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Impact of Various Insurance Types on Level and Appropriateness of Health Care Consumption

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IMPACT OF VARIOUS INSURANCE TYPES ON LEVEL AND APPROPRIATENESS OF HEALTH CARE CONSUMPTION

by

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I. Abstract

The goal of this study was to examine the extent to which insurance type, or method of care management, impact the appropriate delivery of health care. Previous studies indicate a relationship between insurance type and patterns of consumption but do not directly link the incentives or disincentives inherent in each plan with trends in consumption of health care. This study explores how different types of health insurance coverage affect the location, the degree, and the frequency of health care consumption in order to gain insight into which plans promote appropriate delivery and consumption of care.

Patterns of health care consumption with various health care plans (HMO, PPO, POS, FFS, IPA, military insurance, Medicare, and Medicaid) and for those without insurance were examined using multivariate regressions on data from the 2006 National Health Interview Survey. It was found that having insurance increases the probability of obtaining preventative care, as indicated by vaccinations, and decreases the probability of not being able to afford care. Regarding the type of care consumed by individuals, results indicate that those with Medicare, Medicaid, and other government insurance frequent the ER and have surgery more often than those with Private insurance. Medicaid enrollees were found to frequent the ER 24.5 percent more often than the privately insured, and 22.4 percent more likely than the uninsured. Medicaid enrollees also frequent the doctor's office 57.1 percent more often than the privately insured, indicating an overall higher use of health care among individuals on Medicaid compared to the privately insured.

The impact of type of insurance on inappropriate care was also examined, as measured by use of Emergency Rooms (ER) or free clinics as the location of routine care, excessive use of specialist visits, and preventable hospitalizations for ambulatory care conditions. Results indicate that the privately insured are the least likely to list the ER or a free clinic as their usual location of care and that there is little difference between the types of care received between insurance plans. Among the privately insured, it was found that those with PPO or POS plans had more specialist visits relative to those with HMO or IPA plans and other government insurance.

These findings have serious efficiency implications under health care reform. In finding ways to halt rising health care expenditures and the emergency room crisis, a goal of reforms should be to limit unnecessary ER visits because they are at a higher cost to the system. Insurance plans should be promoted which attempt to reduce costs and ER usage, and those plans which encourage excessive ER utilization should be reformed.

II. Introduction

Investigating the relationship between health insurance and health care consumption is essential in furthering our understanding of the health care system. To enable individuals to have access to quality and affordable care, we must find ways to slow the rise of health care expenditures. This can be achieved by locating and reforming aspects of our current system which induce individuals to consume care inefficiently. According to the Kaiser Family Foundation, United States health care expenditures reached $2.3 trillion, or $7,681 per person, in 2008. This represents 16.2 percent of the

GDP and has been on the rise from 7.2 percent of the GDP in 1970, and 12.3 percent of the GDP in 1990. The rising cost of health care is a major problem which the Patient Protection and Affordable Care Act passed in March of 2010 tries to address. Another main issue is a growing crisis in ER access. Nationally, over the past ten years, ER utilization has increased by 26 percent while the number of ERs has decreased by 9 percent (Kellerman, 2006). This crisis may be due to low Medicaid and Medicare reimbursement rates. These reforms are intended to solve the health care crisis stemming from high levels of uninsured individuals and soaring expenditures.

The reforms signed into action by President Obama on March 23, 2010 increase the number of Americans on Medicaid, and mandates that employers offer insurance and that individuals have coverage. This is a similar requirement to those enacted in the Massachusetts Reforms which were in effect by 2007. These two plans diverge in their insurance reforms in that the federal reforms raise Medicaid reimbursement rates and prevent insurance companies from denying individuals based on pre-existing conditions (Kaiser Family Foundation, 2010). Requiring large employers to offer health insurance essentially increases the number of Americans on private insurance because most employer-based insurance is private. The theoretical net result of these reforms is an increase in the number of insured Americans by putting more individuals under Medicaid and private insurance plans, but what are the implications of these reforms on health care consumption by patients? This thesis intends to shed light on the answer to that question by examining how individuals currently under these plans consume care to probe the consumption patterns we could expect when these reforms are put into action. Expanding

Medicaid and private insurance magnifies any inefficiency inherent in these plans. Recognizing the flaws in the Medicaid and private insurance systems can enable us to address issues before they hinder any benefits the reforms may bring.

In this thesis, I will first explain what characterizes each type of insurance. Building off of this understanding, we can then examine the economic theory behind health insurance and how it is believed to change how people consume health care. Then we are equipped to discuss the theory of moral hazard and the literature exploring the relationships between health insurance, health outcomes, and patterns of health care consumption. Highlighting the incentives in each type of health care insurance and how they affect how patients consume care enables us to examine the level of efficiency or inefficiency induced by different policies. Since there are varying incentives within each plan, efficiency implications and cost analyses will be discussed to frame the intended effects of policies within a plan. Insurance companies try to structure their policies so that costs are reduced, but this theoretical goal is not always achieved. These cost reduction measures are then analyzed with respect to both the consumer and the supplier sides of the market and assessed regarding their effectiveness. Sources and motivations for inappropriate and inefficient care are extensively discussed, specifically regarding the overuse of Emergency Rooms (ERs) and free clinics. The data section outlines the methodology of the study and the definitions of variables and controls. With this background from the discussion of the theory behind health insurance, summary of previous literature and findings, and analysis techniques used here, we launch into the results and link them to efficiency implications for the system as a whole. These

implications are then expanded to help guide, encourage, and question aspects of health care reform with the goal of ensuring increased access, affordability, and efficiency of health care provision and consumption.

A. Defining Types of Insurance

To analyze types of health care plans, it is first important to define the characteristics of health insurance which are found within each plan, as defined by the National Health Interview Survey writers. For the purposes of this study, general insurance types were broken down into five groups. The first group is the *uninsured*, which is defined as those individuals who do not list that they have any type of insurance coverage, or minimal Single-Service Plan which covers only one aspect of health care such as dental or prescription benefits, with no other type of insurance coverage. Individuals who qualify for *Medicare* are those over 65 years of age and select disabled individuals receiving federal coverage. *Medicaid* is a joint federal-state program where the state administers coverage for low income and disabled individuals under the age of 65. *Military insurance* encompasses TRICARE plans, Veteran's insurance, and CHAMP-VA plans, which cover the families of members of the armed forces. *Other government insurance* includes the Indian Health Service, which is a federal program covering Native Americans, state –sponsored health plans, which are any type of state-run coverage plans excluding Medicaid, or any other public health care plan which is not Medicare, Medicaid, or military insurance. The distinction is made between these other government insurance plans and Medicare and Medicaid policies because they have very different coverage of services. *Private insurance* includes those plans which are not

provided by federal or state programs, but does include Medi-Gap because it is purchased by the individual to supplement other public plans. These private plans are typically purchased by the individual, the employer, or the union a person belongs to. There are large variations between private insurance plans, so this category is divided into sub-categories reflecting these differences.

The first group of private insurance includes those with *HMOs*, or Health Maintenance Organizations, and *IPAs*, or Independent Practice Association. These are plans which offer care to their enrollees for one fixed cost. All patients pay a monthly or annual fee for any amount of care they receive, but they have to receive all care a specified locations. IPAs, are similar to HMOs, but instead of linking patients to a hospital, they are linked to a variety of independent practices with different specialties so all care is covered. They have the same incentives for patients to receive care solely at specified locations and therefore are grouped together in this study. The second group of private insurance consists of *PPOs*, or Preferred Provider Organizations, and *POS*, or Point of Service plans. PPOs are another type of managed care, but unlike HMOs, they offer financial incentives for their enrollees to pick doctors from a preferred list, but are allowed to go out of network for care, if they pay a higher price. POS plans also allow for out of network coverage, and like PPOs, offer financial incentives for patients to stay within the network for care. These two plans are similar in structure and incentives and are grouped together in regressions. The third group of private insurance is comprised of *FFS*, or Fee-For-Service, plans. Here, the insurer covers part of the hospital bill after the service has been rendered and the individual pays the rest. These FFS plans are the

private insurance option with the greatest freedom of choice of doctor and location of care for the patient.

These distinctions between plans are important to highlight because differences in health care consumption, when other care-dependant variables are controlled for, indicate the effects of incentives and disincentives within each plan. Recognizing that individuals are induced into specific patterns of consumption is an important implication of health care policy reform. In determining which type of insurance to encourage or dissuade individuals from acquiring, understanding the implications inherent within each plan allows for a more encompassing perspective on health care policy.

III. Theory and Literature Review

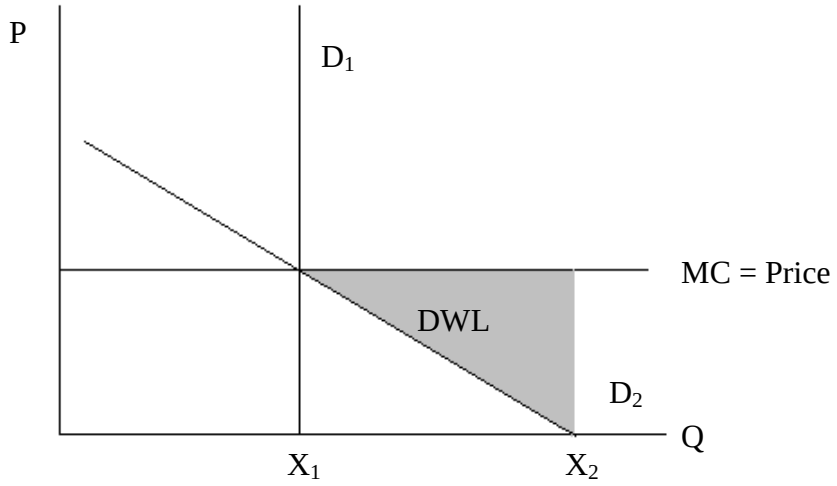
In studying the relationship between insurance coverage and the health and health care use of individuals, it is important to understand the theory behind insurance and health care consumption. One main topic concerning the theory behind insurance and health care use is moral hazard, or the induced consumption of health care due to over coverage by insurance. This discussion of moral hazard will be followed by a review of the literature regarding the relationship between insurance and health care use and the demand of insurance. These results will then be explained through an analysis of the characteristics of different insurance plans and how they induce people to consume care differently, and influence doctors to provide care differently immediately and in the long term. All of these demand side issues are rooted in the idea that there is asymmetric information between the consumer of health care and health care professionals and the

insurance providers. Another level of uncertainty resides on the supply side, between physicians and what is appropriate care, and between insurers and patients, as health care expenditures are attempted to be lowered.

A. Theory of Moral Hazard

With the acquisition of health insurance, the consumption of health care increases because insurance policies decrease the price of care for an individual. Consumption above the necessary level of care, as seen in **Graph 1**, is the inefficiency referred to as moral hazard. **Graph 1** depicts the dead weight loss from moral hazard with insurance. The shaded portion represents the inefficiency of the market involving moral hazard, assuming no co-pay or deductible. Increasing the level of coinsurance or lowering the copayment paid by the consumer moves the individual along the demand curve, changing the quantity of care consumed. The patient consumes more health care because, from their perspective, they face a lower price. The demand curve is theoretically equal to the marginal benefits for the individual at any quantity and price of health care. Curve D_2 represents the demand of an insured individual. Each point on the line represents the balance where the benefits of care equal the patient's willingness and ability to pay for that quantity of care. This balance is unique for each individual because the willingness and ability to pay varies over time and from person to person. Changing the copayment also changes the individual's willingness and ability to pay, as shown by the sliding downwards along the demand curve with insurance (D_2). This slide down the curve from the ideal quantity of health care consumption, X_1, creates more and more waste in the market because the marginal social cost of health care consumption is greater than the

marginal social benefit. At the point where coinsurance is zero, X_2, the price of care is zero for the patient; at this point individuals consume the greatest amount of health care and also generate the greatest amount of inefficiency.



Graph 1. Moral hazard causes a shift along the demand curve creating DWL, or inefficiency because a wasteful amount of health care is demanded.

The differences in the balance between the marginal benefits and costs are represented by the slope of the demand curve, or the elasticity of demand for health care. If the demand curve has a steep slope (D_1), or is inelastic, the price of care could change dramatically while only inducing a small change in the quantity of care consumed. Conversely, if the demand curve is elastic (D_2), a small change in price has a dramatic effect on the quantity of care consumed. The elasticity of demand also determines the size of the DWL, along with the level of the co-pay. An individual with an inelastic demand for health care will have a smaller amount of DWL than one with a very elastic demand curve because even if the price of care is substantially lowered, they will not consume a much larger quantity of care.

In other words, when insurance is purchased, the cost of health care decreases for the individual, causing a change in the quantity of health care demanded. For the same market price as before, which represents true marginal costs, a patient can consume a greater amount of health care because the insurance policy is covering part of the price of the care, thereby lowering the cost for the patient. At the new level of health care demand the marginal social costs of consuming health care outweigh the marginal social benefits, creating waste.

It is hard to determine whether this increased consumption of health care due to the acquisition of insurance is actually inefficient because this increase may represent care which was needed, but not previously affordable. This idea of under-consumption of care due to the inability of a patient to pay is also illustrated in **Graph 2**. Since the demand curve is comprised of the patient's willingness and ability to pay for care, if they do not have the ability to pay for necessary care, any increase in consumption of care up to the point where the marginal costs are equal to the marginal benefits is not moral hazard, but a movement towards appropriate consumption of care (Nyman, 2007). It is difficult to determine whether this increase in consumption is inefficient or a correction from a previous lack of access to necessary health care and is assessed in this study by the appropriateness of care measures. Those cases where an increase in consumption of care in the short run leads to fewer hospitalizations for ambulatory care conditions (those conditions where hospitalization is deemed unnecessary if proper maintenance care is received), illustrates new access to necessary care; those increases where the long term hospitalization rate is not decreased is determined to be moral hazard.

B. Literature Review

Since the size of the DWL depends on measures of consumer responsiveness to price changes of health care, we now turn to the empirical literature which examines the correlations between insurance and health care consumption. The literature on the relationship between insurance and an individual's propensity to purchase health care falls into two major categories of studies. The first category is randomized treatment control studies, which is characterized by a group of subjects receiving randomized treatments or assignments of different insurance policies and another group serving as the control. This type of study is the "gold standard" because it allows for the largest degree of control by the experimenter over the conditions of the subjects and treatments. In randomized treatment control studies regarding health insurance, researchers examine the differences between health outcomes or consumption patterns of the treatment and control groups. Because these groups were treated the same except for the variable in question, the treatment and control groups are compared directly to examine whether insurance affects health outcomes. The most notable randomized treatment control study is the RAND Experiment from 1971 which will be discussed below. These studies are expensive and time consuming and are therefore rare. The RAND Experiment is referred to extensively because it one of few randomized treatment control studies of health markets.

The other category of studies is observational studies, which constitute the bulk of the literature examine in this paper. These studies take large compilations of data and examine the traits of individuals and their health outcomes and consumption patterns.

Statistical analysis yields correlations between these variables and the probability of a specified outcome to determine if the relationship between the two is significant. This dataset differs from those used in randomized treatment control studies because the outcomes are observational in nature and therefore the environment of the individual or their treatments cannot be directly controlled. The group of individuals may be randomly selected to participate in an observational study, but within these groups, the treatments cannot be applied consistently because the data is being collected is the result of choices on the part of the subjects. There is a tradeoff between external and internal validity between observational studies and randomized treatment control experiments. Observational studies are externally valid in the sense that they can include a very large population of subjects from diverse areas relatively easily, but there are internal variations between the treatments of each subject which are hard to control for. Randomized treatment control studies are internally valid in the sense that each subject is treated consistently, except for the variable in question, but are limited in the sense that these studies are typically conducted on small populations in small geographic areas. Since randomized treatment control studies are so costly to perform, they cannot be conducted nationally and therefore may only describe the behaviors of a small subset of the population. Both types of studies are discussed in this paper to conduct the most accurate analysis of the relationship between health insurance and care consumption patterns as possible.

C. Review of Randomized Treatment Control Studies

The 15 year RAND Health Insurance Experiment from 1971 to 1986 was the most notable randomized treatment control study in the social sciences conducted in the United States. The RAND Experiment studied the impact of generosity of insurance coverage on health and health care use. Analysis of the RAND Experiment by affiliates of the RAND Corporation found that cost-sharing policies such as coinsurance or copayments reduced both the amount of unnecessary and necessary health care purchases. The goal was to determine the optimal level of coinsurance as to reduce the level of moral hazard (Brooke *et al*, 1984). In the RAND Experiment, 5809 subjects were randomly assigned to various insurance coverage plans of no cost sharing, 25, 50, or 95 percent coinsurance rates (Keeler, 1992).

Each family received monthly monetary "participation incentives" and a "completion bonus" at the end of the study to decrease the level of attrition among subjects (Newhouse *et al*, 2007). The level of attrition and its impact on the results was criticized by Nyman (2007). He claimed that the findings of the RAND Experiment -that there was a decrease in health care expenditures as coinsurance increased- were due to the high level of attrition among subjects. He argued that those people who had high levels of coinsurance left the study and found alternative insurance because they could not afford their treatment. This would eliminate a large amount of health care spending recorded in the study if those who needed to purchase health care left the experiment before they purchased it (Nyman, 2007). Newhouse (2007) countered this argument by pointing out the presence of monetary "participation incentives" and a "completion

bonus". He argued that dropping out of the study was against the financial interest of individuals because of these monetary incentives. He also drew attention to data which shows no change in hospitalization rates of those who dropped out of the study before and after they left. Since there was no change in hospitalization and there were no financial incentives for any one group to drop out of the study, I find the effect of attrition to be negligible.

Critiquing the RAND Experiment, Nyman (2007) argued that the RAND Experiment shows both the level of unnecessary moral hazard experienced by increasing the level of insurance for consumers, as well as the level of health care the insured will now consume because they gained access to previously unattainable care. This latter variation of moral hazard, Nyman argued, is beneficial to the population and represents an increase in welfare. This original premise, that the increased level of moral hazard would have a large effect, is debatable because health care is shown to be generally inelastic, so any increase in moral hazard would be small. The impact on the welfare of individuals who reduced health care purchases is also debatable. In Keeler's analysis of the RAND experiment, he attributed the decline in blood pressure control, corrected vision, and oral health to increased cost sharing, but stated that there are no other negative health effects (Keeler, 1992). Other reviews of the RAND Experiment explained that there was no change in the health of individuals with various coinsurance rates except for those with low incomes (Normand, 1994). This could be explained by the ability of those with high incomes to compensate for high coinsurance rates because of their increased ability to pay for health care. They offset the increased cost for care

caused by a lower-coverage insurance policy with their own expendable income and therefore it would have been interesting if the RAND Experiment had analyzed whether the rate of health care was the same between insurance groups, indicating that these people just spent more of their own money for care instead of relying solely upon the insurance plan, resulting in negligible differences in health outcomes between groups.

A downside of the RAND Experiment is that the data was collected in the 1970s and 1980s, over a quarter of a century ago. The themes of this research may hold true over time, but the realm of health care and insurance has changed significantly since then. For instance, there are now many different insurance types such as PPOs, HMOs, and HSAs which were not considered in that study. The health care community would benefit from another study such as the RAND Experiment to incorporate the various new insurance options. This type of experimental study is very expensive, so in this paper, observational data was utilized.

D. Review of Observational Studies

The other branch of literature examined falls under the scope of observational studies. These studies lack the ability to control the treatment of individuals, because the measured outcomes are the result of individual decisions by the subjects. But, observational studies do allow for large numbers of respondents with few negative moral implications because an authority is not assigning on possibly beneficial or harmful policies because the treatments have been essentially self assigned. One such observational study conducted by Goldman *et al* (2007), looked specifically at the influence of coinsurance rates on prescription drug spending found that with every ten

percent increase in coinsurance rates, there was a two to six percent decrease in the level of prescription drug spending. They also associated increasing coinsurance rates with decreased treatment with drugs, and increased risk of discontinuation of care by patients. This decrease in treatment with drugs could be beneficial because there would be less over-prescription of antibiotics and unnecessary medications, and also that doctors would prescribe the generic form of the drug, changes which decrease medical costs. The article stated that the welfare benefit is unknown because there could also be a decrease in health in the long term if patients do not take necessary drugs prescribed to them due to prohibitory coinsurance rates. It would be difficult to determine the long run cost of declining costly prescription medications, because it is hard to directly link any illness as the effect of the decrease in prescription drug usage. This is exemplified in **Graph 2** by shifts in demand curves with and without insurance.

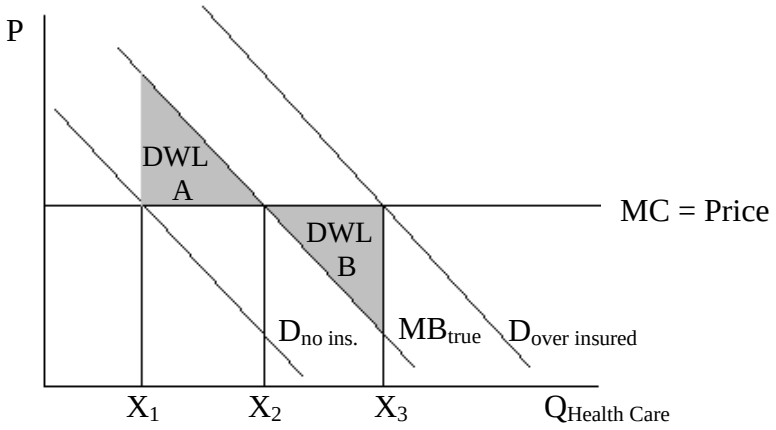
The demand for health care is based on the marginal benefit of consuming an additional unit of health care, or the patient's willingness and ability to pay. The insurance effect is the impact on the quantity of care consumed with insurance. Health care and health insurance are not typical goods. There is an equity issue associated with access to quality health care which rests on the premise that individuals should have access to health care no matter their financial situation, similar to the idea of access to education. It is very important for health care to be provided to everyone because there are many positive externalities associated with health care. A healthy population is able to be an efficient workforce, and since productivity is social, quality health care has a

positive social welfare effect. There are also the benefits derived from the altruistic want for everyone to have access to quality health care (Sen, 2004).

When individuals are uninsured, their ability to pay or ability is less than the cost of care, leading to dead-weight-loss (labeled DWL A) or inefficiency because they are under-consuming health care. Normally, a lack of ability to pay for a good would not cause this shift in the demand curve, but low income individuals are also constrained by credit because it is difficult for them to obtain loans and credit to pay for health care. These individuals are missing out on care where the true marginal benefits exceed the marginal costs of care. This is illustrated in **Graph 2** by the left most demand curve with the associated loss of marginal benefits to the patient shaded in grey. The uninsured individual consumes the quantity X_1 of health care which is less than the most efficient quantity of health care consumption, X_2. The under consumption of prescription drugs discussed by Goldman *et al* (2007) would be illustrated by the $D_{no\ ins}$ curve, because individuals are not consuming necessary care. The demand curve with the true marginal benefits of care (MB_{true}), or middle curve on **Graph 2**, represents the most efficient level of insurance, or where the price of care is equal to the marginal benefits of care consumption for each patient.

On the other hand, when coinsurance rates or co-payments are too low, the price of health care is artificially lowered from the perspective of the patient and they are willing to purchase more health care at this lower price. This shifts the demand curve out because a patient's ability and willingness to pay for care at this lower price has increased. Since the demand curve also theoretically illustrates the marginal benefits of

consumption, a higher demand curve than the "true" level of demand articulates that the marginal benefits are not maximized at this level of demand. Patients then consume the quantity X_3 of care again generating dead-weight-loss (labeled DWL B) because the marginal costs of care far exceed the marginal benefits of care for the patient but they are still consuming care because it is at a low dollar cost to the individual, but taxing on the overall system (**Graph 2**).



Graph 2. The insurance effect causes under consumption of care if patients do not have enough insurance and over consumption of care if they are over insured.

Levy and Meltzer (2007) assert that the causality established by other studies may not be due to the effect of health insurance on health, but instead reflects the presence of unobservable factors. These authors' findings are consistent with the RAND study analysis, stating that, "health insurance certainly increases the quantity of health care consumed," (Levy and Meltzer, 2007) but they go on to show that individuals receive less marginal benefit for each additional unit of health care consumption, despite this increase in spending. This article attempted to determine which policy will be the most cost-effective and beneficial for the public to increase insurance coverage to a greater portion

of the population while maximizing marginal benefits. When discussing marginal social costs and benefits, we are mainly referring to the effects on the individual and society of consuming more care. Society benefits from people being disease-free and healthy enough to work, but incurs a cost when the scarce resources of health care are consumed because of the fixed supply of health care. Individuals benefit from consuming health care, but after a certain level, the marginal benefits of consuming an additional unit of health care diminish and it is no longer efficient to consume more care past this level.

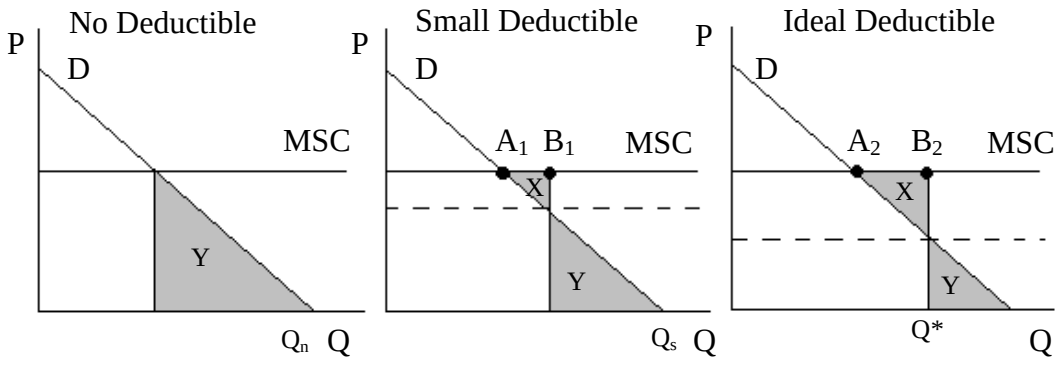
There is also uncertainty in determining the true marginal benefits of care. It has been shown that there are similar, or even worse, health outcomes with higher health care spending when comparing cities of similar demographic composition (Gawande, 2009). The reason we see under and over consumption of care is partly due to the fact that we do not know what the ideal level of health care consumption should be. We are unsure of the true marginal benefits of varying procedures as well as the true marginal benefits of each dollar spent. This uncertainty prevents us from promoting ideal health care consumption and should be probed in further research because there are massive efficiency implications if this ideal level can be determined.

Since there is a decrease in demand for health care from increasing the coinsurance rates, we must look at whether this decrease in demand has any effect on the market price of medical care. The rising net cost of health care is a concern in the health care industry and finding a way to manipulate the market price of health care would be beneficial. Unfortunately, analysis on the topic of the effect of coinsurance and overall medical expenditures concludes that there would be little to no effect on the price of

medical care by increasing coinsurance rates. In reality, the marginal social costs, or supply curves, are not horizontal as depicted in the graphs for simplicity. Despite the change in demand, which is elastic, by consumers with higher coinsurance rates, the supply of medical care is very inelastic and therefore the price will not change in the long run (Arrow, 1973). This brings us to the short run and long run cost analysis regarding different insurance policies.

E. Cost Sharing and Deductible Analysis

In the short run, the deductible faced by the consumer plays a large role in consumption of care because it dictates the price of care. A deductible is the amount of money a person must spend per year before an insurance company will step in and pay the remainder. The size of the deductible is depicted as the distance from points A to B on **Graph 3**. A very low deductible (A_1 to B_1) encourages people to spend the small amount of money quickly and then consume a large amount of health care because the remainder of care expenditures cost nothing monetarily from the perspective of the consumer. This can lead to inefficiency, as depicted in **Graph 3**.



Graph 3. Marginal costs and benefits of spending a CDHP deductible from the perspective of the consumer. MSC is marginal social costs.

The demand curve represents the willingness and ability of the patient to pay, the horizontal line the marginal social costs of care, or the market price, and the dashed line the level of premium or deductible the patient faces. The shaded triangle above the dashed line (X) is the marginal costs to the individual of spending the deductible and consuming additional care at zero cost, and the shaded triangle below the dashed line (Y) represents the marginal benefits of spending the entire deductible. In other words, from points A_1 to B_1 in the small deductible panel, the individual pays the full marginal social cost, and then after point B_1 the individual consumes to the point Q_s to maximize marginal benefits. The dollar value of the personal loss from consuming from A_1 to B_1 is "X" and the dollar value of the personal gain from consuming from B_1 to Q_s is "Y". If $Y-X < 0$, the consumer does not spend the entire deductible because they would not receive enough marginal benefits from additional care consumed at zero cost to compensate for the cost of the entire deductible. Conversely, if $Y-X > 0$, the consumer spends the entire deductible because they would receive as much care as they wanted at a low cost because their deductible is easily met. This is represented by the Small Deductible graph because the marginal costs of care are easily overcome and unnecessary care is consumed. The ideal level of deductible should be where $X = Y$ so that the marginal costs and benefits of spending the entire deductible are equal for the consumer.

Making the consumer more responsible for the costs of health care introduces a new cost-benefit analysis from the perspective of the patient. Consumer-Driven Health Plans, or CDHPs, set high premiums or deductibles and the patient must weigh their marginal benefits of care against the costs up to a certain point, but after that deductible

has been met, the cost of additional care moves to zero, artificially changing the cost of care from the perspective of the patient. With CDHPs, patients can chose where and when they consume health care, but they bear more of the costs themselves. CDHPs have been found to reduce total health care expenditures compared to managed care plans, but in the long run, they are found to have higher costs per hospitalization admission (Parente *et al*, 2004). The goal of CDHPs is to facilitate competition between health care providers by giving the patients control over their health care spending. This market-based approach to health care provision encourages consumers to cut costs by giving them a financial stake in their health care. The intention of CDHPs is to reduce moral hazard by making patients face the full marginal costs of their own health care. Fee-for-service plans and other plans which detach the patient from the financial side of health care, give incentives for consumers to be indifferent to costs (Callahan, 2008). Putting the patient in control of their own health care spending reduces short run costs because the patient has fewer visits to the doctor. CDHPs are included in the "other private" insurance category among other insurance types for the purposes of this study so it is difficult to derive any direct conclusions about CDHPs with these regressions. Examining both inexpensive short run and costly long run care is crucial in identifying efficient insurance systems.

F. Managed Care Analysis

Another type of health insurance policy, HMOs or Health Maintenance Organizations, uses a different combination of patient-directed and provider-directed mechanisms to effect spending than CDHPs. HMOs use three main mechanisms for

reducing health care spending: gate-keepers, capitation, and promotion of preventative care.

Gate keepers refer to the practice of HMOs to have each patient first be seen by a primary physician, or "gate keeper". This procedure reduces costs because primary health care is less expensive and it often eliminates the need of seeing a specialist, which is much more costly (Fang et al, 2009). Since the patient pays the same amount, there are incentives for the hospital to create access to inexpensive care so that future, more expensive, hospitalizations and specialist visits are avoided. Forcing primary physicians to become restrictive gatekeepers may cut costs, but may also have a negative effect on the moral authority of doctors. The role of a gatekeeper can either be a physician who efficiently identifies which specialist a patient should see and what kind of care they need, or a physician whose sole purpose is to decrease costs by limiting access to care which may be necessary (Starfield 1992, Manson 1995). This distinction is hazy because both roles are assumed by the gatekeeper; they are responsible for directing patients to the most cost-effective route of care. Whether this route is also the one of highest quality of care is currently being questioned as our health care system evolves and as HMOs steer away from the incentives which generate very restrictive "gatekeeper" primary physicians.

Capitation is when an HMO or Preferred Provider Organization (PPO) decreases costs by instituting financial disincentives to provide more care. If a primary doctor is a part of an HMO with capitation policies and they refer the patient to a specialist or order an expensive test outside of the standard procedure for these symptoms, they may not be

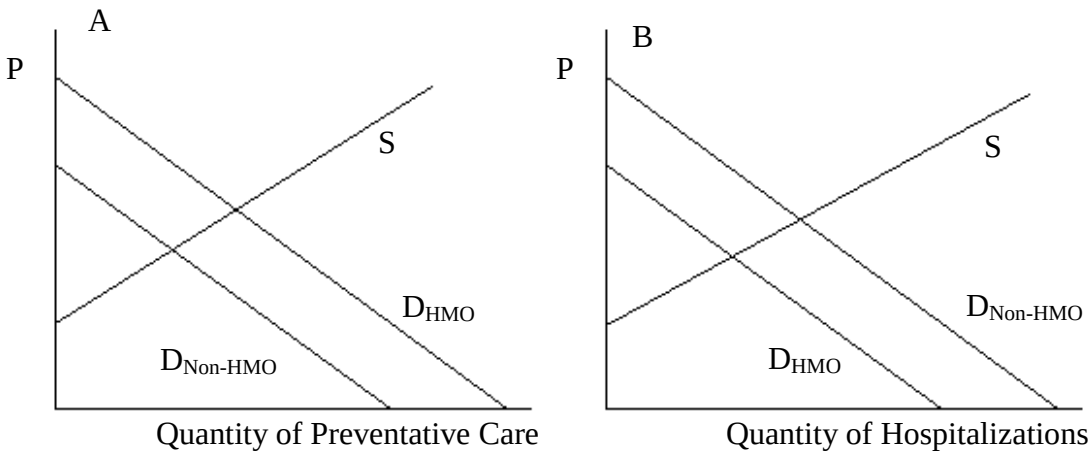
reimbursed as highly for the visit or may incur some other financial disincentive. These policies reduce incentives for induced demand, or treating patients more frequently or in more costly ways than necessary to increase their own incomes.

Emphasizing preventative medicine is a method used by HMOs to limit the instance of costly hospitalizations in the long run. Literature suggests that HMOs induce the patient to seek frequent preventative care visits because the consumer pays one price no matter how much care they receive. Although they frequent the doctor more often, their overall costs in the long run are lower than with other plans because they are less likely to need to undergo expensive, longer hospitalizations in the future. It was found that a 10 percent increase in HMO market penetration decreases hospitalizations for ambulatory care conditions, also known as preventable hospitalizations, by 3.8 percent (Zhan *et al*, 2004). Ambulatory care conditions are those conditions for which hospitalizations are avoidable if proper preventative care had been received.

Reasons for admission of a patient into a hospital are grouped into three categories in studies analyzing hospital use. The first group consists of those conditions where the outpatient care received has little to no effect on whether the patient is hospitalized. These are conditions for which preventative care has little impact on outcome. Another group encompasses those conditions which are not considered to require hospitalization if effective preventative or maintenance care is received, also called ambulatory care sensitive conditions. The third category is referral-sensitive care such as expensive surgery or diagnostic tests requiring advanced technology (Billings *et al*, 1993). Hospitalization for conditions considered to be ambulatory care sensitive, is an

indicator for problems with access to primary health care (Millman, 1993). A list of ambulatory sensitive care conditions (ASCH) can be found in Laditka *et al* (2003).

It has been found that those with HMO plans demand less hospitalizations indicating that their demand of different types of health services varies from those with other plans (Zhan *et al*, 2004). **Graph 4** illustrates the difference between the demand curves of patients with non-HMO and HMO insurance policies. Panel A shows that patients with non-HMO insurance plans demand less preventative care and those with HMOs demand more preventative care because of the incentives inherent within those plans. This trend of an increased consumption of preventative care in HMOs could explain the lower rate found in literature of expensive hospitalizations. Panel B shows that HMO insured individuals consume are hospitalized less than those with non-HMO plans. This change in the quantity demanded of each type of care saves costs in HMOs because preventative care is much less expensive than hospitalizations.



Graph 4. Side-by-side preventative care and long run hospitalization demand curves for HMO and Non-HMO plans.

A study by Deb et al (2006) shows that those in HMO plans go to the Emergency Room 90 percent more often and have 90 percent more doctor's visits than those with non-HMO plans. This is a surprising result, because it is inefficient for a health care provider to have their patients frequent the ER. This could indicate a large source of inefficiency in the way HMOs provide care. Their plans do not create incentives for the patient to distinguish between ER and doctor's office care and therefore the patient chooses the immediate care option, which is the ER. This increase in doctor's visits may be the result of the emphasis on preventative care and would be the reason hospitalization for ambulatory care conditions decreases in the long run, thereby decreasing costs.

Although there is certainly evidence for cost containment by HMOs during the HMO "boom" from 1990-94, since then, those policies enacted by HMOs which were most successful at cutting costs have been rescinded due to decreased patient satisfaction. Decreasing the restrictive aspects of HMOs has lead to a decrease in their efficiency and now HMOs have limited cost-cutting effects. This decreased efficiency of HMOs in terms of cost-containment may continue until HMOs are no longer more efficient than other sources of insurance, so policies which encourage employees towards managed care plans, may not have the same degree of a desired effect as they did in the 1990s (Shen and Melnick, 2006). A study of for-profit HMOs and non-profit HMOs found that the quality ratings of non-profit HMOs were much higher than for-profit HMOs. The article attributed this difference to the incentive of for-profit HMOs to restrict and "skimp" on health care for its members (Burkey *et al*, 2008). The article concluded with the idea that HMOs are the only way to guarantee health care but the quality of said health care is

variable. Studies have shown low physician satisfaction with HMOs, articulating the belief that the patient receives a lower quality of care (Christianson *et al*, 2005).

Although HMOs may have issues, such as decreased patient and physician satisfaction (Christainson *et al*, 2005), with their mechanisms to cut costs, they are effective in doing so. Efficiency analysis shows that areas with greater HMO penetration have a negative correlation with inefficiency, illustrating that HMOs decrease costs. The source of the restriction of costs is unknown, but could be attributed to cutting access to health care for patients and decreasing the quality of care, but increasing the overall efficiency (Rosko, 2001). These mechanisms are relatively effective because they work on both sides of the equation, they induce patients to consume inexpensive care, and they encourage physicians to treat patients more efficiently, a topic which is discussed in the next section.

G. Supply of Health Care Analysis: The Doctor's Side

Physicians may not have consensus on what is considered "appropriate" care. In many cases, there is no set course of treatment for doctors and this independence of health care provision allows for a great deal of uncertainty but grants the ability for treatment to be tailored to each patient. Uncertainty of which treatment is best for each patient is a factor which is hard to account for in regressions because it pertains to the physician's training, overall medical knowledge, and level of risk aversion. Even with the best training, doctors are still met with the uncertainty of what is the actual best treatment for the patient. The general lack of evidence based medicine forces us to rely

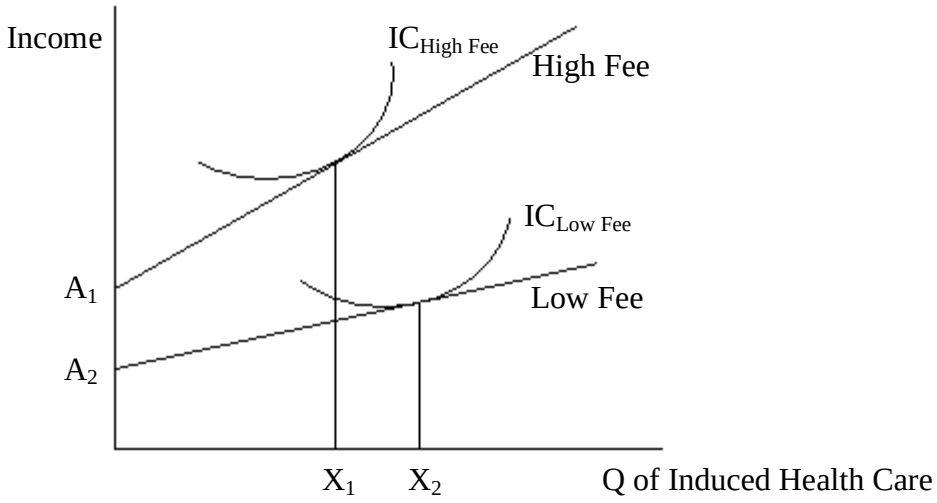
heavily on the preferences of individual doctors which are affected by a variety of factors, including risk aversion and possibly supplier induced demand.

A prime example of the discrepancies in health care provision is discussed in an article by Atul Gawande (2009). Gawande compared two small Texas towns, McAllen and El Paso, and found that McAllen had Medicare expenses of $15,000 per enrollee whereas El Paso had expenses of only $7,504 per enrollee. This was an astounding difference for two towns of very similar socioeconomic and demographic statistics. This huge variation in cost of health care was attributed to general overutilization of expensive health care with no benefits of better health outcomes or higher quality of care. Gawande states that a patient coming in for the first time with pain from gallstones would have once been prescribed pain medication, and told to change their diet and be sent home, now "McAllen surgeons simply operate." This is an easy solution for possibly non-compliant patients, but it also generates $700 more revenue for the physician (Gawande, 2009). It has been shown that states with the highest levels of Medicare spending actually had lower quality of care rankings than many other states (Baicker and Chandra, 2004). The high costs give patients more care, but not necessarily better care. Fisher *et al* (2003) from Dartmouth's Institute for Health Policy and Clinical Practice found that these patients were receiving very expensive care and not receiving preventative care, and also had longer ER wait times. Not only were the patients receiving a poorer health outcome at this higher price, but they were not even receiving basic preventative care.

Uncertainty and variability also arises from variation in the reimbursement of doctors and hospitals by different insurance plans. These fluctuating reimbursement rates

may alter incentives to prescribe or provide certain services to patients. It is hard to determine whether the outcome of a certain treatment pattern is due to the choices of the consumer or the provider of health care because there are no data in this survey about doctor's choices except their final treatments. But, controlling for insurance type and premium captures some of this effect.

Gawande speculates that doctors in McAllen provide more expensive care to increase their revenues, as an illustration of supplier induced demand. With decreasing rates of reimbursement from the uninsured and public insurance plans, the doctor or hospital could make up for this difference by providing more expensive care. A doctor can induce care by directly prescribing more tests or visits, and a hospital can induce care by instituting policies which pressure doctors to over-treat patients. This is illustrated in **Graph 5** by an increase in quantity of health care consumed at the low fee relative to the higher fee.



Graph 5. Supplier induced demand causes physicians to prescribe more expensive treatments increasing the costs of care.

The downward shift in the amount of income received per unit of health care delivered is represented by the lower y-intercept and less steep slope of the Low Fee curve. The y-intercept values, A_1 and A_2, represent the income of the physician if no health care was induced, which is the point of appropriate quantity of health care. At the lower fee, the intercept (A_2) is lower than the intercept with the higher rate (A_1) because the income of the physician is lower with the low fee. The increase in supply of care seen above (shift from X_1 to X_2) due to a decrease in overall reimbursement rates creates waste just as the change in demand did as discussed earlier. The shape of the indifference curves (IC curves) represents that doctors gain disutility by inducing more health care consumption. This means that they need more income to make up for losing utility from each additional unit of health care they induce due to the income and substitution effects. If the income of the doctor is decreased by lower fees, they compensate by providing more expensive treatments (substitution) or increasing the quantity of care supplied.

This concept can be linked to the lower rates of reimbursement from Medicaid. Theoretically, since the rates are lower, physicians and hospitals could induce care from these patients to compensate for this cut in reimbursement. This is a situation where it may actually reduce overall costs if Medicare and Medicaid reimbursement rates were increased. This is a complex topic which merits further examination because it would be necessary to probe the market to determine the point at which the lower reimbursement rate is still high enough that doctors and hospitals do not induce care.

In the case where the low fee causes SID, the marginal social cost of health care consumption is greater than the marginal social benefit. This inefficiency is caused by a supply-side shift in the market, instead of a demand-side shift as seen previously by deductible and co-insurance variation. We are limited in that we can only measure the final consumption patterns in relation to different insurance types, which indicate the presence of incentives or disincentives, but cannot tell us whether these patterns are caused by supply or demand side factors. Despite the primary origins of inefficiency, they all result in the overuse of expensive health care and therefore we should work to find and resolve these issues.

H. Efficiency Implications of Health Care Overuse

The increasing inefficiency discussed throughout this paper has severe implications for the state of health care. One major source of inefficiency results from the overuse of Emergency Room visits because of the high cost for hospitals to provide round-the-clock care. Zuckerman and Shen (2004) illustrated the significance of the growing burden on ERs across the United States. They explain that visits to ERs increased 20 percent between 1992 and 2001, while this increase was not matched in creating more ERs. Instead, the number of ERs fell 15 percent during this same time. Due to this inadequate amount of ERs with rising ER utilization, any plan that generates incentives to visit the ER should be deemed inefficient. With long waits and not enough beds for patients, the ER is an extremely inefficient location to consume health care, both in terms of the opportunity cost of the patient's time, and the burden on the ER itself of

being over utilized. More doctor's office visits rather than ER visits might yield lower overall marginal costs for the same care.

There has been found to be a positive correlation between public health care plans such as Medicare and Medicaid, and inefficiency, but this increase in cost per admission could be attributed to an increase in PPS payments to urban hospitals in the 1990s (Rosko, 2001). Contrary to popular belief, the uninsured are not the largest population which utilizes the ER. Only 15 percent of ER use is from the uninsured, and the uninsured are just as likely to be frequent users of the ER as the privately insured (Zuckerman and Shen, 2004). Zuckerman and Shen (2004) also found that those with public insurance were 2.08 times more likely to be frequent users of the ER, the most likely group to visit the ER. This level of ER utilization is a focal point of this study because of the high degree of inefficiency caused by over utilization of the ER. Emphasizing research energies on efficiency implications of different policies is essential to determining which aspects of current policies should be preserved and removed in the process of health care reform.

IV. Data

The data source utilized in this study is the National Health Interview Survey from 2006. The respondents were restricted to the noninstitutionalized population 18 years of age and older form all 50 states, but the respondents also answered questions regarding their children. The NHIS 2006 has a sample size of 75,716 in the Sample Adult Level with 36,561 (48.29 percent) of the respondents being male and 39,155 (51.71

percent) of the respondents being female. The insurance status of the individual was found under the Family Level section of the questionnaire and their consumption of medical care was found under Sample Adult Level questionnaire. The information from the files was merged to form the data set that will be examined in this study. The policy differences between groups, SCHIP for children, and Medicare for the elderly, impact health care consumption and therefore age is controlled for.

A. Level and Appropriateness of Care Measures

Quantifying aspects of the health care market such as quality of health care, access to care, and appropriateness of care, is also very complicated. The health status recorded in the interview survey is self-reported, and is reported as: excellent, good, fair, and poor. These four categorical variables do not leave room for a continuous scale of health status and therefore may limit some of the conclusions which can be drawn from linking health status alone to another variable. These broad categories are crude approximates of true health status and therefore may not capture the true health status of an individual. Quality of health care is also often self-reported leading to a bias because there is no standard which each individual is using to assess the overall quality of care, so health outcomes are used instead to indicate the quality of care received. Access to health care is also difficult to quantify. Access can be measured in terms of distance to the nearest hospital or by asking the respondent if they did not consume necessary health care for any reason. In this study, the latter was used because the distance to the nearest hospital, Emergency Room, or clinic was not recorded.

Whether an individual received standard vaccinations illustrates the provision of basic preventative care. The relationship between the types of insurance coverage and choosing not to get health care or prescriptions for financial reasons establishes the effect of insurance on consumption of necessary health care. This study uses hypertension, asthma, diabetes, bronchitis, heart disease, heart attack, and angina, as indicator variables for ambulatory care sensitive conditions and the presence of these conditions paired with high hospitalization and ER utilization rates indicates inefficiency. The patient's usual location of health care was also examined in terms of whether the patient sought out health care at the appropriate location. Doctor's offices or outpatient clinics were deemed to be appropriate usual locations of care and the ER and free clinics were tagged as inappropriate locations of usual care because of their high financial toll on the provider. The frequency of doctor's visits, ER visits, hospitalizations and surgeries shows the degree to which the different locations and types of health care consumption are utilized. Definitions of all variables can be found in **Appendix 1** and the means for the full sample and measured sample can be found in **Appendix 2**.

V. Methods

This study examines three hypotheses regarding how insurance policies impact health care consumption. The first hypothesis is that basic plans such as Medicare, Medicaid, and other government insurance will have higher rates of hospitalization and surgery because they do not emphasize preventative care, while HMOs and other types of private insurance will have lower rates of hospitalization and surgery. The second hypothesis is that those with Medicare, Medicaid, and other government insurance plans

will frequent the ER more and the doctor's office less than those with other private insurance. The third hypothesis is that individuals with public insurance plans (Medicare, Medicaid, and other government insurance) will list the ER and free clinics as the primary location of health care more often than the uninsured or other private plans which will list a doctor's office.

There are difficulties in measuring the relationship between health care use and health insurance as described by Levy and Meltzer (2007), including the omitted variable bias inherent in the relationship between health insurance and health care use. Omitted variable bias is when the variable in question is also correlated to other, unknown or unmeasured, variables which bias the regression coefficient. As many control variables as possible are included to minimize omitted variable bias, but some bias may remain. Controlling for geographic region, place of birth, and race, accounts for some of the small area variations throughout the nation. Education, sex, marital status, income, age, and self-reported health status will also be controlled for in all regressions. The Grossman model indicates that education and income have large effects on consumption of care and accumulation of health stock and may also influence the decision to purchase health insurance (Folland, Goodman and Stano, 2007), so in order to examine the effects of insurance on health care consumption, controlling for these variables is necessary. Differences between how subpopulations consume health care have also been found by literature and will be examined (Levy and Meltzer, 2007). One such group, those with chronic illnesses, will be addressed by controlling for chronic illness, since they consistently consume more health care. These differences resulting from omitted

variable bias would skew the results because the changes in insurance policies would not be responsible for all the variations of the health of individuals.

Endogeneity is another potential source of bias in the estimates. In this context, those with poor health may decide to purchase more health insurance, knowing that they will be consuming more health care in the future than those with better health, confounding the correlation coefficient. It is expected that endogeneity would bias the measured correlation between health insurance and health consumption so that there seems to be a larger correlation than the true causal influence of health insurance on health care consumption because individuals pick a plan which fits how they consume health care. Endogeneity is hard to overcome in observational studies, but this problem is partially addressed by controlling for income, education, and health status.

All regressions were run with all controls, without the income control, and without both the income and health status controls to test the problems with the issue of endogeneity. Health status and income controls were removed and the correlation coefficients for each set of regressions are reported in each table. By removing layers of controls one at a time, we can examine the degree of impact the removed control had on the regression by comparing the two sets. If the values of the correlation coefficients or marginal effects do not change significantly between regression sets, the removed control had a small effect on the other variables, and therefore the insurance type has a large effect on the variables.

The regressions were also run for the samples of the privately insured separately to reveal the effects of different private insurance policies on the variables at hand. One

limitation of these regressions is that they may not be fully generalized to the population because the measured sample may be skewed. Those who knew that they had private insurance and what kind of private insurance they had were included in these regressions, so individuals may have been excluded who have private insurance, but did not know what kind. The fact that some individuals knew what kind of insurance they had and that some did not, may reflect inherent differences between these two populations. It is plausible that those who know what kind of insurance they have also know what sources of care are less expensive to them and may consume care differently than the group who does not know this information. Those who are able to label their own insurance type represent a population with more information on the insurance market and therefore, by examining this group alone, we are ignoring the element of the population with minimal information on the insurance market. The number of individuals with private insurance, but did not know what kind of private plan they had was 8,622, and 36,650 respondents with private insurance did know their insurance type. One regression set was run including those listing other private insurance, and another set was run with those with other private insurance dropped from the data set. Both sets of private insurance regressions were run relative to those with private HMOs or IPAs.

A. Statistical Analysis

Ordinary Least Squares (OLS) regressions were run for those variables which had scalar values, such as frequency of doctor's visits, ER visits, and hospitalizations. The equation shows the relationship between variables for scalar and binary data sets, where

β_0 - β_9 = coefficients to be estimated, X = a vector of other confounding variables, and ε_i = disturbance term.

[1] $Y[scalar]^* = X\beta_0 + \beta_1 HMO + \beta_2 PPO + \beta_3 POS + \beta_4 FFS + \beta_5 OTHPRIV + \beta_6 SSP + \beta_7 MEDIC + \beta_8 GOV + \beta_9 NOINS + \varepsilon_i$

With OLS regressions, the slope is equal to the correlation coefficient because the variations between data points are constant. It is these correlation coefficients which are compared in the analysis of the output data to determine the relationship between specified variables.

A probit regression was run instead of an OLS regression for binary variables because many of the assumptions made by the OLS regression are violated by this data set. The main issue is the heteroscedasticity of the limited dependent variables. OLS regressions assume a constant variance among variables and in this study the variables have a range of variances, or are heteroscedastic. Since the variance is not constant and predictions can fall outside of the [0,1] range, the probit regression classifies each variable as a "1" or "0" if the prediction coefficient is above or below a certain threshold. As the variance between data points and the regression line gets smaller, the slope between the two points approaches the marginal effect. Dummy variables were created for variables examined with a binary system, and probit regressions were run using STATA for each type of insurance. This binary system was used for variables such as the site for routine care, whether vaccines had been administered, and whether the patient saw a nurse or physician's assistant, general doctor, or specialist. Equation [2] shows the

relationship between variables for binary variables, where β_0 - β_9 = coefficients to be estimated, X = a vector of other confounding variables, and ε_i = disturbance term.

[2] $y^* = X\beta_0 + \beta_1 HMO + \beta_2 PPO + \beta_3 POS + \beta_4 FFS + \beta_5 OTHPRIV + \beta_6 SSP + \beta_7 MEDIC + \beta_8 GOV + \beta_9 NOINS + \varepsilon_i$

$y = 1$ if $y^* > 0$

$y = 0$ otherwise

The marginal effects are then a function of β's and X's which STATA calculates and are shown as functions in the analyses. The value, y* is not observed and is often referred to as a "latent" variable, and if this value is greater than zero, the observed y value is defined as "1". If we are examining whether or not an individual went to the ER, y* would be defined as the desire and ability of a person to go to the ER. This level of desire and ability cannot be directly observed, only the final outcome of whether or not the person went to the ER.

Since the variance is irregular and predictions can fall outside of the [0,1] range, we assume that $var(\varepsilon_i) = 1$ which means the scale of y* is fixed so that we can define the probability of y = 1 in Equation [3] where, F = cumulative normal distribution function.

[3] $P = Prob(y = 1) = Prob [\varepsilon_i > -(X\beta_0 + \beta_1 HMO + \beta_2 PPO + \beta_3 POS + \beta_4 FFS + \beta_5 OTHPRIV + \beta_6 SSP + \beta_7 MEDIC + \beta_8 GOV + \beta_9 NOINS)]$

$P = 1 - F[-(X\beta_0 + \beta_1 HMO + \beta_2 PPO + \beta_3 POS + \beta_4 FFS + \beta_5 OTHPRIV + \beta_6 SSP + \beta_7 MEDIC + \beta_8 GOV + \beta_9 NOINS)]$

Probit regressions also include a variable which is the probability density function for a standardized normal variable (Φ). It is important to include this correction factor to

determine accurate estimated correlation coefficients for prediction purposes because of disproportionate sampling, or unequal numbers of observations in each group. This term is added when examining how changes in the explanatory variables affect the probabilities determined above. For a probit regression,

[4] $\partial P/\partial x = \beta\Phi(Z)$

where,

$$Z = \beta_0 + \sum_{i=1}^{k} (\beta x) .$$

With a probit regression, these derivatives are not constant, so they must be calculated for each explanatory variable (Maddala and Lahiri, 2009). STATA calculates these marginal effects and these values are displayed in the summary tables reported in the appendices.

For the variable regarding the out of pocket amount of expenditures on health care, an ordered probit regression was used. Since the dependant variable is multinomial, or that different expenditures are reported as ranges, a normal probit or OLS regression only reports on the average effect. The ordered probit model allows the marginal effects going from one category to another to be non-linear. In other words, an ordered probit allows the probability of ending up in each category to vary while an OLS regression averages the effects of all the categories. Like in the probit model, there is a latent y* variable which either exceeds or falls below a threshold, μ, but in this case, there is a threshold value for each category. Each category represents a range of annual out of pocket health care expenditures, where category 0 is zero dollars spent, category 1 is 0-

$499, category 2 is $500-$1,999, category 3 is $2,000-$2,999, category 4 is $3,000-$4,999, and category 5 is over $5,000 spent. Here,

[5] $y = n$ if $\mu_{n-1} < y^* < \mu_n$,

where, n = 0, 1, 2, 3, 4, 5, or the desired category. The same equation for the marginal effects as the probit model is used [2]. Since we want to probe how changes in insurance, or the "predictor" variables, change the probability of an individual falling into each category, we must find the probability of observing each outcome. This is found by calculating the probability of finding y* between the two threshold values, or,

[6] $P(y = n) = P(\mu_{n-1} < y^* < \mu_n)$,

and since we established that $y^* = X\beta + \varepsilon_i$,

[7] $$P(y = n) = P(\mu_{n-1} < X\beta + \varepsilon_i < \mu_n)$$
$$= P(\mu_{n-1} - X\beta < \varepsilon_i < \mu_n - X\beta)$$
$$= \Phi(\mu_{n-1} - X\beta) - \Phi(\mu_n - X\beta) ,$$

where Φ is the probability density function for a standardized normal variable as seen in equation [4] (Jackman, 2000).

Chi-squared tests will be run on all regression sets to determine statistically significant differences between insurance types. A 95 percent confidence interval will be used to determine statistical significance. The marginal effects of the regressions are summarized in **Appendix 3** with all insurance types, and a complete example of a set of the marginal effects with all controls can be found in **Appendix 4**.

VI. Discussion

The findings derived from analysis of the correlation coefficients, marginal effects and chi square tests are broken down into sections based on their implications. First, access and affordability of care will be discussed, followed by an analysis on the utilization of types of health care. The type of health professional seen was also examined and will be discussed in relation to expensive versus inexpensive care consumption by patients. The findings regarding the usual location of health care consumption have major efficiency, or inefficiency, implications and are presented in regards to which plans encourage efficient or inefficient consumption of care. The location of care consumption is of great consequence because it highlights severe inefficiencies in insurance plans if they encourage individuals to consume care routinely at an ER or free clinic.

A. Affordability of Care and Preventative Care Analysis

The overall out of pocket spending for individuals was examined and variations in these expenditures were found between insurance types. Individuals with Medicaid plans were 10.7 and 7.1 percent more likely to spend zero or less than $500 out of pocket respectively than other plans. Those with other government insurance and military insurance also followed this trend of being more likely to have spent between zero and $500 on health care out of pocket in the past year. The marginal effects broken down for each range of expenditures are reported in **Table 1** seen in **Appendix 3**. These ranges are raw out of pocket expenditures and are not corrected in any way for the income of the

individual. Only the amount spent on health care is assessed by this analysis, and the affordability of care is another issue which is examined next.

Table 2 shows that all types of insurance were less likely to both delay care because of cost and to not get needed care because of cost than the uninsured. This result was expected, but using a chi-squared test, it was found that those individuals with private insurance are less likely than those on Medicare and with other government insurance to delay care because of cost, are less likely than those on Medicare, Medicaid, and other government insurance to neglect to get needed care because of cost. Likewise, all forms of insurance were less likely to not be able to afford prescription drugs than the uninsured, and those with private insurance were the least likely to not be able to afford prescription drugs for all types of insurance except military insurance.

The variation seen between regression sets with and without health status and income is consistent with the expected effects of health status and income on the specified variables. The trends indicate that the coefficients without health status and income are less negative than those regressions which control for these factors. These trends are consistent with the literature in that as health status and incomes rise, people would be less likely to delay or neglect needed care because of cost or not be able to afford prescriptions because if they are in excellent health, care is not needed and if they have a high income, affordability of care is not a problem. It has also been shown that both health status and income are positively correlated with selection into a health insurance policy in general. It follows that as health status increases and incomes rise, individuals may have increased access to insurance because insurance companies want to

insure them, and also are more likely to get plans with greater coverage because of employment. Once these effects which skew the regressions in the positive direction are accounted for, the coefficient becomes more negative (**Table 2**).

Within the private insurance group, those with other private insurance and PPO or POS plans had statistically significant positive marginal effects on the probability of delaying care because of cost relative to those with HMOs or IPAs. This demonstrates that those with HMOs or IPAs have a lower incidence of delaying medical care due to cost. This trend continues with not obtaining needed care because of cost. Those with other private insurance and PPO or POS plans are more likely to not obtain needed care because of cost than those with HMO or IPA plans. Also, of the privately insured, those with other private insurance were the most likely to say that they cannot afford prescription drugs at a statistically significant level (**Table 8**). This finding is interesting because it illustrates the trends discussed by the literature which state that HMOs cause people to have increased utilization of preventative care with fewer barriers to this cheap care. It does not address the idea of HMOs limiting more expensive care via gatekeepers and capitation policies.

To examine the provision of basic preventative care, regressions were run for whether individuals received pneumonia and Hepatitis B vaccines. Having insurance increased the probability of getting a vaccine with the most likely people to get the vaccine being those with Medicare and military insurance for both vaccines (**Table 3**). Little information could be derived from the regressions concerning only private insurance for vaccinations, but it was found that those with PPO or POS plans were less

likely to have been vaccinated for pneumonia than those with other private insurance at the 0.05 significance level.

B. Frequency and Instance of Utilization of Health Care Analysis

To examine the utilization of care, both the frequency and instance of different types of care were analyzed. The instance and frequency of overnight hospitalizations and surgery, and the frequency of ER visits and doctor's visits regressions can be found in **Tables 4 and 5**. It was found that those with private insurance, other government insurance, and military insurance have a lower incidence of reporting at least one overnight hospitalization than those with Medicare and Medicaid, with those with all types of insurance being more likely to spend a night in a hospital than the uninsured. In terms of frequency of overnight hospitalizations, there was a positive correlation for all types of insurance, except for private insurance without controlling for income or health status, but this value was not statistically significant at the 0.05 level. Those with private and military insurance had the lowest correlation coefficient and have a lower frequency of overnight hospitalizations than all other insurance types, except other government insurance (**Table 4**). Among the privately insured, those with FFS plans were more likely to both list that they were hospitalized, and have the highest frequency of hospitalizations than those with HMOs/IPAs, PPOs/POSs, or other private insurance at a statistically significant level when the controls of income and health status were removed (**Table 10**). This result of the FFS policies having the highest frequency of hospital visits is also consistent with the findings of regressions run without those listing other private insurance at a statistically significant level (**Table 16**).

There is also a positive correlation between having at least one surgery and having some type of insurance, and chi-square tests indicate that those with private insurance have less surgery than those with Medicaid at a statistically significant level. The frequency of surgical procedures follows the same trend, with statistically significant positive correlation coefficients for all insurance types. Those with Medicare and Medicaid are more likely to have a higher frequency of surgical procedures at a statistically significant level than those who are privately insured (**Table 4**). When types of private insurance were examined separately, it was found that those with FFS plans were the least likely to have had surgery and also have a lower frequency of surgery than all other private insurance types at a 0.05 significance level. This result was surprising because those with FFS plans have a higher incidence and frequency of overnight hospitalizations than all other plans, but have a lower incidence and frequency of surgery (**Table 10**). Those with FFS plans are hospitalized overnight more frequently than others, but do not require surgery for these hospitalizations, therefore the cost of each hospitalization may not be as high as some other plans. Hospitalizations for diabetes, bronchitis, pneumonia, some cancers, flu, and infectious diseases typically do not result in surgery, so those with FFS plans may be hospitalized for these types of conditions and therefore require less surgery. The frequency of hospitalization is a good indicator of health care use, but it does not tell us what type of health care was consumed at each hospitalization so we can derive no direct information from the data about cost per hospitalization. This limits the analysis of efficiency implications, but it is possible that

high levels of hospitalizations and low frequency of surgery indicates an excessive use of overnight observational stays.

An example of possible overuse of overnight hospitalizations is the stay of patients in the Intensive Care Unit, ICU, after gastric bypass surgery. The ICU is a more expensive location in the hospital to be kept overnight because of the increased level of supervision by nurses and doctors as well as the more advanced technology utilized to monitor the patient. The movement of patients to the surgical floor is the goal of doctors and hospitals because it is less costly to the hospitals to monitor the patient and indicates positive outcomes of a procedure because the patient must be doing well to move them to the surgical floor. It was found by Grover *et al* (2010) that the common post-operative stay of gastric bypass patients with obstructive sleep apnea in the ICU is an unnecessary precaution. Typically, gastric bypass patients with obstructive sleep apnea are kept in the ICU overnight to allow for close observation to avoid pulmonary complications, but it was found that there were no difference in the length of overall hospital stay or major complications between group kept overnight in the ICU and the group moved directly to the surgical floor. This indicates that the use of ICU beds for these gastric bypass patients with obstructive sleep apnea is an inefficient allocation of an expensive resource because the marginal benefits of keeping the patient in the ICU are very small. This inefficient length of expensive care is one major issue with the system, but the location of care can also yield inefficiency.

As previously discussed, the ER is an inefficient location to consume health care because of the high financial burden it places on hospitals. Keeping an ER heavily

staffed around the clock is a massive drain on a hospital and ER use must be examined when searching for inefficiency. It was found that the frequency of ER visits varies significantly between insurance types. All insurance types except the privately insured have a positive correlation coefficient for frequency of ER visits. This negative coefficient is not significant at the 0.05 level, except when income and health status are not controlled for, but it can be said with statistical significance that the privately insured frequent the ER less often than those with Medicare, Medicaid and other government insurance (**Table 5**). This finding is interesting because the ER is an inefficient location of health care consumption due to high costs incurred by the hospital. It is expected that the uninsured would frequent the ER to a large extent because they would receive care regardless of their ability to pay. It is surprising that some insurance plans encourage individuals to frequent the ER more often than the uninsured, as represented by the positive correlation coefficient. This result could be the result of public plans such as Medicare not covering regular checkups. To minimize the cost to the individual, a person would go to the ER for routine care because it would cost less than making a doctor's appointment. Also, even if a doctor's appointment is covered by Medicaid many physicians do not accept or limit Medicaid patients because the reimbursement rate is lower than for those with private plans. In this light, it is possible that increasing reimbursement to physicians and covering routine care by Medicaid and Medicare may reduce overall costs. Inducing individuals not to utilize the ER as often would yield a net savings for the system if they instead consumed care at a more efficient location and

level. Plans which encourage an increased frequency of ER visits should be reexamined to eliminate this inefficient consumption of health care.

When the privately insured were examined alone, there was not found to be any statistically significant difference in ER utilization between insurance types. It would be expected that since the privately insured had the lowest frequency of ER visits, that this would be compensated for by an increase in the frequency of doctor's visits relative to all other types of insurance, but this is not the case. It was found that all types of insurance had a positive relationship with frequency of doctor's visits, but those with private insurance had a lower frequency of doctor's visits than all other insurance types except other government insurance at a statistically significant level. Those with Medicaid had the highest correlation coefficient relative to all other types of insurance, meaning that they have the highest frequency of doctor's visits (**Table 5**). Those with Medicaid insurance plans were also the most likely to have had ten or more doctor's visits in the past year at a statistically significant level (**Table 5**). Since health status, ambulatory care conditions, and chronic conditions are controlled for in that regression set, it follows that those with Medicare plans are consuming care inefficiently in the form of excessive doctor's visits. This illustrates the imperfect capturing of true health by the controls of health status, ambulatory care conditions, and chronic conditions. The true health status is controlled for as much as possible with the data set at hand because of availability of data. Including other health controls would severely limit the sample size and could lead to inaccurate sample populations.

Among the privately insured, those with PPO plans frequent the doctor's office more than those with HMO or other private insurance plans at a statistically significant level (**Table 11**). It was also found that when the other private insurance group is dropped from the sample, PPO plan individuals frequent the doctor more often than those with HMOs (**Table 17**). Those with PPO plans were also more likely than those with HMO plans to list having ten or more doctor's visits in the past year. This trend continues in regressions which control for health status and in those which do not control for health status. This implies that with the effects of health status removed, PPO enrollees are consuming more care in the form of doctor's visits than other private insurance types (**Table 11**).

All regressions including health status were run with an ambulatory care sensitive condition indicator variable as a control, but the coefficients of these variables are also included in **Tables 5, 11, and 17**. This ambulatory care sensitive condition variable may reveal how insurers and patients select for health insurance. Those plans with probabilities of ambulatory care conditions may exhibit endogeneity, meaning that individuals may have selected specific plans because of their health status and conditions before they acquired these plans. Causality is difficult to determine but it is important to discuss that self selection or insurer selection may have resulted in those with ambulatory care sensitive conditions having these plans. Therefore, it is possible that these conditions are not the result of the plans, but instead that the plan chosen by an individual is the result of their underlying health status. The health status of the individual was controlled for by including self reported health status, ambulatory care conditions, stroke,

and chronic conditions such as cancer. Although all of these factors were controlled for, they do not assess the complete picture of the health of the individual. It is these omitted health controls which contribute to the underlying health status which may be skewing coefficients and causing endogeneity.

C. Type of Health Care Consumption Analysis

The type of health care professional seen - nurse or physician's assistant, general MD, or specialist - was also examined. It was found that there were positive correlations between all insurance types and seeing all health care professional types relative to the uninsured, as expected. When asked if a nurse or physician's assistant (PA) was seen, those with military insurance had the highest measured impact at a statistically significant level. It was also found that those with Medicare plans were the least likely of all insurance types to have seen a general MD. Also, the privately insured reported seeing a general MD less than those with Medicaid and other government insurance. For specialist visits, all types of insurance had positive correlation coefficients, but they were not found to be different at a statistically significant level (**Table 6**).

When private insurance was examined alone, it was found that those with FFS plans were the least likely to have seen a general MD in regressions with and without health status and insurance controls. It was also found that there were no statistically significant differences among private insurance types for whether they had seen a nurse or physician's assistant. Those with PPO or POS plans were more likely to have seen a specialist than those with other private insurance or HMO plans (**Table 12**).

D. Location of Health Care Consumption Analysis

The marginal effects between groups with and without health status and income controls are very similar for those who listed the usual location of health care consumption as the ER. This means that the insurance type has a large impact on the outcome of whether an individual utilizes the ER as their usual location of health care. Those with private insurance are less likely to have the ER as their usual location of care than all other types of insurance at a statistically significant level. This finding is interesting, because it is inefficient to consume care at the ER, and these individuals are not only consuming care there, but listing the ER as their *usual* location of health care consumption; this is very inefficient. There was little difference among the privately insured groups concerning whether the usual location of care is the ER, with very low marginal effect values for each private insurance type (**Table 13**).

Those with private insurance are also the least likely to list their usual location of health care consumption as a free clinic at a statistically significant level. This result was expected, but the degree of the differences is very large. Individuals with private insurance were between 11 and 12 percentage points less likely than the uninsured to list a free clinic as the usual source of care, whereas military and other government insurance were between 12 percentage points and 10 percentage points more likely than the uninsured. Free clinics are also very inefficient locations to receive health care because they are a financial drain on health care providers. These very strong numbers indicate that other government and military insurance plans contain some inherent motivation for individuals to consume care inefficiently (**Table 7**). Within the privately insured groups,

those with other private insurance were the most likely to list their usual location of care as a free clinic at the 0.05 significance level (**Table 13**).

For those with other government and military insurance, the marginal effects were statistically significant and negative, indicating that they are less likely to list the usual location of care listed as the office. These two insurance types are the least likely to list a doctor's office as the usual location of care than all other insurance types. The most likely to list the doctor's office as the usual location of care was the privately insured across all regression sets (**Table 7**). Among the privately insured, individuals with other private insurance were the least likely to report a doctor's office as the usual location of care (**Table 13**). Those with private insurance are also the least likely to list an outpatient clinic as their usual location of care than all other types of insurance at a statistically significant level. The insurance group that were the most likely to list an outpatient clinic as the usual location of health care consumption were those with military insurance policies. This could be due to the structure of the veteran's hospitals and an emphasis on outpatient care (**Table 7**). There was little difference between the private insurance types for the outpatient clinic variable, implying that no one private plan encourages or discourages outpatient clinic use than another private plan in this study (**Table 13**).

VII. Conclusion

Efficiency analysis of various insurance policies is imperative when determining which methods of insurance provision should be expanded or reduced to help slow increasing health care costs. A high degree of ER utilization is an indicator of inefficient

consumption of health care. Since it was found that the privately insured frequent the ER less than Medicare and Medicaid, some aspect of Medicare and Medicaid is inducing individuals to consume more ER visits. These incentives are important to identify so we can include them in an ideal insurance system. It was also found that there were statistically significant positive correlations between the frequency of ER visits and individuals on Medicare, Medicaid, other government insurance, and military insurance, relative to the uninsured. This illustrates major flaws in the system. It would be expected that the uninsured would consume the most ER visits because the ER is a location with guaranteed access to quality health care, but these results indicate that some insurance plans induce individuals to consume more ER visits than the uninsured. These results are consistent with the findings of Zuckerman and Shen (2004) who observed that public insurance plans, such as Medicare and Medicaid, were 2.08 times more likely to be frequent users of the ER, the highest correlation coefficient of all insurance types.

The increased utilization of the ER by individuals on Medicare and Medicaid could be due to the characteristics of the policies which limit how enrollees can consume care. Medicare does not cover doctor's visits for routine care. This means that it is cheapest for the individual to go to the ER or a free clinic for routine care than it would be to consume care efficiently at a doctor's office. This incentive could explain the findings in this paper and should be addressed in health care reform. This unexpectedly high utilization of the ER by Medicaid enrollees could be due to the low reimbursement rates by Medicaid for routine doctor's visits. 21.0 percent of doctors do not accept Medicaid enrollees as new patients because the reimbursement rates are so low, and this

figure rises to 24.7 percent with states with delays in reimbursement, magnifying the problem (Cunningham and O'Malley, 2009). The low Medicaid participation rate of physicians forces people to consume care at other locations, such as the ER. The fact that doctors are not accepting Medicaid amplifies the issues with access to health care. Those on Medicaid have low incomes or disabilities by definition, so any decrease in access disproportionately disadvantages this group of individuals. The equity issue then presents itself again; by providing low income individuals with insurance which does not maximize access to care, we are limiting the benefits this insurance can have. Low reimbursement rates also may cause hospitals and doctors to induce the demand of health care by ordering more tests, as previously explained. It may seem counterintuitive initially, but if the idea of supplier induced demand is true, it may lower the net costs of the system if Medicare covered routine doctor's visits and Medicaid reimbursement rates were elevated because it would decrease incentives for the provision of unnecessary care.

Overcrowding of ERs and low Medicaid reimbursement rates for treatment provided by the ER, has put financial stress on many hospitals causing them to close ERs (Steele *et al,* 2008). In Califonia, ER closures have taken a significant toll on hospitals. Since 1998 in Los Angeles County alone, 40 ERs have closed while only one has opened (Los Angeles Times, 2007). Medi-Cal, the Californian Medicaid service, has one of the lowest reimbursement rates and hospital administrators shave been forced to close the doors of their ERs in order to keep the whole hospital from going bankrupt. This issue is not contained in California; nationally, ER utilization has increased by 26 percent, while the numbers of ERs has decreased by 9 percent in the past decade (Kellerman, 2006).

Each time an ER closes, the geographic area they serve faces an access to health care issue. Because the reason the ERs are closing is that the ER is not getting reimbursed for the care they provide, the people who are getting displaced by this closure generally have low incomes. Reducing health care access for a population which is ill-equipped to compensate for this change because they have minimal resources to gain access to quality care, illustrates an equity issue. Closing ERs and threatening to close entire hospitals has many negative social welfare implications, the most direct of which is the lack of access to health care. As ERs close, the burden of patients then gets shifted to another, already stressed ER. Moving patients around from overcrowded ER to overcrowded ER could compromise patient care and lead to poor health outcomes.

Another interesting finding which merits more investigation is that FFS enrollees consume more overnight hospitalizations, but fewer surgeries than all other types of private insurance. Individuals with FFS plans may be hospitalized more frequently for conditions that do not require surgery such as diabetes, bronchitis, pneumonia, some cancers, flu, and infectious diseases. Although the frequency of hospitalization is a good indicator of health care use; it does not tell us what type of health care was consumed at each hospitalization. This lack of data limits the ability to determine if this pattern of consumption is efficient because we do not have information about cost per hospitalization. It is both possible that high levels of hospitalizations and low frequency of surgery indicates an excessive use of overnight observational stays, or that other types of insurance are over-consuming surgeries whereas FFS patients do not. Further research

is required to determine efficiency implications of this consumption pattern among FFS enrollees.

The inefficiencies discussed here have many different origins which should be examined further. Identifying and quantifying the flaws in the system is a first step; now we must find the root of these errors and correct them in order to improve health care provision and consumption. The finding that Medicare and Medicaid patients consume abnormally high levels ER visits is astoundingly pertinent to the recent addition of more individuals to Medicaid. The recently signed health care reform law adds more individuals to Medicaid and private insurance by expanding Medicaid qualifications and mandating health insurance. Adding more people to plans which induce inefficient health care consumption will only magnify the current issue of rising health care cost when these reforms were intended to reduce costs. The current reforms also raise Medicaid reimbursement rates, but whether these rates were increased enough to remedy the inefficiencies induced by these low rates is yet to be determined. The Massachusetts reforms provide an example for current health reforms and a warning against the same pit-falls which have caused health care costs in Massachusetts to rise above their expected values. More research is necessitated on this topic before we can hone in on the most efficient and applicable insurance policies for the United States, but it merits attention because without this understanding, it would be difficult to solve the problems in the health care system we face today.

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IX. Appendix 1: Variable Definitions

Variable	***Definition***
NOINS	No insurance coverage of any type
MCARE	Medicare
MCAID	Medicaid
SINGSERV	Single service plan
PRIV	Private health insurance
PRIVHMOIPA	Private insurance in the form of an HMO (Health Maintenance Organization) or IPA (Individual Provider Association)
PRIVPPOPOS	Private insurance in the form of a PPO or POS plan
PRIVFFS	Private insurance in the form of a FFS (Fee-for-Service) plan
PRIVDRCH	Private insurance plan that allows for patients to choose which doctor they prefer to see
OTHGOVINS	Other state-sponsored insurance
MILITINS	Military health care coverage
INCLESS20k	Whether family income is below $20,000 per year
INC20kTO45k	Whether family income is between $20,000 and $44,999 per year
INC45kTO75k	Whether family income is between $45,000 and $ 74,999 per year
INCOVER75k	Whether family income is over $75,000 per year

NORTHEAST	Whether the person lives in the northeast
MIDWEST	Whether the person lives in the Midwest
SOUTH	Whether the person lives in the south
WEST	Whether the person lives in the west
BLACK	Whether the person listed themselves as black
HISPANIC	Whether the person listed themselves as Hispanic
ASIAN	Whether the person listed themselves as Asian
AGE2	The age of the individual squared
AGEPERCENT	The age of the individual divided by 100
FEMALE	Whether the person is female
MARRIED	Whether the person is married
EXCELLENT	Self-reported health status listed as excellent
VERYGOOD	Self-reported health status listed as very good
GOOD	Self-reported health status listed as good
FAIR	Self-reported health status listed as fair
POOR	Self-reported health status listed as poor
BORNUSA	Whether the individual was born in the United States
NOHS	Whether the individual never attended high school
HSGRAD	Whether the individual graduated from high school or received a GED equivalent only
SOMECOL	Whether the highest level of education an individual reached was attending some college
ASSOCBA	Whether the highest level of education an individual reached was

	receiving an Associate degree or a BA
GRADDEG	Whether the highest level of education an individual reached was receiving a graduate degree
VACCINEPNU	Whether the individual received a pneumonia vaccine
VACCINEHEPB	Whether the individual received an hepatitis B vaccine
AMBUL	Whether the individual suffers from an ambulatory care condition, i.e. hypertension, asthma, diabetes, bronchitis, heart disease, heart attack, or angina
HYPERTEN	Whether the individual has ever been told that they are hypertensive
ASTHMA	Whether the individual has ever been told that they had asthma
AMBULASTHMA	Whether the individual has gone the ER or Urgent Care because of an asthma attack in the last 12 months
DIABETES	Whether the individual has ever been told that they had diabetes
BRONCH	Whether the individual has ever been told that they had bronchitis
HEARTDIS	Whether the individual has ever been told that they had a heart attack, heart disease, or angina
STROKE	Whether the individual has ever been told that they had a stroke, to control for a chronic condition
CANCER	Whether the individual has ever been told that they had cancer, to control for a chronic condition
USLOCER	Whether the usual location of health care is a Emergency Room
USLOCCLI	Whether the usual location of health care is a clinic
USLOCOFF	Whether the usual location of health care is a doctor’s office
USLOCOUT	Whether the usual location of health care is a hospital outpatient clinic or urgent care center
CAREDYLDCOST	Whether health care was delayed because of cost

NEEDCARECOST	Whether needed health care was not received because of cost
NOTAFFRX	Whether prescriptions were not filled because they could not afford it
HOSPNIGHT	Whether a family member was hospitalized overnight, not including overnight stays in the emergency room in the last 12 months
FREQHOSPN	Number of days a family member was hospitalized overnight in the last 365 days
SURGERY	Whether the individual had surgery in the last 12 months
FREQSRG	Number of surgeries in the last 12 months
FREQER	Number of visits to the ER (for themselves) in the last 12 months
FREQDR	Number of visits to a doctor's office, clinic, or other (not including overnight hospitalizations, visits to the ER, home visits, dental visits, or phone calls) in the last 12 months
PLUS10DR	Whether the individual has received care 10 or more times in the past 12 months
NURSEPA	Whether a nurse practitioner, physician assistant, or midwife has been seen in the last 12 months
GENERALMD	Whether a general doctor (general practice, family medicine, or internal medicine) has been seen in the last 12 months
SPECIALIST	Whether a medical doctor who specializes in a particular medical disease or problem as been seen in the last 12 months
PRIVPREMIUM	The dollar amount of the premium for private insurance plans
AMNTSPENTHC	The amount of money spent out of pocket by a family on health care in the last 12 months

X. Appendix 2: Means and Standard Deviations of the Full and Measured Sample

	Full Sample		Measured Sample	
Variable Name	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
INCLESS20k	0.199	0.0399	0.240	0.427
INCLESS45k	0.5212	0.500	0.565	0.496
INCLESS75k	0.734	0.442	0.770	0.421
NORTHEAST	0.173	0.378	0.181	0.385
MIDWEST	0.202	0.401	0.225	0.418
SOUTH	0.370	0.483	0.371	0.483
WEST	0.255	0.436	0.223	0.146
BLACK	0.160	0.366	0.169	0.375
HISPANIC	0.236	0.425	0.144	0.351
ASIAN	0.063	0.244	0.053	0.225
AGE2	1720.207	1766.333	2704.190	1868.221
AGEPERCENT	0.351	0.222	0.488	0.180
FEMALE	0.517	0.500	0.588	0.492
MARRIED	0.527	0.500	0.486	0.500
EXCELLENT	0.344	0.475	0.265	0.441
VERYGOOD	0.300	0.458	0.311	0.463
GOOD	0.256	0.437	0.272	0.445
FAIR	0.076	.0265	0.113	0.317
POOR	0.023	0.150	0.039	0.194
CAREDYLDCOST	0.075	0.263	0.087	0.281
NEEDCARECOST	0.057	0.231	0.065	0.247
NOTAFFRX	0.089	0.284	0.076	0.266
HOSPNIGHT	0.079	0.269	0.112	0.136

	Full Sample		Measured Sample	
Variable Name	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev**
BORNUSA	0.816	0.388	0.837	0.369
NOHS	0.236	0.425	0.067	0.249
HSGRAD	0.626	0.484	0.821	0.383
SOMECOL	0.397	0.489	0.543	0.498
ASSOCBA	0.253	0.435	0.351	0.477
GRADDEG	0.060	0.237	0.086	0.281
VACCINEPNU	0.181	0.385	0.204	0.403
VACCINEHEPB	0.265	0.441	0.267	0.442
AMBUL	0.428	0.495	0.467	0.500
HYPERTEN	0.290	0.454	0.325	0.468
ASTHMA	0.111	0.312	0.117	0.321
DIABETES	0.087	0.281	0.097	0.296
BRONCH	0.045	0.207	0.049	0.216
HEARTDIS	0.115	0.319	0.129	0.335
STROKE	0.029	0.169	0.034	0.180
CANCER	0.072	0.258	0.081	0.272
USLOCER	0.012	0.109	0.012	0.109
USLOCCLI	0.183	0.387	0.183	0.387
USLOCOFF	0.771	0.420	0.771	0.420
USLOCOUT	0.016	0.127	0.016	0.127
NOINS	0.171	0.377	.102	0.302
MCARE	0.122	0.327	0.240	0.427
MCAID	0.129	0.335	0.099	0.298
SINGSERV	0.242	0.428	0.271	0.444
PRIV	0.604	0.489	0.676	0.468

	Full Sample		Measured Sample	
Variable Name	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
PRIVHMOIPA	0.294	0.456	0.292	0.455
PRIVPPOPOS	0.491	0.500	0.494	0.500
PRIVFFS	0.024	0.154	0.036	0.186
PRIVDRCH	0.421	0.494	0.465	0.499
OTHGOVINS	0.017	0.129	0.018	0.132
MILITINS	0.029	0.168	0.039	0.194
FREQER	0.106	0.481	0.352	0.829
FREQDR	0.786	1.720	2.747	2.258
PLUS10DR	0.090	0.286	0.150	0.357
NURSEPA	0.141	0.348	0.156	0.363
GENERALMD	0.659	0.474	0.735	0.441
SPECIALIST	0.254	0.435	0.286	0.451
PRIVPREMIUM	3061.237	2884.580	2668.221	2680.033
AMNTSPENTHC	1.706	1.215	1.666	1.181
AMBULASTHMA	0.003	0.057	0.011	0.104

Data gathered from the NHIS 2006
All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

XI. Appendix 3: Summary Tables of Regression Outputs

Table 1. Effect of insurance on the amount spent out of pocket on health care.

Level of Out of Pocket Spending	Medicare Marginal Effects (Standard Error)	Medicaid Marginal Effects (Standard Error)	Private Insurance Marginal Effects (Standard Error)	Other Government Insurance Marginal Effects (Standard Error)	Military Insurance Marginal Effects (Standard Error)
Zero	-0.010 (0.006)**	0.107 (0.008)*	-0.001 (0.004)	0.069 (0.015)*	0.071 (0.011)*
Less than $500	-0.012 (0.008)**	0.071 (0.003)*	-0.002 (0.004)	0.053 (0.007)*	0.055 (0.005)*
$500 - $1,999	0.010 (0.006)**	-0.098 (0.007)*	0.001 (0.004)	-0.065 (0.013)*	-0.068 (0.010)*
$2,000 - $2,999	0.005 (0.003)**	-0.037 (0.002)*	0.001 (0.002)	-0.025 (0.004)*	-0.026 (0.003)*
$3,000 - $4,999	0.004 (0.002)**	-0.024 (0.001)*	0.001 (0.001)	-0.017 (0.003)*	-0.018 (0.002)*
$5,000 or more	0.004 (0.002)**	-0.020 (0.001)*	0.001 (0.001)	-0.014 (0.002)*	-0.015 (0.001)*

Data gathered from the NHIS 2006
All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education
* indicates statistical significance at the $p < 0.05$ level
** indicates statistical significance at the $p < 0.10$ level

Table 2. Effect of insurance on variables indicating basic care provision.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Care Delayed because of Cost	Medicare	-0.032*	0.004	-0.055*	0.005	-0.064*	0.005
	Medicaid	-0.050*	0.002	-0.067*	0.003	-0.077*	0.003
	Private	-0.139*	0.003	-0.142*	0.005	-0.129*	0.006
	Other Gov't Ins.	-0.037*	0.004	-0.050*	0.005	-0.057*	0.006
	Military Ins.	-0.057*	0.002	-0.065*	0.003	-0.070*	0.004
	N		56,706		23,723		19,472
Needed Care not obtained because of Cost	Medicare	-0.022*	0.003	-0.040*	0.004	-0.046*	0.004
	Medicaid	-0.037*	0.001	-0.047*	0.002	-0.053*	0.002
	Private	-0.125*	0.003	-0.122*	0.005	-0.106*	0.005
	Other Gov't Ins.	-0.027*	0.003	-0.035*	0.003	-0.040*	0.003
	Military Ins.	-0.040*	0.002	-0.043*	0.002	-0.046*	0.003
	N		56,695		23,721		19,473
Cannot Afford Prescriptions	Medicare	-0.011	0.006	-0.029*	0.005	-0.033*	0.005
	Medicaid	-0.036*	0.003	-0.045*	0.002	-0.049*	0.003
	Private	-0.132*	0.005	-0.115*	0.005	-0.101*	0.005
	Other Gov't Ins.	-0.033*	0.006	-0.037*	0.005	-0.040*	0.005
	Military Ins.	-0.057*	0.003	-0.051*	0.002	-0.053*	0.003
	N		23,681		23,538		19,360

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 3. Effect of insurance on whether vaccines were received.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Received Pneumonia Vaccine	Medicare	0.191*	0.012	0.165*	0.012	0.165*	0.013
	Medicaid	0.062*	0.011	0.030*	0.011	0.033*	0.011
	Private	0.030*	0.006	0.032*	0.006	0.026*	0.007
	Other Gov't Ins.	0.067*	.0025	0.047*	0.024	0.041**	0.024
	Military Ins.	0.127*	0.017	0.110*	0.017	0.108*	0.019
	N		23,060		22,921		18,903
Received Hepatitis B Vaccine	Medicare	0.028*	0.014	0.021	0.014	0.029**	0.016
	Medicaid	0.060*	0.013	0.051*	0.013	0.049*	0.014
	Private	0.045*	0.008	0.045*	0.008	0.040*	0.009
	Other Gov't Ins.	0.092*	0.027	0.082*	0.027	0.088*	0.029
	Military Ins.	0.212*	0.021	0.208*	0.021	0.199*	0.023
	N		22,591		22,460		18,543

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 4. Effect of insurance on utilization of overnight hospitalizations and surgery.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Whether they were hospitalized overnight	Medicare	0.075*	0.006	0.044*	0.008	0.048*	0.009
	Medicaid	0.087*	0.006	0.066*	0.009	0.066*	0.010
	Private	-0.001	0.003	0.009	0.005	0.009	0.005
	Other Gov't Ins.	0.036*	0.011	0.036*	0.017	0.025	0.018
	Military Ins.	0.022*	0.007	0.023*	0.011	0.031*	0.013
	N		56,677		23,719		19,468
Frequency of overnight hospitalizations	Medicare	1.195*	0.092	0.709*	0.124	0.765*	0.140
	Medicaid	0.976*	0.078	0.682*	0.115	0.671*	0.126
	Private	-0.070	0.050	0.087	0.074	0.148	0.086
	Other Gov't Ins.	0.412*	0.165	0.221	0.236	0.268	0.251
	Military Ins.	0.248*	0.114	0.104	0.165	0.235	0.185
	N		56,619		23,698		19,454
Whether they had surgery	Medicare	0.060*	0.010	0.037*	0.009	0.040*	0.010
	Medicaid	0.095*	0.011	0.065*	0.010	0.065*	0.011
	Private	0.034*	0.005	0.036*	0.005	0.038*	0.006
	Other Gov't Ins.	0.086*	0.023	0.065*	0.022	0.055*	0.023
	Military Ins.	0.055*	0.014	0.039*	0.013	0.054*	0.015
	N		23,643		23,500		19,340
Frequency of Surgery	Medicare	0.133*	0.014	0.094*	0.014	0.100*	0.015
	Medicaid	0.145*	0.013	0.101*	0.013	0.100*	0.014
	Private	0.040*	0.008	0.046*	0.008	0.050*	0.009
	Other Gov't Ins.	0.108*	0.027	0.082*	0.027	0.073*	0.027
	Military Ins.	0.071*	0.019	0.048*	0.019	0.070*	0.020
	N		23,636		23,494		19,338

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 5. Effect of insurance on frequency of ER and doctor's visits, and presence of ambulatory care conditions.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Frequency of ER visits	Medicare	0.169*	0.022	0.057*	0.022	0.066*	0.024
	Medicaid	0.364*	0.020	0.225*	0.020	0.224*	0.021
	Private	-0.044*	0.013	-0.017	0.013	-0.021	0.015
	Other Gov't Ins.	0.182*	0.042	0.119*	0.041	0.100*	0.044
	Military Ins.	0.077*	0.029	0.037	0.029	0.028	0.032
	N		23,623		23,482		19,331
Frequency of Doctor's visits	Medicare	1.137*	0.059	0.741*	0.056	0.813*	0.062
	Medicaid	1.644*	0.054	1.171*	0.051	1.161*	0.056
	Private	0.529*	0.035	0.608*	0.033	0.590*	0.038
	Other Gov't Ins.	0.999*	0.112	0.704*	0.106	0.642*	0.113
	Military Ins.	1.021*	0.078	0.833*	0.074	0.864*	0.082
	N		23,471		23,336		19,252
Whether there were 10 or more doctor's visits	Medicare	0.106*	0.007	0.055*	0.009	0.065*	0.010
	Medicaid	0.154*	0.008	0.099*	0.010	0.101*	0.011
	Private	0.015*	0.003	0.032*	0.005	0.031*	0.006
	Other Gov't Ins.	0.103*	0.015	0.061*	0.020	0.058*	0.022
	Military Ins.	0.063*	0.009	0.061*	0.014	0.064*	0.017
	N		56,601		23,699		19,451
Presence of an Ambulatory care condition	Medicare	0.128*	0.015	0.072*	0.015	0.063*	0.017
	Medicaid	0.191*	0.013	0.126*	0.014	0.123*	0.016
	Private	0.016	0.009	0.047*	0.009	0.050*	0.010
	Other Gov't Ins.	0.120*	0.028	0.082*	0.029	0.071*	0.031
	Military Ins.	0.125*	0.020	0.118*	0.021	0.129*	0.023
	N		23,774		23,734		19,478
Whether a visit to the ER was due to asthma	Medicare	0.047	0.053	0.024	0.052	0.007	0.055
	Medicaid	0.043	0.043	0.017	0.043	0.022	0.045
	Private	-0.015	0.039	0.001	0.039	-0.002	0.044
	Other Gov't Ins.	0.153	0.106	0.138	0.106	0.134	0.112
	Military Ins.	0.125	0.094	0.127	0.095	0.136	0.102
	N		935		935		943

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 6. Effect of insurance on type of care received and overall spending.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Whether a Nurse or PA was seen	Medicare	0.045*	0.010	0.017**	0.009	0.029*	0.011
	Medicaid	0.078*	0.011	0.041*	0.010	0.040*	0.011
	Private	0.019*	0.006	0.024*	0.006	0.022*	0.006
	Other Gov't Ins.	0.073*	0.022	0.046*	0.021	0.047*	0.022
	Military Ins.	0.127*	0.016	0.110*	0.016	0.127*	0.018
	N		23,611		23,471		19,328
Whether a General MD was seen	Medicare	0.145*	0.012	0.114*	0.013	0.124*	0.014
	Medicaid	0.191*	0.009	0.159*	0.010	0.175*	0.010
	Private	0.182*	0.008	0.192*	0.008	0.177*	0.010
	Other Gov't Ins.	0.198*	0.016	0.181*	0.017	0.188*	0.017
	Military Ins.	0.182*	0.013	0.166*	0.014	0.161*	0.015
	N		23,620		23,476		19,331
Whether a Specialist was seen	Medicare	0.158*	0.013	0.105*	0.013	0.125*	0.014
	Medicaid	0.159*	0.014	0.084*	0.013	0.089*	0.014
	Private	0.088*	0.007	0.101*	0.007	0.101*	0.008
	Other Gov't Ins.	0.139*	0.028	0.097*	0.027	0.095*	0.029
	Military Ins.	0.139*	0.018	0.115*	0.018	0.129*	0.021
	N		23,616		23,475		19,332
Amount Spent on Health Care	Medicare	0.013	0.023	-0.036	0.031	0.038	0.034
	Medicaid	-0.410*	0.020	-0.472*	0.029	-0.408*	0.031
	Private	0.115*	0.013	0.082*	0.019	-0.024	0.021
	Other Gov't Ins.	-0.202*	0.042	-0.279*	0.059	-0.264*	0.061
	Military Ins.	-0.263*	0.029	-0.284*	0.041	-0.313*	0.045
	N		54,488		23,169		19,236

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 7. Effect of insurance on the usual location of health care consumption.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Usual location of care is ER	Medicare	-0.001	0.001	-0.002	0.001	-0.002	0.001
	Medicaid	-0.004*	0.001	-0.004*	0.001	-0.004*	0.001
	Private	-0.018*	0.002	-0.017*	0.002	-0.015*	0.002
	Other Gov't Ins.	-0.003*	0.001	-0.003*	0.001	-0.004*	0.001
	Military Ins.	-0.003*	0.001	-0.003*	0.001	-0.003	0.001
	N		19,987		19,862		16,194
Usual location of care is a free clinic	Medicare	-0.025*	0.010	-0.027*	0.010	-0.038*	0.011
	Medicaid	0.018	0.010	0.015	0.010	-0.002	0.011
	Private	-0.123*	0.008	-0.122*	0.008	-0.110*	0.009
	Other Gov't Ins.	0.101*	0.024	0.100*	0.024	0.108*	0.026
	Military Ins.	0.096*	0.017	0.091*	0.017	0.120*	0.020
	N		19,987		19,862		16,194
Usual location of care is a doctor's office	Medicare	0.036*	0.011	0.040*	0.011	0.056*	0.012
	Medicaid	0.019	0.010	0.024*	0.010	0.046*	0.011
	Private	0.195*	0.009	0.194*	0.009	0.181*	0.010
	Other Gov't Ins.	-0.076*	0.024	-0.076*	0.024	-0.067*	0.026
	Military Ins.	-0.178*	0.019	-0.174*	0.019	-0.197*	0.022
	N		19,987		19,862		16,194
Usual location of care is an outpatient clinic	Medicare	0.0005	0.002	0.0002	0.002	0.00004	0.003
	Medicaid	0.0002	0.002	-0.0003	0.002	-0.001	0.002
	Private	-0.011*	0.002	-0.010*	0.002	-0.011*	0.002
	Other Gov't Ins.	0.002	0.004	0.002	0.004	-0.0002	0.004
	Military Ins.	0.066*	0.011	0.066*	0.011	0.067*	0.012
	N		19,987		19,862		16,194

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 8. Effect of insurance on basic care provision for the privately insured relative to those with private HMOs or IPAs.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Care Delayed because of Cost	Other Private Ins.	0.018*	0.004	0.027*	0.007	0.194*	0.060
	Private PPO or POS	0.017*	0.003	0.019*	0.004	0.186*	0.048
	Private FFS	0.020*	0.010	0.019*	0.015	0.048	0.130
	Dr. of Choice	-0.007*	0.002	-0.013*	0.004	-0.112*	0.041
	N		35,697		14,833		11,930
Needed Care not obtained because of Cost	Other Private Ins.	0.014*	0.003	0.017*	0.005	0.012*	0.005
	Private PPO or POS	0.010*	0.002	0.010*	0.003	0.011*	0.003
	Private FFS	0.034*	0.010	0.026*	0.014	0.015	0.012
	Dr. of Choice	-0.009*	0.002	-0.010*	0.003	-0.010*	0.003
	N		35,693		14,834		11.931
Cannot Afford Prescriptions	Other Private Ins.	0.030*	0.006	0.023*	0.006	0.015*	0.006
	Private PPO or POS	0.010*	0.004	0.010*	0.003	0.010*	0.004
	Private FFS	0.020**	0.014	0.016	0.012	0.011	0.012
	Dr. of Choice	-0.009*	0.003	-0.006*	0.003	-0.005**	0.003
	N		14,805		14,726		11,875

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 9. Effect of insurance on vaccinations for the privately insured relative to those with private HMOs or IPAs.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Received Pneumonia Vaccine	Other Private Ins.	0.016	0.010	0.013	0.010	0.007	0.011
	Private PPO or POS	-0.010	0.008	-0.010	0.008	-0.007	0.008
	Private FFS	0.014	0.017	0.010	0.017	-0.005	0.017
	Dr. of Choice	0.008	0.007	0.009	0.007	0.005	0.007
	N		14,412		14,335		11,596
Received Hepatitis B Vaccine	Other Private Ins.	0.012	0.013	0.011	0.013	0.0003	0.014
	Private PPO or POS	-0.004	0.010	-0.005	0.010	-0.016	0.011
	Private FFS	-0.015	0.024	-0.016	0.024	-0.022	0.009
	Dr. of Choice	-0.009	0.008	-0.008	0.008	-0.004	0.017
	N		14,124		14,052		11,379

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 10. Effect of insurance on utilization of overnight hospitalizations and surgery for the privately insured relative to those with private HMOs or IPAs.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Whether they were hospitalized overnight	Other Private Ins.	0.005	0.004	0.004	0.007	0.006	0.008
	Private PPO or POS	0.003	0.003	0.006	0.006	0.004	0.006
	Private FFS	0.009*	0.009	0.001	0.012	0.002	0.013
	Dr. of Choice	0.003	0.003	0.006	0.005	0.009	0.005
	N		35,664		14,829		11,925
Frequency of overnight hospitalizations	Other Private Ins.	0.060	0.052	0.063	0.105	0.114	0.127
	Private PPO or POS	0.069	0.042	0.127	0.083	0.129	0.098
	Private FFS	0.313*	0.111	0.039	0.197	0.063	0.235
	Dr. of Choice	0.006	0.037	0.063	0.072	0.080	0.086
	N		35,638		14,822		11,922
Whether they had surgery	Other Private Ins.	0.001	0.009	-0.003	0.009	0.003	0.010
	Private PPO or POS	0.008	0.007	0.007	0.007	0.007	0.008
	Private FFS	-0.022	0.014	-0.025**	0.014	-0.036*	0.015
	Dr. of Choice	0.014*	0.006	0.014*	0.006	0.015*	0.007
	N		14,770		14,691		11,857
Frequency of Surgery	Other Private Ins.	0.002	0.013	-0.004	0.013	0.004	0.014
	Private PPO or POS	0.002	0.010	0.001	0.010	-0.003	0.014
	Private FFS	-0.025	0.024	-0.031	0.024	-0.058*	0.027
	Dr. of Choice	0.015**	0.009	0.016**	0.009	0.022*	0.010
	N		14,764		14,686		11,856

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 11. The effect of insurance on frequency of ER and doctor's visits and presence of ambulatory care conditions for the privately insured relative to those with private HMOs or IPAs.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Frequency of ER visits	Other Private Ins.	0.009	0.018	-0.005	0.018	-0.006	0.020
	Private PPO or POS	0.0004	0.014	-0.001	0.014	0.002	0.016
	Private FFS	-0.036	0.034	-0.048	0.033	-0.042	0.037
	Dr. of Choice	0.029*	0.013	0.036*	0.012	0.037*	0.014
	N		14,685		14,763		11,854
Frequency of Doctor's visits	Other Private Ins.	0.088	0.054	0.027	0.051	0.020	0.058
	Private PPO or POS	0.178*	0.043	0.169*	0.041	0.170*	0.045
	Private FFS	0.129	0.102	0.088	0.096	0.022	0.108
	Dr. of Choice	0.017	0.038	0.040	0.035	0.072**	0.040
	N		14,672		14,598		11,816
Whether there were 10 or more doctor's visits	Other Private Ins.	0.010*	0.005	0.017*	0.008	0.013	0.010
	Private PPO or POS	0.021*	0.004	0.026*	0.006	0.025*	0.007
	Private FFS	0.023*	0.010	0.025**	0.016	0.011	0.017
	Dr. of Choice	0.002	0.010	-0.002	0.005	0.002	0.006
	N		35,621		14,820		11,918
Presence of an Ambulatory care condition	Other Private Ins.	0.026	0.014	0.016	0.014	0.033*	0.016
	Private PPO or POS	0.015	0.011	0.015	0.011	0.026*	0.012
	Private FFS	-0.003	0.026	-0.012	0.026	-0.004	0.030
	Dr. of Choice	-0.015	0.009	-0.009	0.010	-0.006	0.011
	N		14,839		14,857		11,933
Whether a visit to the ER was due to asthma	Other Private Ins.	-0.057	0.051	-0.089**	0.047	-0.103**	0.047
	Private PPO or POS	-0.056	0.047	-0.070	0.047	-0.061	0.050
	Private FFS	-0.087	0.074	-0.093	0.069	-0.100	0.068
	Dr. of Choice	0.083*	0.042	0.096*	0.042	0.082**	0.044
	N		482		482		425

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 12. Effect of insurance on type of care received and overall spending for the privately insured relative to those with private HMOs or IPAs.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Whether a Nurse or PA was seen	Other Private Ins.	0.010	0.009	0.007	0.009	0.006	0.011
	Private PPO or POS	0.001	0.007	0.001	0.007	0.0002	0.009
	Private FFS	-0.020	0.016	-0.020	0.016	-0.025	0.018
	Dr. of Choice	-0.008	0.006	-0.006	0.006	-0.002	0.007
	N		14,752		14,675		11,849
Whether a General MD was seen	Other Private Ins.	-0.003	0.012	-0.009	0.012	-0.004	0.014
	Private PPO or POS	0.003	0.009	0.001	0.009	-0.007	0.010
	Private FFS	-0.053*	0.025	-0.054*	0.026	-0.047**	0.028
	Dr. of Choice	0.010	0.008	0.013	0.008	0.013	0.009
	N		14,754		14,675		11,850
Whether a Specialist was seen	Other Private Ins.	0.005	0.012	-0.003	0.012	0.004	0.014
	Private PPO or POS	0.028*	0.010	0.027*	0.010	0.031*	0.011
	Private FFS	0.032	0.022	0.026	0.023	0.026	0.025
	Dr. of Choice	0.011	0.008	0.013	0.009	0.013	0.009
	N		14,753		14,676		11,849
Amount Spent on Health Care	Other Private Ins.	0.048*	0.020	0.036	0.029	0.070*	0.032
	Private PPO or POS	0.233*	0.016	0.198*	0.023	0.186*	0.025
	Private FFS	0.115*	0.041	0.067	0.055	0.050	0.060
	Dr. of Choice	0.055*	0.014	0.058*	0.020	0.079*	0.022
	N		34,249		14,504		11,798
Private Premium	Other Private Ins.	-217.135*	69.358	-168.744**	93.226	-97.592	100.280
	Private PPO or POS	80.569	49.397	43.694	68.313	36.256	72.312
	Private FFS	-209.033**	122.167	-46.459	157.882	54.683	170.921
	Dr. of Choice	262.589*	43.935	237.444*	60.449	204.430*	64.395
	N		19,711		8,800		7,497

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 13. Effect of insurance on the usual location of health care for the privately insured relative to those with private HMOs or IPAs.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Usual location of care is ER	Other Private Ins.	0.003*	0.002	0.003*	0.002	0.002**	0.001
	Private PPO or POS	0.001**	0.001	0.001**	0.001	0.001	0.001
	Private FFS	0.002	0.004	0.002	0.004	0.001	0.003
	Dr. of Choice	0.0002	0.0005	0.0002	0.0005	0.0001	0.0005
	N		13,553		13,481		10,802
Usual location of care is a free clinic	Other Private Ins.	0.052*	0.010	0.052*	0.010	0.056*	0.012
	Private PPO or POS	-0.015*	0.007	-0.014**	0.007	-0.016*	0.008
	Private FFS	0.003	0.017	-0.0001	0.017	-0.007	0.018
	Dr. of Choice	0.011**	0.006	0.011**	0.006	0.017*	0.007
	N		13,553		13,481		10,802
Usual location of care is a doctor's office	Other Private Ins.	-0.069*	0.011	-0.069*	0.011	-0.068*	0.013
	Private PPO or POS	0.012	0.008	0.011	0.008	0.017**	0.009
	Private FFS	-0.003	0.019	-0.0001	0.018	0.007	0.020
	Dr. of Choice	-0.016*	0.012	-0.016*	0.007	-0.024*	0.008
	N		13,553		13,481		10,802
Usual location of care is an outpatient clinic	Other Private Ins.	0.00004	0.002	-0.00002	0.002	-0.001	0.002
	Private PPO or POS	-0.003*	0.001	-0.003*	0.001	-0.003*	0.002
	Private FFS	-0.002	0.002	-0.002	0.002	-0.002	0.003
	Dr. of Choice	0.002**	0.001	0.002**	0.001	0.003*	0.001
	N		13,553		13,481		10,802

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 14. Effect of insurance on basic care provision for the privately insured relative to those with private HMOs or IPAs without other private insurance.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Care Delayed because of Cost	Private PPO or POS	0.017*	0.003	0.017*	0.004	0.018*	0.005
	Private FFS	0.023*	0.010	0.018	0.015	0.005	0.014
	Dr. of Choice	-0.009*	0.002	-0.012*	0.004	-0.011*	0.004
	N		28,979		12,145		9,866
Needed Care not obtained because of Cost	Private PPO or POS	0.010*	0.002	0.010*	0.003	0.011*	0.003
	Private FFS	0.040*	0.011	0.030*	0.014	0.019**	0.013
	Dr. of Choice	-0.011*	0.002	-0.011*	0.003	-0.011*	0.003
	N		28,975		12,145		9,866
Cannot Afford Prescriptions	Private PPO or POS	0.010*	0.004	0.009*	0.004	0.009*	0.003
	Private FFS	0.020**	0.013	0.016	0.002	0.013	0.012
	Dr. of Choice	-0.009*	0.003	-0.006*	0.003	-0.006**	0.003
	N		12,113		12,054		9,820

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 15. Effect of insurance on vaccinations for the privately insured relative to those with private HMOs or IPAs without other private insurance.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Received Pneumonia Vaccine	Private PPO or POS	-0.005	0.008	-0.006	0.007	-0.003	0.008
	Private FFS	0.020	0.017	0.015	0.017	0.002	0.017
	Dr. of Choice	0.0002	0.007	0.003	0.007	-0.001	0.008
	N		11,814		11,757		9,602
Received Hepatitis B Vaccine	Private PPO or POS	-0.006	0.010	-0.006	0.010	-0.018	0.011
	Private FFS	-0.023	0.025	-0.024	0.025	-0.030	0.027
	Dr. of Choice	-0.008	0.009	-0.007	0.009	-0.002	0.010
	N		11,596		11,543		9,436

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 16. Effect of insurance on utilization of overnight hospitalizations and surgery for the privately insured relative to those with private HMOs or IPAs without other private insurance.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Whether they were hospitalized overnight	Private PPO or POS	0.006**	0.003	0.006	0.005	0.005	0.006
	Private FFS	0.018*	0.009	0.002	0.012	0.003	0.013
	Dr. of Choice	0.001	0.003	0.006*	0.005	0.009	0.006
	N		28,969		12,140		9,860
Frequency of overnight hospitalizations	Private PPO or POS	0.074**	0.041	0.126	0.079	0.134	0.091
	Private FFS	0.351*	0.017	0.099	0.188	0.136	0.009
	Dr. of Choice	-0.004	0.039	0.070	0.075	0.081	0.081
	N		28,953		12,135		9,858
Whether they had surgery	Private PPO or POS	0.009	0.007	0.007	0.007	0.007	0.008
	Private FFS	-0.024	0.014	-0.026**	0.014	-0.038*	0.014
	Dr. of Choice	0.016*	0.007	0.017*	0.007	0.020*	0.007
	N		12,084		12,026		9,806
Frequency of Surgery	Private PPO or POS	0.004	0.010	0.003	0.010	-0.0005	0.010
	Private FFS	-0.023	0.024	-0.029	0.024	-0.058*	0.026
	Dr. of Choice	0.016**	0.010	0.017**	0.017	0.023*	0.010
	N		12,080		12,023		9,805

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 17. Effect of insurance on frequency of ER and doctor's visits and presence of ambulatory care conditions for the privately insured relative to those with private HMOs or IPAs without other private insurance.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Frequency of ER visits	Private PPO or POS	-0.0004	0.015	-0.002	0.014	0.005	0.016
	Private FFS	-0.037	0.035	-0.047	0.034	-0.038	0.038
	Dr. of Choice	0.033*	0.014	0.038	0.014	0.038*	0.015
	N		12,082		12,023		9,838
Frequency of Doctor's visits	Private PPO or POS	0.204*	0.043	0.190*	0.041	0.202*	0.046
	Private FFS	0.186**	0.104	0.145	0.098	0.083	0.110
	Dr. of Choice	-0.022	0.042	0.007	0.039	0.023	0.044
	N		12,032		11,978		9,781
Whether there were 10 or more doctor's visits	Private PPO or POS	0.022*	0.010	0.025*	0.006	0.024*	0.007
	Private FFS	0.026*	0.012	0.025**	0.016	0.014	0.017
	Dr. of Choice	0.000001	0.004	0.002	0.006	0.004	0.007
	N		28,938		12,133		9,856
Presence of an Ambulatory care condition	Private PPO or POS	0.022*	0.011	0.022*	0.011	0.032*	0.012
	Private FFS	0.009	0.026	0.003	0.027	0.007	0.030
	Dr. of Choice	-0.026*	0.010	-0.021*	0.010	-0.016	0.012
	N		12,157		12,148		9,867
Whether a visit to the ER was due to asthma	Private PPO or POS	-0.072	0.051	-0.087**	0.051	-0.074	0.055
	Private FFS	-0.070	0.081	-0.083	0.074	-0.087	0.075
	Dr. of Choice	0.097*	0.048	0.104*	0.048	0.081**	0.050
	N		395		395		346

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 18. Effect of insurance on type of care received and overall spending for the privately insured relative to those with private HMOs or IPAs without other private insurance.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Whether a Nurse or PA was seen	Private PPO or POS	0.003	0.007	0.002	0.007	0.003	0.008
	Private FFS	-0.019	0.016	-0.019	0.016	-0.022	0.018
	Dr. of Choice	-0.011	0.007	-0.008	0.007	-0.007	0.008
	N		12,077		12,020		9,803
Whether a General MD was seen	Private PPO or POS	0.006	0.010	0.003	0.010	-0.004	0.011
	Private FFS	-0.039	0.025	-0.041	0.026	-0.037	0.028
	Dr. of Choice	0.004	0.009	0.008	0.009	0.009	0.010
	N		12,079		12,021		9,804
Whether a Specialist was seen	Private PPO or POS	0.027*	0.010	0.027*	0.010	0.030*	0.011
	Private FFS	0.032	0.023	0.026	0.023	0.031	0.026
	Dr. of Choice	0.014	0.009	0.017**	0.009	0.016	0.010
	N		12,077		12,020		9,804
Amount Spent on Health Care	Private PPO or POS	0.239*	0.016	0.205*	0.023	0.188*	0.025
	Private FFS	0.124*	0.042	0.092**	0.055	0.059	0.061
	Dr. of Choice	0.046*	0.015	0.044*	0.022	0.075*	0.024
	N		28,222		11,943		9,779
Private Premium	Private PPO or POS	92.900**	50.487	51.202	70.203	38.030	73.861
	Private FFS	-198.809	125.3749	-15.175	163.331	65.311	175.366
	Dr. of Choice	250.4628*	47.781	227.246*	66.345	210.070*	70.140
	N		16,983		7,461		6,393

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 19. Effect of insurance on the usual location of health care for the privately insured relative to those with private HMOs or IPAs without other private insurance.

Variable		Without Health Status and Income		With Health Status Added		With Health Status and Income Added	
		Marginal Effect	Std. Error	Marginal Effect	Std. Error	Marginal Effect	Std. Error
Usual location of care is ER	Private PPO or POS	0.001	0.001	0.001	0.001	0.001	0.001
	Private FFS	0.001	0.003	0.001	0.003	0.001	0.003
	Dr. of Choice	0.001	0.001	0.001	0.001	0.0005	0.0006
	N		11,165		10,738		8,703
Usual location of care is a free clinic	Private PPO or POS	-0.015*	0.007	-0.014*	0.007	-0.015**	0.008
	Private FFS	-0.010	0.015	-0.013	0.015	-0.016	0.016
	Dr. of Choice	0.013*	0.007	0.014*	0.007	0.017*	0.008
	N		11,165		11,110		8,992
Usual location of care is a doctor's office	Private PPO or POS	0.015**	0.008	0.013**	0.008	0.017*	0.009
	Private FFS	0.015	0.016	0.017	0.016	0.019	0.018
	Dr. of Choice	-0.022*	0.007	-0.023*	0.007	-0.027*	0.008
	N		11,165		11,110		8,992
Usual location of care is an outpatient clinic	Private PPO or POS	-0.003*	0.001	-0.003*	0.001	-0.003*	0.002
	Private FFS	-0.002	0.002	-0.002	0.001	-0.002	0.002
	Dr. of Choice	0.003*	0.001	0.003*	0.001	0.003*	0.001
	N		11,165		11,110		8,992

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ leve

XII. Appendix 4: Complete Set of Regression Outputs Including Controls

Table 20. Correlation coefficients for care delayed due to cost and not getting needed care due to cost.

	CAREDLYDCOST		**NEEDCARECOST**	
Variable Name	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
MEDICARE	-0.064*	0.005	-0.046*	0.004
MEDICAID	-0.076*	0.003	-0.053*	0.002
PRIVATE	-0.128*	0.006	-0.106*	0.005
OTHER GOV'T INS	-0.057*	0.006	-0.040*	0.004
MILITARY INSURANCE	-0.070*	0.004	-0.046*	0.003
INCLESS20k	0.113*	0.011	0.102*	0.010
INC. Between 20k-45k	0.095*	0.009	0.078*	0.009
INC. Between 45k-75k	0.048*	0.009	0.035*	0.008
MIDWEST	0.0.019*	0.007	0.007	0.006
SOUTH	0.012	0.006	0.009*	0.005
WEST	0.019*	0.007	0.005	0.005
FEMALE	0.020*	0.004	0.011*	0.003
BLACK	-0.031*	0.004	-0.012*	0.004
HISPANIC	-0.034*	0.005	-0.021*	0.004
ASIAN	-0.056*	0.006	-0.032*	0.005
AGE2	-0.0001*	0.00001	-0.0001*	0.00001
AGEPERCENT	0. 661*	0.071	0.541*	0.056
MARRIED	-0.033*	0.004	-0.018*	0.003
GOOD	0.049*	0.006	0.041*	0.005
FAIR	0.137*	0.011	0.129*	0.010
POOR	0.225*	0.021	0.230*	0.021
BORNUSA	0.022*	0.006	0.014*	0.005
HSGRAD	0.015*	0.006	0.001	0.004
SOMECOL	0.051*	0.008	0.026*	0.006
ASSOCBA	0.051*	0.008	0.027*	0.006
GRADDEG	0.059*	0.014	0.011	0.010
STROKE	0.021	0.013	0.019	0.011
CANCER	0.014	0.009	0.019*	0.008
N	19,548		19,549	
R^2	0.165		0.208	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 21. Correlation coefficients for not being able to afford prescription drugs.

Variable Name	Coefficient	Std. Error
MEDICARE	-0.033*	0.005
MEDICAID	-0.049*	0.003
PRIVATE	-0.101*	0.005
OTHER GOV'T INS	-0.041*	0.005
MILITARY INSURANCE	-0.053*	0.003
INCLESS20k	0.116*	0.011
INC. Between 20k-45k	0.102*	0.010
INC. Between 45k-75k	0.054*	0.010
MIDWEST	0.015*	0.006
SOUTH	0.015*	0.005
WEST	0.009	0.006
FEMALE	0.033*	0.003
BLACK	-0.001	0.004
HISPANIC	-0.010	0.005
ASIAN	-0.010	0.009
AGE2	-0.0001*	0.00001
AGEPERCENT	0.477*	0.059
MARRIED	-0.001	0.004
GOOD	0.056*	0.005
FAIR	0.134*	0.011
POOR	0.248*	0.021
BORNUSA	0.025*	0.005
HSGRAD	-0.008	0.005
SOMECOL	0.018*	0.006
ASSOCBA	0.009	0.006
GRADDEG	0.005	0.010
STROKE	0.024*	0.011
CANCER	0.017*	0.008
N	19,435	
R^2	0.189	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 22. Correlation coefficients for instance and frequency of overnight hospitalizations.

	HOSPNIGHT		FREQHOSPN	
Variable Name	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
MEDICARE	0.052*	0.010	0.787*	0.139
MEDICAID	0.073*	0.010	0.697*	0.126
PRIVATE	0.011*	0.005	0.167	0.086
OTHER GOV'T INS	0.027	0.018	0.285	0.184
MILITARY INSURANCE	0.031*	0.013	0.249	0.251
INCLESS20k	0.007	0.008	0.094	0.120
INC. Between 20k-45k	0.010	0.007	0.057	0.103
INC. Between 45k-75k	0.010	0.007	0.129	0.103
MIDWEST	0.002	0.007	-0.212*	0.105
SOUTH	0.002	0.006	-0.215*	0.096
WEST	-0.012	0.006	-0.223*	0.105
FEMALE	0.038*	0.004	0.037	0.066
BLACK	-0.008	0.005	-0.130	0.094
HISPANIC	-0.011	0.007	-0.140	0.113
ASIAN	-0.020	0.007	-0.235	0.171
AGE2	0.00004*	0.000001	-0.00006*	0.0001
AGEPERCENT	-0.409*	0.066	-1.160	1.131
MARRIED	0.013*	0.005	-0.013	0.074
GOOD	0.044*	0.006	0.301*	0.078
FAIR	0.113*	0.020	1.081*	0.114
POOR	0.225*	0.020	3.517*	0.185
BORNUSA	0.016*	0.007	0.075	0.111
HSGRAD	0.001	0.006	0.123	0.100
SOMECOL	-0.005	0.007	0.086	0.111
ASSOCBA	0.005	0.007	0.209	0.110
GRADDEG	0.002	0.010	0.170	0.151
STROKE	0.098*	0.016	2.358*	0.151
CANCER	0.061*	0.009	0.821*	0.130
N	19,543		19,529	
R^2	0.102		0.056	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 23. Correlation coefficients for frequency of ER and doctor's visits.

	FREQER		**FREQDR**	
Variable Name	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
MEDICARE	0.076*	0.024	0.863*	0.063
MEDICAID	0.242*	0.022	1.244*	0.057
PRIVATE	-0.015	0.015	0.622*	0.039
OTHER GOV'T INS	0.109*	0.044	0.705*	0.114
MILITARY INSURANCE	0.044	0.032	0.951*	0.083
INCLESS20k	0.023	0.021	-0.221*	0.054
INC. Between 20k-45k	0.047*	0.018	-0.136*	0.046
INC. Between 45k-75k	0.020	0.018	-0.054	0.047
MIDWEST	-0.036*	0.018	-0.208*	0.047
SOUTH	-0.046*	0.017	-0.263*	0.043
WEST	-0.067*	0.018	-0.245*	0.048
FEMALE	0.061*	0.011	0.713*	0.030
BLACK	0.041*	0.016	-0.302*	0.043
HISPANIC	-0.061*	0.020	-0.195*	0.051
ASIAN	-0.063*	0.030	-0.355*	0.077
AGE2	0.00006*	0.00002	-0.00003	0.00006
AGEPERCENT	-1.044*	0.197	0.245	0.510
MARRIED	-0.016	0.013	0.060*	0.035
GOOD	0.151*	0.014	0.581*	0.035
FAIR	0.400*	0.020	1.533*	0.052
POOR	0.871*	0.032	2.477*	0.084
BORNUSA	0.088*	0.019	0.201*	0.050
HSGRAD	-0.029	0.017	0.115*	0.045
SOMECOL	0.005	0.019	0.424*	0.050
ASSOCBA	-0.007	0.019	0.445*	0.050
GRADDEG	-0.047	0.026	0.535*	0.068
STROKE	0.370*	0.035	0.742*	0.059
CANCER	0.093*	0.023	0.857*	0.141
N	19,405		19,325	
R^2	0.106		0.225	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 24. Correlation coefficients for more than 10 doctor's visits.

Variable Name	Coefficient	Std. Error
MEDICARE	0.069*	0.011
MEDICAID	0.110*	0.012
PRIVATE	0.033*	0.006
OTHER GOV'T INS	0.066*	0.022
MILITARY INSURANCE	0.074*	0.016
INCLESS20k	-0.011	0.008
INC. Between 20k-45k	-0.011	0.007
INC. Between 45k-75k	-0.003	0.007
MIDWEST	-0.012	0.007
SOUTH	-0.016*	0.006
WEST	-0.011	0.007
FEMALE	0.049*	0.005
BLACK	-0.027*	0.006
HISPANIC	-0.014	0.008
ASIAN	-0.015	0.012
AGE2	-0.00002*	0.000001
AGEPERCENT	0.162*	0.076
MARRIED	-0.019*	0.005
GOOD	0.085*	0.007
FAIR	0.278*	0.013
POOR	0.483*	0.022
BORNUSA	0.025*	0.007
HSGRAD	0.008	0.007
SOMECOL	0.050*	0.009
ASSOCBA	0.053*	0.009
GRADDEG	0.049*	0.013
STROKE	0.106*	0.017
CANCER	0.073*	0.010
N	19,527	
R^2	0.169	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 25. Correlation coefficients for instance and frequency of surgery.

	SURGERY		**FREQSRG**	
Variable Name	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
MEDICARE	0.043*	0.011	0.104*	0.015
MEDICAID	0.070*	0.011	0.107*	0.014
PRIVATE	0.039*	0.006	0.052*	0.009
OTHER GOV'T INS	0.057*	0.023	0.076*	0.027
MILITARY INSURANCE	0.059*	0.016	0.076*	0.020
INCLESS20k	-0.004	0.009	-0.005	0.013
INC. Between 20k-45k	0.001	0.009	0.007	0.011
INC. Between 45k-75k	-0.0002	0.007	0.003	0.011
MIDWEST	0.012	0.008	0.008	0.011
SOUTH	0.006	0.007	-0.005	0.010
WEST	-0.008	0.008	-0.020	0.011
FEMALE	0.036*	0.005	0.036*	0.001
BLACK	-0.033*	0.006	-0.062*	0.010
HISPANIC	-0.027*	0.008	-0.042*	0.012
ASIAN	-0.039*	0.011	-0.063*	0.019
AGE2	0.000001	0.000008	-0.00003*	0.00001
AGEPERCENT	-0.007	0.079	0.203	0.123
MARRIED	0.009	0.005	0.008	0.008
GOOD	0.042*	0.006	0.062*	0.019
FAIR	0.067*	0.010	0.106*	0.012
POOR	0.129*	0.018	0.237*	0.020
BORNUSA	0.034*	0.007	0.035	0.012
HSGRAD	0.004	0.007	0.015	0.012
SOMECOL	0.021*	0.009	0.042*	0.012
ASSOCBA	0.011	0.008	0.033*	0.012
GRADDEG	0.023*	0.012	0.041*	0.016
STROKE	0.016	0.014	0.037	0.016
CANCER	0.126*	0.012	0.226*	0.014
N	19,414		19,412	
R^2	0.058		0.054	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 26. Correlation coefficients for whether a nurse or physician's assistant (NURSEPA), general MD, or specialist was seen.

	NURSEPA		GENERALMD		SPECIALIST	
Variable Name	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
MEDICARE	0.032*	0.011	0.130*	0.014	0.133*	0.014
MEDICAID	0.046*	0.011	0.185*	0.010	0.100*	0.014
PRIVATE	0.024*	0.006	0.181*	0.009	0.105*	0.008
OTHER GOV'T INS	0.053*	0.023	0.192*	0.017	0.101*	0.029
MILITARY INSURANCE	0.135*	0.019	0.172*	0.015	0.140*	0.021
INCLESS20k	-0.006	0.009	-0.081*	0.013	-0.048*	0.011
INC. Between 20k-45k	-0.005	0.008	-0.059*	0.011	-0.047*	0.009
INC. Between 45k-75k	-0.005	0.007	-0.028*	0.011	-0.027*	0.011
MIDWEST	0.009	0.008	-0.060*	0.012	-0.030*	0.010
SOUTH	-0.025*	0.007	-0.084*	0.011	-0.018*	0.009
WEST	0.031*	0.009	-0.078*	0.012	-0.042*	0.010
FEMALE	0.077*	0.005	0.095*	0.007	0.019*	0.006
BLACK	-0.058*	0.006	0.021*	0.010	-0.074*	0.008
HISPANIC	-0.061*	0.007	-0.023	0.012	-0.028*	0.011
ASIAN	-0.052*	0.010	-0.050*	0.019	-0.056*	0.011
AGE2	0.000004	0.00001	-0.00003*	0.00001	-0.00006*	0.00001
AGEPERCENT	-0.197*	0.084	0.037	0.128	0.829*	0.111
MARRIED	0.015*	0.006	0.016	0.008	-0.007	0.007
GOOD	0.032*	0.006	0.069*	0.008	0.108*	0.008
FAIR	0.115*	0.011	0.122*	0.011	0.226*	0.013
POOR	0.182*	0.021	0.177*	0.015	0.375*	0.021
BORNUSA	0.059*	0.007	0.020	0.012	0.048*	0.010
HSGRAD	0.026*	0.009	0.020	0.011	0.035*	0.010
SOMECOL	0.081*	0.011	0.082*	0.011	0.095*	0.012
ASSOCBA	0.088*	0.010	0.060*	0.011	0.094*	0.012
GRADDEG	0.121*	0.016	0.065*	0.015	0.126*	0.017
STROKE	0.058*	0.017	0.089*	0.023	0.109*	0.021
CANCER	0.036*	0.010	0.081*	0.014	0.194*	0.014
N	19,401		19,405		19,405	
R^2	0.078		0.112		0.133	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 27. Correlation coefficients for whether the usual location of care was listed as the ER or a free clinic.

	ER		Free Clinic	
Variable Name	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
MEDICARE	-0.002	0.001	-0.038*	0.011
MEDICAID	-0.004*	0.001	-0.001	0.011
PRIVATE	-0.015*	0.002	-0.109*	0.009
OTHER GOV'T INS	-0.004*	0.001	0.107*	0.026
MILITARY INSURANCE	-0.003	0.001	0.123*	0.020
INCLESS20k	0.007*	0.003	0.104*	0.013
INC. Between 20k-45k	0.006*	0.003	0.069*	0.011
INC. Between 45k-75k	0.001	0.002	0.025*	0.011
MIDWEST	-0.002	0.001	0.164*	0.012
SOUTH	-0.001	0.001	-0.015	0.010
WEST	-0.003*	0.001	0.089*	0.012
FEMALE	-0.003*	0.001	-0.003	0.006
BLACK	0.008*	0.002	-0.016	0.009
HISPANIC	0.005*	0.002	0.022*	0.011
ASIAN	-0.002	0.002	-0.023	0.015
AGE2	0.000002	0.000002	-0.00001	0.00001
AGEPERCENT	-0.00001	0.014	-0.032	0.104
MARRIED	-0.001	0.001	-0.005	0.007
GOOD	0.001	0.001	0.019*	0.008
FAIR	0.002	0.002	0.014	0.011
POOR	0.002	0.003	0.002	0.016
BORNUSA	0.002	0.001	-0.045*	0.012
HSGRAD	-0.001	0.001	-0.022*	0.009
SOMECOL	-0.002*	0.001	-0.034*	0.009
ASSOCBA	-0.002	0.001	-0.036*	0.010
GRADDEG	-0.002	0.002	-0.034*	0.013
STROKE	0.002	0.003	-0.012	0.017
CANCER	-0.001	0.002	0.012	0.012
N	16,258		16,258	
R^2	0.177		0.088	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 28. Correlation coefficients for whether the usual location of care was listed as a doctor's office or outpatient clinic.

	Doctor's Office		Outpatient Clinic	
Variable Name	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
MEDICARE	0.055*	0.012	-0.0002	0.003
MEDICAID	0.045*	0.011	-0.001	0.002
PRIVATE	0.180*	0.010	-0.011	0.002
OTHER GOV'T INS	-0.066*	0.026	-0.0004	0.004
MILITARY INSURANCE	-0.200*	0.022	0.066	0.012
INCLESS20k	-0.139*	0.014	0.004	0.003
INC. Between 20k-45k	-0.09*	0.012	0.002	0.003
INC. Between 45k-75k	-0.026*	0.012	0.0003	0.003
MIDWEST	-0.152*	0.012	-0.002	0.002
SOUTH	0.031*	0.010	-0.008	0.002
WEST	-0.077*	0.012	-0.004	0.002
FEMALE	0.034*	0.007	-0.006	0.002
BLACK	-0.001	0.010	0.013	0.003
HISPANIC	-0.011*	0.012	0.016	0.004
ASIAN	0.015	0.017	0.014	0.007
AGE2	0.00002	0.00001	-0.000004*	0.000002
AGEPERCENT	0.058	0.115	0.033	0.024
MARRIED	0.019*	0.008	-0.005	0.002
GOOD	-0.019*	0.008	0.004	0.002
FAIR	-0.022	0.012	0.006	0.003
POOR	0.001	0.018	0.003	0.004
BORNUSA	0.060*	0.013	-0.004	0.003
HSGRAD	0.026*	0.010	-0.001	0.002
SOMECOL	0.048*	0.010	-0.004	0.002
ASSOCBA	0.040*	0.011	-0.001	0.002
GRADDEG	0.034*	0.015	0.005	0.004
STROKE	0.001	0.019	0.005	0.004
CANCER	-0.012	0.013	-0.0002	0.003
N	16,258		16,258	
R^2	0.114		0.129	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 29. Correlation coefficients for whether the pneumonia or the Hepatitis B vaccine was received (preventative care proxy).

	Pneumonia Vaccine		**Hepatitis B Vaccine**	
Variable Name	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
MEDICARE	0.017*	0.013	0.033*	0.016
MEDICAID	0.042*	0.011	0.054*	0.014
PRIVATE	0.030*	0.007	0.042*	0.009
OTHER GOV'T INS	0.047**	0.024	0.093*	0.029
MILITARY INSURANCE	0.119*	0.019	0.202*	0.023
INCLESS20k	0.014	0.010	-0.011	0.012
INC. Between 20k-45k	0.029*	0.009	-0.006	0.010
INC. Between 45k-75k	0.018*	0.009	-0.002	0.010
MIDWEST	0.012	0.009	0.010	0.011
SOUTH	0.005	0.008	-0.019*	0.010
WEST	0.020*	0.009	-0.019	0.011
FEMALE	0.009	0.005	0.064*	0.007
BLACK	-0.030*	0.007	0.029*	0.010
HISPANIC	-0.035*	0.008	-0.022	0.011
ASIAN	-0.036*	0.012	0.038*	0.018
AGE2	0.00004*	0.000001	-0.000006	0.00001
AGEPERCENT	0.041	0.089	-0.921*	0.126
MARRIED	-0.007*	0.006	-0.017*	0.008
GOOD	0.037*	0.007	0.007	0.008
FAIR	0.057*	0.010	0.014	0.013
POOR	0.128*	0.019	0.021	0.022
BORNUSA	0.023*	0.009	0.046*	0.011
HSGRAD	0.032*	0.008	0.050*	0.012
SOMECOL	0.046*	0.010	0.133*	0.013
ASSOCBA	0.052*	0.010	0.174*	0.013
GRADDEG	0.042*	0.014	0.243*	0.019
STROKE	0.009	0.013	0.003	0.023
CANCER	0.064*	0.011	0.009	0.015
N	18,976		18,613	
R^2	0.255		0.116	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

* indicates statistical significance at the $p < 0.05$ level

** indicates statistical significance at the $p < 0.10$ level

Table 30. Correlation coefficients for amount spent on health care and the private premium.

	AMNTSPENTHC		PRIVPREMIUM	
Variable Name	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
MEDICARE	0.051	0.034	-747.727	146.346
MEDICAID	-0.384*	0.031	162.678	409.570
PRIVATE	-0.014	0.021		
OTHER GOV'T INS	-0.250*	0.061	535.027	1449.303
MILITARY INSURANCE	-0.287*	0.045	-486.034	274.533
INCLESS20k	-0.618*	0.029	-505.708	118.533
INC. Between 20k-45k	-0.310*	0.025	-532.268	84.276
INC. Between 45k-75k	-0.180*	0.025	-517.559	79.117
MIDWEST	0.144*	0.026	-97.996	93.175
SOUTH	0.157*	0.023	67.488	88.242
WEST	0.097*	0.026	189.266	99.350
FEMALE	0.106*	0.016	38.945	38.775
BLACK	-0.283*	0.023	-415.573	91.771
HISPANIC	-0.218*	0.027	--294.931	110.725
ASIAN	-0.267*	0.042	-5.400	160.602
AGE2	-0.00004	0.00003	0.135	0.129
AGEPERCENT	0.712*	0.276	2.975	1187.095
MARRIED	0.350*	0.018	1082.704	65.966
GOOD	0.207*	0.019	-68.898	70.475
FAIR	0.410*	0.028	304.847	115.484
POOR	0.643*	0.045	816.416	232.993
BORNUSA	0.002	0.027	-50.295	108.060
HSGRAD	0.028	0.024	83.587	108.582
SOMECOL	0.139*	0.027	232.920	115.088
ASSOCBA	0.142*	0.027	152.288	109.559
GRADDEG	0.187	0.037	105.778	134.617
STROKE	0.091*	0.049	-158.993	201.045
CANCER	0.220*	0.032	114.616	110.725
N	19,311		7521	
R^2	0.154		0.081	

Data gathered from the NHIS 2006

All regressions also controlled for geographic region, gender, race, age, marital status, birth in the United States, and education

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** indicates statistical significance at the $p < 0.10$ level