|---|---|---|
| Place of Service (POS) Code | Other Therapy File | 23 |
| Current Procedural Terminology (CPT) Code | Other Therapy File | 99281-99285 |
| Revenue Code | Other Therapy File, Inpatient File | 0450-0459, 0981 |

**Appendix Table 2.3:** An Instrumental Variable (IV) Falsification Test: Association between State Re-enrollment Policy and Cost and Utilization of Antibiotic Medication, N=139,164

| | Cost of Antibiotic Medication Prescriptions[¶§±] | | Number of Antibiotic Medication Uses[¶§±] | |
|---|---|---|---|---|
| | Model 1.1 | Model 1.2 | Model 2.1 | Model 2.2 |
| | *Marginal Effects* | | | |
| **Streamlined Medicaid re-enrollment policy** | | | | |
| Recertification every 6 months or more | (Ref) | (Ref) | (Ref) | (Ref) |
| Recertification every 12 months | -0.721 | -1.609 | -0.023 | 0.016 |
| | (0.456) | (0.076) | (0.077) | (0.255) |
| **County-level independent variables** | | | | |
| Median household income ($10,000)[+] | | -1.502[***] | | -0.022[**] |
| | | (0.000) | | (0.001) |
| No. of psychiatrists, per 100K[+] | | 1.733[***] | | 0.012 |
| | | (0.000) | | (0.106) |
| No. of community health centers, per 100K[+] | | -0.114 | | -0.006 |
| | | (0.792) | | (0.361) |
| No. of general and family practitioners, per | | -3.940[***] | | -0.061[***] |
| | | (0.000) | | (0.000) |
| **Individual-level independent variables** | | | | |
| Demographics | | | | |
| Age | | -0.515[***] | | -0.019[***] |
| | | (0.000) | | (0.000) |
| Female | | 29.51[***] | | 0.836[***] |
| | | (0.000) | | (0.000) |
| Race/ethnicity | | | | |
| White | | (Ref) | | (Ref) |
| Non-Hispanic Black | | -19.35[***] | | -0.313[***] |
| | | (0.000) | | (0.000) |
| Hispanic | | -14.36[***] | | -0.311[***] |
| | | (0.000) | | (0.000) |
| Other | | -14.55[***] | | -0.461[***] |
| | | (0.000) | | (0.000) |
| Unknown | | -16.22[***] | | -0.317[***] |
| | | (0.000) | | (0.000) |
| Need characteristics | | | | |
| Percentage of time on Medicaid due to disability[+] | | 4.550[***] | | 0.091[***] |
| | | (0.000) | | (0.000) |

**Appendix Table 2.3 (Continued)**:  An Instrumental Variable Falsification Test: Association Between State Reenrollment Policy and Antibiotic Medication Cost and Utilization

| | Cost of Antibiotic Medication Prescriptions[¶§±] | | Number of Antibiotic Medication Uses[¶§±] | |
|---|---|---|---|---|
| | Model 1.1 | Model 1.2 | Model 2.1 | Model 2.2 |
| | *Marginal Effects* | | | |
| Mental health comorbidity | | | | |
| Anxiety disorder | | 8.988[***] | | 0.226[***] |
| | | (0.000) | | (0.000) |
| Bipolar disorder | | 4.457[***] | | 0.160[***] |
| | | (0.000) | | (0.000) |
| Schizophrenia / other psychoses | | -15.61[***] | | -0.274[***] |
| | | (0.000) | | (0.000) |
| Substance abuse disorder | | 6.505[***] | | 0.190[***] |
| | | (0.000) | | (0.000) |
| Depressive disorder not otherwise | | 5.353[***] | | 0.132[***] |
| | | (0.000) | | (0.000) |
| Dysthymia | | 6.532[***] | | 0.163[***] |
| | | (0.000) | | (0.000) |
| Other mental health disorder | | 4.330[***] | | 0.123[***] |
| | | (0.000) | | (0.000) |
| No. of Elixhauser medical comorbidities[+] | | 24.71[***] | | 0.467[***] |
| | | (0.000) | | (0.000) |

*Notes:* [§] *p*-values were reported in parentheses.

[¶] For all regressions, we estimated a generalized linear model (GLM) with a log link and gamma distribution because of the skewed distribution of antibiotic medication cost and utilizations.

[±] Marginal effects were reported; all marginal effects were estimated at the reference of Medicaid re-enrollment policy (i.e., recertification every 6 months or more frequently) and the observed value of other covariates.

[+] Continuous variable was standardized so that a one unit increase corresponds to a one standard deviation increase above its mean value.

[*] $p<0.05$, [**] $p<0.01$, [***] $p<0.001$

# CHAPTER 3

Express Lane Eligibility, Medicaid Coverage, and Acute Care Use among Children with Depression in Two Southern States

**Abstract**

**Objective**: Express Lane Eligibility (ELE), originally authorized in 2009, provides states a mechanism to simplify Medicaid eligibility recertification processes for youth. The literature has suggested that the simplified administrative processes could increase Medicaid retention rates for the overall Medicaid child populations. However, little is known about the effect of ELE on Medicaid retention rates on health services utilization among youth with chronic conditions, such as depression. This study estimates the impact of ELE on Medicaid coverage continuity and its downstream effect on acute care utilization among depressed youth. **Data Sources/Study Setting**: 2008-2011 data for Medicaid-insured children with depression from the Medicaid Analytic eXtract File in seven Southeast states. **Study Design**: I employed a quasi-experimental difference-in-difference method, in conjunction with propensity analysis, to compare outcomes among youth living in Louisiana and Alabama (which implemented ELE) with those residing in Missouri, Virginia, Texas, Georgia, and North Carolina (which did not adopt ELE) before versus after ELE implementations. **Principal Findings**: In Alabama, ELE implementation led to a 56% reduction in the likelihood of coverage disruptions and a 53% reduction in the length of coverage disruptions [$p<0.001$] over the 9-month treatment period after the diagnosis of depression. ELE implementation in Alabama also led to a 19% reduction in total mental health (MH) related emergency department (ED) visits [$p<0.05$] during the treatment period. In Louisiana, the ELE processes had a counterintuitive positive effect on the disenrollment rate and the use of MH-related ED services [$p<0.01$], and had no effect on other outcomes. **Conclusions**: Heterogeneity across states was observed in the effect of ELE on coverage continuity and acute services utilization among youth with depression. Alabama's ELE implementation had a significant effect on reducing Medicaid coverage discontinuities for depressed youth, which contributed to a downstream effect on the decreased use of acute services for mental disorders. As states continue their efforts to streamline enrollment and promote retention, strategies similar to Alabama's ELE processes merit consideration. Further, the counterintuitive effects of ELE in Louisiana suggest that the large variation in how states operate ELE may result in disparate impacts on youth. More research is needed to investigate the heterogeneity in the long-term effect of ELE among this vulnerable population.

## I. Introduction

Medicaid is the largest payer of mental health (MH) services and the bedrock source of coverage for children in the U.S.[1,2] In 2014, approximately 36 million children were covered by Medicaid, accounting for more than half of low-income youth.[1,3] Despite the indispensable role of Medicaid, coverage discontinuities are common among Medicaid beneficiaries. Of Medicaid-insured children, almost one in five experienced coverage disruptions in 2012.[4,5] These disruptions are especially problematic for children with chronic conditions, such as depression, given their needs for constant access to care.

Medicaid discontinuities have been found to be strongly related to the complexity of eligibility recertification procedures.[6-8] Eligibility recertification often requires applicants to revisit the social welfare offices in person and provide documentation to prove income or other eligibility criteria. These paper-driven renewal processes, therefore, impose burdens on families in terms of increased time and paperwork.[7,9] A large body of literature has shown that the administrative hassle at eligibility renewal functions as the major threat to continuous coverage and exacerbated disenrollment among individuals eligible for Medicaid.[5,10-12]

To reduce these burdens and improve coverage continuity, a number of states have implemented policies that simplified Medicaid enrollment processes for families during the past decade.[13-15] The Affordable Care Act (ACA) has further encouraged strategies to streamline enrollment and promote retention of the Medicaid program through the use of information-sharing technology.[16,17] Some states have now modernized eligibility processes by using data from other public agencies to determine individuals' eligibility through data linkages across programs.[17,18] Express Lane

Eligibility (ELE) is one such process implemented by several states to enroll and retain children in Medicaid based on income information from third parity data sources, such as the Supplemental Nutrition Assistance Program (SNAP).[17,19] Medicaid features such as ELE are expected to alleviate beneficiaries' renewal burden, thereby reducing coverage discontinuities. Nevertheless, very few empirical studies have been done to examine whether ELE actually improves the continuity of Medicaid coverage among children.

Maintenance of continuous coverage is especially crucial for children with chronic conditions, such as depression, who need ongoing outpatient treatment to manage their conditions. Depression is one of the most prevalent and disabling disorders in youth.[20] Approximately 13% of adolescents ages 12-17 experienced a major depressive episode in 2015.[21] Effective treatment for childhood depression exists, including psychotherapy, pharmacotherapy, or both.[22,23] Therefore, continuous Medicaid coverage for MH care is particularly important for youth with depression to ensure affordability and accessibility to these types of treatments.[24] Disruptions in their coverage could lead to a lack of access to outpatient care, which could result in exacerbated depressive symptoms that may trigger hospital emergency care and inpatient hospitalizations.[25,26]

There is little empirical evidence for whether policies aimed at streamlining enrollment processes actually reduce Medicaid discontinuities and how they affect healthcare use among vulnerable youth with depression. More importantly, the future of the Medicaid program and related ACA provisions remains uncertain. It is critical, therefore, to understand how states' streamlined eligibility policies affect coverage stability and healthcare utilization among vulnerable populations. This study examined the ELE policy adopted in Alabama and Louisiana prior to the ACA.[27,28] I specifically

explored the impact of ELE on Medicaid continuity and acute care utilization among low-income youth with depression.

## II. Background

*Express Lane Eligibility*

ELE was originally enacted through the 2009 Children's Health Insurance Program (CHIP) Reauthorization Act and was later extended by Section 302 of the Medicare Access and CHIP Reauthorization Act of 2015.[19,29,30] ELE provides state Medicaid programs an optional mechanism to simplify youth beneficiaries' eligibility determination and renewal processes.[19,31] Specifically, the state Medicaid agency can use other agencies' data to certify children's eligibility, even though the agencies use different methodologies to determine income and other eligibility criteria.[19,31] Consequently, ELE affords states a method to retain eligible children who may otherwise lose Medicaid due to cumbersome eligibility recertification processes. Under the ACA, ELE has been encouraged as a promising strategy to streamline Medicaid application and re-enrollment.[17,32] Despite ELE's potential, as of July 2015, only nine states had implemented ELE for Medicaid-insured children.[13]

*State Variation in Express Lane Eligibility Processes*

In October 2009, Alabama adopted ELE to facilitate eligibility determination and renewal for Medicaid-insured children.[33] Alabama's ELE implementation was built on a partnership with the state's SNAP and Temporary Assistance for Needy Families (TANF) program.[33] During the first three years after implementing ELE, Alabama

adopted a manual ELE process, under which caseworkers could access the databases

from SNAP and TANF and use the income information to renew children's eligibility.[33]

In February 2013, the state operated a more automated Medicaid renewal process, which

reduced the involvement of caseworkers.[33]  However, given the data available, this

analysis only focuses on the manual ELE processes in Alabama. This ELE process

streamlined Medicaid enrollment and re-enrollment procedures by reducing the burden

on families to file paperwork to prove eligibility. Notably, the partnership between

Medicaid and these other programs had existed prior to the implementation of ELE and

these programs had a history of working together, which facilitated the rollout of ELE.[33]

Accordingly, the ELE processes were implemented with virtually no need for technology

renovation or investment.[33]

      Louisiana adopted ELE to determine initial Medicaid enrollment in early 2010

and expanded it to eligibility renewals for child beneficiaries in November 2010.[34] The

state matched the records of Medicaid beneficiaries with the SNAP database, and sent a

letter to SNAP-recipient families whose child was not enrolled in Medicaid to notify

them of their children's eligibility and gain their consent in data matching.[32] Children in

families that did not "opt out" were automatically enrolled in Medicaid.[32] In January

2011, the ELE approach was updated to connect the state's eligibility system with the

system recording consumers' consent.[34] Specifically, families that consent to data

matching and enrollment could check an "opt-in" box in their SNAP application form,

which permit ELE renewals within in a single data system.[34] It is important to note,

however, that Louisiana's ELE implementation was built on the state's previous efforts to

simplify eligibility and renewal, which had already reduced the uninsured rate among

eligible children to a very low level (i.e., approximately 6% in 2009).[34-36] Consequently, the gains from the additional procedural simplification through ELE may be marginal in this state.

*Literature on Express Lane Eligibility*

Despite increasing empirical evidence regarding other features of state policies aimed at streamlining eligibility processes,[6,8,11,19,37] little is known about the effect of ELE on continuity of Medicaid and use of acute care services. Using a quasi-experimental design, a recent report found a significant increase in total program enrollment and coverage continuity among Medicaid-insured children after the adoption of ELE.[19] The improvement in Medicaid continuity was attributed to the data sharing across agencies and the decreased documentation requirements, which together reduced the procedural barriers to Medicaid retention.[19] Nevertheless, this research did not examine the impact of ELE on health service utilization.

To date, only one peer-reviewed study has examined healthcare use among children covered through ELE. Using administrative data from four states, this study reported a lower intensity and likelihood that ELE enrollees would use acute care and outpatient services.[32] The cross-sectional analysis, however, did not consider patterns of services use prior to ELE, which may raise concerns regarding a biased estimation of the ELE impact.

Previous quasi-experimental research that investigated the impact of re-enrollment procedures on service use primarily focused on other types of eligibility policies, such as 12-month continuous eligibility.[11] This line of research has shown that

these policies reduced the use and cost of acute care services, which is suggestive of potential positive results with ELE.[11,37] Nevertheless, it is also possible that the earlier successes of these programs may mitigate the impact of ELE. As most states have continued to streamline their eligibility procedures through other mechanisms in the past decade,[13,38,39] the benefits to be gained from further automating the process through ELE may be marginal. The potential administrative complexities associated with the initial technology setup may further moderate the effect of ELE, at least in the short term.[32,34]

Furthermore, the ELE literature consistently targets the broader child population,[19,32] while little is known about how policies to streamline Medicaid coverage affect children with chronic conditions, such as depression. Yet, these children should be a research priority because maintenance of continuous coverage is crucial for these vulnerable populations to receive timely care. This study contributes to the literature by estimating the effect of ELE adopted in two Southern states on the continuity of Medicaid coverage and the downstream policy effect on the utilization of acute care services based on a difference-in-difference analysis among low-income children with depression. The results shed light on state policy and planning efforts regarding the implementation of ELE and other data-based eligibility methods moving forward.

## III. Methods

*Data and Sample*

I used the 2008-2011 Medicaid Analytic eXtract (MAX) files from Alabama and Louisiana, two states that implemented the ELE processes during my study period, as well as five control states: Georgia, Texas, Missouri, Virginia, and North Carolina. These

states were selected as the control states because their socio-demographic characteristics are relatively similar to the treatment states, and because there was no evidence suggesting that these states changed their policies related to Medicaid re-enrollment procedures during my study period. Research has shown that the seven Southeast states reported sufficiently complete managed care encounter data;[40-42] thus, the analyses include data from those enrolled in fee-for-service and managed care plans.

The MAX data include information on Medicaid enrollment and eligibility status, healthcare utilization and cost (in claims/encounter data), and beneficiaries' socio-demographic characteristics. Using the client county codes, the MAX data were merged with measures from the Area Health Resources File (AHRF). AHRF is a national data file that includes information on county-level socio-demographic characteristics, health professionals, and healthcare facilities.[43]

My analytic sample was derived from a subsample of children aged 18 years or younger who were treated for depression. Consistent with previous research,[44-46] a diagnosis of depression was based on at least two inpatient and/or outpatient claims with ICD-9 codes 296.2-296.3, 300.4, or 311 on distinct dates. The index date was the first reported diagnosis date for depression followed by a 9-month treatment period. According to the suggested treatment period for depression in the Healthcare Effectiveness Data and Information Set (HEDIS) guidelines,[47] this analysis focused on children's service use patterns over the 9-month treatment period after the index date. During the treatment period, continuous Medicaid coverage is especially important to ensure timely access to depression care. In a difference-in-difference framework,

therefore, I restricted the analysis to children whose 9-month treatment period was either entirely before or after the implementation date of the ELE policy.

Of these, I further excluded children who (1) had dual Medicare eligibility, (2) moved across states, and (3) had missing values for one of the model covariates. These exclusion criteria yielded an analytic sample of 97,730 children with a diagnosis of depression across all seven states.

*Outcome Variables*

The first outcome measure of interest assessed discontinuity of Medicaid coverage using a dichotomous indicator for whether the beneficiary had at least one disruption in coverage (versus continuous enrollment) during the 9-month treatment period.  Consistent with prior studies,[25,48] a disruption in coverage was defined as an enrollment gap for more than one month. I also created a continuous variable calculated as the total number of days when Medicaid is discontinued. This variable was set to zero for beneficiaries with continuous enrollment.

Acute care utilization was measured by discrete count variables for emergency department (ED) visits and inpatient hospitalizations. The number of all-cause ED visits was determined using ED claims in the Other Therapy and Inpatient Files. ED claims were identified using place of service code (23), current procedural terminology code (99281-99285), and revenue codes (450-452, 456, 459, 981).[49] I also calculated the number of ED visits associated with MH treatment, using ED claims in combination with a diagnosis of MH conditions (ICD-9 codes: 290, 293-302, or 306-316).  The number of all-cause inpatient episodes was determined using the start and end dates of inpatient

claims.[49] The start date of a claim was compared with the end date of the previous claim to ensure that a single episode was not counted as multiple hospitalizations.[48] The number of inpatient days was created by summing the length of stay for all inpatient episodes.[48] Similarly, the numbers of MH-related inpatient episodes and MH-related inpatient days were derived using inpatient claims with a diagnosis of MH conditions. Lastly, I created dichotomous indicators to determine whether the child had any all-cause (or MH-related) ED visit or inpatient episode over the 9-month treatment period.

*Key Predictor*

I first created an indicator to determine whether the child resided in a state that implemented ELE (the "ELE state"; versus in a state that never adopted ELE) during the study period (i.e., 2008-2011). I then created another indicator for whether the child's 9-month treatment period was entirely after (versus before) the ELE adoption date. The key predictor of interest for this analysis is an interaction term of these two indicators. This interaction term assigned a value of "1" to children from the ELE state whose treatment period was entirely after the state's adoption of ELE, and a value of "0" for children from comparison states and for those whose treatment period was completely before the ELE adoption date.

*Covariates*

This analysis also included a rich set of patient- and county-level control variables that may be correlated with state Medicaid eligibility policies and patients' decisions about insurance coverage and care access. To measure patient-level demographic

characteristics, I included age (in years) at the index depression diagnosis, an indicator

for female gender, and a categorical measure of race/ethnicity (**Table 3.1**). I also created

a mutually exclusive categorical variable for health plan type ([1] behavioral healthcare

carve-out plan, [2] comprehensive managed care plan, [3] primary care case

management, [4] fee-for-service only, or [5] more than one type of plan) as a measure of

individual-level enabling factors.

To measure patient-level need-related characteristics, I created a mutually

exclusive categorical variable for Medicaid eligibility category ([1] blind/disabled, [2]

foster care, or [3] other basis of eligibility). I also included several dichotomous

indicators for the presence of the following comorbid mental disorders: (1) attention

deficit hyperactivity disorder, (2) conduct disorder and/or oppositional defiant disorder,

(3) anxiety, (4) bipolar, (5) schizophrenia and/or other psychoses, and (4) other MH

disorders. Likewise, I included two indicators for the presence of comorbid asthma and

any of the following chronic medical conditions: diabetes, seizure disorder, congenital

heart disease, cerebral palsy, cystic fibrosis, spina bifida, sickle cell disease, and/or

malignant neoplasms. These medical conditions were selected because they are

associated with intensive service utilization among Medicaid-enrolled children.[50,51] I

grouped other chronic medical conditions into one indicator due to the small size of these

conditions in my sample.

To measure local socioeconomic status, I included the percentage of county

residents under the federal poverty level and the county-level median household income.

I also created an indicator for rural counties versus urban/suburban counties, as defined

by the U.S. census,[52] to measure urbanicity. Finally, I created three continuous variables

to measure the geographic accessibility to local MH care resources – i.e., the numbers of primary care physicians, psychiatrists, and community health centers (i.e., federally qualified health centers and rural health clinics) per 100,000 county residents.

*Analytic Strategy*

To identify the effect of the implementation of ELE on coverage discontinuities and service utilization, I used a quasi-experimental difference-in-difference analysis. Specifically, I estimated a general difference-in-difference model, in which the outcome of person $i$ in state $s$ and time $t$ is a function of the interaction term (*ELEstate* × *PostELE*) indicating the implementation of ELE in state $s$ (i.e., Alabama or Louisiana) during post-ELE period $t$. This model also includes state (*ELEstate*) and time (*PostELE*) two-way fixed effects, as well as a vector ($X_{ist}$) of the individual- and contextual-level covariates as described above. The state and time two-way fixed effects adjust for the time-invariant state heterogeneity and secular trend in coverage stability and health service utilization that may be systematically correlated to ELE. The coefficient of the interaction term ($α_1$) is of key interest, representing the estimated effect of the implementation of ELE on the outcome of interest. This general difference-in-difference model is as follows:

$$Outcome_{ist} = α_0 + α_1 \, ELEstate × PostELE_{st} + ELEstate_s + PostELE_t + α_2 \, X_{ist} + ε_{ist} \quad (1)$$

I used the two-part model with a logit model in the first part and a generalized linear model with a log link and Poisson distribution in the second part to estimate the count of services (e.g., the number of ED visits). This modeling method accommodates the skewed distribution of visits and produces robust estimates even in the presence of heteroskedasticity.[48,53,54] A Modified Park test, which recommends a family given a link

function, was also conducted,[55] and the test results supported the choice of modeling method. I used the logistic model to estimate dichotomous outcomes (e.g., any ED visit). All models clustered standard errors at the state level to correct for the serial correlation. The clustered standard errors allow for arbitrary within-state correlation in error terms but assume independence across states.[56]

Notably, Alabama's manual ELE process was built on the well-established partnership with both the SNAP and TANF programs of the state, from which caseworkers could easily access income data to recertify eligibility.[33] Louisiana's automated ELE process, which was based on automated record matching with the SNAP database, required substantial infrastructure setup and technology investment.[32] These and other characteristics of the implementation procedures make the ELE policies in Alabama and Louisiana differ considerably from each other. It is important, therefore, to estimate the ELE policy within individual states to best understand the differential effects of the ELE processes.[57] Accordingly, this analysis stratified the analytic sample into two subsamples to estimate the effect of ELE in Alabama and Louisiana separately. In the first subsample used to examine Alabama's ELE process, 82,579 depressed children who were from Alabama and its control states were identified using the MAX data. In the second subsample used to estimate Louisiana's ELE policy, there were 63,862 children who resided in Louisiana and the control states.

To further address the potential concerns that children from states that adopted ELE (the "treatment") may be systematically different from those in control states, I applied an estimator combining the difference-in-difference analysis with a propensity score weighting method. In a difference-in-difference framework, the propensity score

analysis is a commonly used protocol that matches the treatment and control groups to account for confounding in non-experimental studies.[58] Consistent with prior research, I used the propensity score standardized mortality ratio (SMR) weighting method in this analysis.[59] The SMR weighting method generates weights for subjects in the control group to make them representative of the subjects in the treatment group.[60] Therefore, this analysis estimates the average treatment effect on the treated of the state-specific ELE policy.[60]

## IV. Results

*Sample Characteristics*

Compared to children in the control states, those from Alabama were slightly older; were more likely to be white or black (rather than Hispanic), eligible for Medicaid due to disability (rather than involvement with foster care), and to have comorbid anxiety, substance abuse disorders, and medical conditions; and were less likely to have major depression and dysthymia (p<0.05). (**Table 3.1**) While there was no difference in the availability of safety net facilities (p>0.05), children in Alabama were more likely than those in the control states to live in counties with slightly fewer psychiatrists and primary care physicians (p<0.05).

Similar demographic differences were observed between children from Louisiana and those in the control states; however, the rates of having comorbid medical conditions and substance abuse disorders, and the availability of psychiatrists and safety net facilities in local community were nearly identical when comparing Louisiana to its control states (p>0.1). (**Table 3.2**) Moreover, after applying the propensity analysis, the

differences in the weighted sample characteristics between each treatment state and its respective control group all lost their statistical significance (p>0.05). (**Tables 3.1–3.2**)

*Trends of Coverage Discontinuities and Acute Care Use*

To examine the effect of ELE on disenrollment and utilization, I first graphically depicted the descriptive trends in the rate of Medicaid discontinuities and the utilization of acute services specific to mental disorders by the month of children's index date of depression diagnosis. In Alabama, there was an obvious decline in the average rate of Medicaid coverage disruptions immediately after the adoption of ELE, while the rate of coverage disruptions remained stable over time in the control states. (**Figure 3.1 Panel A**) There was also a decrease in the use of MH-related ED services associated with the adoption of ELE in Alabama; however, this decrease did not become pronounced until several months after the ELE adoption date (i.e., among children whose index date was in July of 2010 or later).  Over time, no significant change was found in the rate of use of inpatient services in Alabama compared to the control states.  No substantial change was observed in the rates of coverage discontinuities and utilization in Louisiana compared to the control states. (**Figure 3.1 Panel B**) Notably, the average trends of the outcomes of interest prior to each ELE adoption date were generally parallel over time between the ELE state and its control group, a key assumption of the difference-in-difference method.

*Difference-in-difference Results*

In Alabama, the implementation of the ELE processes led to a 5.7 percentage-point decrease in the likelihood of experiencing any disruption in Medicaid coverage and

a decline of 5.8 days in total duration of coverage disruptions during the 9-month treatment period (p<0.001). (**Table 3.3**) To elucidate the magnitude of these differences, I translated the marginal effects (ME) into relative difference. Specifically, the ELE adoption decreased the likelihood of Medicaid discontinuities by 56% (5.7/10.2) and shortened the total duration of lost Medicaid coverage by 53% (5.8/10.9).

The implementation of ELE processes in Alabama also contributed to a 13% (1.9/14.8; ME = -1.9 percentage-points; p<0.05) reduction in the likelihood of having any MH-related ED visit, and a 19% (0.04/0.21; ME = -0.04 visits; p<0.01) decrease in total MH-related ED visits during the treatment period. Although ELE had no effect on inpatient episodes, the ELE adoption decreased the all-cause inpatient days by 43% (0.6/1.4; ME = -0.6 days; p<0.01) and reduced the MH-related inpatient days by one-half (0.6/1.2; ME = -0.6 days; p<0.05) during the treatment period.

The estimated effect of the ELE processes in Louisiana was substantially different from the ELE effect in Alabama. Specifically, the adoption of the ELE processes in Louisiana led to a counterintuitive increase in the likelihood of coverage disruptions (ME = 2.3 percentage-points; p<0.01) during the treatment period, which was accompanied by increases in the likelihood of MH-related ED visit (ME = 3.0 percentage-points; p<0.01) and in the total number of MH-related ED visits (ME = 0.05 visits; p<0.01). (**Table 3.4**) The ELE processes in this state had no effect on the duration of coverage disruptions nor the utilization of inpatient services (p>0.05).

*Sensitivity Analyses*

I also conducted the difference-in-difference analyses by changing the 9-month treatment period to a 6-month or one-year period as a robustness check. Additionally, I used the propensity score matching approach,[60] in lieu of the propensity score weighting method, among a narrowed sample consisting of children in the treatment states and those in the control states who were matched to the treatment children. My main findings remained qualitatively similarly in both direction and significance in these sensitivity analyses (not shown).

**V. Discussion**

Overall, I found substantial state heterogeneity in the effect of ELE processes. In Alabama, the implementation of ELE led to a significant reduction in coverage disruptions among Medicaid-insured youth with depression. The improved continuity of Medicaid coverage contributed to substantial decreases in the likelihood and total number of MH-related ED visits. In contrast, the implementation of the ELE processes in Louisiana resulted in counterintuitive increases in the disenrollment rate and the use of MH-related ED service, and had no effect on the duration of disenrollment nor inpatient services use among depressed youth beneficiaries.

The difference-in-difference analyses for Alabama found that the implementation of the ELE procedures decreased the likelihood and length of coverage disruptions by 56% and 53%, respectively. Prior research has conceptualized the eligibility recertification process as a trade-off beneficiaries face between the benefits of maintaining Medicaid coverage and the opportunity cost of recertifying their eligibility.[9] Accordingly, the Medicaid features that streamline eligibility processes, such as ELE, can

alleviate beneficiaries' burden in terms of time and paperwork, which can reduce the opportunity cost of coverage renewal and thus mitigate the drop-out rates of Medicaid participation. Although this hypothesis cannot be tested using the data available, this mechanism has been supported in previous quasi-experimental studies that have investigated ELE and similar policies related to eligibility procedures, such as the "12-month continuous eligibility" policy.[11,19] For instance, a recent study of eight states found that ELE led to an increase in coverage continuity among the overall Medicaid child population.[19] The rollout of the "12-month continuous eligibility" policy has also been reported to effectively increase the Medicaid retention rate of all youth.[11]

In Alabama, ELE implementation also led to a 13% decrease in the likelihood of having any MH-related ED visit and a 19% reduction in total MH-related ED visits. The one known study examining the relationship between ELE and service use reported that among Medicaid child populations overall, ELE enrollees had a lower level of acute service use than non-ELE enrollees.[32]  The findings for Alabama add to the literature by showing that for certain small, vulnerable subpopulations such as children with depression, ELE implementation led to improved continuity of Medicaid coverage, which can help to ensure timely access to outpatient care, such as visits to MH specialists or filled antidepressant prescriptions. Likely due to the improved coverage continuity, ELE also reduces the use of high-cost emergency care, potentially by preventing negative health events (e.g., suicide attempts) during the treatment period when children have a high need for care to manage depressive symptoms. A similar observation has been made in prior research focusing on ambulatory care sensitive conditions and major depression.[37,61,62] Notably, the current study identifies the effect of the manual ELE

processes implemented in 2009. As more recent data become available, more research will be needed to understand how Alabama's automated ELE processes adopted in 2013 impact coverage and utilization, and how such impact differs from the state's earlier manual ELE processes.

In Louisiana, the ELE processes had a counterintuitive positive effect on the likelihood of coverage disruption and the use of MH-related ED service, and had no effect on other outcomes. These results may be attributed to the earlier successes of other eligibility programs in Louisiana, which had already significantly reduced the state's Medicaid disenrollment to a very low level prior to the adoption of ELE (i.e., 2.7% [versus 10.2% in Alabama]; Table 3.3).[34,35] Moreover, recent studies have shown that there were significant up-front investment and technology renovation to setup the state's eligibility system when ELE was initiated for eligibility renewal in Louisiana.[34,63] In contrast, no such technology investment was needed when Alabama started ELE.[33] Therefore, the initial technology setup and the associated administrative complexities may partially explain the findings in Louisiana.  Likewise, compared to the ELE processes in Alabama, which partnered with both TANF and SNAP, Louisiana's ELE was built on the database from SNAP only, possibly limiting the improvement in administrative efficiency.  Lastly, the findings may also relate to the short post-ELE period for Louisiana in the data. It may take a longer time for a policy to fully come into effect. Indeed, the descriptive trend for Alabama showed that the decrease in the rate of MH-related ED use did not become pronounced until several months after the ELE adoption date.  Therefore, future studies should use longer data periods to provide a more

complete evaluation of the ELE process in Louisiana and identify its long-term impact on coverage and utilization in vulnerable youth.

Under the ACA, states are encouraged to replace the paper-driven recertification processes with a more efficient technology system that facilitates linkages of reliable electronic data sources to determine eligibility.[12] This focus of the ACA aims to reduce the burden of re-enrollment procedures for families  as a way to maximize the ongoing coverage and reduce the possibility that eligible individuals lose coverage due to administrative reasons.[12] Several states that had already used ELE prior to the ACA have continued their ELE processes to determine Medicaid beneficiaries' eligibility.[13]

Under the proposals currently being debated in the Congress, however, the provisions that simplify enrollment and promote retention may be rolled back with the potential repeal of the ACA and the proposed Medicaid cuts over the coming years.[64] As states consider implementing ELE or other similar automated processes, this study suggests that through cross-agency data sharing – particularly as implemented in Alabama's ELE processes – improving the continuity of Medicaid coverage among youth with depression is possible, and may result in a spillover effect on the reduction in use of high-cost emergency care.

Results of this analysis should be interpreted with caution. Measurement errors may occur as with all studies using claims based data.[65,66] In addition, with the MAX data, no information is available regarding service use and outcomes during the disenrollment period upon losing Medicaid nor the services reimbursed by payers other than Medicaid.  Thus, while the MAX Files remain the best data source available to understand insurance stability among low-income vulnerable youth and service

utilization patterns in the Medicaid system, I cannot determine the entire service use patterns of a child. Furthermore, ELE processes vary substantially across states, which may or may not require beneficiaries to attest to and validate their eligibility related information.[12,32,67-69] Therefore, results generated from two Southern states may not necessarily generalize to ELE processes in other states. Nonetheless, the multistate MAX data support a quasi-experimental design and a rigorous estimation of state-wide changes in Medicaid eligibility processes.

## VI. Conclusion

Results from this difference-in-difference analysis indicate there was substantial cross-state heterogeneity in the effect of ELE implementation. ELE implementation in Alabama had a significant effect on reducing the likelihood and duration of disruptions in Medicaid coverage during the treatment period for youth with a depression diagnosis. On the other hand, ELE implementation in Louisiana was associated with counterintuitive increases in disenrollment rate and use of MH-related ED visits, and had no effect on other outcomes. As states continue their efforts to streamline enrollment and promote retention, similar strategies as implemented in Alabama's ELE processes merit consideration. Further, the counterintuitive and null effects of ELE in Louisiana suggest that the large variation in how states operate ELE may result in disparate impacts on youth with MH needs. More research is needed to investigate the heterogeneity in the long-term effect of ELE on this vulnerable population.

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**Figure 3.1:** Trends in the Rate of Medicaid Coverage Discontinuities and Acute Care Utilization Before and After the Implementation of Express Lane Eligibility among Medicaid-Insured Children with Depression, By the Month of the Index Date of Depression Diagnosis

**Panel A:**



Any Disruption in Medicaid Coverage



Any Mental Health Related Emergency Department Visit



Any Mental Health Related Inpatient Episode
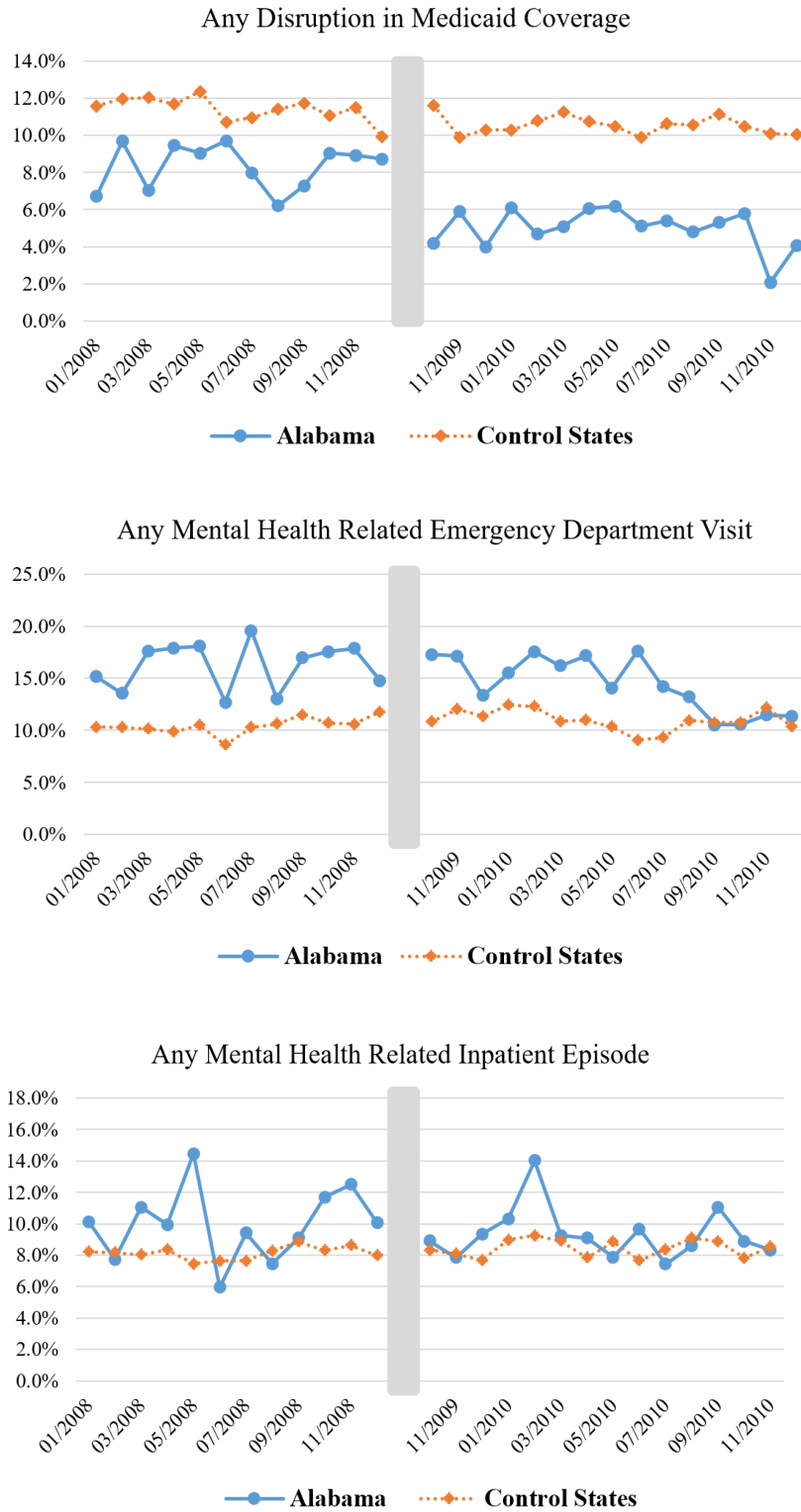
**Figure 3.1 (Continued):** Trends in the Rate of Medicaid Coverage Discontinuities and Acute Care Utilization Before and After the Implementation of Express Lane Eligibility among Medicaid-Insured Children with Depression, By the Month of the Index Date of Depression Diagnosis

**Panel B:**



Any Disruption in Medicaid Coverage



Any Mental Health Related Emergency Department Visit



Any Mental Health Related Inpatient Episode

**Table 3.1:** Sample characteristics of Medicaid-insured children (≤ 18 years) with depression in Alabama and control states

| Sample characteristics | Unweighted | | | Propensity Score Weighted | | |
|---|---|---|---|---|---|---|
| | AL | Control | *P-value* | AL | Control | *P-value* |
| | (N= 4,683) | (N= 77,896) | | (N= 4,683) | (N= 77,896) | |
| **Demographics** | | | | | | |
| Age (years) | 13.4 (2.9) | 12.8 (3.2) | 0.000 | 13.4 (2.9) | 13.4 (3.0) | 0.689 |
| Female (versus male), % | 57.5 | 53.3 | 0.000 | 57.5 | 57.5 | 0.975 |
| | | | | | | |
| **Race/ethnicity** | | | 0.000 | | | 0.985 |
| Non-Hispanic White | 59.3 | 45.0 | | 59.4 | 59.6 | |
| Non-Hispanic Black | 35.8 | 28.2 | | 35.7 | 35.4 | |
| Hispanic | 1.8 | 20.8 | | 1.8 | 1.8 | |
| Non-Hispanic Other | 0.6 | 1.0 | | 0.6 | 0.7 | |
| Unknown | 2.5 | 5.0 | | 2.5 | 2.6 | |
| | | | | | | |
| **Health plan type, %** ¶ | | | 0.000 | | | 0.810 |
| Fee-for-service only | 1.5 | 13.9 | | 1.5 | 1.5 | |
| Any behavioral healthcare carve-out plan | -- | 0.5 | | -- | -- | |
| Comprehensive managed care plan | 38.4 | 46.9 | | 38.4 | 38.8 | |
| Primary care case management (no carve-out) | 14.9 | 11.0 | | 14.9 | 15.3 | |
| More than one type of plan | 45.2 | 27.7 | | 45.1 | 44.4 | |
| | | | | | | |
| **Eligibility type, %** | | | 0.000 | | | 0.895 |
| Blind / disabled | 16.4 | 10.0 | | 16.4 | 16.6 | |
| Foster care | 7.0 | 16.8 | | 7.0 | 7.1 | |
| Other eligibility type‡ | 76.5 | 73.3 | | 76.6 | 76.3 | |
| | | | | | | |
| **Mental health comorbidity, %** | | | | | | |
| Major depressive disorder (vs. no) | 39.8 | 50.0 | 0.000 | 39.8 | 39.9 | 0.858 |
| Dysthymia (vs. no) | 9.4 | 14.7 | 0.000 | 9.3 | 9.2 | 0.734 |
| Attention deficit hyperactivity disorder (vs. no) | 37.2 | 39.0 | 0.017 | 37.2 | 37.3 | 0.911 |
| Conduct disorder / oppositional defiant | 25.6 | 31.1 | 0.000 | 25.6 | 25.7 | 0.906 |
| Anxiety disorder (vs. no) | 30.2 | 16.4 | 0.000 | 30.2 | 30.5 | 0.708 |
| Bipolar disorder (vs. no) | 26.3 | 28.5 | 0.001 | 26.3 | 26.7 | 0.542 |
| Schizophrenia / other psychotic disorder (vs. no) | 8.3 | 4.3 | 0.000 | 8.2 | 8.6 | 0.377 |
| Substance abuse disorder (vs. no) | 8.1 | 4.4 | 0.000 | 8.1 | 8.3 | 0.685 |
| Other mental health disorder (vs. no) | 42.2 | 45.0 | 0.000 | 42.2 | 42.5 | 0.670 |

**Table 3.1 (Continued)**: Sample characteristics of Medicaid-insured children (≤ 18 years) with depression in Alabama and control states

| Sample characteristics | Unweighted | | | Propensity Score Weighted | | |
|---|---|---|---|---|---|---|
| | AL (N= 4,683) | Control (N= 77,896) | *P-value* | AL (N= 4,683) | Control (N= 77,896) | *P-value* |
| **Physical health comorbidity, %** | | | | | | |
| Asthma (vs. no) | 19.7 | 14.4 | 0.000 | 19.6 | 19.7 | 0.873 |
| Any other chronic condition# (vs. no) | 7.5 | 5.2 | 0.000 | 7.4 | 7.8 | 0.380 |
| | | | | | | |
| **County-level characteristics,** | | | | | | |
| Location in urban/suburban (vs. rural) county, % | 86.7 | 89.3 | 0.000 | 86.7 | 86.7 | 0.985 |
| Percentage of residents living in poverty, mean (SD) | 18.5 (4.8) | 17.5 (6.5) | 0.000 | 18.5 (4.8) | 18.5 (6.1) | 0.712 |
| No. of community health centers per 100K residents, mean (SD) § | 4.3 (5.1) | 4.1 (8.3) | 0.098 | 4.3 (5.1) | 4.3 (7.4) | 0.995 |
| No. of primary care physicians per 100K residents, mean (SD) | 57.3 (24.0) | 61.2 (28.5) | 0.000 | 57.3 (24.0) | 57.8 (29.9) | 0.228 |
| No. of psychiatrists per 100K residents, mean (SD) | 5.9 (6.3) | 8.4 (11.2) | 0.000 | 5.9 (6.3) | 5.8 (6.8) | 0.937 |

*Notes*: SD: Standard Deviation; AL: Alabama. N=82,579

¶ No children residing in Alabama in the analytic sample were enrolled in any behavioral healthcare carve-out plan; in the propensity analysis, 368 observations (i.e., children in the control states who were enrolled in any behavioral healthcare carve-out plan) were excluded due to the perfect prediction issue.

‡ "Other eligibility type" included children eligible for Medicaid based on household income, classified as "medically needy," and/or other criteria specified in each state's Section 1115 waiver.

# "Other chronic conditions" included cerebral palsy, cystic fibrosis, diabetes, spina bifida, seizure disorder, congenital heart disease, sickle cell disease, and malignant neoplasms.

§ Community health centers include federally qualified health centers and rural health clinics.
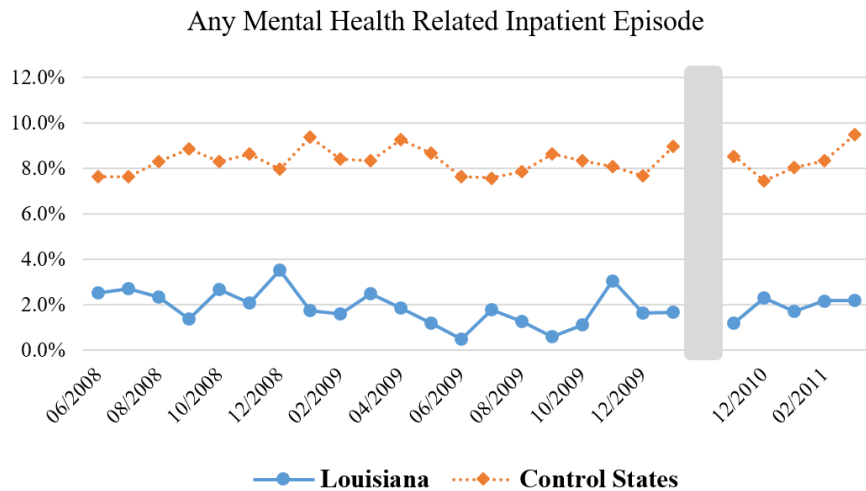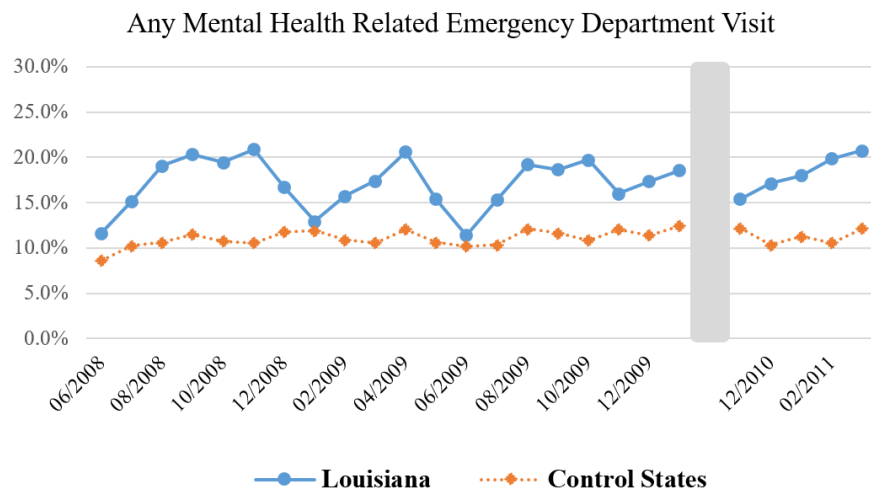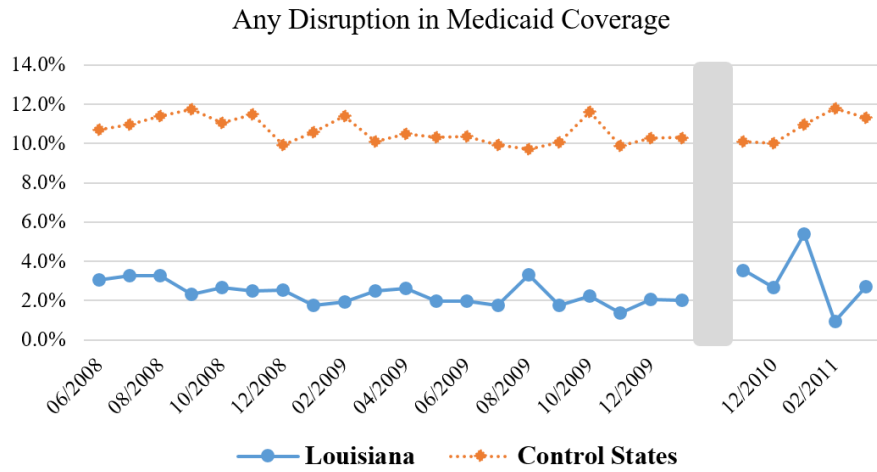
**Table 3.2:** Sample characteristics of Medicaid-insured children (≤ 18 years) with depression in Louisiana and control states

| Sample characteristics | Unweighted | | | Propensity Score Weighted | | |
|---|---|---|---|---|---|---|
| | LA (N= 5,394) | Control (N= 58,468) | *P-value* | LA (N= 5,394) | Control (N= 58,468) | *P-value* |
| **Demographics** | | | | | | |
| Age (years) | 13.4 (2.7) | 12.8 (3.2) | 0.010 | 13.4 (2.7) | 13.4 (2.9) | 0.731 |
| Female (versus male), % | 54.9 | 53.1 | 0.000 | 54.9 | 54.6 | 0.743 |
| **Race/ethnicity, %** | | | 0.000 | | | 0.997 |
| Non-Hispanic White | 55.9 | 45.5 | | 55.9 | 56.0 | |
| Non-Hispanic Black | 38.4 | 28.7 | | 38.4 | 38.3 | |
| Hispanic | 1.2 | 20.2 | | 1.1 | 1.1 | |
| Non-Hispanic Other | 0.9 | 1.0 | | 0.9 | 0.9 | |
| Unknown | 3.6 | 4.5 | | 3.6 | 3.7 | |
| **Health plan type, %** ¶ | | | 0.000 | | | 0.933 |
| Fee-for-service only | 16.7 | 14.8 | | 16.7 | 16.5 | |
| Any behavioral healthcare carve-out plan | -- | 0.5 | | -- | -- | |
| Primary care case management (no carve-out) | 67.7 | 12.1 | | 67.7 | 67.9 | |
| Comprehensive managed care plan or more than one type of plan | 15.6 | 72.6 | | 15.6 | 15.6 | |
| **Eligibility type, %** | | | 0.000 | | | 0.923 |
| Blind / disabled | 12.4 | 10.5 | | 12.4 | 12.5 | |
| Foster care | 7.3 | 17.2 | | 7.3 | 7.2 | |
| Other eligibility type‡ | 80.3 | 72.2 | | 80.3 | 80.4 | |
| **Mental health comorbidity, %** | | | | | | |
| Major depressive disorder (vs. no) | 44.2 | 50.5 | 0.000 | 44.2 | 44.3 | 0.906 |
| Dysthymia (vs. no) | 6.9 | 15.2 | 0.000 | 6.9 | 6.9 | 0.824 |
| Attention deficit hyperactivity disorder (vs. no) | 43.2 | 39.7 | 0.000 | 43.2 | 43.5 | 0.713 |
| Conduct disorder / oppositional defiant | 22.1 | 32.1 | 0.000 | 22.1 | 22.0 | 0.951 |
| Anxiety disorder (vs. no) | 26.3 | 17.1 | 0.000 | 26.3 | 26.7 | 0.522 |
| Bipolar disorder (vs. no) | 25.6 | 29.9 | 0.000 | 25.6 | 25.6 | 0.995 |
| Schizophrenia / other psychotic disorder (vs. no) | 6.1 | 4.6 | 0.000 | 6.1 | 6.1 | 0.801 |
| Substance abuse disorder (vs. no) | 5.2 | 5.6 | 0.158 | 5.2 | 5.1 | 0.844 |
| Other mental health disorder (vs. no) | 28.4 | 45.8 | 0.000 | 28.4 | 28.3 | 0.846 |

**Table 3.2 (Continued)**: Sample characteristics of Medicaid-insured children (≤ 18 years) with depression in Louisiana and control states

| Sample characteristics | Unweighted | | | Propensity Score Weighted | | |
|---|---|---|---|---|---|---|
| | LA (N= 5,394) | Control (N= 58,468) | *P-value* | LA (N= 5,394) | Control (N= 58,468) | *P-value* |
| **Physical health comorbidity** | | | | | | |
| Asthma (vs. no), % | 14.1 | 14.3 | 0.718 | 14.1 | 14.0 | 0.852 |
| Any other chronic condition(vs. no), % # | 5.3 | 5.3 | 0.820 | 5.3 | 5.4 | 0.740 |
| | | | | | | |
| **County-level characteristics** | | | | | | |
| Location in urban/suburban (vs. rural) county, % | 92.0 | 88.9 | 0.000 | 92.0 | 92.0 | 0.875 |
| Median household income ($10,000), mean (SD) | 4.3 (0.7) | 4.7 (1.2) | 0.000 | 4.3 (0.7) | 4.2 (0.9) | 0.083 |
| No. of community health centers per 100K residents, mean (SD) § | 4.2 (5.7) | 4.2 (8.4) | 0.870 | 4.2 (5.7) | 4.2 (7.3) | 0.608 |
| No. of primary care physicians per 100K residents, mean (SD) | 59.6 (26.4) | 61.7 (28.6) | 0.000 | 59.6 (26.4) | 59.5 (28.0) | 0.765 |
| No. of psychiatrists per 100K residents, mean (SD) | 8.5 (10.0) | 8.7 (11.5) | 0.184 | 8.5 (10.0) | 8.5 (10.4) | 0.907 |

*Notes*: SD: Standard Deviation; LA: Louisiana. N=63,862

¶ No children residing in Louisiana in the analytic sample were enrolled in any behavioral healthcare carve-out plan. In the propensity analysis, because of the perfect prediction issue, 310 observations (i.e., children in the control states who were enrolled in any behavioral healthcare carve-out plan) and were excluded. Also, individuals who were enrolled in comprehensive managed care plan or more than one type of plan were combined into one category due to the perfect prediction issue.

‡ "Other eligibility type" included children eligible for Medicaid based on household income, classified as "medically needy," and/or other criteria specified in each state's Section 1115 waiver.

# "Other chronic conditions" included cerebral palsy, cystic fibrosis, diabetes, spina bifida, seizure disorder, congenital heart disease, sickle cell disease, and malignant neoplasms.

§ Community health centers include federally qualified health centers and rural health clinics.

**Table 3.3:** Results for Alabama: Model-adjusted relative changes in Medicaid discontinuities, emergency department use, and inpatient services use in difference-in-difference analysis in conjunction with propensity score weighting

| | Alabama | | Control | | Adjusted Relative Change |
|---|---|---|---|---|---|
| | Before | After | Before | After | |
| | (N=2,002) | (N=2,681) | (N=34,878) | (N=43,018) | |
| | Model-adjusted Mean / Percentage | | | | Marginal Effects |
| *Discontinuity of Medicaid Coverage* | | | | | |
| Any Coverage Disruptions (vs. Continuous Enrollment), %[§] | 10.2 | 5.1 | 10.8 | 11.5 | **-5.7**\*\*\* |
| Total Days of Coverage Disruptions[¶] | 10.9 | 5.8 | 12.6 | 13.3 | **-5.8**\*\*\* |
| *Emergency Department (ED) Use* | | | | | |
| Any (≥ 1) All-cause ED Visit, %[§] | 42.9 | 45.9 | 42.8 | 45.1 | 0.7 |
| Any (≥ 1) MH-related ED Visit, %[§] | 14.8 | 15.8 | 12.8 | 15.7 | **-1.9**\* |
| No. of All-cause ED Visits[¶] | 0.89 | 0.97 | 0.95 | 1.09 | -0.06 |
| No. of MH-related ED Visits[¶] | 0.21 | 0.23 | 0.21 | 0.27 | **-0.04**\*\* |
| *Inpatient Services Use* | | | | | |
| Any (≥ 1) All-cause Inpatient Visit, %[§] | 11.7 | 12.9 | 9.8 | 12.6 | -1.6 |
| Any (≥ 1) MH-related Inpatient Visit, %[§] | 9.2 | 10.6 | 7.7 | 10.9 | -1.9 |
| No. of All-cause Inpatient Episodes[¶] | 0.16 | 0.16 | 0.14 | 0.19 | -0.04 |
| No. of MH-related Inpatient Episodes[¶] | 0.11 | 0.13 | 0.10 | 0.16 | -0.04 |
| No. of All-cause Inpatient Days[¶] | 1.42 | 1.18 | 1.03 | 1.41 | **-0.63**\*\* |
| No. of MH-related Inpatient Days[¶] | 1.23 | 1.04 | 0.84 | 1.28 | **-0.62**\* |

*Notes*: \* $p<0.05$, \*\* $p<0.01$, \*\*\* $p<0.001$; All regressions adjusted for individual-level socio-demographic and need characteristics, county-level socioeconomic status, and measures of local mental healthcare infrastructure.

[§] For dichotomous outcome measures, logit models were estimated combined with the propensity score SMR weighting.

[¶] For count outcome measures, two-part models (with a logit model in the first part and a generalized linear model with a log link and Poisson distribution in the second part) were estimated combined with the propensity score SMR weighting.

**Table 3.4:** Results for Louisiana: Model-adjusted relative changes in Medicaid discontinuities, emergency department use, and inpatient services use in difference-in-difference analysis in conjunction with propensity score weighting

| | Louisiana | | Control | | Adjusted Relative Changes |
|---|---|---|---|---|---|
| | Before | After | Before | After | |
| | (N=3,829) | (N=1,565) | (N=44,492) | (N=13,976) | |
| | Model-adjusted Mean / Percentage | | | | Marginal Effects |
| *Discontinuity of Medicaid Coverage* | | | | | |
| Any Coverage Disruptions (vs. Continuous Enrollment), %[§] | 2.7 | 3.0 | 12.0 | 10.0 | **2.3**\*\* |
| Total Days of Coverage Disruptions[¶] | 3.5 | 3.5 | 15.3 | 13.2 | 2.1 |
| | | | | | |
| *Emergency Department (ED) Use* | | | | | |
| Any (≥ 1) All-cause ED Visit, %[§] | 45.1 | 48.4 | 40.3 | 41.3 | 2.3 |
| Any (≥ 1) MH-related ED Visit, %[§] | 15.3 | 21.8 | 11.0 | 14.6 | **3.0**\*\*\* |
| No. of All-cause ED Visits[¶] | 0.92 | 1.02 | 0.83 | 0.92 | 0.02 |
| No. of MH-related ED Visits[¶] | 0.22 | 0.35 | 0.17 | 0.25 | **0.05**\*\*\* |
| | | | | | |
| *Inpatient Services Use* | | | | | |
| Any (≥ 1) All-cause Inpatient Visit, %[§] | 5.0 | 4.9 | 8.6 | 11.6 | -3.1 |
| Any (≥ 1) MH-related Inpatient Visit, %[§] | 2.1 | 2.7 | 6.9 | 10.4 | -3.0 |
| No. of All-cause Inpatient Episodes[¶] | 0.07 | 0.07 | 0.12 | 0.17 | -0.05 |
| No. of MH-related Inpatient Episodes[¶] | 0.02 | 0.04 | 0.09 | 0.15 | -0.05 |
| No. of All-cause Inpatient Days[¶] | 0.34 | 0.33 | 0.86 | 1.21 | -0.36 |
| No. of MH-related Inpatient Days[¶] | 0.10 | 0.17 | 0.73 | 1.15 | -0.35 |

*Notes*: * $p<0.05$, ** $p<0.01$, *** $p<0.001$; All regressions adjusted for individual-level socio-demographic and need characteristics, county-level socioeconomic status, and measures of local mental healthcare infrastructure.

[§] For dichotomous outcome measures, logit models were estimated combined with the propensity score SMR weighting.

[¶] For count outcome measures, two-part models (with a logit model in the first part and a generalized linear model with a log link and Poisson distribution in the second part) were estimated combined with the propensity score SMR weighting.

# CHAPTER 4

The Impact of Medicaid Churning on Healthcare Utilization Among Adults with Mental Health Disorders

**Abstract**

**Objective:** The Medicaid program is currently facing the possibility of a reduction of approximately 800 billion dollars in federal funding over the coming decade, potentially leading to loss in coverage for adults with mental health (MH) disorders. However, little is known about the dynamic relationship between Medicaid coverage churn and outpatient healthcare utilization for adult beneficiaries with mental health problems. This study examined the causal effect of loss of Medicaid coverage on outpatient care utilization and healthcare costs among adults with mental illness. Subjects: Using the 2001-2014 Medical Expenditure Panel Survey, 8,697 persons (190,961 person-months) ages 18-64 with mental illness (identified as a diagnosis of mental disorders and/or the self-reported depression or serious psychological distress) were included in the sample. **Methods:** Logit models were estimated to examine the effect of Medicaid churning on the likelihoods of having any all-cause outpatient visit and any MH-related outpatient visit per person per month. Two-part models were used to estimate total all-cause health care costs and out-of-pocket costs per person per month. To establish causality in this relationship, I used an instrumental variables (IV) approach, relying on exogenous variation in two state-level policies for identification. **Results:** In IV models, the complete loss of insurance coverage upon losing Medicaid led to significant decreases in the monthly rate of utilization of outpatient services (OR = 0.19; 95% CI = [0.16, 0.23]) and MH-related outpatient services (OR = 0.34; 95% CI = [0.25, 0.45]). Churning to no coverage also led to a decrease of $322.49 in total healthcare costs per person per month, and an increase of $4.47 in out-of-pocket costs per person per month ($p<0.05$). In contrast, no statistically significant change in service use or costs was observed as a result of churning from Medicaid coverage to private health insurance. **Conclusions:** Among low-income adults with mental illness, the complete loss of insurance coverage immediately after dis-enrolling from Medicaid leads to significant decreases in outpatient healthcare utilization.

**I. Introduction**

Medicaid is the primary source of mental health (MH) coverage in the U.S, accounting for more than one-fourth behavioral health spending in 2009.[1-3] Adults with MH problems account for about one-fifth of the adult Medicaid population but almost two-fifths of overall Medicaid spending for adults.[3] Under the Affordable Care Act (ACA), Medicaid is playing an even larger role in providing coverage for adults with mental illness.[4,5] Of adults newly eligible for Medicaid through the ACA, it has been estimated that one in seven has depressive symptoms and one in 10 has serious psychological distress.[4] Nevertheless, proposals currently being debated in the Congress would reduce federal funding to state Medicaid programs and scale back the ACA's Medicaid expansion, which could potentially make millions of people with mental illness lose Medicaid coverage and experience "churning."

"Churning" refers to either losing Medicaid coverage and becoming uninsured, or transitioning between Medicaid and other sources of insurance. Income dynamics and re-enrollment procedures are well-documented determinants of churning, especially among those with high instability in social and economic circumstances.[6] Beneficiaries can lose Medicaid if they fail to complete the recertification process required by many states biannually or annually.[6] The dynamic nature of Medicaid enrollment may also relate to the fact that Medicaid eligibility is determined by income, which can fluctuate over time. When individuals' MH status improves, they may take part-time jobs with variable hours, making them susceptible to churning when their eligibility for Medicaid is recertified.[6]

In states that opt out of the ACA Medicaid expansion, there may be large eligibility gaps for adults whose incomes are too high for Medicaid but too low to receive

tax credits to purchase insurance in the Exchange. Consequently, if income or family circumstances fluctuate, these adults may lose coverage entirely unless they qualify for a traditional category of Medicaid eligibility (e.g., low-income parents, low-income pregnant women, and the disabled).[7] Recent studies have also underscored the possibility of a new form of churning, particularly among adults in expansion states whose income was near the ACA's Medicaid eligibility threshold.[6,7] This research suggests that around half of these low-income adults may experience a change in income or family circumstances that can cause them to move between Medicaid and subsidized private insurance offered through Marketplaces.[7]

Both types of "churning" – loss of coverage entirely and transition between insurance programs – can bring challenges. Complete loss of coverage may raise issues related to affordability of care. Transitions from Medicaid to private insurance programs may also create problems for beneficiaries and providers.[7] Patients who experience program transitions may have to seek care with a new provider or make a change to their treatment regimen if their new insurance plan uses a different provider network or covers different benefits, potentially causing disruptions in the continuity of care.[7] On the other hand, if private plans offer *broader* provider networks than Medicaid,[8] clients may find it easier to see an available MH provider when they become privately insured. Further, Medicaid enrollees may be more likely to access care when they switch to private plans, because they no longer face the stigma associated with receiving public assistance.[9] Thus, it is hypothesized that the complete loss of coverage after dis-enrolling from Medicaid is likely to reduce healthcare utilization, while the direction of the impact of program switches on care use is mixed, given the competing mechanisms.

Prior research has generally reported strong negative associations between the lack of insurance and access to healthcare[10,11] In the literature specific to insurance churning, previous studies have consistently reported a positive association between interrupted Medicaid coverage and increased emergency department (ED) visits and inpatient admissions among patients with mental illness.[12-14] Notably, these studies have primarily focused on the relationship between churning and utilization of acute services upon re-enrolling in Medicaid after a coverage disruption in a single state.[12-14] Much less is known about patients' care seeking patterns during the periods of disenrollment immediately after losing Medicaid.

There is also a dearth of information about churning and its impact on access to outpatient care among patients with mental illness. Evidence has shown that the rate of utilization of outpatient MH services was significantly higher among patients with public insurance than those with no coverage at all and those with private insurance, and that uninsured patients had the lowest utilization rate.[4,15,16] However, an empirical limitation in the literature[15-17] is that churning is potentially endogenous with respect to outpatient care utilization. Omitted variables may exist due to the unmeasured individual heterogeneity, specifically the fluctuation of income, which may be correlated with both insurance status and healthcare use. Reverse causality may also exist if use of outpatient services improves patients' health status and thus reduces the value of maintaining Medicaid coverage. Failure to address these sources of endogeneity can result in an underestimation of the effect of churning on the use of outpatient services. Another estimation limitation is that point-in-time measures of health insurance and service

utilization that have been used in prior studies[18,19] may not provide a comprehensive picture of the dynamic relationship between insurance coverage and access to care.

This study contributes to the literature by using a nationwide panel survey database to examine the dynamic relationship between loss of Medicaid coverage and outpatient healthcare utilization among adults with mental illness. This analysis adds nuance to the churning literature by distinguishing patients who lost insurance coverage entirely upon dis-enrolling from Medicaid from those who switched from Medicaid to private insurance. To address the potential sources of endogeneity in the relationship of churning to healthcare use, I employed an IV approach using the exogenous variation in the state-specific policies related to Medicaid eligibility recertification procedures for identification. The findings of this analysis provide new information about the consequences of Medicaid churning among low-income adults with mental illness and inform the current debate surrounding U.S. healthcare reform.

## II. Methods

*Data and Sample*

I used the longitudinal data from Panels 6 to 18 of the Medical Expenditure Panel Survey (MEPS), which include respondents who were interviewed during 2001-2014. MEPS is a national household survey of civilian, non-institutionalized persons.[20] Respondents are interviewed five times over a two-year period,[20] and the response rate varied from 53% to 71% during my study period.[21] MEPS provides information on respondents' health services utilization and insurance status by month, as well as the individual socio-demographic characteristics by interview round or by year. Using the

county code, the MEPS data were merged with county-level measures from the Area Health Resources File (AHRF).[22] The AHRF is a national data file that provides county-level information about the local socio-demographic characteristics and healthcare resources. Using the state code, the MEPS data were also merged with state-level measures of Medicaid policy characteristics from previous published articles.[23-27]

My analytic sample was derived from a subsample of adults ages 18-64 who reported Medicaid enrollment for at least one month over their two-year follow-up period. Of these, I restricted the sample to adults with mental illness.  Consistent with prior research,[4,28,29] an adult was considered to have a mental illness if at any point in the two-year follow-up period, the respondent (1) met the level of severity for depression or serious psychological distress (SPD) as assessed by the Adult Self-Administered Questionnaire (SAQ);[4] (2) had a self-reported health condition associated with the ICD-9 codes 295-302 or 306-316; or (3) had current depression based on the Mental Component of the Short-Form 12 (SF-12) Health Survey.[28,29]

More specifically, the MEPS Adult SAQ includes the Patient Health Questionnaire two-item (PHQ-2) depression screener and the Kessler-6 (K6) scale of nonspecific psychological distress.[30,31]  PHQ-2 asks respondents how often over the past two weeks they had "little interest or pleasure in doing things" or were "feeling down, depressed, or hopeless,"[32] with possible responses ranging from 0 (not at all) to 3 (nearly every day).[32]According to prior research,[4,30,32] a summed score greater than 3 on the 0-6 scale indicates further screen for major depression. The K6 scale asks respondents how often in the past 30 days they felt symptoms, such as sadness, hopelessness, and worthlessness,[32] with possible responses ranging from 1 (none of the time) to 4 (all of the

time).[32] Prior studies have established the validity of this metric and suggested that a summed score of 13 or greater on the 0-24 scale is indicative of serious distress.[4,31,33] Moreover, the Mental Health Component of SF-12 provides a weighted score based on the scoring algorithm over 12 items, and a score of 45.6 or greater indicates self-defined current depression.[28,29]

Consistent with prior research on churning, I excluded adults whose "churning cycle" – defined as a period surrounding Medicaid discontinuation when the respondent has either Medicaid, private insurance, or no coverage – was less than six months. Lastly, I excluded persons who had missing values in any of the model covariates. These exclusions yielded a final analytic sample of 8,697 adults (190,961 person-months) across all 50 states and the District of Columbia.

*Defining Churning*

The primary independent variable was a measure of Medicaid enrollment transitions (i.e., churning) using the self-reported monthly insurance enrollment data available at MEPS.  I defined churning as an initial period of Medicaid enrollment followed by a loss of Medicaid coverage (a "churning cycle"; see **Figure 4.1**). The definition of churning included respondents who became uninsured and those who were enrolled in private insurance upon leaving Medicaid.  In this analysis, I focused on changes in healthcare utilization before and after the month in which individuals churned out of Medicaid.  For those in the churning groups, I restricted the analysis period before disenrollment to include the months when the person had Medicaid, and the post-disenrollment period to the months when the respondent lacked Medicaid coverage.  For

those who experience multiple episodes of churning, I focused on healthcare use before

and after the discontinuation of Medicaid in the first churning cycle.

*Dependent Variables*

Consistent with prior studies,[4,34] outpatient healthcare utilization was measured by

a dichotomous indicator that determines, for each month, whether the respondent

received any service in an office-based or clinic setting or in a hospital outpatient

department.  Next, I created a dichotomous indicator for whether the respondent received

any MH-related services in these outpatient settings in each month. As suggested by

Garfield et al. (2011),[4] a service visit was classified as specific to MH if: (1) the

respondent reported that the main reason for the visit was for "psychotherapy or MH

counseling," (2) the visit was to a specialty MH provider, or (3) the visit was associated

with a MH diagnosis (ICD-9 codes 295–302; 305–314).

The MEPS data include the amount paid by all payers or paid out-of-pocket by

the respondent for each service visit.[34] Using this information, I created a measure of total

healthcare costs, which included the cost of office-based visits, hospital outpatient visits,

ED visits, and inpatient episodes per person per month.  Lastly, I created a measure of

total out-of-pocket costs of services delivered in these settings.

*Covariates*

To assess the relationship between churning and healthcare utilization, I created a

number of individual-level measures of predisposing, enabling, and need-related

characteristics.[35,36]  Individual predisposing characteristics were measured by age (in

years), an indicator for female (versus male) gender, a categorical variable of race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, or other race/ethnicity), and a dichotomous indicator to determine whether the respondent was married (versus not married).  Individual-level enabling factors were measured by an indicator for those who were employed (versus not) during each of the five interview rounds, a continuous variable of total personal income in each year, and a mutually exclusive categorical variable of education status ([1] less than high school, [2] high school diploma, [3] some college, or [4] bachelor's degree or more advanced degree).

To measure individual-level need-related characteristics, I also included a dichotomous indicator to determine whether the respondent reported "good," "very good," or "excellent" (versus "poor" or "fair") perceived MH status during each interview round to capture the fluctuation in the course of mental illness that may be correlated to churning and care use. Consistent with previous research,[37] I also included several indicators to determine whether respondents reported that they had ever been diagnosed by a doctor or other health professional as having a specific chronic medical condition over the year: (1) diabetes, (2) asthma, (3) high blood pressure, or (4)  heart disease (including coronary heart disease, heart attack [myocardial infarction], angina, and any other heart condition).  Moreover, I included a continuous variable of the physical component summary score of the of the SF-12 Health Survey in Round 2 and Round4 of interview.[4,38]  Finally, in each interview round, the survey ascertained whether the respondent had problems making decisions, required supervision for their own safety, or experienced confusion or memory loss.[37] Using this survey question, an indicator was

derived for whether the respondent answered yes to any of these items to measure

cognitive limitation.[37]

To measure the socioeconomic status of the local community, which may relate to

insurance stability and access to care, I included the percentage of county residents living

in poverty in each year.  To measure the macroeconomic downturn that occurred during

my study period, I also included the county-level unemployment rate in each year.

Finally, I derived continuous variables to measure the geographic accessibility to local

MH care resources, including the numbers of psychiatrists and community health centers

(federally qualified health centers and rural health clinics) per 100,000 county residents

in each year.

*Analytic Strategy*

I employed panel data to examine the change in healthcare utilization and costs

following Medicaid discontinuation.  I conducted separate analyses for those who lost

coverage entirely and for those who transitioned to private insurance. For each outcome

variable, I estimated the following models for person $i$ in month $t$:

$$Y_{it} = \delta_1 \, Unins_{it} + S_t + T_y + X_{it} + \varepsilon_{it}$$

$$Y_{it} = \alpha_1 \, Private_{it} + S_t + T_y + X_{it} + \varepsilon_{it}$$

where $Y_{it}$ is a dependent variable (e.g., any office-based visit). $Unins_{it}$ is a dichotomous

indicator that equals one if person $i$ has discontinued Medicaid and become uninsured

during month $t$. $Private_{it}$ is an indicator that equals one if person $i$ has transitioned from

Medicaid to private insurance in month $t$.   $\delta_1$ identifies the mean effect on $Y_{it}$ of

switching from Medicaid to no coverage.  $\alpha_1$ measures the mean impact of transitioning

from Medicaid to private plans.   In all models, I controlled for the individual- and

county-level measures of sociodemographic or need-related characteristics ($X_{it}$) that may

be correlated with both insurance status and outpatient healthcare utilization.  Moreover,

the models included the season-specific indicators ($S_t$) to control for seasonal variation,

and the year indicators ($T_y$) to account for national trends and common shocks related to

insurance coverage and service use.

When examining dichotomous measures of healthcare utilization, I estimated logit

models and present the results as odds ratio. When examining healthcare costs, I used

two-part models with a logit model in the first part and a generalized linear model with a

log link and gamma distribution in the second part. The two-part model was selected to

address the skewed distribution of costs with a large proportion of zeros was well as any

heteroskedasticity.[39-41] I also conducted the Modified Park test, which recommends a

family given a link function,[42] and the test results were consistent with the modeling

choice. In the two-part model regressions, marginal effects were calculated at the

observed value of model predictors, using the "margins" command in Stata Statistical

Software,[43] for ease of interpretation.

To examine the impact of loss of Medicaid coverage and becoming uninsured on

outpatient healthcare utilization, I compared the service utilization rate (or cost) between

the uninsured months and the Medicaid-enrolled months among adults who dis-enrolled

from Medicaid with no alternative source of insurance coverage and those with

continuous Medicaid enrollment. To select those in the continuous group that are

demographically similar to those who lost Medicaid and become uninsured, I used a

propensity score matching (PSM) method to match this churning group and the

continuously-enrolled group, based on the individual- and county-level characteristics described above, and only included those in the continuous group who can be matched with those in the churning group.[44] Likewise, to examine the impact of switching to private coverage, I compared service use patterns between the privately-insured months and Medicaid-enrolled months among adults who transitioned from Medicaid to a private plan and those in the continuous group. The PSM method was also used to select those in the continuously-enrolled group that can be matched with those in the group that transitioned to private insurance.[44]

A potential concern of this analysis is that churning may be endogenous to outpatient care use due to reverse causality and omitted variable bias. First, omitted variables bias may exist, such as the fluctuation in individuals' income during the study period. An increase in income may disqualify a person from Medicaid, and may also raise the purchasing power and thus the demand for health services of a consumer. Failure to adjust for the individual heterogeneity may bias estimates of the relationship between churning and outpatient care use toward the null hypothesis. Moreover, utilization of outpatient services could improve patients' health status, thereby reducing the value of reapplying to Medicaid at eligibility renewal periods. Therefore, reverse causality may exist, which may also bias the estimate towards the null hypothesis and underestimate the churning effect on outpatient care use.

To address the endogeneity of churning with respect to outpatient healthcare use, I performed a two-stage residual inclusion instrumental variable (2SRI-IV) analysis. In an instrumental variable (IV) framework, the 2SRI-IV approach generates consistent estimators for nonlinear models, such as the logit and two-part models. In the first stage,

I estimated a linear model for the endogenous *Unins*$_{it}$ (or *Private*$_{it}$), which was instrumented with the state-level policy indicators related to Medicaid recertification procedures (*IV*$_{st}$). In the second stage, a logit or two-part model was used to estimate the effect of churning on the outcome, and the residual predicted from the first stage was included as an additional control variable. To account for the error in the residual, I bootstrapped standard errors in all regression models.[34,45] The 2SRI-IV model specifications are presented as follows:

(*First Stage*)    $Unins_{it} = IV_{st} + S_t + T_y + X_{it} + \varepsilon_{it}$

(*Second Stage*)    $Y_{it} = \delta_1 Unins_{it} + S_t + T_y + X_{it} + \widehat{\varepsilon_{it}} + u_{it}$

*or*

(*First Stage*)    $Private_{it} = IV_{st} + S_t + T_y + X_{it} + \varepsilon_{it}$

(*Second Stage*)    $Y_{it} = \alpha_1 Private_{it} + S_t + T_y + X_{it} + \widehat{\varepsilon_{it}} + u_{it}$

The 2SRI-IV analysis relies on the exogenous variation in churning induced by instruments to establish, statistically, a causal relationship between churning and outpatient care utilization or healthcare costs.[46] The IV estimates are consistent and unbiased only if the instruments are strongly related to churning and otherwise unrelated to outpatient care use.[46] Thus, I used two state-level indicators for (1) whether the state required Medicaid recertification annually ("streamlined" re-enrollment versus recertification every six months or more frequently), and (2) whether the state eliminated the requirement of face-to-face interviews at renewal ("streamlined" re-enrollment versus adopting face-to-face interviews). My choice of IVs was guided by robust research indicating that the streamlined re-enrollment policies are strongly related to a reduction in Medicaid churning and do not directly influence healthcare utilization.[9,47,48] For all

analyses, I tested the validity of the IVs based on the $F$-statistics and partial $R^2$ for the instruments.[46]

To further justify the credibility of the IVs, I also conducted an IV falsification test, testing the direct "impact" of the two state re-enrollment policies on the outcome variables, in reduced-form models, only among those who had continuous Medicaid coverage throughout the two-year follow-up period. I would expect no significant policy effect on the outcomes among this alternative sample. In addition, in the 2SRI-IV models estimating churning to no coverage, the use of both policy indicators as the instruments allowed for over-identification tests. The test results suggested that we did not reject the null hypothesis that the instruments are valid at the 5% significance level.

## III. Results

*Sample Characteristics*

My sample consisted of 2,738 persons (50,897 person-months) who experienced churning and become uninsured, 556 persons (10,392 person-months) who transitioned from Medicaid coverage to a private plan, and 5,403 persons (129,672 person-months) who were continuously enrolled in Medicaid throughout the two-year follow-up period. Compared to the continuously-enrolled group, adults in the churning groups were younger; had higher average personal income; were more likely to be married and employed and to report good/excellent MH status; had higher SF-12 physical health summary scores (indicating better health status); and were less likely to have any cognitive limitation or chronic medical conditions (p-values<0.01). (**Table 4.1**) The churning groups were also more likely than the continuous group to live in communities

with fewer residents in poverty, a lower unemployment rate, and fewer safety net facilities (p<0.01). Moreover, compared to the continuous group, the churning groups had lower unadjusted rates of outpatient service utilization, *lower* unadjusted mean values of total costs per person per month, and *higher* unadjusted mean values of out-of-pocket costs per person per month (p<0.01).

Furthermore, the churning groups were *less* likely to reside in states that required annual recertification (i.e., "streamlined" eligibility renewal procedure, versus recertification every six months or more frequently) (p<0.01). The magnitude of this difference was larger when comparing the continuous group with those that churned to no coverage (rather than those that transitioned to private plans). Likewise, the churning groups were *less* likely than the continuous group to live in states that eliminated the face-to-face interview requirements at renewal ("streamlined" procedure, versus states requiring a face-to-face interview) (p<0.01). In the sample, about 34% of adults lived in states that required recertification more frequently than annually, and 15% lived in states that did not eliminate the face-to-face interview requirements at renewal. I used the exogeneous, intertemporal and cross-state variation in these instruments to identify the unbiased churning effect on outpatient healthcare utilization in the 2SRI-IV analysis.

*Association between State Re-enrollment Policies and Churning*

In the first stage of my 2SLS-IV analysis, I estimated the association between the re-enrollment policy measures and the likelihood of Medicaid churning. In the model that used both policy indicators as the instruments, after adjusting for the individual- and county-level covariates, respondents residing in the states that required annual eligibility

recertification were 3.0 percentage-points less likely to lose Medicaid and become uninsured, compared to those living in the states that required recertification very six months or more frequently (27.1% versus 30.1%, p<0.01). (**Table 4.2 Model 3**) Likewise, respondents residing in the states that eliminated the face-to-face interview requirements had a reduction of 3.6 percentage-points in the likelihood of churning from Medicaid coverage to no coverage at all, compared to those living in the states that required a face-to-face interview at renewal (26.5%% versus 30.1%, p<0.01).

The magnitude of these absolute percentage-point differences can be further clarified with relative differences. More specifically, living in states with annual (versus more frequent) recertification was significantly associated with a 10.0% (i.e., 3.0/30.1) reduction in the likelihood of churning to no coverage. Similarly, living in states that eliminated face-to-face interviews at recertification was significantly associated with a 12.0% (i.e., 3.6/30.1) decrease in the likelihood of churning from Medicaid to no coverage. The partial F-statistics for the IVs was 76.8 for the renewal frequency indicator, and was 58.7 for the face-to-face interview indicator. Both F-statistics were well beyond the conventional level supporting a valid instrument.[49] Similar results were observed in the models that used either the renewal frequency policy or the face-to-face interview policy as the IV. (**Table 4.2 Model 1-2**)

When including both policy instruments in the model that estimated program transition, living in states with annual (versus more frequent) recertification was significantly associated with a 18.4% (i.e., 5.4/29.4) reduction in the likelihood of transitioning from Medicaid to private insurance. Similarly, living in states that eliminated face-to-face interviews was significantly associated with a 12.9% (i.e.,

3.8/29.4) decrease in the likelihood of transitioning to private coverage. (**Table 4.3 Model 3**) In a slightly different model specification that used either policy instrument, results were similar in both direction and significance. (**Table 4.3 Model 1-2**) In all models, the F-statistics of the instruments satisfied the conventional level for a valid instrument.[49]

Finally, in the IV falsification tests, I found no significant relationship between the two policy instruments and the outcome measures among those who were continuously on Medicaid throughout the two-year follow-up period (**Appendix Table 4C**).[50]

*Relationship of Churning to Healthcare Utilization*

I first provided a naïve estimation of the churning effect on outpatient care utilization, ignoring the potential sources of endogeneity. I graphically depicted the trend of the monthly utilization rate of health services during the five months immediately before and after the churning point [i.e., the zero point on the horizontal axis] for the two churning groups, or the mid-point of Medicaid enrollment [i.e., the zero point] for those who were continuously enrolled for two years. (**Figure 4.2**) For the churning groups, to the left of the zero point, I depicted their average service utilization rate in months when they had Medicaid coverage; to the right of the zero point, I depicted the average service use rate during months when they were uninsured or enrolled in private plans.

Among those that lost Medicaid and became uninsured, the average utilization rate of any outpatient service and any MH-related outpatient service decreased during the five uninsured months after disenrollment, compared to the earlier Medicaid-enrolled

months. (**Figure 4.2**) Of the group that transitioned to private insurance, there was also a slight decrease in the utilization rate of any outpatient service in the five months with private insurance versus the earlier Medicaid-enrolled months. No significant change was observed across time in the monthly rate of MH-related outpatient service use in the group that churned to private insurance. Notably, the utilization rate of outpatient services remained steady among those with continuous Medicaid enrollment.

Results from the 2SRI-IV models indicated that those who churned from Medicaid coverage to no insurance coverage had significantly lower odds of receiving any outpatient service (OR = 0.19; 95% CI = [0.16, 0.23]) and any MH-related outpatient service (OR = 0.34; 95% CI = [0.25, 0.45]) during the uninsured months than in the Medicaid-covered months. (**Table 4.4**) Moreover, the total per person per month costs during the uninsured months were $322.5 *lower* than in the Medicaid-covered months (p-values<0.01). (**Table 4.5**) The monthly out-of-pocket costs during the uninsured months were $4.5 *higher* than in the Medicaid-covered months (p-values<0.05). These results remained similar in both direction and significance in the IV models using either the renewal frequency policy or the face-to-face interview policy as the IV (**Appendix Tables 4A-4B**).

The magnitude of the estimated reductions in outpatient services use and total healthcare costs in the IV models was larger than the estimates in the models without applying the IV approach. (**Tables 4.4-4.5**) For example, in the model that did not use the IV method, the total per person per month costs during the uninsured months was $202.8 lower (versus $322.5 lower in the 2SRI-IV model) than in the Medicaid-covered months.

Finally, in the IV models, I did not find any evidence that transitioning to private plans had an impact on outpatient services utilization or healthcare costs.

## IV. Discussion

Using national data, this study provides one of the most rigorous estimates of the causal effect of Medicaid churning on outpatient healthcare utilization among low-income adults with mental illness. It specifically examines the differential changes in outpatient care use that occur when adult Medicaid beneficiaries become uninsured or transitioned to private plans after losing Medicaid. Results from this analysis suggest that for these vulnerable adults, their monthly rate of utilization of outpatient services and the total monthly costs declined substantially during the uninsured months immediately after discontinuing Medicaid coverage, compared to Medicaid-enrolled months. I also observed a small increase in out-of-pocket costs during the uninsured months after disenrollment, compared to Medicaid-enrolled months. In contrast, no significant changes were observed in outpatient service utilization or costs when individuals transitioned from Medicaid to private insurance.

The novel 2SRI-IV analysis allows for the use of nationwide data to identify the exogeneous, intertemporal and cross-state variation in two state-level policies related to eligibility recertification processes, and to use this variation to identify the causality between churning and outpatient care use. Nonetheless, the IV findings of this analysis should be interpreted with caution. The estimates associated with churning reflect a local average treatment effect. More specifically, the 2SRI-IV results concentrate in the respondents whose Medicaid coverage stability was sensitive to the instruments (i.e., two

state-specific re-enrollment polices). Thus, the results may not be generalizable to other groups, particularly those whose eligibility was less likely to be affected by the re-enrollment policies examined in this analysis.

This analysis showed that churning to no coverage substantially disrupts the utilization of outpatient services for adults with MH problems. This finding is consistent with prior studies reporting disrupted access to care among the uninsured.[10,11] When adults with mental illness lose Medicaid with no alternative source of coverage, the elevated out-of-pocket cost of care may force them to forgo routine treatment, such as skipping appointments with their providers. Consequently, the jeopardized access to care may contribute to negative health outcomes. This may be especially true for low-income adults eligible or nearly-eligible for Medicaid, for whom a small increase in their out-of-pocket costs could represent a serious financial burden. Indeed, my analysis of the monthly out-of-pocket expenses provides some preliminary evidence to support this mechanism.

I did not observe any significant change in the monthly rate of outpatient care use as a result of the transition from Medicaid coverage to private plans. On the one hand, the observed null effect of churning may reflect a mix of three mechanisms that work in opposing directions from one another. The first is the "stigma" mechanism, which hypothesizes that switching from Medicaid to private insurance could increase use of care because patients no longer face the sigma of receiving public assistance. The second is the "network breadth" mechanism, hypothesizing that the larger breadth of provider network offered by private plans may also facilitate care access. The third is the "network change" mechanism, which hypothesizes that changes in provider network and covered

benefits resulting from program transitions could disrupt timely access to care, at least in the short term. On the other hand, the insignificant results may be also due to the small sample size of the respondents who churned to private plans identified from the MEPS data, which limits the statistical power to detect the significance of my estimates. More research is needed to utilize larger samples and provide more accurate estimation of the effect on outpatient care use of transitions between Medicaid and private programs among low-income vulnerable adults.

The results of this analysis may have important policy implications. Proposals that are currently being debated in the Congress would reduce federal funding for the Medicaid expansions under the ACA.[51,52] If states do not maintain sufficient financial support to continue the ACA's expansion due to cuts in federal funding, state policymakers may be faced with the decision to partially or entirely reverse the expansion. Consequently, millions of individuals, including those with severe mental disorders, who have gained MH coverage through the ACA's Medicaid expansion, could lose Medicaid coverage and become completely uninsured.[4,53,54] Thus, if the ACA's Medicaid expansion is scaled back and the churning and uninsured rates increase for those with mental illness, these findings indicate that these individuals would be less likely to use any outpatient services as well as any outpatient services for their MH problems. The lack of outpatient care could ultimately result in poorer outcomes for these individuals.

Furthermore, findings from the first stage of the IV analysis suggest that the state-specific policies that streamline eligibility procedures – annual recertification and elimination of face-to-face interviews at review – were strongly associated with

decreased Medicaid churning rates for adults with mental illness.  Under the ACA, states

are required to streamline enrollment processes and to recertify Medicaid eligibility no

more frequently than annually for those whose eligibility is based on income. As of

January 2015, all states have eliminated biannual (or more frequent) recertification and

face-to-face interviews at renewal.[55]  However, the current proposals would reinstate

more frequent eligibility renewals and give states more authority in restructuring their

Medicaid programs.[51,52] The findings of this study suggest that the proposed policies

could exacerbate Medicaid churning for those with MH needs, which, in turn, may

jeopardize patients' access to outpatient care if they become uninsured after losing

Medicaid coverage.

Several study limitations are noted.  First, I do not have information on the

reasons churning took place, which may differentially affect individuals' care-seeking

behaviors.  Individuals who lost Medicaid coverage due to fluctuations in income could

have different service use patterns than those who remained eligible but churned due to

administrative issues. However, I employed an IV approach to address the potential bias

stemming from these unobserved factors.  Second, the MEPS data are based on self-

reporting. Therefore, in this analysis, I may have included those who incorrectly reported

that they were on Medicaid and excluded enrollees who failed to report their Medicaid

coverage. Nevertheless, evidence suggests that the magnitude of this type of

measurement error has a small effect on estimates of insurance type among Medicaid

enrollees.[56] Similarly, previous studies have shown that the MEPS respondents may

underreport their service use, particularly in office-based settings and among low-income

respondents.[57]  Yet, because these respondents consistently underreport service use over

time, there is no reason to believe that the estimated association between churning and service utilization is biased by this measurement error.[6]

Further, MEPS follows a respondent for up to two years, which limits the ability to explore the long-term effect of churning. Nonetheless, the MEPS data are the best available source of information on monthly churning patterns and access to outpatient care during periods of Medicaid disenrollment for a nationwide cohort of adults with MH needs. Finally, I excluded season indicators from the second stage of the IV analyses in some cases because of extensive multi-collinearity. This exclusion may reduce the strength of the IV estimates.[46] Nevertheless, to the extent that the IV analysis could not fully address sources of endogeneity in the relationship between churning and outpatient care use, the results would underestimate the churning effect on reductions in outpatient services use and total costs among those with mental illness.

**V. Conclusion**

This analysis raises an important question about Medicaid churning for low-income adults with mental illness and provides new information about the churning effect for those who lose coverage entirely after discontinuing Medicaid coverage and those who transitioned from Medicaid to private plans. While no significant change in utilization was observed as a result of program transition, the complete loss of coverage upon dis-enrolling from Medicaid leads to a substantial decline in utilization of outpatient services and an increase in patients' out-of-pocket costs. In a dynamic policy environment in which policies concerning healthcare coverage may be drastically changed in the coming years, program-level or policy-level strategies will be crucial for

mitigating Medicaid churning and ensuring timely access to outpatient care for this

vulnerable population.

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**Figure 4.1:** Illustration of Churning and Continuously-enrolled Groups

| | Churning-Example 1 | Churning-Example 2 | Churning-Example 3 | Continuous Group |
|---|---|---|---|---|
| Month *1* | Medicaid | Uninsured | Medicaid | Medicaid |
| … | | | | |
| Month *m-1* | Medicaid | Medicaid | Medicaid | Medicaid |
| Month *m* | Uninsured | Medicaid | Medicaid | Medicaid |
| Month *m+1* | Uninsured | Uninsured | Private | Medicaid |
| … | | | | |
| Month *24* | Uninsured | Uninsured | Private | Medicaid |

**Figure 4.2:** Trends in Outpatient Health Services Utilization for Churning and Continuously-enrolled Groups

**Panel A:**
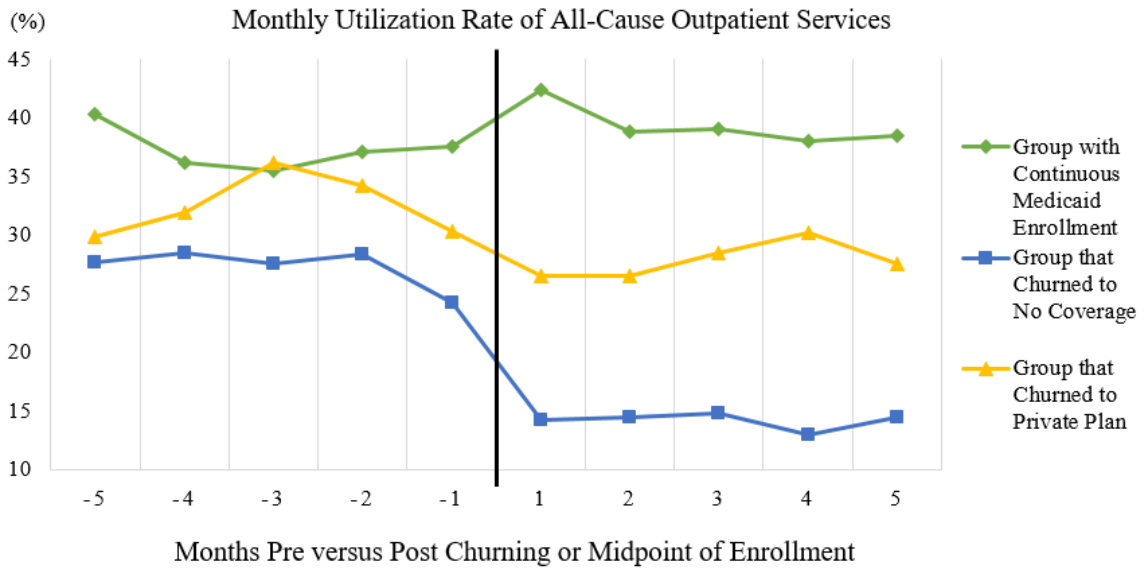


**Panel B:**

**Table 4.1:** Sample Characteristics of Adults with Mental Illness for Churning and Continuously-enrolled Groups

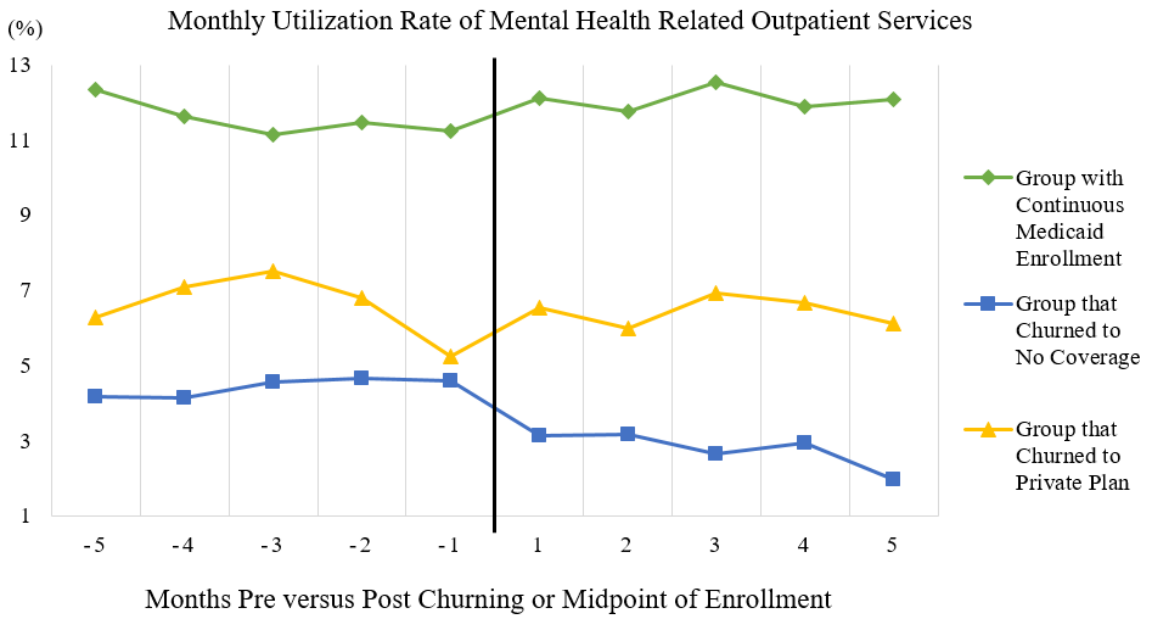| | Continuous Medicaid Enrollment [¶] | Churned Out of Medicaid and Become Uninsured [†¶] | Churned Out of Medicaid to A Private Plan [†¶] |
|---|---|---|---|
| | (N = 129,672) | (N = 50,897) | (N = 10,392) |
| *Dependent Variables* | | | |
| Any outpatient service per person month, % | 39.0 | 20.9*** | 30.5*** |
| Any MH outpatient service per person month, % | 11.9 | 3.5*** | 6.6*** |
| Total costs per person month ($), *mean (SD)* | 377.7 (2813.5) | 189.2 (2165.0)*** | 321.9 (2479.4)* |
| Out-of-pocket costs per person month ($), *mean (SD)* | 4.5 (160.1) | 11.4 (364.2)*** | 11.0 (97.8)*** |
| | | | |
| *State-level Instrumental Variables* | | | |
| Frequency of Eligibility Recertification, % | | | |
| Recertification every 6 months or more frequently | 31.6 | 39.6*** | 32.6* |
| Recertification every 12 months | 68.4 | 60.4*** | 67.4** |
| Face-to-face interview (FFI) requirement, % | | | |
| Required FFI at recertification | 14.5 | 16.9*** | 17.2*** |
| Eliminated FFI at recertification | 85.6 | 83.2*** | 82.8*** |
| | | | |
| *County-level Covariates, mean (SD)[§]* | | | |
| Percent county residents living in poverty | 16.6 (6.0) | 16.2 (5.7)*** | 15.0 (4.9)*** |
| Unemployment rate | 7.7 (2.8) | 7.5 (2.9)*** | 6.9 (2.6)*** |
| No. community health center per 100K | 3.2 (6.1) | 3.1 (6.1)*** | 2.5 (4.6)*** |
| No. psychiatrists' per 100K | 12.7 (14.9) | 11.2 (11.4)*** | 12.0 (13.1)*** |
| | | | |
| *Individual-level Covariates* | | | |
| Age, *mean (SD)[§]* | 40.8 (13.0) | 32.8 (12.2)*** | 33.9 (12.0)*** |
| Female (versus male), % | 71.0 | 72.2*** | 73.8*** |
| Race/ethnicity, % | | | |
| Non-Hispanic white | 32.5 | 31.1*** | 42.7*** |
| Non-Hispanic black | 31.2 | 24.0*** | 23.3*** |
| Hispanic | 29.3 | 39.1*** | 27.8*** |
| Other | 7.0 | 5.8*** | 6.2*** |
| Married (versus not), % | 23.7 | 31.9*** | 38.0*** |
| Employed (versus not), % | 24.1 | 51.2*** | 72.7*** |
| Personal income ($1000), *mean (SD)[§]* | 9.0 (8.8) | 9.7 (11.4)*** | 18.0 (16.9)*** |

**Table 4.1 (Continued)**: Sample Characteristics of Adults with Mental Illness for Churning and Continuously-enrolled Groups

| | Continuous Medicaid Enrollment¶ | Churned Out of Medicaid and Become Uninsured†¶ | Churned Out of Medicaid to A Private Plan†¶ |
|---|---|---|---|
| | (N = 129,672) | (N = 50,897) | (N = 10,392) |
| Education status, % | | | |
|    Less than high school | 22.6 | 16.9*** | 9.4*** |
|    High school | 58.8 | 61.6*** | 49.0*** |
|    Some college | 15.1 | 17.1*** | 26.2*** |
|    Bachelor's or more advanced degree | 3.7 | 4.4*** | 15.4*** |
| Good/excellent (versus poor/fair) self-reported mental health status, % | 65.6 | 83.2*** | 86.5*** |
| SF-12 physical health summary score | 41.2 (13.0) | 48.2 (11.1)*** | 49.4 (10.9)*** |
| Cognitive limitation (versus no), % | 23.5 | 7.0*** | 5.6*** |
| Chronic medical conditions, % | | | |
|    Diabetes (versus no) | 17.1 | 7.3*** | 6.5*** |
|    Asthma (versus no) | 22.1 | 14.8*** | 13.5*** |
|    High blood pressure (versus no) | 40.0 | 21.1*** | 19.9*** |
|    Heart disease (versus no) | 17.5 | 8.6*** | 7.7*** |

*Notes*: SD: Standard Deviation. ED: Emergency Department. N = 190,961

¶ All statistics reported in this table were calculated at the person-month level.

† Wald test used to compare value for each churning group to the continuously-enrolled group.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

**Table 4.2:** Association between State Re-enrollment Policies and Medicaid Churning to Uninsured among Adults with Mental Illness

| | Loss of Medicaid and Being Uninsured (vs. Continuous Medicaid Enrollment), % | | |
| --- | --- | --- | --- |
| | Mode 1[+] | Model 2[¶] | Model 3[†] |
| | (Intercept = 30.1%)[±#] | (Intercept = 30.1%)[±#] | (Intercept = 30.1%)[±#] |
| *State-level Instrumental Variables* | | | |
| Frequency of Eligibility Recertification | | | |
| Recertification every 6 months or more frequently | (Reference) | ---- | (Reference) |
| Recertification every 12 months | -3.3*** | ---- | -3.0*** |
| *Partial F-statistics* | *92.2\*\*\** | *----* | *76.8\*\*\** |
| *Partial $R^2$* | *0.001* | *----* | *0.001* |
| Face-to-face interview (FFI) requirement | | | |
| Required FFI at recertification | ---- | (Reference) | (Reference) |
| Eliminated FFI at recertification | ---- | -4.1*** | -3.6*** |
| *Partial F-statistics* | *----* | *73.8\*\*\** | *58.7\*\*\** |
| *Partial $R^2$* | *----* | *0.001* | *0.001* |
| | | | |
| *County-level Covariates*[§] | | | |
| Percent county residents living in poverty | 1.9*** | 1.4*** | 1.5*** |
| Unemployment rate | -3.2*** | -2.5*** | -2.8*** |
| No. community health center per 1000K | 0.3 | 0.2 | 0.3 |
| No. psychiatrists' per 1000K | -0.02 | 0.03 | 0.1 |
| | | | |
| *Individual-level Covariates* | | | |
| Age[§] | 3.8*** | 3.8*** | 3.7*** |
| Female (versus male) | -0.3 | -0.3 | -0.3 |
| Race/ethnicity | | | |
| Non-Hispanic white | (Reference) | (Reference) | (Reference) |
| Non-Hispanic black | -0.9 | -0.9 | -0.9 |
| Hispanic | -1.2** | -0.7 | -1.1* |
| Other | 1.8* | 2.5*** | 2.1** |
| Married (versus not), % | -1.9*** | -2.0*** | -1.9*** |
| Employed (versus not) | -1.7 | -1.8 | -1.6 |
| Personal income ($1000) [§] | 1.2*** | 1.3*** | 1.3*** |

**Table 4.2 (Continued)**: Association between State Re-enrollment Policies and Medicaid Churning to Uninsured among Adults with Mental Illness

| | Loss of Medicaid and Being Uninsured (vs. Continuous Medicaid Enrollment), % | | |
|---|---|---|---|
| | Mode 1[+] | Model 2[¶] | Model 3[†] |
| | (Intercept = 30.1%)[±#] | (Intercept = 30.1%)[±#] | (Intercept = 30.1%)[±#] |
| Education status | | | |
|    Less than high school | (Reference) | (Reference) | (Reference) |
|    High school | -0.7 | -0.9 | -0.7 |
|    Some college | -1.7** | -1.8** | -1.7** |
|    Bachelor's or more advanced degree | -4.4*** | -4.6*** | -4.3*** |
| Good/excellent (versus poor/fair) self-reported mental health status | 1.3** | 1.4** | 1.4** |
| SF-12 physical health summary score [§] | -0.2 | -0.2 | -0.2 |
| Cognitive limitation (versus no) | 1.5* | 1.5* | 1.4 |
| Chronic medical conditions (versus no) | | | |
|    Diabetes (versus no) | -1.2* | -1.2 | -1.3* |
|    Asthma (versus no) | -0.6 | -0.6 | -0.6 |
|    High blood pressure (versus no) | 2.7*** | 2.6*** | 2.7*** |
|    Heart disease (versus no) | -1.0 | -1.0 | -0.9 |

*Notes*: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; N = 82,030; the sample of these models contained those who churned to no coverage and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method.

[±] Model-adjusted rate of losing Medicaid and becoming uninsured per person per month.

[#] Regression model also controlled for propensity score, year indicators, and season indicators.

[+] Model estimated using a linear model (*F-statistic* = 194.2, adjusted $R^2$ = 0.077).

[¶] Model estimated using a linear model (*F-statistic* = 193.9, adjusted $R^2$ = 0.077).

[†] Model estimated using a linear model (*F-statistic* = 191.4, adjusted $R^2$ = 0.078).

[§] Continuous variables were standardized such that a one-unit increase corresponds to a one standard deviation increase in the measure above its mean value.

**Table 4.3:** Association between State Re-enrollment Policies and Medicaid Churning to Private Insurance among Adults with Mental Illness

| | Transition from Medicaid to Private Insurance (vs. Continuous Medicaid Enrollment), % | | |
|---|---|---|---|
| | Mode 1[+] | Model 2[¶] | Model 3[†] |
| | (Intercept = 29.4%)[±#] | (Intercept = 29.4%)[±#] | (Intercept = 29.4%)[±#] |
| *State-level Instrumental Variables* | | | |
| Frequency of Eligibility Recertification | | | |
| Recertification every 6 months or more frequently | (Reference) | ---- | (Reference) |
| Recertification every 12 months | -5.5*** | ---- | -5.4*** |
| *Partial F-statistics* | *54.5**** | *----* | *53.0**** |
| *Partial $R^2$* | *0.003* | *----* | *0.003* |
| Face-to-face interview (FFI) requirement | | | |
| Required FFI at recertification | ---- | (Reference) | (Reference) |
| Eliminated FFI at recertification | ---- | -4.0*** | -3.8*** |
| *Partial F-statistics* | *----* | *16.2**** | *14.6**** |
| *Partial $R^2$* | *----* | *0.001* | *0.001* |
| | | | |
| *County-level Covariates*[§] | | | |
| Percent county residents living in poverty | 0.8 | 0.5 | 0.4 |
| Unemployment rate | -3.7*** | -3.0*** | -3.4*** |
| No. community health center per 1000K | 0.6 | 0.4 | 0.6 |
| No. psychiatrists' per 1000K | -1.5*** | -1.6*** | -1.3*** |
| | | | |
| *Individual-level Covariates* | | | |
| Age[§] | -0.1 | 0.1 | -0.02 |
| Female (versus male) | 0.3 | 0.3 | 0.3 |
| Race/ethnicity | | | |
| Non-Hispanic white | (Reference) | (Reference) | (Reference) |
| Non-Hispanic black | 2.4* | 2.4** | 2.4** |
| Hispanic | -1.1 | -0.5 | -1.1 |
| Other | 0.2 | 1.3 | 0.5 |
| Married (versus not), % | 3.6*** | 3.7*** | 3.6*** |
| Employed (versus not) | 4.3*** | 4.4*** | 4.4*** |
| Personal income ($1000) [§] | 2.0*** | 2.1*** | 2.0*** |

**Table 4.3 (Continued)**: Association between State Re-enrollment Policies and Medicaid Churning to Private Insurance among Adults with Mental Illness

|  | Transition from Medicaid to Private Insurance (vs. Continuous Medicaid Enrollment), % | | |
|---|---|---|---|
|  | Mode 1[+] | Model 2[¶] | Model 3[†] |
|  | (Intercept = 29.4%)[±#] | (Intercept = 29.4%)[±#] | (Intercept = 29.4%)[±#] |
| Education status |  |  |  |
|    Less than high school | (Reference) | (Reference) | (Reference) |
|    High school | 5.6*** | 5.7*** | 5.7*** |
|    Some college | 4.0** | 4.3*** | 4.0** |
|    Bachelor's or more advanced degree | 1.9 | 1.9 | 1.8 |
| Good/excellent (versus poor/fair) self-reported mental health status | -2.6** | -2.9** | -2.6** |
| SF-12 physical health summary score [§] | -0.5 | -0.3 | -0.5 |
| Cognitive limitation (versus no) | -1.5 | -1.5 | -1.3 |
| Chronic medical conditions (versus no) |  |  |  |
|    Diabetes (versus no) | -2.6 | -1.9 | -2.7* |
|    Asthma (versus no) | 0.6 | 0.7 | 0.8 |
|    High blood pressure (versus no) | 0.7 | 0.3 | 0.6 |
|    Heart disease (versus no) | -1.1 | -0.8 | -1.3 |

*Notes*: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; N = 18,364; the sample of these models contained those who transitioned to private insurance and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method.

[±] Model-adjusted rate of losing Medicaid and becoming uninsured per person per month.

[#] Regression model also controlled for propensity score, year indicators, and season indicators.

[+] Model estimated using a linear model (*F-statistic* = 49.3, adjusted $R^2$ = 0.088).

[¶] Model estimated using a linear model (*F-statistic* = 48.4, adjusted $R^2$ = 0.087).

[†] Model estimated using a linear model (*F-statistic* = 48.7, adjusted $R^2$ = 0.089).

[§] Continuous variables were standardized such that a one-unit increase corresponds to a one standard deviation increase in the measure above its mean value.

**Table 4.4:** Regression Results of Multivariate Logit Models for Monthly Utilization Rate of Outpatient Services, Using Both Re-enrollment Policies as the Instruments

|  | Any Outpatient Services[¶] | | Any MH-related Outpatient Services[¶] | |
|---|---|---|---|---|
|  | 2SRI-Logit[+] | Logit[†] | 2SRI- Logit[+] | Logit[†] |
|  | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Lose Medicaid and Become Uninsured (vs. Continuous Medicaid Enrollment)[±] | 0.19*** | 0.36*** | 0.34*** | 0.42*** |
|  | (0.16, 0.23) | (0.35, 0.38) | (0.25, 0.45) | (0.39, 0.46) |
| *P-value of Over-identification Test*[†] | *0.64* | ---- | *0.10* | ---- |
|  | Any Outpatient Services[¶] | | Any MH-related Outpatient Services[¶] | |
|  | 2SRI-Logit[+] | Logit[†] | 2SRI- Logit[+] | Logit[†] |
|  | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Transition from Medicaid to a Private Plan (vs. Continuous Medicaid Enrollment)[§] | 0.62 | 0.88*** | 1.44 | 0.93 |
|  | (0.17, 2.17) | (0.82, 0.95) | (0.77, 2.70) | (0.80, 1.08) |
| *P-value of Over-identification Test*[†] | *<0.01* | ---- | *0.25* | ---- |

*Notes*: OR: Odds Ratio; CI: Confidence Interval; MH: Mental Health.
[±] N=82,030; the sample of these models contained those who churned to no coverage and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method.
[§] N=18,364; the sample of these models contained those who transitioned to private insurance and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method.
[+] 2SRI-Logit: Logit model with two stage residual inclusion instrumental variables approach. [‡] Logit model without applying the instrument variable approach.
[†] P-value greater than 0.05 indicates that we do *not* reject the null hypothesis that the instruments are valid at the 5% significance level.
[¶] All 2SRI-IV models in this table used both policy indicators as the instruments. Regressions models also adjusted for the individual-level measures of demographic, enabling, and need-related characteristics, the county-level measures of socio-demographic characteristics and MH care resources, year indicators, and propensity score.

**Table 4.5:** Regression Results of Multivariate Two-Part Models for Costs Per Person Per Month, Using Both Re-enrollment Policies as the Instruments

| | Total Costs[¶] | | Out-of-Pocket Costs[¶] | |
|---|---|---|---|---|
| | 2SRI-TPM [+] | TPM [†] | 2SRI-TPM [+] | TPM [†] |
| | ME (SE) | ME (SE) | ME (SE) | ME (SE) |
| Lose Medicaid and Become Uninsured (vs. Continuous Medicaid Enrollment)[±] | -322.5*** | -202.8*** | 4.5* | 6.2*** |
| | (91.6) | (20.4) | (2.0) | (0.6) |
| Intercept | 291.9 | 259.5 | 5.9 | 5.0 |
| *P-value of Over-identification Test*[†] | *0.37* | ---- | *0.95* | ---- |
| | Total Costs[¶] | | Out-of-Pocket Costs[¶] | |
| | 2SRI-TPM [+] | TPM [†] | 2SRI-TPM [+] | TPM [†] |
| | ME (SE) | ME (SE) | ME (SE) | ME (SE) |
| Transition from Medicaid to a Private Plan (vs. Continuous Medicaid Enrollment)[§] | 288.9 | -54.2 | 0.2 | 5.2*** |
| | (529.9) | (37.1) | (4.4) | (0.7) |
| Intercept | 257.3 | 330.4 | 8.8 | 6.6 |
| *P-value of Over-identification Test*[†] | *0.06* | ---- | *0.74* | ---- |

*Notes*: ME: Marginal Effects; SE: Standard Errors; [±] N=82,030; the sample of these models contained those who churned to no coverage and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method. [§] N=18,364; the sample of these models contained those who transitioned to private insurance and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method. [+] 2SRI-TPM: Two-part model with two stage residual inclusion instrumental variables approach. [‡] Two-part model without applying the instrument variable approach. [†] P-value greater than 0.05 indicates that we do *not* reject the null hypothesis that the instruments are valid at the 5% significance level. [¶] All 2SRI-IV models in this table used both re-enrollment policy indicators as the instruments. Regressions models also adjusted for the individual-level measures of demographic, enabling, and need-related characteristics, the county-level measures of socio-demographic characteristics and MH care resources, year indicators, and propensity score.

# Appendix

**Appendix Table 4A:** Regression Results of Multivariate Logit Models for Monthly Utilization Rate of Outpatient Services

| | Any Outpatient Services¶ | | Any MH-related Outpatient Services¶ | |
|---|---|---|---|---|
| | IV: Frequency Only | IV: FFI Only | IV: Frequency Only | IV: FFI Only |
| | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Lose Medicaid and Become Uninsured (vs. Continuous Medicaid Enrollment)± | 0.20*** | 0.20*** | 0.38*** | 0.37*** |
| | (0.17, 0.23) | (0.17, 0.24s) | (0.28, 0.51) | (0.27, 0.50) |

| | Any Outpatient Services¶ | | Any MH-related Outpatient Services¶ | |
|---|---|---|---|---|
| | IV: Frequency Only | IV: FFI Only | IV: Frequency Only | IV: FFI Only |
| | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Transition from Medicaid to A Private Plan (vs. Continuous Medicaid Enrollment)§ | 2.91 | 0.48*** | 1.47 | 1.28 |
| | (0.67, 12.6) | (0.34, 0.67) | (0.89, 2.44) | (0.75, 2.21) |

*Notes*: OR: Odds Ratio; CI: Confidence Interval; MH: Mental Health; FFI: Face-to-face interview.

± N=82,030; the sample of these models contained those who churned to no coverage and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method.

§ N=18,364; the sample of these models contained those who transitioned to private insurance and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method.

¶Regression models also adjusted for the individual-level measures of demographic, enabling, and need-related characteristics, and the county-level measures of socio-demographic characteristics and MH care resources, as well as year indicators.

**Appendix Table 4B:** Regression Results of Multivariate Two-Part Models for Costs Per Person Per Month

| | Total Costs¶ | | Out-of-Pocket Costs¶ | |
|---|---|---|---|---|
| | IV:<br>Frequency Only | IV:<br>FFI Only | IV:<br>Frequency Only | IV:<br>FFI Only |
| | ME (SE) | ME (SE) | ME (SE) | ME (SE) |
| Lose Medicaid and Become Uninsured (vs. Continuous Medicaid Enrollment)± | -316.5*** | -297.9*** | 5.1** | 4.8* |
| | (93.8) | (91.5) | (1.8) | (2.1) |
| *Intercept* | *290.3* | *285.3* | *5.5* | *5.7* |
| | Total Costs¶ | | Out-of-Pocket Costs¶ | |
| | IV:<br>Frequency Only | IV:<br>FFI Only | IV:<br>Frequency Only | IV:<br>FFI Only |
| | ME (SE) | ME (SE) | ME (SE) | ME (SE) |
| Transition from Medicaid to A Private Plan (vs. Continuous Medicaid Enrollment)§ | 378.0 | 184.9 | 1.2 | 1.2 |
| | (493.6) | (962.6) | (3.8) | (4.0) |
| *Intercept* | *246.8* | *234.5* | *8.4* | *8.4* |

*Notes*: ME: Marginal Effects; SE: Standard Errors;

± N=82,030; the sample of these models contained those who churned to no coverage and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method.

§ N=18,364; the sample of these models contained those who transitioned to private insurance and those in the continuously-enrolled group that were matched with this specific churning group using the propensity score matching method.

¶ Regression models also adjusted for the individual-level measures of demographic, enabling, and need-related characteristics, and the county-level measures of socio-demographic characteristics and MH care resources, as well as year indicators.

**Appendix Table 4C:** An Instrumental Variables Falsification Test: Association between State Re-enrollment Policies and Outpatient Healthcare Utilization and Costs among Adults with Continuous Medicaid Enrollment

| | Any Outpatient Services[†] | Any MH-related Outpatient Services[†] | Total Costs[+] | Out-of-Pocket Costs[+] |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| | OR (p-value) | OR (p-value) | ME (p-value) | ME (p-value) |
| *State-level Instrumental Variables* | | | | |
| Frequency of Eligibility Recertification | | | | |
| Recertification every 6 months or more frequently | (Reference) | (Reference) | (Reference) | (Reference) |
| Recertification every 12 months | 1.1 | 1.1 | 3.2 | -0.02 |
| | (0.312) | (0.177) | (0.938) | (0.982) |
| Face-to-face interview (FFI) requirement | | | | |
| Required FFI at recertification | (Reference) | (Reference) | (Reference) | (Reference) |
| Eliminated FFI at recertification | 0.9 | 0.8 | 20.7 | -0.28 |
| | (0.126) | (0.101) | (0.593) | (0.799) |

*Notes*: OR: Odds Ratio; ME: Marginal Effects; MH: Mental Health. N=129,672

[+] Two-part model was estimated for cost outcomes; [†] Logit model was estimated for binary outcomes.

All four regression models also adjusted for the individual-level measures of demographic, enabling, and need-related characteristics, and the county-level measures of socio-demographic characteristics and MH care resources, as well as state and year indicators. Standard errors were clustered at the person-level.

# CHAPTER 5

## Conclusion & Implication

Taken together, the three dissertation studies provide a rigorous estimation of Medicaid churning rates among low-income patients with mental health (MH) disorders, and identify the *causal* effect of churning on utilization of healthcare services delivered in both outpatient and hospital acute care settings. The three studies also examine the impact of state policies that streamline Medicaid re-enrollment procedures on Medicaid coverage continuity and healthcare utilization. The findings of these studies shed light on the importance of these re-enrollment policies for vulnerable populations with MH needs in terms of their stability of health coverage, access to healthcare, and ultimately, health outcomes.

Both the first and third studies provide evidence that reducing the frequency of the eligibility recertification process is strongly associated with a reduction in Medicaid churning rates among adult beneficiaries with MH disorders. Improved continuity of Medicaid coverage, in turn, helps to maintain access to outpatient services and prevent adverse health consequences that may trigger use of costly emergency department and inpatient services.

The Affordable Care Act (ACA) streamlines Medicaid re-enrollment policies by requiring all states to recertify eligibility no more frequently than annually for beneficiaries who qualify based on income.[1] When extrapolating the study findings to the potential impact of this provision of the ACA, we anticipate that annualized certification

period would improve Medicaid continuity and support access to care for those with MH disorders. Nevertheless, proposals currently debated in Congress would give states more authority in administrating their Medicaid programs,[2,3] including the authority to reinstate requirements that re-enrollment must occur more frequently.[3] The findings of these studies suggest that the proposed policies could exacerbate disruptions in Medicaid coverage for those with MH needs. These increased disruptions could, in turn, jeopardize access to routine care and raise the possibility of adverse health events that require costly visits in hospital acute care settings.

The second study provides comprehensive estimates of the effect of a state-specific re-enrollment policy, Express Lane Eligibility (ELE), on the continuity of Medicaid coverage and use of acute care services among youth with depression in two Southern states. The study findings suggest substantial cross-state heterogeneity in ELE implementation, contributing to disparate impacts on depressed youth. While ELE in Louisiana generally had no effects on improving Medicaid continuity and reducing acute care utilization, Alabama's ELE processes largely reduced Medicaid churning rates among youth beneficiaries with depression. Through improving coverage continuity, Alabama's ELE also led to reductions in use of acute care for MH disorders. As states consider ELE or other data-driven eligibility processes in the coming years, the findings of this paper suggest that the cross-agency data sharing, as implemented in Alabama's ELE processes, has the potential to improve coverage continuity for certain, vulnerable youth subgroups, such as those with depression, who rely heavily on Medicaid for care.

Under the ACA, Medicaid enrollment reforms are intended to move toward a more simplified, electronic procedure by replacing paper-driven, manual enrollment

processes with automated procedures that reply on the use of technology.[4,5] Specifically, states can opt for streamlining enrollment and promoting retention through linkages among reliable electronic data sources to determine eligibility.[4,6] However, this provision of the ACA could be repealed under the current proposals being considered in the U.S. Congress.[7] If this provision were repealed, states may no longer face the decision to streamline their Medicaid enrollment processes using automated procedures.

The third study offers insights into other changes in the ACA and the Medicaid programs as currently proposed in the bills under consideration in the U.S. House of Representatives and the U.S. Senate.[2,3] The current proposals would reduce federal funding for the Medicaid expansions that provided coverage to nonelderly adults with household incomes up to 138% of the federal poverty level.[2,3] If states do not have sufficient financial resources to continue to support the Medicaid expansion as federal funding is reduced, state policymakers may be faced with the decision to roll back the expansion – either partially or entirely.

It has been estimated that nearly two millions patients with severe mental disorders have gained Medicaid coverage through the ACA's expansion.[8] While most individuals become uninsured after losing Medicaid coverage,[9,10] this is especially true for those with MH problems who are *more* likely than other groups to experience poverty and umemployment.[11] Hence, the findings of this study highlight that, if the ACA's Medicaid expansion is reversed and rates of churning increase for those with MH disorders, this will result in reduced access to outpatient services and an increased financial burden among patients who need care for their mental disorders.

Along with scaling back the Medicaid expansion, the current proposals also cap the federal funding that states receive per Medicaid enrollee – leading to long-term cuts in federal outlays for Medicaid. In addition, the proposals afford states more autonomy to restructure their Medicaid programs.[2,3] Facing potential federal cuts, states may have to make difficult policy choices to balance budgets. Given the heterogeneity in the financial and political environments across states, different policy mechanisms may be considered to contain costs. States may opt to make enrollment and renewal processes more stringent (thereby reducing Medicaid caseloads), or impose additional constraints to enrollment, such as work-related restrictions.[2,3]

Furthermore, a piece of the proposals eliminates all federal funding for Medicaid enrollees who gained coverage under the ACA Medicaid expansion if their enrollment is interrupted for two or more months.[12] This provision, if enacted, would make it especially costly for states to re-enroll those who experienced a coverage disruption. In this context, the findings of all three studies in this dissertation, collectively, offer insight into the undesirable consequences of these potential policy changes on low-income individuals with MH needs who rely on Medicaid for their health insurance coverage.

In conclusion, the findings of this dissertation underscore the importance of maintaining continuous Medicaid coverage and streamlining state policies related to Medicaid re-enrollment for low-income individuals with MH disorders. As policymakers continue to debate the future of Medicaid, it will be important to consider program- or policy-level strategies to reduce gaps in Medicaid coverage, ensure timely access to healthcare, and minimize any potential adverse consequences of churning for this vulnerable population.

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