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MEDICAID MANAGED CARE AND ITS IMPACT ON POTENTIALLY PREVENTABLE HOSPITAL UTILIZATION (INPATIENT AND EMERGENCY ROOM VISITS)

by

MOHAMMAD USAMA TOSEEF

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

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for the degree of

DOCTOR OF PHILOSOPHY

2019

MAJOR: ECONOMICS

Approved By:

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Advisor Date

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DEDICATION

To my parents, my brothers and their families and my wife.

ACKNOWLEDGEMENTS

I thank Allah the Almighty for all His blessings and favors upon me.

This work would not have been possible without my mentor and my advisor Professor Gail Jensen Summers. She was there for me throughout the past few years and believed in me when I did not believe in myself.

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Finally, I would not have achieved my goals without the support of my family. My mother wanted this more than anyone else and this is what kept me going. My father sacrifices himself for all of us every day. I rely on my brothers and their families for the smallest of things. And my wife gives me support every second of every day.

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CHAPTER 1 INTRODUCTION

Medicaid and Managed Care

Medicaid, the largest social health insurance program in the United States, now insures more than 70 million low-income and financially needy Americans. States provide Medicaid benefits through two distinct delivery systems, conventional fee-for-service (FFS) and managed care (Congressional Budget Office, 2018). Under conventional FFS, Medicaid pays providers a fee for each service provided to recipients, whereas under managed care, Medicaid contracts with risk-based managed care organizations (MCOs) to provide covered services to recipients in exchange for a fixed per-capita fee (Congressional Budget Office (CBO), 2018). Most MCOs are health maintenance organizations (HMOs) that cover all Medicaid services for recipients enrolled in these plans (Henry J Kaiser Family Foundation, 2016). There are also Medicaid MCOs that cover only a narrow set of benefits, e.g., behavioral health services for recipients who have been diagnosed with a serious mental illness, or long-term care services and supports for recipients needing long term care (CBO, 2018).

The percentage of Medicaid enrollees enrolled in some form of Medicaid managed care increased roughly six-fold between 1991 and 2013, as shown in Figure 1 (Centers for Medicare and Medicaid Services, 2015; Duggan & Hayford, 2013). States are moving towards mandatory implementation of managed care plans on most or all of their Medicaid enrollees (Congressional Budget Office (CBO), 2018). Ideally, managed care plans aim to reduce costs, provide preventive services and discourage overutilization of healthcare resources. Therefore, it is reasonable to expect a decline in the prevalence of preventable healthcare utilization within managed care settings. Given the trends in managed care adoption, it is important to evaluate the effectiveness of such plans; do enrollees in Medicaid managed care plans use services differently, and if so, in

what ways? Assessing how these plans affect the quality of healthcare provided to recipients is essential to understanding their value added to Medicaid, as well as their long-term sustainability. In this study, I aim to address whether these plans provide better quality of care to their beneficiaries than the conventional fee-for-service (FFS) Medicaid arrangements.

Surprisingly, peer-reviewed research on the effects of comprehensive HMOs under Medicaid is limited, despite the growing prevalence of these plans, and findings from such studies have been mixed (Caswell & Long, 2015; Duggan & Hayford, 2013; Herring & Adams, 2011; Sparer, 2012). There is little evidence, for example, that Medicaid HMOs have reduced Medicaid healthcare spending among nonelderly adult recipients, or improved access to care among recipients.

Duals

Nationwide, about 7 million Medicaid recipients receive both full Medicaid benefits and Medicare, the federal health insurance program for adults 65 and older and certain younger people with disabilities (Congressional Budget Office, 2013). These recipients, called "dual-eligibles" or "duals," tend to be economically vulnerable with very high healthcare needs, e.g., higher rates of physical or mental disabilities and multiple chronic conditions (CBO, 2013). Although duals comprise only 15% of the total Medicaid population they account for 39% of all Medicaid expenditures (Young et al., 2012; Medicare Payment Advisory Commission and Medicaid and CHIP Payment and Access Commission, 2018). Enrollment in comprehensive Medicaid MCOs tends to be much lower among duals. In 2012, for example, only 24% of duals were insured through such plans, whereas 70% of nonelderly nondisabled adult recipients were insured through them (CBO 2018).

Objective of Dissertation

This dissertation examines whether Medicaid HMOs are associated with a less frequent occurrence of potentially avoidable hospitalizations and potentially avoidable emergency room (ER) visits among nonelderly adult recipients, ages 18-64. Preventable healthcare utilization is considered an important measure of the quality of primary health care that a person receives; such hospital or ER admissions can be prevented with adequate primary care (Billings et al 1993; Agency for Healthcare Research and Quality (AHRQ), 2018). In this context, if Medicaid HMOs are doing a better job providing primary health care, then I should find a lower incidence of potentially avoidable hospital stays or ER visits among Medicaid HMO enrollees than among Medicaid FFS enrollees. I pay careful attention to the possibility that the effects of Medicaid HMOs differ for dual eligibles and recipients whose only health coverage is Medicaid. Data source for this dissertation is the Medical Expenditure Panel Survey (MEPS) covering 2003-2012; within this time period, Medicaid managed care enrollment grew from around 65% to 89% and now managed care is considered predominant delivery system in Medicaid (CBO, 2018; Gifford et al 2017).

Contributions

This dissertation contributes to the literature in several ways. First, while previous studies on the effects of Medicaid HMOs on the occurrence of potentially avoidable health care utilization analyzed data from a single state, ours is based on nationally representative data of all nonelderly adults with Medicaid, making this study more generalizable. Second, while previous studies have ignored the possibility that Medicaid HMOs may have different effects among dual eligibles than they have among recipients with Medicaid-only insurance, this study explicitly allows for this possibility because such effects may indeed differ, since duals tend to have more complex

healthcare needs (Neuman et al. 2012). Simply stated, with more medical problems there may be more than can go wrong. Finally, while most previous studies ignored the possibility of selection bias into Medicaid HMOs, I consider it, explicitly address it in model estimation using propensity score methods, and then compare how addressing it affects the estimated effects of Medicaid HMOs. Consequently, more thorough methodology has been employed in this dissertation.

Organization of Dissertation

The next chapter, chapter 2, provides a detailed discussion of preventable hospital utilization and ambulatory care sensitive admissions. In chapter 3, I present prior research on Medicaid managed care and preventable inpatient visits and preventable ER visits. Chapter 4 contains information on the data sources and variables used in this study. Methods used in this dissertation and their details are discussed in chapter 5. In chapter 6 results from all the models are explained and further discussion of the results and limitations of this study are in chapter 7. Chapter 8 will conclude this dissertation.

CHAPTER 2 BACKGROUND

Potentially avoidable hospital admissions are admissions for "ambulatory care sensitive (ACS) conditions." In many cases, an admission for an ACS condition could have been avoided if the individual had received timely and proper primary care instead. ACS conditions include diseases like asthma, appendicitis, and pneumonia. Hospitalizations for ACS conditions have been identified by the Agency for Healthcare Research and Quality (AHRQ) as the Prevention Quality Indicators (PQIs) (AHRQ 2018a). The logic is that if good outpatient care is being provided for ACS conditions then hospitalizations for such conditions can be avoided. Also, with timely outpatient interventions, it may be possible to prevent complications or more severe diseases related with these conditions. For example, diabetic patients should be more likely to avoid hospitalizations or ER visits if their conditions are routinely monitored and kept in check, or if they are given adequate self-management education. Although there are other factors that may affect the possibility of hospitalization that could have been avoided otherwise, the prevalence of potentially preventable hospitalizations can serve as a screening tool to highlight potential health care quality problems across different types of insurance plans. If patients have access to high quality and appropriate community based primary care, then unnecessary inpatient stays should be prevented.

The PQIs developed by AHRQ identify the admissions rate of specific ACS conditions.[1] In this paper I examine the admission rate across several important ACS conditions which one can identify through the International Classification of Diseases (ICD-9) codes used by hospitals on admission records to indicate a patient's diagnoses. ICD-9 is the official system used to assign

codes to diagnoses and procedures associated with hospital utilization in the U.S.[1] More detail is provided later on the ICD-9 codes in the Data chapter.

The issue of potentially preventable hospitalizations has received significant attention in the literature on managed care effectiveness. Since managed care tends to emphasize primary care and preventive services, it follows that the incidence of potentially avoidable hospital admissions should be lower among patients enrolled in managed care plans. The same should be true under Medicaid however prior research provides mixed results.

[1] http://www.cdc.gov/nchs/icd/icd9cm.htm

CHAPTER 3 PRIOR RESEARCH

Preventable Hospitalizations

A few previous studies, all state-specific, have compared the incidence of preventable hospital stays between Medicaid HMO enrollees with Medicaid non-HMO enrollees. Porell (2001) analyzed hospital discharge data from the Massachusetts Healthcare Data Consortium for 1996 (state fiscal year), and found that Medicaid HMO enrollees experienced a higher age-gender-race adjusted ACS hospital discharge rate when compared to their Medicaid FFS counterparts. He speculated that perhaps Medicaid recipients had problems accessing specialty care within HMOs. More recent research by others on the experiences of Medicaid recipients nationwide appears to confirm Porell's speculation. Using Medicaid HMOs to serve recipients has not improved their access to care, based on several measures of access, including the probability of using the emergency department, reporting difficulty seeing a specialist, and reporting unmet need for prescription drugs (Herring and Adams, 2011; Caswell and Long, 2015).

Basu et al. (2004) also looked into this matter using hospital discharge data for adults ages 20-64 from the Healthcare Cost and Utilization Project (HCUP) for four states: New York, Pennsylvania, Tennessee and Wisconsin. For each state they estimated logistic models to examine the association of Medicaid managed care enrollment and whether the hospitalization was potentially preventable. Their models controlled for socioeconomic and demographic characteristics, as well as the intensity of illness. They found that Medicaid managed care enrollment was not associated with a reduction in preventable admissions.

Bindman et al. (2005) analyzed hospital discharge data from California for nonelderly Medicaid recipients with a hospital stay between 1994 and 1999. Using multivariate Poisson regression, they found a 33% lower hospitalization rate for ACS conditions among Medicaid

recipients in mandatory managed care, compared to recipients covered through Medicaid FFS. Their findings suggest that, at least in California, Medicaid managed care did a better job in terms of managing the ACS conditions of Medicaid recipients.

Two studies of Medicaid managed care in Florida have been conducted, and show contrasting results. Using Agency for Health Care Administration (AHCA) data, Hu and Mortensen (2018) found that mandatory Medicaid managed care in Florida led to slower growth in potentially preventable inpatient stays among Medicaid recipients ages 18-64. On the other hand, Park and Lee (2014), who also analyzed AHCA data for Florida Medicaid recipients in this same age range, found that Medicaid HMO patients were more likely to be hospitalized for ACS conditions.

Researchers have also looked at differences in preventable hospital admissions among Medicare seniors, comparing beneficiaries with traditional FFS Medicare to enrollees in Medicare Advantage plans, most of which are Medicare HMOs. Most prior studies have documented lower levels of potentially preventable hospitalizations among Medicare Advantage enrollees (Basu and Mobley, 2007; Basu, 2012; Basu and Mobley, 2012; Lemieux et al., 2012).

Preventable ER Visits

One of the costliest uses of these resources is a trip of the emergency room (ER). While ER use can be inevitable and necessary for a substantial proportion of visits, in many instances, ER visits could be avoided through timely routine clinical encounters, use of preventive care services, and appropriate outpatient and primary care. It has been estimated that around 13% to 27% of ER visits within the United States could have been managed and taken care in physician offices, clinics and urgent care centers (Weinick et al., 2010).

There is some evidence that managed care plans, especially Health Maintenance Organizations (HMOs), within Medicaid are associated with a decrease in the use of the ER (Garrett, Davidoff and Yamane, 2003; Garrett and Zuckerman, 2005; Freund et al, 1989; Hurley et al, 1993; Lowe et al, 2005; Powers, 2000). On the other hand, more recent studies have found Medicaid managed care market penetration to be associated with increased probability of ER use (Caswell and Long, 2015; Herring and Adams, 2011). A recent study by Hu and colleagues assessed the impact of mandatory Medicaid managed care implementation in Florida on preventable ER visits but focused on racial and ethnic disparities (Hu et al 2018). They found that this mandatory implementation was associated with a slowing in growth of preventable ER visits for minorities relative to whites. No work, to my knowledge, has looked at the national prevalence of avoidable ER visits within Medicaid managed care.

CHAPTER 4 DATA

Medical Expenditure Panel Survey (MEPS)

This study uses data from the Household Component (HC) of Medical Expenditure Panel Survey (MEPS) for this study. MEPS is conducted by the Agency for Healthcare Research and Quality (AHRQ). MEPS, a set of large-scale surveys, collects data from a sample of families and individuals regarding their health services utilization. Within the several data components of HC, I specifically used the full-year consolidated data files, hospital inpatient stays files (for preventable inpatient visits) and the emergency room visits files (for preventable ER visits) and merged the three together to gather information about individuals who were admitted to the hospital (inpatient or ER). 10 years of data were compiled for analysis: from 2003 to 2012. Respondents from ages 18 to 64 were in the sample. Based on their Medicaid status, the sample was divided into two subgroups: non-duals who had only Medicaid and duals who had both Medicare and Medicaid. Data for 2013 and beyond are excluded from this study because after 2012 MEPS does not include the ICD-9 codes in the publicly available files, and I use ICD-9 codes to identify preventable hospitalizations. Additionally, since many Medicaid programs in 2013 and 2014 raised their payment rates to primary care physicians to no less than 100 percent of Medicare payment rates for primary care services (an Affordable Care Act provision), I stopped at 2012 to enhance the precision of estimates.

The MEPS is based on a complex survey design that involves stratification, clustering and disproportionate sampling (AHRQ, 2014b). My models and estimates account for these design elements, and my analyses were conducted using survey command functionalities in Stata v.15 (StataCorp, 2015).

Outcome variables

I focused on three outcomes variables for the purposes of this dissertation and conducted separate analyses on each outcome variable for both duals and non-duals:

- preventable inpatient visits,
- any ER visit and
- preventable ER visits.

For each hospitalization in 2003-2012, MEPS reports up to four ICD-9 codes, each recorded at the 3-digit level. These ICD-9 codes are recorded in the order they were reported by a respondent, not necessarily in their order of clinical importance (AHRQ, 2014a). Medical conditions associated with respondents' hospital visits were documented by the interviewer as verbatim text and then coded by professional coders into ICD-9 codes. According to AHRQ, these codes were verified and error rates for each coder did not exceed 2.5 percent (AHRQ 2014a).

Three binary outcome variables were generated: 1) avoidable inpatient visit (1=preventable, 0=otherwise), 2) any ER visit (1=had an ER visit, 0=otherwise) and 3) avoidable ER visit (1=preventable, 0=otherwise). 12 adult ACS conditions were used to identify preventable visits: bacterial pneumonia, dehydration, urinary tract infection, perforated appendix, angina without procedure, congestive heart failure, hypertension, asthma, chronic obstructive pulmonary disease, uncontrolled diabetes, diabetes complications and amputations among patients with diabetes. A list of the ACS conditions with their corresponding ICD-9 codes are listed in Table 1.

Independent variables

The key independent variable is a binary variable, *mcd_hmo*, which equals 1 if the recipient is enrolled in a Medicaid HMO, 0 otherwise. The MEPS includes a multistep careful ascertainment process to ensure participant enrollment in a Medicaid HMO. Specifically, if Medicaid or other

government program was identified as one of the respondent's sources of hospital/physician insurance coverage, he/she was then asked to identify their plan from a list of state names or programs for the Medicaid HMOs in the respondent's area. If the respondent didn't know their plan's name, they were given the following definition of an HMO and asked whether it describes their Medicaid plan: "With an HMO, you must generally receive care from HMO physicians. If another doctor is seen, the expense is not covered unless you were referred by the HMO, or there was a medical emergency."

My estimated models account for other factors that could also have influenced occurrence of a preventable hospital visit, including demographics, health and functional status, attitudes towards health insurance and risk-taking, and use of preventive services. These covariates have been previously adopted in studies examining preventable hospitalizations and emergency department utilization (Culler, Parchman, & Przybylski, 1998). Demographics include age (less than 35, 35-55, and 56 and above), gender, poverty status based on household income relative to poverty thresholds (poor, near poor, low income, and middle-or-high income), education (high school or less, some college, and college or more), and region (northeast, midwest, south, and west).

Health and functional status measures include self-reported health (excellent, very good, good, and fair-or-poor), self-reported mental health (excellent, very good, good, and fair-or-poor), whether he/she has any difficulty with activities of daily living (ADLs), whether he/she has any difficulty with instrumental activities of daily living (IADLs), adult Body Mass Index (underweight, normal, overweight, obese), whether he/she has been advised to restrict fatty foods, whether he/she currently smokes, and whether he/she has a usual source of care. I also account for the self-reported presence/absence of ten clinical conditions, each measured by a (0,1) indicator,

including the presence of high blood pressure, coronary heart disease (CHD), other heart disease, angina, emphysema, diabetes, and asthma, ever having had a heart attack or myocardial infarction, and ever having had a stroke. AHRQ refers to these conditions as priority conditions due to their high prevalence (AHRQ, 2014b).

To control for attitudes toward health insurance and risk-taking I include four variables that measure whether the respondent agrees with each of four statements (considered one at a time): "I'm healthy enough that I really don't need health insurance," "Health insurance is not worth the money it costs," "I'm more likely to take risks than the average person," and "I can overcome illness without help from a medically trained person."

Preventive services utilization measures include indicators probing the length of time since the respondent's last routine check-up, the length of time since their last cholesterol check, and the length of time since their last flu shot. These variables proxy for how conscientious a person is about taking care of their own health, which may correlate with their ability to recognize potentially dangerous symptoms or when they should see their doctor.

Definitions for all of model covariates can be found in Table 2, and their descriptive statistics, calculated separately for duals and non-duals, are reported in Table 3 (for inpatient visits), 5 (for any ER visits) and 6 (for preventable ER visits).

CHAPTER 5 METHODS

All analyses accounted for the complex design of the MEPS using the survey specific commands and functions in Stata v.15 software.

Summary Statistics

First, descriptive statistics were generated to examine, and test differences based on dual eligibility status. I used survey design-based f-tests to determine whether significant differences exist in healthcare use (the three outcome measures) and other covariates between dual and non-duals. Second, within each of the six samples (preventable inpatient stays for non-duals, preventable hospital stays for duals, any ER visit for non-duals, any ER visit for duals, avoidable ER visit for non-duals and avoidable ER visit for dual) I generated descriptive statistics based on Medicaid HMO status. Again, this was done to examine differences between Medicaid HMO and FFS enrollees.

Logistic Model

I estimate multivariable logistic regressions for the probability that the hospitalization is a preventable stay. For each outcome measure, two models are estimated, one for duals, the other for non-duals. My interest centers on whether Medicaid HMO enrollees have lower or higher odds of being hospitalized (inpatient or ER) for an ACS condition or any ER visit. The latter would suggest that Medicaid HMOs are not achieving optimal outcomes, vis-à-vis traditional FFS Medicaid, in managing these conditions on an outpatient basis.

Equation for Logistic Model

$$\boldsymbol{log}\ [\boldsymbol{P}_i/(\mathbf{1}-\boldsymbol{P}_i)] = \boldsymbol{\beta}_1 \mathbf{mcd\_hmo}_i + \boldsymbol{\beta}_2\, \boldsymbol{X}_i + \boldsymbol{\varepsilon}_i,$$

where $\boldsymbol{P}$ is the probability of an individual having a hospital visits (inpatient or ER), **mcd_hmo** equals 1 if the recipient is enrolled in a Medicaid HMO and 0 otherwise, $\boldsymbol{X}$ is the full set of independent variables discussed in the Data section of this dissertation, and $\boldsymbol{\varepsilon_i}$ is a set of unobserved characteristics.

Possible Selection Bias in Medicaid HMO Enrollment

So far, the discussion has ignored the possibility of selection bias into Medicaid HMOs. However, in some states, recipients are offered a choice between Medicaid FFS and Medicaid HMOs (CBO, 2018). I argue that it is possible that individuals with certain characteristics may self-select into different Medicaid plans. For example, given an option, people with higher healthcare utilization may choose to enroll in FFS Medicaid where fewer restrictions are placed on which providers they can see and how much care they can receive (Duggan & Hayford, 2013). Voluntary enrollment in public (Medicaid or Medicare) managed care programs shows that enrollees in HMOs often differ on both observable and unobservable dimensions from enrollees in FFS plans (Brown, Duggan, Kuziemko, & Woolston, 2014; Glied, Sisk, Gorman, & Ganz, 1997). As shown in Appendix Table 1, 4 and 5, among both duals and non-duals in my data, there are important systematic differences between HMO and FFS recipients. For example, within the non-dual population in the preventable inpatient visits sample, HMO enrollees are less likely to take risks and less likely to think that health insurance in not worth the cost. Differences in income, overall health status, and mental health status are also evident between HMO and FFS recipients.

A large body of econometric literature suggests that the presence of selection bias can lead to bias in the estimated effect of HMOs (Heckman, 1990; Wooldridge, 2015).

Propensity Score Model

To address this issue, I also estimate the multivariate models using propensity score weighting techniques. Specifically, I use inverse probability of treatment weighting (IPTW) based on estimated propensity scores (details below). Rosenbaum and Rubin (1983) define the propensity score as the probability of treatment assignment conditional on observed baseline covariates (Rosenbaum & Rubin, 1983). Since the propensity score acts as a balancing score, subjects with the same propensity score have the same distribution of observed baseline covariates whether they are treated or untreated. Although the true propensity score may not be known in observational studies, it is possible to estimate it. I follow Austin (2011) and estimate the propensity score using a logistic regression model, where treatment status (in this case, enrollment in a Medicaid HMO), is regressed on observed baseline characteristics. To obtain the estimated propensity score, the predicted probability of enrollment in Medicaid HMO is derived from the fitted regression model. These methods have been used previously to account for selection bias across several field (Frölich, 2007; Hirano & Imbens, 2001; Rubin, 2001).

IPTW using the propensity score generates weights based on the propensity score, which are then used to form a synthetic sample in which the distribution of covariates in the model is independent of treatment assignment (Austin 2011). Specifically, the weight assigned to individual *i* is $w_i = mcd\_hmoi/e_i + (1\text{-}mcd\_hmo_i)/(1\text{-}e_i)$ where e_i is the propensity score for individual i. However, as noted earlier, the complex survey design of MEPS also needs be taken into account. I do this by using the AHRQ-supplied weights, adjusted with the weights generated from the

propensity scores, following recommendations provided by Dugoff et al., 2014). Specifically, I generate a new analytic weight by multiplying the propensity score weight and the AHRQ survey weight. I use these generated weights to re-estimate all logistic regression models specified above including all covariates to ensure double robustness of findings through controlling for any possible residual differences in characteristics following propensity score weighting (Austin & Stuart, 2015; Guo & Fraser, 2014; Lunceford & Davidian, 2004).

CHAPTER 6 RESULTS

Preventable Inpatient Visits

After excluding respondents with any missing values in the covariates, the final number of duals and non-duals in the analytic sample was 515 and 2937, respectively.

Table 4 reports the prevalence of potentially preventable hospitalizations among duals and non-duals, as well as the relationship between being enrolled in a Medicaid HMO and the occurrence of such stays. Nationwide, between 2003 and 2012, among all hospitalizations for non-duals, ages 18-64, 13.4% were potentially preventable, whereas among all hospitalizations for duals in this age range, 23.9% were potentially preventable.

Table 4 also summarizes the key findings regarding the effects of Medicaid HMOs on the occurrence of preventable hospitalizations, after controlling for other possible determinants of such stays. Among non-duals I find no significant effect of Medicaid HMO enrollment on the odds of having such a stay. In both the multivariable logit regression estimated using the survey weights and in the multivariate logit regression estimated using the propensity score adjusted weights, which controls for possible self-selection into HMOs, enrollment in a Medicaid HMO has no effect on the probability of a preventable hospitalization. (Appendix Tables 2 and 3 report the full multivariable logit regressions estimated for non-duals and duals, respectively.)

In contrast, among duals, enrollment in a Medicaid HMO increases the odds of a preventable hospitalization by 68%, and this effect is statistically significant at the 10% level. The effect of Medicaid HMO status becomes stronger and more significant once propensity score adjusted weights are adopted. That is, after adjusting for possible self-selection into Medicaid HMOs, I find that duals in Medicaid HMO who are hospitalized have 1.8 times higher odds of having a preventable stay, compared to duals in Medicaid FFS who were hospitalized, and this

effect is significant at the 5% level (Table 4). I present the corresponding marginal probability estimates derived from these models in Figure 2.

A few other interesting findings also emerge from the analyses. Among non-duals both of the estimated models reveal that as non-duals age, their odds of experiencing a potentially preventable stay rise significantly (Appendix Table 2). Both models also reveal that non-duals who have diabetes, asthma, high blood pressure, angina, or emphysema have significantly higher odds of experiencing a preventable stay.

Among duals there are also significant regional differences in the odds of having had a preventable hospitalization over this period, with those living in the Midwest or South having an odds ratio twice as high as recipients living in the Northeast (Appendix Table 3) . Education is inversely related to the occurrence of preventable hospitalizations. Specifically, duals with a college degree have lower odds of having a preventable stay. Finally, duals who have been advised by their doctor(s) to reduce their intake of fatty foods or foods rich in cholesterol have higher odds of having a preventable stay, suggesting that people with unhealthy eating habits are at higher risk of a preventable hospitalization.

ER Visits (any and preventable)

Once respondents with missing values for covariates were excluded from the sample, the sample size for any ER visits was 18,406 non-duals and 2,361 duals, and for preventable ER visits was 4,584 non-duals and 725 duals (shown in Figure 3).

Differences between Duals and non-Duals. For both individuals with any ER admissions and individuals with avoidable ER visits only, duals were more likely than non-duals to have an ER visit (30.6% vs 26.2%; $p = 0.0004$) and were less likely to be enrolled in a Medicaid HMO (31.5% vs. 49.6%; $p < 0.0001$). The profiles of duals and non-duals differed on all considered

characteristics with the exception of income and smoking status. Specifically, duals were more likely to be older, more likely to report lower levels of mental and physical health, more likely to receive help or supervision for activities of daily living and more likely to have chronic clinical conditions. Duals were also more likely to utilize preventive health care services. These differences provide empirical evidence for treating the two groups separately.

Differences between HMO and FFS non-dual enrollees. I found significant regional and income differences between the groups. Otherwise, the characteristics of HMO and FFS enrollees were statistically not distinct.

Multivariable analysis. Results from the estimated regression models are reported in Tables 7 to 10. Across all models I found no significant differences between the two forms of Medicaid plans after controlling for possible determinants of such visits. Overall, these results provide no evidence to support Medicaid HMOs as being either superior or inferior to Medicaid FFS. This was true for both overutilization and prevalence of avoidable ER visits (an indicator of care quality). A Few other noteworthy results emerged from my findings. For any ER use, among both duals and non-duals older age, male sex, and higher income were associated with lower odds ratios of use. Conversely, lower reports of mental health status and smoking were associated with higher odds ratios of use. For avoidable ER visits, duals and non-duals with asthma, high blood pressure and emphysema had consistently higher odds avoidable ER use for ACS conditions.

CHAPTER 7 DISCUSSION

Preventable Inpatient Visits

The relationship between Medicaid HMO status and the occurrence of potentially preventable hospitalizations differs by a recipient's dual eligibility status. Among duals, I find a much higher prevalence of preventable hospitalizations in Medicaid HMOs, whereas among non-duals, Medicaid HMO recipients are no more likely than Medicaid FFS recipients to have a preventable stay.

None of the models I estimated provide support for the notion that Medicaid HMO membership leads to fewer hospital stays that could have been avoided with timely and appropriate primary care, i.e., more efficient care in outpatient settings. In the case of non-duals, Medicaid HMOs did not statistically differ from FFS Medicaid on this important quality measure. This finding is consistent with findings from two decades old data reported by Basu et al., 2004). In contrast, duals enrolled in Medicaid HMOs fared worse than their counterparts under Medicaid FFS. Duals in Medicaid HMOs were 1.6 to 1.8 times more likely than duals in Medicaid FFS to experience a preventable hospitalization. This raises quality concerns regarding Medicaid HMOs for the dual eligible population. Earlier studies have either dropped the duals from their analysis or they treated them the same as non-duals in the analysis. My results suggest that treating duals as a separate group is necessary to characterize the distinct effects that Medicaid HMOs have on these two different populations.

There is a need to understand why outpatient care quality would be lower among duals in Medicaid HMOs. One possibility is that having Medicaid HMO coverage made it more difficult and confusing to navigate the healthcare system. If the duals' Medicare coverage was under FFS, they may have been unsure about whether particular healthcare providers would require referrals

from their Medicaid primary care physician (PCP), or whether they are able to see providers outside of their HMO's network, or whether their Medicare copays would be covered by Medicaid. If, instead, their Medicare coverage was through a managed care plan with its a provider network that is different from the Medicaid HMO's network, the issues become even more confusing. This is especially the case if the Medicare Advantage plan is also an HMO with a different gatekeeper PCP. Navigating services under these scenarios would be challenging for healthy adults. Dual eligibles, many of whom have stressful and complex medical conditions and extremely limited finances, would find these arrangements even more difficult to manage. My findings provide support to published evidence suggesting that difficulties navigating coverage rules may obstruct duals from obtaining services when needed; be it preventive, maintenance, or follow-up care (Merrell, Colby, & Hogan, 1997). This might explain their higher prevalence of potentially preventable hospitalizations.

Another possibility is that Medicaid HMOs simply lack the expertise and experience needed to provide high quality care to duals, who are among the sickest and most vulnerable patients (Friedland & Feder, 1998). Historically, duals have relied on FFS Medicaid. As Gold and colleagues (2012) note, a small but growing share of duals have been enrolled in Medicaid managed care plans (Gold, Jacobson, & Garfield, 2012). Medicaid HMOs have far more experience with non-duals, who tend to be nondisabled and healthier (Miller & Weissert, 2004). Providers in Medicaid HMOs may simply need more experience and training to better manage the complicated problems of duals.

ER Visits

Using a nationally representative sample, a few interesting findings emerge for both non-duals and duals. I observed that irrespective of the analytical strategy, my primary findings are

consistent: no significant difference exist in the patterns of ER use (any or avoidable) between Medicaid HMO and Medicaid FFS enrollees. The summary statistics show that dual eligible beneficiaries tend to have a higher prevalence of ER visits than non-duals, however within each of the two groups differences disappear when individuals are differentiated according to their Medicaid HMO status. This suggests that duals and non-duals are very similar in terms of their utilization of ER, and implementation of Medicaid managed care is not necessarily improving the quality of care while at the same time not making it worse either.

Given the mixed evidence with regards to overall ER use in the managed care literature, this study provides no evidence of overutilization of ER within the HMO enrollees. This is despite that more HMO (duals and non-duals) enrollees reported to have a usual source of care (Table with Summary Stats). This may suggest that the usual source of care is doing a good enough job that results in healthcare utilization that is no worse than conventional Medicaid.

In the case of ER visits for ACS conditions, there are no differences between the HMO and FFS enrollees. It has been asserted in the past that such visits are not necessarily a result of poor judgement on the part of patients but are a strong indicator of poor access to care (Billings et al, 2000; Kellermann and Weinick, 2012). This might reflect the poor quality of primary care services that enrollees receive in managed care settings. However, this study finds no evidence of inferior quality of such services in Medicaid managed care. Although there is some evidence from my study that Medicaid HMO enrollees utilize preventive care services more frequently than non-HMO enrollees, this does not translate into fewer avoidable ER stays. Specifically, for duals, this no difference despite a focus of preventive services might be due to the complex Medicaid-Medicare dual system in addition to the managed care restrictions that they have to navigate to get the appropriate care they require. It is important to realize the health status and possible disabilities

of these individuals. So, as mentioned earlier, it can be challenging for these high healthcare need individuals to steer their way around their HMO which imposes additional limitations for example seeing primary care physician before getting referrals to specialist physicians etc (Merrell, Colby, & Hogan, 1997). Moreover, since enrolling duals into Medicaid managed care is a much more recent phenomenon, the HMO physicians might not be fully equipped or trained to manage these individuals and have more experience with non-duals who are relatively healthier and non-disabled individuals (Friedland & Feder, 1998; Gold, Jacobson, & Garfield, 2012; Miller & Weissert, 2004). Therefore, the benefits of primary care and preventive care services within the managed care arrangements may be overshadowed by inexperience of the system to look after the duals.

Although my primary interest was to examine the relationship between managed care in Medicaid and ER visits, my results show impacts of other factors on the prevalence of these visits. More specifically, I found that smokers, individuals with mental health problems and those with chronic conditions like high blood pressure, asthma and emphysema have higher odds to visit the ER, including avoidable visits. This shows that these conditions play an important role for health care utilization. Particular emphasis can be put on dealing with these issues outside of the ER setting. Primary care physicians and those responsible for provision of health in the outpatient settings can be made more equipped to educate and train enrollees how to manage their health especially with the aforementioned health conditions.

In this analysis I tried to control for the possible selection bias. I used IPTW using propensity scores to get causal inferences. However, upon a closer inspection of the estimates of odds ratio, I observe that the estimates and their p-values turn out to be very similar. This renders support to the original logistic models with survey weights only.

Limitations

A number of limitations of this analysis should be noted. First, the sample in this study was limited to the period 2003-2012. More recent years were excluded because beginning in 2013 AHRQ no longer reported ICD-9 codes for the hospitalizations of MEPS participants, making it impossible to identify potentially preventable stays. It may be, however, that the performance of today's Medicaid HMOs differs from what I found for the 2003-2012 era. Second, my findings may not generalize to Medicaid seniors or to children on Medicaid because I deliberately focused on recipients ages 18-64. Third, this analysis examined the collective experience of Medicaid HMOs across the U.S., rather than the specific experience of particular Medicaid managed care programs, or the experience of programs where HMO enrollment was voluntary rather than mandatory for recipients. Because MEPS does not identify the location of participants (no zip code, city, county or even state information was accessible), it was not possible to examine these issues. Furthermore, the publicly available MEPS data files only contain information on ICD-9 codes up to three-digits, while AHRQ PQI measures use the full five-digits codes. However, prior studies have used three digits ICD-9 codes for their analysis and I believe this classification is sufficient for this analysis also (Galarraga, Mutter, & Pines, 2015; Wang et al., 2018). I also kept the last year of the analysis as 2012 because from 2013 and onwards, MEPS publicly available files do not report the ICD-9 conditions and instead information for the broader Clinical Classification Codes is available. Correcting each of these limitations and using a larger sample size to overcome any power issues represents a fruitful direction for further research on the performance of HMOs under Medicaid.

CHAPTER 8 CONCLUSION

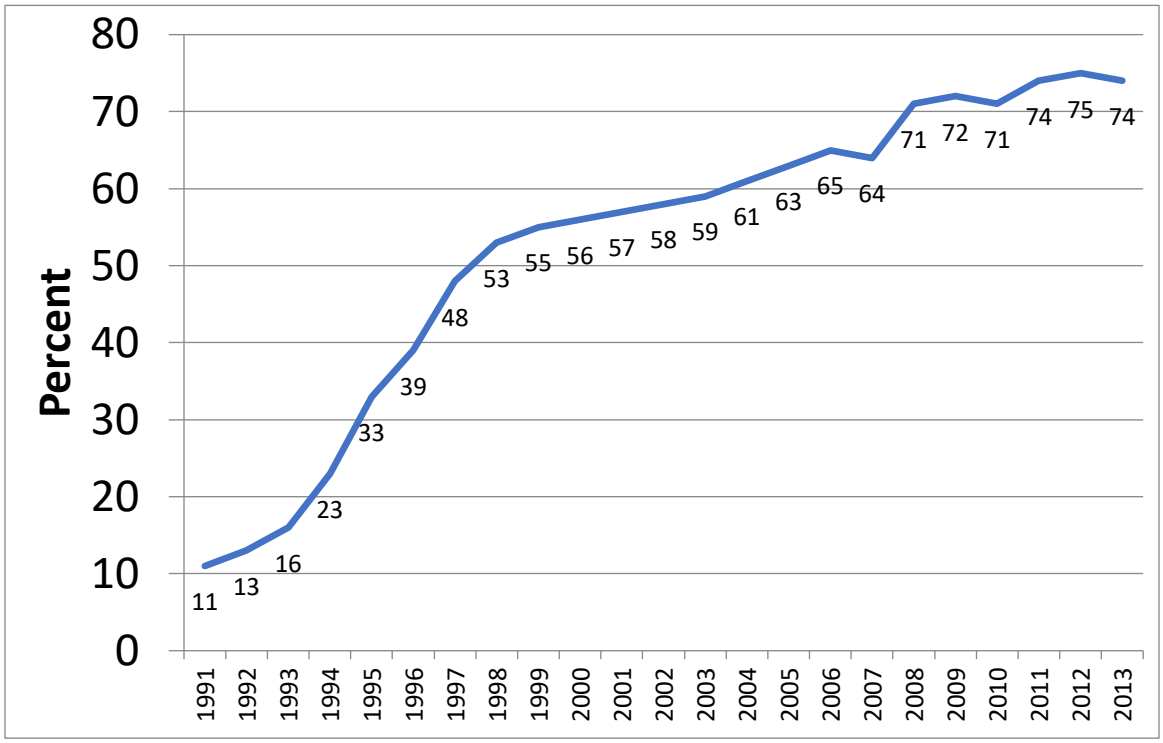
This study explored the issues of overutilization of ER and the prevalence of potentially preventable ER and inpatient visits within the Medicaid population and whether Medicaid managed care has any impact on these. Furthermore, I did separate analysis for dually eligible beneficiaries (individuals with both Medicaid and Medicare) and non-duals. Using MEPS data from 2003-2012, I found that Medicaid HMO are not associated with either an increase or decrease of ER utilization when compared with the conventional Medicaid; however duals enrolled in Medicaid HMOs were significantly more likely than dual eligibles under FFS Medicaid to experience a potentially preventable hospitalization while likelihood of having a preventable hospitalization did not differ in Medicaid HMOs and in FFS Medicaid. These findings raise concerns about care quality in Medicaid HMOs, and suggest that, at least for dual eligibles, the primary care delivered through Medicaid HMOs is of lower quality than the care being provided under FFS Medicaid. Also I found that there are significant differences in the characteristics of duals and non-duals and for future research, they should be treated as separate groups.

As a result of the Affordable Care Act, 37 states have expanded their Medicaid programs, and Medicaid enrollment nationwide has risen dramatically. For example, between 2013 and 2017 total enrollment in Medicaid rose more than 20%, up from 60 to 73.5 million (Statista, 2018). Many of these enrollees are in mandatory Medicaid HMOs, i.e., they were not even given the option of enrolling in FFS Medicaid instead (Centers for Medicare and Medicaid Services, 2016).

Clearly, further research is needed which examines the effects of Medicaid HMOs on other measures of care quality, not just the particular measure examined here. Moving forward, data from recent years and access to confidential data is important to evaluate the impact of managed care in Medicaid on health care quality measures. If additional research confirms these findings

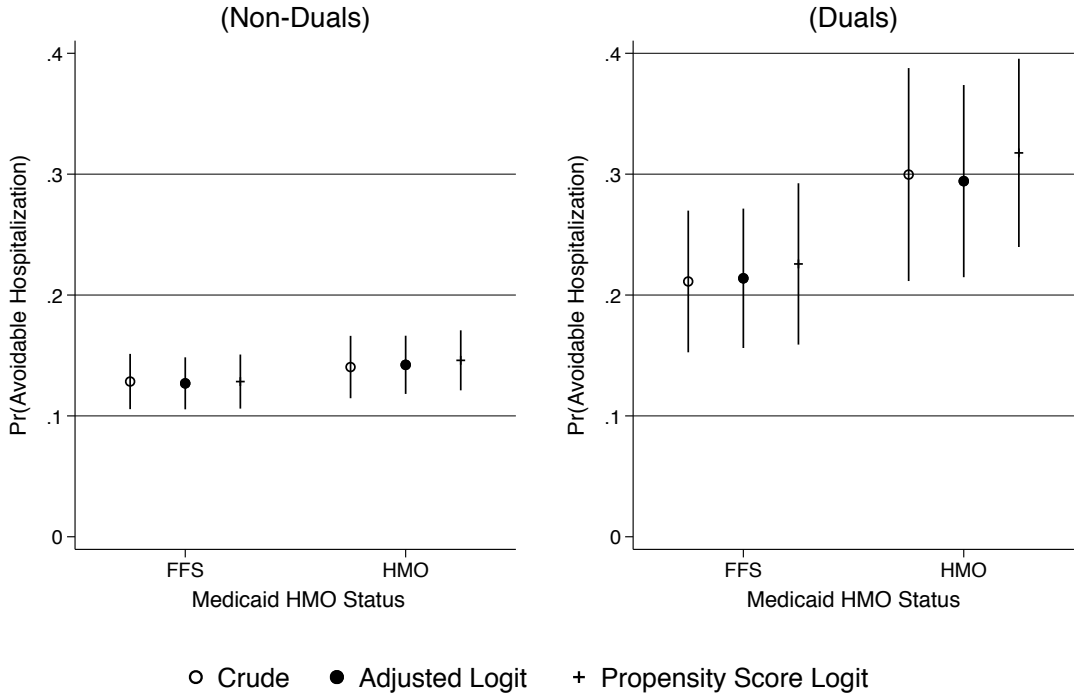
here, namely that Medicaid recipients receive better primary care under FFS Medicaid, then policymakers should reconsider the notion that Medicaid HMOs are an appropriate vehicle for serving the needs of dual eligibles.

Figure 1: Percent of Medicaid Population in Medicaid Managed Care Plans, 1991-2013



Sources: Data for 1991 through 1999 are from M. Duggan and T. Hayford. (2013) "Has the Shift to Managed Care Reduced Medicaid Expenditures? Evidence from State and Local-Level Mandates," *Journal of Policy Analysis and Management*. 32(3): 505-535, and data for 2000 through 2013 are from Mathematica Policy Research. (2015) *Medicaid Managed Care Trends and Snapshots, 2000 – 2013.* (Report prepared for the Division of Managed Care Plans in the Center for Medicaid and CHIP Services at the Centers for Medicare & Medicaid Services.)

Figure 2: Marginal probabilities of a preventable hospitalization for duals and non-duals by Medicaid Health Maintenance Organization (HMO) status and their 95% confidence intervals. FFS stands for Fee-For-Service.



Results are based on aggregated data from the Medical Expenditures Panel Survey. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.

Figure 3: An illustration to show different samples used in the Emergency Room Visit Analysis

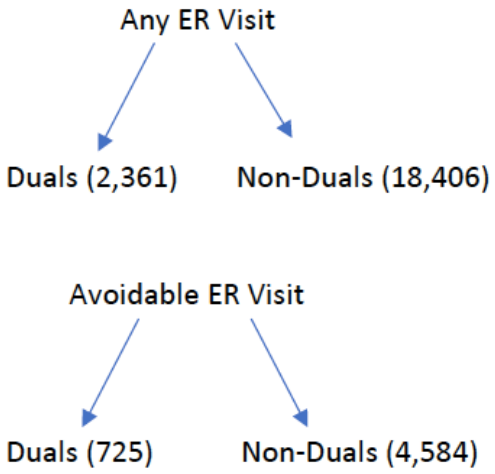


Table 1: ACS Conditions for Adults Used to Identify Potentially Preventable Hospitalizations in the Medical Expenditure Panel Survey (MEPS)

ACS Conditions	ICD-9 Codes
Bacterial Pneumonia	481, 482, 483, 485, 486
Dehydration	276
Urinary Tract Infection	590, 595, 599
Perforated Appendix	540, 541
Angina Without Procedure	411, 413
Congestive Heart Failure	398, 402, 404, 428
Hypertension	401, 402, 403, 404
Adult Asthma	493
COPD	466, 490, 491, 492, 494, 496
Uncontrolled Diabetes	250
Diabetes Complications	250
Amputations among Patients with Diabetes	250

Source:
https://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V50/PQI_Brochure.pdf

Table 2: Study variables and definitions.

Variables	Definition
Key Variables	
Avoid_hosp1234	1 if any 4 of the corresponding International Classification of Diseases (ICD)-9 codes of the hospital stay includes an Ambulatory Care Sensitive condition; 0 otherwise
Mcd_hmo	1 if individual enrolled in Medicaid Health Maintenance Organization (HMO); 0 for Medicaid non-HMO enrollees
Er_admission	1 if individual had an Emergency Room (ER) visit; 0 otherwise
Avoid_er12	1 if the corresponding ICD-9 codes of ER visit include an ACS condition; 0 otherwise
Demographics	
Age_35orless	1 if age is 35 or less; 0 otherwise
Age_36to55	1 if age is more than 35 and less than 56; 0 otherwise
Age_56plus	1 if age is 56 or above; 0 otherwise
Northeast	1 if lives in northeast; 0 otherwise
Midwest	1 if lives in midwest; 0 otherwise
South	1 if lives in south; 0 otherwise
West	1 if lives in west; 0 otherwise
Sex	1 if male; 0 if female
Hschool_orless	1 if education is high school or less; 0 otherwise
Some_college	1 if education is some college; 0 otherwise
College_ormore	1 if education is college or more; 0 otherwise
Poor	1 if poor; 0 otherwise
Nearpoor	1 if nearpoor; 0 otherwise
Lowincome	1 if low income; 0 otherwise
Middlehigh_income	1 if middle or high income; 0 otherwise
Health and Functional Status	
Excel_health	1 if health if self-reported health is excellent; 0 otherwise
Vgood_health	1 if health if self-reported health is very good; 0 otherwise
Good_health	1 if health if self-reported health is good; 0 otherwise
Fairpoor_health	1 if health if self-reported health is fair or poor; 0 otherwise
Excel_mnhealth	1 if health if self-reported mental health is excellent; 0 otherwise
Vgood_mnhealth	1 if health if self-reported mental health is very good; 0 otherwise
Good_mnhealth	1 if health if self-reported mental health is good; 0 otherwise
Fairpoor_mnhealth	1 if health if self-reported mental health is fair or poor; 0 otherwise
Iadlhp31	1 if individual received help or supervision for instrumental activities of daily living; 0 otherwise

Adlhlp31	1 if individual received help or supervision for activities of daily living; 0 otherwise
Underweight	1 if underweight; 0 otherwise
Normal	1 if normal weight; 0 otherwise
Overweight	1 if overweight; 0 otherwise
Obese	1 if obese; 0 otherwise
Adsmok42	1 if currently smokes; 0 otherwise
Haveus42	1 if access to usual source of care; 0 otherwise

Preventive Care Services Utilization

Cholck	Time since cholesterol check where 0 = within last year, and 1 = more than a year or never
Flushot	Time since flu shot where 0 = within last year, and 1 = more than a year or never
Check	Time since last routine check where 0 = within last year, and 1 = more than a year or never
Nofat53	1 if advised by doctor to restrict food high in fat or cholesterol; 0 otherwise
Exrcis53	1 if advised by doctor to exercise more; 0 otherwise

Attitudes towards health insurance and risk

Need_hinsurance	0 if disagree with “do not need health insurance”; 1 otherwise
Worth_hinsurance	0 if disagree with “health insurance is not worth the money it costs”; 1 otherwise
Risky	0 if disagree with “more likely to take risks”; 1 otherwise
Overcome_illness	0 if disagree with “can overcome illness without help from a medically trained person”; 1 otherwise

Clinical Conditions

Diab	1 if diagnosed with diabetes; 0 otherwise
Asth	1 if diagnosed with asthma; 0 otherwise
Hibp	1 if have high blood pressure; 0 otherwise
Chd	1 if diagnosed with coronary heart disease; 0 otherwise
Angi	1 if diagnosed with angina; 0 otherwise
Mid	1 if diagnosed with heart attack or myocardial infarction; 0 otherwise
Ohrt	1 if diagnosed with any other heart disease/condition; 0 otherwise
Strk	1 if diagnosed as having stroke; 0 otherwise
Emph	1 if diagnosed with emphysema; 0 otherwise

Table 3: Characteristics of the Medicaid population with Inpatient Visits ages 18-64 by dual-eligibility[a] status. Results are based on aggregated data from the Medical Expenditures Panel Survey[b].

	Non-duals	Duals	*p*-value[c]
Variable	Unweighted n = 2937 %	Unweighted n = 515 %	
Key Variables			
Avoidable Hospital Stay	13.4	23.9	< 0.0001
Medicaid HMO	46.5	31.9	< 0.0001
Demographic Characteristics			
Age			
Less than 35	61.6	11.8	< 0.0001
Between 35 and 56	27.8	58.3	
56 and above	10.6	29.9	
Region			0.2423
Northeast	20.5	17.3	
Midwest	24.1	21.0	
South	33.2	39.7	
West	22.3	22.0	
Male	17.7	36.0	< 0.0001
Education			0.1104
High School or Less	31.1	28.3	
Some College	55.3	53.6	
College or More	13.7	18.1	
Income			0.1872
Poor	55.7	52.4	
Near Poor	9.0	13.0	
Low Income	18.4	18.2	
Middle or High Income	17.0	16.4	
Health and Functional Status Characteristics			
Self-Reported Health			< 0.0001
Excellent	15.7	2.4	
Very Good	21.6	7.1	
Good	27.3	19.7	

Fair or Poor	35.3	70.9	
Self-Reported Mental Health			< 0.0001
Excellent	29.3	10.1	
Very Good	21.8	14.5	
Good	28.5	31.7	
Fair or Poor	20.4	43.8	
Received help or supervision for instrumental activities of daily living	10.1	33.7	< 0.0001
Received help or supervision for activities of daily living	4.9	19.1	< 0.0001
BMI			0.0003
Underweight	2.5	1.3	
Normal	29.9	21.3	
Overweight	27.0	23.8	
Obese	40.6	53.6	
Current Smoker	33.8	48.6	< 0.0001
Access to usual source of care	77.6	91.7	< 0.0001
Preventive Care Services Utilization			
Cholesterol Check (more than a year or never)	42.9	11.1	< 0.0001
Flu Shot (more than a year or never)	66.4	41.5	< 0.0001
Routine Check (more than a year or never)	28.0	12.2	< 0.0001
Advised by Doctor to Restrict Fatty Food	32.3	57.9	< 0.0001
Advised by Doctor to Exercise More	38.4	58.1	< 0.0001
Attitudes towards health insurance and risk			
Agree with Following Statements			
Do not need health insurance	15.6	5.6	< 0.0001
Health insurance is not worth the money it costs	40.9	32.4	0.0053
More likely to take risks	37.6	37.6	0.9936
Can overcome illness without help from a medically trained person	27.7	13.3	< 0.0001
Clinical Conditions (Yes)			
Diabetes	13.1	34.1	< 0.0001
Asthma	18.2	30.3	< 0.0001
High Blood Pressure	28.9	66.3	< 0.0001
Coronary Heart Disease	6.2	15.5	< 0.0001
Angina	4.4	12.0	< 0.0001
Myocardial Infarction	6.3	13.7	0.0001
Any other heart disease/condition	12.1	25.7	< 0.0001
Stroke	5.3	16.0	< 0.0001

Emphysema	4.2	14.7	< 0.0001

a. Dual Eligibility Status: Non-Duals are Medicaid recipients whose only health insurance is Medicaid. Duals are Medicaid recipients who are also insured through Medicare.
b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
c. *p*-values from Survey Design Based F-test

Table 4: Association between Medicaid Health Maintenance Organizations (HMO) coverage and Potentially Preventable Hospitalizations Among Non-Duals and Dual Eligibles[a], Ages 18-64. Results are based on data from the Medical Expenditures Panel Survey[b].

	Among Non-Duals	Among Duals
Prevalence of Potentially Preventable Hospitalizations		
Full Sample (%)	13.40	23.94
Among Medicaid FFS Recipients (%)	12.85	21.12
Among Medicaid HMO Recipients (%)	14.04 *p*-value = 0.4906	29.97 *p*-value = 0.0830
Logistic Regression: Survey-Weighted Logistic Model		
Odds Ratios[c] (95% CI[d])	1.18 (0.86 – 1.61) *p*-value = 0.308	1.68 (0.95 – 2.80) *p*-value = 0.0740
Logistic Regression: Propensity Score Weights		
Odds Ratios[e] (95% CI[d])	1.2 (0.88 – 1.64) *p*-value = 0.247	1.83 (1.05 – 3.19) *p*-value = 0.0340

Notes:

a. Dual Eligibility Status: Non-Duals are Medicaid recipients whose only health insurance is Medicaid. Duals are Medicaid recipients who are also insured through Medicare.
b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
c. Adjusted odds ratios from a multivariable logit regression estimated with survey weights, which controls for Medicaid HMO enrollment, demographics, health and functioning, attitudes towards health insurance and risk, preventive care services utilization, and clinical conditions.

d. CI = Confidence Interval
e. Adjusted odds ratios from a multivariable logit regression estimated with propensity score weights, which controls for Medicaid HMO enrollment, demographics, health and functioning, attitudes towards health insurance and risk, preventive care services utilization, and clinical conditions.

Table 5: Characteristics of the Medicaid population with any Emergency Room admission ages 18-64 by dual-eligibility status[a]. Results are based on aggregated data from the Medical Expenditures Panel Survey[b].

	Non-duals Unweighted n = 4584	Duals Unweighted n = 725	P-value[c]
Variable			
Key Variables			
Avoidable ER Visit	26.2	30.6	0.0004
Medicaid HMO	49.6	31.5	<0.0001
Demographics			
Age			<0.0001
Less than 35	56.2	14.4	
Between 35 and 56	34.6	57.8	
56 and above	9.2	27.8	
Region			<0.0001
Northeast	25.1	19.1	
Midwest	21.0	21.9	
South	26.5	36.6	
West	27.4	22.4	
Male	31.4	45.6	<0.0001
Education			0.0013
High School or Less	35.4	29.7	
Some College	51.3	54.6	
College or More	13.3	15.6	
Income			0.0518
Poor	47.8	46.8	
Near Poor	9.7	12.4	
Low Income	20.6	19.9	
Middle or High Income	21.9	20.9	
Health and Functional Status			
Self Reported Health			<0.0001
Excellent Health	19.5	5.9	
Very Good Health	25.2	10.9	
Good Health	29.8	25.4	

Fair or Poor Health	25.6	57.8	
Self Reported Mental Health			<0.0001
Excellent Mental Health	30.8	13.2	
Very Good Mental Health	24.1	16.4	
Good Mental Health	28.9	32.6	
Fair or Poor Mental Health	16.2	37.7	
Received help or supervision for instrumental activities of daily living	6.1	26.7	<0.0001
Received help or supervision for activities of daily living	2.8	12.3	<0.0001
BMI			<0.0001
Underweight	2.8	1.7	
Normal	32.6	23.9	
Overweight	28.5	27.2	
Obese	36.1	47.2	
Currently Smoke	33.5	39.0	0.0001
Access to usual source of care	75.4	90.4	<0.0001
Preventive Care Services Utilization			
Cholesterol Check (more than a year or never)	50.8	22.7	<0.0001
Flu Shot (more than a year or never)	75.3	51.2	<0.0001
Routine Check (more than a year or never)	36.9	20.3	<0.0001
Advised by Doctor to Restrict Fatty Food	30.6	52.6	<0.0001
Advised by Doctor to Exercise More	36.7	54.3	<0.0001
Attitudes towards health insurance and risk			
Agree With Following Statements			
Do not need health insurance	18.6	9.6	<0.0001
Health insurance is not worth the money it costs	42.8	35.4	<0.0001
More likely to take risks	41.4	37.6	0.0085
Can overcome illness without help from a medically trained person	32.3	20.3	<0.0001
Clinical Conditions			
Diabetes	9.2	25.2	<0.0001
Asthma	14.9	22.2	<0.0001
High Blood Pressure	24.2	53.4	<0.0001
Coronary Heart Disease	3.3	9.5	<0.0001
Angina	2.0	6.6	<0.0001
Myocardial Infarction	3.0	8.3	<0.0001
Any other heart disease/condition	7.7	16.9	<0.0001

Stroke	2.7	10.9	<0.0001
Emphysema	2.4	8.2	<0.0001

a. Dual Eligibility Status: Non-Duals are Medicaid recipients whose only health insurance is Medicaid. Duals are Medicaid
recipients who are also insured through Medicare.
b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
c. p-values from Survey Design Based F-test

Table 6: Characteristics of the Medicaid population with Avoidable Emergency Room admission ages 18-64 by dual-eligibility status[a]. Results are based on aggregated data from the Medical Expenditures Panel Survey[b].

	Non-duals	Duals	P-value[c]
	Unweighted n = 4584	Unweighted n = 725	
Variable			
Key Variables			
Avoidable ER Visit	17.5	24	0.0019
Medicaid HMO	50.1	32.1	<0.0001
Demographics			
Age			
Less than 35	57.7	13.9	<0.0001
Between 35 and 56	34.3	57	
56 and above	8.1	29.1	
Region			0.0038
Northeast	23.6	17	
Midwest	24.8	22.8	
South	29.4	38.2	
West	22.2	22.1	
Male	26.1	39.3	<0.0001
Education			0.0304
High School or Less	34	29.2	
Some College	53.7	54.7	
College or More	12.3	16.1	
Income			0.1082
Poor	54.3	52.5	
Near Poor	9.5	13.1	
Low Income	18.9	16.8	
Middle or High Income	17.4	17.6	
Health and Functional Status			
Self Reported Health			<0.0001
Excellent Health	13	3.3	
Very Good Health	21.3	9.2	
Good Health	29	23.3	

Fair or Poor Health	36.6	64.2	
Self Reported Mental Health			<0.0001
Excellent Mental Health	27	9.1	
Very Good Mental Health	21.1	17	
Good Mental Health	29.7	32.5	
Fair or Poor Mental Health	22.2	41.4	
Received help or supervision for instrumental activities of daily living	8.6	29.5	<0.0001
Received help or supervision for activities of daily living	3.8	14.4	<0.0001
BMI			0.0018
Underweight	2.8	1.5	
Normal	29.8	22	
Overweight	25.2	28.1	
Obese	42.2	48.4	
Currently Smoke	42	46.1	0.1286
Access to usual source of care	77.3	92.6	<0.0001
Preventive Care Services Utilization			
Cholesterol Check (more than a year or never)	47	18.7	<0.0001
Flu Shot (more than a year or never)	71.2	45.9	<0.0001
Routine Check (more than a year or never)	33.3	16.1	<0.0001
Advised by Doctor to Restrict Fatty Food	33.6	54.1	<0.0001
Advised by Doctor to Exercise More	41.6	57.9	<0.0001
Attitudes towards health insurance and risk			
Agree With Following Statements			
Do not need health insurance	14.3	9.4	0.0052
Health insurance is not worth the money it costs	40.8	35	0.0119
More likely to take risks	40.5	41	0.8494
Can overcome illness without help from a medically trained person	29.2	19.1	0.0001
Clinical Conditions			
Diabetes	12	30	<0.0001
Asthma	21.6	28.3	0.0049
High Blood Pressure	30.1	59.6	<0.0001
Coronary Heart Disease	5.2	12.1	<0.0001
Angina	3.3	9.7	<0.0001
Myocardial Infarction	5	11.5	<0.0001
Any other heart disease/condition	10.9	23.2	<0.0001

Stroke	4.5	14.8	<0.0001
Emphysema	3.8	11.9	<0.0001

a. Dual Eligibility Status: Non-Duals are Medicaid recipients whose only health insurance is Medicaid. Duals are Medicaid
recipients who are also insured through Medicare.
b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
c. p-values from Survey Design Based F-test

Table 7: Logistic Regressions for the Prevalence of Any Emergency Room Visit in the Medicaid Non-Dual[a] Population, Ages 18-64 (N=18406). Results are based on aggregated data from the Medical Expenditures Panel Survey[b].

VARIABLES	(Model 1) Survey Logistic Regression[c]	(Model 2) PSW Logistic Regression[d]
	Odds Ratio (95% CI[e])	Odds Ratio (95% CI)
Medicaid HMO[f] (Ref[g]: Medicaid non-HMO**)**	1.004 (0.920 – 1.096)	1.006 (0.921 – 1.097)
Demographic Characteristics		
Age (Ref: less than 35**)**		
Between 35 and 56	0.644*** (0.577 – 0.719)	0.637*** (0.569 – 0.714)
56 and above	0.407*** (0.335 – 0.494)	0.408*** (0.332 – 0.501)
Region (Ref: Northeast**)**		
Midwest	1.232*** (1.064 – 1.426)	1.234*** (1.067 – 1.426)
South	1.140* (0.998 – 1.303)	1.138* (0.996 – 1.301)
West	0.860** (0.740 – 0.998)	0.855** (0.734 – 0.995)
Male (Ref: Female**)**	0.770*** (0.690 – 0.859)	0.787*** (0.704 – 0.879)
Education (Ref: High School or Less**)**		
Some college	1.090* (0.989 – 1.202)	1.094* (0.989 – 1.210)
College or more	1.068 (0.907 – 1.256)	1.097 (0.926 – 1.299)
Income (Ref: Poor**)**		
Near Poor	0.920 (0.797 – 1.062)	0.926 (0.800 – 1.071)
Low income	0.891* (0.788 – 1.007)	0.894* (0.790 – 1.012)
Middle or High Income	0.759*** (0.661 – 0.872)	0.765*** (0.666 – 0.879)
Health and Functional Status Characteristics		
Self-Reported Health (Ref: Excellent**)**		
Very Good	1.402*** (1.176 – 1.672)	1.413*** (1.183 – 1.687)
Good	1.615*** (1.366 – 1.910)	1.610*** (1.361 – 1.905)
Fair or Poor	2.422*** (2.006 – 2.924)	2.425*** (1.993 – 2.949)
Self-Reported Mental Health (Ref: Excellent**)**		
Very Good	0.853** (0.744 – 0.977)	0.843** (0.734 – 0.968)
Good	0.869** (0.761 – 0.992)	0.861** (0.753 – 0.984)
Fair or Poor	0.950 (0.807 – 1.120)	0.925 (0.780 – 1.096)
Received help or supervision for instrumental activities of daily living (Ref: Otherwise**)**	1.163 (0.922 – 1.468)	1.175 (0.928 – 1.486)

Received help or supervision for activities of daily living (Ref: Otherwise**)**	0.994 (0.737 – 1.341)	0.940 (0.691 – 1.278)
BMI (Ref: Underweight**)**		
Normal weight	1.058 (0.772 – 1.450)	1.050 (0.751 – 1.466)
Overweight	0.969 (0.711 – 1.322)	0.965 (0.694 – 1.343)
Obese	1.157 (0.843 – 1.586)	1.137 (0.814 – 1.588)
Current Smoker (Ref: Current Non-smoker**)**	1.443*** (1.299 – 1.604)	1.441*** (1.294 – 1.605)
Access to usual source of care (Ref: No Access**)**	0.943 (0.847 – 1.049)	0.945 (0.849 – 1.051)
Preventive Care Services Utilization		
Cholesterol Check[h] (more than a year or never)	0.957 (0.854 – 1.071)	0.946 (0.845 – 1.060)
Flu Shot[h] (more than a year or never)	0.842*** (0.752 – 0.942)	0.833*** (0.742 – 0.935)
Routine Check[h] (more than a year or never)	0.955 (0.845 – 1.080)	0.961 (0.849 – 1.088)
Advised by Doctor to Restrict Fatty Food (Ref: Doctor did not advice)	0.879* (0.762 – 1.013)	0.854** (0.738 – 0.988)
Advised by Doctor to Exercise More (Ref: Doctor did not advice)	1.140* (0.998 – 1.301)	1.154** (1.008 – 1.320)
Attitudes towards health insurance and risk		
Agree with following statements[i]		
Do not need health insurance	0.824*** (0.723 – 0.940)	0.822*** (0.718 – 0.940)
Health Insurance is not worth the money it costs	0.977 (0.887 – 1.077)	0.978 (0.887 – 1.078)
More likely to take risks	1.027 (0.936 – 1.126)	1.032 (0.941 – 1.132)
Can Overcome Illness without help from a medically trained person	0.978 (0.870 – 1.099)	0.977 (0.869 – 1.100)
Clinical Conditions[j]		
Diabetes	1.146 (0.952 – 1.379)	1.152 (0.951 – 1.395)
Asthma	1.397*** (1.237 – 1.578)	1.382*** (1.222 – 1.565)
High Blood Pressure	1.189*** (1.048 – 1.349)	1.205*** (1.057 – 1.373)
Coronary Heart Disease	1.214 (0.871 – 1.693)	1.237 (0.874 – 1.751)
Angina	1.206 (0.871 – 1.669)	1.214 (0.870 – 1.695)
Myocardial Infarction	1.346* (0.984 – 1.839)	1.316 (0.943 – 1.835)
Any other heart disease/condition	1.149 (0.964 – 1.369)	1.157 (0.970 – 1.381)
Stroke	1.539*** (1.190 – 1.990)	1.481*** (1.140 – 1.924)
Emphysema	1.213 (0.917 – 1.605)	1.222 (0.910 – 1.640)
Constant	0.283*** (0.193 – 0.415)	0.288*** (0.193 – 0.431)

Notes: ***significant at the 1% level; **significant at the 5% level; and *significant at the 10% level
a. Non-Duals are Medicaid recipients whose only health insurance is Medicaid.
b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
c. Logistic regression using survey weights
d. Logistic regression using survey weights combined with propensity score weights
e. CI = Confidence Interval
f. HMO = Health Maintenance Organization
g. Reference category
h. Reference = within last year
i. For all attitudes towards health insurance and risk statements: Reference = Disagree with the statement
j. For all clinical conditions: Reference = Condition not present

Table 8: Logistic Regressions for the Prevalence of Any Emergency Room Visit in the Medicaid Dual[a] Population, Ages 18-64 (N=2361). Results are based on aggregated data from the Medical Expenditures Panel Survey[b].

VARIABLES	(Model 1) Survey Logistic Regression[c] Odds Ratio (95% CI[e])	(Model 2) PSW Logistic Regression[d] Odds Ratio (95% CI)
Medicaid HMO[f] (Ref[g]: Medicaid non-HMO**)**	1.046 (0.850 – 1.286)	1.036 (0.840 – 1.277)
Demographic Characteristics		
Age (Ref: less than 35**)**		
Between 35 and 56	0.693** (0.482 – 0.997)	0.692** (0.450 – 0.998)
56 and above	0.625** 0.414 – 0.944)	0.651** (0.425 – 0.997)
Region (Ref: Northeast**)**		
Midwest	1.227 (0.824 – 1.827)	1.138 (0.750 – 1.726)
South	1.237 (0.863 – 1.772)	1.106 (0.756 – 1.618)
West	1.163 (0.788 – 1.714)	1.002 (0.671 – 1.496)
Male (Ref: Female**)**	0.689*** (0.559 - .849)	0.654*** (0.520 – 0.824)
Education (Ref: High School or Less**)**		
Some college	1.070 (0.829 – 1.381)	1.080 (0.818 – 1.426)
College or more	1.094 (0.762 – 1.570)	1.170 (0.790 – 1.732)
Income (Ref: Poor**)**		
Near Poor	0.875 (0.631 – 1.212)	0.999 (0.695 – 1.436)
Low income	0.710** (0.522 – 0.965)	0.665** (0.472 – 0.937)
Middle or High Income	0.725* (0.523 – 1.003)	0.636** (0.436 – 0.928)
Health and Functional Status Characteristics		
Self-Reported Health (Ref: Excellent**)**		
Very Good	1.187 (0.573 – 2.46)	0.952 (0.450 – 2.014)
Good	1.185 (0.611 – 2.300)	0.957 (0.483 – 1.895)
Fair or Poor	1.249 (0.662 – 2.357)	1.068 (0.546 – 2.092)
Self-Reported Mental Health (Ref: Excellent**)**		
Very Good	1.526* (0.988 – 2.357)	1.573* (0.993 – 2.493)
Good	1.486* (0.984 – 2.245)	1.725** (1.143 – 2.603)
Fair or Poor	1.488* (0.985 – 2.247)	1.560** (1.029 – 2.365)
Received help or supervision for instrumental activities of daily living (Ref: Otherwise**)**	1.060 (0.797 – 1.410)	0.997 (0.729 – 1.362)

Received help or supervision for activities of daily living (Ref: Otherwise**)**	1.202 (0.806 – 1.793)	1.256 (0.811 – 1.946)
BMI (Ref: Underweight**)**		
Normal weight	1.143 (0.494 – 2.645)	1.047 (0.397 – 2.761)
Overweight	1.358 (0.574 – 3.211)	1.283 (0.480 – 3.428)
Obese	1.073 (0.446 – 2.582)	0.981 (0.356 – 2.701)
Current Smoker (Ref: Current Non-smoker**)**	1.449*** (1.139 – 1.844)	1.511*** (1.164 – 1.960)
Access to usual source of care (Ref: No Access**)**	1.371 (0.885 – 2.124)	1.646** (1.031 – 2.629)
Preventive Care Services Utilization		
Cholesterol Check[h] (more than a year or never)	0.948 (0.666 – 1.348)	0.816 (0.561 – 1.187)
Flu Shot[h] (more than a year or never)	0.788** (0.622 – 0.998)	0.770** (0.597 – 0.992)
Routine Check[h] (more than a year or never)	0.830 (0.600 – 1.146)	0.994 (0.721 – 1.370)
Advised by Doctor to Restrict Fatty Food (Ref: Doctor did not advice)	0.807 (0.614 – 1.062)	0.853 (0.636 – 1.146)
Advised by Doctor to Exercise More (Ref: Doctor did not advice)	1.210 (0.943 – 1.553)	1.240 (0.942 – 1.630)
Attitudes towards health insurance and risk		
Agree with following statements[i]		
Do not need health insurance	1.219 (0.826 – 1.800)	1.200 (0.793 – 1.815)
Health Insurance is not worth the money it costs	0.932 (0.739 – 1.174)	0.915 (0.705 – 1.188)
More likely to take risks	1.263* (0.985 – 1.619)	1.262 (0.956 – 1.664)
Can Overcome Illness without help from a medically trained person	1.041 (0.769 – 1.409)	0.993 (0.726 – 1.358)
Clinical Conditions[j]		
Diabetes	1.206 (0.898 – 1.621)	1.215 (0.883 – 1.673)
Asthma	1.205 (0.908 – 1.600)	1.087 (0.798 – 1.481)
High Blood Pressure	1.236 (0.957 – 1.597)	1.132 (0.855 – 1.497)
Coronary Heart Disease	0.715 (0.454 – 1.124)	0.777 (0.459 – 1.316)
Angina	1.558* (0.938 – 2.590)	1.601 (0.907 – 2.823)
Myocardial Infarction	1.271 (0.823 – 1.965)	1.396 (0.856 – 2.79)
Any other heart disease/condition	1.589*** (1.149 – 2.199)	1.570** (1.105 – 2.230)
Stroke	1.334 (0.939 – 1.895)	1.211 (0.829 – 1.770)
Emphysema	1.274 (0.864 – 1.879)	1.127 (0.763 – 1.666)
Constant	0.157*** (0.048 – 0.514)	0.186*** (0.054 – 0.638)

Notes: ***significant at the 1% level; **significant at the 5% level; and *significant at the 10% level
a. Duals are Medicaid recipients who are also insured through Medicare.
b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
c. Logistic regression using survey weights
d. Logistic regression using survey weights combined with propensity score weights
e. CI = Confidence Interval
f. HMO = Health Maintenance Organization
g. Reference category
h. Reference = within last year
i. For all attitudes towards health insurance and risk statements: Reference = Disagree with the statement
j. For all clinical conditions: Reference = Condition not present

Table 9: Logistic Regressions for the Prevalence of Avoidable Emergency Room Visit in the Medicaid Non-Dual[a] Population, Ages 18-64 (N=4584). Results are based on aggregated data from the Medical Expenditures Panel Survey[b].

VARIABLES	(Model 1) Survey Logistic Regression[c] Odds Ratio (95% CI[e])	(Model 2) PSW Logistic Regression[d] Odds Ratio (95% CI)
Medicaid HMO[f] (Ref[g]: Medicaid non-HMO**)**	0.926 (0.754 – 1.137)	0.938 (0.764 – 1.152)
Demographic Characteristics		
Age (Ref: less than 35**)**		
Between 35 and 56	0.944 (0.700 – 1.273)	0.919 (0.675 – 1.250)
56 and above	1.040 (0.707 – 1.533)	0.990 (0.668 – 1.467)
Region (Ref: Northeast**)**		
Midwest	0.892 (0.623 – 1.277)	0.957 (0.662 – 1.385)
South	1.210 (0.883 – 1.659)	1.250 (0.900 – 1.736)
West	1.040 (0.731 – 1.479)	1.056 (0.731 – 1.524)
Male (Ref: Female**)**	0.671*** (0.520 – 0.867)	0.671*** (0.515 – 0.875)
Education (Ref: High School or Less**)**		
Some college	0.942 (0.757 – 1.172)	0.958 (0.766 – 1.197)
College or more	0.948 (0.647 – 1.388)	0.918 (0.621 – 1.356)
Income (Ref: Poor**)**		
Near Poor	1.127 (0.801 – 1.585)	1.140 (0.802 – 1.618)
Low income	1.154 (0.889 – 1.499)	1.183 (0.911 – 1.535)
Middle or High Income	1.314* (0.954 – 1.809)	1.371* (0.988 – 1.903)
Health and Functional Status Characteristics		
Self-Reported Health (Ref: Excellent**)**		
Very Good	1.225 (0.789 – 1.902)	1.252 (0.808 – 1.940)
Good	1.100 (0.703 – 1.723)	1.124 (0.711 – 1.777)
Fair or Poor	1.369 (0.882 – 2.126)	1.433 (0.916 – 2.241)
Self-Reported Mental Health (Ref: Excellent**)**		
Very Good	0.936 (0.673 – 1.300)	1.005 (0.718 – 1.406)
Good	0.946 (0.696 – 1.286)	0.974 (0.706 – 1.344)
Fair or Poor	0.825 (0.595 – 1.143)	0.856 (0.615 – 1.193)
Received help or supervision for instrumental activities of daily living (Ref: Otherwise**)**	0.806 (0.558 – 1.165)	0.785 (0.540 – 1.142)

Received help or supervision for activities of daily living (Ref: Otherwise**)**	1.116 (0.696 – 1.789)	1.180 (0.723 – 1.925)
BMI (Ref: Underweight**)**		
Normal weight	0.880 (0.488 – 1.589)	0.811 (0.445 – 1.480)
Overweight	0.664 (0.363 – 1.216)	0.608 (0.330 – 1.119)
Obese	0.619 (0.340 – 1.126)	0.557* (0.308 – 1.009)
Current Smoker (Ref: Current Non-smoker**)**	1.018 (0.807 – 1.283)	0.985 (0.783 – 1.238)
Access to usual source of care (Ref: No Access**)**	1.051 (0.801 – 1.380)	1.029 (0.778 – 1.361)
Preventive Care Services Utilization		
Cholesterol Check[h] (more than a year or never)	0.957 (0.732 – 1.249)	0.937 (0.712 - 1232)
Flu Shot[h] (more than a year or never)	0.929 (0.729 – 1.183)	0.937 (0.731 – 1.201)
Routine Check[h] (more than a year or never)	0.962 (0.733 – 1.262)	1.005 (0.761 – 1.327)
Advised by Doctor to Restrict Fatty Food (Ref: Doctor did not advice)	0.901 (0.669 – 1.213)	0.867 (0.643 – 1.170)
Advised by Doctor to Exercise More (Ref: Doctor did not advice)	1.149 (0.870 – 1.516)	1.148 (0.865 – 1.524)
Attitudes towards health insurance and risk		
Agree with following statements[i]		
Do not need health insurance	1.207 (0.869 – 2.676)	1.214 (0.866 – 1.701)
Health Insurance is not worth the money it costs	0.978 (0.782 – 1.222)	0.966 (0.767 – 1.218)
More likely to take risks	1.061 (0.847 – 1.328)	1.102 (0.883 – 1.377)
Can Overcome Illness without help from a medically trained person	0.691*** (0.527 – 0.906)	0.702** (0.536 – 0.920)
Clinical Conditions[j]		
Diabetes	2.126*** (1.505 – 3.002)	2.319*** (1.625 – 3.309)
Asthma	2.334*** (1.867 – 2.920)	2.248*** (1.797 – 2.812)
High Blood Pressure	1.605*** (1.211 – 2.127)	1.694*** (1.263 – 2.272)
Coronary Heart Disease	1.257 (0.752 – 2.101)	1.294 (0.770 – 2.174)
Angina	1.160 (0.651 – 2.067)	1.103 (0.615 – 1.977)
Myocardial Infarction	1.102 (0.687 – 1.767)	1.106 (0.682 – 1.795)
Any other heart disease/condition	1.118 (0.803 – 1.557)	1.078 (0.772 – 1.505)
Stroke	0.773 (0.516 – 1.156)	0.728 (0.488 – 1.088)

Emphysema	1.839** (1.107 – 3.057)	1.923** (1.130 – 3.272)
Constant	0.173*** (0.082 – 0.367)	0.173*** (0.079 – 0.376)

Notes: ***significant at the 1% level; **significant at the 5% level; and *significant at the 10% level

a. Non-Duals are Medicaid recipients whose only health insurance is Medicaid.

b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.

c. Logistic regression using survey weights

d. Logistic regression using survey weights combined with propensity score weights

e. CI = Confidence Interval

f. HMO = Health Maintenance Organization

g. Reference category

h. Reference = within last year

i. For all attitudes towards health insurance and risk statements: Reference = Disagree with the statement

j. For all clinical conditions: Reference = Condition not present

Table 10: Logistic Regressions for the Prevalence of Avoidable Emergency Room Visit in the Medicaid Dual[a] Population, Ages 18-64 (N=725). Results are based on aggregated data from the Medical Expenditures Panel Survey[b].

VARIABLES	(Model 1) Survey Logistic Regression[c]	(Model 2) PSW Logistic Regression[d]
	Odds Ratio (95% CI[e])	Odds Ratio (95% CI)
Medicaid HMO[f] (Ref[g]: Medicaid non-HMO**)**	1.107 (0.709 – 1.730)	1.028 (0.659)
Demographic Characteristics		
Age (Ref: less than 35**)**		
Between 35 and 56	0.991 (0.475 – 2.065)	1.408 (0.650 – 3.050)
56 and above	0.814 (0.335 – 1.978)	1.314 (0.517 – 3.340)
Region (Ref: Northeast**)**		
Midwest	0.901 (0.413 – 1.964)	0.807 (0.371 – 1.755)
South	1.193 (0.566 – 2.513)	0.864 (0.407 – 1.835)
West	0.901 (0.419 – 1.936)	0.690 (0.314 – 1.513)
Male (Ref: Female**)**	0.604** (0.371 – 0.983)	0.698 (0.412 – 1.183)
Education (Ref: High School or Less**)**		
Some college	0.674 (0.399 – 1.139)	0.634* (0.369 – 1.090)
College or more	0.597 (0.293 – 1.216)	0.604 (0.297 – 1.231)
Income (Ref: Poor**)**		
Near Poor	1.247 (0.673 – 2.312)	1.419 (0.745 – 2.702)
Low income	0.732 (0.378 – 1.417)	0.650 (0.322 – 1.311)
Middle or High Income	1.448 (0.776 – 2.702)	1.390 (0.737 – 2.622)
Health and Functional Status Characteristics		
Self-Reported Health (Ref: Excellent**)**		
Very Good	6.091** (1.038 – 35.747)	6.267* (0.995 – 39.478)
Good	9.356** (1.422 – 61.543)	8.545** (1.308 – 55.848)
Fair or Poor	7.344** (1.123 – 48.038)	7.362** (1.183 – 45.804)
Self-Reported Mental Health (Ref: Excellent**)**		
Very Good	0.276*** (0.114 – 0.671)	0.219*** (0.090 – 0.533)
Good	0.296*** (0.137 – 0.641)	0.308*** (0.139 – 0.682)
Fair or Poor	0.252*** (0.117 – 0.543)	0.212*** (0.097 – 0.463)
Received help or supervision for instrumental activities of daily living (Ref: Otherwise**)**	1.224 (0.676 – 2.219)	1.839* (1.000 – 3.381)

Received help or supervision for activities of daily living (Ref: Otherwise**)**	2.037* (0.943 – 4.401)	1.629 (0.706 – 3.759)
BMI (Ref: Underweight**)**		
Normal weight	0.162** (0.030 – 0.880)	0.148** (0.032 – 0.693)
Overweight	0.207* (0.039 – 1.101)	0.170** (0.038 – 0.767)
Obese	0.230* (0.042 – 1.257)	0.255* (0.051 – 1.263)
Current Smoker (Ref: Current Non-smoker**)**	0.851 (0.558 – 1.296)	0.858 (0.557 – 1.321)
Access to usual source of care (Ref: No Access**)**	1.982 (0.716 – 5.488)	1.800 (0.650 – 4.988)
Preventive Care Services Utilization		
Cholesterol Check[h] (more than a year or never)	1.270 (0.656 – 2.460)	0.977 (0.499 – 1.911)
Flu Shot[h] (more than a year or never)	1.524* (0.954 – 2.437)	1.504 (0.897 – 2.523)
Routine Check[h] (more than a year or never)	0.802 (0.397 – 1.620)	1.123 (0.572 – 2.204)
Advised by Doctor to Restrict Fatty Food (Ref: Doctor did not advice)	1.866** (1.125 – 3.095)	1.813** (1.040 – 3.161)
Advised by Doctor to Exercise More (Ref: Doctor did not advice)	0.631* (0.370 – 1.075)	0.561** (0.326 – 0.968)
Attitudes towards health insurance and risk		
Agree with following statements[i]		
Do not need health insurance	0.886 (0.380 – 2.063)	0.645 (0.263 – 1.583)
Health Insurance is not worth the money it costs	0.820 (0.505 – 1.331)	0.915 (0.542 – 1.546)
More likely to take risks	1.286 (0.814 – 2.032)	1.164 (0.697 – 1.946)
Can Overcome Illness without help from a medically trained person	0.681 (0.354 – 1.308)	0.740 (0.347 – 1.580)
Clinical Conditions[j]		
Diabetes	1.221 (0.687 – 2.168)	0.987 (0.539 – 1.806)
Asthma	2.432 (1.460 – 4.051)	2.730*** (1.612 – 4.622)
High Blood Pressure	1.153*** (0.659 – 2.019)	1.144 (0.655 – 1.998)
Coronary Heart Disease	0.872 (0.340 – 2.236)	0.974 (0.343 – 2.765)
Angina	0.928 (0.437 – 1.971)	0.853 (0.388 – 1.873)
Myocardial Infarction	1.501 (0.604 – 3.731)	1.547 (0.624 – 3.831)
Any other heart disease/condition	1.015 (0.578 – 1.781)	1.057 (0.613 – 1.823)
Stroke	1.224 (0.649 – 2.309)	0.946 (0.498 – 1.794)
Emphysema	2.118** (1.091 – 4.110)	2.128** (1.131 – 4.007)

Constant	0.193 (0.012 – 3.185)	0.218 (0.017 – 2.755)

Notes: ***significant at the 1% level; **significant at the 5% level; and *significant at the 10% level
a. Duals are Medicaid recipients who are also insured through Medicare.
b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
c. Logistic regression using survey weights
d. Logistic regression using survey weights combined with propensity score weights
e. CI = Confidence Interval
f. HMO = Health Maintenance Organization
g. Reference category
h. Reference = within last year
i. For all attitudes towards health insurance and risk statements: Reference = Disagree with the statement
j. For all clinical conditions: Reference = Condition not present

APPENDIX

A Table 1: Characteristics of the Medicaid population ages 18-64 by dual-eligibility[a] and Medicaid HMO[b] status. Results are based on aggregated data from the Medical Expenditures Panel Survey[c].

	Non-duals			Duals		
Characteristics (%)	FFS[d]	HMO	*p*-value[e]	FFS	HMO	*p*-value
Demographic Characteristics						
Age			0.8293			0.9135
Less than 35	61.39	61.81		12.25	10.69	
Between 35 and 56	28.32	27.16		58.21	58.52	
56 and above	10.29	11.03		29.54	30.79	
Region			0.0001			0.1645
Northeast	16.35	25.25		18.10	15.7	
Midwest	24.83	23.19		24.54	13.44	
South	38.09	27.49		38.16	42.85	
West	20.72	24.08		19.20	28	
Male	17.63	17.88	0.932	38.13	31.54	0.2885
Education			0.343			0.4522
High School or less	31.58	30.51		26.64	31.77	
Some College	53.84	56.88		56.03	48.41	
College or more	14.58	12.61		17.33	19.83	
Income			0.0735			0.0289
Poor	53.62	58.00		47.48	62.86	
Near Poor	8.14	9.96		12.87	13.14	
Low Income	19.85	16.67		20.89	12.58	
Middle or High Income	18.39	15.37		18.76	11.42	
Health and Functional Status Characteristics						
Self-Reported Health			0.3287			0.0877
Excellent	17.03	14.24		1.54	4.25	
Very Good	21.89	21.28		8.08	4.91	
Good	26.96	27.71		17.65	23.94	
Fair or Poor	34.11	36.76		72.72	66.90	
Self-Reported Mental Health			0.9511			0.0972
Excellent	29.85	28.62		7.88	14.69	
Very Good	21.51	22.05		16.29	10.63	
Good	28.32	28.77		30.23	34.92	

Fair/Poor	20.33	20.56		45.61	39.76	
Received help or supervision for instrumental activities of daily living	10.67	9.37	0.3753	32.96	35.23	0.6728
Received help or supervision for activities of daily living	5.34	4.49	0.3602	17.05	23.38	0.1277
BMI			0.2045			0.5195
Underweight	2.81	2.16		0.84	2.40	
Normal	31.47	28.08		20.39	23.08	
Overweight	27.18	26.69		25.44	20.31	
Obese	38.53	43.07		53.33	54.22	
Current smoker	33.73	33.91	0.9421	47.51	51.06	0.5656
Access to usual source of care	75.70	79.68	0.0504	91.16	92.84	0.5828
Preventive Care Services Utilization						
Cholesterol Check (more than a year or never)	45.33	40.00	0.0413	12.29	8.56	0.2407
Flu Shot (more than a year or never)	67.83	64.64	0.1979	39.04	46.83	0.1634
Routine Check (more than a year or never)	30.49	25.19	0.0184	11.43	13.83	0.4949
Advised by Doctor to Restrict Fatty Food	31.10	33.54	0.2729	60.03	53.38	0.2726
Advised by Doctor to Exercise More	37.54	39.41	0.4183	58.8	56.56	0.6962
Attitudes towards health insurance and risk						
Agree with Following Statements						
Do not need health insurance	17.17	13.73	0.0363	6.10	4.41	0.5489
Health insurance is not worth the money it costs	43.47	37.84	0.0227	34.99	26.88	0.1485
More likely to take risks	40.09	34.67	0.0096	35.55	41.83	0.2704
Can overcome illness without medical help	28.70	26.62	0.3665	13.96	11.92	0.6076
Clinical Conditions						
Diabetes	12.86	13.4	0.7306	34.89	32.33	0.6474
Asthma	17.55	18.89	0.4927	28.89	33.33	0.3992
High Blood Pressure	28.59	29.28	0.7581	68.19	62.08	0.2896
Coronary Heart Disease	6.70	5.66	0.4143	15.62	15.26	0.9419
Angina	5.03	3.67	0.1882	11.85	12.44	0.9005
Myocardial Infarction	6.62	5.96	0.6218	12.79	15.69	0.5524

Any other heart disease/condition	12.94	11.17	0.2701	27.32	22.49	0.4176
Stroke	4.73	5.99	0.2784	15.12	17.73	0.5636
Emphysema	5.13	3.04	0.0424	14.31	15.50	0.7931

a. Dual Eligibility Status: Non-Duals are Medicaid recipients whose only health insurance is Medicaid. Duals are Medicaid recipients who are also insured through Medicare.
b. HMO = Health Maintenance Organization
c. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
d. FFS = Fee For Service
e. *p*-values from Survey Design Based F-test

A Table 2: Logistic Regressions for the Prevalence of a Potentially Preventable Hospital Stay in the Medicaid Non-Dual[a] Population, Ages 18-64 (N=2937). Results are based on aggregated data from the Medical Expenditures Panel Survey[b].

VARIABLES	(Model 1) Survey Logistic Regression[c]	(Model 2) PSW Logistic Regression[d]
	Odds Ratio (95% CI[e])	Odds Ratio (95% CI)
Medicaid HMO[f] (Ref[g]: Medicaid non-HMO**)**	1.177 (0.860 – 1.611)	1.203 (0.880 – 1.640)
Demographic Characteristics		
Age (Ref: less than 35**)**		
Between 35 and 56	1.994*** (1.202 – 3.306)	1.854** (1.120 – 3.060)
56 and above	2.358*** (1.326 – 4.194)	2.142** (1.196 – 3.834)
Region (Ref: Northeast**)**		
Midwest	1.191 (0.689 – 2.057)	1.234 (0.720 – 2.113)
South	1.294 (0.774 – 2.160)	1.328 (0.789 – 2.234)
West	1.385 (0.813 – 2.350)	1.312 (0.772 – 2.228)
Male (Ref: Female**)**	1.304 (0.898 – 1.890)	1.386 (0.935 – 2.054)
Education (Ref: High School or Less**)**		
Some college	0.985 (0.689 – 1.40)	0.948 (0.658 – 1.365)
College or more	0.693 (0.376 – 1.276)	0.660 (0.354 – 1.232)
Income (Ref: Poor**)**		
Near Poor	1.333 (0.819 – 2.171)	1.243 (0.758 – 2.040)
Low income	1.114 (0.749 – 1.658)	1.255 (0.814 – 1.934)
Middle or High Income	1.478 (0.924 – 2.365)	1.661** (1.031 – 2.672)
Health and Functional Status Characteristics		
Self-Reported Health (Ref: Excellent**)**		
Very Good	1.117 (0.535 – 2.329)	1.194 (0.551 – 2.580)
Good	0.739 (0.334 – 1.633)	0.710 (0.308 – 1.635)
Fair or Poor	1.334 (0.603 – 2.949)	1.344 (0.582 – 3.099)
Self-Reported Mental Health (Ref: Excellent**)**		
Very Good	1.105 (0.705 – 1.732)	1.221 (0.761 – 1.960)
Good	0.933 (0.593 – 1.469)	0.981 (0.599 – 1.607)
Fair or Poor	1.117 (0.686 – 1.817)	1.248 (0.757 – 2.059)
Received help or supervision for instrumental activities of daily living (Ref: Otherwise**)**	0.868 (0.507 – 1.485)	0.738 (0.435 – 1.250)

Received help or supervision for activities of daily living (Ref: Otherwise**)**	0.687 (0.342 – 1.370)	0.805 (0.394 – 1.645)
BMI (Ref: Underweight**)**		
Normal weight	0.372*** (0.204 – 0.679)	0.371*** (.194 – 0.709)
Overweight	0.289*** (0.160 – 0.522)	0.297*** (0.153 – 0.577)
Obese	0.330*** (0.184 – 0.592)	0.328*** (0.176 – 0.613)
Current Smoker (Ref: Current Non-smoker**)**	1.124 (0.762 – 1.658)	1.052 (0.725 – 1.525)
Access to usual source of care (Ref: No Access**)**	1.560* (0.963 – 2.527)	1.386 (0.843 – 2.277)
Preventive Care Services Utilization		
Cholesterol Check[h] (more than a year or never)	1.144 (0.760 – 1.723)	1.102 (0.724 – 1.678)
Flu Shot[h] (more than a year or never)	0.833 (0.590 – 1.10)	0.876 (0.618 – 1.241)
Routine Check[h] (more than a year or never)	1.010 (0.617 – 1.651)	1.043 (0.641 – 1.694)
Advised by Doctor to Restrict Fatty Food (Ref: Doctor did not advice)	0.936 (0.592 – 1.479)	0.865 (0.543 – 1.377)
Advised by Doctor to Exercise More (Ref: Doctor did not advice)	0.931 (0.603 – 1.437)	0.958 (0.621 – 1.476)
Attitudes towards health insurance and risk		
Agree with following statements[i]		
Do not need health insurance	1.166 (0.655 – 2.077)	1.188 (0.682 – 2.070)
Health Insurance is not worth the money it costs	0.779 (0.558 – 1.087)	0.809 (0.574 – 1.141)
More likely to take risks	0.905 (0.641 – 1.277)	0.913 (0.627 – 1.328)
Can Overcome Illness without help from a medically trained person	0.680* (0.449 – 1.030)	0.708 (0.457 – 1.097)
Clinical Conditions[j]		
Diabetes	3.283*** (2.092 – 5.150)	3.685*** (2.340 – 5.803)
Asthma	1.469** (1.019 – 2.116)	1.405* (0.978 – 2.018)
High Blood Pressure	1.516** (1.022 – 2.248)	1.644** (1.20 – 2.458)
Coronary Heart Disease	0.921 (0.468 – 1.812)	0.817 (0.394 – 1.693)
Angina	2.311*** (1.250 – 4.271)	2.277** (1.210 – 4.284)
Myocardial Infarction	0.765 (0.399 – 1.467)	0.832 (0.423 – 1.638)
Any other heart disease/condition	1.071 (0.718 – 1.599)	1.055 (0.702 – 1.584)
Stroke	1.046 (0.635 – 1.722)	0.877 (0.524 – 1.465)

Emphysema	2.631*** (1.29 – 1.722)	2.813*** (1.422 – 5.565)
Constant	0.0922*** (0.032 – 0.268)	0.0938*** (0.031 – 0.285)

Notes: ***significant at the 1% level; **significant at the 5% level; and *significant at the 10% level

a. Non-Duals are Medicaid recipients whose only health insurance is Medicaid.
b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
c. Logistic regression using survey weights
d. Logistic regression using survey weights combined with propensity score weights
e. CI = Confidence Interval
f. HMO = Health Maintenance Organization
g. Reference category
h. Reference = within last year
i. For all attitudes towards health insurance and risk statements: Reference = Disagree with the statement
j. For all clinical conditions: Reference = Condition not present

A Table 3: Logistic Regressions for the Prevalence of a Potentially Preventable Hospital Stay in the Medicaid Dual[a] Population, Ages 18-64 (N=515). Results are based on aggregated data from the Medical Expenditures Panel Survey[b].

VARIABLES	(Model 1) Survey Logistic Regression[c]	(Model 2) PSW Logistic Regression[d]
	Odds Ratio (95% CI[e])	Odds Ratio (95% CI)
Medicaid HMO[f] (Ref[g]: Medicaid non-HMO**)**	1.681* (0.951 – 2.970)	1.828** (1.047 – 3.192)
Demographic Characteristics		
Age (Ref: less than 35**)**		
Between 35 and 56	0.989 (0.366 – 2.674)	0.940 (0.349 – 2.528)
56 and above	1.277 (0.440 – 3.704)	1.300 (0.452 – 3.732)
Region (Ref: Northeast**)**		
Midwest	2.133* (0.880 – 5.172)	2.377* (0.949 – 5.954)
South	2.308** (1.110 – 4.798)	2.178** (1.032 – 4.592)
West	1.395 (0.588 – 3.305)	1.346 (0.536 – 3.378)
Male (Ref: Female**)**	0.924 (0.535 – 1.594)	0.855 (0.447 – 1.635)
Education (Ref: High School or Less**)**		
Some college	0.880 (0.441 – 1.755)	1.083 (0.527 – 2.226)
College or more	0.337** (0.142 – 0.800)	0.313** (0.123 – 0.794)
Income (Ref: Poor**)**		
Near Poor	0.445* (0.189 – 1.046)	0.498 (0.203 – 1.223)
Low income	0.920(0.468 – 1.806)	0.910 (0.457 – 1.809)
Middle or High Income	0.714 (0.346 – 1.470)	0.389* (0.145 – 1.040)
Health and Functional Status Characteristics		
Self-Reported Health (Ref: Excellent**)**		
Very Good	1.008 (0.139 – 7.315)	1.213 (0.122 – 12.00)
Good	0.734 (0.092 – 5.826)	0.799 (0.088 – 7.220)
Fair or Poor	1.081 (0.246 – 1.562)	1.100 (0.130 – 9.298)
Self-Reported Mental Health (Ref: Excellent**)**		
Very Good	0.720 (0.261 – 1.980)	0.565 (0.180 – 1.774)
Good	0.579 (0.248 – 1.352)	0.814 (0.326 – 2.029)
Fair or Poor	0.620 (0.246 – 1.562)	0.682 (0.262 – 1.775)
Received help or supervision for instrumental activities of daily living (Ref: Otherwise**)**	0.954 (0.468 – 1.945)	1.355 (0.593 – 3.097)

Received help or supervision for activities of daily living (Ref: Otherwise**)**	2.513** (1.071 – 5.894)	2.139 (0.843 – 5.426)
BMI (Ref: Underweight**)**		
Normal weight	0.619 (0.074 – 5.170)	0.428 (0.054 – 3.400)
Overweight	1.017 (0.130 – 7.965)	0.617 (0.087 – 4.371)
Obese	0.500 (0.061 – 4.094)	0.276 (0.036 – 2.143)
Current Smoker (Ref: Current non-smoker**)**	0.770 (0.443 – 1.340)	0.572* (0.311 – 1.053)
Access to usual source of care (Ref: No Access**)**	1.496 (0.676 – 3.314)	1.623 (0.574 – 4.588)
Preventive Care Services Utilization		
Cholesterol Check[h] (more than a year or never)	1.029 (0.418 – 2.533)	0.771 (0.302 – 1.960)
Flu Shot[h] (more than year or never)	0.783 (0.437 – 1.400)	0.675 (0.351 – 1.298)
Routine Check[h] (more than year or never)	0.605 (0.259 – 1.411)	0.679 (0.274 – 1.679)
Advised by Doctor to Restrict Fatty Food	2.409** (1.172 – 4.947)	2.779*** (1.283 – 6.01)
Advised by Doctor to Exercise More	0.737 (0.395 – 1.374)	0.460** (0.234 – 0.904)
Attitudes towards health insurance and risk		
Agree with following statements[i]		
Do not need health insurance	0.538 (0.173 – 1.670)	0.387 (0.119 – 1.259)
Health Insurance is not worth the money it costs	1.525 (0.916 – 2.536)	1.444 (0.834 – 2.502)
More likely to take risks	1.436 (0.768 – 2.685)	1.249 (0.633 – 2.465)
Can Overcome Illness without medical help from a medically trained person	0.619 (0.270 – 1.418)	1.026 (0.428 – 2.459)
Clinical Conditions[j]		
Diabetes	1.376 (0.707 – 2.676)	1.448 (0.716 – 2.931)
Asthma	1.767* (0.938 – 3.330)	1.738 (0.851 – 3.548)
High Blood Pressure	0.888 (0.442 – 1.784)	1.227 (0.645 – 2.332)
Coronary Heart Disease	1.686 (0.733 – 3.874)	1.443 (0.573 – 3.634)
Angina	1.084 (0.468 – 2.510)	1.417 (0.543 – 3.696)
Myocardial Infarction	1.251 (0.506 – 3.092)	1.198 (0.446 – 3.210)
Any other heart disease/condition	1.028 (0.510 – 2.070)	1.546 (0.800 – 2.989)
Stroke	1.893 (0.873 – 4.106)	1.702 (0.731 – 3.964)
Emphysema	1.197 (0.534 – 2.680)	1.472 (0.615 – 3.526)
Constant	0.128 (0.005 – 3.300)	0.175 (0.005 – 6.024)

Notes: ***significant at the 1% level; **significant at the 5% level; and *significant at the 10% level

a. Duals are Medicaid recipients who are also insured through Medicare.
b. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
c. Logistic regression using survey weights
d. Logistic regression using survey weights combined with propensity score weights
e. CI = Confidence Interval
f. HMO = Health Maintenance Organization
g. Reference category
h. Reference = within last year
i. For all attitudes towards health insurance and risk statements: Reference = Disagree with the statement
j. For all clinical conditions: Reference = Condition not present

A Table 4: Characteristics of the Medicaid population with any Emergency Room admission ages 18-64 by dual-eligibility[a] and Medicaid HMO[b] status. Results are based on aggregated data from the Medical Expenditures Panel Survey[c].

	Non-duals			Duals		
Characteristics (%)	FFS[d]	HMO	p-value[e]	FFS	HMO	p-value
Any ER Admission	26.0	26.5	0.5838	30.3	31.3	0.6850
Demographics						
Age			0.0164			0.7337
Less than 35	57.2	55.1		14.1	15	
Between 35 and 56	33.1	36.2		57.4	58.6	
56 and above	9.6	8.8		28.5	26.4	
Region			<0.0001			0.0478
Northeast	21.7	28.5		18.5	20.3	
Midwest	21.9	20.1		24.9	15.5	
South	30.9	22.1		35.3	39.4	
West	25.6	29.3		21.3	24.8	
Male	32.2	30.5	0.0874	46.4	43.9	0.4718
Education			0.4836			0.9518
High School or Less	35.3	35.4		29.5	30.3	
Some College	50.9	51.7		54.8	54.3	
College or More	13.8	12.9		15.8	15.4	
Income			<0.0001			0.0039
Poor	44.7	51		43.6	53.9	
Nearpoor	9.6	9.8		12.7	11.8	
Low Income	21.3	19.9		21.4	6.5	
Middle or High Income	24.4	19.4		22.2	17.9	

Health and Functional Status						
Self Reported Health			0.0617			0.3784
Excellent Health	20.5	18.5		5.2	7.4	
Very Good Health	24.9	25.4		11.1	10.6	
Good Health	28.9	30.7		25	26.3	
Fair or Poor Health	25.7	25.4		58.7	55.8	
Self Reported Mental Health			0.7128			0.0689
Excellent Mental Health	31.3	30.4		11.6	16.8	
Very Good Mental Health	23.7	24.4		17.3	14.6	
Good Mental Health	28.6	29.1		33	31.8	
Fair or Poor Mental Health	16.4	16		38.1	36.7	
Received help or supervision for instrumental activities of daily living	6.7	5.4	0.0079	27.5	24.8	0.3045
Received help or supervision for activities of daily living	3	2.6	0.2711	11.5	14.1	0.1924
BMI			<0.0001			0.0927
Underweight	3.3	2.3		1.4	2.5	
Normal	34.5	30.7		22.8	26.3	
Overweight	28.1	28.9		28.8	23.5	
Obese	34.1	38.1		47	47.7	
Currently Smoke	33.8	33.2	0.6114	38	41.3	0.2897
Access to usual source of care	72.5	78.4	<0.0001	89.4	92.4	0.0683
Preventive Care Services Utilization						

Cholesterol Check (more than a year or never)	54	47.5	<0.0001	23.7	20.6	0.2229
Flu Shot (more than a year or never)	76.4	74.1	0.0114	49.6	54.8	0.0926
Routine Check (more than a year or never)	40.3	33.4	<0.0001	20.3	20.4	0.947
Advised by Doctor to Restrict Fatty Food	29.1	32.1	0.0018	53.9	49.7	0.1152
Advised by Doctor to Exercise More	34.5	38.9	<0.0001	55.2	52.2	0.3295
Attitudes towards health insurance and risk						
Agree With Following Statements						
Do not need health insurance	20.3	16.8	<0.0001	10	8.8	0.4819
Health insurance is not worth the money it costs	44.5	41.2	0.0024	37.2	31.7	0.0341
More likely to take risks	42.5	40.3	0.0404	37.7	37.4	0.924
Can overcome illness without help from a medically trained person	33.2	31.3	0.057	21	18.9	0.3557
Clinical Conditions						
Diabetes	9	9.3	0.6847	25.4	24.6	0.7816
Asthma	14.2	15.6	0.0406	21.9	23.1	0.6602
High Blood Pressure	23.2	25.2	0.0494	53.6	53	0.8489
Coronary Heart Disease	3.2	3.4	0.5686	9.6	9.2	0.8256
Angina	2.1	1.9	0.4066	6.6	6.5	0.9015

Myocardial Infarction	3	2.9	0.9058	8.4	8.2	0.9139
Any other heart disease/condition	7.7	7.7	0.9353	18.5	13.4	0.0304
Stroke	2.7	2.7	0.9798	10.5	11.6	0.5575
Emphysema	2.6	2.1	0.1617	8	8.7	0.7093

a. Dual Eligibility Status: Non-Duals are Medicaid recipients whose only health insurance is Medicaid. Duals are Medicaid
recipients who are also insured through Medicare.
b. HMO = Health Maintenance Organization
c. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
d. FFS = Fee For Service
e. p-values from Survey Design Based F-test

A Table 5: Characteristics of the Medicaid population with avoidable Emergency Room admission ages 18-64 by dual-eligibility[a] and Medicaid HMO[b] status. Results are based on aggregated data from the Medical Expenditures Panel Survey[c].

Avoid ER

	Non-duals			Duals		
Characteristics (%)	FFS[d]	HMO	p-value[e]	FFS	HMO	p-value
Avoidable Hospital Stay	18.2	16.9	0.3878	22.9	26.3	0.4364
Demographics						
Age			0.8095			0.5376
Less than 35	57.4	58		15.1	11.5	
Between 35 and 56	34.8	33.7		55.4	60.2	
56 and above	7.8	8.3		29.5	28.3	
Region			<0.0001			0.386
Northeast	20.3	26.9		15.5	20.1	
Midwest	25.8	23.8		25.2	17.8	
South	34.2	24.5		38	38.5	
West	19.7	24.7		21.4	23.6	
Male	26.2	25.9	0.8482	41.2	35.2	0.2339
Education			0.765			0.3659
High School or Less	34.3	33.7		29.1	29.2	
Some College	53	54.4		56.3	51.4	
College or More	12.6	11.9		14.6	19.4	
Income			0.0115			0.0187
Poor	51.5	57.1		48.4	61.1	
Nearpoor	9.4	9.5		12.5	14.3	
Low Income	19.6	18.2		18.4	13.5	
Middle or High Income	19.5	15.3		20.6	11.2	
Health and Functional Status						
Self Reported Health			0.7896			0.0632
Excellent Health	13.4	12.6		2	6	

Very Good Health	21.8	20.9		9.8	7.8	
Good Health	28.6	29.5		22.9	24.3	
Fair or Poor Health	36.2	37.1		65.3	61.9	
Self Reported Mental Health			0.7776			0.5645
Excellent Mental Health	26.8	27.2		8.8	9.7	
Very Good Mental Health	20.4	21.7		18.1	14.6	
Good Mental Health	29.8	29.6		30.9	36	
Fair or Poor Mental Health	22.9	21.5		42.2	39.7	
Received help or supervision for instrumental activities of daily living	9.5	7.6	0.0743	29.8	28.7	0.8071
Received help or supervision for activities of daily living	4.4	3.19	0.0648	13	17.3	0.2115
BMI			0.0558			0.6293
Underweight	3.4	2.3		1.2	2.3	
Normal	31.7	27.9		21.8	22.3	
Overweight	24.5	25.9		29.7	24.8	
Obese	40.4	44		37.3	50.6	
Currently Smoke	42.5	41.5	0.6561	43.5	51.7	0.117
Access to usual source of care	74.1	80.5	0.0001	91.7	94.6	0.3347
Preventive Care Services Utilization						
Cholesterol Check (more than a year or never)	49.7	44.4	0.0108	20.5	14.9	0.1459
Flu Shot (more than a year or never)	72.7	69.7	0.1152	43.6	50.8	0.1321

Routine Check (more than a year or never)	36.9	29.8	0.0002	15.3	17.7	0.5053
Advised by Doctor to Restrict Fatty Food	30.4	36.7	0.0006	53.4	55.4	0.6732
Advised by Doctor to Exercise More	39	44.1	0.0103	56.5	60.9	0.3787
Attitudes towards health insurance and risk						
Agree With Following Statements						
Do not need health insurance	15.8	12.8	0.0219	9.7	8.6	0.7116
Health insurance is not worth the money it costs	43	38.7	0.031	37.5	29.7	0.105
More likely to take risks	41.7	39.2	0.1965	41.6	39.7	0.6926
Can overcome illness without help from a medically trained person	29.9	28.5	0.409	20.4	16.4	0.3027
Clinical Conditions						
Diabetes	11.5	12.5	0.4718	30	29.9	0.9817
Asthma	211	22	0.5767	27.8	29.3	0.7669
High Blood Pressure	29.6	30.5	0.6192	60.2	58.3	0.7105
Coronary Heart Disease	5.3	5.2	0.8776	11.4	13.4	0.5906
Angina	3.4	3.3	0.7998	9.1	11	0.5358
Myocardial Infarction	5.1	4.8	0.7534	10.8	12.8	0.5771
Any other heart disease/condition	11	10.8	0.8813	24.9	19.5	0.2435
Stroke	4.6	4.4	0.8292	14.7	15	0.9357

Emphysema	4.6	3.1	0.071	13	9.6	0.3112

a. Dual Eligibility Status: Non-Duals are Medica id recip ients whose o nly health ins urance is Med icaid. Duals a re Medicaid
recipients who are also insured through Medicare.
b. HMO = Health Maintenance Organization
c. Data source: Public use data files from the Medical Expenditure Panel Survey (MEPS) for 2003 through 2012.
d. FFS = Fee For Service
e. p-values from Survey Design Based F-test

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ABSTRACT

MEDICAID MANAGED CARE AND ITS IMPACT ON POTENTIALLY PREVENTABLE HOSPITAL UTILIZATION (INPATIENT AND EMERGENCY ROOM VISITS)

by

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DISSERTATION

August 2019

Advisor: Dr. Gail Jensen Summers

Major: Economics

Degree: Doctor of Philosophy

Introduction: The objective of this study is to compare the performance of Medicaid health maintenance organizations (HMOs) and fee-for-service (FFS) Medicaid regarding the prevalence of potentially preventable hospitalizations and emergency room (ER) visits, a recognized measure of outpatient care quality.

Methods: Nationally representative data on non-institutionalized Medicaid recipients, ages 18-64, from the 2003-2012 Medical Expenditure Panel Survey. Separate analyses are conducted for recipients insured through both Medicaid and Medicare ("dual eligibles") and recipients whose only health insurance is Medicaid ("non-duals"). In each group the occurrence of potentially preventable hospital use is measured, and then survey-weighted multivariable logistic regression models are fit to quantify the relationship between Medicaid HMO status and the occurrence of such stays. The possibility of selection bias into HMOs is considered and explicitly addressed in model estimation using propensity score methods.

Results: Adjusting for covariates and confounders dual eligibles are more likely to have a potentially preventable hospitalization relative to those covered under FFS Medicaid (survey weighted logit model OR = 1.68, 95% CI = 0.95-2.97; propensity score weighted logit model OR = 1.83, 95% CI = 1.05-3.19). In contrast, the odds ratios did not differ among non-duals in Medicaid HMOs versus FFS Medicaid. Furthermore, no significant differences exist in the patterns of ER use (any or avoidable) between Medicaid HMO and Medicaid FFS enrollees for both duals and non-duals

Conclusion: These findings suggest that, at least for dual eligibles, the quality of outpatient care in Medicaid HMOs may be worse than under FFS Medicaid. Better and more streamlined clinical preventive approaches for this high risk and vulnerable population might be required in Medicaid HMOs.

AUTOBIOGRAPHICAL STATEMENT

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