

INFLUENCE OF INSURANCE TYPE ON EMERGENCY DEPARTMENT USAGE AND COSTS

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Abstract: High health care costs are widely acknowledged as one of the most difficult policy challenges facing America today. For the past several decades, hospital emergency departments (EDs) have become increasingly overcrowded, which is problematic because EDs are often more costly than non-urgent care facilities. Thus, emergency care is a good target for policy interventions to improve efficiency and cut costs without compromising quality of care. This study contributes to literature that explores the relationship between ED use and insurance type. We use 2011 data from the Medical Expenditures Panel Survey to consider three outcome variables: individuals' total 2011 ED costs, average (mean) ED cost per visit in 2011, and number of ED visits in 2011. In addition to our independent variables of interest, private and public insurance, we control for chronic conditions and certain demographic and geographic variables. Using OLS, poisson, and tobit models, we show that Medicaid status is related to higher likelihood of visiting an emergency department. In keeping with the majority of literature on this subject, we recommend that policymakers explore strategies for reducing ED utilization in favor of more efficient, regular, and possibly preventive care.

INTRODUCTION

High health care costs are widely acknowledged as one of the most difficult policy challenges facing America today. Rising costs have important effects on government budgets: between 1985 and 2012, federal spending on Medicare and Medicaid rose from 1.8 to 4.6 percent of gross domestic product (GDP).¹ State governments, as well as private households and employers, also face a heavy burden. On average, states devote nearly 25% of their budgets to Medicaid, more than any other single area of expenditure, and more than spending on transportation and higher education combined.² In 2011, total spending on health care services and supplies rose to 16.4 percent of GDP, or \$2.5 trillion, up from just 4.6 percent in 1960 and 9.6 percent in

1 Julie Topoleski, "Federal Spending on the Government's Major Health Care Programs Is Projected to Rise Substantially Relative to GDP," CBO.gov, Washington, D.C., last modified September 18, 2013, <http://www.cbo.gov/publication/44582>

2 Than National Association of State Budget Officers. (2013). The Fiscal Survey of States: Fall 2013: (1). <http://www.nasbo.org/sites/default/files/NASBO%20Fall%202013%20Fiscal%20Survey%20of%20States.pdf> Total state spending includes funds from states' budgets as well as federal transfers to states; when looking exclusively at general funds from states' revenue sources, the share spent on Medicaid falls to 19%, an amount that is still significant, especially in light of health care costs' rapid growth rate.

1985.³ According to the Congressional Budget Office (CBO) 2013 “Long-Term Budget Outlook,” the private sector was responsible for 53% of this spending.⁴

The reasons behind high costs are diverse. Improved access to coverage through social welfare programs such as Medicare and the Affordable Care Act account for some of the increases, but costs are also rising *per person*, due to factors including improved medical technology, an aging population, and higher disease prevalence.⁵

Public and private insurers have implemented a variety of strategies to decrease costs. Potential solutions include improved preventive care⁶ and reforming care delivery systems to improve efficiency and quality of care.⁷ A common goal of these strategies is to eliminate unnecessary spending while improving quality and access to care.⁸

One area in which it might be possible to reduce health care costs while improving quality is emergency department (ED) use. EDs are a crucial component of the nation’s health care system: they provide services for critically ill and injured patients, and serve as the “first responders” to public health crises and natural disasters.⁹ Over the past several decades, reports have described EDs as increasingly overcrowded due to a variety of factors, and burdened with treating patients in settings where care is more costly than it would be in non-urgent care facilities.¹⁰

Research Question

This paper will use data from the Medical Expenditures Panel Survey (MEPS) to compare patients’ ED costs and number of visits based on whether they have private or public health insurance plans. Our goal is to better understand how type of insurance relates to ED visits and costs, controlling for certain demographic and health factors. Our research question is: What effect does type of insurance (public vs. private) have on an individual’s ED utilization and ED costs? We predict that, while Medicaid and other public health insurance programs have been shown to control costs better than private insurance plans, Medicaid will be related to higher ED costs and utilization. This prediction stems from research indicating that Medicaid beneficiaries are more likely to have costly chronic conditions to treat than the general population has for a number of reasons, some of which are difficult to measure. This study will contribute to existing literature comparing Medicaid and private insurers’ costs and to literature

3 Julie Topoleski, “Federal Spending on the Government’s Major Health Care Programs Is Projected to Rise Substantially Relative to GDP,” *CBO.gov*, Washington, D.C., last modified September 18, 2013, <http://www.cbo.gov/publication/44582>

4 Manchester, Joyce, et al. “The 2013 Long-Term Budget Outlook.” *CBO.gov*. Washington, DC, September 2013, 31 http://www.cbo.gov/sites/default/files/cbofiles/attachments/44521-LTBO2013_0.pdf

5 “Health Care Costs: A Primer,” *Kaiser Family Foundation*. Menlo Park, CA, 2012, 25. <http://kaiserfamilyfoundation.files.wordpress.com/2013/01/7670-03.pdf>.

6 Catherine B Kemp, “Public Health in the Age of Health Care Reform,” *CDC.gov*, Atlanta, GA, 2012, http://www.cdc.gov/pcd/issues/2012/12_0151.htm.

7 *Ibid.*, 32.

8 For more information on the “Triple Aim” of improving patient experiences and population health while lowering the per capita cost of care, see The IHI Triple Aim. (2013). *Institute for Healthcare Improvement*. Retrieved from <http://www.ihl.org/offerings/Initiatives/TripleAim/Pages/default.aspx>

9 DeLia, Derek, and Joel Cantor. “Emergency Department Utilization and Capacity.” *The Synthesis Project. Research Synthesis Report* no. 17 (July 2009): 1, <http://www.ncbi.nlm.nih.gov/pubmed/22052080>.

10 Debra A. Draper, Michelle B. Rosenburg, Jennie Apter, Matthew Gever, Carolyn Feis Korman, Katherine Mack, Margaret J. Weber, and Jennifer Whitworth, *Health Center Strategies That May Help Reduce Their Use*. Washington, D.C., 2011. <http://www.gao.gov/assets/100/97416.pdf>

examining trends in ED use by looking specifically at ED costs and yearly number of visits based on insurance type.

BACKGROUND: HEALTH CARE IN THE UNITED STATES

The United States health care system is diverse, fragmented, and changing rapidly. Americans rely on a combination of private and publically-funded insurance programs for coverage. These programs differ in terms of cost, type of services provided, and population served.

Private Insurance – Many Types, Many Implications

The private health insurance industry emerged during the Second World War, when the U.S. government exempted health insurance coverage from wage and price controls and employers responded by using health insurance and other fringe benefits to attract workers.¹¹ Today, employer-sponsored health insurance expenses are still exempt from federal taxes, maintaining an incentive for some employers to offer high-quality benefits to employees.

In 2010, about 73 percent of the 255.3 million individuals with insurance coverage were enrolled in private plans.¹² When considering the impact of this kind of private coverage, it is important to remember that these plans vary widely in terms of cost to subscribers and the services that they cover. Many rely on networks of providers with which they have negotiated discounted fees.¹³ These fees vary substantially by region and by provider and payer market power; they are much higher than rates set by public health insurance programs.¹⁴

Public Insurance – Brief History and Important Characteristics

In response to concerns that the nation's largely private health insurance options were not sufficient to provide coverage for the elderly, poor, and disabled, Medicare and Medicaid were created through the Social Security Act of 1965. Medicare, a health insurance program funded by trust funds that beneficiaries pay into, is administered by the federal government. Medicare primarily covers adults over 65, but it also provides benefits to individuals with certain disabilities regardless of age and to individuals with end stage renal disease.¹⁵

11 "National Health Insurance—A Brief History of Reform Efforts in the U.S." *Kaiser Family Foundation*, last modified 2009, <http://kaiserfamilyfoundation.files.wordpress.com/2013/01/7871.pdf> .

12 Levitt, Larry, and Gary Claxton. "Betting on Private Insurers," *Kaiser Family Foundation*. 2012. <http://kff.org/health-reform/perspective/betting-on-private-insurers/>.

13 For more information on different types of health insurance plans, see "Healthcare: Plan Information." (2013). *U.S. Office of Personnel Management*. Retrieved from <http://www.opm.gov/healthcare-insurance/healthcare/plan-information/plan-types/> OR "What are the different types of health insurance?" (2013). *HealthCare.gov*. Retrieved from <https://www.healthcare.gov/what-are-the-different-types-of-health-insurance/>

14 Chapin White , Amelia Bond, and James D. Reschovsky, "High and Varying Prices for Privately Insured Patients Underscore Hospital Market Power," *Center for Studying Health System Change*, Washington, D.C., 2013. <http://www.hschange.com/CONTENT/1375/>.

15 Centers for Medicare and Medicaid Services. (2013). Medicare Program – General Information. <http://www.cms.gov/Medicare/Medicare-General-Information/MedicareGenInfo/index.html>

Medicaid is a social assistance program that provides health care to low-income populations, including children, and to those with disproportionately high medical expenditures due to disabilities. The program is funded with federal and state tax dollars. Each state is responsible for implementing a Medicaid program following certain federal eligibility and benefit guidelines with some discretion in determining eligibility and payment rates to providers.¹⁶ For example, while states must cover certain “mandatory” services such as inpatient and outpatient hospital services, x-rays, and lab costs, they can decide whether or not to cover additional services such as prescription drugs and dental care. States must cover pregnant women and children younger than six with household incomes up to 133% of the federal poverty level, (FPL) and children between six and eighteen with household incomes up to 100% of the FPL. States set eligibility levels for the elderly and disabled, and these rules vary widely, from extending coverage to those with household incomes above the FPL to limiting it to those with incomes as low as 17% of the FPL.^{17,18}

Today Medicaid covers one in five Americans, or about 62 million individuals.¹⁹ Many states’ programs do not cover impoverished, childless adults. However, on a national level, Medicaid covers 9.3 million non-elderly adults with a wide range of physical and mental disabilities. According to the Kaiser Foundation on Medicaid and the Uninsured, the program “...plays a particularly large role for certain subpopulations who are disproportionately likely to be poor and who lack access to private coverage due to their low income or health status.”^{20,21} While certain provisions in the 2010 Patient Protection and Affordable Care Act (ACA) will change Medicaid’s population in the future, we do not consider these potential impacts because our data are from 2011, before these provisions took effect.

The federal government sets Medicare payment rates based on estimates of the cost of distinct medical services in different areas of the country. States set Medicaid rates based on federal guidelines that take into account “the costs of providing the service, a review of what commercial payers pay in the private market, and a percentage of what Medicare pays for equivalent services.”²² These fees are

16 “Policy Basics: Introduction to Medicaid,” *Center on Budget and Policy Priorities*, Washington, D.C., 2013. <http://www.cbpp.org/cms/index.cfm?fa=view&id=2223>

17 Health Reform GPS. (2011). Update: Medicaid Program Eligibility Changes under the Affordable Care Act. Sarah Rosenbaum. <https://www.statereform.org/system/files/medicaid-expansion-pdf.pdf>

18 Under the ACA, Medicaid eligibility will change in some states. While this is an important development, it does not affect our research question or the implications of our findings because we use data from 2011, well before the relevant ACA provisions took effect in January 2014. For more information about Medicaid eligibility requirements under the ACA and an analysis of possible future trends, see Holahan, John; Kenney, Genevieve; and Pelletier, Jennifer. (2010). *The Health Status of New Medicaid Enrollees Under Health Reform*. *Robert Wood Johnson Foundation and the Urban Institute*. <http://www.urban.org/uploadedpdf/412206-health-status.pdf> and The Kaiser Commission on Medicaid and the Uninsured. (2013). *Medicaid: A Primer*. <http://kaiserfamilyfoundation.files.wordpress.com/2010/06/7334-05.pdf>

19 The Kaiser Commission on Medicaid and the Uninsured. (2013). *Medicaid: A Primer*, 8. <http://kaiserfamilyfoundation.files.wordpress.com/2010/06/7334-05.pdf>

20 *Ibid.*, 8.

21 Under the ACA, insurance companies can no longer reject applicants due to poor health status; however, because this provision of the law did not take effect until the beginning of 2014, the data used for this paper reflects the effects of potential exclusion from insurance due to health status.

22 “Financing & Reimbursement,” *Medicaid.gov*, 2013, <http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Financing-and-Reimbursement/Financing-and-Reimbursement.html>.

consistently lower than payments made by private insurers, often less than Medicare rates, and sometimes less than the full cost of providing the services.²³ Thus, while Medicaid provides coverage for many people with high-cost, chronic conditions, states are able to control costs to an extent by setting lower payment rates.

LITERATURE REVIEW

Public and Private Cost Containment Strategies

Both public and private insurance plans include strategies for containing costs. While there is some overlap, there are also important differences that have the potential to impact patient care and overall costs. In general, private insurers shift costs to patients through co-pays, coinsurance, and higher deductibles. Co-pays are fees that beneficiaries pay when accessing specific services, and coinsurance requires payment of a percentage of the cost of a certain services. High deductible health plans require beneficiaries to spend more of their own money before the plan begins to cover expenses than do typical plans.²⁴ These tools are intended to alleviate the insurer's cost burden by encouraging patients to engage in preventive care and consume fewer unnecessary services.²⁵ Thus, cost-sharing is often applied to services that are viewed as elective, including ED visits.²⁶

Medicaid programs are more restricted than private insurances in terms of how much they can increase patient cost-sharing, but states still implement measures such as increasing patient cost sharing and benefit reductions as well as reducing payments to providers and attempting to better coordinate long term care.²⁷ While Medicaid programs also make use of cost containment strategies, they are restricted from using high co-pays and premiums because of the program's intent to serve low-income populations.²⁸ Instead, states more commonly rely on strategies that are less likely to affect patient utilization of health care in general and EDs in particular, such as payment and delivery system reforms.²⁹

While Medicaid has a limited ability to deter health care utilization through patient cost sharing, several recent studies have indicated that it provides access to care at

23 Uwe E. Reinhardt, "How Do Hospitals Get Paid? A Primer," *The New York Times* (New York, NY), Jan. 23, 2009. http://economix.blogs.nytimes.com/2009/01/23/how-do-hospitals-get-paid-a-primer/?_r=1.

24 Internal Revenue Service. (2013). Health Savings Accounts and Other Tax-Favored Health Plans. Publication 969: 11. <http://www.irs.gov/pub/irs-pdf/p969.pdf>

25 Sally Trude, Jon B. Christianson, Cara S. Lesser, Carolyn Watts, and Andrea M. Benoit. "Employer-Sponsored Health Insurance: Pressing Problems, Incremental Changes," *Health Affairs* 21, no. 1 (2002): 66–75, <http://content.healthaffairs.org/content/21/1/66.full.pdf+html>.

26 Jon B. Christianson, Ha T. Tu, and Divya R. Samuel. "Employer-Sponsored Health Insurance: Down But Not Out," *Center for Studying Health System Change*, Washington, D.C., 2011, 2-4. <http://www.hschange.com/CONTENT/1251/1251.pdf>.

27 Vernon Smith, "What Are States Doing to Control Medicaid Costs and Why Is It so Hard?" Madison, WI: Policy Institute for Family Impact Seminars, 2005, 26. http://www.familyimpactseminars.org/s_wifis22c03.pdf.

28 Vernon Smith, Kathleen Gifford, Eileen Ellis, Robin Rudowitz, and Laura Snyder, "Medicaid in a Historic Time of Transformation: Results from a 50-State Medicaid Budget Survey for State Fiscal Years 2013 and 2014," *Kaiser Family Foundation*, Menlo Park, CA, 2013, 10. <http://kaiserfamilyfoundation.files.wordpress.com/2013/10/8498-medicaid-in-a-historic-time4.pdf>

29 Ibid.

lower costs when controlling for socioeconomic characteristics and health conditions within the populations that it serves. Two recent studies used MEPS data to simulate what Medicaid beneficiaries' health care costs would have been if they had been covered by private health insurance plans; both found that Medicaid provides access to care at lower costs than private insurance when taking into account the high volume and complex nature of services that Medicaid beneficiaries require.^{30,31} In other words, Medicaid spending presents significant challenges to state governments as it grows more quickly than state revenues, and consumes increasing shares of state budgets,^{32,33} but the cost of providing care to the specific population it serves would be higher using private insurers' negotiated fees and benefit packages.

Trends in ED Utilization

Studies have shown a variety of factors to be important in patient decisions to access care through EDs as opposed to other, potentially less costly, settings such as urgent care clinics or a primary care provider. Understanding who tends to access EDs and why is increasingly important, as research over the past several decades has suggested that overcrowding compromises quality of patient care.³⁴ Additionally, ED visits have been widely documented as much more costly than care in other outpatient settings,³⁵ yet EDs handle over a quarter of all acute care outpatient visits, which involve treatment for new health care problems or for "chronic disease flare-ups."³⁶ Finally, ED visits have been on the rise over the last few decades, increasing 23% from 1992 to 2002.³⁷

Several studies have found that EDs are disproportionately used by groups that are lower-income and bear a higher disease burden than the general population.³⁸

30 Teresa A. Coughlin, Sharon K. Long, Lisa Clemans-Cope and Dean Resnick, "What Difference Does Medicaid Make? Assessing Cost Effectiveness, Access, and Financial Protection under Medicaid for Low-Income Adults," *The Kaiser Commission on Medicaid and the Uninsured*, Issue Brief 8440, 2013.

31 Jack Hadley and John Holahan, "Is Health Care Spending Higher under Medicaid or Private Insurance?" *Inquiry* 40, no. 4 (Winter 2003/2004): 323–42.

32 National Governors Association and National Association of State Budgets. *The Fiscal Survey of States*. (2011): 28. <http://www.nga.org/files/live/sites/NGA/files/pdf/FSS1111.PDF>

33 Melissa Hansen. Medicaid spending is at the top of many legislative agendas. *Confronting Costs*: June 2012 | State Legislatures Magazine. <http://www.ncsl.org/research/health/confronting-costs.aspx>

34 Marcia Crosse, Kim Yamane, Danielle Bernstein, Susannah Bloch, Ted Burik, Aaron Holling, Carla Jackson, et al. *Hospital Emergency Departments: Crowding Continues to Occur, and Some Patients Wait Longer Than Recommended Time Frames*. *GAO.gov*, Washington, D.C., 2009. <http://www.gao.gov/assets/290/289048.pdf>

35 National Center for Health Statistics (US). *Health, United States, 2012: With Special Feature on Emergency Care*. Hyattsville (MD): National Center for Health Statistics (US); 2013 May. Special Feature on Emergency Care. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK148933/>

36 Stephen R. Pitts, Emily R. Carrier, Eugene C. Rich, and Arthur Kellerman. "Where Americans Get Acute Care: Increasingly, It's Not At Their Doctor's Office." *Health Affairs* 29, no. 9 (2010): 1621-23. <http://content.healthaffairs.org/content/29/9/1620.full.html> .

37 E., J. Weber, Showstack, K. Hunt, D. Colby, and M. Callaham. "Does Lack of a Usual Source of Care or Health Insurance Increase the Likelihood of an Emergency Department Visit? Results of a National Population-Based Study," *Annals of Emergency Medicine* 45, no. 1 (2005): 1. http://californiaacep.org/wp-content/uploads/Uninsured_Use_of_the_ED_Annals_of_Emergency_Medicine_Jan_2005.pdf .

38 N.Tang, J. Stein, R. Hsia, J. Maselli, and R. Gonzalez. "Trends and Characteristics of US Emergency Department Visits, 1997-2007." *Journal of the American Medical Association* 304, no. 6 (2010). <http://jama.jamanetwork.com/article.aspx?articleid=186383&resultClick=1>.

This trend seems to continue even when insurance coverage is extended to previously uninsured individuals. A 2009 study showed that in Massachusetts, ED visits did not decline after the state passed health care reform legislation in 2006 that improved access to health insurance.³⁹ Those who used ED services represented “a sicker, more disabled, and more chronically ill population...than other adults in the state” and were more likely to report a separate hospital inpatient stay during the same year that their ED visit took place.⁴⁰

Finally, other research has found that adults who report one or more ED visits per year are also more likely to have incomes below the poverty level, and report poor health status and/or multiple chronic conditions.^{41,42} This trend suggests that patients who rely on ED care have the potential to incur higher costs due to medical conditions and/or socioeconomic factors that affect their health, illustrating the importance of developing strategies to serve these patients more efficiently.

Chronic Conditions and Insurance Status

Chronic conditions create significant cost burdens, especially among vulnerable populations enrolled in public insurance programs. According to the Institute of Medicine, medical costs for those with chronic conditions represent 75 percent of annual U.S. health care spending.⁴³ Other sources have estimated that chronic conditions cost the U.S. economy over \$1 trillion annually.^{44,45} The high costs of treating the conditions that fall into this category are not surprising: the Centers for Disease Control defines chronic conditions as “noncommunicable illnesses that are prolonged in duration, do not resolve spontaneously, and are rarely cured completely.”⁴⁶ In other words, though patients with conditions ranging from asthma to arthritis to cancer are able to live increasingly longer, healthier lives due to advances in medical care and technology, the prolonged and complex nature of these diseases translates into higher health care costs.

39 Long, Sharon, and Karen Stockley, “Emergency Department Visits in Massachusetts: Who Uses Emergency Care and Why?” *Robert Wood Johnson Foundation*, Washington, D.C., 2009, 3. <http://www.rwjf.org/en/research-publications/find-rwjf-research/2009/09/emergency-department-visits-in-massachusetts.html>
40 Ibid, 3.

41 Peter Cunningham, “What Accounts for Differences in the Use of Hospital Emergency Departments Across U.S. Communities?” *Health Affairs* (2006): W330. doi:10.1377/hlthaff.25.w324.

42 KA Hunt, EJ Weber, JA Showstack, DC Colby, and ML Callahan, “Characteristics of Frequent Users of Emergency Departments,” *Annals of Emergency Medicine* 48, no. 1 (2006). <http://www.ncbi.nlm.nih.gov/pubmed/16781914>.

43 E. Lorraine Bell, Pamela Lighter, and Chelsea Frakes. “Living Well with Chronic Illness: A Call For Public Health Action,” *Institute of Medicine*. Washington, D.C., 2012, 1. http://iom.edu/~media/Files/ReportFiles/2012/Living-Well-with-Chronic-Illness/livingwell_chronicillness_reportbrief.pdf.

44 The Milken Institute. (2007). *An Unhealthy America: The Economic Burden of Chronic Disease — Charting a New Course to Save Lives and Increase Productivity and Economic Growth*. Ross DeVol and Armen Bedroussian, <http://www.milkeninstitute.org/publications/publications.taf?function=detail&ID=38801018&cat=ResRep>

45 The Milken Institute (2014). *Checkup Time: Chronic Disease and Wellness in America*. Anusuya Chatterjee, Sindhu Kubendran, Jaque King, and Ross DeVol. <http://www.milkeninstitute.org/publications/publications.taf?function=detail&ID=38801460&cat=resrep>

46 The Centers for Disease Control and Prevention, “Chronic Diseases – The Power to Prevent, The Call to Control: At A Glance 2009,” *The Centers for Disease Control and Prevention Website*, 2009. <http://www.cdc.gov/chronicdisease/resources/publications/aag/chronic.htm>.

Additional research has also documented that Medicaid patients have high rates of chronic conditions. In an assessment of chronic conditions in the Medicaid population, the Kaiser Foundation on Medicaid and the Uninsured determined that 1 in 10 Medicaid beneficiaries had diabetes, 28 percent had respiratory disease, 23 percent had cardiovascular disease, and 35 percent had a diagnosed mental illness.⁴⁷ To an extent, this pattern mirrors increasing rates of chronic disease in the general population. Using MEPS data, a 2009 study found that over 40 percent of adults in 2005 reported suffering from one or more chronic condition.⁴⁸ Researchers from the Centers for Disease Control have highlighted chronic conditions as a concern likely to increase pressure on public health and budgets in the future due to “current trends in population growth, age distribution, and disease dynamics.”⁴⁹

Medicaid covers a diverse group of beneficiaries ranging from young children to adults with multiple disabilities, but certain groups account for a disproportionate amount of the program’s expenses. For example, disabled adults represent just 16 percent of Medicaid beneficiaries but account for nearly half of Medicaid expenditures.⁵⁰ Research has also indicated that Medicaid beneficiaries incur more costs than individuals of comparable socioeconomic status who are covered by private insurance, and, according to 1996-1999 MEPS data, a much higher proportion of adults on Medicaid than those covered by private insurance reported being in poor health.⁵¹ Thus, chronic conditions are increasingly prevalent even in the general population, making it crucial to control for them in our model. Additionally, poor health has the potential to interact with poverty and place of residence, race, or income to result in a greater likelihood of ED use and higher costs.

Insurance Status, ED Utilization, and Chronic Conditions

Finally, research indicates that our main independent variable of interest, insurance status, is associated with the likelihood of visiting an ED and the costs of the visit. Using data from the National Hospital Ambulatory Medical Care Survey, one study documented increased visits to the emergency department from 1997 to 2007 for individuals aged 18-64; during this time, uninsured individuals, “showed no significant change in [emergency department] visit rates.”⁵² By contrast, the rate of ED visits for Medicaid beneficiaries increased by nearly 37 percent between 1999 and 2007, while

47 “The Role of Medicaid for Adults With Chronic Illnesses,” *Kaiser Family Foundation*. Menlo Park, CA, 2012, 2. <http://kff.org/health-reform/fact-sheet/the-role-of-medicaid-for-adults-with/>.

48 Kathryn Anne Paez, Lan Zhao, and Wenke Hwang, “Rising Out-Of-Pocket Spending For Chronic Conditions: A Ten-Year Trend.” *Health Affairs*, 28, no. 1 (2009): 17. <http://content.healthaffairs.org/content/28/1/15.full.pdf+html>

49 Richard A. Goodman, Samuel F. Posner, Elbert S. Huang, Anand K. Parekh, and Howard Koh, *Defining and Measuring Chronic Conditions: Imperatives for Research, Policy, Program, and Practice*. Atlanta, GA, 2013. http://www.cdc.gov/pcd/issues/2013/12_0239.htm.

50 “Policy Basics: Introduction to Medicaid,” *Center on Budget and Policy Priorities*, Washington, D.C., 2013. <http://www.cbpp.org/cms/index.cfm?fa=view&id=2223>

51 Julia Paradise and David Rousseau, “Medicaid: A Lower-Cost Approach to Serving a High-Cost Population,” *Kaiser Family Foundation*, Washington, D.C., 2004, 3. <http://kff.org/medicaid/issue-brief/medicaid-a-lower-cost-approach-to-serving/>.

52 N. Tang, J. Stein, R. Hsia, J. Maselli, and R. Gonzalez. “Trends and Characteristics of US Emergency Department Visits, 1997-2007.” *Journal of the American Medical Association* 304, no. 6 (2010): 664. <http://jama.jamanetwork.com/article.aspx?articleid=186383&resultClick=1>.

rates for adults with private insurance and Medicare remained the same.⁵³

A 2009 study using data from the National Center for Health Statistics found that adults with Medicaid tended to receive more outpatient care in hospital EDs than in other outpatient settings; adults receiving care for chronic conditions were more likely to be covered by Medicare or Medicaid.⁵⁴ Another study reports that Medicaid beneficiaries are much more likely to use ED services than the privately insured, Medicare beneficiaries, or the uninsured, even after controlling for self-reported health status and demographics.⁵⁵ Recently, a 2014 study of low-income adults who received Medicaid coverage through Oregon's 2008 limited expansion of the program found that Medicaid coverage increased ED use by 40% relative to a control group.⁵⁶

In light of at risk populations' disproportionate use of ED services, it is concerning that research has shown differences in quality and cost of care based on health and insurance statuses. A 2012 study that compared patients with different types of insurance in terms of in-hospital mortality, length of stay, and cost per hospitalization for several common conditions found Medicaid and uninsured patients had worse health outcomes than privately insured patients. Additionally, both length of stay and average costs were higher for Medicaid beneficiaries than for the privately insured or the uninsured.⁵⁷ A 2013 study found that Medicaid beneficiaries were more likely to seek ED care due to barriers to accessing other sources of outpatient care than were those with private insurance.⁵⁸ This combination of higher costs, worse health outcomes, and potential barriers to access reinforces research that suggests that Medicaid beneficiaries would be more costly to care for regardless of type of coverage.^{59,60}

However, due to the wide variety of factors that contribute to ED use and costs, it is difficult to predict these variables' relationships with insurance status. Federal and state governments are able to negotiate lower reimbursement rates than private insurers, which could lower their costs. On the other hand, research indicates that many patients covered by Medicaid have more health conditions and require more costly care than the general population.

53 Ibid, 667.

54 Sandra L. Decker, Susan M. Schappert, and Jane E. Sisk. "Use of Medical Care for Chronic Conditions." *Health Affairs* 28, no. 1 (2009): 29-30. doi:10.1377/hlthaff.28.1.26.

55 DeLia, Derek, and Joel Cantor. "Emergency Department Utilization and Capacity." *The Synthesis Project. Research Synthesis Report* no. 17 (July 2009), <http://www.ncbi.nlm.nih.gov/pubmed/22052080>.

56 Sarah Taubman et al. (2014). Medicaid Increases Emergency-Department Use: Evidence from Oregon's Health Insurance Experiment. *Science*. 343: 263-268. DOI: 10.1126/science.1246183

57 Omar Hasan, E. John Orav, and LeRoi S. Hicks, "Insurance Status and Hospital Care for Myocardial Infarction, Stroke, and Pneumonia," *Journal of Hospital Medicine* 5, no. 8 (2010): 454-56. <http://onlinelibrary.wiley.com/doi/10.1002/jhm.687/pdf>.

58 Roberta Capp, Sean P. Rooks, Jennifer L. Wiler, Richard D. Zane, Adit A. Ginde, (2013). National Study of Health Insurance Type and Reasons for Emergency Department Use. *Journal of General Internal Medicine*. Published online 24 Dec 2013. DOI: 10.1007/s11606-013-2734-4.

59 Jack Hadley and John Holahan, "Is Health Care Spending Higher under Medicaid or Private Insurance?" *Inquiry* 40, no.4 (Winter 2003/2004).

60 It is important to note that some access barriers may be due to the nature of Medicaid coverage. This will be discussed more thoroughly in our "Policy Prescriptions" section.

Literature on Additional Control Variables

In the current study, we also control for important demographic and geographic factors including gender, age, race and ethnicity, region, urban area, and income. According to a 2010 study, ED usage is higher in the Northeast than in the south due to higher proportions of people with allergies and asthma.⁶¹ However, other research suggests that ED usage is greater in the Southern states.⁶² According to the Kaiser Family Foundation, the states with the highest rate of ED visits are the District of Columbia, roughly 736 visits per 1,000 people, and West Virginia, with 656 visits per 1,000 people.⁶³ Larger hospitals that have teaching facilities tended to have more ED visits than other hospitals.⁶⁴

Income and ED usage has been extensively debated. A 2002 community-based sample of homeless individuals found that their ED visits were roughly three times as high as the national average.⁶⁵ The average monthly income of the 2,578 survey respondents in this study was only \$631, with 85% of respondents reporting some source of state-funded income, such as Social Security or Disability Insurance. Additionally, poorer individuals have higher ED expenditures and higher proportions of ED costs to total medical costs than higher income patients.⁶⁶

Additionally, overuse of EDs can occur due to non-urgent visits from individuals who do not have a regular source of care. A 2002 evaluation of ED usage noted that as a result of lack of or disappointment with a usual source of care, adults under 45 were strongly associated with non-urgent ED use.⁶⁷ This study also reported a “persistent influence of income and Medicaid insurance,” on the quality and accessibility of usual source of care. Without quality and accessible care, lower income individuals rely more heavily on EDs.⁶⁸ Finally, existing research indicates that ED use is high for nursing home residents, the homeless, African Americans, individuals covered by Medicaid/SCHIP,⁶⁹ and income below the poverty level.⁷⁰

Dataset and Variables

This paper uses data gathered from the Full Year Medical Expenditure Panel Survey (MEPS) Household Component #147. In order to create this data set, the

61 S.A. Rudders, and J.A. Espinola, “North-South Differences in US Emergency Department Visits for Acute Allergic Reactions,” *Annals of Allergy, Asthma & Immunology*, 104, no. 5 (2010): 413–416.

62 “Hospital Emergency Room Visits Per 1,000 Population,” *The Henry J. Kaiser Family Foundation Website*, 2013. <http://kff.org/other/state-indicator/emergency-room-visits/>.

63 Ibid.

64 J.M. Pines, “Variation in Emergency Department Admission Rates Across the United States.” *Medical Care Research and Review* 70, no. 2 (2013).

65 M. Kushel, S. Bangsberg, R. Clark, and A. Moss. “Emergency Department Use Among the Homeless and Marginally Housed: Results From a Community-Based Study.” *American Journal of Public Health* 92, no. 5 (2002). <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1447161/pdf/0920778.pdf>.

66 P.D. Tyrance, Himmelstein, and S. Woodhandler. “U.S. Emergency Department Costs: No Emergency.” *American Journal of Public Health* 86, no. 11 (1996).

67 J. Sarver, R. Cydulka, and D. Baker, “Usual Source of Care and Nonurgent Emergency Department Use,” *Academic Emergency Medicine* 9, no. 9 (2002): 921.

68 Ibid, 922.

69 DeLia, Derek, and Joel Cantor. “Emergency Department Utilization and Capacity.” *The Synthesis Project. Research Synthesis Report* no. 17 (July 2009): 3, <http://www.ncbi.nlm.nih.gov/pubmed/22052080>.

70 Ibid, 5.

Agency for Healthcare Research and Quality (AHRQ) collects data from members of individual households and their medical providers. There are 35,313 observations in total, and data were collected from January 1st to December 31st, 2011. For the current study, the analytic sample size is 21,181 because we excluded individuals under the age of 18 and over the age of 65, as well as individuals whose household income was recorded as a negative number.⁷¹ Individuals younger than 18 were excluded because their chronic medical conditions were not included in the dataset. Individuals over the age of 65 were excluded because Medicare covers their ED visits, and this paper focuses only on comparing private insurance with Medicaid.

The outcome variables for this paper are number of ED visits per individual in 2011, total expenditure on ED visits per individual in 2011, and average (mean) cost of an ED visit per individual. Total expenditures are measured in dollars per person in 2011; average cost of an ED visit per person is the dollar value of the mean cost per person in 2011. ED visits is simply the number of ED visits for each person in 2011.⁷²

The independent variables of interest are private insurance coverage and Medicaid coverage. The private insurance and Medicaid are binary variables and represent whether an individual was covered by private health insurance or Medicaid for the entire year of 2011. For each variable, having private coverage or Medicaid is coded as 1; not having this type of coverage is coded as 0, respectively.⁷³

Control variables include age, sex, household income, race and ethnicity, chronic conditions, region of the U.S., and whether or not an individual lives in an urban area. The age variable indicates individuals' ages as of December 31, 2011, and the gender variable is a binary variable (i.e., women are coded as 0 and men as 1). Race is a categorical variable that includes Caucasian, African American, Asian, Pacific Islander, American Indian and Native Hawaiian. Hispanic is a binary variable where 0 is coded as non-Hispanic and 1 represents Hispanic ethnicity. Household income is an interval ratio variable. We control for a total of seven chronic conditions: high blood pressure, coronary heart disease, emphysema, cancer, high cholesterol, diabetes, and/or asthma.^{74,75} All chronic condition variables are binary; 1 indicates an individual has the condition and 0 indicates that he or she does not. For the binary variable metropolitan, 1 indicates that an individual lives in a metropolitan area, and 0 indicates that he or she does not. Finally, there are four regional variables: Midwest, Southwest, Northwest and Northeast, which are defined by the U.S. Census categories. For a list of states included in each region, please see Table 9 in Appendix 5.

⁷¹ We decided to delete these entries because they were very few, and likely represented errors in the dataset.

⁷² Due to the way the MEPS data is organized, ED visits that resulted in inpatient admissions were categorized as inpatient visits, and their costs were included in inpatient costs for the individual that incurred them. For more detail, please see our "Strengths and Weaknesses" section, page 26.

⁷³ For the purpose of this analysis we considered someone to be privately insured or enrolled in Medicaid if they were enrolled in these programs for the entire year of 2011.

⁷⁴ An individual is categorized as having each condition if he or she has been diagnosed with it at any point. Agency for Healthcare Research and Quality. (2013). MEPS HC-147 2011 Full Year Consolidated Data File, Section C.

⁷⁵ While chronic conditions are widely acknowledged as a daunting challenge, there is currently no uniform definition for or list of what this category includes. We have selected chronic conditions to include based on the list, disease categories and context included in Goodman et al. (2013). Defining and Measuring Chronic Conditions: Imperatives for Research, Policy, Program, and Practice. Preventing Chronic Disease, 10:120-239.

TABLE 1: DESCRIPTIVE STATISTICS

<i>Independent Variables</i>	<i>Percent</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Standard Deviation</i>
<i>Binary Independent Variables</i>				
Male	47%	0	1	N/A
High Blood Pressure	24%	0	1	N/A
Coronary Heart Disease	2%	0	1	N/A
Emphysema	1%	0	1	N/A
Cancer	5%	0	1	N/A
Diabetes	7%	0	1	N/A
High Cholesterol	21%	0	1	N/A
Asthma	9%	0	1	N/A
White	69%	0	1	N/A
Black	20%	0	1	N/A
Native American	1%	0	1	N/A
Asian	7%	0	1	N/A
Native Hawaiian/ Pacific Islander	1%	0	1	N/A
Multiple Races Reported	2%	0	1	N/A
Hispanic	28%	0	1	N/A
Northeast	16%	0	1	N/A
Midwest	20%	0	1	N/A
South	38%	0	1	N/A
West	26%	0	1	N/A
Urban	87%	0	1	N/A
Medicaid	10%	0	1	N/A
Private Insurance	48%	0	1	N/A

INFLUENCE OF INSURANCE TYPE ON EMERGENCY DEPARTMENT USAGE AND COSTS

<i>Independent Variables</i>	<i>Percent</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Standard Deviation</i>
<i>Non-binary Independent Variables</i>	<i>Mean</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Standard Deviation</i>
Age	39.7	18	64	13.36
Family Income	60,267.29	0	462,118	54,467.78
<i>Dependent Variables</i>				
Cost Per Visit	125.14	0	29,750	691.43
Total Visits	0.181	0	22	0.593
Total Expenditures	168.34	0	34,604	915.21

Observations: 21,181

MODEL⁷⁶

First, we first ran three separate ordinary least squares (OLS) regressions for each of our dependent variables: ED visits, total expenditures on ED visits, and the mean cost of individuals’ 2011 ED visits. The independent variables of interest are public and private health insurance status. We included age, sex, race, income, Hispanic ethnicity, and chronic conditions as control variables.

Next, we estimated tobit and poisson regressions on our ED cost dependent variables and our ED visits dependent variable, respectively. We chose to use tobit for ED costs and ED costs per visit because both dependent variables can be characterized as “corner solutions.” That is, they include many observations at zero, and the rest of the values have a roughly normal distribution. Poisson was used for the ED visits dependent variable because while the range is between 0 to 22 visits, many of the observations are zero or close to zero. The poisson regression is capable of recognizing this pile-up of observations at zero, and, unlike OLS, will not predict negative fitted values. Thus, it could provide a more precise estimate than an OLS regression.

RESULTS

Due to space constraints, we only list average partial effects (APE) for our main independent variables of interest below. A complete list for all control variables can be found in Tables 5-7 in Appendix 1.

ED Visits

Our model of the relationship between insurance status and the likelihood of visiting an ED produced results that confirm previous research on ED usage. That

⁷⁶ To view our empirical models in detail, please see Appendix 3.

is, OLS regression indicated that individuals enrolled in private health plans are less likely to visit the ED than individuals without private insurance by 4.9 percentage points, while individuals enrolled in Medicaid were more likely to visit the ED than the uninsured by 12 percentage points; both results were statistically significant at $\alpha = .01$. A poisson regression indicated that individuals enrolled in private health insurance plans were 23.8% less likely than individuals without private insurance to visit an ED, and that individuals enrolled in Medicaid were 32.3% more likely to visit an emergency department than uninsured individuals; both results were significant at $\alpha = .01$.

These results are important because they support previously discussed research indicating that Medicaid beneficiaries are more likely to utilize EDs. If Medicaid beneficiaries are nearly a third more likely to visit EDs than uninsured individuals, our baseline population, it is important to understand why, in order to develop less costly, more efficient care alternatives for this population.

TABLE 2: ED VISITS

<i>VARIABLES</i>	<i>1</i> <i>OLS</i>	<i>2</i> <i>Poisson</i>
Private Insurance	-0.049 (0.009)***	-0.236 (0.052)***
Medicaid	0.122 (0.021)***	0.323 (0.064)***
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

ED Total Costs

OLS regression indicated that individuals enrolled in private insurance had an average of \$12.31 more in annual emergency department expenditures per year than uninsured individuals and that they were 0.6 percentage points less likely to have emergency department expenditures than uninsured individuals; neither of these results were statistically significant, or practically significant. Individuals enrolled in Medicaid had an average of \$16.45 less in annual ED expenditures than uninsured individuals. Neither of these results was statistically significant.

When conducting a tobit regression, it is possible to obtain three types of APE. “Tobit APE if $y > 0$ ” produces APE conditional on ED costs being greater than zero. For example, the “Medicaid” variable would be interpreted as, “For those with ED costs above zero, Medicaid status is related to a \$106.04 increase in ED costs.” “Tobit APE” produces APE that are not conditional on costs greater than zero. For example, the “Medicaid” variable would be interpreted as, “Medicaid is related to a \$68.20 increase in ED costs.” Importantly, this APE is comparable to coefficients produced with OLS. Finally, “Tobit APE whether $y > 0$ ” indicates the probability that the dependent variable

is greater than zero. For example, the “Medicaid” variable would be interpreted as, “Medicaid status is related to an increase of about 3 percentage points in the likelihood of incurring ED costs.”

Our tobit regression indicated that individuals enrolled in a private health plan had an average of \$13.61 less in annual ED expenditures than uninsured; this result was also statistically and practically insignificant. However, for Medicaid beneficiaries, tobit indicated an average of \$68.20 more than non-Medicaid covered individuals in annual emergency department expenditures; this result was significant at $\alpha = .01$. Medicaid beneficiaries were 3.1% more likely to have ED expenditures. Finally, tobit indicated that Medicaid beneficiaries who incurred more than zero ED costs incurred an average of \$106.10 more per year than the uninsured. All tobit results for Medicaid beneficiaries were statistically significant at $\alpha = .01$. The latter results could also be important as an average of \$106.10 more in ED cost *per Medicaid beneficiary* per year could be a practically significant burden on federal, and especially state, budgets.

While this amount could be practically significant, our OLS results differed substantially from the average partial effects that our tobit model produced. These results are difficult to reconcile, and suggest that we may be missing information that is important to predicting the relationship between insurance status and cost and that we were unable to find a statistically significant relationship between the two that is robust.

TABLE 3: ED TOTAL COSTS

<i>Variables</i>	<i>OLS</i>	<i>Tobit Coef</i>	<i>Tobit APE if y>0</i>	<i>Tobit APE</i>	<i>Tobit APE whether y>0</i>
Private Insurance	12.675 (14.274)	-119.104 (97.988)	-20.578 (16.929)	-13.227 (10.883)	-0.006 (.005)
Medicaid	-16.255 (20.255)	615.091 (130.676)***	106.269 (22.566)***	68.309 (14.544)***	0.031 (0.007)***

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

ED Costs Per Visit

OLS regression indicated that individuals enrolled in private health insurance plans had \$17.80 more in expenditures per visit than uninsured, and that individuals enrolled in Medicaid had \$21.87 less in expenditures per visit than uninsured individuals. Neither OLS regression was statistically significant. Our tobit regression indicated that individuals enrolled in private insurance had an average of \$8.08 less in expenditures per visit than uninsured individuals and that individuals enrolled in Medicaid had \$50.32 more in expenditures per visit than uninsured individuals. While the former was not statistically significant (and, at only about \$8 per visit, not practically significant,

the latter was statistically significant at $\alpha = .01$. Moreover, the tobit APE conditional on ED costs per visit being greater than zero indicated that Medicaid status is related to a \$78.64 increase in costs per visit, statistically significant at $\alpha = .01$. As also demonstrated by the tobit model for Total ED Costs, Medicaid beneficiaries were also about 3% more likely to have ED expenditures. It is important to recognize that the APE change significantly when tobit is applied. This model is more useful in our case, because it does not produce negative fitted values, and thus produces better APE over the wide range of values in our dataset.

These results make sense, in light of the literature, which suggests that Medicaid status is more strongly associated with higher ED visits and cost than other types of insurance coverage as well as lack of insurance.⁷⁷ However, like our results for total ED costs per person in 2011, our OLS coefficients differ substantially from the APEs that our tobit model produced, suggesting that we may be missing information that is important to predicting the relationship between insurance status and costs, or that there may not be an important relationship between these two variables.

TABLE 4: ED COSTS PER VISIT

<i>Variables</i>	<i>OLS</i>	<i>Tobit Coef</i>	<i>Tobit APE if y>0</i>	<i>Tobit APE</i>	<i>Tobit APE whether y>0</i>
Private Insurance	18.159 (10.865)	-70.280 (74.337)	-12.134 (12.834)	-7.766 (8.214)	-0.005 (0.005)
Medicaid	-21.644 (14.972)	456.338 (99.450)***	78.787 (17.162)***	50.425 (11.012)***	0.03 (0.007)***

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Chronic Conditions: An issue for future research

Importantly, we found that certain chronic conditions had a greater effect on number of ED visits, total ED Expenditures, and cost per ED visit than the type of insurance plan the individual was enrolled in. Of these chronic conditions, coronary heart disease and asthma were robust, having consistently higher effects at $\alpha = .01$ significance level across all specifications that we ran. This finding makes sense in light of extensive literature documenting the relationship between chronic conditions and general health status to ED visits and cost – as described previously, these variables tend to be associated with more frequent visits, and with higher cost.

77 DeLia, Derek, and Joel Cantor. “Emergency Department Utilization and Capacity.” *The Synthesis Project. Research Synthesis Report* no. 17 (July 2009), <http://www.ncbi.nlm.nih.gov/pubmed/22052080>.

POLICY PRESCRIPTIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Our results contribute to research indicating that individuals enrolled in Medicaid and those who have certain chronic conditions visit EDs more often than the general population. For this reason, public administrators need to evaluate the preventative and long-term care these individuals receive to see whether care can be provided more efficiently to Medicaid patients, especially those with complex health care needs that can be costly to treat. Today, a variety of state and national initiatives exist to pursue this goal by providing more effective, efficient care to specific populations.

On a national level, Community Health Centers (CHCs) are a crucial tool for serving populations with limited access to health care. By definition, they provide comprehensive primary care services to medically underserved communities, areas that the Health Resources and Services Administration (HRSA) has designated as lacking in medical services.⁷⁸ In 2012, a Government Accountability Office (GAO) report indicated that HRSA has failed to adequately oversee CHCs' performance and compliance with HRSA standards.⁷⁹ The report issued recommendations to improve oversight, which HRSA should continue to implement.

More recently, CHCs have raised concerns that some states' plans to expand Medicaid using private insurance plans that offer lower reimbursements than public Medicaid plans will threaten their financial viability.⁸⁰ HRSA and other offices within HHS should closely monitor whether and to what extent this threat unfolds prepare to take measures to ensure that CHCs continue to provide adequate primary care in medically underserved areas.

In addition to adequate funding and oversight of community health centers on a federal level, states and the national government can also work to initiate and fund innovative demonstration programs that improve access to care for Medicaid beneficiaries. For example, New York is implementing six demonstration pilots to test an interdisciplinary model of care seeking to "improve health care quality, ensure appropriate use of services, improve clinical outcomes, and reduce the cost of care for beneficiaries with medically complex conditions," for Medicaid beneficiaries. Washington state has begun several initiatives dedicated to providing intensive care management and care coordination for Medicaid beneficiaries with chronic physical needs and mental illness or substance abuse issues, as well as helping patients with chronic conditions better manage their care.⁸¹ Projects such as these should continue to

⁷⁸ Health Resources and Services Administration. (2013). *What is a Health Center?* Paragraph 1. <http://bphc.hrsa.gov/about/> For more information on how medically underserved areas and health professional shortage areas are defined, please see: Health Resources and Services Administration. (2013). *Shortage Designation: Health Professional Shortage Areas & Medically Underserved Areas/Populations* <http://www.hrsa.gov/shortage/>

⁷⁹ Government Accountability Office. (2012). *Health Center Program: Improved Oversight Needed to Ensure Grantee Compliance with Requirements*. GAO-12-546. <http://www.gao.gov/assets/600/591177.pdf>

⁸⁰ Galewitz, Phil. (Feb 21 2014). *Health Centers See Threat From 'Private Option' Medicaid*. *Kaiser Health News*. [http://www.kaiserhealthnews.org/Stories/2014/February/21/Shifting-Medicaid-enrollees-into-private-plans-could-mean-less-money-for-clinics-treating-the-poor.aspx?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+khn+\(All+Kaiser+Health+News\)](http://www.kaiserhealthnews.org/Stories/2014/February/21/Shifting-Medicaid-enrollees-into-private-plans-could-mean-less-money-for-clinics-treating-the-poor.aspx?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+khn+(All+Kaiser+Health+News))

⁸¹ "Rethinking Care for Medicaid's Highest-Need, Highest-Cost Population." Center for Health Care Strategies, Inc. Hamilton, NJ, 2008. www.chcs.org/info-url_nocat3961/info-url_nocat_show.htm?doc_id=676169.

receive funding and be evaluated by public or nonprofit entities to determine whether they are successful, and if so, how they can be expanded to additional Medicaid beneficiaries and/or other states.

Overuse of EDs can lead to a variety of problems, as discussed in previous literature. Research indicates that ED overcrowding is driven by chronic conditions, low income, and poor health.⁸² Other research suggests that some patients prefer EDs to a regular source of care because they are perceived as more easily accessible, higher quality, and cannot deny care based on ability to pay.⁸³ More quantitative and qualitative work should be done to evaluate specific sources of overcrowding, because better understanding of these factors could help policymakers determine what types of initiatives could alleviate them.

Future researchers should also examine the ED services used by Medicaid recipients compared to privately insured individuals to conclusively determine whether Medicaid users have higher ED expenditures and are more likely to visit the ED. While substantial research exists documenting that Medicaid beneficiaries tend to be lower-income and have poorer health than the general population, policymakers need to better understand factors leading to ED use and high costs that are difficult to measure and control for, in empirical studies. These factors might include how poverty and/or poor health interact with place of residence, race, or income to result in a greater likelihood of ED use and higher costs.

Finally, there are several chronic conditions and demographic factors that we were not able to control for that deserve additional attention. Homelessness has been associated with frequent and high-cost ED use, as have problems with substance abuse and mental health.⁸⁴ The effect of these characteristics on ED use need to be studied in more depth in order to determine which lower-cost strategies can reduce the costs associated with their use.

Strengths and Weaknesses

A major strength of this analysis is the quality of the MEPS dataset. MEPS includes a large number of observations, which gives us a closer estimate to the true population. In addition, the dataset has in-depth information on individual observations, which provided us the ability to incorporate many important control variables into the regressions. Controlling for variables such as region and a variety of chronic conditions in the regressions improved our analysis of the relationship between ED costs and visits to insurance status. Finally, MEPS includes total expenditures from all payers (public and private insurance plans as well as individual co-pays), which makes it possible to assess overall health costs as opposed to exclusively considering patient cost-sharing responsibilities or insurance fees paid to hospitals which, for private payers, is often proprietary.

82 DeLia, Derek, and Joel Cantor. "Emergency Department Utilization and Capacity." *The Synthesis Project. Research Synthesis Report* no. 17 (July 2009), <http://www.ncbi.nlm.nih.gov/pubmed/22052080>.

83 Ibid.

84 Kelly M. Doran, Maria C. Raven, and Robert A. Rosenheck, "What Drives Frequent Emergency Department Use in an Integrated Health System? National Data From the Veterans Health Administration," *Annals of Emergency Medicine* 62, no. 2 (2013). doi:10.1016/j.annemergmed.2013.02.016.

An important weakness to consider is that we were not able to include all ED visits in our dataset from MEPS, because MEPS categorized ED visits that lead to inpatient care into a separate “inpatient care” variable. Therefore, our observations are restricted to ED visits that did not result in inpatient care. Additionally, while having the ability to control for chronic conditions strengthened our analysis, we were unable to include all chronic conditions. This is partially due to the lack of a standardized list of chronic conditions that is used uniformly across all research.⁸⁵ It is also because certain variables, including mental health, are not recorded in a way that is comparable to other chronic conditions. Therefore, we included chronic conditions based on our literature review that could be incorporated in the form of easily interpreted binary variables.

Additionally, research suggests that homelessness increases the probability of visiting an ED at least once a year. For example, a 2002 study found that factors including female gender, poor health, mental illness, a history of substance abuse and crime, and public insurance are associated with more visits to the ED.⁸⁶ The MEPS data set is organized by household and does not include homeless individuals, so we were unable to examine look at the effects of homelessness on ED use or costs.

Another weakness in our analysis is that we did not distinguish between individuals who cycle in and out of health insurance coverage. Approaches to categorizing individuals who “churn” in and out of Medicaid or private coverage vary; in this study, we categorize individuals as covered by public or private insurance if they had such coverage throughout 2011. However, if we had been able to categorize each ED visit based on type of insurance coverage, our results might have better reflected true ED costs and visits.

A great discrepancy exists between the number of observations enrolled in Medicaid and private insurance holders in the data set. In our sample, there are roughly 10,000 people with private insurance while we have a sample of 2,000 with Medicaid. This means the coefficient for public insurance variable is much more sensitive to changes than our private insurance variable.

Finally, MEPS data oversampled minorities to increase sample size and improve the precision of survey estimates for particular subgroups. Not all minority groups are oversampled and the MEPS public dataset does not provide weighting information on which subgroups were oversampled. This has the potential to decrease precision for the general population and some subgroups that are not oversampled resulting in varying precision issues across racial groups.

CONCLUSION

Based on our results and on existing literature, it is clear that more research is needed to establish the effects of public insurance on ED use and cost. As Medicaid expands and its population covered diversifies, this work will become all the more

85 Richard A. Goodman, Samuel F. Posner, Elbert S. Huang, Anand K. Parekh, and Howard Koh, *Defining and Measuring Chronic Conditions: Imperatives for Research, Policy, Program, and Practice*. Atlanta, GA, 2013. http://www.cdc.gov/pcd/issues/2013/12_0239.htm

86 M. Kushel, S. Bangsberg, R. Clark, and A. Moss. “Emergency Department Use Among the Homeless and Marginally Housed: Results From a Community-Based Study.” *American Journal of Public Health* 92, no. 5 (2002). <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1447161/pdf/0920778.pdf> .

urgent. Fortunately, extensive research exists on demographic and health factors that affect ED use and costs; this paper contributes to that literature by suggesting that Medicaid beneficiaries are more likely to visit the ED and incur higher costs, even when controlling for chronic conditions that tend to drive spending. These results suggest that Medicaid beneficiaries' high ED use and costs are related to additional, more complex factors that might include access to care or interactions between multiple chronic conditions and income level. Better understanding how these factors relate, and how they affect use of ED services, would help policymakers to design interventions that could result in more efficient and effective care.

APPENDIX 1: REGRESSION RESULTS

TABLE 5: ED VISITS

<i>VARIABLES</i>	<i>OLS</i>	<i>Poisson</i>
Private Insurance	-0.049 (0.009)***	-0.236 (0.052)***
Medicaid	0.122 (0.021)***	0.323 (0.064)***
Age	-0.002 (0.0003)***	-0.013 (0.002)***
Male	-0.063 (0.008)***	-0.352 (0.045)***
High Blood Pressure	0.101 (0.013)***	0.508 (0.059)***
Coronary Heart Disease	0.168 (0.042)***	0.496 (0.105)***
Emphysema	0.261 (0.069)***	0.485 (0.129)***
High Cholesterol	0.013 (0.012)	0.073 (0.062)
Cancer	0.089 (0.025)***	0.330 (0.087)***
Diabetes	0.064 (0.021)***	0.230 (0.076)***
Asthma	0.128 (0.019)***	0.432 (0.061)***

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<i>VARIABLES</i>	<i>OLS</i>	<i>Poisson</i>
Black	0.017 (0.013)	0.040 (0.057)
Native American	0.138 (0.061)**	0.501 (0.189)***
Asian	-0.077 (0.010)***	-0.807 (0.120)***
Native Hawaiian/Pacific Islander	-0.072 (0.043)*	-0.526 (0.425)
Multiple Races Reported	0.063 (0.044)	0.234 (0.156)
Hispanic	-0.060 (0.011)***	-0.352 (0.065)***
Family Income	-6.15e-07 (5.87e-08)***	-5.55e-06 (6.06e-07)***
Midwest	0.026 (0.015)*	0.096 (0.069)
South	-0.017 (0.012)	-0.120 (0.062)*
West	-0.036 (0.012)***	-0.257 (0.072)***
Urban	-0.027 (0.015)*	-0.101 (0.066)
Constant	0.350 (0.027)***	-0.728 (0.129)***

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 6: ED TOTAL COSTS

<i>VARIABLES</i>	<i>OLS</i>	<i>Tobit Coef</i>	<i>Tobit sigma</i>	$E(y y > 0, x)$	$E(y x)$	$Pr(y > 0 x)$
Private Insurance	12.676 (14.275)	-119.104 (97.988)		-20.578 (16.929)	-13.227 (10.882)	-0.006 (.005)
Medicaid	-16.255 (20.256)	615.091 (130.676)***		106.269 (22.566)***	68.309 (14.544)***	0.031 (0.007)***
Age	-1.218 (0.500)**	-19.607 (3.673)***		-3.388 (.634)***	-2.177 (0.410)***	-0.001 (0.0002)***
Male	-60.033 (12.581)***	-642.755 (84.361)***		-111.049 (14.557)***	-71.381 (9.456)***	-0.032 (.004)***
High Blood Pressure	93.813 (20.018)***	848.386 (106.318)***		146.576 (18.350)***	94.218 (11.928)***	0.042 (0.005)***
Coronary Heart Disease	339.087 (105.457)***	1,449.742 (221.513)***		250.472 (38.277)***	161.002 (24.768)***	0.073 (.011)***
Emphysema	85.712 (73.198)	989.210 (306.378)***		170.906 (52.930)***	109.857 (34.059)***	0.050 (.015)***
High Cholesterol	22.478 (19.960)	195.253 (112.793)*		33.734 (19.486)*	(21.684)*	0.010 (0.006)*
Cancer	77.409	595.117		102.991	66.202	0.03

INFLUENCE OF INSURANCE TYPE ON EMERGENCY DEPARTMENT USAGE AND COSTS

<i>VARIABLES</i>	<i>OLS</i>	<i>Tobit Coef</i>	<i>Tobit sigma</i>	<i>E(y y>0,x)</i>	<i>E(y x)</i>	<i>Pr(y>0 x)</i>
Diabetes	(34.170)** 51.267	(174.321)*** 530.750		(30.114)*** 91.698	(19.393)*** 58.943	(0.009)*** 0.027
Asthma	(32.729) 111.217	(150.290)*** 939.980		(25.960)*** 162.385	(16.719)*** 104.380	(.008)*** 0.047
Black	(29.327)*** -17.155	(126.845)*** 109.697		(21.904)*** 18.852	(14.199)*** 12.182	(.006)*** 0.005
Native American	(16.454) 346.922	(108.644) 1,482.784		(18.770) 256.181	(12.066) 164.671	(.005) 0.074
Asian	(190.641)* -90.675	(371.520)*** -1,348.851		(64.189)*** -233.041	(41.377)*** -149.797	(0.019)*** -0.068
Native Hawaiian/ Pacific Islander	(15.417)*** -105.836	(208.568)*** -1,344.574		(35.973)*** -232.302	(23.330)*** -149.322	(0.01)*** -0.067
Multiple Races	(41.647)** 9.872	(699.170)* 202.943		(120.781) 35.063	(77.697)** 22.538	(0.035)** 0.01
Hispanic	(40.351) -30.978	(311.648) -580.211		(53.843) -100.243	(34.612) -64.436	(.016) -0.029
Family Income	(18.000)* -0.0003	(109.114)*** -0.007		(18.836)*** -0.001	(12.168)*** -0.0007	(.005)*** -3.31E-07
Midwest	(0.0001)** 14.837	(0.001)*** 5.260		(.0002)*** .909	(0.0001)*** 0.584	(0.000000493)*** 0.0002
	(20.308)	(133.619)		(23.085)	(14.839)	(0.007)

<i>VARIABLES</i>	<i>OLS</i>	<i>Tobit Coef</i>	<i>Tobit sigma</i>	$E(y y>0,x)$	$E(y x)$	$Pr(y>0 x)$
South	-4.080 (19.159)	-303.631 (122.012)**		-52.458 (21.075)**	-33.720 (13.561)**	-0.0152 (0.006)**
West	-28.861 (18.735)	-463.7681 (133.504)***		-80.125 (23.057)***	-51.504 (14.854)***	-0.023 (.007)***
Urban	-22.929 (20.852)	-180.015 (119.618)		-31.101 (20.666)	-19.992 (13.289)	-0.009 (.006)
Constant	249.424 (33.765)***	-2,938.089 (223.9144)***	3,598.92 (58.508)***			

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 7: ED COSTS PER VISIT

<i>VARIABLES</i>	<i>OLS</i>	<i>Tobit Coef</i>	<i>sigma</i>	$E(y y>0,x)$	$E(y x)$	$Pr(y>0 x)$
Private Insurance	18.159 (10.865)	-70.280 (74.337)		-12.139 (12.834)	-7.766 (8.214)	-0.005 (0.005)
Medicaid	-21.644 (14.973)	456.338 (99.450)***		78.787 (17.162)***	50.425 (11.012)***	0.03 (0.007)***
Age	-0.533	-13.829		-2.388	-1.528	-0.0009

INFLUENCE OF INSURANCE TYPE ON EMERGENCY DEPARTMENT USAGE AND COSTS

<i>VARIABLES</i>	<i>OLS</i>	<i>Tobit Coef</i>	<i>sigma</i>	<i>E(y y>0,x)</i>	<i>E(y x)</i>	<i>Pr(y>0 x)</i>
Sex	(0.375) -36.292 (9.835)***	(2.786)*** -463.343 (63.994)***		(0.481)*** -80.264 (11.035)***	(0.309)*** -51.199 (7.130)***	(0.0002)*** -0.031 (0.004)***
High Blood Pressure	50.193 (13.613)***	593.484 (80.793)***		102.466 (13.934)***	65.579 (9.002)***	0.039 (0.005)***
Coronary Heart Disease	194.526 (68.404)***	995.389 (169.331)***		171.856 (29.235)***	109.989 (18.811)***	0.066 (0.011)***
Emphysema	-2.276 (38.964)	651.183 (234.279)***		112.428 (40.444)***	71.955 (25.904)***	0.043 (0.015)***
High Cholesterol	18.685 (14.482)	151.802 (85.615)*		26.209 (14.781)**	16.774 (9.466)**	0.01 (0.005)*
Cancer	40.380 (24.820)	412.755 (132.774)***		71.436 (22.921)***	45.719 (14.692)***	0.027 (0.009)***
Diabetes	37.783 (24.005)	402.015 (114.285)***		69.409 (19.728)***	44.422 (12.650)***	0.027 (0.008)***
Asthma	68.898 (19.796)***	686.876 (96.544)***		118.590 (16.659)***	75.899 (10.746)***	0.045 (0.006)***
Black	-13.591 (12.264)	83.755 (82.511)		14.461 (14.245)	9.255 (9.118)	0.006 (0.005)
Native American	301.851	1,201.523		207.445	132.767	0.079

<i>VARIABLES</i>	<i>OLS</i>	<i>Tobit Coef</i>	<i>sigma</i>	<i>E(y y>0,x)</i>	<i>E(y x)</i>	<i>Pr(y>0 x)</i>
Asian	(179.785)* -69.850 (11.919)**	(280.571)** -1,015.752 (157.624)**		(48.444)** -175.340 (27.169)**	(31.109)** -112.219 (17.544)**	(0.019)** -0.067 (0.010)**
Native Hawaiian/ Pacific Islander	-68.91 (40.727)*	-968.950 (525.538)*		-167.291 (90.724)**	-107.068 (58.105)**	-0.067 (0.035)*
Multiple Races	-14.949 (24.972)	103.349 (237.948)		17.843 (41.082)	11.420 (26.293)	0.007 (0.016)
Hispanic	-23.403 (13.788)*	-439.866 (82.799)**		-75.944 (14.284)**	-48.605 (9.188)**	-0.029 (.005)**
Family Income	-0.0002 (0.00009)**	-0.005 (0.001)**		-0.0008 (0.0001)**	-0.0005 (0.00008)**	-3.19E-07 (0.0000000491)**
Midwest	-7.470 (14.746)	-39.628 (101.421)		-6.842 (17.510)	-4.379 (11.207)	-0.003 (0.007)
South	-9.611 (14.835)	-244.561 (92.473)**		-42.224 (15.962)**	-27.023 (10.229)**	-0.0161 (0.006)**
West	-28.434 (14.415)**	-365.906 (101.152)**		-63.174 (17.458)**	-40.432 (11.201)**	-0.024 (.007)**
Urban	-9.651 (14.980)	-118.838 (90.980)		-20.518 (15.707)	-13.131 (10.056)	-0.008 (.006)
Constant	171.164	-2,281.412	2,733.607			

<i>VARIABLES</i>	<i>OLS</i>	<i>Tobit Coef</i>	<i>sigma</i>	$E(y y>0,x)$	$E(y x)$	$Pr(y>0 x)$
	(24.053)***	(170.008)***	(44.481)***			
Observations	21,109					
R-squared	0.010					
rank	23					
ll_0	-168017					
ll	-167909					
r2_a	0.00914					
rss	1.000e+10					
mss	1.030e+08					
rmse	689.5					
r2	0.0102					
F	8.138					
df_r	21086					
df_m	22					
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

APPENDIX 2

TABLE 8: CHRONIC CONDITION, RACE, ETHNICITY, AND REGION BY TYPE OF INSURANCE

<i>Variable (binary)</i>	<i>Private Insurance</i>	<i>Medicaid</i>
Male	48.00%	34.00%
High Blood Pressure	26.00%	30.00%
Coronary Heart Disease	2.00%	5.00%
Emphysema	0.70%	3.00%
Cancer	6.00%	6.00%
Diabetes	7.00%	12.00%
High Cholesterol	25.00%	24.00%
Asthma	8.00%	16.00%
White	71.00%	58.00%
Black	17.00%	35.00%
Native American	0.60%	0.60%
Asian	10.00%	4.00%
Native Hawaiian/Pacific Islander	0.60%	0.50%
Multiple Races Reported	2.00%	2.00%
Hispanic	18.00%	32.00%
Northeast	17.00%	27.00%
Midwest	23.00%	20.00%
South	34.00%	28.00%
West	26.00%	26.00%
Urban	88.00%	86.00%

APPENDIX 3: EMPIRICAL MODELS:

$$ER\ Visits = \beta_0 + \beta_1 privatein + \beta_2 publicin + \beta_3 age + \beta_4 male + \beta_5 hibp + \beta_6 chd + \beta_7 emph + \beta_8 highchol + \beta_9 cancer + \beta_{10} diab + \beta_{11} asthma + \beta_{12} Black + \beta_{13} NativeAmer + \beta_{14} Asian + \beta_{15} NativeHawPI + \beta_{16} Hispanic + \beta_{17} Faminc + \beta_{18} Midwest + \beta_{19} South + \beta_{20} West + \beta_{21} Urban + \mu$$

$$ER\ Total\ Expenditures = \beta_0 + \beta_1 privatein + \beta_2 publicin + \beta_3 male + \beta_4 sex + \beta_5 hibp + \beta_6 chd + \beta_7 emph + \beta_8 highchol + \beta_9 cancer + \beta_{10} diab + \beta_{11} asthma + \beta_{12} Black + \beta_{13} NativeAmer + \beta_{14} Asian + \beta_{15} NativeHawPI + \beta_{16} Hispanic + \beta_{17} Faminc + \beta_{18} Midwest + \beta_{19} South + \beta_{20} West + \beta_{21} Urban + \mu$$

$$ER\ Costs\ per\ visit = \beta_0 + \beta_1 privatein + \beta_2 publicin + \beta_3 age + \beta_4 male + \beta_5 hibp + \beta_6 chd + \beta_7 emph + \beta_8 highchol + \beta_9 cancer + \beta_{10} diab + \beta_{11} asthma + \beta_{12} Black + \beta_{13} NativeAmer + \beta_{14} Asian + \beta_{15} NativeHawPI + \beta_{16} Hispanic + \beta_{17} Faminc + \beta_{18} Midwest + \beta_{19} South + \beta_{20} West + \beta_{21} Urban + \mu$$

APPENDIX 4: VARIABLE DEFINITIONS

ER Visits = **Number of ER Visits for Calendar Year (CY) 2011**

- ER Total Expenditures = Total expenditures on ER visits for CY 2011
- ER Costs per Visit = Average Cost per ER visit in CY 2011
- privatein = Individual Enrolled in Private Insurance Plan in CY 2011
- publicin = Individual Enrolled in Medicaid in CY 2011
- age = Age on December 31st, 2011
- male = Individual is Male
- hibp = Diagnosis of High Blood Pressure
- chd = Diagnosis of Chronic Heart Disease
- emph = Diagnosis of Emphysema
- highchol = Diagnosis of High Cholesterol
- cancer = Diagnosis of Cancer
- diab = Diagnosis of Diabetes
- asthma = Diagnosis of Asthma
- Black = Individual is of African American Ancestry
- NativeAmer = Individual is of Native American Ancestry
- Asian = Individual is of Asian Ancestry
- NativeHawPI = Individual is of Native Hawaiian/Pacific Islander Ancestry
- Hispanic = Individual is of Hispanic Ancestry
- Faminc = Individual's Family Income for CY 2011
- Midwest = Individual lives in the Midwest
- South = Individual lives in the South
- West = Individual lives in the West
- Urban = Individual lives in an Urban Area
- μ = Unobservable Error.

APPENDIX 5

TABLE 9: REGIONS OF THE UNITED STATES

<i>Region</i>	<i>States</i>
Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont
Midwest	Indiana, Illinois, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin
South	Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.
West	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming

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