The Effect of Community Uninsurance Rates on Access to Health Care among the Insured

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Abstract

While the direct effects of being uninsured have been studied extensively, there is significantly less research on how a high community uninsured rate can impact health care access for insured individuals. Using data from SMART BRFSS, I examine the effect of community uninsured rates on access to health care for insured individuals ages 18 to 64 years old. Controlling for MMSA-level fixed effects and year fixed effects, I estimate the effect of community uninsurance on the likelihood of an insured individual skipping care due to cost, the likelihood of an insured individual having at least one personal doctor, and the likelihood of an insured individual delaying a physical exam, cholesterol check, or pap smear. Results suggest that a 10 percentage point increase in the community uninsured rate decreases the likelihood of an insured individual having at least one personal doctor by 0.304 percentage points and increases the likelihood of delaying a physical exam, cholesterol check, or pap smear by 0.590 to 2.31 percentage points. These findings suggests that policies aimed at reducing the uninsured rate, such as the Affordable Care Act and Medicaid expansion, may produce widespread benefits for all Americans, both the uninsured and the insured.

JEL classification: I1, I11, I13

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1. Introduction

The presence of a large uninsured population in the United States continues to be an alarming and significant issue. To gain health insurance in the US, one must either purchase private insurance or qualify for public insurance like Medicaid or Medicare. Due to the exorbitant costs of private health insurance and an inability to qualify for Medicaid, many Americans lack health care coverage. Existing research has largely focused on how a lack of health insurance directly impacts those who are uninsured. Interestingly, the presence of large numbers of uninsured individuals may create externalities for the insured population. In 2003, the Institute of Medicine (IOM) hypothesized that the community uninsured rate may affect all individuals in a community; a larger uninsured population may decrease revenues for providers and facilities, forcing them to raise health care costs or decrease health care services for all individuals in order to remain financially viable. Additionally, a large uninsured population may affect the insured population by shrinking the health care market (Pauly & Pagan, 2006). Assuming uninsured individuals demand less health care in both quality and quantity than the insured, communities with a large uninsured population will have a lower demand for healthcare, thus possibly leading to a decrease in the supply of health care services and providers. Consequently, a high community uninsured rate may reduce access to health care for insured individuals in that community. The primary objective of this study is to investigate how variations in community uninsured rates impact health care access in the US for both privately and publicly insured individuals ages 18 to 64 years old.

An existing relationship between community uninsurance and the insured's access to health care could have significant policy implications. Indeed, the US government has made several attempts to reduce the uninsured rate. Effective in 2014, the Affordable Care Act (ACA) of 2010 provides premium tax credits for families with incomes between 100% and 400% of the federal poverty line to make health insurance more affordable. Additionally, the ACA has given states the option to expand their Medicaid programs to cover all adults with incomes below 138% of the federal poverty line. Medicaid expansion, however, remains a highly controversial topic. Only 40 states and Washington, DC have chosen to expand Medicaid. Opponents argue Medicaid expansion increases costs for states and only benefits those who would otherwise be uninsured. Evidence showing that insured individuals also benefit from decreasing the uninsured

rate may encourage opposition in the 10 remaining states to also expand Medicaid despite cost concerns.

Previous studies reveal mixed results when assessing the relationship between community uninsured rates and health care access for the insured. Using survey data from the 2000 – 2001 Community Tracking Study (CTS), Pauly & Pagan (2006) employ multilevel logistic regression analysis and control for individual-level and community-level variables to estimate the effect of community uninsurance on the likelihood of insured individuals reporting having unmet medical needs. Pauly & Pagan (2006) find that a 5 percentage point increase in the local uninsured population increases the probability of an insured individual reporting having unmet medical needs by 10.5 percentage points. However, the validity of this result may be subject to an endogeneity threat due to an incomplete accounting of both observed and unobserved community factors. Attempting to eliminate endogeneity, Sabik (2011) further employs market-level and time fixed effects as well as instrumental variables. Using individual-level survey data from the 1996 and 2003 CTS, Sabik (2011) finds community uninsurance has no statistically significant effect on the insured's likelihood of delaying or forgoing care. Using the 1996 to 2006 Medical Expenditure Panel Survey, Gresenz & Escarce (2011) utilize instrumental variables to estimate the effect of community uninsurance on the insured's access to healthcare. Unlike Sabik (2011), Gresenz & Escarce (2011) find an increase in the local uninsurance rate decreases the probability of the insured having a usual source of care, at least one office-based visit, and medical expenditures; furthermore, the probability of the insured having greater difficulty obtaining care also increases.

Primarily using individual-level data from the 2002 to 2023 Selected Metropolitan/Micropolitan Area Risk Trends Behavioral Risk Factor Surveillance Survey (SMART BRFSS), I estimate the effect of the community uninsured rate on the insured's access to health care while controlling for a set of individual-level covariates, a set of community-level covariates, and including fixed effects for communities and time. Specifically, I examine the effect of the community uninsured rate on an insured individual's likelihood of skipping care due to cost, an insured individual's likelihood of having at least one personal doctor, and an insured individual's time since one's last physical exam, last cholesterol check, or last pap smear. I find that an increase in the community uninsured rate decreases an insured individual's likelihood of having at least one personal doctor. Additionally, the study finds that an increase in the

community uninsured rate (1) increases an insured individual's likelihood of delaying his or her annual physical exam, (2) increases an insured individual's likelihood of delaying one's cholesterol check by more than two years and by more than one year, and (3) increases an insured woman's likelihood of delaying her pap smear past the recommended interval.

This study builds on existing literature by using data from the 2002 to 2023 SMART BRFSS. In addition to covering a more recent and much longer period, the dataset also encompasses the adoption of the ACA and Medicaid expansion which previous studies were unable to do. The ACA and Medicaid expansion have significantly decreased the number of uninsured individuals in the US. The uninsured rate decreased from 20.5% in 2013 to 12.9% in 2019 (US Census Bureau, 2024). As a result, the inclusion of the ACA and Medicaid expansion provides greater variation in uninsured rates over time. Additionally, this study contributes to existing literature by examining a variety of access outcome variables. While past studies have examined the effect of the community uninsured rate on an insured individual's probability of skipping care or of having a personal provider, the BRFSS surveys allow an investigation of the effect of the community uninsured rate on the likelihood of an insured individual delaying specific health care services: physical exams, cholesterol checks, and pap smears.

The remainder of the paper is presented as follows. Section 2 reviews the relevant past literature. Section 3 describes the theoretical framework behind the proposed relationship between community uninsured rate and the insured's access to health care. Section 4 presents the empirical approach and model utilized. Section 5 describes the data used in this analysis. Section 6 discusses the findings, possible limitations, and future extensions of this study. Section 7 concludes.

2. Literature Review

Does a large uninsured population in a community pose externalities on the insured population? Existing literature has explored the effect of community uninsurance on the health care of insured individuals through the three main attributes of the US health care system: quality, cost, and access.

I. Quality & Cost

Past research on this spillover effect has largely focused on the quality aspect of an insured individual's health care. Studies focusing on self-reported measures of quality have found evidence of a spillover effect. Specifically, an increase in the local uninsurance rate decreases the incidence of reports of satisfaction with providers from both working age privately insured individuals and Medicare enrollees (Gresenz & Escarce, 2011) and decreases insured individuals' trust in providers (Pauly & Pagan, 2007). However, when using outcome-of-care quality measures such as mortality rates, past studies have found mixed results. Daysal (2012) finds that an increase in the local uninsured rate increases mortality rates attributed to acute myocardial infarction in insured adults receiving medical treatment in California hospitals. Conversely, McMorrow (2013) finds no statistically significant relationship between the community uninsured rate and mortality rates associated with Medicare-insured procedures in metropolitan/micropolitan statistical area-level communities. However, this inconsistency may be a result of McMorrow's (2013) specific focus on Medicare-insured individuals ages 65 and older, whereas Daysal focuses on all adults, not just the elderly. Since Medicare insurance is nearly universal in Americans over 65 years old, it's unlikely that the uninsured population consists of these older individuals and thus community uninsurance may have a different effect on those insured with Medicare than on younger individuals with private insurance.

Unlike studies on the quality of the insured's health care, there is limited past research investigating the effect of community uninsured rates on the cost of health care for insured individuals. In one study, Kirby & Cohen (2017) report that an increase of 1 percentage point in the uninsured rate is associated with a $20 increase in the average payment of insured individuals in the emergency department. An increasing cost in care may impede the insured's access to health care.

II. Access

Ultimately, this paper studies the effect of community uninsured rates on the insured's health care access. Past studies have examined this spillover effect on both potential and realized access of the insured population. Potential access can be defined as the access to care relative to the population need: the availability of services and providers in that community (Zahnd et al., 2022). On the other hand, realized access refers to the actual utilization of these healthcare services.

Past literature finds that a high community uninsured rate can harm the potential healthcare access of the insured. Specifically, an increase in the uninsured rate decreases the number of hospital beds per capita and the availability of some psychiatric services in both urban and rural communities (Gaskin & Needleman, 2003; Needleman & Gaskin, 2003) Additionally, in rural communities, an increase in the uninsured rate reduces insured individuals' access to healthcare by decreasing the supply of high technology services like MRIs (Needleman & Gaskin, 2003). A high community uninsured rate may reduce local hospital profitability and thus capital spending.

Existing literature on realized access, however, has yielded mixed results. Using individual-level data from the 2000 – 2001 Community Tracking Survey (CTS) and controlling for a set of individual-level covariates and community-level covariates, Pauly & Pagan (2006) find that a 5-percentage point increase in the local uninsured rate is associated with a 10.5 percentage point increase in the probability that an insured adult reports having unmet medical needs within a 12-month period. Due to not accounting for other unobserved community-level covariates, Pauly & Pagan's study faces a potential endogeneity threat. Other studies have attempted to eliminate this potential endogeneity. Gresenz & Escarce (2011) find that an increase in the uninsured rate decreases health care access for privately insured individuals 18 to 64 years old when estimating probit models using standard maximum likelihood methods and instrumental variables. Specifically, by examining individual-level data from the 1996 to 2006 Medical Expenditure Panel Survey, the authors report that a 10 percentage point increase in the community uninsured rate 1) decreases the probability of a privately insured individual having a usual source of care by 6.2 percentage points, 2) increases the probability of having difficulty obtaining or delaying needed care by 7.7 percentage points, 3) decreases the probability of having medical care expenditures by 1.4 percentage points, and 4) decreases the probability having an office-based visit during the previous year by 1.7 percentage points. Sabik (2011)

attempts to address endogeneity concerns by utilizing instrumental variables, specifically premium costs and the unemployment rate, and including market and year fixed effects in the analysis. Unlike Gresenz & Escarce (2011), Sabik (2011) finds no statistically significant effect on the likelihood of an insured individual (ages 18 to 64) foregoing or delaying care when using individual-level data from the 1996 and 2003 Community Tracking Survey. It is possible that these conflicting results can be explained by Sabik (2011) investigating the effect on all types of insured individuals (public and private) while Gresenz & Escarce (2011) only study privately insured individuals.

To further examine the effect of community uninsurance on the insured population's access to health care, this present study incorporates more recent data from the SMART BRFSS, spanning 2002 to 2023. Unlike datasets employed in previous studies, this dataset includes the adoption of the ACA and Medicaid expansion, thus providing a greater variation in community uninsured rates. Moreover, this study builds on existing research by examining a variety of access outcome measures provided by the BRFSS surveys. In addition to investigating the effect of community uninsured rates on the incidence of insured individuals skipping necessary care or of having a personal doctor, this study also examines the effect of community uninsured rates on access to specific preventative services like physical exams, cholesterol checks, and pap smears. Altogether, this study aims to explore the impact of community uninsured rates on the realized healthcare access of both privately and publicly insured individuals ages 18 to 64 in the US.

3. Theoretical Framework

Community-level factors may influence an individual's access to health care. Specifically, the proportion of uninsured individuals in a community may affect the health care of all its members (Institute of Medicine, 2003). In this study, a community is defined "as a group of people that (1) lives in a particular geographic area and (2) has access to a specific set of health resources for which there are data about financial and health-related outcomes" (IOM, 2003, pp. 3).[2] Existing literature has suggested three main mechanisms/theories for the relationship between community uninsured rates and the insured's access to health care.

First, the Institute of Medicine (2003) proposes, given hospitals and some providers[3] are required to treat both uninsured patients and insured patients, the community uninsured rate affects the insured population by placing a larger financial burden on these providers and hospitals. To remain financially viable, providers and hospitals may be forced to decrease the quantity and quality of services (e.g., by cutting hours or reducing unprofitable services) for both uninsured and insured patients. Extreme cases may even require providers to shut down in that community. Additionally, providers and hospitals may increase health care prices to compensate for lower revenue streams (Pauly & Pagan, 2006). Insured individuals may be harmed if required to pay a proportional coinsurance. A proportional coinsurance is the percentage of the cost of the health care service that the insured individual must pay. Ultimately, decreasing the quantity and quality of healthcare services and increasing their costs may reduce access for the insured individuals in that community.

The second theory proposes that a large uninsured population may shrink the healthcare market (Pauly & Pagan, 2006). Due to an inability to pay, uninsured individuals may demand less health care in both quality and quantity than insured individuals. Thus, communities with a large uninsured population will have a lower demand for health care, and the availability of medical services and providers will subsequently decrease. A reduced supply of health care services and providers in the community may decrease access for insured individuals as a result.

Third, it may be difficult for physicians who take care of both insured and uninsured patients to differentiate care level based on insurance level. Physicians may provide a similar

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[2] Institute of Medicine. 2003. *A Shared Destiny: Community Effects of Uninsurance.* Washington, DC: The National Academies Press https://doi.org/10.17226/10602.

[3] Providers working on emergent cases in accordance with the Emergency Medical Treatment & Labor Act

level of care to all patients based on the average insurance coverage in the community (Gresenz & Escarce, 2011). Because the uninsured demand lower quantity and quality of health care, a greater proportion of uninsured will bias the mean level of care to lower quantity and quality levels, reducing access for both the uninsured and insured population.

4. Empirical Framework

4.1 Conceptual Framework

The aim of this study is to estimate the causal effect of the community uninsured rate on the insured population's access to health care. In this study, communities are defined as metropolitan statistical areas, metropolitan divisions, or micropolitan statistical areas (MMSAs). Therefore, individuals who reside in the same MMSA belong to the same community. This definition is consistent with previous literature (Sabik, 2011; Gresenz & Escarce, 2011; McMorrow, 2013). The main variable of interest is health care access of the insured: 1) whether the individual skipped healthcare due to cost, 2) whether the individual has at least one personal health provider, and the time since the individual's last 3) physical exam, 4) cholesterol check, and 5) pap smear (if applicable) (Table 1). To evaluate the effect of the community uninsured rate on the time since an individual's last health care service, I create binary variables from the original categories.

Table 1: Access Outcome Variables

Access Outcome Variables	Type of Variable	Description
Skipped Care Due to Cost	Binary	No = 0 Yes = 1
At Least 1 Personal Doctor	Binary	No = 0 At least one = 1
Time Since Last Physical Exam: 5 or More Years, More than 2 Years, More than 1 Year	Binary	No = 0 Yes = 1
Time Since Last Cholesterol Check: 5 or More Years, More than 2 Years, More than 1 Year	Binary	No = 0 Yes = 1
Time Since Last Pap Smear: 5 or More Years, More than 3 Years, More than 2 Year, More than 1 Year	Binary	No = 0 Yes = 1

Whether an individual has skipped health care due to cost, has at least one personal provider, and the time since his or her last physical exam, are chosen as access measures because the CDC BRFSS survey has identified these questions as standard health care access questions. These outcome variables are also consistent with measures used in previous literature (Pauly & Pagan, 2006; Sabik, 2011; Gresenz & Escarce, 2011). Additionally, the use of necessary and common medical services can assess health care access. For example, the time since an individual's last cholesterol check can be a useful metric for access to preventive health care services for adults.

Similarly, time since a woman's last pap smear can be an important measure of access to health care as regular screenings for cervical cancer are highly recommended by the US Preventative Services Task Force for women 21 years and older. Individuals who are not regularly receiving this care may be experiencing limited access.

Health care access can be affected by both individual-level factors and other community-level factors. These factors may also influence the uninsured rate in a community. Previous studies have controlled for individual-level factors like age, income, employment, race, gender, education, general health, and number of children (Pauly & Pagan, 2006; Sabik, 2011; Gresenz & Escarce, 2011). Community-level factors like MMSA income, population, unemployment rate, percent of MMSA population on Medicaid, and percent of MMSA population on Medicare are often controls in past studies (Sabik, 2011; Gresenz & Escarce, 2011). Past literature controls for community-level covariates in two ways: (1) MMSA fixed effects to control for time-invariant MMSA-specific factors and (2) explicitly controlling for time-variant community-level factors to capture the impact of their variation overtime within the MMSA (Sabik, 2011).

4.2 Empirical Specification

SMART BRFSS provides annual cross-sectional data at the individual-level and panel data at the MMSA level for the uninsured rate from 2002 to 2023. Additionally, the US Bureau of Economic Analysis, the US Bureau of Labor Statistics, the Center of Medicaid and Medicare services, the CDC Wonder, and the US Census Bureau provides panel data for MMSA-level covariates.

To estimate the effect of the community uninsured rate on the insured population's access to healthcare, I utilize a repeated cross-sectional design and include fixed effects for MMSA and year and cluster standard errors by MMSA.[4]

The regression equation:

$$Y_{ijt} = \beta_o + \beta_1 UNINSUR_{jt} + \beta_2 X_{ijt} + \beta_3 Z_{jt} + \alpha_j + \tau_t + \alpha_j * t + \alpha_j * t^2 + \gamma_{rt} + \varepsilon_{ijt} \quad (1)$$

The dependent variable Y_{ijt} represents the access outcome variable (Table 1) for insured individual i in MMSA j in year t for t = 1, …, 22 for years 2002 – 2023. The main independent variable $UNINSUR_{jt}$ represents the uninsured rate in MMSA j in year t. The coefficient β_1

[4]Due to the Incidentals Parameter Problem, I do not employ logit or multinominal logit models.

quantifies the effect of the uninsured rate in MMSA j on the health care access of the average insured individual i in MMSA j in year t.

To reduce possible omitted variable bias and isolate the effect of community uninsurance, I control for both individual-level factors and community-level factors. X_{ijt} is a vector of individual-level characteristics for individual i in MMSA j in year t: age, age squared, race, sex, education level, income, employment status, self-reported general health, and number of children. Z_{jt} is a set of community-level covariates for MMSA j in year t: income per capita of the MMSA, unemployment rate of MMSA, percentage of MMSA population on Medicaid, percentage of MMSA population over 65, percentage of MMSA population in poverty, percentage of MMSA under 18 years old, and population size of MMSA. Additionally, I control for any additional joint effect of both income per capita and percentage of MMSA population with public insurance (Medicaid or Medicare) through an interaction variable.

Despite controlling for a large set of community-level covariates Z_{jt}, there may still be unobserved time-invariant MMSA-specific factors that influence both health care access and the community uninsured rate. As a result, I include fixed effects for MMSAs. Specifically, α_j represents fixed effects for each MMSA j. Additionally, there may be temporal trends that affect the health care access and uninsured rate of all MMSAs. I attempt to control for this through including year fixed effects. τ_t represents year fixed effects for $t = 1, \ldots, 22$ for years 2002 – 2023. To account for linear and nonlinear temporal trends within MMSAs, I also control for MMSA-specific linear and quadratic trends using $\alpha_j * t$ and $\alpha_j * t^2$, respectively. Lastly, I control for any year-region effects: γ_{rt} for US census regions r and year t. ε_{ijt} is the error term where standard errors are clustered by MMSA to avoid correlated errors due to individuals from the same MMSA sharing similar factors and experiences.

5. Data

5.1 Primary Data Set

To assess the effect of a community's uninsured rate on insured individuals' access to healthcare, this paper primarily utilizes data from the Selected Metropolitan/Micropolitan Area Risk Trends Behavioral Risk Factor Surveillance Survey (SMART BRFSS) for the years 2002 – 2023. BRFSS collects state data annually from more than 400,000 randomly sampled U.S. residents, concerning health-related risk behaviors, chronic health conditions, and use of preventive services. Unlike other known health surveys, SMART BRFSS provides health information at the community level by assigning respondents in the BRFSS data to metropolitan statistical areas, metropolitan divisions, and micropolitan statistical areas (MMSAs). MMSAs are included in SMART BRFSS if at least 500 interviews are conducted in that MMSA, and the weighting criteria is met that year. SMART BRFSS utilizes design weighting and raking (iterative proportional fitting) to decrease selection bias and to adjust for demographic differences between the individuals sampled and the MMSA population they belong to. Thus, SMART BRFSS allows prevalence estimates like the uninsured rate to be calculated for each MMSA and for these estimates to be comparable across MMSAs. Using SMART BRFSS, my final dataset contains 2,916,786 insured individuals ages 18 – 64 years old from 260 MMSAs.

5.2 Communities -- MMSAs

Like previous studies, I define communities as MMSAs (Sabik, 2011; Gresenz & Escarce, 2011; McMorrow, 2013). MMSAs are defined by the US's Office of Management and Budget (OMB) and are assigned an ID number. The OMB periodically changes the MMSA name, county composition, and/or the MMSA ID number. SMART BRFSS uses the most recent MMSA definitions and ID numbers at the time the survey is completed.

From 2002 – 2023, SMART BRFSS provides data on 321 MMSAs. I removed 51 MMSAs because they appear for only 1 year and exclude the 3 MMSAs in Puerto Rico. In the data, some MMSAs are composed of the same counties but have different MMSA ID numbers in different years. If their county composition remains the same, I treat these MMSAs as identical by assigning them the same ID number. For example, Honolulu (26180) and Urban Honolulu (46520) both contain only Honolulu County. As a result, I assign individuals in Urban Honolulu (46520) with Honolulu's MMSA ID number (26180). A list of the other 9 MMSAs where this method is applied is in Appendix Section 2.1. Additionally, 5 MMSAs experienced a county

composition change but did not experience an ID change. As a result, I create a new MMSA ID to account for these county composition changes. A detailed explanation of this process is in Appendix Section 2.1. Ultimately, my final dataset contains 260 MMSAs from 2002 to 2023.

5.3 Uninsured Rate & Access Outcome Variables

Data for the five main access outcome variables (Table 1) and insurance status come from SMART BRFSS for individuals 18 – 64 years old: 2,916,786 insured individuals and 402,432 uninsured individuals. Using the weighting methodology, I calculate the uninsured rate for each of the 260 MMSAs. The average MMSA uninsured rate is 0.157 (15.7%). Figure 1 displays the distribution of MMSA uninsured rates from 2002 to 2023: the median uninsured rate is 0.148 (14.8%) and the standard deviation is 0.068 (6.8%). Figure 2 shows MMSA uninsured rates over time, specifically highlighting the difference in uninsured rates before and after the ACA became effective in 2014.

Figure 1: Distribution of MMSA Uninsured Rates Over the Full Time Period (2002 – 2023)

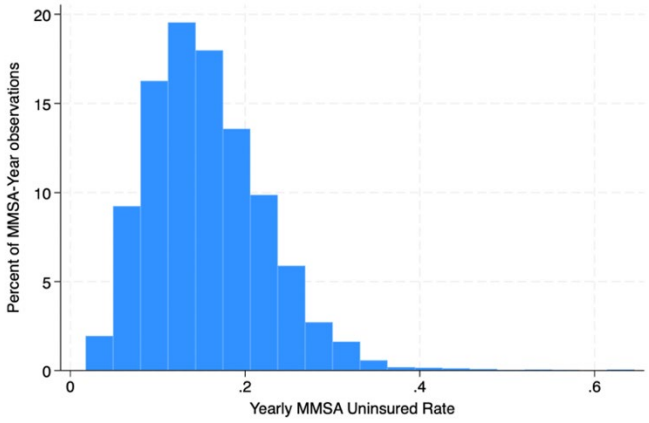
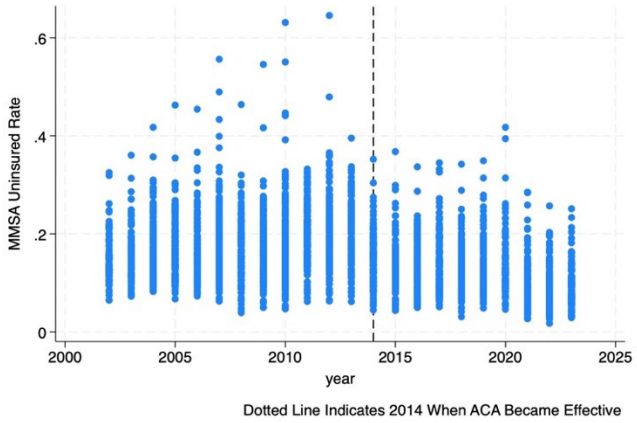


Figure 2: MMSA Uninsured Rate Over Time



From the original data, for the years since an individual's last physical exam, cholesterol check, and pap smear, I create binary variables for each level of the original categorical variable. Table 2 reports summary statistics for the access outcome variables. Appendix Table 3 reports summary statistics for the access outcome variables segmented by MMSAs with uninsured rates at the 10th percentile (.077) or lower and MMSAs with uninsured rates at the 90th percentile (0.245) or higher.

Table 2: Insured Individuals Descriptive Statistics: *Access Outcome Variables for Insured Individuals (2002 to 2023)*

Access Outcome Variables	(1) Mean	(2) Median	(3) SD	(4) Min	(5) Max	(6) N
Skipped Care Due to Cost	0.092	0	0.289	0	1	2,833,424
Has At Least 1 Personal Doctor	0.863	1	0.344	0	1	2,905,801
Last Physical Exam ≥ 5 Years Ago	0.060	0	0.237	0	1	2,615,241
Last Physical Exam > 2 Years Ago	0.131	0	0.337	0	1	2,615,241
Last Physical Exam > 1 Year Ago	0.265	0	0.442	0	1	2,615,241
Last Cholesterol Check ≥ 5 Years Ago	0.039	0	0.194	0	1	1,294,226
Last Cholesterol Check > 2 Years Ago	0.125	0	0.125	0	1	1,294,226
Last Cholesterol Check > 1 Year Ago	0.271	0	0.271	0	1	1,294,226
Last Pap Smear ≥ 5 Years Ago	0.080	0	0.271	0	1	734,147
Last Pap Smear > 3 Years Ago	0.124	0	0.330	0	1	734,147
Last Pap Smear > 2 Years Ago	0.197	0	0.397	0	1	734,147
Last Pap Smear > 1 Year Ago	0.377	0	0.377	0	1	734,147

5.4 Individual-Level Covariates

Additionally, I control for age, race, sex, education level, annual income group, employment status, self-reported general health, and number of children using SMART BRFSS data. To avoid dropping observations from the regression, I create an additional categorical level for missing values for each individual covariate except for age which has no missing values.[5] There are nine race categories (1-9): White, African American, American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, Other, Multiracial, Hispanic, and Missing, respectively. For sex, I create the variable $Male_{ijt}$. There are five levels for education

[5] For example, there are three levels for the variable $Male_{ijt}$. When $Male_{ijt} = 0$, the individual is a female. When $Male_{ijt} = 1$, the individual is a male. If $Male_{ijt} = 2$, the sex of the individual is missing.

level (1 – 5): did not graduate high school, graduated high school, attended college or technical school, graduated college or technical school, and missing. To control for employment, I create a categorical variable for employment status ($employstatus_{ijt}$). For employment status, there are six categories (0 – 5). For $employstatus_{ijt}$ = 0, 1, 2, 3, 4, and 5, individuals are considered unemployed [6], employed [7], a homemaker, a student, retired, or one's employment status is missing, respectively. I create separate categories for "homemaker", "student", and "retired" because these individuals are not actively seeking employment. There are nine different annual household income categories (1 - 9): less than $10,000, less than $15,000, less than $20,000, less than $25,000, less than $35,000, less than $50,000, less than $75,000, more than $75,000, and missing. The categories (1 - 6) for self-reported general health are excellent, very good, good, fair, poor, and missing, correspondingly. For number of children, I converted the original numerical variable to a categorical variable with 4 levels (0 – 3): has no children, has 1 child, has more than 1 child, and missing, in that order. Appendix Table 1 reports summary statistics for these individual-level covariates.

5.5 MMSA-Level Covariates

Share of Population on Medicare

SMART BRFSS indicates whether an individual is insured or uninsured. However, if an individual is insured, SMART BRFSS does not indicate whether the individual has private health insurance, Medicaid, or Medicare. Thus, I do not have MMSA-level data for Medicare enrollment from SMART BRFSS. Since individuals over 65 years old have near universal Medicare coverage, I use, as a proxy for the share of the MMSA population on Medicare, the share of MMSA population over 65. Using SMART BRFSS data on individuals over 65 years old and its weighting methodology, I calculate the share of the population over 65 for each MMSA for every year.[8]

Income Per Capita and Population

MMSA data on income per capita and population count come from the US Bureau of Economic Analysis (BEA) for the years 2002 – 2023. The US BEA provides data on counties

[6] Includes respondents who were unemployed for less than a year and respondents who were unemployed for more than a year

[7] Includes individuals who responded that they are self-employed or employed for wages.

[8] SMART BRFSS is utilized rather than US Census data because it is already at the MMSA level. The US Census only recently started to provide MMSA-level data.

and MMSAs defined by the OMB in 2020. For the 3 MMSAs that no longer exist, I use county-level data from the US BEA to construct the MMSA's total population and income per capita. Specifically, for the income per capita, I calculate a population weighted average of the MMSA's counties' income per capita. Appendix Section 2.2 discusses this in further detail.

Unemployment Rate

MMSA-level data on unemployment rate for 2002 to 2023 is from the US Bureau of Labor Statistics (BLS). The BLS provides MMSA-level and county-level unemployment rate data and uses the most recent MMSA definitions by the OMB. However, for the New England states (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont), BLS uses the MMSA New England Cities and Town Areas (NECTA) definitions which are different from the standard MMSA definitions. As a result, for MMSAs residing in these 6 New England states, I aggregate unemployment data from each of the counties that form the MMSA to construct its unemployment rate. I calculate a population weighted average using county-level unemployment rate data from the BLS and county-level population data from the BEA. Appendix Table 5 provides a list of the 28 MMSAs where this method is used.

Percentage of Population on Medicaid

Due to a lack of data at the MMSA level, I must utilize state-level Medicaid data. For the years 2002 – 2007, I retrieve state-level data on the percentage of the population on Medicaid from the US Census Bureau's Current Population Survey. Excluding 2020, for the years 2008 – 2023, I retrieve data on the percentage of each state's population on Medicaid from the American Community Survey (ACS). Due to COVID19, the ACS did not release data for 2020. As a result, for 2020, I use monthly state-level data on the number of Medicaid enrollees from the Center of Medicaid and Medicare services (CMS). For this data, I average the monthly number of Medicaid enrollees in each state to calculate the annual number. Then, utilizing annual state population counts from the US Census Bureau, I calculate the share of the state population on Medicaid and convert these values to percentages. For each MMSA, the percentage of population on Medicaid was assigned based on the state that the MMSA was in. For the MMSAs that encompass more than one state, the MMSA is assigned to the state that the MMSA's principal city resides in.

Share of Population in Poverty:

Because I only have state-level Medicaid data, I also control for the level of poverty in each MMSA. To control for the level of poverty in each MMSA, I construct MMSA estimates using county-level data on the number of people in poverty from the US Census Bureau, specifically the Small Area Income and Poverty Estimates (SAIPE) program. The share of the MMSA population in poverty is calculated by using MMSA-level population data from the US Bureau of Economic Analysis.

Share of the Population Ages 0 – 17 Years Old:

For 2002 to 2020, I construct the share of the MMSA population from 0 to 17 years old using county-level data from the CDC Wonder. For 2021 to 2023, I utilize MMSA-level data on the number of children under 18 years old from the US Census Bureau. Finally, I use the total population of the MMSA from the US Bureau of Economic Analysis to calculate the share of the MMSA population that is under 18 years old.

6. Results & Discussion

6.1 Main Model:

To estimate the effect of community uninsurance on health care access, I utilize seven different specifications. The most basic model (1) includes only the community uninsured rate, MMSA fixed effects, year fixed effects, MMSA-specific linear trends, and clusters standard errors by MMSA. In Model 2, to reduce omitted variable bias and isolate the effect of community uninsurance, I control for some individual-level demographics: age, race, sex, and education. In Model 3, I add MMSA-level covariates.[9] Adding to previous models, Model 4 also controls for income group, employment status, self-reported general health, and the number of children an individual has. I do not include these individual-level controls in Model 2 due to possible post-treatment bias. Unlike the individual covariates in Model 2, income, employment status, self-reported general health, and the number of children are less exogenous. A community with a high uninsured rate may affect a person's income, employment status, or general health which then may affect their access to health care. To account for the possibility of non-linear trends, Model 5 also includes MMSA-specific quadratic trends. Model 6 and Model 7 control for any region-specific year effects and division-specific year effects, respectively. I do not utilize logit or multinominal logit models for any of the access outcome variables due to the Incidental Parameters Problem.

[9] In my model, I take the logarithm of income per capita and the log of the total population in the MMSA to normalize their possibly skewed distributions and to account for diminishing marginal effects on access.

6.2: Results [10]

6.2.a: At Least One Personal Doctor:

Table 3: At Least One Personal Doctor

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	-0.0202	-0.0311	-0.0351**	-0.0357**	-0.0237	-0.0304*	-0.0309*
	(0.0222)	(0.0191)	(0.0177)	(0.0174)	(0.0184)	(0.0179)	(0.0175)
Mean	0.863	0.863	0.863	0.863	0.863	0.863	0.863
Standard Deviation	0.344	0.344	0.344	0.344	0.344	0.344	0.344
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	2,905,801	2,905,801	2,905,801	2,905,801	2,905,801	2,905,801	2,905,801
# of MMSAs	260	260	260	260	260	260	260
Adjusted R^2	0.020	0.078	0.078	0.084	0.085	0.085	0.085

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

[10] Appendix Section 3.1 Tables 6 – 16 contains the results for all 7 specifications for all the access outcome variables.

Results for all seven specifications are presented in Table 3. Ultimately, I choose Model 7 as the main model for all access outcome variables. I include all individual-level covariates (age, age squared, race, sex, education, income group, employment status, self-reported general health, and number of children) because Model 3's estimate and Model 4's estimate are approximately the same. Thus, it's unlikely post-treatment bias is present. Additionally, I include MMSA-specific quadratic trends because these trends are statistically significant, and the observed effect changes. I include region-specific year effects because the standard error decreases from Model 5 to Model 6 and the magnitude of observed effect increases, resulting in a statistically significant result. Moreover, including region-specific year effects improves the quality of the counterfactual: comparisons will be made across MMSA communities that are in the same region. Because the standard errors and the observed effect is similar in both Model 6 (region-specific year effects) and Model 7 (division-specific year effects), I choose region-specific year effects for parsimony.

Results suggest that a 10 percentage point increase in the community uninsured rate decreases an insured individual's likelihood of having at least one personal doctor by 0.304 percentage points. The full results for Model 6 are presented in Table 4. This result is congruent to past literature: specifically, when utilizing instrumental variables, Gresenz & Escarce (2011) find that the likelihood that an insured individual has a usual source of care decreases by 0.62 percentage points with a 10 percentage point increase in the community uninsured rate. Furthermore, this result is consistent with some of the proposed theories: in communities with higher uninsured rates, there may be a reduced supply of providers due to an overall lower demand, discouraging providers from remaining in or moving to the area. Thus, insured individuals may have less access to doctors. Additionally, personal doctors refer mainly to primary care physicians (PCPs). In the US, the number of PCPs is rapidly declining. Due to this shortage, many areas, including non-rural areas, have been designated Health Professional Shortage Areas. Thus, PCPs or personal doctors may be especially vulnerable to this lower demand in high uninsured communities.

Table 4: Model 6 – At Least 1 Personal Doctor & Skipped Care Due to Cost

Access Outcome Variables	(1) At Least 1 Personal Dr.	(2) Skipped Care Due to Cost
MMSA Uninsured Rate	**-0.0304***	**0.0146**
	(0.0179)	**(0.0115)**
Mean	0.863	0.092
Standard Deviation	0.344	0.289
Age	0.00817***	0.00332***
	(0.000253)	(0.000171)
Age Squared	-2.93e-05***	-5.21e-05***
	(3.28e-06)	(2.05e-06)
Race = African American	0.0202***	-0.00198
	(0.00333)	(0.00176)
Race = American Indian or Alaskan Native	-0.0252***	0.0255***
	(0.00575)	(0.00466)
Race = Asian	-0.0203***	-0.00673***
	(0.00508)	(0.00142)
Race = Native Hawaiian or Other Pacific Islander	-0.00586	0.00233
	(0.00432)	(0.00437)
Race = Other	-0.0265***	0.0342***
	(0.00304)	(0.00288)
Race = Multiracial	-0.00644**	0.0249***
	(0.00288)	(0.00285)
Race = Hispanic	-0.0268***	0.0135***
	(0.00308)	(0.00165)
Race = Missing	-0.0260***	0.0277***
	(0.00242)	(0.00162)
Male = Yes	-0.0786***	-0.0245***
	(0.00238)	(0.00105)
Sex = Missing	-0.00417	0.0185
	(0.0463)	(0.0383)
Education = HS Grad	0.0421***	-0.0161***
	(0.00209)	(0.00153)
Education = Attended College/Technical School	0.0560***	-0.00290*
	(0.00243)	(0.00159)
Education = College/ Tech School Grad	0.0563***	-0.0132***
	(0.00282)	(0.00174)
Education = Missing	0.0331***	0.00620
	(0.00479)	(0.00407)
Income < $15,000	0.00662***	0.0179***
	(0.00178)	(0.00240)
Income < $20,000	-0.000395	0.0248***
	(0.00195)	(0.00211)
Income < $25,000	0.00488**	0.0179***
	(0.00201)	(0.00212)
Income < $35,000	0.0152***	-0.00737***
	(0.00222)	(0.00246)
Income < $50,000	0.0323***	-0.0402***
	(0.00225)	(0.00271)
Income < $75,000	0.0503***	-0.0728***
	(0.00247)	(0.00277)
Income > $75,000	0.0729***	-0.106***
	(0.00252)	(0.00291)
Income = Missing	0.0339***	-0.0660***
	(0.00214)	(0.00246)
Employed	-0.0273***	-0.0210***
	(0.00142)	(0.00142)
Student	0.00944***	-0.0408***
	(0.00264)	(0.00164)

(continued)	(1) At Least 1 Personal Dr.	(2) Skipped Care Due to Cost
Homemaker	-0.0101***	-0.0487***
	(0.00129)	(0.00160)
Retire	-0.0282***	-0.0334***
	(0.00151)	(0.00159)
Employment Status = Missing	-0.0340***	-0.0156***
	(0.00322)	(0.00243)
# of Children = 1	0.0269***	0.00530***
	(0.000963)	(0.000700)
# of Children > 1	0.0328***	0.00368***
	(0.00117)	(0.00107)
# of Children = Missing	0.0195***	-0.00300
	(0.00239)	(0.00190)
General Health = Very Good	0.0153***	0.0153***
	(0.000797)	(0.000494)
General Health = Good	0.0186***	0.0475***
	(0.00119)	(0.000965)
General Health = Fair	0.0389***	0.108***
	(0.00182)	(0.00197)
General Health = Poor	0.0645***	0.155***
	(0.00253)	(0.00245)
General Health = Missing	0.00215	0.0874***
	(0.00415)	(0.00528)
Log(Total MMSA Population)	-0.143**	-0.00224
	(0.0551)	(0.0255)
Log(MMSA Income Per Capita)	-0.00516	0.0343
	(0.0363)	(0.0225)
MMSA Unemployment Rate	0.00115**	-9.65e-05
	(0.000488)	(0.000350)
Share of MMSA in Poverty	0.0513	0.0628**
	(0.0400)	(0.0267)
% of MMSA on Medicaid	0.00282***	-0.000312
	(0.000916)	(0.000688)
Share of MMSA over 65	-0.312	0.326**
	(0.222)	(0.152)
Share of MMSA < 18	0.0105	0.0387**
	(0.0502)	(0.0158)
MMSA Income Per Capita x Percent of MMSA on Medicaid	-5.28e-08**	0.000
	(1.61e-08)	(0.000)
MMSA Income Per Capita x Share of MMSA > 65	0.000	-7.26e-06**
	(0.000)	(2.37e-06)
Constant	2.284	-0.161
	(211.4)	
MMSA Indicators	Yes	Yes
Year Indicators	Yes	Yes
MMSA specific linear trends	Yes	Yes
MMSA specific quadratic trends	Yes	Yes
Time x Region Indicators	Yes	Yes
N	2,905,801	2,833,424
# of MMSAs	260	260
Adjusted R^2	0.085	0.071

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

6.2.b: Skipped Needed Care Due to Cost

Results (Table 4) suggest that the community uninsured rate does not affect the likelihood that an insured individual skipped necessary care due to cost. This insignificant result is consistent with previous literature. When looking at both privately and publicly insured individuals, Sabik (2011) also finds that the community uninsured rate does not affect an insured individual's probability of foregoing or delaying needed care. Gresenz & Escarce (2011), however, do observed a positive effect though they focus only on privately insured individuals while this paper studies both privately and publicly insured individuals. One of the suggested theories for the spillover effect of the community uninsured rate on insured individuals is that in areas with a larger uninsured population there may be a larger financial burden placed on some providers and hospitals that serve both insured and uninsured individuals. As a result, to compensate for this burden, providers and hospitals may raise prices for both insured individuals and uninsured individuals. For insured individuals with cost-sharing insurance plans, increased costs may be a barrier to their health care access. However, using the BRFSS data, I am ultimately evaluating whether an insured individual skipped *necessary* care due to cost. The RAND Health Insurance Experiment (1988) finds that an individual's demand for emergent care is relatively price inelastic: -0.14. Since this paper is looking at necessary and thus more emergent care, the insignificant result may be due to cost not being a significant barrier to accessing emergent care.

Table 5: Model 6 – Time Since Last Physical Exam

Access Outcome Variables	(1) 5 or More Years Since Last Physical Exam	(2) More than 2 Years Since Last Physical Exam	(3) More than 1 Year Since Last Physical Exam
MMSA Uninsured Rate	**0.0147**	**0.0590*** **	**0.0857*** **
	(0.0105)	**(0.0180)**	**(0.0268)**
Mean	0.060	0.131	0.265
Standard Deviation	0.237	0.337	0.442
Age	0.00314***	0.00212***	0.00249***
	(0.000180)	(0.000209)	(0.000298)
Age Squared	-5.14e-05***	-5.93e-05***	-8.15e-05***
	(2.39e-06)	(2.55e-06)	(3.32e-06)
Race = African American	-0.0422***	-0.0786***	-0.113***
	(0.00122)	(0.00196)	(0.00300)
Race = American Indian or Alaskan Native	-0.0127***	-0.0260***	-0.0385***
	(0.00197)	(0.00277)	(0.00345)
Race = Asian	-0.0114***	-0.0257***	-0.0262***
	(0.00203)	(0.00292)	(0.00335)
Race = Native Hawaiian or Other Pacific Islander	-0.0168***	-0.0354***	-0.0443***
	(0.00258)	(0.00436)	(0.00536)
Race = Other	-0.00542**	-0.0195***	-0.0352***
	(0.00241)	(0.00326)	(0.00459)
Race = Multiracial	-0.00158	-0.00612***	-0.0122***
	(0.00127)	(0.00186)	(0.00236)
Race = Hispanic	-0.0239***	-0.0425***	-0.0544***
	(0.00121)	(0.00177)	(0.00289)
Race = Missing	-0.00766***	-0.0177***	-0.0247***
	(0.00148)	(0.00246)	(0.00348)
Male = Yes	0.0391***	0.0709***	0.0876***
	(0.00158)	(0.00244)	(0.00258)
Sex = Missing	0.0912**	0.0994**	0.0578
	(0.0439)	(0.0464)	(0.0585)
Education = HS Grad	-0.0105***	-0.0110***	-0.0110***
	(0.000949)	(0.00123)	(0.00188)
Education = Attended College/Technical School	-0.0184***	-0.0156***	-0.0112***
	(0.00123)	(0.00147)	(0.00194)
Education = College/ Tech School Grad	-0.0233***	-0.0180***	-0.0104***
	(0.00139)	(0.00184)	(0.00283)
Education = Missing	-0.0107***	-0.00496	-0.00234
	(0.00319)	(0.00419)	(0.00624)
Income < $15,000	-0.000351	0.000230	0.00279
	(0.00137)	(0.00182)	(0.00200)
Income < $20,000	-0.00123	9.79e-05	0.00484***
	(0.00112)	(0.00132)	(0.00173)
Income < $25,000	-0.000795	0.00295*	0.00916***
	(0.00123)	(0.00163)	(0.00199)
Income < $35,000	0.000341	0.00190	0.00868***
	(0.00120)	(0.00164)	(0.00201)
Income < $50,000	-0.00604***	-0.00879***	-0.00366*
	(0.00124)	(0.00157)	(0.00188)
Income < $75,000	-0.0145***	-0.0215***	-0.0177***
	(0.00135)	(0.00177)	(0.00221)
Income > $75,000	-0.0291***	-0.0438***	-0.0439***
	(0.00157)	(0.00224)	(0.00250)
Income = Missing	-0.0138***	-0.0245***	-0.0218***
	(0.00119)	(0.00159)	(0.00183)
Employed	0.0152***	0.0251***	0.0399***
	(0.000933)	(0.00133)	(0.00154)
Student	-0.0183***	-0.0248***	-0.0120***
	(0.00118)	(0.00183)	(0.00268)
Homemaker	0.00320***	0.000227	-0.00460***
	(0.000846)	(0.00120)	(0.00149)

Table 5: Model 6 – Time Since Last Physical Exam

Access Outcome Variables	(1) 5 or More Years Since Last Physical Exam	(2) More than 2 Years Since Last Physical Exam	(3) More than 1 Year Since Last Physical Exam
Retire	0.0175***	0.0290***	0.0449***
	(0.00107)	(0.00155)	(0.00179)
Employment Status = Missing	0.00886***	0.00479*	0.0110***
	(0.00201)	(0.00246)	(0.00383)
# of Children = 1	-0.00726***	-0.00947***	-0.00455***
	(0.000562)	(0.000765)	(0.000896)
# of Children > 1	-0.00585***	-0.00432***	0.00524***
	(0.000619)	(0.000940)	(0.00120)
# of Children = Missing	-0.00939***	-0.0108***	-0.00854***
	(0.00154)	(0.00213)	(0.00277)
General Health = Very Good	-0.00835***	-0.00962***	-0.00972***
	(0.000518)	(0.000875)	(0.00128)
General Health = Good	-0.00615***	-0.0106***	-0.0192***
	(0.000663)	(0.00108)	(0.00166)
General Health = Fair	-0.00779***	-0.0176***	-0.0405***
	(0.000978)	(0.00163)	(0.00238)
General Health = Poor	-0.00889***	-0.0234***	-0.0596***
	(0.00119)	(0.00179)	(0.00269)
General Health = Missing	0.0166***	0.0178***	0.000799
	(0.00359)	(0.00447)	(0.00509)
Log(Total MMSA Population)	0.0191	-0.107	-0.246**
	(0.0435)	(0.0761)	(0.108)
Log(MMSA Income Per Capita)	0.00145	-0.0151	-0.0939
	(0.0249)	(0.0457)	(0.0741)
MMSA Unemployment Rate	-0.000423	-8.66e-05	0.00110
	(0.000342)	(0.000666)	(0.00121)
Share of MMSA in Poverty	0.0620*	0.110*	0.126
	(0.0346)	(0.0578)	(0.0901)
% of MMSA on Medicaid	-0.000280	0.000658	-0.00237
	(0.000634)	(0.00115)	(0.00188)
Share of MMSA over 65	-0.0671	-0.0550	-0.0780
	(0.145)	(0.270)	(0.458)
Share of MMSA < 18	-0.00327	-0.00157	-0.0270
	(0.0140)	(0.0263)	(0.0472)
MMSA Income Per Capita x Percent of MMSA on Medicaid	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
MMSA Income Per Capita x Share of MMSA > 65	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Constant	-0.853	0.856	3.565
	(79.95)		
MMSA Indicators	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes
MMSA Specific Linear Trends	Yes	Yes	Yes
MMSA Specific Quadratic Trends	Yes	Yes	Yes
Time x Region Indicators	Yes	Yes	Yes
N	2,615,241	2,615,241	2,615,241
# of MMSAs	257	257	257
Adjusted R^2	0.027	0.045	0.055

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

6.2.c Time Since Last Physical Exam

Results presented in Table 5 suggest that the community uninsured rate does not affect the likelihood that an insured individual has not had a physical exam in 5 or more years. Since most health insurances are required to (mostly) cover an annual physical exam, waiting five or

more years to get another physical exam as an insured individual may be unlikely: in the data, only 156, 208 insured individuals have not had a physical exam in 5 or more years compared to 2,459, 033 insured individuals whose last physical exam was less than 5 years ago.

However, the uninsured rate in a community may affect the likelihood that an insured individual has not had a physical exam in more than two years and the likelihood that an insured individual has not had a physical exam in more than one year (Table 5). Statistically significant at the 1% level, a 10 percentage point increase in the uninsured rate in a community increases the likelihood that an insured individual has not had a physical exam in more than 2 years by 0.590 percentage points. Moreover, a 10 percentage point increase in the community uninsured rate increases the likelihood that an insured individual has not had a physical exam in more than 1 year by 0.857 percentage points. The larger effect on the likelihood that the insured's most recent physical exam was more than 1 year ago aligns with the requirement that most insurance plans in the US cover at least a significant portion of the cost of an *annual* physical exam.

Gresenz & Escarce (2011) find similar results: a 10 percentage point increase in the community uninsured rate reduces the likelihood of an insured individual having an office-based visit in the previous year by 1.7 percentage points. Their estimate is larger than what this paper observes. This may be due to examining the effect on any office-based visit which likely includes more than physical exams. Similarly to the discussion regarding personal doctors, these results are consistent with some of the proposed theoretical mechanisms. Since primary care physicians are experiencing a significant shortage, their services may be even more sensitive to the lower demand in communities with a high uninsured population, leading to a reduced availability of primary care services like physical exams. Consequently, scheduling a physical exam may be more difficult. The insignificant effect of the community uninsured rate on whether an insured individual skips needed care due to cost may appear to contradict the results regarding physical exams. However, these results align with evidence that demand for outpatient care like receiving a physical exam is more sensitive to price than inpatient/emergent care (RAND 1988). As a result, if health care prices for physical exams and primary care services increase in communities with larger uninsured populations, insured individuals with cost-sharing plans may be more sensitive to this price increase. Therefore, cost may be a larger barrier to access to primary care, at least compared to cases of necessary care, resulting in lower demand and utilization.

6.2.d Years Since Last Cholesterol Check

Results for the time since an insured individual's last cholesterol check are presented in Table 6. Table 6 suggests that there is no effect of community uninsured rate on the likelihood that an insured individual has not had a cholesterol check in five or more years. However, according to the results, when the community uninsured rate increases by 10 percentage points, an insured individual's likelihood that one has not received a cholesterol check in more than two years increases by 0.871 percentage points. The effect seems to be even larger when investigating the likelihood that an insured individual's last cholesterol check was more than one year ago. A 10 percentage point increase in the community uninsured rate increases an insured individual's likelihood that one's last cholesterol check was more than a year ago by 1.26 percentage points. Cholesterol checks are preventive services, often done during one's physical exam. Therefore, these results are consistent with some of the theoretical mechanisms discussed in section 6.2.c regarding time since one's last physical exam.

Table 6: Model 6 – Time Since Last Cholesterol Check

Access Outcome Variables	(1) Last Cholesterol Check ≥ 5 Years	(2) Last Cholesterol Check > 2 Years	(3) Last Cholesterol Check > 1 Year
MMSA Uninsured Rate	**-0.00200**	**0.0871*** **	**0.126** **
	(0.0135)	**(0.0275)**	**(0.0487)**
Age	0.00226***	0.00275***	0.00291***
	(0.000164)	(0.000284)	(0.000406)
Age Squared	-3.55e-05***	-6.70e-05***	-9.62e-05***
	(1.95e-06)	(3.36e-06)	(4.54e-06)
Race = African American	-0.0253***	-0.0633***	-0.0923***
	(0.000712)	(0.00240)	(0.00403)
Race = American Indian or Alaskan Native	-0.0110***	-0.0346***	-0.0522***
	(0.00188)	(0.00303)	(0.00435)
Race = Asian	-0.0183***	-0.0409***	-0.0499***
	(0.00139)	(0.00225)	(0.00298)
Race = Native Hawaiian or Other Pacific Islander	-0.0127***	-0.0420***	-0.0749***
	(0.00429)	(0.00600)	(0.00792)
Race = Other	-0.00646***	-0.0255***	-0.0420***
	(0.00240)	(0.00405)	(0.00499)
Race = Multiracial	-0.00239	-0.0134***	-0.0254***
	(0.00153)	(0.00250)	(0.00337)
Race = Hispanic	-0.0189***	-0.0418***	-0.0561***
	(0.000806)	(0.00151)	(0.00249)
Race = Missing	-0.00295	-0.0147***	-0.0263***
	(0.00179)	(0.00290)	(0.00432)
Male = Yes	0.0124***	0.0191***	0.0151***
	(0.000580)	(0.000879)	(0.00126)
Sex = Missing	0.0668	0.0267	0.0528
	(0.0421)	(0.0481)	(0.0718)
Education = HS Grad	-0.00231**	-0.00595***	-0.00841***
	(0.000940)	(0.00159)	(0.00239)
Education = Attended College/Technical School	-0.00331***	-0.00452***	-0.00576**
	(0.00101)	(0.00154)	(0.00238)
Education = College/ Tech School Grad	-0.00436***	0.00165	0.00683**
	(0.00104)	(0.00170)	(0.00274)
Education = Missing	1.70e-05	-0.000577	-0.0111
	(0.00328)	(0.00477)	(0.00798)
Income < $15,000	-0.00261*	0.000507	0.00266
	(0.00140)	(0.00223)	(0.00278)
Income < $20,000	-0.00225	-0.00229	0.00225
	(0.00144)	(0.00213)	(0.00323)
Income < $25,000	-0.00403***	0.000799	0.00361
	(0.00120)	(0.00186)	(0.00293)
Income < $35,000	-0.00259**	0.00161	0.00942***
	(0.00118)	(0.00182)	(0.00299)
Income < $50,000	-0.00513***	-0.00367*	0.00133
	(0.00116)	(0.00198)	(0.00266)
Income < $75,000	-0.00878***	-0.00933***	-0.00522*
	(0.00125)	(0.00200)	(0.00283)
Income > $75,000	-0.0180***	-0.0263***	-0.0253***
	(0.00137)	(0.00212)	(0.00273)
Income = Missing	-0.0108***	-0.0173***	-0.0148***
	(0.00120)	(0.00194)	(0.00263)
Employed	0.00447***	0.0124***	0.0257***
	(0.000665)	(0.000999)	(0.00159)
Student	-0.00269*	0.00117	0.0194***
	(0.00157)	(0.00277)	(0.00324)
Homemaker	-0.000448	-0.000952	-0.00373*
	(0.000716)	(0.00143)	(0.00191)
Retire	0.0127***	0.0309***	0.0514***
	(0.00103)	(0.00182)	(0.00243)

Table 6: Model 6 – Time Since Last Cholesterol Check

Access Outcome Variables	(1) Last Cholesterol Check ≥ 5 Years	(2) Last Cholesterol Check > 2 Years	(3) Last Cholesterol Check > 1 Year
Employment Status = Missing	0.000753	0.00462	0.0102*
	(0.00239)	(0.00387)	(0.00524)
# of Children = 1	-0.000527	0.00369***	0.0108***
	(0.000610)	(0.00121)	(0.00148)
# of Children > 1	0.00402***	0.0150***	0.0272***
	(0.000700)	(0.00129)	(0.00176)
# of Children = Missing	0.00158	-0.00204	0.00809**
	(0.00193)	(0.00303)	(0.00399)
General Health = Very Good	-0.00694***	-0.0165***	-0.0261***
	(0.000628)	(0.00113)	(0.00146)
General Health = Good	-0.0114***	-0.0339***	-0.0613***
	(0.000856)	(0.00173)	(0.00218)
General Health = Fair	-0.0175***	-0.0514***	-0.101***
	(0.00113)	(0.00253)	(0.00343)
General Health = Poor	-0.0218***	-0.0626***	-0.124***
	(0.00141)	(0.00285)	(0.00379)
General Health = Missing	0.000778	-0.0188***	-0.0529***
	(0.00385)	(0.00571)	(0.00756)
Log(Total MMSA Population)	3.36e-05	-0.0729	-0.0821
	(0.0237)	(0.0560)	(0.0788)
Log(MMSA Income Per Capita)	0.0269	0.105**	0.114
	(0.0236)	(0.0517)	(0.0729)
MMSA Unemployment Rate	-0.000176	0.000241	0.000429
	(0.000382)	(0.000818)	(0.00130)
Share of MMSA in Poverty	0.0116	0.0896	0.212*
	(0.0299)	(0.0814)	(0.117)
% of MMSA on Medicaid	-0.000731	-0.00101	-0.00305*
	(0.000769)	(0.00148)	(0.00180)
Share of MMSA over 65	-0.0953	0.498	0.805*
	(0.166)	(0.351)	(0.410)
Share of MMSA < 18	0.0180	0.0612***	0.0374
	(0.0179)	(0.0228)	(0.0395)
MMSA Income Per Capita x Percent of MMSA on Medicaid	0.000	0.000	7.78e-08**
	(0.000)	(0.000)	(3.66e-08)
MMSA Income Per Capita x Share of MMSA > 65	0.000	-1.05e-05*	1.73e-05**
	(0.000)	(0.000)	(7.25e-06)
Constant	-0.446	-0.805	-0.676
	(0.476)	(1.047)	(1.407)
MMSA Indicators	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes
Time x Region Indicators	Yes	Yes	Yes
N	1,294,226	1,294,226	1,294,226
# of MMSAs	257	257	257
Adjusted R^2	0.012	0.036	0.058

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

6.2.e Years Since Last Pap Smear

The results presented in Table 7 suggest that the community uninsured rate does not affect the time since an insured woman's last pap smear. [11] These results seem to challenge the results for other preventive care services. One possible reason for this discrepancy is that the number of

[11] Full Results Presented in Appendix 3.1 Table 17

observations for "time since last pap smear" variables are significantly smaller than the number of observations for the other variables: pap smears are for women 21 and older only, and BRFSS did not ask this question annually. Additionally, in 2012, the US Preventive Services Task Force (USPSTF) changed their recommendations regarding pap smears. Prior to 2012, women, ages 21 and above, were recommended to receive a pap smear every year. However, after 2012, women, ages 21 to 29, were recommended to receive a pap smear every three years. For women, ages 30 and older, they were also recommended to receive a pap smear every three years unless they also received HPV testing. In the case they also received HPV testing, these women are only recommended to get a pap smear every 5 years.

Table 7: Model 6 – Time Since Last Pap Smear (2002 – 2023)

Access Outcome Variables	(1) Last Pap Smear ≥ 5 Years	(2) Last Pap Smear > 3 Years	(3) Last Pap Smear > 2 Years	(4) Last Pap Smear > 1 Year
MMSA Uninsured Rate	**0.00866**	**0.00151**	**-0.0144**	**0.0365**
	(0.0242)	**(0.0314)**	**(0.0452)**	**(0.0580)**
Mean	0.0799	0.124	0.197	0.377
Standard Deviation	0.271	0.330	0.397	0.485
Individual-Level Covariates	Yes	Yes	Yes	Yes
MMSA Level Covariates	Yes	Yes	Yes	Yes
MMSA Indicators	Yes	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes	Yes
Year x Region Indicators	Yes	Yes	Yes	Yes
N	676,621	676,621	676,621	676,621
# of MMSAs	250	250	250	250
Adjusted R^2	0.067	0.078	0.090	0.088

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

Though I include year fixed effects, the year indicators only absorb broad overall time trends and do not capture the structural changes in the relationship between the community uninsured rate and screening behavior after the 2012 guideline changes. From 2012 to 2023, the uninsured rate is likely less relevant for receiving an annual pap smear since testing every year is not recommended. However, before 2012, since insured women *would* want to receive an annual pap smear, the uninsured rate may have a larger influence. As a result, I estimate the effect of the community uninsured rate on insured women's access to pap smears from 2002 to 2011 and from 2012 to 2023, separately. These results are presented in Table 8 and 9, respectively.

When the sample is restricted to only the years 2002 to 2011, a 10 percentage point increase in the community uninsured rate increases the likelihood that an insured woman's last

pap smear was more than one year ago by 2.20 percentage points. The results suggest that there is no effect of community uninsured rate as the number of years since her last pap smear increases. These results align with the USPSTF's recommendations at the time: women 21 years and older should receive a pap smear annually. Since pap smears are preventative services which women are recommended to receive annually, and most health insurances are thus required to cover the cost at least partially, insured women may have been less likely to delay their pap smear beyond two years than to delay their pap smear by more than one year. The results regarding delaying pap smears for more than one year is consistent with the theory that communities with larger uninsured populations may have a lower demand, possibly resulting in a reduction in providers and their services. Thus, this reduction could impede insured women's timely access to pap smears.

Table 8: Model 6 – Time Since Last Pap Smear ***(2002 – 2011)***

Access Outcome Variables	(1) Last Pap Smear ≥ 5 Years	(2) Last Pap Smear > 3 Years	(3) Last Pap Smear > 2 Years	(4) Last Pap Smear > 1 Year
MMSA Uninsured Rate	**0.00889**	**0.00915**	**0.0482**	**0.220****
	(0.0438)	**(0.0491)**	**(0.0634)**	**(0.0939)**
Mean	0.063	0.096	0.148	0.303
Standard Deviation	0.242	0.295	0.355	0.459
Age	-0.00100***	0.000859**	0.00352***	0.00900***
	(0.000327)	(0.000398)	(0.000515)	(0.000679)
Age Squared	4.54e-05***	3.43e-05***	1.51e-05***	-3.57e-05***
	(4.05e-06)	(4.59e-06)	(5.70e-06)	(7.50e-06)
Race = African American	-0.0321***	-0.0436***	-0.0574***	-0.0710***
	(0.00188)	(0.00216)	(0.00286)	(0.00330)
Race = American Indian or Alaskan Native	0.00232	-0.00119	-0.00438	-0.00856
	(0.00639)	(0.00776)	(0.00825)	(0.00841)
Race = Asian	-0.00460	0.000363	0.00787*	0.0174**
	(0.00318)	(0.00304)	(0.00452)	(0.00794)
Race = Native Hawaiian or Other Pacific Islander	-0.0120**	-0.0142**	-0.00254	1.17e-05
	(0.00468)	(0.00651)	(0.00932)	(0.0110)
Race = Other	-0.00100	-0.00511	-0.00534	-0.0107
	(0.00437)	(0.00492)	(0.00574)	(0.00836)
Race = Multiracial	0.000892	0.000658	-0.00127	0.00343
	(0.00337)	(0.00408)	(0.00454)	(0.00616)
Race = Hispanic	-0.0303***	-0.0410***	-0.0507***	-0.0603***
	(0.00195)	(0.00239)	(0.00307)	(0.00454)
Race = Missing	0.00327	0.00271	0.000912	-0.0113
	(0.00573)	(0.00670)	(0.00743)	(0.00925)
Education = HS Grad	-0.00198	-0.00582*	-0.00837**	-0.00568
	(0.00259)	(0.00326)	(0.00407)	(0.00457)
Education = Attended College/Technical School	-0.00589**	-0.0104***	-0.0145***	-0.0112**
	(0.00262)	(0.00338)	(0.00421)	(0.00482)
Education = College/ Tech School Grad	-0.0202***	-0.0298***	-0.0389***	-0.0398***
	(0.00280)	(0.00364)	(0.00463)	(0.00548)
Education = Missing	-0.00662	-0.0125	-0.0187	0.0183
	(0.0151)	(0.0160)	(0.0177)	(0.0254)
Income < $15,000	0.0116***	0.0122***	0.0151***	0.0123**
	(0.00388)	(0.00426)	(0.00485)	(0.00557)
Income < $20,000	-0.00331	-0.00339	-0.000660	0.00488
	(0.00355)	(0.00436)	(0.00473)	(0.00574)
Income < $25,000	-0.00629**	-0.00748*	-0.00427	-0.00110
	(0.00319)	(0.00388)	(0.00427)	(0.00459)
Income < $35,000	-0.0137***	-0.0155***	-0.0113***	-0.00691
	(0.00292)	(0.00355)	(0.00414)	(0.00516)
Income < $50,000	-0.0201***	-0.0245***	-0.0255***	-0.0212***
	(0.00306)	(0.00354)	(0.00385)	(0.00490)
Income < $75,000	-0.0281***	-0.0370***	-0.0414***	-0.0410***
	(0.00292)	(0.00353)	(0.00384)	(0.00491)
Income > $75,000	-0.0379***	-0.0527***	-0.0616***	-0.0699***
	(0.00311)	(0.00373)	(0.00406)	(0.00543)
Income = Missing	-0.0304***	-0.0408***	-0.0473***	-0.0500***
	(0.00301)	(0.00364)	(0.00432)	(0.00559)
Employed	-0.0167***	-0.0224***	-0.0279***	-0.0312***
	(0.00182)	(0.00213)	(0.00254)	(0.00326)
Student	-0.0175***	-0.0218***	-0.0245***	-0.0238***
	(0.00227)	(0.00305)	(0.00408)	(0.00557)
Homemaker	-0.0252***	-0.0328***	-0.0426***	-0.0484***
	(0.00290)	(0.00321)	(0.00367)	(0.00450)
Retire	-0.0187***	-0.0245***	-0.0292***	-0.0338***
	(0.00205)	(0.00241)	(0.00300)	(0.00399)
Employment Status = Missing	-0.0241***	-0.0242**	-0.0394***	-0.0326*
	(0.00813)	(0.0110)	(0.0124)	(0.0166)

Table 8: Model 6 – Time Since Last Pap Smear ***(2002 – 2011)***

Access Outcome Variables	(1) Last Pap Smear ≥ 5 Years	(2) Last Pap Smear > 3 Years	(3) Last Pap Smear > 2 Years	(4) Last Pap Smear > 1 Year
# of Children = 1	-0.00724***	-0.00852***	-0.0121***	-0.00859***
	(0.00108)	(0.00126)	(0.00153)	(0.00237)
# of Children > 1	-0.00662***	-0.00530***	-0.00246*	0.0147***
	(0.00101)	(0.00120)	(0.00146)	(0.00209)
# of Children = Missing	-0.0127*	-0.0207***	-0.0125	-0.0226
	(0.00708)	(0.00780)	(0.0109)	(0.0163)
General Health = Very Good	0.00268***	0.00556***	0.0100***	0.0201***
	(0.000789)	(0.00105)	(0.00129)	(0.00174)
General Health = Good	0.0160***	0.0257***	0.0362***	0.0512***
	(0.00109)	(0.00140)	(0.00171)	(0.00216)
General Health = Fair	0.0363***	0.0515***	0.0693***	0.0847***
	(0.00196)	(0.00254)	(0.00290)	(0.00320)
General Health = Poor	0.0738***	0.0959***	0.112***	0.117***
	(0.00362)	(0.00395)	(0.00418)	(0.00444)
General Health = Missing	0.0160*	0.0198**	0.0404***	0.0703***
	(0.00871)	(0.00889)	(0.0109)	(0.0149)
Log(Total MMSA Population)	-0.0948	-0.211**	-0.280**	-0.202
	(0.0765)	(0.0975)	(0.135)	(0.172)
Log(MMSA Income Per Capita)	-0.210**	-0.160	-0.286*	-0.641***
	(0.101)	(0.116)	(0.173)	(0.230)
MMSA Unemployment Rate	0.000217	-0.00142	-0.00319	-0.00786
	(0.00220)	(0.00278)	(0.00361)	(0.00480)
Share of MMSA in Poverty	0.0230	0.0783	0.0500	0.00278
	(0.105)	(0.117)	(0.158)	(0.174)
% of MMSA on Medicaid	-0.000672	0.00169	-0.00509	-0.00222
	(0.00279)	(0.00313)	(0.00503)	(0.00699)
Share of MMSA over 65	-1.208**	-1.046*	-1.458*	-4.932***
	(0.503)	(0.588)	(0.844)	(1.334)
Share of MMSA < 18	0.522	1.989	2.406	-0.575
	(1.060)	(1.486)	(2.003)	(2.759)
MMSA Income Per Capita x Percent of MMSA on Medicaid	2.68e-08	-4.66e-08	1.04e-07	1.88e-08
	(6.99e-08)	(7.86e-08)	(1.31e-07)	(1.82e-07)
MMSA Income Per Capita x Share of MMSA > 65	0.000	0.000	0.000	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	4.073**	4.695*	6.312*	4.484
	(2.048)	(2.656)	(3.299)	(4.261)
MMSA Indicators	Yes	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes	Yes
Year x Region Indicators	Yes	Yes	Yes	Yes
N	401,243	401,243	401,243	401,243
# of MMSAs	218	218	218	218
Adjusted R^2	0.052	0.062	0.068	0.060

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

When the sample is restricted to the years 2012 to 2023, a statistically significant effect of the community uninsured rate on the likelihood that an insured woman's last pap smear was five or more years ago and on the likelihood that an insured woman's last pap smear was more than three years ago is observed. Specifically, as the community uninsured rate increases by 10 percentage points, the likelihood that an insured woman's last pap smear was five or more years ago increases by 1.90 percentage points ($p < 0.10$). Additionally, a 10 percentage point increase in the community uninsured rate increases an insured woman's probability that her last pap

smear was more than three years ago by 2.31 percentage points ($p < 0.10$). However, as the number of years since her last pap smear decreases, no statistically significant effect is observed. Again, this is consistent with the USPSTF's recommendations at the time. Women were recommended to receive a pap smear every three or five years. Thus, waiting more than a year or more than two years is now perceived as medically acceptable rather than a sign of impeded access. When cervical cancer screenings are delayed beyond the recommended interval (five or more years or more than three years) the observed statistically significant effects suggest that the high uninsured rate in the community may create negative externalities for insured women.

Table 9: Model 6 – Time Since Last Pap Smear ***(2012 – 2023)***

Access Outcome Variables	(1) Last Pap Smear ≥ 5 Years	(2) Last Pap Smear > 3 Years	(3) Last Pap Smear > 2 Years	(4) Last Pap Smear > 1 Year
MMSA Uninsured Rate	**0.190***	**0.231***	**0.0127**	**-0.0643**
	(0.102)	**(0.123)**	**(0.147)**	**(0.163)**
Mean	0.099	0.155	0.250	0.459
Standard Deviation	0.299	0.362	0.433	0.498
Age	-0.000753	0.00136**	0.00377***	0.00598***
	(0.000456)	(0.000622)	(0.000802)	(0.000761)
Age Squared	5.84e-05***	4.62e-05***	3.16e-05***	6.07e-06
	(4.84e-06)	(6.53e-06)	(8.26e-06)	(8.28e-06)
Race = African American	-0.0482***	-0.0635***	-0.0785***	-0.0936***
	(0.00228)	(0.00259)	(0.00272)	(0.00397)
Race = American Indian or Alaskan Native	-0.00316	-0.00786	-0.0111	-0.00798
	(0.00687)	(0.00808)	(0.00962)	(0.0102)
Race = Asian	-0.0120***	-0.00272	0.00905	0.0223***
	(0.00274)	(0.00443)	(0.00687)	(0.00659)
Race = Native Hawaiian or Other Pacific Islander	-0.0387***	-0.0477***	-0.0448***	-0.0550***
	(0.00956)	(0.0116)	(0.0172)	(0.0207)
Race = Other	-0.0129**	-0.0176**	-0.0133	-0.0202*
	(0.00638)	(0.00734)	(0.00876)	(0.0119)
Race = Multiracial	0.00773**	0.00775	0.00806	-0.00730
	(0.00390)	(0.00475)	(0.00566)	(0.00646)
Race = Hispanic	-0.0435***	-0.0542***	-0.0576***	-0.0604***
	(0.00263)	(0.00332)	(0.00399)	(0.00488)
Race = Missing	-0.0118**	-0.0135**	-0.0197**	-0.0409***
	(0.00562)	(0.00669)	(0.00823)	(0.00775)
Education = HS Grad	0.00358	0.00263	0.000502	-0.00329
	(0.00419)	(0.00538)	(0.00604)	(0.00585)
Education = Attended College/Technical School	0.000131	-0.00114	-0.00379	-0.00419
	(0.00449)	(0.00564)	(0.00625)	(0.00608)
Education = College/ Tech School Grad	-0.0233***	-0.0305***	-0.0317***	-0.0237***
	(0.00453)	(0.00571)	(0.00652)	(0.00653)
Education = Missing	0.00232	-0.0165	-0.0154	-0.0259
	(0.0150)	(0.0174)	(0.0251)	(0.0256)
Income < $15,000	0.0109**	0.0183***	0.0155**	0.00944
	(0.00537)	(0.00585)	(0.00653)	(0.00707)
Income < $20,000	0.00290	0.00377	0.00393	0.00258
	(0.00542)	(0.00582)	(0.00624)	(0.00701)
Income < $25,000	-0.00332	1.04e-05	-0.00235	0.000998
	(0.00479)	(0.00523)	(0.00589)	(0.00631)
Income < $35,000	-0.00830*	-0.0107**	-0.00871	0.00152
	(0.00493)	(0.00513)	(0.00572)	(0.00633)
Income < $50,000	-0.0115**	-0.0136***	-0.0114*	-0.00448
	(0.00442)	(0.00488)	(0.00590)	(0.00657)
Income < $75,000	-0.0228***	-0.0268***	-0.0251***	-0.0159**
	(0.00438)	(0.00504)	(0.00630)	(0.00666)
Income > $75,000	-0.0400***	-0.0482***	-0.0500***	-0.0410***
	(0.00470)	(0.00515)	(0.00619)	(0.00632)
Income = Missing	-0.0308***	-0.0391***	-0.0449***	-0.0396***
	(0.00459)	(0.00487)	(0.00537)	(0.00616)
Employed	-0.0287***	-0.0334***	-0.0311***	-0.0259***
	(0.00216)	(0.00257)	(0.00313)	(0.00373)
Student	-0.0277***	-0.0274***	-0.0170***	-0.0106
	(0.00343)	(0.00480)	(0.00517)	(0.00704)
Homemaker	-0.0313***	-0.0373***	-0.0367***	-0.0333***
	(0.00375)	(0.00427)	(0.00503)	(0.00575)
Retire	-0.0267***	-0.0313***	-0.0245***	-0.00924*
	(0.00280)	(0.00338)	(0.00430)	(0.00475)
Employment Status = Missing	-0.0320***	-0.0441***	-0.0413***	-0.0393**
	(0.00981)	(0.0104)	(0.0118)	(0.0168)
# of Children = 1	-0.0118***	-0.0137***	-0.0167***	-0.0128***
	(0.00172)	(0.00203)	(0.00249)	(0.00265)
# of Children > 1	-0.0110***	-0.0102***	-0.00551**	0.00281
	(0.00161)	(0.00204)	(0.00252)	(0.00281)
# of Children = Missing	-0.0158*	-0.0333***	-0.0408***	-0.00922
	(0.00808)	(0.00998)	(0.0131)	(0.0149)

Table 9: Model 6 – Time Since Last Pap Smear *(2012 – 2023)*

Access Outcome Variables	(1) Last Pap Smear ≥ 5 Years	(2) Last Pap Smear > 3 Years	(3) Last Pap Smear > 2 Years	(4) Last Pap Smear > 1 Year
General Health = Very Good	0.00754***	0.0125***	0.0177***	0.0256***
	(0.00138)	(0.00172)	(0.00192)	(0.00202)
General Health = Good	0.0253***	0.0377***	0.0468***	0.0522***
	(0.00178)	(0.00199)	(0.00240)	(0.00271)
General Health = Fair	0.0595***	0.0766***	0.0867***	0.0828***
	(0.00278)	(0.00348)	(0.00419)	(0.00465)
General Health = Poor	0.0950***	0.118***	0.123***	0.110***
	(0.00467)	(0.00519)	(0.00577)	(0.00557)
General Health = Missing	0.0105	0.0254	0.0189	0.0254
	(0.0135)	(0.0174)	(0.0229)	(0.0248)
Log(Total MMSA Population)	-0.297	0.789	-0.637	-0.146
	(0.944)	(1.418)	(1.636)	(1.578)
Log(MMSA Income Per Capita)	0.153	0.402	-0.620	-0.605
	(0.272)	(0.407)	(0.418)	(0.568)
MMSA Unemployment Rate	-0.00132	0.00402	0.00628	0.00121
	(0.00457)	(0.00657)	(0.00778)	(0.00761)
Share of MMSA in Poverty	0.0384	0.262	-0.231	-0.113
	(0.361)	(0.409)	(0.484)	(0.505)
% of MMSA on Medicaid	-0.0163	-0.00788	-0.0252	-0.0284
	(0.0104)	(0.0157)	(0.0215)	(0.0223)
Share of MMSA over 65	-0.181	0.156	-3.871	-4.086
	(1.840)	(2.874)	(3.110)	(4.119)
Share of MMSA < 18	3.537	4.602	2.256	1.649
	(3.869)	(5.543)	(6.471)	(7.535)
MMSA Income Per Capita x Percent of MMSA on Medicaid	3.72e-07*	2.09e-07	5.69e-07	5.83e-07
	(2.00e-07)	(3.00e-07)	(4.10e-07)	(4.47e-07)
MMSA Income Per Capita x Share of MMSA > 65	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000	(0.000
Constant	2.325	-15.65	15.96	8.767
	(13.94)	(21.49)	(23.98)	(22.70)
MMSA Indicators	Yes	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes	Yes
Year x Region Indicators	Yes	Yes	Yes	Yes
N	275,378	275,378	275,378	275,378
# of MMSAs	213	213	213	213
Adjusted R^2	0.074	0.080	0.081	0.070

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

6.3: Balanced Samples

To ensure that the results are not driven by some unobserved confounder associated with the MMSAs entering and exiting the data, I estimate the effect of the community uninsured rate on access in a balanced sample, which includes only the MMSAs that appear for every year of the sample period. The balanced panel results are presented in Table 10. Except for "has at least one personal doctor", "more than one year since last cholesterol check", and "more than three years since last pap smear", the statistical significance of the results from the unbalanced sample hold. The statistically significant results estimate a somewhat larger effect of community uninsured rates on access though. Selection bias may be driving this larger effect: MMSAs are included if at least 500 interviews are conducted. These will tend to be the largest MMSAs which

likely have greater uninsured rates. It's possible that a statistically significant effect is no longer observed for "has at least one personal doctor", "more than one year since last cholesterol check, and "more than three years since last pap smear" because the sample size greatly decreases in the balanced sample compared to the original unbalanced sample. Compared to the unbalanced sample, only 52 MMSAs are included rather than 260 and almost half of the observations are excluded. As a result, I estimate the effect across these eight access outcome variables including (1) only MMSAs that appear for at least 15 years and (2) only MMSAs that appear for at least 5 years. These results are presented in Table 11 and Table 12, respectively. As the sample size increases, the statistical significance of three variables returns.

Table 10: *Balanced Panel*: Only MMSAs that appeared all 22 years

Access Outcome Variables	(1) Has At Least 1 Personal Doctor	(2) Last Physical Exam > 2 Yrs	(3) Last Physical Exam > 1 Yr	(4) Last Cholesterol Check > 2 Yrs	(5) Last Cholesterol Check > 1 Yr	(6) Last Pap Smear > 5 Yrs	(7) Last Pap Smear > 3 Yrs	(8) Last Pap Smear > 1 Year
MMSA Uninsured Rate	**-0.0439**	**0.0928*** **	**0.164*** **	**0.104** **	**0.0997**	**0.312** **	**0.223**	**0.318** **
	(0.0300)	**(0.0286)**	**(0.0438)**	**(0.0413)**	**(0.0773)**	**(0.128)**	**(0.176)**	**(0.141)**
Mean	0.864	0.128	0.264	0.127	0.277	0.099	0.157	0.294
Standard Deviation	0.343	0.334	0.441	0.333	0.448	0.299	0.364	0.456
MMSA indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA-level covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
All Individual covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year by Region Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,615,821	1,448,527	1,448,527	729,842	729,842	158,968	158,968	196,821
# of MMSAs	52	52	52	52	52	52	52	52
Years	2002 - 2023	2002 - 2023	2002 - 2023	2002 - 2023	2002 - 2023	2012 – 2023	2012 – 2023	2002 - 2011
Adjusted R^2	0.087	0.046	0.055	0.035	0.058	0.075	0.080	0.060

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

Table 11: Only MMSAs that Appear for at least 15 years

Access Outcome Variables	(1) Has At Least 1 Personal Doctor	(2) Last Physical Exam > 2 Yrs	(3) Last Physical Exam > 1 Yr	(4) Last Cholesterol Check > 2 Yrs	(5) Last Cholesterol Check > 1 Yr	(6) Last Pap Smear > 5 Yrs	(7) Last Pap Smear > 3 Yrs	(8) Last Pap Smear > 1 Year
MMSA Uninsured Rate	**-0.0520** **	**0.0581*** **	**0.0831** **	**0.0906*** **	**0.111** **	**0.123**	**0.146**	**0.235** **
	(0.0215)	**(0.0220)**	**(0.0334)**	**(0.0304)**	**(0.0543)**	**(0.100)**	**(0.122)**	**(0.113)**
Mean	0.862	0.129	0.263	0.124	0.271	0.100	0.157	0.296
Standard Deviation	0.344	0.335	0.440	0.330	0.444	0.301	0.364	0.457
MMSA indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA-level covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
All Individual covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year by Region Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,310,241	2,077,776	2,077,776	1,035,593	1,035,593	221,974	221,974	296,113
# of MMSAs	100	100	100	100	100	100	100	100
Years	2002 - 2023	2002 - 2023	2002 - 2023	2002 - 2023	2002 - 2023	2012 - 2023	2012 - 2023	2002 - 2011
Adjusted R^2	0.086	0.045	0.055	0.035	0.057	0.075	0.081	0.061

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

Table 12: Only MMSAs that Appear for At Least 5 Years

Access Outcome Variables	(1) Has At Least 1 Personal Doctor	(2) Last Physical Exam > 2 Yrs	(3) Last Physical Exam > 1 Yr	(4) Last Cholesterol Check > 2 Yrs	(5) Last Cholesterol Check > 1 Yr	(6) Last Pap Smear > 5 Yrs	(7) Last Pap Smear > 3 Yrs	(8) Last Pap Smear > 1 Year
MMSA Uninsured Rate	**-0.0301***	**0.0581*****	**0.0847*****	**0.0884*****	**0.123****	**0.190***	**0.231***	**0.233****
	(0.0180)	**(0.0181)**	**(0.0269)**	**(0.0276)**	**(0.0488)**	**(0.102)**	**(0.123)**	**(0.0948)**
Mean	0.863	0.130	0.265	0.124	0.271	0.099	0.155	0.301
Standard Deviation	0.344	0.337	0.441	0.330	0.444	0.299	0.362	0.459
MMSA indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA-level covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
All Individual covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year by Region Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2,857,413	2,568,955	2,568,955	1,270,833	1,270,833	271,899	271,899	392,162
# of MMSAs	206	206	206	206	206	197	197	181
Years	2002 - 2023	2002 - 2023	2002 - 2023	2002 - 2023	2002 - 2023	2012 - 2023	2012 – 2023	2002 - 2011
Adjusted R^2	0.085	0.044	0.055	0.035	0.057	0.075	0.081	0.060

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

6.4: Placebo Outcomes

Table 13: *Placebo Outcome:* Income

Variables	(1) Income < $10,000	(2) Income < $15,000	(3) Income < $20,000	(4) Income < $25,000	(5) Income < $35,000	(6) Income < $50,000	(7) Income < $75,000	(8) Income > $75,000
MMSA Uninsured Rate	0.00705	0.00236	-0.00673	-0.0230	-0.0134	0.00318	0.00204	-0.00204
	(0.00822)	(0.0116)	(0.0139)	(0.0192)	(0.0206)	(0.0214)	(0.0225)	(0.0225)
MMSA indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA-level covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Some Individual covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year by Region Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2,567,901	2,567,901	2,567,901	2,567,901	2,567,901	2,567,901	2,567,901	2,567,901
# of MMSAs	260	260	260	260	260	260	260	260
Adjusted R^2	0.075	0.130	0.181	0.219	0.247	0.256	0.239	0.239

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

To test whether there are unobserved confounding factors that could be biasing the results, I estimate the effect of the community uninsured rate on individual income level and unemployment. Originally, I held income and employment status as controls. In these regressions, I remove these controls as well as self-reported general health and number of children. For both variables, I find no statistically significant effect of community uninsured rate on individual income level and unemployment. This suggests that the observed effect on access is driven by the community uninsured rate rather than other confounding factors like the socioeconomic status of the community.

Table 14: *Placebo Outcome*: Unemployment

VARIABLES	(1) Unemployed
MMSA Uninsured Rate	-0.0144
	(0.0143)
MMSA indicators	Yes
Year indicators	Yes
MMSA specific linear trends	Yes
MMSA-level covariates	Yes
Some Individual covariates	Yes
MMSA specific quadratic trends	Yes
Year by Region Indicators	Yes
N	2,431,476
# of MMSAs	260
Adjusted R^2	0.252

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

6.5: Missing Observations Dropped

As mentioned in the Section 5, I create an additional categorical level for missing values for each individual-level covariate so that these observations would not be dropped from the regressions. To ensure this does not greatly impact my results, I estimate the effect of community uninsurance on access excluding these missing observations. These results are presented in Table 15. Mostly, I observe very similar effects: statistical significance holds, and the estimates are only slightly smaller. The only result that differs is the effect of community uninsurance on the likelihood that an insured individual has at least one personal doctor. In the original sample, a negative statistically significant effect ($p < 0.10$) is observed. However, when excluding over 500,000 missing observations, there is now no statistically significant effect. The full results are presented in Appendix Section 3.1 Table 18.

Table 15: Model 6 – Access Outcome Variables *Missing Observations Dropped*

Access Outcome Variables	(1) Skipped Care Due to Cost	(2) At Least 1 Personal Dr.	(3) Last Physical Exam ≥ 5 Yrs	(4) Last Physical Exam > 2 Yrs	(5) Last Physical Exam > 1 Yr	(6) Last Cholesterol Check ≥ 5 Yrs	(7) Last Cholesterol Check > 2 Yrs	(8) Last Cholesterol Check > 1 Yr	(10) Last Pap Smear ≥ 5 Yrs	(11) Last Pap Smear > 3 Yrs	(9) Last Pap Smear > 1 Yr
MMSA Uninsured Rate	**0.0105**	**-0.0233**	**0.0175**	**0.0572*** **	**0.0800*** **	**0.000238**	**0.0771*** **	**0.119** **	**0.204** **	**0.228***	**0.260*** **
	(0.0121)	**(0.0176)**	**(0.0114)**	**(0.0175)**	**(0.0270)**	**(0.0144)**	**(0.0292)**	**(0.0502)**	**(0.103)**	**(0.124)**	**(0.0971)**
Mean	0.0902	0.8683	0.0611	0.1341	0.2706	0.0399	0.1267	0.2738	0.0988	0.1548	0.3031
Standard Deviation	0.2864	0.3381	0.2396	0.3408	0.4442	0.1957	0.3327	0.4459	0.2985	0.3618	0.4596
Individual-Level Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA Level Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year x Region Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Years	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2012 – 2023	2012 – 2023	2002 – 2011
N	2,335,045	2,399,547	2,145,007	2,145,007	2,145,007	1,130,626	1,130,626	1,130,626	242,487	242,487	357,403
# of MMSAs	260	260	260	260	260	257	257	257	213	213	218
Adjusted R^2	0.075	0.083	0.028	0.046	0.056	0.013	0.036	0.058	0.075	0.081	0.061

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

Due to the nature of my main dataset, this paper has some limitations. First, I utilize self-reported data which may be inaccurate due to recall bias. Additionally, the external validity of my results is relatively limited. There may be some selection bias: the MMSAs that are surveyed are not randomly selected. Secondly, communities are defined at the MMSA-level. Though previous literature (Sabik, 2011; Gresenz & Escarce, 2011) often uses the same definition, it's possible that an MMSA is not the appropriate definition for a community in terms of size. Possibly, a MMSA is too small. Other than at the MMSA-level, most data available is at the county level or the state level. Since people can travel across counties to receive health care, I believed that defining communities at the county level was not an appropriate definition. On the other hand, the state-level seems too large to be considered a community in which everyone shares the same set of health care resources. Additionally, using MMSAs restricts my investigation to primarily urban areas. It would be interesting to see if rural areas with a high uninsured rate an additional effect on the insured's access to health care as the remoteness of an area can play a huge role in healthcare access. If data exists, defining communities using commuting zones, which don't require an urban center, may allow for this investigation.

SMART BRFSS primarily focuses on primary care and preventative services like physical exams, cholesterol checks, and pap smears. In the future, I would like to investigate whether community uninsured rate influences access on more specialized care like orthopedics. Further, the BRFSS data I have does not allow me to directly determine the mechanisms behind the externalities of community uninsurance. As a future extension, I would use data on the number of physicians in the area to explore whether some of the observed effects are due to the health care market shrinking in the presence of a greater uninsured population.

7. Conclusion

Today, discussions about the uninsured rate in the US primarily focuses on how a lack of health care coverage can directly harm an uninsured individual. Largely motivated by these negative effects, policies like the Affordable Care Act (ACA) and Medicaid expansion were adopted to reduce the uninsured rate. However, because these policies are primarily framed as helping only the uninsured, these policies have sparked controversy.

In this paper, I investigate how the community uninsured rate may harm more than just the uninsured: the insured in that community may also be negatively affected. Contributing to past research, I utilize data which includes the adoption of the ACA and Medicaid expansion to estimate the effect of the community uninsured rate on the insured's access to healthcare. Using MMSA fixed effects and year fixed effects, my results suggest that the community uninsured rate can create negative externalities for the insured population. Specifically, I find that an increase in the community uninsured rate reduces the likelihood that an insured individual has at least one personal doctor and increases the likelihood that an insured individual delays his/her physical exam, cholesterol check, and pap smear. These results suggest that policies like the ACA and Medicaid expansion may have widespread benefits: not only for the uninsured but also for the insured.

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Appendix

Section 1:

Appendix Table 1: Insured Individuals Descriptive Statistics: *Demographic Variables for Insured Individuals (2002 to 2023)*

	(1) Mean	(2) Median	(3) SD	(4) Min	(5) Max	(6) N
Age	45.384	47	12.568	18	64	2, 916, 786
Race [12]	2.029	1	2.235	1	9	2, 916, 786
Male[13]	0.492	0	0.579	0	2	2, 916, 786
Education Level[14]	3.150	3	0.926	1	5	2, 916, 786
Income [15]	6.750	8	2.006	1	9	2, 916, 786
Employment Status [16]	1.256	1	1.002	0	5	2, 916, 786
Self-reported General Health [17]	2.361	2	1.054	1	6	2, 916, 786
Number of Children[18]	0.668	0	0.870	0	3	2, 916, 786

Appendix Table 2: MMSA Descriptive Statistics: *MMSA Uninsured Rate and MMSA Demographic Variables (2002 to 2023)*

	(1) Mean	(2) Median	(3) SD	(4) Min	(5) Max	(6) N	(7) # of MMSAs
Uninsured Rate	0.156	0.148	0.068	0.018	0.646	3,130	260
Population	1,370,141	720,907	1,893,793	27,489	14,826,446	3,130	260
Income per capita	46,984.350	42,952	35635.450	19,621	1,117,014	3,130	260
Unemployment rate (%)	5.475	5.035	2.290	.985	17.4	3,130	260
Share of Population in Poverty	.126	.122	0.040	0.004	0.341	3,130	260
Share of Population 65 and older	0.188	.180	0.041	0.068	0.416	3,130	260
Percent of population on Medicaid (%)	16.7728	16.3	5.074	5.353	41.185	3,130	260
Share of Population < 18	0.234	0.234	0.39	0.029	0.478	3,130	260

[12] **Race** (1 – 9): White, not Hispanic (**1**), African American, not Hispanic (**2**), American Indian or Alaskan Native, not Hispanic (**3**), Asian, not Hispanic (**4**), Native Hawaiian or other Pacific Islander, not Hispanic (**5**), Other (**6**), or Multiracial, not Hispanic (**7**), Hispanic **(8)**, Missing (**9)**

[13] **Male** (0 – 2): Female **(0)**, Male **(1)**, Missing **(2)**

[14] **Education Level** (1 – 5): Did not graduate high school **(1)**, Graduated high school **(2)**, Attended college or technical school **(3)**, Graduated from College or Technical school **(4)**, Missing **(5)**

[15] **Income** (1 – 9): less than $10,000 (**1**), less than $15,000 (**2**), less than $20,000 (**3**), less than $25,000 (**4**), less than $35,000 (**5**), less than $50,000 (**6**), less than $75,000 (**7**), more than $75,000 (**8**), Missing **(9)**

[16] **Employment Status** (0 – 5): unemployed (**0**), employed (**1**), student (**2**), homemaker (**3**), retired (**4**), Missing **(5)**

[17] **Self-Reported General Health** (1 – 6): excellent (**1**), very good (**2**), good (**3**), fair (**4**), poor (**5**), Missing (**6**)

[18] **Number of Children** (0 – 3): Has 0 children **(0)**, Has 1 child **(1)**, Has more than 1 Child **(2)**, Missing **(3)**

Appendix Table 3: Descriptive Statistics: *Access Outcome Variables for Insured Individuals*

(Segmented by Uninsurance Rate Level)

Panel A: Insured Individuals in MMSAs with uninsurance rates ≤ .077 (10th percentile)

	Mean	Median	SD	Min	Max	N
Skipped Care due to Cost	0.075	0.000	0.263	0	1	354,942
Has At Least 1 Personal Doctor	0.885	1.000	0.319	0	1	357,223
Last Physical Exam ≥ 5 Years Ago	0.042	0.000	0.201	0	1	350,523
Last Physical Exam > 2 Years Ago	0.107	0.000	0.309	0	1	350,523
Last Physical Exam > 1 Year Ago	0.238	0.000	0.426	0	1	350,523
Last Cholesterol Check ≥ 5 Years Ago	0.036	0.000	0.186	0	1	161,395
Last Cholesterol Check > 2 Years Ago	0.122	0.000	0.327	0	1	161,395
Last Cholesterol Check > 1 Year Ago	0.275	0.000	0.447	0	1	161,395
Last Pap Smear ≥ 5 Years Ago	0.074	0.000	0.261	0	1	50,291
Last Pap Smear > 3 Years Ago	0.120	0.000	0.324	0	1	50,291
Last Pap Smear > 2 Years Ago	0.206	0.000	0.404	0	1	50,291
Last Pap Smear > 1 Year Ago	0.407	0.000	0.491	0	1	50,291

Panel B: Insured Individuals in MMSAs with uninsurance rates ≥ .245 (90th percentile)

	Mean	Median	SD	Min	Max	N
Skipped Care due to Cost	0.121	0.000	0.326	0	1	152,564
Has At Least 1 Personal Doctor	0.839	1.000	0.367	0	1	155,185
Last Physical Exam ≥ 5 Years Ago	0.071	0.000	0.257	0	1	139,258
Last Physical Exam > 2 Years Ago	0.141	0.000	0.348	0	1	139,258
Last Physical Exam > 1 Year Ago	0.271	0.000	0.444	0	1	139,258
Last Cholesterol Check ≥ 5 Years Ago	0.035	0.000	0.183	0	1	75,701
Last Cholesterol Check > 2 Years Ago	0.109	0.000	0.312	0	1	75,701
Last Cholesterol Check > 1 Year Ago	0.239	0.000	0.427	0	1	75,701
Last Pap Smear ≥ 5 Years Ago	0.083	0.000	0.276	0	1	40,024
Last Pap Smear > 3 Years Ago	0.126	0.000	0.332	0	1	40,024
Last Pap Smear > 2 Years Ago	0.189	0.000	0.391	0	1	40,024
Last Pap Smear > 1 Year Ago	0.358	0.000	0.479	0	1	40,024

Section 2: Changes to MMSAs

2.1: MMSA's IDs

For MMSAs where their ID number change, but the county composition remained the same, I treated them as the same MMSA. Table 4 lists the MMSAs where this method is applied.

Table 4: MMSAs With Same County Composition

MMSA ID →	REASSIGNED MMSA ID
Urban Honolulu (46520) →	Honolulu (26180)
Boston-Quincy (14484) →	Boston (14454)
Warren-Farmington Hills-Troy (47644) →	Warren-Troy-Farmington Hills (47664)
Suffolk County-Nassau County (44844) →	Nassau-Suffolk (35004)
Dayton (19380) →	Dayton-Kettering (1943)
Edison (20764) →	New Brunswick-Lakewood (35154)
Santa Ana-Anaheim-Irvine (42044) →	Anaheim-Santa Ana-Irvine (11244)
Bethesda-Frederick-Gaithersburg (13644) →	Frederick-Gaithersburg-Rockville (23224)
Silver Spring-Frederick-Rockville (43524) →	Frederick-Gaithersburg-Rockville (23224)
Claremont-Lebanon (17200) →	Lebanon (30100)

For some MMSAs, the county composition changed, but the MMSA ID did not change. In the original data, New York-Wayne-White Plains (35644) is reported from 2002 to 2013. This MMSA is replaced in 2013 by New York-Jersey City-White Plains (35614). Unlike New York-Wayne-White Plains (35644), from 2013 to 2017, New York-Jersey City-White Plains (35614) also contains Middlesex County, Monmouth County, and Ocean County in New Jersey. However, in 2018 to 2023, these three counties are removed, and New York-Jersey City-White Plains (35614) is identical to New York-Wayne-White Plains (35644). Consequently, I reassigned individuals in 2018 to 2023 residing in New York-Jersey City-White Plains (35614) to the New York-Wayne-White Plains' MMSA (35644). Additionally, Newark-Union (35084) contains Somerset County in 2013 to 2017 which it does not in the years prior to 2013 and after 2017. For individuals residing in Newark-Union in 2013 to 2017, I generated a new MMSA ID number (35085) to account for the MMSA's composition change. Similarly, Worcester, MA (49340) adds Windham County in 2013 to 2023. To adjust for the difference in Worcester's composition, I generate a new MMSA ID number (49341) for individuals in Worcester from 2013 to 2023. Originally, the OMB defined Essex County, MA (21604) as one MMSA from 2002 to 2008. They renamed this MMSA and gave it a new MMSA ID number Peabody, MA (37764) from 2009 to 2012. At the same time, Cambridge-Newton-Framingham (15764) contained only Middlesex County, MA from 2002 to 2012. Then, from 2013 to 2023, Cambridge-Newton-Framingham (15764) included both Essex County and Middlesex County. Because Cambridge-Newton-Framingham's MMSA ID number did not change despite its composition change, I reassigned individuals in Essex County, MA (21604) and Peabody, MA (37764) to Cambridge-Newton-Framingham's MMSA (15764). Thus, individuals with MMSA ID 15764 will be from both Essex and Middlesex County for all years 2002 to 2023.

2.2: MMSA Income Per Capita & Population

Beginning in 2013, Seaford, DE (42580) was absorbed into Salisbury, DE-MD (41540). As a result, through the BEA, I am unable to directly find MMSA-level data for Seaford, DE (42580). Because Seaford, DE (42580) is composed of only Sussex County, I use the income per capita and population data for Sussex County to determine Seaford's income per capita and

population.[19] Similarly, because the current Newark-Union (35084) differs from Newark (35085) in years 2013 to 2017, I also use county-level data from the BEA to construct the MMSA's total population and income per capita. Specifically, the income per capita for Newark (35085) is calculated by taking a population weighted average of its counties' income per capita. This method is also used to calculate New York-Jersey City-White Plains' (35614) total population and income per capita.

Appendix Table 5: New England MMSAs: *Unemployment Rate Calculated Through County-Level Data*

MMSA ID	MMSA Name	Years
12300	Augusta-Waterville, ME	2007 - 2012
12620	Bangor, ME	2007 - 2012
12700	Barnstable Town, MA	2007 - 2012
12740	Barre, VT	2004 - 2012
13620	Berlin, NH-VT	2008 - 2016
14454	Boston	2002 - 2021
14860	Bridgeport-Stamford-Norwalk, CT	2002 - 2012
15764	Cambridge-Newton-Framingham, MA	2002 - 2021
18180	Concord, NH	2002 - 2012
25450	Hartford-West Hartford-East Hartford, CT	2002 - 2021
30100	Lebanon, VT	2002 - 2021
30340	Lewiston - Auburn, ME	2010 - 2012
31700	Manchester - Nashua, NH	2002 - 2012
35154	New Brunswick - Lakewood, NJ	2002 - 2011, 2018 - 2021
35300	New Haven - Milford, CT	2002 - 2012
35980	Norwich - New London, CT	2002 - 2012
38860	Portland-South Portland-Biddeford, ME	2002 - 2021
39100	Poughkeepsie - Newburgh- Middletown, NJ	2018- 2021
39300	Providence-New Bedford-Fall River, RI - MA	2002 - 2021
40484	Rockingham Country - Strafford County, NH	2002 - 2021
40860	Rutland, VT	2004 - 2012
44140	Springfield, MA	2002 - 2021
49340	Worcester, MA	2002 - 2013
49341	Worcester-Windham, MA	2013 - 2021
35084	Newark-Union	2002-2013, 2018- 2021
35085	Newark	2013 - 2017
35614	New York - Jersey City - White Plains, NY-NJ	2013 - 2017
35664	New York - Wayne - White Plains, NY-NJ	2002 - 2012, 2018 - 2021

[19] The same is done to construct Seaford, DE's unemployment rate: I utilize Sussex County's unemployment rate to determine Seaford's unemployment rate.

Section 3: More Results Tables

Appendix 3.1 Table 6: Skipped Care Due to Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.0124	0.0183	0.0137	0.0153	0.0185	0.0146	0.0149
	(0.0122)	(0.0119)	(0.0115)	(0.0116)	(0.0115)	(0.0115)	(0.0114)
Mean	0.092	0.092	0.092	0.092	0.092	0.092	0.092
Standard Deviation	0.289	0.289	0.289	0.289	0.289	0.289	0.289
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	2,833,424	2,833,424	2,833,424	2,833,424	2,833,424	2,833,424	2,833,424
# of MMSAs	260	260	260	260	260	260	260
Adjusted R^2	0.005	0.024	0.024	0.071	0.071	0.071	0.071

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

Appendix 3.1 Table 7: Last Physical Exam ≥ 5 Years

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.0120	0.0173	0.0197*	0.0200*	0.0108	0.0147	0.0130
	(0.0108)	(0.0107)	(0.0102)	(0.0102)	(0.0104)	(0.0105)	(0.0106)
Mean	0.060	0.060	0.060	0.060	0.060	0.060	0.060
Standard Deviation	0.237	0.237	0.237	0.237	0.237	0.237	0.237
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
Observations	2,615,241	2,615,241	2,615,241	2,615,241	2,615,241	2,615,241	2,615,241
# of MMSAs	260	260	260	260	260	260	260
Adjusted R^2	0.010	0.024	0.024	0.027	0.027	0.027	0.027

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

Appendix 3.1 Table 8: Last Physical Exam > 2 Years

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.0570*** (0.0213)	0.0663*** (0.0200)	0.0654*** (0.0189)	0.0663*** (0.0193)	0.0547*** (0.0178)	0.0590*** (0.0180)	0.0561*** (0.0179)
Mean	0.131	0.131	0.131	0.131	0.131	0.131	0.131
Standard Deviation	0.337	0.337	0.337	0.337	0.337	0.337	0.337
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	2,615,241	2,615,241	2,615,241	2,615,241	2,615,241	2,615,241	2,615,241
# of MMSAs	260	260	260	260	260	260	260
Adjusted R^2	0.014	0.041	0.041	0.044	0.045	0.045	0.045

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

Appendix 3.1 Table 9: Last Physical Exam > 1 Year

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.0730** (0.0332)	0.0861*** (0.0311)	0.0813*** (0.0292)	0.0829*** (0.0298)	0.0843*** (0.0279)	0.0857*** (0.0268)	0.0805*** (0.0264)
Mean	0.265	0.265	0.265	0.265	0.265	0.265	0.265
Standard Deviation	0.442	0.442	0.442	0.442	0.442	0.442	0.442
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	2,615,241	2,615,241	2,615,241	2,615,241	2,615,241	2,615,241	2,615,241
# of MMSAs	260	260	260	260	260	260	260
Adjusted R^2	0.017	0.051	0.051	0.055	0.055	0.055	0.055

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

Appendix 3.1 Table 10: Last Cholesterol Check ≥ 5 Years

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.00510 (0.0123)	0.00762 (0.0123)	0.0120 (0.0116)	0.0131 (0.0116)	-0.00221 (0.0133)	-0.00200 (0.0135)	-0.00254 (0.0134)
Mean	0.039	0.039	0.039	0.039	0.039	0.039	0.039
Standard Deviation	0.194	0.194	0.194	0.194	0.194	0.194	0.194
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	1,294,226	1,294,226	1,294,226	1,294,226	1,294,226	1,294,226	1,294,226
# of MMSAs	257	257	257	257	257	257	257
Adjusted R^2	0.004	0.010	0.010	0.012	0.012	0.012	0.012

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

Appendix 3.1 Table 11: Last Cholesterol Check > 2 Years

	(1)	(2)	(3)	(4)	(5)	(7)	(8)
MMSA Uninsured Rate	0.0906*** (0.0289)	0.0963*** (0.0275)	0.105*** (0.0280)	0.108*** (0.0282)	0.0857*** (0.0285)	0.0871*** (0.0275)	0.0863*** (0.0278)
Mean	0.125	0.125	0.125	0.125	0.125	0.125	0.125
Standard Deviation	0.330	0.330	0.330	0.330	0.330	0.330	0.330
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	1,294,226	1,294,226	1,294,226	1,294,226	1,294,226	1,294,226	1,294,226
# of MMSAs	257	257	257	257	257	257	257
Adjusted R^2	0.010	0.031	0.031	0.035	0.035	0.035	0.035

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

Appendix 3.1 Table 12: Last Cholesterol Check > 1 Year

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.136***	0.145***	0.150***	0.157***	0.129***	0.126**	0.128***
	(0.0463)	(0.0446)	(0.0451)	(0.0454)	(0.0487)	(0.0487)	(0.0485)
Mean	0.271	0.271	0.271	0.271	0.271	0.271	0.271
Standard Deviation	0.444	0.444	0.444	0.444	0.444	0.444	0.444
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	1,294,226	1,294,226	1,294,226	1,294,226	1,294,226	1,294,226	1,294,226
# of MMSAs	257	257	257	257	257	257	257
Adjusted R^2	0.014	0.050	0.050	0.057	0.057	0.058	0.058

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

Appendix 3.1 Table 13: Last Pap Smear ≥ 5 Years

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.0324	0.0226	0.0180	0.0206	0.00937	0.00866	0.00886
	(0.0203)	(0.0198)	(0.0203)	(0.0209)	(0.0242)	(0.0242)	(0.0244)
Mean	0.0799	0.0799	0.0799	0.0799	0.0799	0.0799	0.0799
Standard Deviation	0.271	0.271	0.271	0.271	0.271	0.271	0.271
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	676,621	676,621	676,621	676,621	676,621	676,621	676,621
# of MMSAs	250	250	250	250	250	250	250
Adjusted R^2	0.016	0.055	0.055	0.067	0.067	0.067	0.067

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

Appendix 3.1 Table 14: Last Pap Smear > 3 Years

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.0485*	0.0365	0.0264	0.0298	0.00634	0.00151	0.00170
	(0.0280)	(0.0270)	(0.0273)	(0.0280)	(0.0303)	(0.0314)	(0.0316)
Mean	0.124	0.124	0.124	0.124	0.124	0.124	0.124
Standard Deviation	0.330	0.330	0.330	0.330	0.330	0.330	0.330
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	676,621	676,621	676,621	676,621	676,621	676,621	676,621
# of MMSAs	250	250	250	250	250	250	250
Adjusted R^2	0.023	0.065	0.065	0.078	0.078	0.078	0.078

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

Appendix 3.1 Table 15: Last Pap Smear > 2 Years

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.0791*	0.0651	0.0505	0.0545	-0.000759	-0.0144	-0.0128
	(0.0419)	(0.0416)	(0.0411)	(0.0423)	(0.0437)	(0.0452)	(0.0448)
Mean	0.197	0.197	0.197	0.197	0.197	0.197	0.197
Standard Deviation	0.397	0.397	0.397	0.397	0.397	0.397	0.397
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	676,621	676,621	676,621	676,621	676,621	676,621	676,621
# of MMSAs	250	250	250	250	250	250	250
Adjusted R^2	0.037	0.078	0.078	0.089	0.090	0.090	0.090

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

Appendix 3.1 Table 16: Last Pap Smear > 1 Year

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MMSA Uninsured Rate	0.174***	0.160***	0.139**	0.143**	0.0373	0.0365	0.0320
	(0.0543)	(0.0546)	(0.0547)	(0.0557)	(0.0558)	(0.0580)	(0.0567)
Mean	0.0799	0.0799	0.0799	0.0799	0.0799	0.0799	0.0799
Standard Deviation	0.271	0.271	0.271	0.271	0.271	0.271	0.271
MMSA indicators	X	X	X	X	X	X	X
Year indicators	X	X	X	X	X	X	X
MMSA specific linear trends	X	X	X	X	X	X	X
Individual covariates		X	X	X	X	X	X
MMSA-level covariates			X	X	X	X	X
All Individual covariates				X	X	X	X
MMSA specific quadratic trends					X	X	X
Year by Region Indicators						X	
Year by Division Indicators							X
N	676,621	676,621	676,621	676,621	676,621	676,621	676,621
# of MMSAs	250	250	250	250	250	250	250
Adjusted R^2	0.050	0.080	0.080	0.088	0.088	0.088	0.088

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

Appendix 3.1 Table 17: Model 6 – Time Since Last Pap Smear (2002 – 2023)

Access Outcome Variables	(1) Last Pap Smear ≥ 5 Yrs	(2) Last Pap Smear > 3 Yrs	(3) Last Pap Smear > 2 Yrs	(4) Last Pap Smear > 1 Yr
MMSA Uninsured Rate	**0.00866**	**0.00151**	**-0.0144**	**0.0365**
	(0.0242)	**(0.0314)**	**(0.0452)**	**(0.0580)**
Mean	0.0799	0.124	0.197	0.377
Standard Deviation	0.271	0.330	0.397	0.485
Age	-0.00130***	0.000616	0.00312***	0.00743***
	(0.000307)	(0.000400)	(0.000541)	(0.000597)
Age Squared	5.58e-05***	4.49e-05***	2.83e-05***	-1.43e-05**
	(3.55e-06)	(4.26e-06)	(5.57e-06)	(6.39e-06)
Race = African American	-0.0386***	-0.0516***	-0.0659***	-0.0803***
	(0.00168)	(0.00184)	(0.00220)	(0.00279)
Race = American Indian or Alaskan Native	8.01e-05	-0.00406	-0.00756	-0.00924
	(0.00516)	(0.00631)	(0.00675)	(0.00606)
Race = Asian	-0.00787***	-0.00126	0.00793*	0.0192***
	(0.00241)	(0.00260)	(0.00446)	(0.00660)
Race = Native Hawaiian or Other Pacific Islander	-0.0208***	-0.0249***	-0.0152*	-0.0165
	(0.00486)	(0.00597)	(0.00897)	(0.0102)
Race = Other	-0.00493	-0.00924**	-0.00775	-0.0142*
	(0.00395)	(0.00426)	(0.00509)	(0.00777)
Race = Multiracial	0.00284	0.00275	0.00207	-5.61e-06
	(0.00274)	(0.00311)	(0.00338)	(0.00506)
Race = Hispanic	-0.0363***	-0.0469***	-0.0540***	-0.0606***
	(0.00178)	(0.00218)	(0.00267)	(0.00354)
Race = Missing	-0.00394	-0.00512	-0.00930	-0.0267***
	(0.00403)	(0.00480)	(0.00564)	(0.00585)
Education = HS Grad	0.000408	-0.00247	-0.00532	-0.00551
	(0.00242)	(0.00300)	(0.00353)	(0.00379)
Education = Attended College/Technical School	-0.00297	-0.00642**	-0.0107***	-0.00971**
	(0.00264)	(0.00322)	(0.00370)	(0.00393)
Education = College/ Tech School Grad	-0.0213***	-0.0302***	-0.0366***	-0.0344***
	(0.00279)	(0.00348)	(0.00420)	(0.00467)
Education = Missing	-0.00154	-0.0143	-0.0187	-0.00663
	(0.0111)	(0.0122)	(0.0161)	(0.0191)
Income < $15,000	0.0125***	0.0160***	0.0159***	0.0109**
	(0.00352)	(0.00372)	(0.00412)	(0.00443)
Income < $20,000	0.000423	0.000730	0.00178	0.00335
	(0.00316)	(0.00345)	(0.00362)	(0.00433)
Income < $25,000	-0.00423	-0.00354	-0.00306	-0.000413
	(0.00279)	(0.00326)	(0.00373)	(0.00394)
Income < $35,000	-0.0108***	-0.0125***	-0.00912**	-0.00277
	(0.00285)	(0.00313)	(0.00371)	(0.00403)
Income < $50,000	-0.0157***	-0.0190***	-0.0191***	-0.0142***
	(0.00269)	(0.00296)	(0.00337)	(0.00387)
Income < $75,000	-0.0245***	-0.0313***	-0.0337***	-0.0308***
	(0.00254)	(0.00293)	(0.00356)	(0.00394)
Income > $75,000	-0.0377***	-0.0495***	-0.0554***	-0.0570***
	(0.00288)	(0.00320)	(0.00377)	(0.00439)
Income = Missing	-0.0297***	-0.0393***	-0.0461***	-0.0462***
	(0.00264)	(0.00293)	(0.00349)	(0.00417)
Employed	-0.0236***	-0.0288***	-0.0300***	-0.0278***
	(0.00154)	(0.00185)	(0.00207)	(0.00267)
Student	-0.0244***	-0.0268***	-0.0230***	-0.0172***
	(0.00221)	(0.00282)	(0.00331)	(0.00410)
Homemaker	-0.0299***	-0.0369***	-0.0412***	-0.0409***
	(0.00244)	(0.00257)	(0.00305)	(0.00380)
Retire	-0.0235***	-0.0288***	-0.0280***	-0.0236***
	(0.00176)	(0.00201)	(0.00243)	(0.00327)

(continued)	(1) Last Pap Smear ≥ 5 Yrs	(2) Last Pap Smear > 3 Yrs	(3) Last Pap Smear > 2 Yrs	(4) Last Pap Smear > 1 Yr
Homemaker	-0.0299***	-0.0369***	-0.0412***	-0.0409***
	(0.00244)	(0.00257)	(0.00305)	(0.00380)
Retire	-0.0235***	-0.0288***	-0.0280***	-0.0236***
	(0.00176)	(0.00201)	(0.00243)	(0.00327)
Employment Status = Missing	-0.0289***	-0.0368***	-0.0420***	-0.0389***
	(0.00671)	(0.00758)	(0.00812)	(0.0119)
# of Children = 1	-0.00809***	-0.00947***	-0.0127***	-0.00990***
	(0.00103)	(0.00117)	(0.00149)	(0.00180)
# of Children > 1	-0.00716***	-0.00587***	-0.00221	0.0107***
	(0.000974)	(0.00122)	(0.00148)	(0.00188)
# of Children = Missing	-0.0142**	-0.0277***	-0.0285***	-0.0159
	(0.00561)	(0.00643)	(0.00843)	(0.0111)
General Health = Very Good	0.00431***	0.00806***	0.0130***	0.0227***
	(0.000793)	(0.000980)	(0.00112)	(0.00137)
General Health = Good	0.0194***	0.0302***	0.0404***	0.0520***
	(0.00102)	(0.00125)	(0.00140)	(0.00175)
General Health = Fair	0.0457***	0.0616***	0.0762***	0.0839***
	(0.00187)	(0.00226)	(0.00258)	(0.00287)
General Health = Poor	0.0815***	0.104***	0.116***	0.115***
	(0.00305)	(0.00327)	(0.00360)	(0.00365)
General Health = Missing	0.0140**	0.0219***	0.0340***	0.0568***
	(0.00686)	(0.00798)	(0.0101)	(0.0127)
Log(Total MMSA Population)	-0.0859**	-0.116**	-0.175**	-0.236**
	(0.0399)	(0.0574)	(0.0750)	(0.110)
Log(MMSA Income Per Capita)	-0.0685	0.0121	0.0560	0.0458
	(0.0461)	(0.0662)	(0.0928)	(0.106)
MMSA Unemployment Rate	0.000624	0.00115	0.00170	-0.000153
	(0.000751)	(0.00112)	(0.00170)	(0.00201)
Share of MMSA in Poverty	0.0534	0.141	0.144	-0.00184
	(0.0722)	(0.0878)	(0.0999)	(0.142)
% of MMSA on Medicaid	-0.000315	0.00144	0.000461	0.00242
	(0.00118)	(0.00160)	(0.00311)	(0.00535)
Share of MMSA over 65	-0.282	0.193	0.789	0.379
	(0.261)	(0.391)	(0.599)	(0.852)
Share of MMSA < 18	0.839*	0.952	1.262	1.414
	(0.505)	(0.722)	(0.919)	(1.184)
MMSA Income Per Capita x Percent of MMSA on Medicaid	0.000	-4.80e-08**	0.000	0.000
	(0.000)	(2.36e-08)	(0.000)	(0.000)
MMSA Income Per Capita x Share of MMSA > 65	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.977***	1.423	1.506	2.411
	(0.707)	(1.080)	(1.517)	(1.993)
MMSA Indicators	Yes	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes	Yes
MMSA specific linear trends	Yes	Yes	Yes	Yes
MMSA specific quadratic trends	Yes	Yes	Yes	Yes
Year x Region Indicators	Yes	Yes	Yes	Yes
N	676,621	676,621	676,621	676,621
# of MMSAs	250	250	250	250
Adjusted R^2	0.067	0.078	0.090	0.088

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

Appendix 3.1 Table 18: Model 6 – Missing Observations Dropped

Access Outcome Variables	(1) Skipped Care Due to Cost	(2) At Least 1 Personal Dr.	(3) Last Physical Exam ≥ 5 Yrs	(4) Last Physical Exam > 2 Yrs	(5) Last Physical Exam > 1 Yr	(6) Last Cholesterol Check ≥ 5 Yrs	(7) Last Cholesterol Check > 2 Yrs	(8) Last Cholesterol Check > 1 Yr	(10) Last Pap Smear ≥ 5 Yrs	(11) Last Pap Smear > 3 Yrs	(9) Last Pap Smear > 1 Yr
MMSA Uninsured Rate	**0.0105**	**-0.0233**	**0.0175**	**0.0572*** **	**0.0800*** **	**0.000238**	**0.0771*** **	**0.119** **	**0.260*** **	**0.204** **	**0.228***
	(0.0121)	**(0.0176)**	**(0.0114)**	**(0.0175)**	**(0.0270)**	**(0.0144)**	**(0.0292)**	**(0.0502)**	**(0.0971)**	**(0.103)**	**(0.124)**
Age	0.00344***	0.00788***	0.00300***	0.00192***	0.00258***	0.00246***	0.00277***	0.00289***	0.00952***	-0.000271	0.00208***
	(0.000191)	(0.000252)	(0.000179)	(0.000229)	(0.000305)	(0.000174)	(0.000308)	(0.000441)	(0.000714)	(0.000507)	(0.000696)
Age Squared	-5.25e-05***	-2.75e-05***	-5.00e-05***	-5.77e-05***	-8.26e-05***	-3.79e-05***	-6.80e-05***	-9.68e-05***	-3.99e-05***	5.36e-05***	3.93e-05***
	(2.25e-06)	(3.31e-06)	(2.36e-06)	(2.78e-06)	(3.40e-06)	(2.06e-06)	(3.63e-06)	(4.97e-06)	(7.92e-06)	(5.30e-06)	(7.27e-06)
Race = African American	-0.00550***	0.0244***	-0.0449***	-0.0836***	-0.119***	-0.0267***	-0.0661***	-0.0955***	-0.0744***	-0.0492***	-0.0647***
	(0.00182)	(0.00335)	(0.00123)	(0.00200)	(0.00306)	(0.000787)	(0.00257)	(0.00422)	(0.00334)	(0.00248)	(0.00273)
Race = American Indian or Alaskan Native	0.0265***	-0.0243***	-0.0147***	-0.0285***	-0.0399***	-0.0127***	-0.0371***	-0.0554***	-0.00900	-0.00369	-0.0125
	(0.00494)	(0.00559)	(0.00217)	(0.00294)	(0.00391)	(0.00219)	(0.00340)	(0.00461)	(0.00858)	(0.00780)	(0.00871)
Race = Asian	-0.00613***	-0.0160***	-0.0125***	-0.0270***	-0.0285***	-0.0184***	-0.0402***	-0.0505***	0.0147*	-0.0117***	-0.00105
	(0.00150)	(0.00534)	(0.00214)	(0.00325)	(0.00361)	(0.00147)	(0.00250)	(0.00302)	(0.00868)	(0.00292)	(0.00489)
Race = Native Hawaiian or Other Pacific Islander	0.000690	0.000582	-0.0185***	-0.0398***	-0.0482***	-0.0146***	-0.0470***	-0.0812***	-0.00846	-0.0390***	-0.0472***
	(0.00439)	(0.00434)	(0.00254)	(0.00453)	(0.00553)	(0.00479)	(0.00625)	(0.00748)	(0.0114)	(0.0101)	(0.0126)
Race = Other	0.0305***	-0.0238***	-0.00752***	-0.0231***	-0.0417***	-0.00694***	-0.0270***	-0.0440***	-0.0152*	-0.0174**	-0.0183**
	(0.00303)	(0.00350)	(0.00258)	(0.00355)	(0.00478)	(0.00247)	(0.00510)	(0.00569)	(0.00890)	(0.00707)	(0.00844)
Race = Multiracial	0.0243***	-0.00446	-0.00229*	-0.00657***	-0.0128***	-0.00390**	-0.0151***	-0.0273***	0.00269	0.00443	0.00458
	(0.00312)	(0.00303)	(0.00136)	(0.00195)	(0.00260)	(0.00160)	(0.00260)	(0.00356)	(0.00647)	(0.00438)	(0.00511)
Race = Hispanic	0.0111***	-0.0197***	-0.0263***	-0.0463***	-0.0588***	-0.0200***	-0.0430***	-0.0577***	-0.0602***	-0.0446***	-0.0551***
	(0.00177)	(0.00310)	(0.00132)	(0.00196)	(0.00304)	(0.000788)	(0.00149)	(0.00244)	(0.00514)	(0.00271)	(0.00341)
Male	-0.0240***	-0.0802***	0.0403***	0.0731***	0.0903***	0.0124***	0.0192***	0.0153***			
	(0.00107)	(0.00243)	(0.00160)	(0.00251)	(0.00269)	(0.000601)	(0.000892)	(0.00122)			
Education = HS Grad	-0.0119***	0.0396***	-0.00995***	-0.00939***	-0.00974***	-0.00166	-0.00389**	-0.00690**	0.00243	0.00482	0.00740
	(0.00161)	(0.00220)	(0.00115)	(0.00135)	(0.00206)	(0.00104)	(0.00180)	(0.00269)	(0.00503)	(0.00433)	(0.00531)
Education = Attended College/Technical School	0.00241	0.0513***	-0.0169***	-0.0129***	-0.00909***	-0.00200*	-0.00178	-0.00359	-0.00106	0.00272	0.00569
	(0.00169)	(0.00259)	(0.00137)	(0.00158)	(0.00208)	(0.00116)	(0.00179)	(0.00261)	(0.00532)	(0.00471)	(0.00556)
Education = College/ Tech School Grad	-0.00606***	0.0500***	-0.0209***	-0.0139***	-0.00672**	-0.00266**	0.00516***	0.00957***	-0.0269***	-0.0196***	-0.0233***
	(0.00183)	(0.00301)	(0.00152)	(0.00194)	(0.00287)	(0.00119)	(0.00190)	(0.00286)	(0.00584)	(0.00479)	(0.00564)
Income < $15,000	0.0183***	0.00629***	-0.000467	0.000626	0.00363*	-0.00232	0.000584	0.00250	0.0103*	0.0110**	0.0181***
	(0.00237)	(0.00179)	(0.00140)	(0.00191)	(0.00207)	(0.00144)	(0.00226)	(0.00285)	(0.00564)	(0.00545)	(0.00609)
Income < $20,000	0.0238***	0.000783	-0.00206*	-0.000496	0.00483**	-0.00238	-0.00316	0.00167	0.00163	0.00193	0.00239
	(0.00219)	(0.00206)	(0.00114)	(0.00140)	(0.00187)	(0.00148)	(0.00215)	(0.00326)	(0.00563)	(0.00555)	(0.00605)
Income < $25,000	0.0152***	0.00855***	-0.00243*	0.00104	0.00757***	-0.00472***	-0.000876	0.00112	-0.00576	-0.00507	-0.00282
	(0.00215)	(0.00208)	(0.00125)	(0.00171)	(0.00206)	(0.00122)	(0.00189)	(0.00300)	(0.00454)	(0.00476)	(0.00542)
Income < $35,000	-0.0118***	0.0201***	-0.00181	-0.00130	0.00655***	-0.00390***	-0.00124	0.00614**	-0.0134**	-0.0105**	-0.0139***
	(0.00260)	(0.00237)	(0.00125)	(0.00171)	(0.00211)	(0.00122)	(0.00187)	(0.00305)	(0.00524)	(0.00503)	(0.00530)
Income < $50,000	-0.0466***	0.0386***	-0.00915***	-0.0134***	-0.00752***	-0.00689***	-0.00710***	-0.00281	-0.0289***	-0.0145***	-0.0180***
	(0.00285)	(0.00248)	(0.00131)	(0.00172)	(0.00214)	(0.00118)	(0.00206)	(0.00273)	(0.00506)	(0.00448)	(0.00501)
Income < $75,000	-0.0804***	0.0576***	-0.0180***	-0.0268***	-0.0226***	-0.0108***	-0.0132***	-0.00983***	-0.0503***	-0.0263***	-0.0321***
	(0.00294)	(0.00272)	(0.00143)	(0.00191)	(0.00245)	(0.00128)	(0.00209)	(0.00293)	(0.00510)	(0.00453)	(0.00535)
Income > $75,000	-0.114***	0.0814***	-0.0337***	-0.0509***	-0.0505***	-0.0207***	-0.0313***	-0.0309***	-0.0807***	-0.0445***	-0.0545***
	(0.00310)	(0.00278)	(0.00164)	(0.00236)	(0.00273)	(0.00140)	(0.00222)	(0.00291)	(0.00570)	(0.00479)	(0.00534)
Employed	-0.0160***	-0.0317***	0.0172***	0.0282***	0.0425***	0.00600***	0.0145***	0.0282***	-0.0264***	-0.0263***	-0.0303***
	(0.00135)	(0.00142)	(0.000902)	(0.00129)	(0.00155)	(0.000690)	(0.00109)	(0.00174)	(0.00354)	(0.00248)	(0.00280)
Student	-0.0357***	0.00164	-0.0171***	-0.0205***	-0.00417	-0.00113	0.00448	0.0260***	-0.0276***	-0.0260***	-0.0256***
	(0.00184)	(0.00294)	(0.00146)	(0.00217)	(0.00291)	(0.00168)	(0.00284)	(0.00354)	(0.00567)	(0.00364)	(0.00503)
Homemaker	-0.0460***	-0.0131***	0.00388***	0.00130	-0.00423***	0.000480	0.000642	-0.00171	-0.0443***	-0.0283***	-0.0345***
	(0.00164)	(0.00132)	(0.000869)	(0.00121)	(0.00154)	(0.000705)	(0.00144)	(0.00191)	(0.00523)	(0.00427)	(0.00460)

Appendix 3.1 Table 18: Model 6 – Missing Observations Dropped

Access Outcome Variables	(1) Skipped Care Due to Cost	(2) At Least 1 Personal Dr.	(3) Last Physical Exam ≥ 5 Yrs	(4) Last Physical Exam > 2 Yrs	(5) Last Physical Exam > 1 Yr	(6) Last Cholesterol Check ≥ 5 Yrs	(7) Last Cholesterol Check > 2 Yrs	(8) Last Cholesterol Check > 1 Yr	(10) Last Pap Smear ≥ 5 Yrs	(11) Last Pap Smear > 3 Yrs	(9) Last Pap Smear > 1 Yr
Retire	-0.0291***	-0.0326***	0.0204***	0.0330***	0.0491***	0.0149***	0.0348***	0.0564***	-0.0283***	-0.0245***	-0.0284***
	(0.00157)	(0.00156)	(0.00107)	(0.00154)	(0.00179)	(0.00117)	(0.00203)	(0.00269)	(0.00442)	(0.00307)	(0.00356)
# of Children = 1	0.00649***	0.0265***	-0.00644***	-0.00799***	-0.00317***	-0.000379	0.00406***	0.0116***	-0.00788***	-0.0126***	-0.0144***
	(0.000774)	(0.000963)	(0.000540)	(0.000799)	(0.000983)	(0.000638)	(0.00118)	(0.00146)	(0.00250)	(0.00176)	(0.00206)
# of Children > 1	0.00577***	0.0327***	-0.00530***	-0.00321***	0.00713***	0.00415***	0.0151***	0.0277***	0.0159***	-0.0111***	-0.0102***
	(0.00109)	(0.00123)	(0.000640)	(0.000954)	(0.00133)	(0.000714)	(0.00133)	(0.00170)	(0.00218)	(0.00169)	(0.00218)
General Health = Very Good	0.0147***	0.0158***	-0.00836***	-0.00991***	-0.0101***	-0.00716***	-0.0172***	-0.0272***	0.0184***	0.00742***	0.0122***
	(0.000508)	(0.000782)	(0.000567)	(0.000894)	(0.00132)	(0.000683)	(0.00120)	(0.00155)	(0.00182)	(0.00146)	(0.00175)
General Health = Good	0.0459***	0.0207***	-0.00664***	-0.0115***	-0.0203***	-0.0120***	-0.0356***	-0.0634***	0.0503***	0.0243***	0.0367***
	(0.000965)	(0.00113)	(0.000707)	(0.00114)	(0.00171)	(0.000889)	(0.00181)	(0.00225)	(0.00228)	(0.00189)	(0.00201)
General Health = Fair	0.105***	0.0426***	-0.00854***	-0.0199***	-0.0431***	-0.0186***	-0.0547***	-0.106***	0.0835***	0.0590***	0.0760***
	(0.00206)	(0.00184)	(0.00103)	(0.00176)	(0.00251)	(0.00118)	(0.00264)	(0.00346)	(0.00343)	(0.00286)	(0.00343)
General Health = Poor	0.151***	0.0681***	-0.00977***	-0.0256***	-0.0626***	-0.0233***	-0.0662***	-0.129***	0.109***	0.0924***	0.114***
	(0.00264)	(0.00260)	(0.00133)	(0.00199)	(0.00297)	(0.00156)	(0.00302)	(0.00397)	(0.00456)	(0.00474)	(0.00528)
Log(Total MMSA Population)	-0.00406	-0.113**	0.0203	-0.107	-0.258***	0.000729	-0.0717	-0.0931	-0.168	0.190	1.167
	(0.0270)	(0.0519)	(0.0440)	(0.0756)	(0.0976)	(0.0249)	(0.0617)	(0.0829)	(0.177)	(0.904)	(1.379)
Log(MMSA Income Per Capita)	0.0167	0.0115	-0.00786	-0.0250	-0.0936	0.0313	0.114**	0.129*	-0.627***	0.163	0.320
	(0.0230)	(0.0388)	(0.0289)	(0.0477)	(0.0753)	(0.0244)	(0.0515)	(0.0751)	(0.220)	(0.288)	(0.473)
MMSA Unemployment Rate	-5.85e-05	0.00120**	-0.000341	0.000184	0.00106	-0.000189	0.000309	0.000440	-0.0101**	-0.00176	0.00261
	(0.000394)	(0.000548)	(0.000376)	(0.000722)	(0.00126)	(0.000386)	(0.000827)	(0.00137)	(0.00473)	(0.00530)	(0.00711)
Share of MMSA in Poverty	0.0508	0.0423	0.0605	0.127**	0.154	0.00257	0.0515	0.187	0.0604	0.151	0.302
	(0.0352)	(0.0374)	(0.0385)	(0.0624)	(0.0967)	(0.0368)	(0.0784)	(0.114)	(0.191)	(0.363)	(0.425)
% of MMSA on Medicaid	-0.000788	0.00255***	-2.24e-05	0.00102	-0.00158	-0.000605	-0.00129	-0.00243	-0.00310	-0.0193*	-0.0105
	(0.000659)	(0.000867)	(0.000729)	(0.00125)	(0.00209)	(0.000857)	(0.00154)	(0.00186)	(0.00735)	(0.0104)	(0.0165)
Share of MMSA over 65	0.377**	-0.199	-0.0910	-0.0153	0.0598	-0.109	0.526	0.776*	-4.957***	-0.315	-0.457
	(0.162)	(0.224)	(0.161)	(0.290)	(0.480)	(0.177)	(0.360)	(0.411)	(1.254)	(1.911)	(3.024)
Share of MMSA < 18	0.0475**	0.00531	0.00225	0.0135	-0.0172	0.00898	0.0597**	0.0404	0.115	3.349	4.891
	(0.0191)	(0.0467)	(0.0119)	(0.0243)	(0.0578)	(0.0164)	(0.0245)	(0.0448)	(2.966)	(4.101)	(5.552)
MMSA Income Per Capita x Percent of MMSA on Medicaid	2.04e-08*	-4.62e-08***	8.00e-09	-1.08e-08	4.90e-08	1.79e-08	4.29e-08	7.04e-08*	3.26e-08	4.37e-07**	2.65e-07
	(1.05e-08)	(1.55e-08)	(1.16e-08)	(2.14e-08)	(3.94e-08)	(1.81e-08)	(3.30e-08)	(3.89e-08)	(1.90e-07)	(1.99e-07)	(3.16e-07)
MMSA Income Per Capita x Share of MMSA > 65	-8.07e-06***	-2.96e-06	9.20e-07	2.00e-06	1.26e-06	-2.31e-06	-0.000012**	-0.0000188**	0.0000629**	-0.0000389	-0.0000342
	(2.42e-06)	(4.65e-06)	(2.59e-06)	(4.53e-06)	7.61e-06	(2.95e-06)	(5.78e-06)	(7.29e-06)	(0.0000268)	(0.0000238)	(0.0000462)
Constant	0.0996	2.113	-0.162	1.870	4.842	-0.498	-0.832	-0.400	3.868	-4.513	-20.12
	(88.25)		(24.12)			(0.499)	(1.102)	(1.455)	(4.103)	(13.52)	(21.10)
Years	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2002 – 2023	2012 – 2023	2012 – 2023	2002 – 2011
N	2,335,045	2,399,547	2,145,007	2,145,007	2,145,007	1,130,626	1,130,626	1,130,626	242,487	242,487	357,403
# of MMSAs	260	260	260	260	260	257	257	257	213	213	218
Adjusted R^2	0.075	0.083	0.028	0.046	0.056	0.013	0.036	0.058	0.075	0.081	0.061

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