Predicting the Effects of the Patient Protection and Affordable Care Act of 2010

Adrienne Sabety*
April 20, 2012

Under the direction of Professor David Card

Abstract

With the onset of the Patient Protection and Affordable Care Act of 2010, more than 30 million Americans will become newly insured. This paper predicts how this change will impact patients as well as the health care system by examining the use of health care services by people those newly insured under Medicare. I find those with diabetes and other chronic conditions prefer to go to doctors in an office setting rather than to hospital emergency rooms at 65. Ultimately, this should lower the cost of health care as well as improve health outcomes over all.

---

*Senior Honors Thesis, Department of Economics, University of California, Berkeley, email: ah.sabety@gmail.com

Acknowledgements: I would like to thank Professor David Card for his weekly support, generosity and guidance throughout the entire process; I have been extremely lucky to benefit form his wisdom and insights. I would also like to thank Harrison Dekker in the data lab for his assistance every step of the way.

I. Introduction

According to the Congressional Budget Office, the 2010 Patient Protection and Affordable Care Act is expected to provide health insurance to more than 30 to 33 million previously uninsured, non-elderly Americans by 2016. However, there is considerable uncertainty about how this new, potentially enormous demand for health care will affect patients' choices.

While some think the current high demand on emergency rooms is due to the uninsured having no other place to go, others attribute the frequency of visits to poor general health as well as other unobservable characteristics. For example Card, Dobkin and Maestas (2008) show that the insured have better diets, smoke less, exercise more and are more likely to use a seatbelt when compared to the uninsured. Further, the relationship between health and insurance status likely suffers from reverse causality; insurance status likely improves health, and those who value their health are more likely to pay for health insurance. Since they affect each other simultaneously, it is difficult to examine only the effect of health insurance on health outcomes.

However, Medicare eligibility rules can solve this problem. By using a regression discontinuity (RD) method, the government assignment of Medicare becomes as good as randomly assigned (Lee, 2008). This design addresses the problems of omitted variable bias and reverse causality to yield an unbiased estimate of the causal effect of turning 65 on health care usage.

Levy and Metzler (2008) state that the most plausible pathway for health insurance to improve health is through increased access to medical care. This can be seen as increased quality and/or quantity of care. It is this link that this paper focuses on. I contribute uniquely to the literature by randomly assigning Medicare, through a RD design, and examining how health care usage for preventable conditions changes when patients turn 65. Using Levy and Metzler's pathway to better health, at 65—when our country essentially has universal health insurance—there should be an increase in the quantity and quality of care consumed. As proponents of health reform advocate, there should be a shift in demand from the emergency department (ED) to the doctors' office, the more appropriate and cost effective setting for preventable, chronic conditions.

Most visits to the ED are for non-emergency care. For instance, I find that in the years from 2003 to 2009, about 75 percent of ED visits did not result in an admission to the hospital. Further, by using the New York University Emergency Department visit severity algorithm, I find that around 55 percent of ED visits could have been treated instead at a physician's office. Sixteen percent of emergency department visits were for conditions that did not require immediate medical care; 38 percent of visits did require some care, but could have been handled in a primary care setting within 12 hours; and 12 percent of visits were for conditions that required emergency treatment, but could have been prevented if timely and effective primary care had been given (Figure 1). These high percentages are a sign that patients have limited access to other sources of regular care (Billings, Parikh, and Mijanovich, 2000).

Not only is the ED the more expensive place to treat non-emergency ailments, it is also not designed for them. For instance, a patient who uses the ED for diabetes related complications will not receive help managing their condition or the follow-up care they desperately need, which in turn can prevent future visits to the ED. Further, poor or uninsured patients may forgo preventive care and delay treatment until they face a medical crisis.

Chronic, preventable conditions are known as ambulatory care sensitive conditions (ACSC), which include ailments such as: hypertension, diabetes, chronic obstructive pulmonary disease and asthma. They are also a leading medical problem in the United States. According to the Centers for Disease Control and Prevention about 133 million Americans—nearly one in two adults—live with at least one chronic illness. A study by Bodenheimer, Wagner, and Grumbach (2002a) found that half of these adults have in turn more than one chronic illness, with 88 percent of these individuals aged 65 years or older. Further, they find that 25 percent of the elderly have four or more chronic conditions. Currently, these ailments account for three quarters of our national health care expenditures (Bodenheimer et al., 2002a). When the Affordable Care Act takes full effect in 2016, treating, preventing and monitoring ACSCs will become an even bigger issue due to the number of newly insured individuals seeking care.

I also examine one chronic condition in particular, diabetes, because it affects almost ten percent of the population and is trending toward epidemic proportions in the next few decades (World Diabetes Foundation). Further, according to Linden and Adler-Milstein (2008), while only 18 percent of Medicare beneficiaries have diabetes, they account for 32 percent of Medicare spending.

I look at the change in demand for ACSCs and diabetes in four different settings: visits to the ED, admissions to the hospital through the ED, visits to the outpatient department (OPD) and visits to the doctor’s office. I find that when individuals gain universal health insurance at 65, their demand for care in a doctor’s office setting significantly increases for ACSCs and diabetes.

The rest of the paper is structured as follows. Section II examines relevant literature about the effects of expanding publically subsidized health insurance. Section III describes the dataset and section IV details the findings from my regression discontinuity model. I discuss the results in section V and section VI outlines the policy implications.

II. Literature Review

While the effects of expanding government-subsidized health insurance are unclear, one thing is certain: the newly insured will increase their consumption of health care (Newhouse, 1993; Dafny and Gruber, 2005; Aizer, 2007; Card, Dobkin, and Maestas, 2009; and others). For instance, the Oregon Health Experiment examines how health care demand changes when individuals are randomly assigned Medicaid (Finkelstein et al., 2011). They find that newly qualified Medicaid subscribers have statistically significantly higher health care utilization for primary, preventive, and hospital care. Additionally, Dafny and Gruber (2005) find that the expansion of public health insurance for low-income children causes total hospitalizations to increase significantly. Further, Card, Dobkin and Maestas, (2009) show that the demand for elective procedures jumps at 65, when a person qualifies for Medicare. Another study shows that mammograms in less-educated black women increase after 65 (Decker and Rapaport, 2002). And finally, McWilliams, Michael, Zaslavsky, Meara, and Ayanian (2003) finds that screenings at 65 increase most in individuals who lacked insurance two years before they reached 65.

However, there is more debate over how health insurance affects health outcomes. The 1987 Rand Health Insurance Experiment finds no correlation between insurance status and health status (Newhouse, 1993). Finkelstein and McKnight (2005) also show that the establishment of Medicare in 1965 had "no discernible impact" on the elderly's mortality rate. On the other hand, more recent studies, that exploit "natural experiments" as well as newer econometric methods, which randomize populations, show different results. One of the best places to look is the state of Massachusetts after it implemented its own health care reforms in 2006. A paper by Kolstad and Kolwaski (2010) finds that the average hospital stay and the number of inpatient admissions originating from the emergency department (ED) decreased after the reforms took hold. They also find a reduction in hospitalizations due to preventable conditions. In yet another study, Miller (2011) finds that the Massachusetts plan substantially reduces the number of ED visits. Given her results, Miller determines that the choice to go to one's doctor instead of the ED could decrease the "per dollar" cost of health care, as well as improve patients' health outcomes.

Other current studies show that health outcomes improve when individuals qualify for government-subsidized health insurance. Card et al. (2009) shows that Medicare eligibility reduces the death rate of severely ill patients by 20 percent. Further, the Oregon Health Experiment (Finkelstein et al., 2011) finds an increase in the number of people going to their primary care physicians after gaining insurance. The experiment also finds that individuals who qualify for Medicaid have improved self-reported physical and mental health. Further, Courtemanche and Zapata (2012) claim that the Massachusetts health reform has led to better overall self-assessed health. They also find improvements in several determinants of overall well being, including physical health, mental health, functional limitations, joint disorders, body mass index, and moderate physical activity. If these recent results are correct, universal health insurance may increase the quantity and quality of care consumed, yielding much better health outcomes in the population at large.

III. Description of the Dataset

In order to examine Medicare's effect on Ambulatory Care Sensitive Conditions (ACSCs), I aggregate two stratified, multi-stage probability surveys, the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS). Both surveys are conducted by the Ambulatory and Hospital Care Statistics Branch of the National Center for Health Statistics, Centers for Disease Control and Prevention and are taken annually and are nationally representative. NAMCS randomly surveys physicians in office-based practices and NHAMCS randomly surveys outpatient (OPD) and emergency departments (ED) and they both survey in all 50 states as well as the District of Columbia. Further, the surveys assign a weight to each observation to allow researchers to make nationwide estimates. I use the statistical package Stata (version 12) survey commands to access the sampling methodology.

In total, my dataset has more than 8 billion weighted observations[1], which spans the years 2003 to 2009. In terms of percentages, on average 81.6 percent of my

[1] The NAMCS includes more than 6.5 billion weighted visits and the NHAMCS includes about 1.5 billion weighted visits from years 2003 to 2009.

observations are from NAMCS and 18.4 percent of my observations are from NHAMCS. Furthermore, because I am looking at the Medicare threshold, I focus on visits between the age of 50 and 80, which restricts the dataset to 3 billion visits in the years 2003 to 2009. Examining multiple years allows me to observe similar individuals over time. For example, an unhealthy 60 year-old in the 2003 sample, is still an unhealthy 66 year-old in the 2009 sample. This helps control for unobservable characteristics that may affect demand at the Medicare threshold.

The sampling form counts the number of visits to the ED, OPD and doctors' offices. In terms of scope, NAMCS generally surveys free-standing clinics, community health centers, non-federal government clinics, family planning clinics, health maintenance organizations, faculty practice plans, and private solo or group medical practices. The NHAMCS includes non-institutional general and short-stay hospitals, but excludes federal, military, and Veterans Administration hospitals.

Additionally, there are over 500 variables that range from mental status to patient wait time. Some variables describe patient characteristics such as: age, sex, insurance status, month of visit, race/ethnicity, region, patient's zip code and whether or not the patient resides in a metropolitan statistical area. The primary variables I use are the patient's primary diagnosis, his or her age, whether or not the patient was admitted to a hospital, where the patient was seen (ED, OPD or doctors' office) and the patient weight, which allows me to make nationwide estimates.

I find that, from age 64 to 65, the number of visits increase from 98,000,000 to 102,000,000 (Table 1). Additionally, when patients reach the Medicare threshold, the percentage of patients without insurance decreases from 5.13 percent to 1.91 percent and the percentage of patients with Medicare increases from 20.10[2] percent to 58.14 percent[3] (Table 1).

In order to examine Medicare's effect on ambulatory care sensitive conditions (ACSCs), I use two algorithms created at New York University by Billings. The first algorithm analyzes primary diagnoses that are denoted by ICD-9–CM codes. It then assigns a zero or a one to each visit, depending on if the visit was for an ACSC. The second algorithm by Billings et al. (2000) composes a percentage breakdown of the types of visits made (Figure 1). It then categorizes the types of visits into: an emergent condition, ED care needed, but preventable and/or avoidable; a non-emergent condition; an emergent, primary care treatable condition; and an emergent condition that requires ED care that is not preventable and/or avoidable.

To look at specific ACSCs, I create my own algorithm that uses ICD-9-CM codes to identify specific ACSCs based on primary diagnoses. The conditions I identify are: convulsions, tuberculosis, chronic obstructive pulmonary disease, bacterial pneumonia, asthma, congestive heart failure, hypertension, angina, cellulitis, diabetes, hypoglycemia, gastroenteritis, kidney/urinary infection, dehydration, appendicitis with appendectomy, acute myocardial infarction and gastrointestinal obstruction (Table 3).

Further, in this paper I examine diabetes specifically. The primary, ICD-9-CM codes I use to identify diabetes related complications are: 250.0 through 250.3, 250.8 and 250.9 (New York University). I cross-compare with the first algorithm by Billings,

---

[2] The 20.1 percent of Medicare enrollees under 65 are on Social Security Disability Insurance (DI), have end-stage renal disease, or permanent kidney failure, which is currently about 12 percent of the population (Autor and Duggan, 2003).

[3] Unfortunately, the dataset only contains information about primary insurance. It is very likely that patients over 65 who denoted private insurance as their primary insurance held supplemental Medicare coverage as well.

which creates a dummy variable that indicates if a condition is an ACSC. For my analysis, I use all observations that satisfy both my algorithm and the Billings et al. algorithm, which includes 126,000,000 weighted observations in the restricted age range of 50 to 80.

IV. Regression Discontinuity

My primary tool of analysis is a widely tested reduced form regression discontinuity (RD) method (Card et al., 2009). I determine that it is a "fuzzy" RD because some individuals qualify for Medicare before 65[4] (Hahn, Todd, and Van de Klauuw, 2001). The RD design works well when modeling this dataset because eligibility rules do not change between the years 2003 and 2009 and individuals cannot precisely manipulate the assignment of Medicare. Therefore, randomization is a consequence of individuals' inability to precisely control insurance status at the age of 65 (Lee, 2008).

The model includes the running variable (age), a dummy variable to indicate if a patient is over 65, an interaction term that is activated when an individual is over 65, and a dependent variable that captures health-related outcomes. The dependent variable includes the number of ambulatory care sensitive condition (ACSC) related visits to the emergency department (ED) and admissions to the hospital through the ED as well as visits to the outpatient department and to the doctor's office. It also includes admissions to the hospital through the ED for diabetes, and the number of diabetes-related visits to

[4] Those on Social Security Disability Insurance (DI), with end-stage renal or kidney failure qualify for Medicare before 65.

the ED, outpatient department and to the doctor's office.[5] The equation I am estimating is as follows:

$$(1)\ \ln(Y(x)) = \alpha_1 x + \alpha_2 x^2 + \alpha_3 1_{x\geq 65} + \alpha_4 1_{x\geq 65} * (x\text{-}65) + \alpha_5 1_{x\geq 65} * (x\text{-}65)^2 + \epsilon_x$$

The dependent variable, $Y(x)$, captures the health-related outcome for each visit. X is a measure of age and $1_{x\geq 65}$ is an indicator function for patients with an age over 65[6]. $\mathbf{1}_{x\geq 65} * (x-65)$ and $\mathbf{1}_{x\geq 65} * (x-65)^2$ measure the number of years over 65 and are interacted with the dummy variable for being over 65. For patients whose age is less than 65, this term equals zero. Finally, ϵ_x is an error term representing all other unobservable factors.

The RD design uses two assumptions: first, that the function varies smoothly and continuously in the absence of treatment; and second, that the outcome variable and other covariates do not "jump" when the running variable (age) crosses 65. Both assumptions are supported by extensive research showing that population characteristics are remarkably smooth at the Medicare threshold (Dow, 2004; Finkelstein and McKnight 2008; Card et al., 2008; Card et al., 2009). As a result, I assume that the subsample is independent of whether patients are under or over 65 (Card et al., 2009).

The basic design of RD relies on the idea that as you asymptomatically approach a rule of treatment—in this case qualifying for Medicare at age 65—the sample becomes randomized. As a result, using the basic design of RD, I assume:

---

[5] ACSC was a dummy variable in my dataset, which I collapsed over the number of observations. I used the patient weight that weighted up each visit, to generate my regressions.
[6] This dummy indicator is 0 for patients under 65 and 1 for patients over 65.

$$E[\epsilon_x \mid 65 - \delta \leq x \leq 65] = E[\epsilon_x \mid 65 \leq x \leq 65 + \delta]$$

for δ sufficiently small. In other words, individuals a year below and above the threshold are assumed to have identical characteristics in the absence of the treatment. Due to the limitations of the dataset, the smallest factor away from 65 is one year. Ideally, a sample with month and year birthdates would help zero in on individuals even closer to the treatment threshold.

1. Demand of Care for Ambulatory Care Sensitive Conditions

One of the main arguments for expanding health insurance through legislation like the Affordable Care Act of 2010 (ACA) is that it will improve health by increasing access to doctors in an office setting. In order to quantify the effect of universal coverage, I focus on ACSCs, which are a vital subgroup because these conditions can be prevented with the help of a doctor.

Further, Bodenheimer, et al. (2002b) finds that 18 of 27 studies studying congestive heart failure, asthma and diabetes show that chronic care interventions reduce health care costs and lower the use of health care services at the primary care level. This is because chronic, preventable conditions can be avoided with monitoring. As a result, not having access to a physician on a consistent basis, such as when an individual is uninsured, often results in hospitalization for life-threatening and expensive complications related to ACSCs (McCall, Harlow, and Dayhoff, 2001). For instance, visits for ACSC-related complications are 19 percent of ED visits at age 64 and about 18 percent of visits at 65 (Table 1).

I examine the change in demand by using a RD method at the Medicare threshold in four different settings. If government-subsidized health care works as advocates hope, we would expect to see a significant increase in the number of visits to the doctors' office for ACSCs. This in turn could improve long-term health outcomes on a macro scale.

2. Demand of Care for Ambulatory Care Sensitive Conditions—Empirical Results

I examine the change in demand for care at 65 using four regressions. I also include graphs for each estimate (Figure 2). Each graph gives readers a sense of how the jump in the outcome variable compares to other bumps in the regression curve not at the cut off as well as an idea of outliers in the data (Lee and Lemieux, 2009).

First, my dependent variable is the number of visits to the ED for ACSC-related complications. I find an insignificant decrease at the discontinuity at age 65 (Table 4). After fitting a quadratic model to the data, I find that at 65, the break is clean, the trend is clear, and the fit is good[7].

In the second regression, I examine how the onset of age 65 affects inpatient admissions through the ED. The RD model shows an insignificant decrease at the discontinuity (Table 4). However, these results are somewhat inconclusive because the model has a lot of variance and does not fit the data well[8] (Figure 2). Further, the increase could be due to other factors, which are unrelated to insurance status. For instance, a grandmother is more likely to be admitted for pneumonia, an ACSC, at age 75

---

[7] The first graph had an R^2 of 0.8796
[8] The second graph had an R^2 of 0.4776

than at age 60.

Third, I focus on ACSC-related visits to the outpatient department (OPD). I find an insignificant positive discontinuity at 65 (Table 4). In terms of trends not at the discontinuity, the number of visits decreases from 65 to 80 and the model fits the data well[9] (Figure 2). Fourth, I find that visits to doctors' offices significantly increase at age 65 (Table 4). There is a sizable increasing discontinuity and the jump can be interpreted as a 12 percent increase in visits. The graph shows a clear discontinuity and shift up in demand and the model fits the data fairly well[10] (Figure 2). Graphically, there is an outlier at 65, showing a massive increase in demand at the threshold. To get a better idea of what is going on, I focus in on a specific ACSC, diabetes.

3. Demand of Care for Diabetes

According to the American Diabetes Association, 8.3 percent of the population has diabetes. Further, if current trends continue, one in three adults will have diabetes by 2050 (Centers for Disease Control and Prevention). Not only is the rate of diabetes reaching epidemic levels in the United States, but it is also a leading medical problem among the uninsured. Estimates based on the National Health Interview Survey find that uninsured adults with diabetes are less likely than their insured counterparts to receive medical and dental care; they are less likely to have a usual source of care; and they have substantially higher unmet health needs. In addition, they have higher out-of-pocket spending burdens. As a result, uninsured adults with diabetes often fail to receive regular

[9] The third graph had an R^2 of 0.9458
[10] The fourth graph had an R^2 of 0.7984

medical management as well as tests aimed at detecting complications (The Urban Institute and the University of Maryland, 2005). When the ACA takes full effect in 2016, treating, preventing and monitoring diabetes will become an even bigger issue due to the number of newly insured individuals seeking care.

In terms of the dataset, I find that among 64 year olds, 4 percent of doctors' office visits, 7.5 percent of outpatient visits, and less than 1 percent of ED visits are for diabetes-related complications (Table 1). Comparatively, among 65 year olds, 5.44 percent of doctors' office visits, 8.3 percent of outpatient department visits, and 0.34 percent of ED visits are for these same complications (Table 1). Further, I find that out of the 16 ACSCs that I identify, visits for diabetes-related complications are 25 percent of doctors' office visits for 64 year olds and 32 percent for 65 year olds (Table 3).

4. Demand of Care for Diabetes—Empirical Results

I examine four regressions in the context of diabetes. The first examines the change in ED visits for diabetes related complications at 65. I find an insignificant decreasing discontinuity at 65 (Table 4). Graphically, there is a quadratic relationship with a max at about 58, a shift down at the discontinuity, and then another max at 73 (Figure 3). The fit is poor[11], which may be due to three high outliers.

My second regression focuses on how the onset of 65 affects admissions through the ED for diabetes-related complications. I find an insignificant negative discontinuity at 65 (Table 4). Graphically, it looks like the regression has a similar shape as the first

[11] The first regression had an R^2 of 0.4737

graph, although in this case the fit is worse[12](Figure 3). Again, there seem to be local maxima at age 58 and 73.

Third, I examine the change in OPD visits after 65 for diabetes related complications. I find a positive, insignificant discontinuity at 65 (Table 4). After the discontinuity, the graph shows a decreasing, concave up, trend throughout the age range of 65 to 80 (Figure 3). Additionally, the fit is relatively good.[13]

The last regression focuses on visits to the doctors' office for diabetes-related complications. I find that being over 65 significantly increases visits to the doctor for diabetes-related complications. There is a 31.5 percent increase in visits at the discontinuity (Table 4). Graphically, visits under 65 show a quadratic relationship, with the maximum around age 58 (Figure 3). The fit is relatively good[14] and at 65, there is a significant jump up and then a linear, negative relationship running to 80. Part of this jump may be due to a large outlier at age 65.

---

[12]The second regression had an R^2 of 0.2374
[13] The third regression had an R^2 of 0.8826
[14] The fourth regression has a R^2 of 0.8067

V. Discussion of Results

In my study I am able to establish an unbiased, causal relationship between turning 65 and health care usage using a regression discontinuity (RD) design. I find that universal health care at 65 causes the number of visits to doctors' offices for ambulatory care sensitive conditions (ACSC) and diabetes-related complications to increase significantly. Additionally, my research adds uniquely to the literature by examining what happens to visits related to preventable conditions. This is an important piece of the health care puzzle because poor patients may forgo preventive care and delay treatment until they face a medical crisis. As a result, where preventable, chronic conditions are treated is widely considered a measure of an effective health system.

According to Billings, Anderson, and Newman (1996), the rates of preventable hospitalizations are used to assess the performance of the primary care delivery system and to identify possible deficiencies in the quality of outpatient care. Therefore, in a well-working health care system, we would expect an increase in doctors' office visits and a decrease in emergency department (ED) visits for ACSCs when individuals qualify for Medicare. I find a significant increase in doctors' office visits of 12 percent and an insignificant decrease in ED usage.

In terms of graphical trends, visits to the ED for ACSCs show a flattening of visits after 65. Using a RD method, it is impossible to know exactly what is happening, but it could be due to weekend or off-hour visits remaining relatively constant over time. Also, Billings et al. (2000), finds that in New York City, dependence on hospital emergency departments for primary care remained steady despite efforts to build primary care capacity. So, by Billings et al.'s logic, this flattening could be due to patients not knowing how to access the primary care system and/or a lack of capacity. The second graph shows that ED admissions decrease at the threshold and increase thereafter. This is probably due to the general ailment of the population. As people get older, their likelihood of keeping their ACSCs under control, no matter whether they have a regular doctor or not, probably decrease. In the third and fourth graphs, when moving away from the threshold, I find a continuing downward trend. This may be due to people dying off as well.

In terms of diabetes, I find a significant increase in doctors' office visits of about 32 percent and an insignificant decrease in ED visits and admissions. One explanation for the insignificant discontinuity in the ED and OPD cases could be, as physicians suggest, that the existence of preventable admissions are likely due to short term management of disease in an outpatient setting (Kolstad and Kowalski, 2010). This explanation seems even more likely when taken in the context of the graphs. Both ED graphs show a quadratic relationship above and below the threshold, with local maxima at age 58 and 73. The increase to 73 could be the result of more people needing short-term management of diabetes. Whereas, the decrease after 73 is probably due to patients dying off or, if the individual suffers from other ACSCs, diabetes may be taking a "back-seat" to other chronic conditions.

That being said, the RD model is restricted to localized predictions, so when analyzing non-local trends the sample is no longer randomized. However, in terms of localized changes, the significant effects of turning 65 on the total ACSC and diabetes related visits to doctors' offices are clear. In a wider policy framework, this reinforces the belief that giving individuals access to preventative care and a regular physician encourages them to see their doctor instead of using the ED for preventable conditions.

VI. Policy Implications

Although the United States has the most expensive health system in the world, it ranks last or next to last on quality, access, efficiency, equity and healthy lives when compared to other developed nations (Davis, Schoen, and Stremikis, 2010). One of the main arguments for expanding health insurance through legislation like the Affordable Care Act (ACA) is that it will reduce costs and improve health by increasing access to primary and preventive care services and decreasing the use of the emergency department (ED). Proponents of health reform hope that this will in turn improve health outcomes.

The ED is an important focus for three reasons. First, under the Emergency Medical Treatment and Labor Act (EMTALA), EDs are obligated to provide care whether or not an individual has health insurance. Therefore, EDs are widely used by the uninsured as an access point to care. Second, treating a chronic condition in an ED is more expensive than treating the same condition in a primary care setting. Third, the ED is not designed to provide care for ambulatory care sensitive conditions (ACSC). Rather it is designed to provide immediate, lifesaving, emergency care.

Kolstad and Kowalski (2010) and Miller (2011) find similar results in the context of the Massachusetts Health Reform. Kolstad and Kowalski (2010) find that the reform decreased length of stay, reduced hospitalizations for preventable conditions and decreased the number of inpatient admissions originating from the ED. Miller (2011) finds that the reform significantly reduced the number of ED visits.

By pairing my results with Kolstad and Kowalski's (2010) as well as Miller's (2011), I find that universal health care seems to encourage individuals to see a physician in an office setting instead of using the ED. This means that health outcomes may improve because these conditions are better treated in a doctors' office setting. In light of these results, when you couple this misappropriate use of EDs with the fact they are the more expensive option, it is clear why our system is not only inefficient with poor health outcomes, it is also the most expensive health system in the world. That being said, if recent research is correct, health outcomes are poised to improve with the onset of the ACA in 2016.

References

"ACS Algorithm." *Faculty & Research: John Billings.* New York University. Web. 2 Nov. 2011. Retrieved from http://wagner.nyu.edu/faculty/billings/acs-algorithm.php

Aizer, A. (2007). Public Health Insurance, Program Take-up, and Child Health. *The Review of Economics and Statistics, 89*(3)*,* 400-415.

Autor, D. H. & Duggan, M. G. (2003). The Rise in the Disability Rolls and the Decline in Unemployment. *The Quarterly Journal of* Economics, *118*(1), 157-205.

Bamezai, A., Melnick, G., & Nawathe , A. (2005). The Cost of an Emergency Department Visit and its Relationship to Emergency Department Volume. *Annals of Emergency Medicine, 45*(5)*,* 483-490.

Billings, J., Anderson, G. M., & Newman, L. S. (1996). Recent Findings on Preventable Hospitalizations. *Health Affairs, 15*(3), 239-249.

Billings, J., Parikh, N., & Mijanovich, T. (2000). Emergency Department use in New York City: A Substitute for Primary Care? *The Commonwealth Fund*. Issue Brief.

Bodenheimer, T., Wagner, E. H., & Grumbach, K. (2002a). Improving Primary Care for Patients with Chronic Illness. *JAMA*, *272*(11), 859-66.

Bodenheimer, T., Wagner, E. H., & Grumbach, K. (2002b). Improving Primary Care for Patients with Chronic Illness: The Chronic Care Model, Part 2. *JAMA*, *288*(15), 1909-1914.

Card, D., Dobkin, C., & Maestas, N. (2008). The Impact of Nearly Universal Insurance Coverage on Health Care Utilization: Evidence from Medicare. *American Economic Review*, *98*(5), 2242-58.

Card, D., Dobkin, C., & Maestas, N. (2009). Does Medicare Save Lives? *Quarterly Journal of Economics*, *124*(2), 597-636.

Centers for Disease Control and Prevention. (2010). Chronic Diseases and Health Promotion. Web. 5 Apr. 2012. Retrieved from http://www.cdc.gov/chronicdisease/overview/index.htm

Congressional Budget Office. (2012). Updated Estimates for the Insurance Coverage Provisions of the Affordable Care Act.

Courtemanche C. J., & Zapata, D. (2012). Does Universal Coverage Improve Health? The Massachusetts Experience. National Bureau of Economic Research, Inc, NBER Working Papers: #17893.

Dafny, L. & Gruber, J. (2005). Public Insurance and Child Hospitalizations: Access and Efficiency Effects. *Journal of Public Economics, 89,* 109-129.

Davis, K., Schoen, C., & Stremikis, K. (2010). Mirror, Mirror on the Wall: How the Performance of the U.S. Health Care System Compares Internationally. *The Commonwealth Fund*. Issue Brief.

Decker, S. & Rapaport, C. (2002). Medicare and Inequalities in Health Outcomes: The Case of Breast Cancer. *Contemporary Economic Policy, 20*(1), 1-11.

Dow, W. H. (2004). The Introduction of Medicare: Effects on Elderly Health. (Unpublished manuscript). School of Public Health, University of California, Berkeley.

Finkelstein, A. & McKnight, R. (2008). What Did Medicare Do? The Initial Impact of Medicare on Mortality and Out of Pocket Medical Spending. *Journal of Public Economics, 92,* 1644-1669.

Finkelstein, A., Taubman, S., Wright, B., Bernstein, M., Gruber, J., Newhouse, J. P., Allen, H., Baicker, K., & the Oregon Health Study Group (2011). The Oregon Health Insurance Experiment: Evidence From the First Year. Working Paper, Massachusetts Institute of Technology.

Kolstad, J. T. & Kowalski, A. E. (2010). The Impact of an Individual Health Insurance Mandate on Hospital and Preventive Care: Evidence from Massachusetts. National Bureau of Economic Research, Inc, NBER Working Papers: #16012.

Lee, D. S. (2008). Randomized Experiments from Non-random Selection in U.S. House Elections. *Journal of Econometrics, 142*(2), 675-97.

Lee, D. S. & Lemieux, T. (2009). Regression Discontinuity Designs in Economics. National Bureau of Economic Research, Inc, NBER Working Papers: #14723.

Levy, H. & Meltzer, D. (2008). The Impact of Health Insurance on Health. *Annual Review of Public Health, 29,* 399-409.

Linden, A. & Adler-Milstein, J. (2008). Medicare Disease Management in Policy Context. *Health Care Fin Review, 29,* 1-11.

Newhouse, J. P. (1993). *Free For All? Lessons from the Rand Health Insurance Experiment.* Cambridge, Massachusetts: Harvard University Press.

McCall, N., Harlow, J. & Dayhoff, D. (2001). Rates of Hospitalization for Ambulatory Care Sensitive Conditions in the Medicare+Choice Population. *Health Care Financing Review, 22,* 127-145.

McWilliams, J. M., Zaslavsky, A. M., Meara, E., & Ayanian, J. Z. (2003). Impact of Medicare Coverage on Basic Clinical Services for Previously Uninsured Adults. *Journal of the American Medical Association*, *290,* 757-764.

Miller, S. (2011). The Effect of Insurance on Emergency Room Visits: An Analysis of the 2006 Massachusetts Health Reform. Working Paper, University of Illinois.

The Urban Institute and the University of Maryland. (2005). Uninsured Americans with Chronic Health Conditions: Key Findings from the National Health Interview Survey.

World Diabetes Foundation. Diabetes Facts. Web. 5 Apr. 2012. Retrieved from http://www.worlddiabetesfoundation.org/composite-35.htm

Table 1: Selected Universe Characteristics from NAMCS and NHAMCS

	64	**65**
Total Number of Visits	98,000,000	102,000,000
Characteristics* (%)		
Total Universe	1.20	1.25
Visits to Doctor	87.04	88.53
Visits to OPD	7.45	6.39
Visits to ER	5.46	5.53
Female	55.10	55.29
Male	44.90	45.20
Total Visits for ACSCs*	18.88	20.00
Insurance Status (%)		
Uninsured	5.13	1.91
Private Insurance*	60.82	31.47
Medicaid	5.27	3.70
Medicare	20.10	58.14
Non-White by Setting* (%)		
Doctors office	28.75	26.40
Outpatient	39.20	44.81
Emergency Room	36.14	28.37
Visits for ACSCs* by Setting (%)		
Doctors office	18.76	19.71
Outpatient	20.70	23.24
Emergency Room	19.02	17.80
Visits for Diabetes Related Complications by Setting (%)		
Doctors office	4.03	5.44
Outpatient	7.49	8.33
Emergency Room	0.86	0.34

Notes: The dataset spans the years 2003 to 2009. The percentages = n/N, where n is the number of observations with each specified characteristic and N is the total number of observations at 64 or 65.
ACSCs are ambulatory care sensitive conditions, which are chronic, preventable conditions that are widely used as a measure of a health systems' effectiveness. Unfortunatley, the dataset only contained information about primary insurance coverage. It is likely that individuals who had private insurance after 65 held supplementary Medicare coverage as well. "Non-white" was based on a variable that categorized visits into white and hispanic, white and not hispanic, black and hispanic, black and not hispanic, and other. "Non-white" includes all visits except visits by "white and not hispanic".

Table 2: Summary Statistics at age 64 and 65 from NAMCS and NHAMCS

Visits to the ED for ACSC Related Complications	**64**	**65**
Number of Base Level Observations:	280	281
Weighted Observations	1016784	1004605
Fraction of total	0.1901502	0.1780064
Standard Deviation	0.3925468	0.3826321
Admissions Through the ED for ACSC Related Complications		
Number of Base Level Observations:	113	113
Weighted Observations	441770	416125
Fraction of Total	0.2715722	0.2585207
Standard Deviation	0.4452632	0.4382803
Visits to the OPD for ACSC Related Complications		
Number of Base Level Observations:	468	436
Weighted Observations	1511556	1515418
Fraction of Total	0.207007	0.232423
Standard Deviation	0.4052441	0.4224719
Visits to the Doctors' Office for ACSC Related Complications		
Number of Base Level Observations:	414	399
Weighted Observations	15972293	17843624
Fraction of Total	0.1872195	0.1975367
Standard Deviation	0.39016	0.3982134
Visits to the ED for Diabetes Related Complications		
Number of Base Level Observations:	13	5
Weighted Observations	45903	19227
Fraction of Total	0.0085844	0.0034068
Standard Deviation	0.0922833	0.058286
Admissions Through the ED for Diabetes Related Complications		
Number of Base Level Observations:	4	2
Weighted Observations	12921	2801
Fraction of Total	0.007943	0.0017401
Standard Deviation	0.0888673	0.0417224
Visits to the OPD for Diabetes Related Complications		
Number of Base Level Observations:	177	182
Weighted Observations	547063	543081
Fraction of Total	0.0749201	0.0832935
Standard Deviation	0.2633166	0.2763873
Visits to the Doctors' Office for Diabetes Related Complications		
Number of Base Level Observations:	101	106
Weighted Observations	3437903	4914735
Fraction of Total	0.0402974	0.0544083
Standard Deviation	0.1966924	0.226863

Notes: The dataset spans the years 2003 to 2009. ACSCs are ambulatory care sensitive conditions, which are chronic, preventable conditions that are widely used as a measure of a health systems' effectiveness. The patient weight scales up each individual observation to make nationwide estimates. The "Fraction of Total" are percentages, which equal n/N, where n is the number of visits for each specified characteristic and N is the total number of observations at 64 or 65. Admissions through the ED for ACSC or diabetes related complications look at the number of admissions through the ED for ACSC or diabetes and divide it by the total number of admissions through the ED.

Table 3: Percentage Composition of Ambulatory Care Sensitive Conditions (ACSC) in NAMCS and NHAMCS

	Doctors Office		**OPD**		**ED**	
ACSC (%)	**64**	**65**	**64**	**65**	**64**	**65**
Convulsions	0.54	0.47	0.17	0.05	0.98	0.63
Tuberculosis	0.00	0.00	0.65	0.00	0.00	0.00
Chronic obstructive pulmonary disease	8.55	8.28	6.01	4.59	14.56	13.87
Bacterial pneumonia	1.26	1.03	0.16	1.40	12.74	9.80
Asthma	4.69	6.10	2.41	2.01	6.12	5.23
Congestive heart failure	1.58	3.03	3.12	4.01	7.96	9.82
Hypertension	49.73	41.09	39.04	43.21	7.09	9.92
Angina	1.20	1.96	1.01	0.24	6.57	2.44
Cellulitis	3.68	3.13	1.50	3.10	10.62	14.58
Diabetes	24.56	31.71	41.98	38.15	4.41	1.91
Hypoglycemia	0.00	0.00	0.00	0.00	3.13	6.94
Gastroenteritis	0.33	1.17	0.33	0.97	4.58	2.44
Kidney/urinary infection	2.94	1.70	3.56	1.83	10.26	11.43
Dehydration	0.21	0.00	0.00	0.09	4.62	6.05
Appendicitis w/ appendectomy	0.24	0.27	0.00	0.00	0.68	0.12
Acute myocardial infarction	0.26	0.15	0.07	0.35	3.38	2.18
Gastrointestinal obstruction	0.00	0.03	0.00	0.00	2.30	2.65

Notes: The dataset spanned the years 2003 to 2009. ACSCs are ambulatory care sensitive conditions, which are chronic, preventable conditions that are widely used as a measure of a health systems' effectiveness. The percentages equal n/N, where n is the number of observations with each particular ACSC and N is the total number of ACSCs in the sample. OPD stands for outpatient department and ED stands for emergency department. Each ACSC condition was categorized using an algorithm based on ICD-9-CM codes from the Agency of Healthcare Research and Quality.

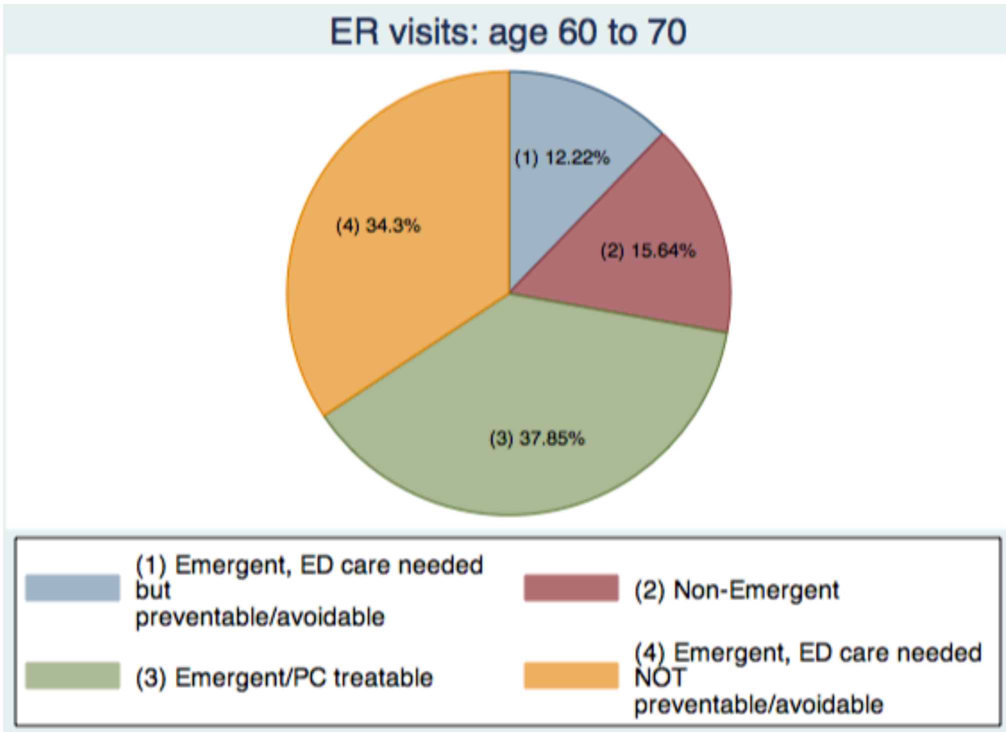
Table 4: Regression Discontinuity Estimates Based off NAMCS and NHAMCS

	ACSC visits ED	ACSC ED Admisisons	ACSC OPD visits	ACSC Doctors Visits
Age Over 65 (x100)	-7.00717	-5.94831	3.08115	12.12355
Observations	33,100,000	12,600,000	43,100,000	467,000,000
Standard Error	[.0837013]	[.1534991]	[.0787779]	[.0444647]
R-squared	0.8796	0.4776	0.9458	0.7984
p-value	0.410	0.702	0.699	0.012

	Diabetes visits ED	Diabetes ED Admisisons	Diabetes OPD Visits	Diabetes Doctors Visits
Age Over 65 (x100)	-69.98684	-37.65729	18.48166	31.50929
Observations	1,158,978	383,934	12,400,000	112,000,000
Standard Error	[.3888818]	[.9643983]	[.1317572]	[.08605]
R-squared	0.4737	0.2374	0.8826	0.8067
p-value	0.084	0.699	0.173	0.001

Notes: The dataset spans the years 2003 to 2009. Estimates are based on a restriced dataset of ages 50 to 80. All models include a quadratic polynomial in age, fully interacted with a dummy for age over 65. ACSCs are ambulatory care sensitive conditions, which are chronic, preventable conditions that are widely used as a measure of health system effectiveness. ED stands for emergency department and OPD stands for outpatient department.

Figure 1: Composition of Emergency Room Visits Using the Billings et al., Algorithm



Notes: These estimates are based on the widely used New York University Emergency Department (NYU ED) visit severity algorithm created by Billings et al.. Conditions classified by "emergent, ED care needed but preventable avoidable" are visits that emergency care was required, but the nature of the condition was potentially preventable or avoidable if timely and effective primary care had been provided. "Non-emergent" visits are for conditions that do not require immediate medical care within the next 12 hours. "Emergent, primary care treatable" conditions require treatment within 12 hours, but could have been cared for in a primary care setting. "Emergent, emergency care needed, not preventable/avoidable" are the only classification that the ED is supposed to care for.

Figure 2: Total Ambulatory Care Sensitive Conditions Visits by Setting: NHAMCS years 2003 - 2009 Regression Discontinuity Estimates

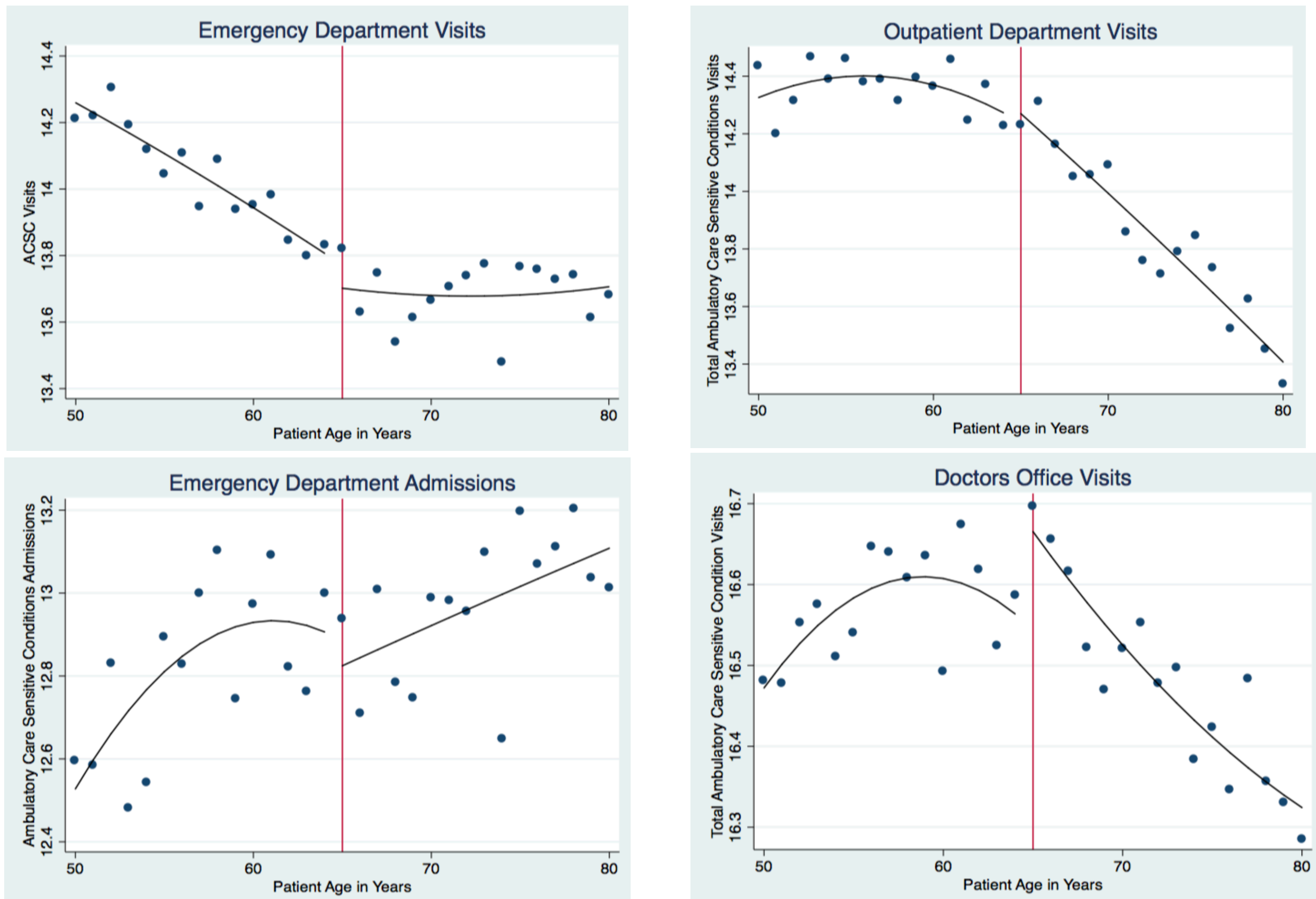


Figure 3: Total Diabetes Related Complications Seen by Settingt: NHAMCS and NAMCS, years 2003 - 2009

Regression Discontinuity Estimates