Health Insurance Literacy and Health Insurance Choices: Evidence from Affordable Care Act Navigator Programs

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Abstract

Consumers frequently make poor choices related to health insurance, such as signing up for dominated plans (in which they pay more for equivalent or worse coverage) or failing to enroll in Medicaid (which provides coverage free of charge). Billions of dollars of federal funding were spent on programs to help consumers understand their health insurance options and enroll in health insurance after the Affordable Care Act, but little is known about the effects of these programs. In particular, economists may worry that these programs could exacerbate adverse selection in private markets if they mainly helped high-cost patients self-select into insurance. Using data on the differential patterns of funding of navigator programs across states and over time, I show that generous navigator programs were associated with increased insurance uptake but similar or decreased spending per insured patient. To explain this lack of adverse selection, I use two additional national data sets to show that patients with low health insurance literacy report higher barriers to care than other patients, including barriers to using their insurance once insured.

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Introduction

The Affordable Care Act (ACA) sought to increase health insurance coverage using a consumer-directed model, wherein uninsured consumers select and apply for their own health insurance coverage. Yet consumers frequently make poor choices related to health insurance, such as signing up for dominated plans (in which they pay more for equivalent or worse coverage) or failing to enroll in Medicaid (which provides coverage free of charge) (Heiss et al., 2013; Stuber and Bradley, 2005; Sinaiko and Hirth, 2011a; Sommers and Epstein, 2010). To address this problem, the federal government spent billions of dollars to implement navigator programs[1] which provided consumers wishing to enroll in health insurance coverage with one-on-one, in-person help with the process free of charge (Grob et al., 2013). During the first open enrollment period more than 28,000 full-time-equivalent staff and volunteers across over 4,400 assister programs helped an 10.6 million people with shopping for private health insurance or signing up for Medicaid (Pollitz et al., 2014). However, little is known about the effects of these programs.

To fill this gap in the literature, this paper examines the relationship between generously funded navigator consumers on health insurance enrollment and health care expenditures. My analysis is timely. Recent developments have further increased the complexity of the health insurance selection process consumers must navigate. New rules from February 20th, 2018 will expand the availability of health plans exempt from ACA minimum coverage requirements, such as covering prescription medications or hospital care; these plans can also reimpose lifetime or annual limits on coverage (Keith, 2018). Patients with low health insurance literacy may not immediately understand that these "bare bones" plans will provide little coverage if they become sick. At the same time, funding for programs that assist consumers with health insurance enrollment were cut under the Trump administration, from $62.5 million in 2016 by about 40 percent to $36.8 million for 2017 (Jost, 2017). Before discontinuing funding for navigator programs, policy-makers should consider whether these programs make a difference to consumers or health care markets.

The welfare consequences of navigator programs are ex ante unclear, because helping patients pick the best health insurance for themselves could have adverse consequences for health insurance markets as a whole. One particular concern is adverse selection, a phenomenon wherein patients sort into more generous insurance plans based on risk factors that are not priced into their premiums (Chiappori and Salanie, 2000; Pauly, 1974; Rothschild and Stiglitz, 1976; Wilson, 1977). When adverse selection compounds over time, there can be

[1] In various states, assisters were termed navigators or in-person assisters; assisters that were officially recognized but did not receive government funding were termed certified application counselors. I will use the term "navigator" to refer to all of these categories together.

major implications for how well a health insurance market can function. In the extreme case (the so-called adverse selection death spiral), only seriously ill people purchase health insurance and health insurance premiums become exorbitantly expensive (Cutler and Zeckhauser, 1998; Ettner, 1997; Hackmann et al., 2012b; Marquis, 1992; Neudeck and Podczeck, 1996; Riley et al., 2009; Sapelli and Vial, 2003; van de Ven and van Vliet, 1995; Spenkuch, 2012). To address this concern, I analyze the impact of navigator programs not only on health insurance take-up but also on health insurance expenditures per insured person. If health care spending per insured patient increased more in states with more generously funded navigator programs, this would be consistent with a hypothesis that navigator programs can exacerbate adverse selection into health insurance (Chiappori and Salanie, 2000; Hackmann et al., 2012a, 2014). This is particularly important given the role adverse selection can play in destabilizing health insurance markets, potentially undermining the welfare benefits of providing patients with information (Handel, 2013; Handel and Kolstad, 2015).

My analysis uses novel data on the funding of government programs to help consumers enroll in insurance, complemented with three national datasets on health insurance literacy, health insurance uptake, and health care expenditures. I leverage these rich datasets to address three main research goals. First, I examine the characteristics of patients with low health insurance literacy, and use this information to generate hypotheses about the health insurance coverage and utilization choices we might expect if this group of patients received assistance in purchasing insurance. Second, I asses whether generous funding for navigator programs associated with increased uptake of health insurance coverage. Third, I assess whether generous funding for navigator programs associated with increased expenditure per insured patient. My main analytic strategy exploits variation in funding across states and over time, which occurred due to idiosyncracies in funding of certain federal funding streams.

I begin by presenting contextual analyses about patients with low health insurance literacy. In a theoretical analysis, I show that as long as patients with low health insurance literacy do not sufficiently overestimate the generosity of insurance on average, they will be less likely to purchase health insurance at any given premium level and risk level. This argument is based on the concavity of the utility function and Jensen's inequality. This implies that effective navigator programs could prevent "under-enrollment," wherein patients with low health insurance literacy fail to enroll in health insurance but would have enrolled had they fully understood their options. Yet, some patients with low health insurance literacy - those who do not understand what deductibles are, for example - could have greatly over-estimated the risk protection provided by health insurance prior to clarification by a navigator. For these patients, navigator programs could prevent "over-enrollment" in health insurance these patients deem to be not worth the out-of-pocket premium outlays. Based

on these findings, I conclude that it is unclear ex ante whether navigators would increase or decrease uptake of health insurance.

Second, I consider how navigator programs - i.e., programs that help patients with low health insurance literacy shop and apply for insurance - could change the composition of patients in private insurance and Medicaid by analyzing the characteristics of patients with low health insurance literacy. I use data from two national surveys, the Understanding America Study (UAS) and the Health Reform Monitoring Survey (HRMS). In both surveys, participants with low health insurance literacy report higher barriers to care than other participants. As one specific example of barriers to care, patients who reported low health insurance literacy in the HRMS were 20-30 percentage points more likely to feel uncomfortable using their insurance once insured - including tasks such as finding an in-network provider, understanding whether prescriptions or services are covered by their insurance, or assessing the cost they would face for services. If participants who have low health insurance literacy experience barriers to using their health insurance, they might use *less* health care after gaining insurance than other patients.

Based on these patterns of findings in the UAS and HRMS data, it is unclear ex ante whether or not navigator programs would be expected to attract additional, high-cost patients into health insurance. I therefore investigate this issue empirically using restricted access Medical Expenditure Panel Survey (MEPS) with geographic identifiers paired with data on the differential patterns of funding of navigator programs across states during 2010-2015. I use a difference-in-differences method, wherein changes over time in states that received the most generous of the three types of federal navigator grants are compared with changes over time in states that did not. To avoid conflating the impact of navigator programs with the impact of concurrent Medicaid eligibility expansions, I restrict the sample to include only Medicaid expansion states. This implies that because both treated and comparison states expanded Medicaid, any differences between the groups cannot be explained by Medicaid expansions alone. I also test whether average health care expenditures among insured patients increase after insurance coverage expands, which is a standard test for asymmetric information in insurance markets (Chiappori and Salanie, 2000; Hackmann et al., 2012a, 2014).

I find that generous navigator programs were associated with additional uptake of health insurance, beyond temporal trends. In particular, states with more generously funded navigator programs showed an additional 2.5 percentage point increase in insurance uptake. The chief source of this increase was an additional uptake of Medicaid insurance, consistent with the "no wrong door" policy wherein navigators were encouraged to assist with Medicaid enrollment as well as private insurance. This finding also matches the high rates of Medicaid

eligibility I find among patients with low health insurance literacy, and the restriction of my sample to Medicaid expansion states.[2]

Examining which type of patients were drawn into insurance by the navigator program, I find no evidence that navigator programs disproportionately attracted high-cost patients into insurance. Rather, non-significant trends indicate the possibility of a sort of *advantageous* selection, as total spending on health care services per insured patient was *lower* in states with more generously funded navigator programs by \$546.30 ($p<0.1$). Analyzing spending by category, I find that this seems to be driven by spending on prescriptions, including a decline in number of prescriptions filled. Total spending on prescriptions per insured patient was \$282.30 lower ($p<0.05$) in states with more generously funded navigator programs. This gap in spending on prescriptions was significant at the 5% level for patients with Medicaid insurance, and significant at the 10% level for patients with private insurance.

Why might patients who became insured after implementation of generous navigator programs have lower health care spending? I consider several possible explanations. First, patients who gain health insurance after generous navigator programs are implemented might be healthier. However, this explanation faces the problem that patients with lower health insurance literacy in the UAS and HRMS data had lower self-reported physical and mental health, lower education, and were more likely to smoke. Additionally, the MEPS data show no evidence that patients who become insured after implementation of generous navigator programs reported better health. A second possible explanation is that patients who shop for insurance with navigator programs could gravitate towards less generous insurance than other patients, such as insurance that offers poorer coverage of prescriptions. However, my results related to private sector plans are unchanged when I adjust for plan characteristics such as deductibles, co-payments or scope of coverage, and I find no changes in plan selections on these margins. Furthermore, the typical person insured by navigator programs seems to have signed up for Medicaid, and Medicaid is required to cover prescriptions; Medicaid also has low or zero cost sharing for prescriptions, so it is unlikely that patients were discouraged from filling prescriptions by cost barriers.

Finally, another explanation for the findings could be that navigator programs signed up patients to health insurance who subsequently experienced barriers to using their coverage successfully. This has face validity for several reasons. First, low health insurance literacy could be a rational response to barriers to care. Patients might rationally decide not to invest time learning about health insurance if they know they have limited access to a provider who speaks their language or lives in their neighborhood even if insured. Second,

[2]In future drafts, I will consider another stratified analysis of only non-expansion states and compare states with vs. without restrictions on navigator activities.

the HRMS data show that insured patients with low health insurance literacy are more likely to struggle with finding an in-network provider or specialist, or assessing whether they can afford their cost-sharing for a particular service - tasks which require health insurance literacy. If these channels underlie my results, this could underscore the importance of re-funding post-enrollment consumer assistance programs (CAP grants), which were established with $30 million in seed funding under the ACA to help patients use their new insurance. These programs have not been allocated new funds to my knowledge since 2014.

This analysis contributes to the small but growing literature on health insurance literacy, which bridges important gaps between the health insurance theory and the practical issues encountered by real patients (Bhargava et al., 2015; Handel, 2013; Abaluck and Gruber, 2016). Classic theoretical models of health insurance markets assume that patients understand the generosity of health insurance plans before they select one, but a majority of Americans are not comfortable with one or more key health insurance terms such as *deductible*, *premium,* and *network* (Hoerl et al., 2017; Long et al., 2014; Norton et al., 2014). At the same time, an estimated 20-50% of patients eligible for free insurance via Medicaid do not complete steps to enroll (Sommers and Epstein, 2010). A study of navigator programs has two key advantages for understand how health insurance choices change when gaps in literacy and barriers to enrollment are addressed in a real-world setting. First, navigators' clients faced substantial barriers in processing their health insurance options. Over 80% of navigator programs reported that most or nearly all consumers who sought help didn't understand the coverage choices offered them or lacked confidence to apply on their own. Second, navigators provided in-depth, customized assistance to each client rather than a light-touch intervention: 64% of navigator programs reported that they spent on average 1-2 hours helping each client in person (Pollitz et al., 2014, 2015, 2016).

The remainder of the paper proceeds as follows. Section 1 reviews the literature on evidence of poor health insurance purchases and low health insurance literacy, describes that federally-funded navigator programs established under the ACA, and reviews the current policy relevance of the topic. Section 2 presents my research questions alongside contextualizing analyses. Section 3 outlines the research design used in my main analysis. Section 4 presents the results, and section 5 concludes.

1 Literature review

1.1 Health insurance literacy and health insurance selections

Consumers often "leave money on the table" when choosing their health insurance plans and sometimes choose dominated plans (Heiss et al., 2013; Sinaiko and Hirth, 2011b). This issue has been explored using data from the Medicare Part D market (Abaluck and Gruber, 2011; Sinaiko and Hirth, 2011a; Zhou and Zhang, 2012; Ho et al., 2015; Abaluck and Gruber, 2016; Ericson and Starc, 2016) and using data from large employers (Handel, 2013; Bhargava et al., 2015; Handel and Kolstad, 2015). Consumer inertia and/or switching costs play an important role in preventing effective consumer decision making (Handel, 2013; Abaluck and Gruber, 2016; Ericson and Starc, 2016). Consumers who choose dominated plans seem to place excessive weight on plan premiums or redundant plan features relative to underlying medical costs (Abaluck and Gruber, 2011; Zhou and Zhang, 2012). Older consumers and consumers with limited cognitive ability are at higher risk for this sort of overspending on their health insurance plans; Asians and whites are the racial/ethnic groups most likely to overspend (Fang et al., 2008; Zhou and Zhang, 2012).

A number of surveys in the United States have highlighted consumers' gaps in health insurance literacy, defined as the "capacity to find and evaluate information about health plans, select the best plan given financial and health circumstances, and use the plan once enrolled" (Roundtable, 2012). Surveys have found that the majority of Americans are uncomfortable with one or more key terms used to define health insurance plan generosity, such as "provider network," "annual health insurance deductible," and "health insurance premium," and only 50% were able to correctly calculate out-of-pocket costs for a hospital stay with a given deductible and copay; participants who are linguistic or racial minorities, or who have less than a high school education are particularly likely to demonstrate or report low health insurance literacy in these surveys (Long et al., 2014; Norton et al., 2014). In a survey with a sample of 3,414 adults aged 18-64 in August and September 2013, 42 percent respondents could not correctly describe the definition of deductible and one half of respondents did not know about the ACA health insurance exchanges (Barcellos et al., 2014). In a Kaiser Family Foundation (KFF) survey from October 2014 assessing Americans' familiarity with health insurance terms and concepts, most people (79 percent) knew the definition of health insurance premium, deductible (72 percent) and out-of-pocket limit (67 percent). However, only about half of respondents correctly calculated the out-of-pocket cost for a hospital stay involving a deductible and copay, and only 16 percent respondents calculated the cost of an out-of-network lab test with a capped allowable charge (Foundation, 2014).

Many consumers struggle to shop for and use health insurance. Based on data from the

Health and Retirement Study (HRS), Levy and Janke (2016) found that individuals with low health literacy are more likely to delay getting care and have more difficulty finding providers. Data collected from non-elderly adults in June 2014 Health Reform Monitoring Survey (HRMS) indicates that only 11.2 percent of respondents rate their literacy as less than very good or excellent, and 36.8 percent rate their numeracy as less than very good or excellent. When navigating the health insurance system, about 40 percent of respondents with limited self-reported literacy and numeracy have difficulty in finding information on health plans (Long et al., 2014). In a survey that simulates the 2016 HealthCare.gov enrollment experience among 374 American adults, participants correctly answered an average of 75.9 percent of the questions about health insurance concepts but only 27.6 percent of participants answered all the six questions correctly (Wang et al., 2016). Regarding to problems consumers have experienced with their health insurance plan, another KFF survey from February 9 through March 26, 2016 among non-group health insurance enrollees indicates that 36 percent of respondents found their plan paid less than they expected for a medical bill, and 26 percent of respondents found the plan would not cover a prescription drug that a doctor prescribed (Foundation, 2016).

The consumers most likely to suffer from low health insurance literacy are the low-income and uninsured, which also happen to be two key populations targeted by the ACA (Barcellos et al., 2014). Surveys conducted prior to Medicaid eligibility expansions and the implementation of the ACA health insurance marketplaces found that low health insurance literacy was much more common among people at the bottom of the income distribution (100-250% of federal poverty level) and among those currently uninsured (Barcellos et al., 2014; Wang et al., 2016). People with low health insurance literacy also tended to lack experience with the health care system and were more likely to be uninsured even after the implementation of the health insurance marketplaces (Hoerl et al., 2017).

1.2 Incomplete uptake of Medicaid coverage

Prior to the ACA, many patients eligible for free insurance via the Medicaid program remained unenrolled. Using data from the Current Population Survey (CPS) from 2007-2009, Sommers and Epstein (2010) sought to examine participation in Medicaid among adults ages 19-64 (including those with disabilities). They found that among eligible adult U.S. citizens without private health insurance, 62% percent currently participate in the program. Participation rates varied by state, and range from less than 44% in Oklahoma, Oregon, and Florida to over 80% in Massachusetts and Washington, DC. Non-Hispanic Black patients and patients with physical health problems were the most likely to not enroll (Stuber and

Bradley, 2005).

Research from prior to the Affordable Care Act indicates that outreach workers can help to increase Medicaid enrollment by assisting with paperwork and providing translation services (Aizer, 2003). Navigator assistance under the Affordable Care may be particularly helpful given the national "no wrong door" policy, which requires states to accept Medicaid enrollment applications from multiple sources including via the online marketplaces.

1.3 Health insurance decision-making in the ACA marketplaces

A number of studies have focused on the design of ACA online health insurance marketplaces and tested which decision support tools are most effective in helping consumers choose optimal plans.

The design architecture of the ACA online health insurance marketplaces can make it easy for consumers with lower numeracy to make mistakes. Ubel et al. (2015) conducted a survey with people taking public buses in Durham, North Carolina. Most participants who were below the median in mathematical ability said they preferred gold plans over bronze plans, regardless of which plan was labeled as gold. The authors also suggested that government should de-emphasize the cognitively overwhelming details of monthly premiums, which draw attention away from other financially important features such as copayments and deductibles. Wong et al. (2016) examined HealthCare.gov and all 12 state-based marketplace websites during the first and second open enrollment periods and reached a similar conclusion. They found most (10) websites presented plans with the cheapest premium first and the most expensive premium last. 3 states had out-of-pocket cost estimators and 6 websites included an integrated decision-support tools. The authors argued that ordering plans based on their monthly premium, rather than by a global measure, could have increased the premium's influence on consumer choices during the first two years of the online health insurance marketplaces. Wong C, Nirenburg G, Polsky D, Town R (2015) found that a richer set of decision support tools were available to consumers online during in the third open enrollment period, including newly adopted tools on the state-based Marketplaces as well as HealthCare.gov, but the impact of these support tools has not yet been assessed.

Research from after the ACA indicates that highlighting intuitive features other than premiums, such as dental coverage, can also encourage uptake of free Medicaid insurance. Hom et al. (2017) conducted an experiment mailing outreach letters to 32,993 adults in Philadelphia that encouraged them to enroll in Pennsylvania's expanded Medicaid program, and found that messages emphasizing the dental benefits of insurance had higher response rates.

Finally, a randomized survey found no evidence that consumers with low health insurance literacy show any systematic preference for one particular structure of information presentation. Politi et al. (2016) conducted a survey with participants who were uninsured and lived in the St. Louis area. Participants were randomized to one of three conditions about insurance plans options: 1) plan-specific information presented in a plain language table; 2) a visual strategy that included graphics and separated information in plain language; and 3) a narrative strategy with both the plain language table and vignettes about how others used and rated the plans. The researchers found participants across conditions made value-consistent choices. People with adequate health insurance literacy preferred the plain language table to the visual and visual to narrative conditions, while those with inadequate health insurance literacy showed no systematic preference for study condition. Instead, each consumer might have his or her own preference for how he or she would like information to be conveyed.

1.4 Federally-funded navigator programs established under the ACA

Recognizing the challenges with health insurance literacy, navigators and assister roles were created and funded by the ACA to provide in-person outreach, education and enrollment assistance with shopping in the health insurance marketplaces (Skinner, 2014). There are several types of navigators and assisters performing similar functions across the health insurance marketplaces. In federally-facilitated marketplaces, which are operated by the federal government in states that did not choose to build their own marketplace, navigators contract directly with the U.S. Centers for Medicare & Medicaid Services (CMS) and provide free outreach and enrollment assistance services. State-based marketplaces which are fully operated by the state, while partnership marketplace are operated by the federal government with state ownership of some functions. States with state-based marketplaces and partnership marketplaces with consumer assistance functions also have in person assister (IPA) programs that mirror the services of the navigators in other states. Certified Application Counselors (CAC) are also available in both state-based marketplace and state partnership marketplaces (Wong et al., 2016).

These professionals all perform similar consumer assistance services, and their vital role is to help consumers prepare applications to establish eligibility and enroll in coverage through the marketplace. In this paper I consider all of these federally funded programs together, and will refer to them simply as "navigators" going forward. Unlike health insurance brokers, who assist private insurance companies in selling their products, navigators are engaged in

public education and outreach activities to help consumers shop for health insurance (Pollitz et al., 2014). Interpreting health insurance information in an easily understandable way to the general public is also their duty. Compared with the clients of brokers, navigators' clients are more likely to be Latino, uninsured, need language translation help, have an income level that would make them eligible for Medicaid in expansion states, have lower levels knowledge about the ACA and lower health insurance literacy. In the annual survey report conducted by the Kaiser Family Foundation (KFF) since 2014, navigators have helped an estimated 21.8 million consumers during the first to the third enrollment. Enrollment assistance was time intensive. In 2016, it took 90 minutes on average to help consumers enroll for the first time and 60 minutes on average to help returning consumers (Pollitz et al., 2014, 2015, 2016).

Crucially for the main research design used in this paper, navigators in different states were funding by three different streams of federal funding and access to each funding stream varied by state-level marketplace implementation. The three streams of federal funding included navigator funding, IPA funding, and community health center funding. The five partnership states with consumer assistance functions could access all three streams of federal funding, and as a result experienced the highest levels of total federal funding for navigator programs. State-based marketplaces were not eligible for the federal navigator funding, and federally facilitated marketplaces were not eligible for the IPA grants.

The IPA grants were created especially to resolve a timing problem faced by state-based marketplaces and partnership marketplaces with consumer assistance functions. These marketplaces in charge of consumer assistance functions were required to finance their own outreach and enrollment efforts, but had no income stream with which to support these efforts before they started to collect and process consumer premiums. As a result, state-based marketplaces and the five partnership states with consumer assistance functions were allowed to apply for IPA grants to give them starter funds for in-person enrollment activities. The IPA grants, which allowed states to choose and justify their own federally funded budget, were the most generous and least regulated federal funding stream for navigator programs. Ultimately, more than $3 billion was spent across the 22 eligible states. As a result, states eligible for IPA grants received an average of $39 per uninsured person in navigator funding compared with only $12 per uninsured person in other states (Act, 2014). These funding differences had important implications for program implementation: in 2014, the number of navigators per baseline uninsured person was about twice as large in states receiving IPA grants as in other states (Pollitz et al., 2014).

Finally, navigator provision was restricted in some states. At least 21 states passed regulations to limit the information navigators can relay to consumers and add standards and training requirements for individuals who want to become navigators (Skinner, 2014).

In addition to placing restrictions on navigators, all of these states except two (Indiana and Montana) decided not to expand eligibility for Medicaid.

1.5 Current policy relevance

Understanding the impact of assistance on consumers' health insurance purchases is particularly critical in the current political climate. Under the Trump administration, grants for navigators were reduced from $62.5 million in 2016 by about 40 percent to $36.8 million for 2017. Before discontinuing funding for navigator programs, policy-makers should consider whether these programs have benefits for uninsured individuals with limited health insurance literacy (Jost, 2017). The Trump administration also cut ACA advertising from $100 million for the 2017 open enrollment period by 90 percent to about $10 million for the 2017-2018 open enrollment cycle, making it more difficult for patients to learn about their options on their own (Services, 2017a).

Health insurance literacy could also shape how consumers react to potential changes in the health insurance marketplaces that have been included in efforts to weaken the ACA. An executive order by President Trump on October 12th, 2017 and following rules from February 20, 2018 expand the possible duration of short-term health based plans that are lightly regulated and do not have to cover essential health benefits. Because these "bare-bones plans" may offer skimpy coverage at a low cost, consumers with low health insurance literacy could be particularly likely to purchase these plans without fully understanding their risk for financial outlays if they become sick (Services, 2017b).

2 Research questions and hypotheses

Given recent and upcoming cuts to funding for navigator programs, policy-makers may wish to know whether there is evidence that navigator programs have had any impact on health insurance enrollment. In addition, given the potential of adverse selection to destabilize health insurance markets, policy-makers may wish to know whether navigator programs chiefly helped high-cost patients self-select into insurance. This paper addresses both these issues by investigating two key research questions:

1. Is federal funding for navigator programs associated with increased health insurance uptake?
2. If so, is funding for navigator programs associated with changes in the average health care spending among insured patients?

If health care spending per insured patient increased more in states with more generously

funded navigator programs, this would be consistent with a hypothesis that navigator programs facilitate patients' adverse selection into health insurance.

In this section, I include two analyses to provide context for these research questions. First, in a theoretical analysis, I show that as long as patients with low health insurance literacy do not sufficiently overestimate the generosity of insurance on average, they will be less likely to purchase health insurance at any given premium level and risk level. This argument is based on the concavity of the utility function and Jensen's inequality and is presented in section 2.1 below. It follows that effective navigator programs could prevent "under-enrollment," a phenomenon wherein patients with low health insurance literacy fail to enroll in health insurance but would have enrolled had they fully understood their options. As a result, I hypothesize that federal funding for navigator programs will be associated with increased health insurance uptake.

Second, I consider how navigator programs could change the composition of patients in insurance by analyzing data from two national surveys, the Understanding America Study (UAS) and Health Reform Monitoring Survey (HRMS). In the both data sources, participants with low health insurance literacy report poorer physical and mental health on average than participants with higher health insurance literacy. Because participants with low health insurance literacy report lower self-reported health, we might expect that they would use more care than other patients after gaining insurance. However, HRMS data also indicate that participants with low health insurance literacy are experience more barriers to care. For example, participants with low health insurance literacy reported more difficulty in using their health insurance to obtain needed care once insured. Based on these two opposite-signed effects, it is unclear whether navigator programs (i.e., programs that help patients with low health insurance literacy shop and apply for insurance) would be expected to produce adverse or advantageous selection into health insurance.

2.1 First contextual analysis: Uncertainty about the generosity of health insurance and uptake of health insurance

Our notation follows Meza and Webb (2001). Although I consider a single health insurance contract here, a continuum of contracts are possible.[3]

Agents act in order to maximize their expected utility, where utility is a smooth, concave function of their wealth. Agent i's initial wealth is denoted W_i.

For simplicity of exposition, I consider two health states. This simplification is not

[3]The possibility of pooling vs. separating equilibria (i.e., equilibria wherein high- vs. low-health insurance literacy types buy the same contracts vs. different contracts, or one type buys no insurance at all) will be discussed in the full analysis.

essential to my results. For agent i, the probability of remaining healthy is p_i and the probability of an adverse health event is $1 - p_i$. In the event of an adverse health event, the agent's wealth will decrease by D.

Expected utility without health insurance Without health insurance, an agent's expected utility would be as follows:

$$E\left(U_i|\text{no insurance}\right) = p_i U\left(W_i\right) + \left(1 - p_i\right) U\left(W_i - D\right) \tag{1}$$

Expected utility with health insurance of known generosity Health insurance for premium y provides pay-out of amount λy (net of the original premium payment) if an adverse health event occurs. Therefore, the expected utility of an insured individual $\underline{i}$ is:

$$E\left(U_i|\text{insurance of known generosity}\right) = p_i U\left(W_i - y\right) + \left(1 - p_i\right) U\left(W_i - D + \lambda y\right) \tag{2}$$

Given the option of purchasing health insurance of known generosity or none at all, agents will purchase if the quantity defined by equation (2) is greater than the quantity defined by equation (1). This is the decision problem faced by patients with high health insurance literacy.

Expected utility with health insurance of unknown generosity When the generosity of health insurance is unknown,

$$E\left(U_i|\text{insurance of } \mathbf{unknown} \text{ generosity}\right) = p_i U\left(W_i - y\right) + \left(1 - p_i\right) U\left(W_i - D + \tilde{\lambda} y\right) \tag{3}$$

where $\tilde{\lambda}$ is drawn from a random distribution. Without placing restrictions on the distribution, I can use the following terminology to denote the distribution's mean and standard deviation:

$$E\left(\tilde{\lambda}\right) = \mu,\ Var\left(\tilde{\lambda}\right) = \sigma$$

Given the option of purchasing health insurance of *unknown* generosity or none at all, agents will purchase if the quantity defined by equation (3) is greater than the quantity defined by equation (1). This is the decision problem faced by patients with low health insurance literacy.

Observation 2.1 *By Jensen's inequality and concavity of the utility function, agents will believe that health insurance of unknown generosity will yield lower expected utility than health insurance of known generosity, as long as agents facing insurance with unknown generosity do*

not sufficiently overestimate *the true generosity of insurance on average. That is, that is, the agent believes that* $E(U_i|$*insurance of unknown generosity*$)<E(U_i|$*insurance of known generosity*$)$ *as long as* μ *is not sufficiently higher than the true health insurance generosity* λ*.*

Observation 2.2 *Observation 2.1 plus the insurance purchase decision rules imply that - as long as agents facing insurance with unknown generosity do not sufficiently overestimate the true generosity of insurance on average - agents with low health insurance literacy will be less likely than agents with high health insurance literacy to purchase insurance at any given premium level* y *and health level* p*.*

It follows that as long as agents facing insurance with unknown generosity do not sufficiently overestimate the true generosity of insurance, effective navigator programs could prevent "under-enrollment," a phenomenon wherein patients with low health insurance literacy fail to enroll in health insurance but would have enrolled had they fully understood the generosity of the available health insurance. Yet, some patients with low health insurance literacy - those who do not understand what deductibles are, for example - could have greatly over-estimated the risk protection provided by health insurance prior to clarification by a navigator. For these patients, navigator programs could prevent "over-enrollment" in health insurance these patients deem to be not worth the out-of-pocket premium outlays. Based on these findings, I conclude that it is unclear ex ante whether navigators would increase or decrease uptake of health insurance.

2.2 Second contextual analysis: Characteristics of people with high vs. low health insurance literacy

In this sub-section, I analyze two national surveys with data on health insurance literacy and other characteristics. These data show that people with poor health insurance literacy reported worse health and lower access to care than people with high health insurance literacy.

2.2.1 Data

This analysis uses data from the Health Reform Monitoring Survey (HRMS) and the Understanding America Study (UAS). These surveys collect data on objective and subjectively measured health insurance literacy, respectively, as well as a variety of important patient characteristics.

Both surveys use an internet-based response design drawn from nationally representative sampling frame. To capture the experiences of patients with low health insurance literacy

before and after the launch of the ACA marketplaces, I combine data from the four waves of the HRMS survey which included questions on health insurance literacy. This sample includes about 7,500 participants aged 18-64 in each of the following time points: 2nd quarter 2013, 3rd quarter 2014, 3rd quarter 2015, and 1st quarter 2016. The HRMS oversampled low-income adults (Holahan and Long, 2013). The UAS panel includes approximately 6,000 participants who completed detailed surveys modeled after the Health and Retirement Survey starting in 2014. UAS participants could opt to answer additional surveys for additional compensation, and one of these modules includes objective measures of health insurance literacy. Both surveys include data on demographics, self-reported health, health insurance coverage, access to and use of health care.

The self-reported health insurance literacy question in the HRMS comprised the following text: "Some people find health insurance coverage complicated and difficult to understand. For each of the health insurance terms below, please indicate whether you are very confident, somewhat confident, not too confident, or not at all confident in how well you understand what the term means for health insurance coverage." The terms included premium, deductible, co-payment, co-insurance, maximum annual out of pocket spending, provider network, covered services, annual limits on services, and non-covered or excluded services. I constructed a binary measure wherein participants who selected "Very confident" or "Somewhat confident" were considered to have higher health insurance literacy, whereas participants who selected "Not too confident" or "Not at all confident" on the questions had lower health insurance literacy. I will show results related to premiums, deductible, co-payment, out of pocket maximum, and provider networks, but the results are not sensitive to this choice.

An objective measure of health insurance literacy was obtained in the UAS data by asking participants to demonstrate several competencies: (1) correctly identifying that premiums should be lower if deductible is higher, (2) correctly identifying that out-of-pocket costs are higher out of network, (3) knowing that PPO plans permit more provider choice than HMO plans, and (4) correctly identifying the definition of a deductible. Participants with more correct answers were deemed to have higher health insurance literacy. At another time, panel members were invited to participate in an insurance game, in which remuneration for participating was directly tied to their performance on the game. Patients with higher health insurance literacy won more money in an insurance game than people with lower health insurance literacy, providing additional evidence of the validity of the health insurance literacy measure. See Table 6 in the Appendix.

2.2.2 Findings

I find that people with poor health insurance literacy report worse health but lower use of health care contingent on need. I further demonstrate that this lower health care use contingent on need coincides with these patients' lower self-reported ability to use their insurance, once insured.

My first key finding is that participants with lower health insurance literacy reported, on average, worse health than participants with higher health insurance literacy. Both data sources ask about self-reported health; a 1-5 Likert scale was used, and I coded both surveys so that a 5 indicated good health and 1 indicated poor health.[4] In both surveys, higher health insurance literacy was correlated with better health, i.e., a higher score. Additionally, in both surveys, participants with high health insurance literacy were less likely to smoke cigarettes. See Table 1. The HRMS data additionally show that participants with high health insurance literacy had, on average, fewer unhealthy days in the past month. (This question was not asked in the UAS data.)

Additionally, patients with low health insurance literacy were more likely to report skipping necessary health care than other patients. This finding remained after subsetting the sample to only included time periods from after the ACA marketplaces, and only including patients who currently had health insurance and who reported needing health care. Even in this sub-sample, patients with low health insurance literacy were 5 percentage points more likely to claim that they had difficulty getting a needed doctor's appointment, 7-12 percentage points more likely to find that the doctor does not take their insurance, and 6 percentage points more ultimately not see a doctor despite needing care. In large part, patients with low health insurance literacy attributed this lower uptake of needed care to cost. They were 8-10 percentage points more likely to skip needed medical care due to cost, including 10-13 percentage points more likely to skip visits to a general doctor, 7-9 percentage points more likely to skip needed specialized care, 8-10 percentage points more likely to skip needed prescription drugs, and 8-9 percentage points more likely to skip recommended follow-up care due to cost.

Even after obtaining insurance, patients with low health insurance literacy reported lower confidence in their ability to successfully use their health coverage to receive needed care. In particular, they reported lower confidence in their ability to review their explanation of benefits received from the plan, figure out what counts as a preventive care service under their plan, or figure out which prescription drugs are covered by their plan. Patients with low health insurance literacy also reported lower confidence in their abilities to find a doctor

[4]Accordingly, the self-reported health categorical variables were coded as 5=Excellent, 4=Very good, 3=Good, 2=Fair and 1=Poor.

or other health provider who is in their health plan's network, figure out whether a service is covered by their plan, figure out how much it will cost to visit a health care provider or use a service, and figure out which health care costs will count toward the plan's deductible. See Table 2.

Finally, patients with lower health insurance literacy often belonged to under-served demographic groups which could result in additional non-pecuniary barriers care. In the UAS and HRMS surveys, participants with lower health insurance literacy had lower levels of income and education on average than other participants, and were more likely to be a racial, ethnic, linguistic or sexual minority, all of which present additional risk for low access to care; see Table 7 in the Appendix. In the UAS survey, participants with low health insurance literacy also scored lower on cognitive indexes and financial literacy indexes and were less likely to use the Internet regularly, as shown in Table 6 in the Appendix. Such factors might decrease patients' use of needed health care if they are associated with non-pecuniary barriers to care.

The 2013 HRMS data, based on a survey implemented just prior to implementation of the ACA marketplaces, also provide a reason to doubt that many participants with low health insurance literacy would ultimately purchase private health insurance on the exchanges. Restricting the data to include only the participants who lacked employer-based health coverage, I find that 59% of participants with low health insurance literacy (i.e., uncomfortable with one or more key health insurance terms) were income-eligible for Medicaid insurance. Therefore, it is possible that some patients who came to navigators asking for help in selecting an insurance plan might instead be assisted with an application to Medicaid.

These mixed findings in the HRMS and UAS data raise questions about whether or not helping patients with low health insurance literacy shop for insurance would help high-cost patients self-select into insurance. As such, I turn to empirical analysis in the next section to determine whether or not navigator programs were associated with changes in health insurance uptake and health care spending per insured patient.

3 Research design

I exploit variation in federal funding for navigator programs that arose because states with different types of health insurance marketplaces were eligible for different federal funding streams for their navigator programs. These funding streams were differentially generous and distributed funds at different times.

State-based marketplaces and partnership marketplaces with consumer assistance functions could propose their own navigator program budget to be funded by the IPA grant

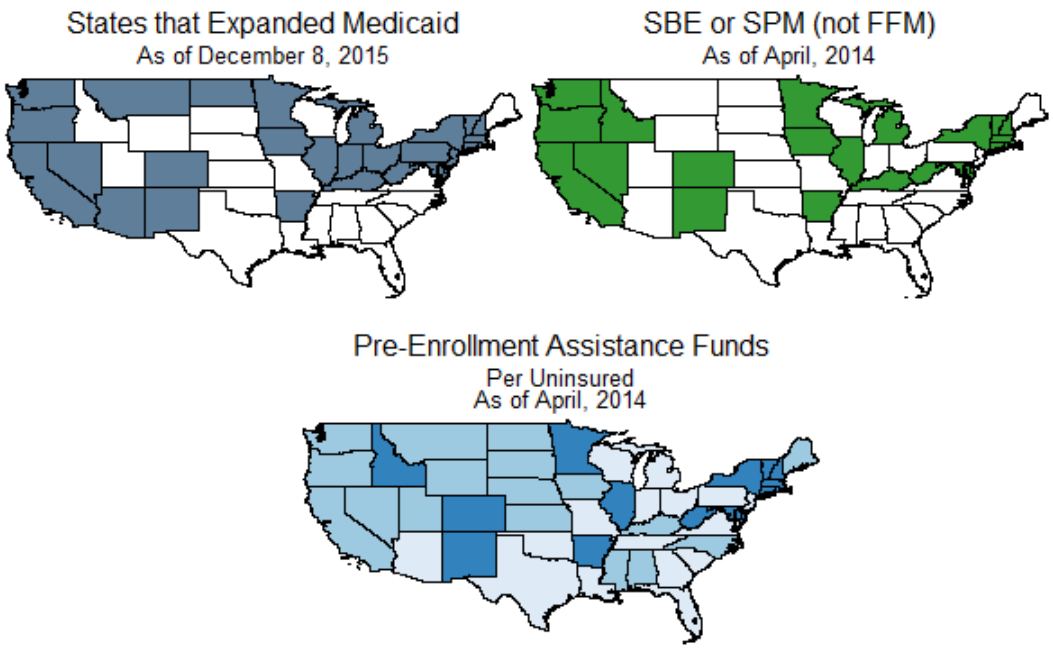
program, whereas states with other types of marketplaces were assigned funds using a more rigid formula based on population size and set minimum level of funding. Therefore, the IPA grant program helped to create a right-skewed distribution of total federal funding for navigator programs. Additionally, states in the IPA grant program received all IPA funds before the start of the first open enrollment period, whereas other funds were distributed slowly on an annual basis.

As a result, the states that were not eligible for IPA grants had received much more funding for their navigator programs even in the first open enrollment cycle, even after taking into account the size of their population in need of help. To illuminate this point, let's consider the number of dollars distributed divided by the number of uninsured people in the state before the first open enrollment period (one proxy for the size of the population in need of help in the state). States that did not receive IPA grants received an average of $12 in federal funding for navigator programs for each baseline uninsured person by 2014 (median: $10), whereas states receiving IPA grants received an average of $39 for each baseline uninsured person (median: $28) by 2014. The highest funding level per uninsured person by 2014 was seen in Washington D.C., which had received $166 for each baseline uninsured person by 2014 (Act, 2014).

States that secured high levels of federal funding for their navigator programs also tended to embrace other elements of ACA implementation, such as expanding eligibility for Medicaid. Figure 1 below and Figure 6 in the Appendix depict the correlation between Medicaid eligibility expansions and total funding for navigator programs as determined by marketplace type. By the first open enrollment period, Medicaid non-expansion states had received an average of $11 in federal navigator funding per baseline uninsured person (median: $10), and no state received more than $23 per baseline uninsured person. At that time, Medicaid expansion states had received an average of $31 per uninsured person (median: $22). States' choices about marketplace implementation explain this relationship. With the exception of Idaho, none of the states that decided against expanding Medicaid established their own state-based marketplaces or set up partnership marketplaces with consumer assistance functions. Therefore, these states remained ineligible for the generous IPA grants. In contrast, all the states which received IPA grants were also Medicaid expansion states. To summarize, states without Medicaid expansions received relatively uniform amounts of federal navigator funding based on need, whereas the IPA grants created variation in navigator funding within the Medicaid expansion states.

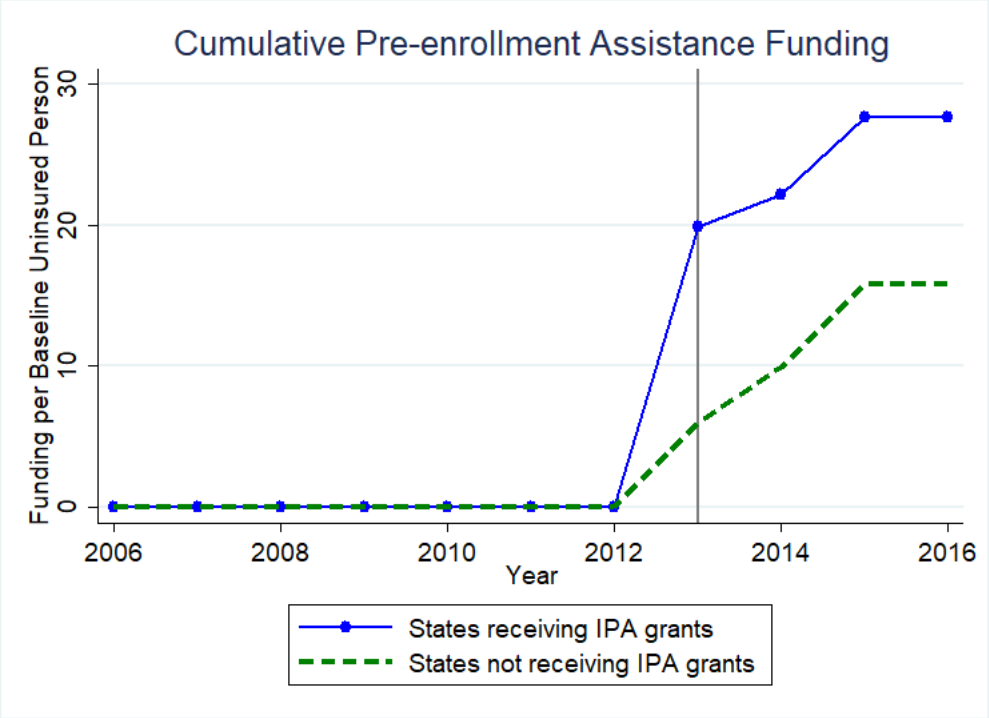
Because of the IPA grants, some Medicaid expansion states with similar numbers of potential marketplace participants received very different amounts of federal navigator funding. This is captured in Figure 2 below. This permits a difference-in-differences based analytic

Figure 1: State-level variation in ACA implementation



Source: HIX 2.0 data and author's calculations using data from Centers for Consumer Information & Insurance Oversight (CCIIO), Medicare and Medicaid Services (CMS) and the Health Resources and Services Administration (HRSA).
Note: SBE: state-based exchange. SPM: state partnership marketplace. FFM: federally facilitated marketplace.

Figure 2: Pre-enrollment assistance funding was higher in states that received IPA grants



Source: Author's calculations using data from Centers for Consumer Information & Insurance Oversight (CCIIO), Medicare and Medicaid Services (CMS) and Health Resources and Services Administration (HRSA). All analyses include patients

strategy comparing Medicaid expansion states that did vs. did not receive IPA grants, before vs. after the grants were dispersed. To avoid conflating the impact of navigator funding with the impact of Medicaid expansions, this analysis only includes data from Medicaid expansion states. Effectively, this research design uses data from Medicaid expansion states without IPA grants to learn about what might have happened in states with IPA grants had they not been eligible for the additional IPA funding.

3.1 Data

My period of analysis extends from 2006 to 2015, the latest year for which the relevant outcome data are available in the Household Component of the Medical Expenditure Panel Survey (hereafter, MEPS). MEPS is a nationally representative survey that is conducted annually to collect detailed information on demographic characteristics, health conditions, health status, use of medical care services, charges and payments, access to care, satisfaction with care, health insurance coverage, income, and employment. I extracted information on patients' health insurance coverage, health insurance churn, medical care utilization and

medical expenditures as well as information about their self-reported health and prevalent chronic conditions.

MEPS uses an overlapping panel design and each panel consists of five interviews conducted over a two-year period. I used MEPS for annual analysis by combining annual data from two overlapping panels. I also used data from each two-year panel to analyze changes in individual patients' health insurance coverage over time. my sample is restricted to full-year in-scope non-elderly adults ages 18 to 64, in the U.S. civilian non-institutionalized population. To provide annual estimates of health insurance coverage, I identified individuals who were covered by private insurance (and health plans on Marketplace since 2014), Medicaid, Medicare, TRICARE and other public coverage at any point during each calendar year. The transition estimates of health insurance churn are based on two-year longitudinal data in each panel. In each two-year period, I defined individuals who gained coverage if they were uninsured for the entire first year and were insured at any point during the second year of the period. Similarly, individuals who lost coverage were defined as those who were insured at any point during the first year and were uninsured for the entire second year.

I measured total health care spending as the total reimbursed health care services for the respondent including out-of-pocket payments, Medicare payments, Medicaid payments, and private insurance payments to health care providers. I separately analyzed total health care spending, spending for outpatient services, inpatient services, prescription fills, and dental care. In future drafts, I will also provide analyses that stratify the sample by contextual variables on the county-level, noted below, and assess whether the type of patient in insurance changed in states with IPA grants. To this end, a number of sociodemographic characteristics were extracted from MEPS including age, sex, race, education and income below 138% federal poverty line. I classified individuals as having a chronic condition if they reported one or more of the following chronic diseases asked about in the MEPS questionnaire: asthma, arthritis, diabetes, emphysema, heart disease (including coronary heart disease, angina, heart attack), high blood pressure, high cholesterol, bronchitis and stroke. I finally extracted data on respondents' self-reported health: respondents were classified as having low self-reported health if they reported fair or poor health in any wave of the survey.

The restricted use MEPS data with geographic identifiers were merged with three additional datasets for use in this project. First, I obtained detailed information about navigator funding in each year and state based on publicly available government documents on Centers for Consumer Information & Insurance Oversight (CCIIO), Medicare and Medicaid Services (CMS) websites. In these documents, CCIIO list recipients of state-level navigator grants and IPA grants and estimates the annual amount of each funding awarded to each state. Data about community health center grants for navigator programs come from the Health

Resources and Services Administration (HRSA). HRSA reports the outreach and enrollment assistance awards to health centers across the nation. Second, I extracted state-level unemployment rates annually from 2006-2015 using Bureau of Labor Statistics (BLS) data. Third, I extracted a number of state-level and county-level demographic characteristics using a variety of publicly available resources. State and county population and the fraction of population uninsured at baseline were obtained from the Small Area Health Insurance Estimates (SAHIE). The fraction of population black and population Hispanic by county is based on the Survey of Epidemiology and End Results (SEER) U.S. Population Data, and the fraction of population in poverty by county is from the Small Area Income and Poverty Estimates (SAIPE) data. I also extracted the number of total primary care physicians, total MD physicians and DO physicians, as well as the number of hospital beds by county from the Area Health Resources Files (AHRF).

3.2 Model

I used a quasi-experimental differences-in-differences designs to distinguish changes in insurance enrollment and usage related to navigator funding from background trends. In this method, trends in insurance enrollment and average health spending before vs. after states received generous navigator funding via IPA grants (first difference) were compared in states that were eligible vs. ineligible for IPA grants (second difference). Because the IPA grants were distributed prior to the first open enrollment period, 2008 through 2012 comprised the pre-intervention period and 2013 through 2015 comprised the post-intervention period.

To avoid conflating the impact of navigator funding with the impact of concurrent Medicaid expansions, all models included only states that expanded eligibility for Medicaid by 2014 or 2015. This was an important precaution because IPA grants were received almost exclusively by states that also elected to expanded eligibility for Medicaid, and Medicaid eligibility expansions have been shown to be associated with a number of effects on health insurance uptake and health care use. In other words, Medicaid expansion status was a confounding variable. Because I are comparing treatment and control states that *all* expanded eligibility for Medicaid, Medicaid eligibility expansions cannot be the cause for any differences between these groups.

I used the differences-in-differences method to model changes in health insurance uptake and utilization after IPA grants. my outcomes of interest included insurance uptake, "churn" out of insurance, generosity of private insurance coverage (including premiums, deductibles, and coverage of specific services such as dental or vision care), use of specific health care services, and health care spending among insured patients. When analyzing spending, I ana-

lyzed changes in inpatient care spending, outpatient care spending, spending on prescription medicines, and spending on dental care, as well as changes in total health care spending. All analyses used patient level data, so that the models focused on spending outcomes captured changes in average spending per patient. I clustered standard errors on the state level to account for the correlation of data from individuals over time, correlation from multiple individuals in the same state over time, and the state-level nature of the IPA grants.

The validity of the differences-in-differences method rests on the assumption that in the absence of the policy intervention of interest, trends in states with different policy implementation would have remained parallel. Although this assumption is not testable, parallel trends prior to the policy intervention provide evidence of the assumption's plausibility. As such, I tested for parallel trends in IPA vs. non-IPA states prior to IPA grants, using data from prior to 2012, for each model presented. In future drafts, I will additionally conduct a pre-trend analysis that used annual indicator variables to check for non-linearity in the trend prior to the implementation of IPA grants.

I addressed possible residual confounding in several ways. First, year indicator variables were included in the model to control for year-specific shifts that took place in all the states in my sample, such as changes in the economy. Second, state indicator variables were included to control for state-level characteristics that remained fixed over time across the study period. Third, I adjusted for determinants of the out-of-pocket premiums faced by individuals, including age, smoking status, and whether they had employer-sponsored insurance. Finally, I accounted for the fact that local changes in the economy can determine availability of employer sponsored insurance as well as the size of the population eligible for Medicaid, by adjusting for annual state-level unemployment rates.[5]

4 Results

In a comparison of baseline characteristics of Medicaid expansion states that received IPA grants vs. did not receive IPA grants to support their navigator programs, I find similar baseline characteristics. These two groups of states showed similar Medicaid and private insurance coverage rates prior to the IPA grants; additionally, insured patients were similar on my outcomes of interest such as average total and out-of-pocket health expenditure, age, prevalence of chronic conditions, and recent use of inpatient care. See Table 3. Additionally, I failed to reject the null hypothesis that pre-trends were similar in my outcomes of interest

[5]I did not include patient fixed effects because the my second research question asks about changes in the composition of insured patients. For this type of research question, a "within-patient" research design would eliminate my variation of interest.

for 29 out of the 30 models presented.

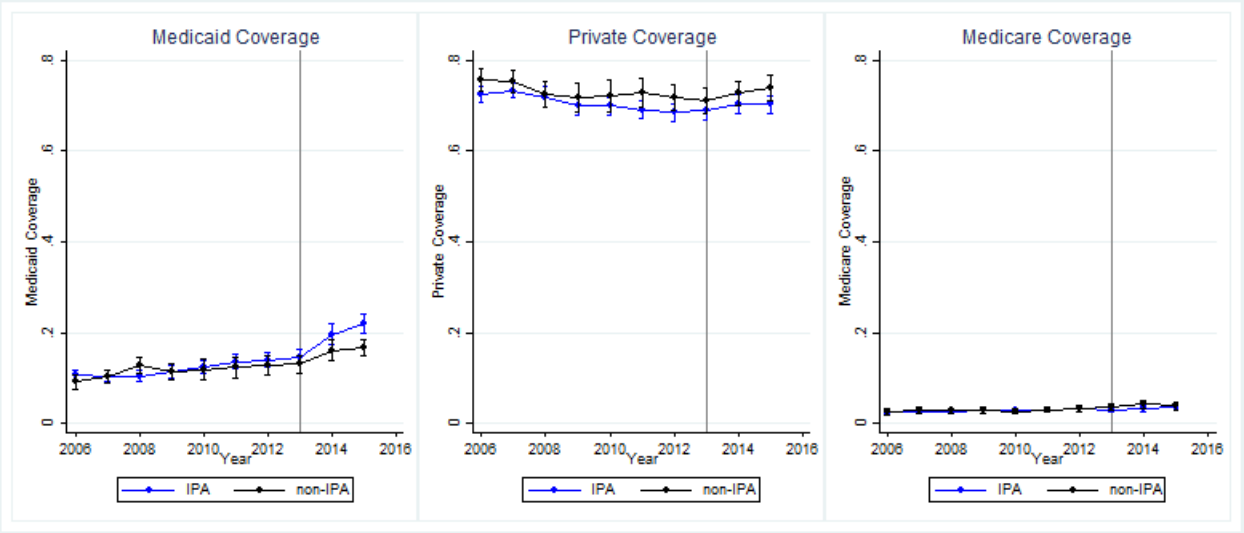
In the differences-in-differences analyses, I find that generous funding for navigator programs was associated with additional uptake of health insurance. States with more generously funded navigator programs (states with IPA grants) showed an additional 2.5 percentage point increase in insurance uptake, beyond temporal trends. The chief source of this increase in coverage was an additional uptake of Medicaid among eligible adults. See Figure 3 and Table 4. These patterns were similar if health insurance uptake was measured using two other data sets, the Small Area Health Insurance Estimates data or the Behavioral Risk Factor Surveillance survey data.[6] See Figure 7 in the Appendix. Participants were also more likely to maintain their coverage over time in states with IPA grants: uninsured patients were 3.3 percentage points more likely to gain insurance in the following year, and insured patients were 3.7 percentage points less likely to lose their coverage in the following year.

Even as health insurance uptake increased and became more stable, I found no evidence that navigator programs were associated with adverse selection. Rather, non-significant trends indicated the possibility of *advantageous* selection: total spending per insured patient may have declined by \$546.3 ($p<0.1$). In particular, states with more generously funded navigator programs spent \$282.30 *less* on prescriptions per patient enrolled in health insurance ($p<0.05$) after navigator programs were implemented. Results are qualitatively similar when expenditure is measured on a log-scale. This gap in spending on prescriptions was significant at the 5% level for patients with Medicaid insurance, and significant at the 10% level for patients with private insurance. There were no significant changes in spending per patient on outpatient care, inpatient care, or dental care, or all non-prescription spending grouped together. Furthermore, the decline in prescription spending is accompanied by a decline in the number of prescriptions filled. See Table 5. Figure 4 below depicts trends in log health care spending by category among all insured patients.

These changes seem not to be driven by changes in the average health of insured patients or the generosity of insurance purchased. In particular, I found no evidence that generously

[6] A more general panel data regression analysis on funding and health insurance uptake not restricted to Medicaid expansion states indicates that navigator programs needed to spend \$901 (95% confidence interval \$137 to \$671) to enroll an additional person in health insurance. This was a linear regression panel data model in which number of people with health insurance was modeled as a function of cumulative funding for consumer assistance at the state-level. I obtained data on insurance rates at the state-level from the Census from 2008-2014 and annual data on federal funding of consumer assistance programs from government sources noted above. Models had state and year fixed effects, and accounted for state-level time trends as well as fluctuations in state-level unemployment. When states were divided into Medicaid expansion vs. non-expansion states, the association was only significantly different from zero in Medicaid expansion states, with \$129 (95% confidence interval \$315 to \$813) needed to spend to enroll an additional person in health insurance. This echoes the findings in the MEPS that increased health insurance uptake in states with generous navigator programs were mainly driven by increased uptake of Medicaid insurance.

Figure 3: Trends in health insurance coverage in states receiving generous navigator funding (IPA states) vs. other Medicaid expansion states not receiving generous navigator funding (non-IPA states)



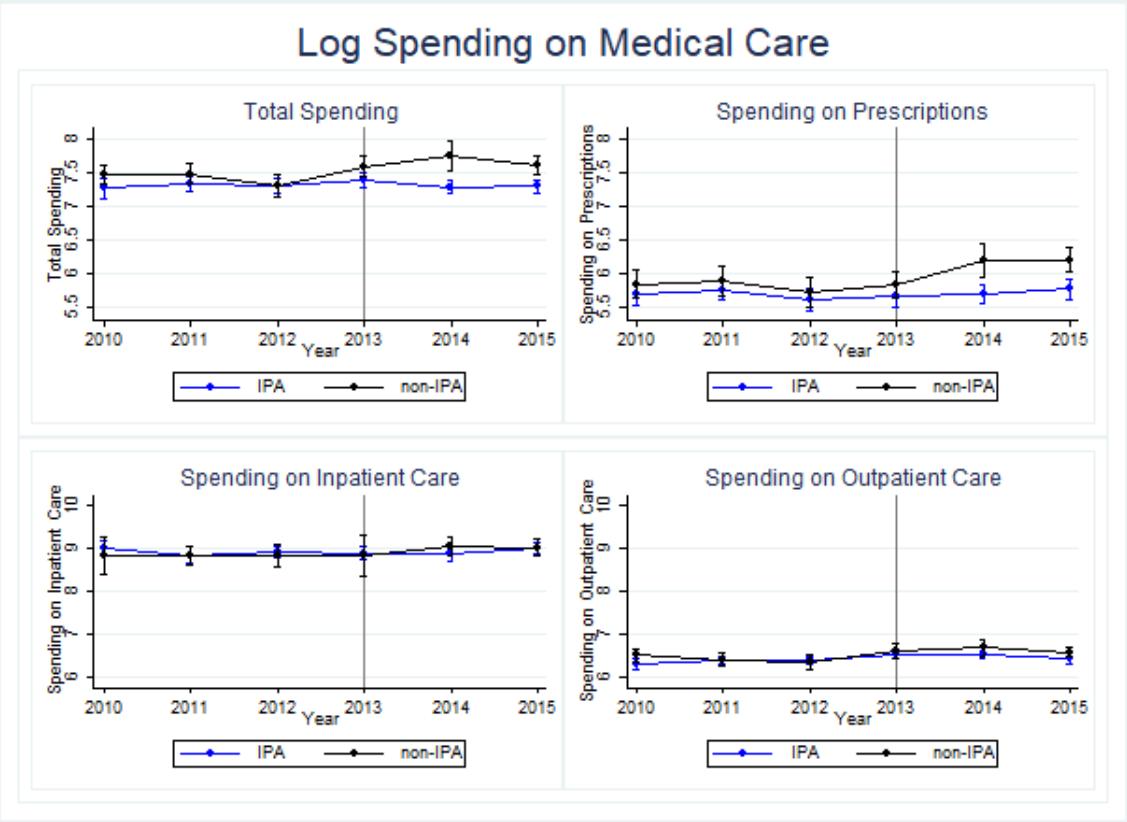
Source: Author's calculations using MEPS data. All analyses include Medicaid expansion states only.

funded navigator programs were associated with changes in the average premium or deductible of private insurance purchased, the coverage categories covered by private insurance purchased, or the prevalence of fair or poor health self-reported health among patients with health insurance. Likewise, there was no evidence that navigator programs were associated with changes in the prevalence of chronic conditions among patients with health insurance, or the number of chronic conditions per patient. In constructing this test, I focused on the chronic conditions asked about in the MEPS questionnaire, which included asthma, arthritis, diabetes, emphysema, coronary heart disease, angina, heart attack, high blood pressure, high cholesterol, bronchitis and stroke. See Table 8 below, and Figure 8 in the Appendix. Finally, my results remained qualitatively similar when I adjusted for characteristics of private insurance such as deductible, premium, and categories of services covered.

5 Discussion

Individual-level data from the HRMS indicate that about 60% of people with low health insurance literacy who lacked employer health insurance coverage would be income-eligible for expanded Medicaid. Accordingly, I find that funding additional marketplace assisters in Medicaid expansion states was associated with uptake of Medicaid. Navigators could familiarize patients with the new Medicaid coverage application process through the marketplace

Figure 4: Trends in average health care spending among patients with health insurance in IPA states vs. non-IPA states



Source: Author's calculations using MEPS data. All analyses include Medicaid expansion states only.

website, consistent with the ACA requirement that there is "no wrong door" to Medicaid enrollment; the removal of onerous asset tests also facilitated on-the-spot application paperwork (Artiga and Rudowitz, 2014; Frean et al., 2016). In California, for example, some of the same local groups that helped with coverage (for example, Covered San Joaqin) both conducted marketplace enrollment (San Joaquin Community Outreach and Enrollment) also helped patients to re-enroll in Medicaid (Medi-Cal Renewal Assistance Program).[7]

Why might patients who became insured after the roll-out of generous navigator programs tend to have lower health care spending - and in particular, spend less on prescriptions and use fewer prescriptions even within the same type of insurance? I consider three possible explanations. First, patients who gain health insurance after generous navigator programs are implemented might have fewer health care needs. However, this explanation faces the issue that patients with lower health insurance literacy in the UAS data had lower self-reported physical and mental health, lower education, and were more likely to smoke. Furthermore, I find no evidence from the MEPS data that patients who become insured after implementation of generous navigator programs differed in their self-reported health or number of chronic health conditions.

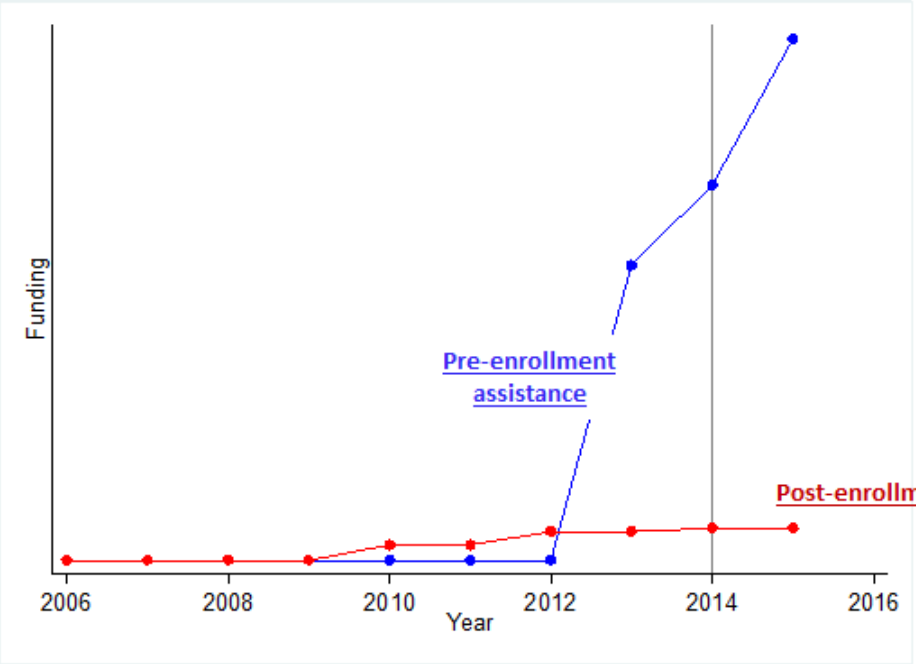
A second possible explanation is that patients who shop for insurance with navigator programs could gravitate towards less generous insurance than other patients, such as insurance that offers poorer coverage of prescriptions. However, adjusting for generosity of the insurance plan in the analysis does not affect my results. Additionally, the typical person insured by navigator programs seems to have signed up for Medicaid, and Medicaid is required to cover prescriptions; Medicaid also has low or zero cost sharing for prescriptions, so it is unlikely that patients were discouraged from filling prescriptions by cost barriers.

Finally, another explanation for the findings could be that navigator programs signed up patients to health insurance who subsequently experienced barriers to using their coverage successfully. This has face validity for several reasons. First, low health insurance literacy could be a rational response to barriers to care. Patients might rationally decide not to invest time learning about health insurance if they know they have limited access to a provider who speaks their language or lives in their neighborhood even if insured. Second, data from the Health Reform Monitoring Survey indicate that patients with lower health insurance literacy are twice as likely to struggle with tasks such as finding an in-network provider or specialist, determining whether prescriptions are covered, or assessing the cost-sharing for a particular service - possibly because these tasks require health insurance literacy.

If this last channel underlies my results, it would underscore the importance of re-funding post-enrollment consumer assistance programs. Post-enrollment consumer assistance pro-

[7] http://apsaraonline.org/service/leadership/

Figure 5: Relative scale of pre-enrollment assistance funding (termed "navigator funding" in this paper) vs. post-enrollment assistance funding after the ACA



Source: Author's calculations using data from Centers for Consumer Information & Insurance Oversight (CCIIO), Medicare and Medicaid Services (CMS) and Health Resources and Services Administration (HRSA).

grams were established with $30 million in seed funding (the CAP grants) under the ACA, with the goal of helping patients use their new insurance. However, these programs have not been allocated new funds to my knowledge since 2014. To clarify the gap in funding between pre-enrollment and post-enrollment consumer assistance funding, Figure 5 depicts the relative scale of pre-enrollment funding (navigator programs) and post-enrollment assistance funding after the ACA.

The finding that navigator programs chiefly increased health insurance coverage chiefly by increasing Medicaid coverage underscores the challenges in helping consumers with low health insurance literacy, a group that also disproportionately had low income, find health insurance options that seemed affordable and suitable to them. As noted previously, a survey of assister programs indicated that 64% reported spending between one and two hours helping each consumer, on average. my findings indicate that even after this level of assistance, many consumers seemed to not to have found a private health insurance option for which they were willing to pay the premium. This seems particularly likely given that I found no relationship between funding of the navigator programs and generosity of insurance purchased.

The current analysis has a number of shortcomings to be addressed in future drafts. First, although the difference-in-differences approach is intuitive and lends itself favorably to graphical presentation of the data, it fails to use the full variation available in the data. Because states were allowed to propose their own budget for the IPA grants, the generosity of navigator funding varied widely across states even after accounting for the size of the uninsured population at baseline and restricting the sample to only include Medicaid expansion states. A more complex regression format could exploit this variation more thoroughly, and also exploit the differential pace of de-funding other streams of navigator funding available across states. Additionally, analyses stratified by patient-level characteristics or local availability of health care services could help to clarify the channels underlying my findings. Finally, although I use linear regressions for ease of exposition, the right-skewed cost data merit a non-linear modeling approach, and it might be appropriate to consider modeling the median of the distribution rather than the mean.

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6 Appendix: Additional Figures and Tables

Figure 6: Non-expansion states received uniformly low amounts of pre-enrollment assistance funding, whereas the IPA grants provided variation in pre-enrollment assistance funding

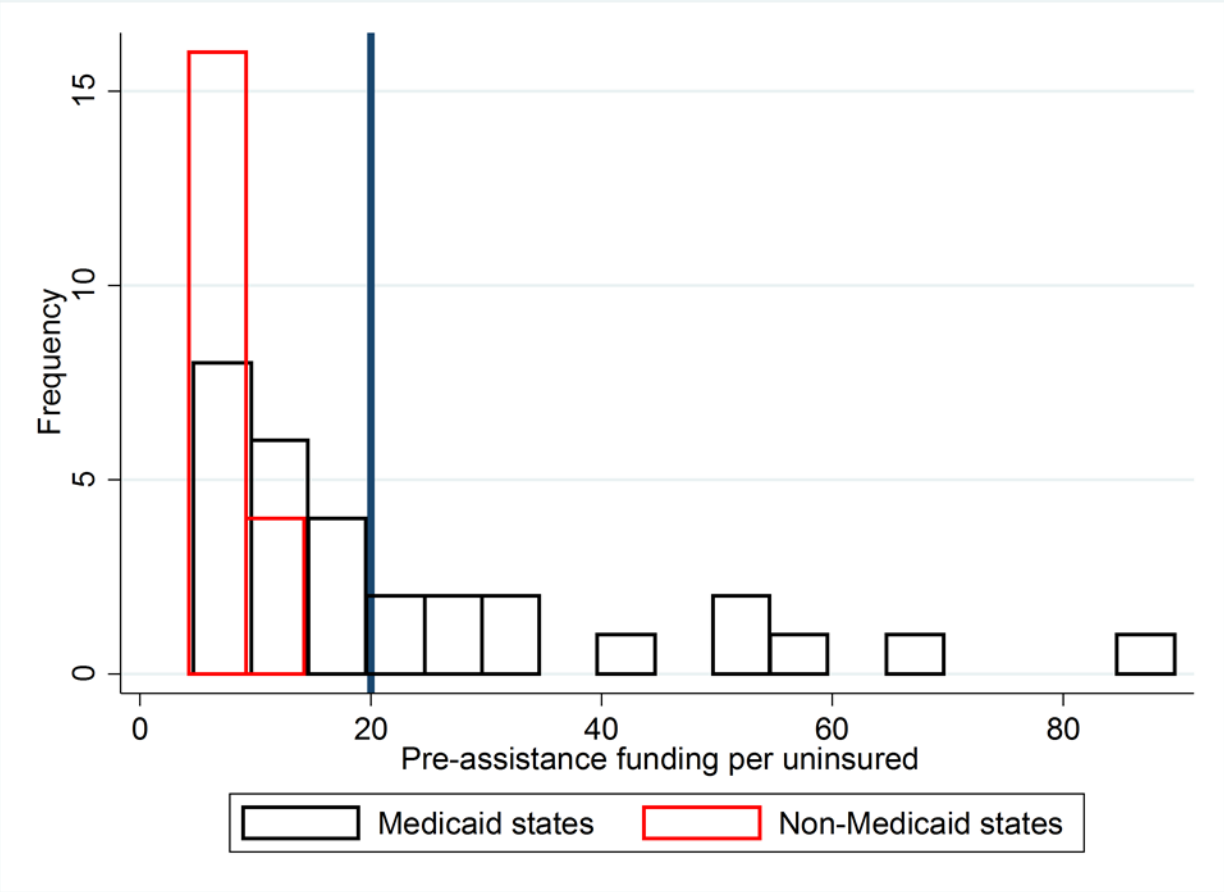


Table 1: Knowledge about key health insurance terms and self-reported health: Bivariate relationships

A. Understanding America Study

	(1) Total correct	(2) Q1 correct	(3) Q2 correct	(4) Q3 correct	(5) Q4 correct
SR good mental health	0.168***	0.0618***	0.0268***	0.0295***	0.0497***
	(0.0165)	(0.00673)	(0.00515)	(0.00795)	(0.00736)
Observations	4,063	4,063	4,063	4,063	4,063
SR good physical health	0.139***	0.0414***	0.0238***	0.0260***	0.0478***
	(0.0161)	(0.00657)	(0.00501)	(0.00773)	(0.00715)
Observations	4,063	4,063	4,063	4,063	4,063
Currently smoke	-0.272***	-0.0820***	-0.0462***	-0.0762***	-0.0680***
	(0.0499)	(0.0206)	(0.0160)	(0.0236)	(0.0228)
Observations	1,851	1,851	1,851	1,851	1,851

Standard errors in parentheses

B. Health Reform Monitoring Survey

	At least somewhat confident in understanding:			
	Premium	Deductible	Co-payments	Provider network
Good SR health	0.0431***	0.0437***	0.0345***	0.0578***
	(0.00709)	(0.00630)	(0.00770)	(0.00698)
Observations	7,388	7,377	7,355	7,377
Physically unhealthy days last month	-0.00248***	-0.00252***	-0.00179***	-0.00388***
	(0.000593)	(0.000559)	(0.000459)	(0.000591)
Observations	7,344	7,333	7,311	7,334
Mentally unhealthy days last month	-0.00406***	-0.00349***	-0.00224***	-0.00475***
	(0.000752)	(0.000692)	(0.000721)	(0.000574)
Observations	7,315	7,304	7,282	7,304
Currently smoke	-0.0209	-0.0361**	-0.0328**	-0.0647***
	(0.0156)	(0.0171)	(0.0144)	(0.0196)
Observations	7,405	7,394	7,372	7,394

Robust standard errors in parentheses

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

SR: Self reported.

Source: Author's analysis of survey data from the Health Reform Monitoring Survey and Understanding America Study. Entries represent slope coefficients from a bivariate linear regression with the outcome specified in the column title and predictor variable specified in the row title. Standard errors are in parentheses; standard errors are clustered by the recommended variance unit in the HRMS analysis. Self-reported mental and physical health are measured on a five-point scale.

Table 2: Knowledge about key health insurance terms and self-reported ability to use insurance once insured: Bivariate relationships in the Health Reform Monitoring Study data

	At least somewhat confident in understanding:			
	Premium	Deductible	Co-payments	Provider network
At least somewhat confident in ability to:				
Review and understand	0.322***	0.317***	0.295***	0.376***
Explanation of Benefit (EOB) statements	(0.0102)	(0.0109)	(0.0161)	(0.0120)
Observations	6,901	6,896	6,897	6,898
Figure out what counts as	0.322***	0.294***	0.276***	0.361***
preventive care services	(0.0115)	(0.0131)	(0.0126)	(0.0103)
Observations	13,718	13,703	13,703	13,718
Figure out which prescription drugs	0.318***	0.294***	0.296***	0.360***
are covered	(0.0109)	(0.0105)	(0.00920)	(0.00758)
Observations	20,582	20,559	20,561	20,576
Find a doctor or other health provider	0.500***	0.471***	0.476***	0.569***
who is in your health plan's network	(0.0105)	(0.0116)	(0.00943)	(0.0110)
Observations	20,615	20,589	20,593	20,604
Figure out whether a service	0.339***	0.335***	0.325***	0.408***
is covered by your plan	(0.0137)	(0.0127)	(0.0100)	(0.01000)
Observations	20,589	20,567	20,570	20,584
Figure out what it will cost to	0.268***	0.263***	0.256***	0.303***
visiting provider or using service	(0.0110)	(0.0103)	(0.00879)	(0.00869)
Observations	20,573	20,549	20,552	20,566
Figure out which health care costs	0.265***	0.262***	0.225***	0.284***
count toward plan's deductible	(0.0120)	(0.0108)	(0.00817)	(0.00885)
Observations	13,741	13,729	13,731	13,731

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

SR: Self reported.

Source: Author's analysis of survey data from the Health Reform Monitoring Survey. Entries represent slope coefficients from a bivariate linear regression with the outcome specified in the column title and predictor variable specified in the row title. Robust standard errors are in parentheses; standard errors are clustered by the recommended variance unit in the HRMS analysis. Self-reported mental and physical health are measured on a five-point scale.

Table 3: Comparing the characteristics of patients with health insurance at baseline, IPA vs non-IPA states, in 2012

	IPA states	Non-IPA states
Medicaid insurance coverage rate	20%	18%
Private insurance coverage rate	63%	67%
Among all insured patients		
Average health care expenditures per person	$4,174	$4,313
Average out of pocket expenditures	$547	$545
Average age	38 years	37 years
Percent in good self-reported health	49%	48%
Percent with a chronic condition	75%	77%
Average number of chronic conditions	1.4	1.4
Fraction with an inpatient discharge in the last year	7%	8%
Fraction with Medicaid insurance	20%	18%
Among patients with Medicaid insurance		
Average expenditure among Medicaid patients	$3,707	$3,919
Average out of pocket expenditures	$172	$162
Average age	26	23
Percent in good self-reported health	40%	38%
Percent with a chronic condition	81%	85%
Average number of chronic conditions	1.3	1.4
Fraction with an inpatient discharge in the last year	12%	15%

All analyses include Medicaid expansion states only and use sample weights to account for the complex sampling design of the MEPS survey.

Table 4: Additional change in insurance coverage in IPA states vs. non-IPA states: Difference in differences estimates

	(1) Insured	(2) Gain Coverage Next Year if Uninsured	(3) Lose Coverage Next Year if Insured
Difference in differences	0.0257**	0.0336**	-0.0372**
	(0.00103 to 0.0504)	(0.00345 to 0.0637)	(-0.0702 to -0.00428)
Observations	126,743	54,545	60,733
Differential pre-trend p	0.41	0.52	0.46

	(4) Private Insurance	(5) Medicaid Insurance	(6) Medicare Insurance
Difference in differences	0.00415	0.0328**	-0.00359
	(-0.0339 to 0.0421)	(0.00488 to 0.0607)	(-0.00950 to 0.00232)
Observations	126,743	126,743	126,743
Differential pre-trend p	0.55	0.75	0.52

95 percent confidence intervals in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations using MEPS data.
Note: Data are adjusted for state fixed effects, year fixed effects, and changes in unemployment on the state-level. Standard errors are clustered by state. All analyses include Medicaid expansion states only.

Table 5: Additional change in health care spending, in IPA states vs. non-IPA states: Difference in differences estimates

	(1) All Patients	(2) Patients with Any Insurance	(3) Patients with Medicaid Insurance	(4) Patients with Private Insurance
Total spending				
Difference in differences	-442.6*	-546.3*	-576.7	-426.0
	(-9.726 to 40.85)	(-1133 to 40.83)	(-1315 to 161.9)	(-943.0 to 91.02)
Observations	126,743	100,494	24,804	75,539
Differential pre-trend p	0.04	0.05	0.06	0.10
Spending on outpatient care				
Difference in differences	-25.15	-16.20	-114.3	-45.60
	(-175.9 to 125.6)	(-201.7 to 169.3)	(-332.5 to 103.9)	(-190.3 to 99.07)
Observations	126,743	100,494	24,804	75,539
Differential pre-trend p	0.17	0.14	0.33	0.12
Spending on inpatient care				
Difference in differences	-123.5	-167.2	43.20	-237.1
	(-326.5 to 79.46)	(-1503.7 to 60.82)	(-168.1 to 245.5)	(-641.6 to 167.4)
Observations	126,743	100,494	24,804	75,539
Differential pre-trend p	0.05	0.15	0.26	0.31
Spending on prescriptions				
Difference in differences	-237.8**	-282.3**	-371.2**	-104.1*
	(-428.0 to -47.65)	(-503.7 to 60.82)	(-611.3 to -133.2)	(-229.2 to 20.96)
Observations	126,742	100,493	24,803	75,539
Differential pre-trend p	0.97	0.82	0.06	0.56
Spending on dental care				
Difference in differences	-15.15	-22.43	-27.25	-7.818
	(-45.76 to 15.51)	(-54.35 to 9.478)	(-63.82 to 9.323)	(-31.87 to 16.23)
Observations	126,743	100,494	24,804	75,539
Differential pre-trend p	0.21	0.19	0.33	0.20

95 percent confidence intervals in parentheses

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

Source: Author's calculations using MEPS data.

Note: Data are adjusted for state fixed effects, year fixed effects, and changes in unemployment on the state-level. Standard errors are clustered by state. All analyses include Medicaid expansion states only.

Table 6: Knowledge about key health insurance terms and participant characteristics: Bivariate relationships

	(1) Total correct	(2) Q1 correct	(3) Q2 correct	(4) Q3 correct	(5) Q4 correct
Numeracy score	0.0372***	0.0129***	0.00554***	0.00911***	0.00970***
	(0.00167)	(0.000690)	(0.000541)	(0.000831)	(0.000768)
Observations	3,987	3,987	3,987	3,987	3,987
Cognition score	0.0440***	0.0138***	0.00657***	0.00992***	0.0138***
	(0.00174)	(0.000729)	(0.000568)	(0.000879)	(0.000799)
Observations	4,051	4,051	4,051	4,051	4,051
Earnings from insurance game	0.0472***	0.0178***	0.00712***	0.00951***	0.0128***
	(0.00757)	(0.00311)	(0.00237)	(0.00366)	(0.00339)
Observations	3,471	3,471	3,471	3,471	3,471
Uses Internet regularly	0.753***	0.185***	0.118***	0.220***	0.230***
	(0.0538)	(0.0223)	(0.0172)	(0.0260)	(0.0241)
Observations	3,611	3,611	3,611	3,611	3,611

Standard errors in parentheses

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

Source: Author's analysis of survey data from the Understanding America Study. Entries represent slope coefficients from a bivariate linear regression with the outcome specified in the column title and predictor variable specified in the row title. Standard errors are in parentheses.

Table 7: Knowledge about key health insurance terms and selected participant characteristics: Bivariate relationships

	(1) Total correct	(2) Q1 correct	(3) Q2 correct	(4) Q3 correct	(5) Q4 correct
Non English speaking	-2.260***	-0.777***	-0.385***	-0.387*	-0.710***
	(0.416)	(0.170)	(0.130)	(0.199)	(0.185)
Observations	3,599	3,599	3,599	3,599	3,599
Hispanic or Latino	-0.256***	-0.0960***	-0.0624***	0.0597*	-0.158***
	(0.0680)	(0.0277)	(0.0212)	(0.0324)	(0.0301)
Observations	3,599	3,599	3,599	3,599	3,599
African American	-0.589***	-0.194***	-0.112***	-0.0583**	-0.225***
	(0.0527)	(0.0215)	(0.0164)	(0.0254)	(0.0234)
Observations	4,054	4,054	4,054	4,054	4,054
Less than high school education	-0.989***	-0.291***	-0.203***	-0.198***	-0.298***
	(0.0694)	(0.0287)	(0.0220)	(0.0338)	(0.0313)
Observations	3,599	3,599	3,599	3,599	3,599
Household income	0.0915***	0.0257***	0.0164***	0.0222***	0.0271***
	(0.00360)	(0.00152)	(0.00117)	(0.00181)	(0.00166)
Observations	4,058	4,058	4,058	4,058	4,058

Standard errors in parentheses

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

Source: Author's analysis of survey data from the Understanding America Study. Entries represent slope coefficients from a bivariate linear regression with the outcome specified in the column title and predictor variable specified in the row title. Standard errors are in parentheses.

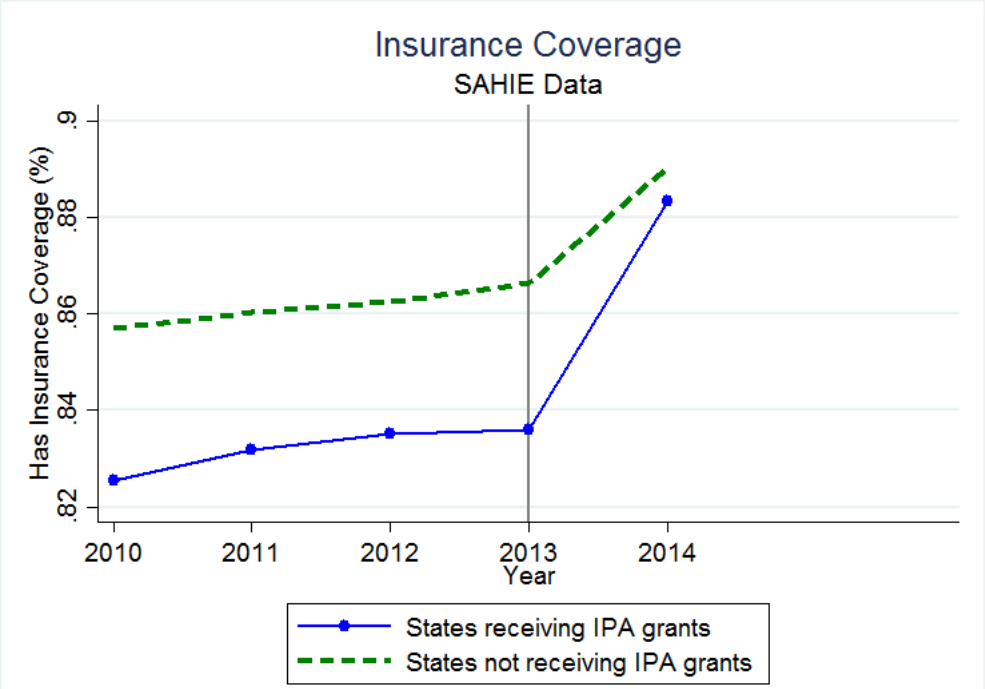
Table 8: Additional change in self-reported health of insured patients, in IPA states vs. non-IPA states: Difference in differences estimates

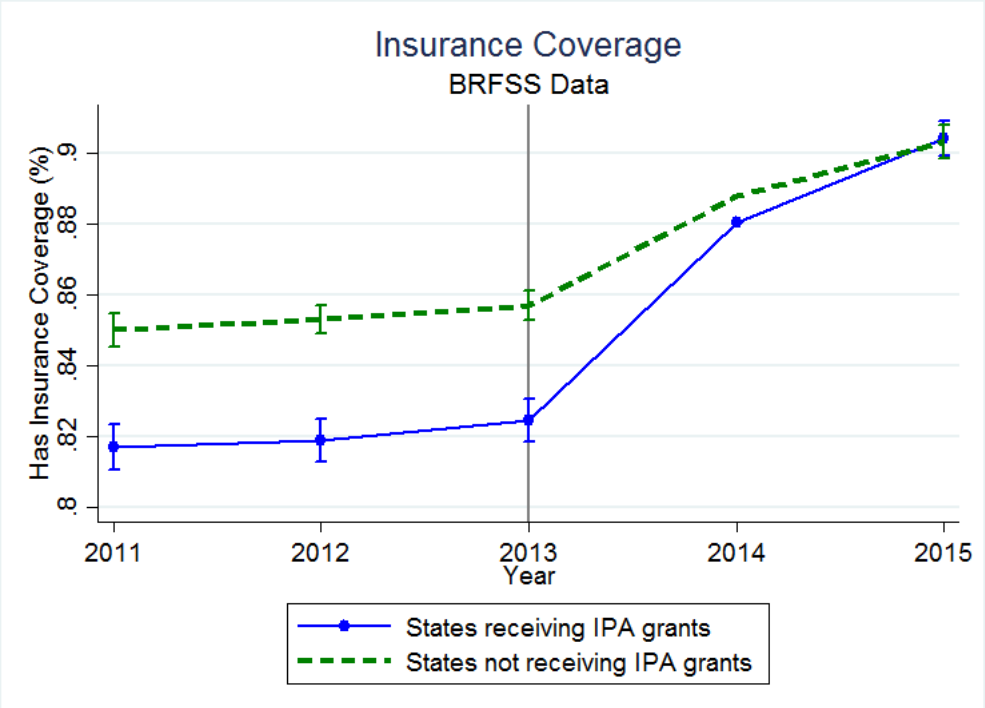
	Patients with Any Insurance
Self-report poor health	
Difference in differences	0.007
	(-0.01 to 0.03)
Observations	80,516
Differential pre-trend p	0.26
Self-report any diagnosed health conditions	
Difference in differences	-0.007
	(-0.02 to 0.01)
Observations	82,113
Differential pre-trend p	0.70
Number of diagnosed conditions reported	
Difference in differences	-0.04
	(-0.11 to 0.02)
Observations	82,113
Differential pre-trend p	0.20

95 percent confidence intervals in parentheses
***p<0.01, **p<0.05, *p<0.1

Source: Author's calculations using MEPS data.
Note: Data are adjusted for state fixed effects, year fixed effects, and changes in unemployment on the state-level. Standard errors are clustered by state. All analyses include Medicaid expansion states only.

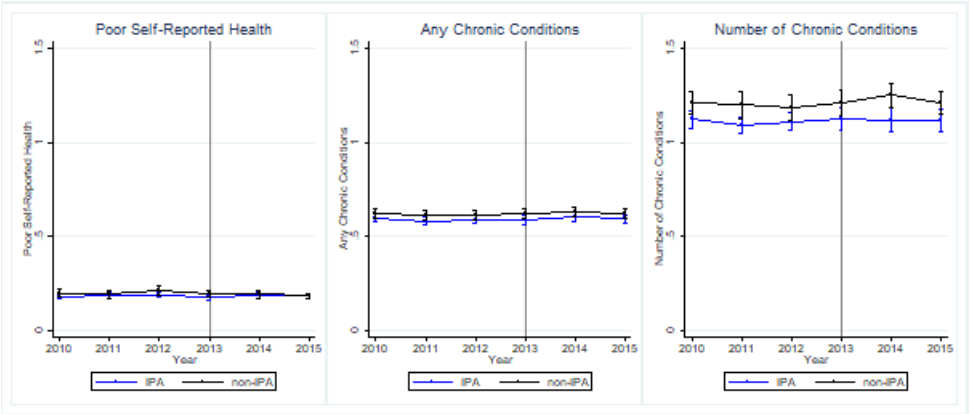
Figure 7: Insurance coverage increased more in IPA states





Note: All analyses include Medicaid expansion states only.

Figure 8: Trends in average self-reported health and health care needs among patients with health insurance: IPA vs. non-IPA states



Source: Author's calculations using MEPS data. All analyses include Medicaid expansion states only.