Cost Sharing in Medicaid: Consequences of Policy Choices on State Expenditures

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Abstract

This study examines the effects of cost sharing requirements on state Medicaid expenditures. In 2016, of the 50 United States (plus D.C.), 24 states required some form of cost sharing (i.e., in premiums, deductibles, coinsurance, and copayments) from adults enrolled in Medicaid. While intended to foster "personal responsibility" and reduce over-usage of expensive services, research has shown a decrease in the initiation of care, medication adherence, usage of preventative services and an increase in the prevalence of untreated illness among low-income people when cost sharing requirements are implemented. Using a cross-sectional design, this study compares six different state cost sharing requirements to yearly expenditures per-enrollee in the fiscal year 2016 on total Medicaid expenses, administrative costs, and expenses paid out to hospitals, mental health facilities, nursing facilities, physicians and other medical practitioners, and prescription drugs to analyze the effects of cost sharing requirements on state Medicaid expenditures. Using least squares regression, the findings suggest there is no reduction in Medicaid spending with an increase in cost sharing.

I. Introduction

Growing health care costs and pressure on state budgets have forced states to devise ways to control costs and increase efficiency in their Medicaid programs. Many states are turning to cost sharing tools in an attempt to cut expenses. Cost sharing in health care refers to shifting some of the costs of services away from the insurance provider(s) (in the case of Medicaid, the state funds the insurance providers for services) onto the recipient (Medicaid enrollee) of the health care services. Monthly premiums, copayments for physician visits, prescription drugs and hospital stay expenses are among the most common cost sharing tools that Medicaid enrollees are facing with the rollout of Medicaid expansion. Proponents of sharing health care costs with enrollees see these fees as a means to cut overhead expenses and discourage overuse of non-essential services.

Medicaid is a need-based, joint state-federal funded health care program that offers coverage to low-income and other needy populations including children and those with disabilities. According to data from the Centers for Medicare and Medicaid Services (CMS), the program's optional expansion to low- to moderate-income individuals under the Affordable Care Act (ACA) resulted in 16.3 million additional Medicaid enrollees (February 2018 Medicaid & CHIP Enrollment Data Highlights). State and federal Medicaid expenditures grew significantly after the expansion in 2012, reaching its highest growth rate of 10.5 percent in 2015. However, recent evidence shows a significant slowing of Medicaid growth in costs in both 2016 and 2017 at 3.5 and 3.9 percent respectively (Rudowitz and Valentine 2017).

Lawmakers' concerns about rising Medicaid costs are not unfounded. However, there is concern that exerting economic pressure using cost sharing policies on low-income persons in order to save money may discourage the use of essential services and drugs leading to what

researchers are calling an “offset effect.” An offset effect resulting from cost sharing refers to changes in health outcomes, utilization of services and program spending as a result of the transfer of cost burden from one entity (insurer/state) to another (patient).

While there is much existing research on the effects of cost sharing (typically in the form of copayments for prescription drugs) on utilization of services, adherence to prescription drug use, and subsequent health outcomes, few studies have examined the effects of cost sharing on categories of state Medicaid expenditures. Existing research largely focuses on whether any discernible changes in patient behavior resulting in an offset effect can be detected in emergency room costs as a result of the implementation of cost sharing policies. The present study examined whether cost sharing requirements in Medicaid lead to an overall reduction in state Medicaid expenses. Furthermore, this study attempted to determine whether there were unintended increases in state Medicaid spending on administrative costs, hospitals, mental health facilities, nursing facilities, physicians and other medical practitioners, and prescription drugs.

II. Economic Theory

There are two basic ways that states can control costs in healthcare: demand-side cost sharing and supply-side cost sharing. In demand-side cost sharing, the consumer is asked to pay more for services provided. In supply-side cost sharing, the provider covers more of the costs or attempts are made to "alter the incentives of health care workers to provide certain services” (Ellis and McGuire 1993). The cost sharing requirements discussed in this paper are place direct costs increases for consumers and are thus examples of demand-side cost sharing.

Proponents of cost sharing policies in health care believe that asking consumers to pay more up front will lead them to make more “efficient” and “value-based” health care choices (Saloner, Sabik, and Sommers 2014). In the context of health care, “value-based” choices are

those in which the patient chooses a less expensive option when seeking necessary medical treatment (Powell, Saloner, and Sabik 2016). As Powell et al. (2016) noted, by introducing cost sharing tools, including copayments at the point of service for prescription drugs and physician visits, policymakers intend to "reign in consumption and costs" without "sacrificing the risk protection value of health insurance."

While cost-effective and equally beneficial health care choices may objectively exist, encouraging consumers to use them requires that they be capable of adequately differentiating between high-value and low-value options (Eaddy et al. 2012). The idea of "curbing consumption" while maintaining use of essential services and drugs – those needed for serious health conditions – relies on the notion that all consumers are perfectly informed about available treatments, treatment effectiveness, and cost. Perfectly informed consumers are defined as those who have the same amount of knowledge as "[medical] experts and planners" (Pauly and Blavin 2008). This optimal, perfectly informed health care consumer rarely exists. Ellis and McGuire (1993) emphasize that the relationship between patient and physician impedes the existence of autonomous health care consumers. Patients often "cede partial or complete authority to providers who then make [value-based] decisions for them." This "ceding of authority" has also lead physicians to be accused of using their inherited position of power to "induce demand" in their own in self-interest and in the interest of profits and quotas (Ellis and McGuire 1993). This poses questions about whether experts always make the best value-based decisions about treatment for their patients. Efforts to control costs by using cost sharing tools to encourage decreased utilization of services and expensive drugs may be effective, but there is no evidence that consumers then choose higher value services and drugs in response. This raises concerns

about possible negative health consequences and subsequent economic effects of raising cost sharing amounts on consumers.

III. Literature Review

While there is much discussion on the merits of cost sharing initiatives to improve the efficiency of Medicaid programs and reduce state spending, there is little disagreement that increased cost sharing decreases consumer spending and utilization. The RAND Health Insurance Experiment (HIE) conducted in 1982 is often cited as the first major study on the effect of cost sharing on health care costs and utilization. The experiment, which was conducted in the 1970's, involved randomly assigning individuals to one of four different levels of cost sharing up to a maximum out of pocket expense that was determined by their income. The results showed that the highest tier of cost sharing, in which the consumer was responsible for 95% of the cost of care, reduced consumer spending by around thirty percent. A similar reduction in consumer spending was seen in the lower two tiers of cost sharing when compared to free coverage, though to a lesser extent. The HIE further indicated that there was a similar decrease in utilization of care, and that consumers did not simply cut back on nonessential medical services, but reduced their use of essential medical services as well (Brook et al. 2006).

Subsequent studies have continued to confirm the HIE's finding of decreased utilization of services and prescription drugs when patients are asked to share in the cost of medical treatment. In their article, *Patient Cost-Sharing and Hospitalization Offsets in the Elderly,* Chandra, Gruber, and McKnight (2010) found a 17.5 percent decline in office visits by elderly patients after a ten dollar increase in copayments. In addition to their finding of fewer office visits, Chandra et al. (2010) determined that there was a significant decrease in prescriptions

filled as a result of increased cost sharing. A survey conducted on the effects of increased cost sharing on parental behavior regarding care for their children diagnosed with asthma found that utilization of prescribed drugs and needed services significantly dropped with increased cost sharing (Fung et al. 2014). Almost ten percent of parents reported using less medication than prescribed for their child while almost eight percent reportedly delayed or avoided visiting a physician to receive care for their child because of the increased burden of costs. Those who reported reduced usage of prescribed drugs and needed services also reported a worsening of care and control over their child's asthma.

A study on the effects of increased prescription drug cost sharing on consumer medication spending found that for every ten percent increase in copayments for prescription drugs, spending on drugs decreased anywhere between two and six percent depending on the type of drug (Goldman, Joyce, and Zheng 2007). Similarly, a study of children enrolled in Alabama's Children's Health Insurance Program, ALL Kids, showed that the probability of any consumer expenditure on prescription drugs decreased by 5.8 percent and expenses paid by the state decreased by 7.9 percent following an increase in copayments on prescription drugs (Sen et al. 2014). While antihistamine drugs saw the largest decline in utilization, central nervous system agents (e.g., analgesics and anticonvulsants) saw the least declines in expenditures (Sen et al. 2014). This is indicative of cost sharing working as intended; decreasing the usage and expenses paid towards non- or less-essential drugs and services while maintaining adherence to more essential drugs and services – though there is still a decline in expenditures on essential drugs.

Some findings suggest that increased copayments for prescription drugs lead to decreased overall expenditures by the state. However, there is evidence that these savings do not impact the consumer, but rather the providers of the health insurance plan. A study on the effects of tiered

cost sharing amounts on prescription drugs found that with the inclusion of higher tiers of cost sharing (typically for brand name drugs, or drugs deemed more expensive), overall spending decreases between twenty-three and thirty-three percent per consumer. However, the amount that consumers pay out-of-pocket towards overall costs increases from anywhere between eighteen to twenty-six percent (Joyce et al. 2002). Cost sharing tools already impose a financial burden on consumers in order to decrease utilization. If an increase in the share of costs on top of the imposed copayments exists, as indicated by Joyce et al. (2001), there may be cause for concern regarding a further decrease in utilization of essential services and treatments.

An extensive survey done of existing literature pertaining to cost sharing and prescription drug adherence and expenses found that patients with "relatively high need for medical services and prescription drugs" showed reduced adherence to treatment recommendations resulting from increased copayments (Powell, Saloner, and Sabik 2016). Goldman et al. (2007) found that high cost sharing was correlated with increased usage of medical services for those with "congestive heart failure, lipid disorders, diabetes, and schizophrenia." As Medicaid enrollees are known to have a higher prevalence of chronic illnesses, there is considerable concern that nonadherence to essential services and drugs with increases in cost sharing is even higher among those in the program.

Evidence suggests that the lower one's annual income, the more they are impacted by even small increases in out-of-pocket expenses. In their study on the Alabama CHIP program, Sen et al. (2014) found evidence of larger reductions of essential drug use for those families that reported a lower annual income. They relate their finding to the microeconomic theory of "price responsive demand," and indicate that the demand of these essential drugs is reliant on both the necessity of the medication and a household's disposable income (Sen et al. 2014). In such

scenarios, families are forced to make a choice between economic security and their child's medical treatment. A similar conclusion was found in a study of patients in Quebec after the introduction of increased cost sharing in 1996. Tamblyn et al. (2001) found that while cost sharing decreased the use of essential drugs by 9.12 percent overall, utilization of essential drugs in recipients receiving public assistance decreased by 14.42 percent. Similar effects were discovered in a behavioral study on the impacts of expanding health insurance coverage to low-income, childless adults. Individuals who received expanded health care coverage increased their usage of preventative services. However, if cost sharing increases were introduced, no such increase in the usage of preventative services was observed (Guy Jr. 2010). Fung et. al (2014) also addressed the impact of income, stating that cost-related barriers to children's asthma care were "concentrated among low-income families with higher cost-sharing levels."

As discussed by Chandra et al. (2010), the decrease in usage of essential services and drugs as a result of increased cost sharing raises major concerns about consumers foregoing important services or prescription drugs. When the cost of medical services is prohibitive, it leads to a deterioration of health and subsequently results in more hospitalizations and other costly services (the "offset effect"). This concern is echoed by Powell et al. (2016) in their survey of existing literature, citing the risk that "[Emergency Department] use could itself be a consequence of cost-related nonadherence for prescription drugs or other chronic disease management." Evidence of this offset effect was found in research done by Chandra et al. (2010). They found a net decrease in expenditures by the state per patient on physician office visits and prescription drugs at $36.22 and an increase in hospital expenditures per patient of $7.23. In a study on the effects of cost sharing on non-urgent ER visits, researchers found that increased cost sharing reduced the likelihood that visits were for a non-urgent reason (Sabik and

Gandhi 2016). Their findings, however, did not indicate a decrease in usage of the emergency department, but rather a shift in the urgency of visits. In fact, similar research produced findings of increased cost sharing showing no reduction of overall usage of the emergency department (Mortensen 2010). If overall usage of emergency services is stagnant while the reasons for visits become more urgent, this may explain the existence of an offset effect in hospital expenses. Further, the increase in the urgency of visits – but not the frequency of visits – is indicative of researchers' concerns that lower utilization of essential services and drugs appears to contribute to worse health outcomes and subsequently higher expenses for hospitals. Though there seems to be evidence of an offset in hospital expenses as a result of increased cost sharing, no research supports that this offset would be large enough to negate the apparent overall savings that cost sharing is expected to yield, a claim supported by Powell et al. (2016) and Chandra et al. (2010). While these results indicate that it is unlikely that any offset effect would result in net greater health care expenses, the offset effect could potentially be compounded by the lower economic status and increased health needs of state Medicaid populations.

Increases in cost sharing have been shown to have adverse effects on consumer health. A study on phasing out copayments on prescription drugs for low-income people in Israel (Elhayany and Vinker 2011) showed "significant improvements in blood pressure, LDL cholesterol, and HbA1c levels (an indication of the severity of diabetes)" only six months after removing copayments. A survey of existing research showed that a decline in medication adherence leads to worse health outcomes (Eaddy et al. 2012). Serious adverse events, defined as hospitalization, nursing home admission, and mortality were shown to increase by fifty-three percent for public assistance recipients as a result of nonadherence to essential drugs (Tamblyn et al. 2001). Similarly, a study on the prevalence of chronic illnesses in Medicaid recipients after

the introduction of increased cost sharing showed an average rise in uncontrolled hypertension of more than seven percentage points and uncontrolled hypercholesterolemia of more than thirteen percentage points (Kostova and Fox 2017).

The overall health of a patient population has a significant impact on the size of an offset effect. Medicare patients in poor health cost hospitals two dollars for every one dollar saved on expenses elsewhere. In addition, hospital expenses paid by the Medicare program rose by six dollars for every one dollar saved on spending for physicians as a result of cost sharing increases (Chandra, Gruber, and McKnight 2010). The health of patients is also strongly correlated with continuity of care, or the quality of care over time as a result of a consistent patient-provider relationship. A study on Medicaid insurance claims in Delaware in the 1990's (Chandra, Gruber, and McKnight 2010) found that better continuity of care resulted in a significant decrease in the likelihood of an individual visiting the Emergency Room. A similar study (Christakis et al. 2001) also found that poor continuity of care resulted in more frequent Emergency Room visits and that this was even more apparent in children enrolled in Medicaid. This increase in emergency department visits by Medicaid patients may be explained by research showing that Medicaid coverage increases the likelihood of Emergency Room use (Taubman et al. 2014). A Gallup survey in 2013 showed a positive relationship between Medicaid enrollment and ER usage - contributing to rising costs - that is likely due to the fact that Medicaid enrollees are in significantly worse health than adults who get their coverage elsewhere (Gallup Inc. 2013). This is likely due to the fact that Medicaid allows enrollees to access care, including emergency services, that they otherwise were unable to afford before enrollment.

The findings that improved continuity of care has a positive effect on patient health are important when assessing the effect of cost sharing on continuity of care. A study on enrollment

in Medicaid or CHIP by eligible children showed a significant increase in uninsured populations when premiums were introduced (Abdus et al. 2014). After the state of Oregon introduced cost sharing to their Medicaid program, Oregon Health Plan (OHP), in early 2003, almost half of the OHP enrollees followed disenrolled from the program (Wright et al. 2005).

In summary, cost sharing is shown to significantly decrease utilization of services and prescription drugs. This is consistent with the intentions of policymakers to curb apparent excessive use of non-essential services and lower costs. However, it is clear that unintended consequences, including consumers forgoing essential services and drugs, poorer health outcomes, lower enrollment levels, and worse continuity of care as a result of increased cost sharing levels call into question the effectiveness of these policies. As states continue to debate the inclusion of such cost sharing policies in their Medicaid programs, it is essential that all possible consequences – intended and unintended – are thoroughly examined. Medicaid populations include low-income households, elderly people and those with disabilities, and these patients frequently experience higher levels of chronic illnesses. Studying the effects of existing cost sharing levels on categorized state Medicaid expenditures is critical to understanding whether these policies are working as intended.

IV. Hypotheses

Cost sharing is consistently shown to decrease the utilization of medical services and prescription drugs. Additionally, lower-income consumers and those with poorer health status may find it even more cumbersome to afford necessary medical treatment. Given these findings, the following is hypothesized:

> *Hypothesis 1: higher levels of cost sharing will result in decreased overall Medicaid spending by states per enrollee.*

Previous research points to the existence of an increase in hospital expenditures as a result of worsening health outcomes due to higher cost sharing levels (the "offset effect"). All evidence points to the likelihood of similar findings when the effects of cost sharing are examined on state Medicaid hospital expenditures, as represented by the second testable hypothesis:

> *Hypothesis 2: higher levels of cost sharing will result in increased Medicaid spending by states on hospitals per enrollee.*

Increased cost sharing has been shown to significantly alter consumer behavior and cause an offset effect in hospital expenditures. It is reasonable, then, to expect that when the effects of higher cost sharing levels are examined on other categories of Medicaid expenditures, similar reverse-trend offset effects will be present. These findings lead to a third testable hypothesis:

> *Hypothesis 3: higher levels of cost sharing will result in various other offset effects on state Medicaid expenditure categories.*

V. Data

To test these assertions regarding the effects of cost sharing on state Medicaid expenditures, state cost sharing requirement and Medicaid expenditure data was used. Data from all 50 United States plus Washington D.C., all of whom maintain a Medicaid program, were analyzed. State cost sharing amounts were retrieved from the Kaiser Family Foundation (KFF) report: *Medicaid and CHIP Eligibility, Enrollment, Renewal, and Cost-Sharing Policies as of January 2016: Findings from a 50-State Survey* (KFF 2016) and were reported as dollar amounts required by the consumer at the time of service or purchase. The Kaiser Family Foundation is a nonprofit organization that focuses on health care policy research.

State Medicaid expenditure data was retrieved from the December 2017 edition of the MACStats: Medicaid and CHIP Data Book published by the Medicaid and CHIP Payment and

Access Commission (MACPAC). MACPAC is a nonpartisan agency of the legislative branch that gives policy recommendations to Congress and various agencies regarding Medicaid, the Children's' Health Insurance Program (CHIP) and related issues. Medicaid expenditure data is reported by states to the Centers for Medicare and Medicaid Services (CMS) every fiscal year in order to receive federal reimbursements for Medicaid expenses. MACPAC compiles this data annually to create a user-friendly data book on Medicaid every year. As reported by MACPAC, not all states had their CMS-64 data certified by the time MACPAC compiled this set. Reported state Medicaid expenses used in this study may have changed after all states had their expenditure data formally certified by CMS.

Data regarding the administration type (managed care or fee for service) and Medicaid expansion status of states in 2016 were also collected from the 2017 MACStats data book. While various managed care coverage types exist (primary care management provider, prepaid inpatient health plans, managed care organizations), only data regarding the percentage of a state's population covered by a comprehensive managed care plan (MCOs), or the most widely used managed care system, was used. Though the state of Louisiana passed Medicaid expansion in 2016, it had not implemented the new system at the time this data was collected Therefore, Louisiana was not considered an "expansion" state in this study.

Cost sharing amounts by state, categorized state Medicaid expenditures, and Medicaid enrollment figures from the fiscal year 2016 were used in this study as this was the most recent year in which all three sets of data were available. State demographic data from 2016 including population, age, race, income, education, and disability were obtained from the United States Census Bureau (USCB). Only the percentage of a state's population that is under the age of 18 is used as the other age statistic reported by the UCSB, over 65, is highly correlated with the

percentage of a state's population living with a disability and was represented in the disability control variable. Similarly, the rate of uninsured in each state was highly correlated with whether the state has expanded their Medicaid program, as the states that have expanded have far fewer people uninsured that those that have foregone expansion. For this reason, the percentage of population uninsured was not included in this study as a control variable due to the inclusion of an expansion variable.

VI. Methodology

In order to analyze the cost-effectiveness of Medicaid cost sharing policies on state Medicaid expenses and any variation in categorized spending, a series of regression models were run on the data discussed above. The dependent variables used in the various regression analyses are shown in Table1 below.

Table 1. List of Dependent Variables used in the Analysis

Dependent Variables	Description (from MACPAC)
Total Medicaid Spending	Total combined state and federal Medicaid expenses (in millions of dollars)
Administrative Costs	Design and development of Medicaid Management Information systems, operation of approved systems and other costs, electronic health record incentive payments to providers, administration of payments, and other costs.[1]
Prescription Drug Spending	All expenditures on drugs before federal reimbursements to state (in millions of dollars)
Hospital Spending	Inpatient, outpatient, critical access hospital, and emergency hospital expenses (in millions of dollars)
Physician Care Spending	All physician and other practitioner expenses except dental, nurse-midwife, and nurse practitioner expenses (in millions of dollars)
Nursing and ICF/ID Care Spending	Payments to nursing facilities and intellectual disability institutions including any costs in addition to any standard services (in millions of dollars)
Mental Care Spending	Inpatient psychiatric services for individuals under the age of 21 and inpatient or nursing facility payments for those above the age of 65 in an institution for mental diseases (in millions of dollars)

[1]Includes skilled medical professionals, preadmission screening and resident review, medical and utilization review, external independent review, survey and certification, and MFCU operations (all at 75 percent federal match); translation and interpretation services for children and planning activities for the Health Home benefit (both at match equal to a state's federal medical assistance percentage); eligibility changes associated with the Temporary Assistance for Needy Families program (75 or 90 percent); administration of family planning services (90 percent); and immigration status verification systems (100 percent). Excludes MMIS and eligibility systems, which are included in their own categories (MACPAC).

The dependent variables in Table 1 consist of seven categories of expenditures by state Medicaid programs reported by MACPAC. The variable *Total Medicaid Spending* represents all costs associated with a given state's Medicaid program (before any federal reimbursements) for the fiscal year of 2016. The variable *Prescription Drug Costs* includes all expenses paid for by the state for prescribed medications for enrollees in their Medicaid program. The total drug costs are reported by MACPAC before states receive any reimbursements for drugs. Reimbursement rates for medications are negotiated by each individual state. The third variable in Table 1, *Hospital Spending,* includes all expenses reimbursed to hospitals for all inpatient, outpatient, and emergency services provided. The variable *Physician Care Spending* listed next in Table 1 incorporates all costs of services provided by physicians or other practitioners associated with hospitals other than dental, nurse-midwife, and nurse practitioner expenses which MACPAC does not include in this category of spending. The sixth variable in Table 1 is *Nursing and ICF/ID Care Spending* which covers expenses reimbursed to nursing care facilities as well as intellectual disability facilities for services provided to patients. The last dependent variable in Table 1, *Mental Care Spending,* includes expenses for inpatient psychiatric services for those under the age of 21 as well as nursing care services for those aged 65 and above in an institution for mental disease.

State Medicaid expenditures, as expressed by the seven dependent variables, vary greatly due to vast differences in the size of Medicaid programs (expansion, no expansion), state population size, the type of program administration, and various demographic discrepancies. As

such, expenditure figures would not be useful when trying to analyze the effect of cost sharing amounts on state Medicaid expenses. Therefore, state expenditure amounts for the seven dependent variables were divided by the total state Medicaid population in order to find the cost per Medicaid enrollee for each of the categories. This was calculated by $\frac{Total\ Expenditures}{Number\ of\ Medicaid\ Enrollees}$. Because this categorized expenditure data is reported in number of millions, after determining the cost per enrollee, the figure is multiplied by 1,000 for ease of use in regression analysis. An example of one state's Medicaid expenditure data and cost per enrollee is shown below in Table 2.

Table 2. New Mexico Medicaid Expenditure Amounts
[Medicaid Enrollees 2016 (n) = 768,665]

Expenditure Type	Total Cost ($millions)	Cost per enrollee = Total cost/n ($thousands)
Total Expenditures	5537	7.203398
Administrative Costs	197	0.256288
Prescription Drug Spending	328	0.427234
Hospital Spending	351	0.457546
Physician Care Spending	66	0.085212
Nursing Care Spending	26	0.034085
Mental Care Spending	2.2	0.002862

Table 3, below, lists the descriptions of the seven independent variables that were used in the regression models. The first variable, *Cost Sharing Required,* is a binary variable and indicates whether a state requires any form of cost sharing at all: 1 was assigned if there is a cost sharing requirement, 0 was assigned for states where there is no cost sharing required. Independent variables 2-7 in Table 3 include cost sharing dollar amounts charged to adult Medicaid enrollees by states in federal year 2016. The second independent variable in Table 3,

Non-Emergency ER Visit, is the copayment amount charged to consumers for visits to the emergency room deemed as "minor" and not needing emergency care. As hospital care is especially expensive, these non-emergency visits to the ER are specifically targeted by policymakers supportive of cost sharing as they see this expense as an indicator of excessive or unnecessary expenses that can be reduced. In contrast, emergency visits to the ER generally require no copayment. The independent variable, *Inpatient Hospital Visit,* is the copayment charged to a consumer for any extended care at a hospital requiring at least one overnight stay. The fourth independent variable in Table 3 is *Non-Preventative Physician Visit,* which is the copayment amount required from a patient for any visits to a physician for treatment of an on-going medical issue, and any testing and diagnostic services after the appearance or treatment of symptoms.

Independent variables 5-7 listed in Table 3 represent copayment amounts for the three different types of prescription drugs available to consumers: *Generic Drugs, Preferred Brand Name drugs,* and *Non-Preferred Brand Name Drugs.* According to Consumer Choice Health Plans, a *Generic Drug* is defined as "one that is no longer sold exclusively under the patent of the pharmaceutical company that developed it." A *Preferred Brand Name Drug* is "one that is listed on the plan's formulary or preferred list of prescription drugs. These drugs may cost plan participants more than generics but less than non-preferred brands." A *Non-Preferred Brand Name Drug* is one "that is not included on the plan's formulary or list of preferred prescriptions. Non-preferred brand-name drugs are higher in costs than preferred brand-name drugs" (CCHP 2017).

Table 3. List of Independent Variables used in the Analysis

Independent Variables	Description
1 - Cost Sharing Required	Binary variable= 1 if state requires any type of cost sharing, 0 if state does not require any cost sharing
2 - Non-Emergency ER Visit	Copayment at time of service (in dollars)
3 - Inpatient Hospital Visit	Copayment at time of service (in dollars per night)
4 - Non-Preventative Physician Visit	Copayment at time of service (in dollars)
5 - Generic Drug	Copayment at time of purchase (in dollars per prescription)
6 - Preferred Brand Name Drug	Copayment at time of purchase (in dollars per prescription)
7 - Non-Preferred Brand Name Drug	Copayment at time of purchase (in dollars per prescription)

Three separate prescription drug copayments are included in this study as states typically charge copayments for drugs in three separate tiers: (low) *Generic Drugs*, (medium) *Preferred Brand Name Drugs*, and (high) *Non-Preferred Brand Name Drugs*. Utilization of the three types of prescription drugs by consumers is evenly split. MACPAC (2017) reported that the percentage of drugs used in each state in the fiscal year 2016 that were generic ranged from fifteen to thirty-five percent of all prescriptions filled, while the rest were either preferred or non-preferred brand name drugs. In order to capture the effect of the three tiers of drug copayments and varied usage, all three drug copayments are treated as their own independent variables for the purposes of this study.

Some states report a range of copayment amounts for particular drugs or services. For example, a physician copayment may range from $3 to $5 per service. For the purposes of this study, the median figure in the range – in this case, $4 – is used. These cost sharing amounts are exemplified below in Table 4, which shows the state of Montana's required copayments for the year 2016.

Table 4. Montana Medicaid Cost Sharing Amounts in 2016

Cost Sharing Type	Cost to Consumer
Non-Emergency ER Visit	$8 (per visit)
Inpatient Hospital Visit	$75 (per night)
Non-Preventative Physician Visit	$4 (per visit)
Generic Drug	$0 (no cost sharing required)
Preferred Brand Name Drug	$4 (per prescription)
Non-Preferred Brand Name Drug	$8 (per prescription)

Table 5, below, lists the ten independent variables used as control variables in the regression models. The variable *Expansion* is self-explanatory and is represented as a 1 for a state that expanded their Medicaid program and a 0 if the state had not expanded their Medicaid program in 2016. States that expand their Medicaid programs provide coverage to many more low-income families and individuals making less than 133 percent of the Federal Poverty level. This increase in program enrollment, income qualifications, and other administrative changes as a result of expansion make it paramount to control for any variance in state Medicaid expenditures per enrollees between states that had and had not expanded Medicaid.

The second control variable in Table 5, *Managed Care,* represents the percentage of a state's Medicaid population that is covered by a comprehensive managed care plan. MACPAC describes comprehensive managed care plans (MCOs) as care organizations that cover acute, primary, and specialty medical care services and may also cover behavioral health, long-term services and supports, and other benefits in some states. Importantly, Medicaid insurance coverage and reimbursements are typically delivered in two different systems. In managed care systems, states contract out to traditional managed care providers, or standard insurance companies, to cover most, if not all of needed services for a patient. In a managed care system, these providers insurance are paid a capitation fee by the state for each Medicaid enrollee on their plan to cover health care services for one year. Fee-for-service systems, on the other hand,

involve the state directly reimbursing the service provider, for example a private physician's office or a hospital, for a service provided to a patient enrolled in Medicaid. Fee-for-service systems typically involve fixed costs for services determined by the state. As the cost and payment type of these two systems often greatly differ, the type of Medicaid administration that a state has may affect its Medicaid expenditures per enrollee on various services. For this reason, the percent of a state's Medicaid enrollee population covered by a comprehensive managed care program must be controlled for.

Table 5. List of Control Variables used in the Analysis

Control Variables	Description
1 - Expansion	Binary variable = 1 for had expanded Medicaid by 2016, 0 for had not expanded Medicaid by 2016
2 - Managed Care	% of state Medicaid population covered under Comprehensive Managed Care
3 - State Population	State population estimates for the year 2016
4 - Median Family Income	Median family income in state for 2016
5 - Disability	% of state population with a disability in 2016
6 - Under age 18	% of state population under the age of 18 in 2016
7 - High School or Higher	% of state population who have at least a high school education in 2016
8 - Black	% of state population that was Black in 2016
9 - Hispanic	% of state population that was Hispanic in 2016
10 - Asian	% of state population that was Asian in 2016

The control variables 3-10 in Table 5 are a collection of state demographic information from 2016 reported by the United States Census Bureau (USCB). *State Population* is the USCB's population estimate for a given state in the year 2016. *Median Family Income* is the median family income for each state reported by the USCB. The control variable *Disability* represents the percent of a state's population that reported having a disability. *Under age 18* is simply the percent of a state's population below adult age while *High School or Higher* is the percent of a state's population that received at least a high school education. The last three

control variables, *Black, Hispanic,* and *Asian,* are the percentage of a state's population that identify as one of these three races as reported by the USCB.

As Medicaid is a joint federal-state program, expenses are shared by both state governments and the federal government. However, the percent of Medicaid expenses reimbursed by the federal government differs for every state. This reimbursement amount is called the Federal Medical Assistance Percentages (FMAP). A state's FMAP is calculated by comparing each state's per capita income to the mean per capita income of the country as a whole and can be no lower than 50% (MACPAC 2017). Due to the variance of federal reimbursement rates, using only data of expenses paid by the state itself would give an inaccurate accounting of the total Medicaid expenses in a given state. To account for this, the total Medicaid expenses paid by both the federal government and the states are used to determine the expenses paid for each enrollee in the states studied. This gives an accurate accounting of all Medicaid expenses paid in each state for the fiscal year 2016.

Table 6 includes descriptive statistics regarding the sample population of the 50 U.S. states plus the District of Columbia. Table 6 primarily shows how many states required each independent variable, or type of cost sharing copayment, in their Medicaid program in 2016.

Table 6. Sample Statistics – Cost Sharing Requirements

	Number of States (plus D.C.)
Had Expanded Medicaid (2016)	32[1]
Required Any Form of Cost Sharing in Medicaid (2016)	24
Cost Sharing Type Required (2016)	
Non-Emergency ER Visit	14
Inpatient Hospital Visit	16
Non-Preventative Physician Visit	14
Generic Drug	19
Preferred Brand Name Drug	22
Non-Preferred Brand Name Drug	23

[1]*Including D.C., not including Louisiana as the state had not fully implemented expansion by 2016*

Two regression models consisting of different independent were run in order to analyze the effects of a state's cost sharing amounts on their Medicaid expenditures in the year 2016. The first regression (regression Model 1) was run on all seven dependent variables as listed in Table 1 and included the independent variable *Cost Sharing Required* as well as all of the control variables listed in Table 5 in order to analyze whether the existence of any cost sharing requirement at all had an effect on a state Medicaid expenditures per enrollee in 2016. The second regression model (regression Model 2), also run on all seven dependent variables, included independent variables 2-6 listed in Table 3 along with all ten control variables in Table 5 in order to assess the effect of varying copayment levels for the six cost sharing types studied on state Medicaid expenditures in the year 2016.

VII. Results

Table 7, below, shows the results of regression Model 1 run on the seven dependent variables. Coefficients in both Table 7 and Table 8 should be interpreted in the following way: positive values indicate higher expenditures per enrollee relative to other states in the given category for the year 2016, while negative values indicate lower expenditures relative to that of other states in 2016. The first coefficients to examine in Model 1 are those for the dependent variables concerning the first independent variable *Cost Sharing Required.* There are no significant coefficients for any of the dependent variables in Model 1 as a result of the *Cost Sharing Required* independent variable indicating that there was no discernable impact on state Medicaid spending per enrollee as a result of cost sharing requirement.

Table 7.

Regression Results - Cost Sharing Effects on Categorized Medicaid Expenses

	Dependent variable: (per enrollee)						
	Total Spending	Administrative Spending	Prescription Drug Spending	Hospital Spending	Physician Care Spending	Nursing Care Spending	Mental Care Spending
Cost Sharing Required	0.623 (0.859)	0.009 (0.111)	-0.039 (0.129)	-0.189 (0.224)	-0.008 (0.066)	-0.092 (0.289)	-0.049 (0.037)
Expansion	-0.298 (0.995)	0.002 (0.128)	-0.033 (0.150)	-0.222 (0.260)	0.018 (0.077)	0.170 (0.335)	0.005 (0.042)
Managed Care	0.003 (0.008)	-0.001 (0.001)	-0.0002 (0.001)	-0.015** (0.002)	-0.007** (0.001)	-0.005 (0.003)	-0.001* (0.0003)
State Population	-0.005 (0.006)	-0.001 (0.001)	-0.001 (0.001)	0.002 (0.001)	-0.0002 (0.0004)	-0.001 (0.002)	0.0003 (0.0002)
Median Family Income	1.364* (0.526)	0.108 (0.068)	-0.084 (0.079)	0.508** (0.137)	0.088* (0.041)	0.113 (0.177)	0.060* (0.022)
Disability	-0.348 (0.352)	-0.074 (0.045)	-0.026 (0.053)	0.049 (0.092)	0.004 (0.027)	-0.252* (0.119)	0.017 (0.015)
Under 18	-0.223 (0.168)	-0.017 (0.022)	-0.035 (0.025)	-0.002 (0.044)	0.028* (0.013)	-0.035 (0.056)	-0.004 (0.007)
High School or Higher	-0.280 (0.242)	-0.040 (0.031)	-0.0002 (0.036)	-0.089 (0.063)	-0.004 (0.019)	-0.138 (0.081)	-0.003 (0.010)
Black	-0.056 (0.039)	-0.009 (0.005)	-0.002 (0.006)	-0.008 (0.010)	-0.0002 (0.003)	-0.018 (0.013)	-0.001 (0.002)
Hispanic	-0.077 (0.046)	-0.010 (0.006)	-0.010 (0.007)	-0.005 (0.012)	0.001 (0.004)	-0.051** (0.016)	-0.002 (0.002)
Asian	-0.159* (0.063)	-0.015 (0.008)	0.059** (0.010)	-0.026 (0.017)	-0.003 (0.005)	-0.055* (0.021)	-0.004 (0.003)
Constant	35.547 (26.365)	4.785 (3.393)	2.312 (3.961)	7.002 (6.886)	-0.219 (2.039)	16.911 (8.878)	0.058 (1.122)
Observations	51	51	51	51	51	51	51
R^2	0.440	0.388	0.646	0.666	0.792	0.423	0.377
Adjusted R^2	0.282	0.215	0.546	0.572	0.734	0.260	0.202

Note: *p<0.05 **p<0.01

The results in table 7 do not support the first hypothesis which assumes that higher cost sharing, or in the case of regression Model 1 whether a state had cost sharing requirements or not, should result in lower overall Medicaid expenditures per enrollee than that of a state with little or no cost sharing requirements. As discussed earlier, the introduction of, or an increase in cost sharing is a tool used by lawmakers with the intention of saving costs and lowering pressures on state budgets. The findings in Model 1 do not indicate any support for such cost savings.

While there are no indications of significant cost savings per enrollee in state Medicaid programs that had cost sharing requirements compared to those that did not, it is also important to note that there are no indications of cost increases as a result of the existence of cost sharing requirements in Model 1 either. In other words, there is no discernable "offset effect", or shifting of costs from one area to another simply because a state had cost sharing requirements as past research concerning shifts in utilization of services might lead one to expect. In this respect, the results of Model 1 also do not support the second and third hypotheses advanced in this study.

Model 2 shifts the focus from whether a state had any requirement of cost sharing at all, to how large of a copayment each state required for the specific types of cost sharing as represented by the remaining independent variables. The results of Model 2, of which are shown below in Table 8, also do not support the first hypothesis that higher level of cost sharing requirements should result in cost savings on overall state Medicaid expenditures per enrollee. There is no discernable effect on the dependent variable *Total Spending* for the year 2016 resulting from a state's copayment amount for *Non-Emergency ER visits, Inpatient Hospital visits, Non-Preventative Physician Visits, Generic Drugs, Preferred Brand Name Drugs or Non-Preferred Brand Name Drugs.*

Table 8.

Regression Results - Cost Sharing Effects on Categorized Medicaid Expenses

Dependent variable: (per enrollee)

	Total Spending	Administrative Spending	Prescription Drug Spending	Hospital Spending	Physician Care Spending	Nursing Care Spending	Mental Care Spending
Non-Emergency ER Visit	0.017 (0.142)	0.00005 (0.017)	0.005 (0.021)	-0.030 (0.038)	0.003 (0.011)	0.025 (0.046)	-0.003 (0.006)
Inpatient Hospital Visit	0.025 (0.015)	0.004* (0.002)	-0.001 (0.002)	0.0002 (0.004)	0.001 (0.001)	0.012* (0.005)	0.001 (0.001)
Non-Preventative Physician Visit	0.051 (0.208)	0.017 (0.026)	-0.029 (0.032)	0.035 (0.056)	0.029 (0.016)	-0.086 (0.067)	0.006 (0.009)
Generic Drugs	-0.639 (0.422)	-0.088 (0.052)	-0.009 (0.064)	-0.197 (0.115)	-0.068* (0.032)	-0.212 (0.136)	-0.044* (0.018)
Preferred Brand Name Drug	0.696 (0.419)	0.057 (0.052)	-0.079 (0.063)	0.129 (0.114)	0.036 (0.031)	0.180 (0.135)	0.025 (0.018)
Non-Preferred Brand Name Drug	-0.564 (0.327)	-0.066 (0.040)	0.070 (0.049)	-0.017 (0.089)	-0.030 (0.025)	-0.107 (0.105)	-0.013 (0.014)
Expansion	0.527 (0.897)	0.045 (0.110)	-0.043 (0.136)	-0.360 (0.243)	0.010 (0.067)	0.085 (0.288)	-0.028 (0.038)
Managed Care	0.006 (0.009)	-0.0004 (0.001)	-0.001 (0.001)	-0.015** (0.002)	-0.006** (0.001)	-0.006 (0.003)	-0.001 (0.0004)
State Population	0.001 (0.005)	-0.0004 (0.001)	-0.001 (0.001)	0.001 (0.001)	-0.0001 (0.0004)	0.00005 (0.002)	0.0004 (0.0002)
Median Family Income	1.407* (0.596)	0.124 (0.073)	-0.015 (0.090)	0.569** (0.161)	0.109* (0.045)	0.253 (0.191)	0.077** (0.025)
Disability	-0.086 (0.374)	-0.046 (0.046)	-0.024 (0.057)	0.076 (0.102)	0.013 (0.028)	-0.127 (0.120)	0.027 (0.016)
Under 18	-0.084 (0.194)	-0.007 (0.024)	-0.036 (0.029)	-0.003 (0.053)	0.024 (0.015)	0.032 (0.062)	-0.003 (0.008)
High School or Higher	-0.145 (0.251)	-0.024 (0.031)	-0.014 (0.038)	-0.109 (0.068)	-0.004 (0.019)	-0.090 (0.081)	-0.004 (0.011)
Black	-0.034 (0.043)	-0.006 (0.005)	-0.005 (0.007)	-0.008 (0.012)	-0.0003 (0.003)	-0.005 (0.014)	-0.001 (0.002)
Hispanic	-0.078 (0.048)	-0.008 (0.006)	-0.012 (0.007)	-0.005 (0.013)	0.0002 (0.004)	-0.042** (0.015)	-0.001 (0.002)
Asian	-0.155* (0.065)	-0.015 (0.008)	0.056** (0.010)	-0.021 (0.018)	-0.005 (0.005)	-0.040 (0.021)	-0.002 (0.003)
Constant	16.891 (27.750)	2.692 (3.417)	3.266 (4.201)	8.118 (7.524)	-0.327 (2.084)	8.818 (8.921)	-0.150 (1.164)
Observations	51	51	51	51	51	51	51
R^2	0.523	0.522	0.693	0.693	0.833	0.552	0.484
Adjusted R^2	0.298	0.297	0.549	0.549	0.754	0.341	0.241

Note: *p<0.05 **p<0.01

The significant positive coefficient of 0.004 for *Administrative Spending* when compared to a state's *Inpatient Hospital Visit* copayment requirement suggests that states that required or had higher copayments for inpatient hospital visits, or visits requiring at least one night of overnight care spent more per enrollee on the administration of their program in 2016 than the states that had little or no required inpatient hospital stay copayments. Similarly, Table 8 shows a significant positive coefficient of 0.012 for *Nursing Care Spending* when compared to a state's *Inpatient Hospital Stay* copayment amount. This result indicates that in 2016, states that required or had higher copayments for inpatient hospital visits spent more per enrollee on payments to nursing care facilities than states with little or no required inpatient hospital stay copayments.

The significant negative coefficient of -0.068 for *Physician Care Spending* concerning the *Generic Drug* copayments required by a state in 2016 indicates that the higher the *Generic Drug* copayment, the less a state spent on care provided by physicians per enrollee. Similarly, there was a significant negative coefficient of -0.044 for *Mental Care Spending* when compared to a state's *Generic Drug* copayment requirement. This finding would indicate that a state with higher *Generic Drug* copayments in the year 2016 spent less per enrollee on payments for mental care services than a state with reduced or no copayment requirement for *Generic Drugs.*

These various significant findings in Model 2 do support the third hypothesis, that various unintentional "offset effects" would be visible as a result of varying cost sharing amounts after Medicaid expenditures per enrollee were analyzed by category.

VIII. Discussion

The results from the regression analyses run on the seven dependent expenditure variables using Model 1 and Model 2 indicate that neither the exitance of, nor the level of, cost

sharing requirements of any type had a significant impact on the total state Medicaid expenses per enrollee in 2016. These findings do not support the first hypothesis that increased cost sharing requirements would result in decreased overall state Medicaid spending per enrollee. These results challenge the central rationale of cost sharing policies in Medicaid programs: that asking Medicaid enrollees to share in the cost of services and drugs with small dollar copayment amounts the state will in turn save state governments money.

Notably, the regression results do not support the second hypothesis, that an increase in cost sharing should result in increased hospital expenses per enrollee. The results do not demonstrate any effect on hospital expenditures per enrollee as a result of increased cost sharing. Research indicating an "offset effect" on the utilization of essential drugs and the potential for increased emergency room use (Chandra, Gruber, and McKnight 2010; Powell, Saloner, and Sabik 2016) would suggest that one should expect otherwise. The regression results in Model 2, however, did indicate that there may be some "offset effects" as a result of cost sharing policies. The significant negative coefficients for *Physician Care Spending* and *Mental Care Spending* as a result of increased *Generic Drug* copayments are likely indicative of spurious correlations. There is no theoretical or research-backed explanation for these findings. The significant coefficient for *Administrative Spending* when *Inpatient Hospital Visit* copayments are increased, indicating the higher the copayment for overnight hospital stays the more a state paid in administrative costs, is fairly consistent with research regarding the costs associated with administering cost sharing policies. Administrative costs to set up needed infrastructure in order to charge and receive copayments from Medicaid enrollees are often identified as a reason why cost sharing tools may not provide the total cost savings expected. A report on the effects of premiums and cost sharing on low-income populations found that revenue gains from cost

sharing policies could be offset by costs including those required to administer the cost sharing requirements themselves (Artiga et al 2017). A financial report to the state of Arizona regarding the potential costs and savings of implementing cost sharing requirements found that after factoring in the federal share in all revenues from the program, the state would be set to possibly bring in $2,972,547 in potential premiums and $2,705,663 in potential copayments. However, the administrative costs of implementing the cost sharing requirements would be $15,838,100, a striking net loss for the program (Arizona Health Care Cost Containment System, *Fiscal Impact of Implementing Cost Sharing and Benchmark Benefit Provisions of the Federal Deficit Reduction Act of 2005*).

It is important to note that the type of Medicaid administration, or in this case the percent of Medicaid enrollees covered by comprehensive managed care, was significantly correlated with lowered hospital and physician expenditures in both Model 1 and Model 2. Though the *Managed Care* variable was intended to control for type of Medicaid administration of a given state, the significant findings that states with more patients covered by comprehensive managed care plans saw large decreases in *Hospital Spending* and *Physician Care Spending* are important for understanding state Medicaid expenses. Research suggests that managed care plans do in fact lower hospital costs. In their study on the effects of managed care on health care costs, Zwanziger and Melnick (1996) found that market penetration of managed care plans significantly decreased hospital costs. This is likely due to the fact that managed care systems induce competition as providers bid to receive contracts from insurance companies, or in the case of Medicaid from states, to cover the costs of services for enrollees.

Though the control variables used in the regression analysis accounted for much of the variance among states and their Medicaid programs, there are still many factors unaccounted for

that may contribute to variances in state Medicaid expenditures that would improve the accuracy of results in the regression models if they were to be included. That being said, it would likely be impossible to control for every possible factor effecting Medicaid expenditures, and the controls included in this study are robust enough provide clear results.

Further research is needed to assess the long-term effects of cost sharing policies on consumers. This study is cross-sectional and uses cost sharing policy and Medicaid expenditure data from states for only one year, 2016. As such, these results do not indicate whether there are any lasting or long-term effects on state Medicaid expenses as a result of increased cost sharing amounts. Research indicates that there is reason to believe that there may be long term effects of cost sharing policies on Medicaid expenditures. Multiple studies indicate that increased copayments reduce the utilization of essential services and lead to worse health outcomes and higher rates of hospitalization (Chandra, Gruber, and McKnight 2010; Powell, Saloner, and Sabik 2016). If the health status of a consumer faced with high levels of cost sharing were to deteriorate, it would likely do so over time, as the consumer may forgo important services or essential drugs over the period of multiple years. In this case, a state's cost sharing policies may not have an "offset effect", or the shifting of costs due to a change in behavior, until well down the line. As of 2016, Medicaid expansion was still relatively new as the first states to expand their programs did so in 2014. Many of the states that have expanded their Medicaid program have also introduced cost sharing policies as an attempt to counterbalance the larger expense of the program. The results of this paper suggest that cost sharing will not yield cost savings for these states.

Research indicating decreased utilization of essential health care services and drugs and worsening health status as a result of cost sharing increases as well as results from this study

indicating no significant savings as a result of cost sharing policies, raise questions regarding the effectiveness of these policies on the Medicaid population. There is no evidence that these cost sharing policies save the state money, though they cost the consumer, already low-income patients, considerably more. The results of this study raise other important questions, including whether controlling costs in the health care market can be approached with the same supply and demand assumptions that may be appropriate in other industries. Evidence that increased cost sharing levels can produce worsening health outcomes should encourage a reassessment of what state legislators' priorities are in relation to providing government-administered health care coverage to those in need.

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