

Supplemental Appendix

Health Insurance and Access to Care for the Near Elderly

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I. Derivation of Estimating Equations

Consider a case in which an instrument Z (in our context the age-65 threshold) may affect multiple treatments (in our context insurance transitions). We first derive Equation (2). Let H be the observed change in an individual's outcome at age 65 with H_0 , H_{I1} , H_{I2} , and H_{I3} corresponding to potential changes in the outcome based on whether the individual undergoes no insurance transition or insurance transitions $I1$, $I2$, or $I3$ respectively.

We use the following assumptions and abbreviations to derive Equation (2):

A.R : Random assignment of Z

A.MO : Monotonicity

A.ER : Exclusion restriction, $E[u_{st} | I1_{st}, I2_{st}, I3_{st}] = 0$

IE : Iterated expectations

OR : Observations rule

Under the exclusion restriction the change in the outcome does not depend on the instrument Z conditional on insurance transitions Ij , so using the observations rule we may write:

$$H = H_0 + (H_{I1} - H_0)I1 + (H_{I2} - H_0)I2 + (H_{I3} - H_0)I3$$

An observed insurance transition Ij (for $j = 1, 2, 3$) is a function of potential insurance transitions Ij_1 (the transition when $Z = 1$) and Ij_0 (the transition when $Z = 0$). Again using the observations rule we may write:

$$Ij = Ij_1Z + Ij_0(1 - Z)$$

For a given state s and period t we can now derive the reduced-form estimand of the RD:

$$\begin{aligned}
& E[H \mid Z = 1] - E[H \mid Z = 0] \\
& \stackrel{OR}{=} E[H_0 + (H_{I1} - H_0)I1 + (H_{I2} - H_0)I2 + (H_{I3} - H_0)I3 \mid Z = 1] \\
& \quad - E[H_0 + (H_{I1} - H_0)I1 + (H_{I2} - H_0)I2 + (H_{I3} - H_0)I3 \mid Z = 0] \\
& \stackrel{A.R}{=} \sum_{j=1}^3 E[(H_{Ij} - H_0)Ij_1 \mid Z = 1] - E[(H_{Ij} - H_0)Ij_0 \mid Z = 0] \\
& \stackrel{A.R}{=} \sum_{j=1}^3 E[(H_{Ij} - H_0)(Ij_1 - Ij_0)] \\
& \stackrel{IE}{=} \sum_{j=1}^3 E[E[(H_{Ij} - H_0)(Ij_1 - Ij_0) \mid (Ij_1 - Ij_0)]] \\
& \stackrel{A.MO}{=} \sum_{j=1}^3 E[(H_{Ij} - H_0) \mid (Ij_1 - Ij_0) = 1] \cdot P(Ij_1 - Ij_0 = 1)
\end{aligned}$$

In this context $E[(H_{Ij} - H_0) \mid (Ij_1 - Ij_0) = 1]$ is the local average treatment effect (LATE) for compliers for insurance transition type j . For completeness note that the first-stage estimand of the RD is:

$$\begin{aligned}
& E[Ij \mid Z = 1] - E[Ij \mid Z = 0] \\
& \stackrel{OR}{=} E[Ij_1 \cdot Z + Ij_0 \cdot (1 - Z) \mid Z = 1] - E[Ij_1 \cdot Z + Ij_0 \cdot (1 - Z) \mid Z = 0] \\
& = E[Ij_1 \mid Z = 1] - E[Ij_0 \mid Z = 0] \\
& \stackrel{A.R}{=} E[Ij_1 - Ij_0] \\
& \stackrel{A.MO}{=} P(Ij_1 - Ij_0 = 1)
\end{aligned}$$

Combining the results above yields:

$$(1) \quad H_{st} = \tau_{1st}I1_{st} + \tau_{2st}I2_{st} + \tau_{3st}I3_{st} + u_{st}$$

where H_{st} is the reduced-form estimate for state s in period t , Ij_{st} are first-stage estimands for state s in period t , τ_{jst} are LATEs for state s in period t , and u_{st} is a residual reflecting estimation error in H_{st} .

Decompose the LATEs to averages and deviations from averages, $\tau_{jst} = \bar{\tau}_j + \tilde{\tau}_{jst}$. We now show that estimating Equation (1) yields the average LATEs (i.e., $\bar{\tau}_1, \bar{\tau}_2, \bar{\tau}_3$) if we make an additional assumption:

$$A.MI : \text{Mean independent LATEs, } E[\tilde{\tau}_{jst} \mid I1_{st}, I2_{st}, I3_{st}] = 0$$

The conditional expectation function (CEF) of H_{st} with respect to $I1_{st}, I2_{st}, I3_{st}$ is:

$$\begin{aligned} E[H_{st} \mid I1_{st}, I2_{st}, I3_{st}] &= E[\bar{\tau}_1 I1_{st} + \bar{\tau}_2 I2_{st} + \bar{\tau}_3 I3_{st} + \tilde{\tau}_{1st} I1_{st} + \tilde{\tau}_{2st} I2_{st} + \tilde{\tau}_{3st} I3_{st} + u_{st} \mid I1_{st}, I2_{st}, I3_{st}] \\ &= \bar{\tau}_1 I1_{st} + \bar{\tau}_2 I2_{st} + \bar{\tau}_3 I3_{st} + \sum_{j=1}^3 Ij_{st} E[\tilde{\tau}_{jst} \mid I1_{st}, I2_{st}, I3_{st}] + E[u_{st} \mid I1_{st}, I2_{st}, I3_{st}] \\ &\stackrel{A.ER}{=} \bar{\tau}_1 I1_{st} + \bar{\tau}_2 I2_{st} + \bar{\tau}_3 I3_{st} + \sum_{j=1}^3 Ij_{st} E[\tilde{\tau}_{js} \mid I1_{st}, I2_{st}, I3_{st}] \\ &\stackrel{A.MI}{=} \bar{\tau}_1 I1_{st} + \bar{\tau}_2 I2_{st} + \bar{\tau}_3 I3_{st} \end{aligned}$$

For completeness we note that if the CEF is linear, then linear regression estimates the CEF. Let $E[Y|X] = X\beta$. Then:

$$\begin{aligned} &E[(X'X)^{-1}(X'Y)] \\ &\stackrel{IE}{=} E[E[(X'X)^{-1}(X'Y)]|X] \\ &= E[(X'X)^{-1}(X'E[Y|X])] \\ &= E[(X'X)^{-1}(X'X)\beta] \\ &= \beta \end{aligned}$$

In summary, estimating Equation (2) yields consistent estimates of the average

LATEs under the mean independence of LATEs assumption. Furthermore, restricting the intercept to zero can increase precision while requiring no additional assumptions.

We now consider the case in which mean independence of LATEs (*A.MI*) fails. Let *FOTE* denote a first order Taylor expansion. The CEF of the reduced form under no mean independence of LATEs becomes (approximately):

$$\begin{aligned}
& E[H_{st} \mid I1_{st}, I2_{st}, I3_{st}] \\
&= E[\bar{\tau}_1 I1_{st} + \bar{\tau}_2 I2_{st} + \bar{\tau}_3 I3_{st} + \tilde{\tau}_{1st} I1_{st} + \tilde{\tau}_{2st} I2_{st} + \tilde{\tau}_{3st} I3_{st} + u_{st} \mid I1_{st}, I2_{st}, I3_{st}] \\
&= \bar{\tau}_1 I1_{st} + \bar{\tau}_2 I2_{st} + \bar{\tau}_3 I3_{st} + \sum_{j=1}^3 Ij_{st} E[\tilde{\tau}_{js} \mid I1_{st}, I2_{st}, I3_{st}] + E[u_{st} \mid I1_{st}, I2_{st}, I3_{st}] \\
&\stackrel{A.ER}{=} \bar{\tau}_1 I1_{st} + \bar{\tau}_2 I2_{st} + \bar{\tau}_3 I3_{st} + \sum_{j=1}^3 Ij_{st} E[\tilde{\tau}_{js} \mid I1_{st}, I2_{st}, I3_{st}] \\
&= \bar{\tau}_1 I1_{st} + \bar{\tau}_2 I2_{st} + \bar{\tau}_3 I3_{st} + \sum_{j=1}^3 Ij_{st} g_j(I1_{st}, I2_{st}, I3_{st}) \\
&\stackrel{FOTE}{\approx} \bar{\tau}_1 I1_{st} + \bar{\tau}_2 I2_{st} + \bar{\tau}_3 I3_{st} + \sum_{j=1}^3 Ij_{st} (\theta_j + \sum_{k=1}^3 \theta_{jk} I k_{st}) \\
&= \delta_1 I1_{st} + \delta_2 I2_{st} + \delta_3 I3_{st} + \delta_4 I1_{st}^2 + \delta_5 I2_{st}^2 + \delta_6 I3_{st}^2 \\
&\quad + \delta_7 I1_{st} I2_{st} + \delta_8 I1_{st} I3_{st} + \delta_9 I2_{st} I3_{st}
\end{aligned}$$

This result motivates a straightforward test of the mean independence assumption (*A.MI*): regress the reduced-form estimate for state s in period t on a quadratic of the first stage estimates for state s in period t , as well as the two-way interactions between the first stage estimates, and perform a joint test on the quadratic and interaction term coefficients. Formally, run the regression

$$\begin{aligned}
H_{st} = & \delta_1 I1_{st} + \delta_2 I2_{st} + \delta_3 I3_{st} + \delta_4 I1_{st}^2 + \delta_5 I2_{st}^2 + \delta_6 I3_{st}^2 \\
& + \delta_7 I1_{st} I2_{st} + \delta_8 I1_{st} I3_{st} + \delta_9 I2_{st} I3_{st} + u_{st}
\end{aligned}$$

and test the null hypothesis $\delta_4 = \delta_5 = \dots = \delta_9 = 0$.

II. Error in Variables Model

The variables $I1_{st}$, $I2_{st}$ and $I3_{st}$ are estimates of the changes in insurance coverage as described in Section II.D. In finite samples these estimated changes have the following relationship with the true changes in insurance coverage, $I1_{st}^*$, $I2_{st}^*$, and $I3_{st}^*$:

$$\begin{aligned} I1_{st} &= I1_{st}^* + \eta_{1st} \\ I2_{st} &= I2_{st}^* + \eta_{2st} \\ I3_{st} &= I3_{st}^* + \eta_{3st} \end{aligned}$$

where η_{1st} , η_{2st} and η_{3st} are mean-zero measurement error terms. These η terms represent classical measurement error and their presence attenuates parameter estimates in Equation (2).

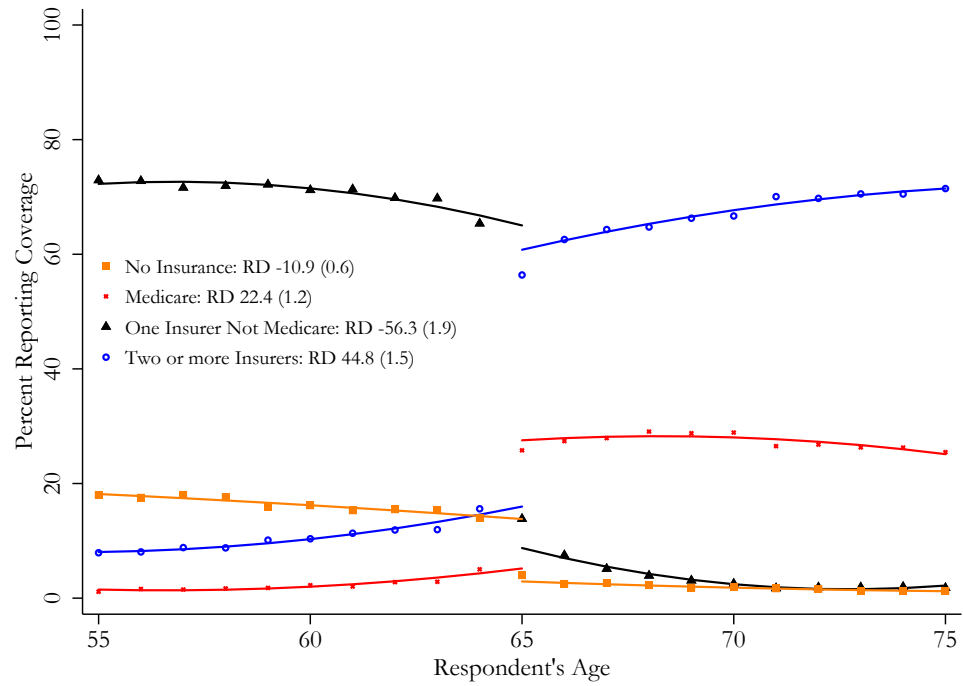
We take two steps to address the potential attenuation bias. First, since much of the time series variation in the first-stage estimates arises from the ACA, we collapse the data from state-year cells to state-pre/post-ACA cells, increasing the sample size in each cell. Second, we directly estimate the degree of measurement error and adjust for it using an error in variables (EIV) model. In a simple EIV model the η terms are uncorrelated with each other, but in our context $Cov(\eta_{jst}, \eta_{kst}) \neq 0$ because the insurance transitions apportion the population into mutually exclusive subgroups. We thus estimate the variance-covariance matrix of these errors, denoted Σ_{st} for each state and time period, via bootstrapping. (Note that the errors in the measurement of the insurance transitions (the first-stage coefficients) are uncorrelated with errors in the measurement of the health care utilization outcomes (the reduced-form coefficients) because they are estimated using different datasets.) We then estimate the effect of the three insurance transitions, denoted by the vector τ , as

$$(2) \quad \tau = \left(\sum_{st} (\mathbf{I}'_{st} \mathbf{I}_{st} - \widehat{\Sigma}_{st}) \right)^{-1} \left(\sum_{st} \mathbf{I}'_{st} H_{st} \right)$$

where $\mathbf{I}_{st} = (1, I1_{st}, I2_{st}, I3_{st})$ is a vector of the three transition probabilities plus a constant and $\hat{\Sigma}_{st}$ is the estimate of the variance-covariance matrix of the transition probability errors for state s in year t . In the simplest EIV model with zero covariances between insurance transitions, Equation (2) is equivalent to inflating the OLS coefficient on Ij_{st} by σ_j^2/σ_j^{*2} , where σ_j^2 and σ_j^{*2} represent the variances of Ij_{st} and Ij_{st}^* respectively.

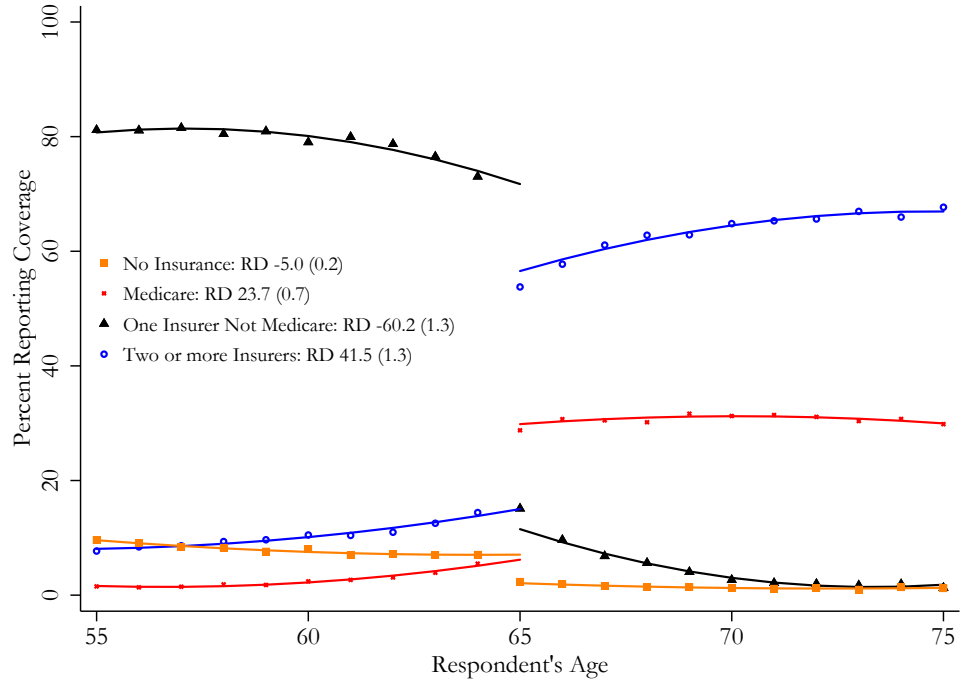
III. Additional Figures and Tables

FIGURE A1. AGE PROFILE OF INSURANCE COVERAGE FOR CALIFORNIA PRE ACA



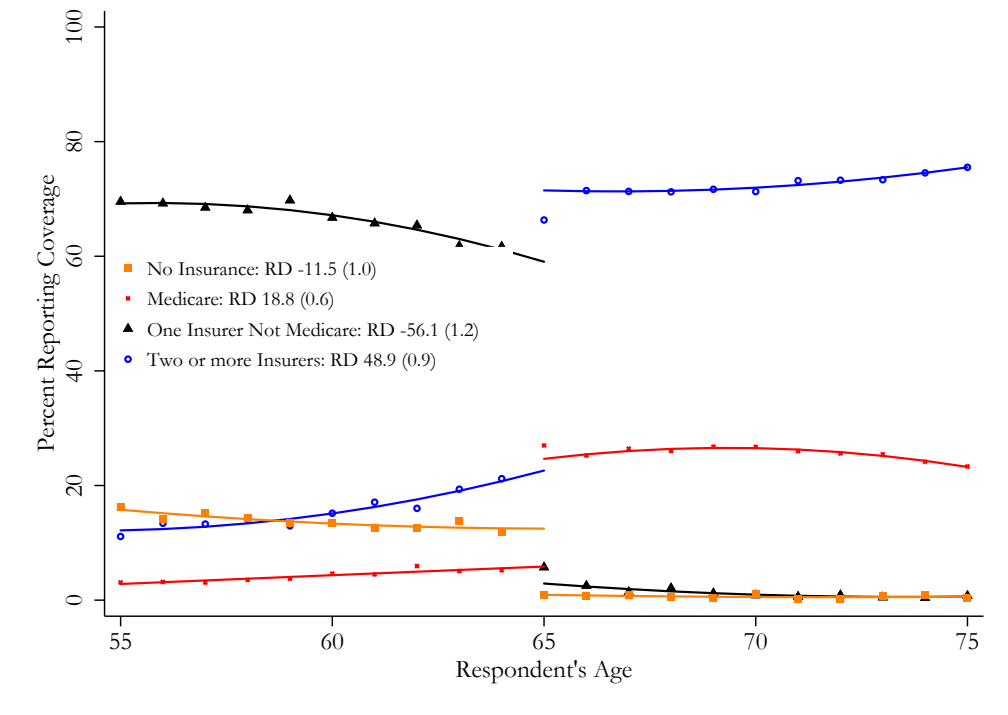
Notes: These estimates are from the American Community Survey.

FIGURE A2. AGE PROFILE OF INSURANCE COVERAGE FOR CALIFORNIA POST ACA



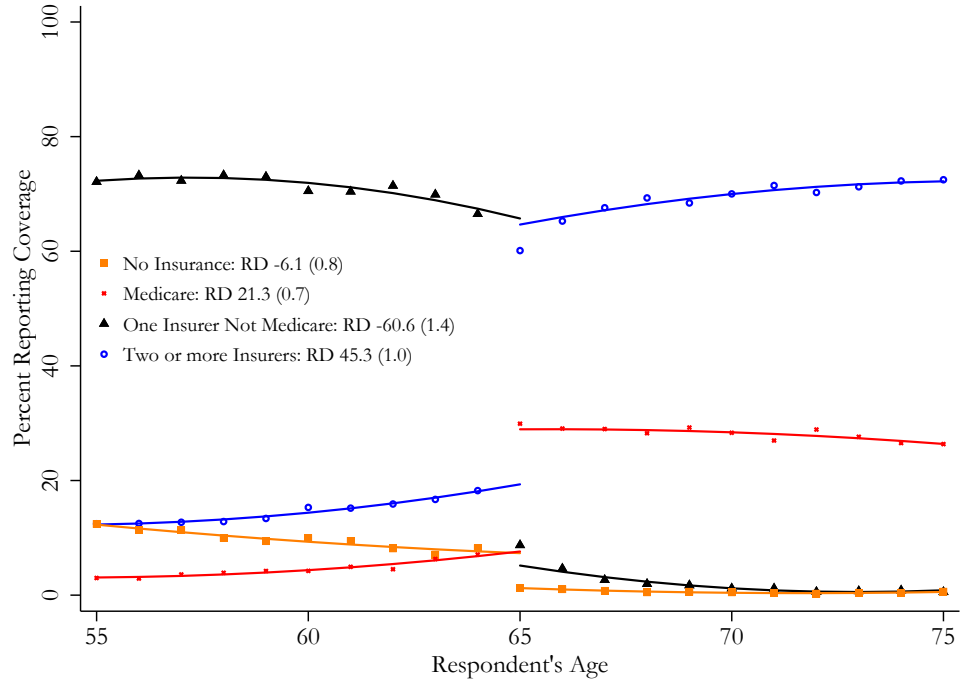
Notes: These estimates are from the American Community Survey.

FIGURE A3. AGE PROFILE OF INSURANCE COVERAGE FOR NORTH CAROLINA PRE ACA



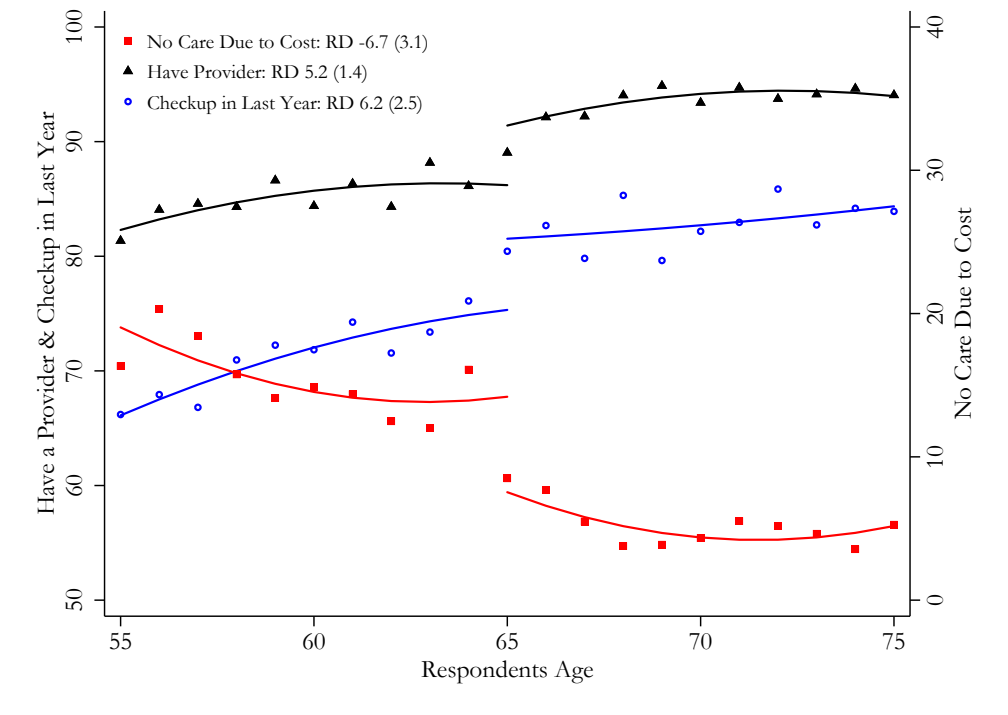
Notes: These estimates are from the American Community Survey.

FIGURE A4. AGE PROFILE OF INSURANCE COVERAGE FOR NORTH CAROLINA POST ACA



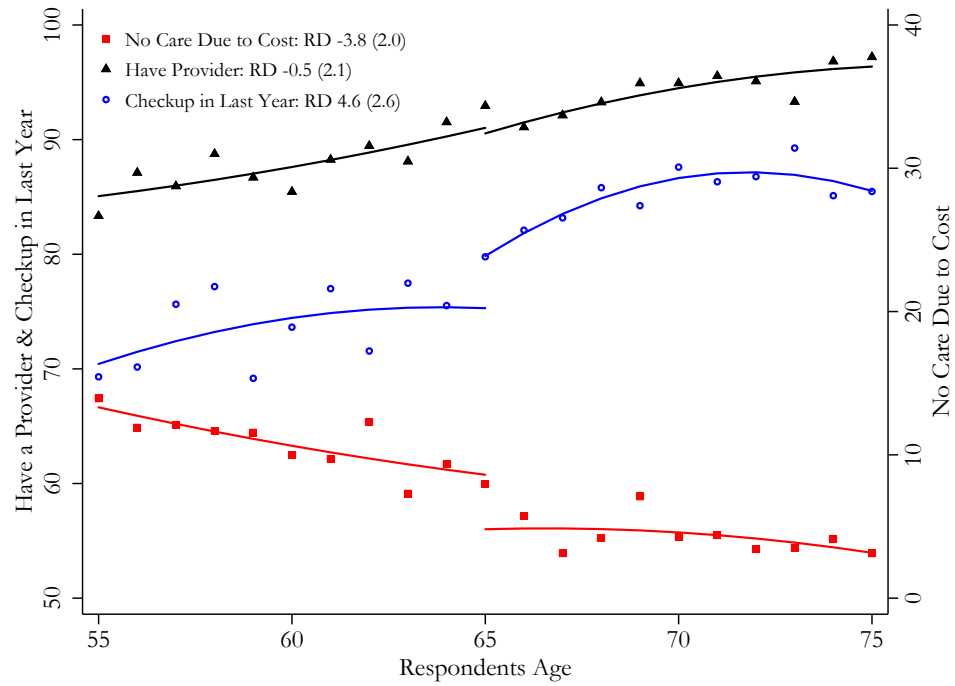
Notes: These estimates are from the American Community Survey.

FIGURE A5. AGE PROFILE OF HEALTH CARE ACCESS FOR CALIFORNIA PRE ACA



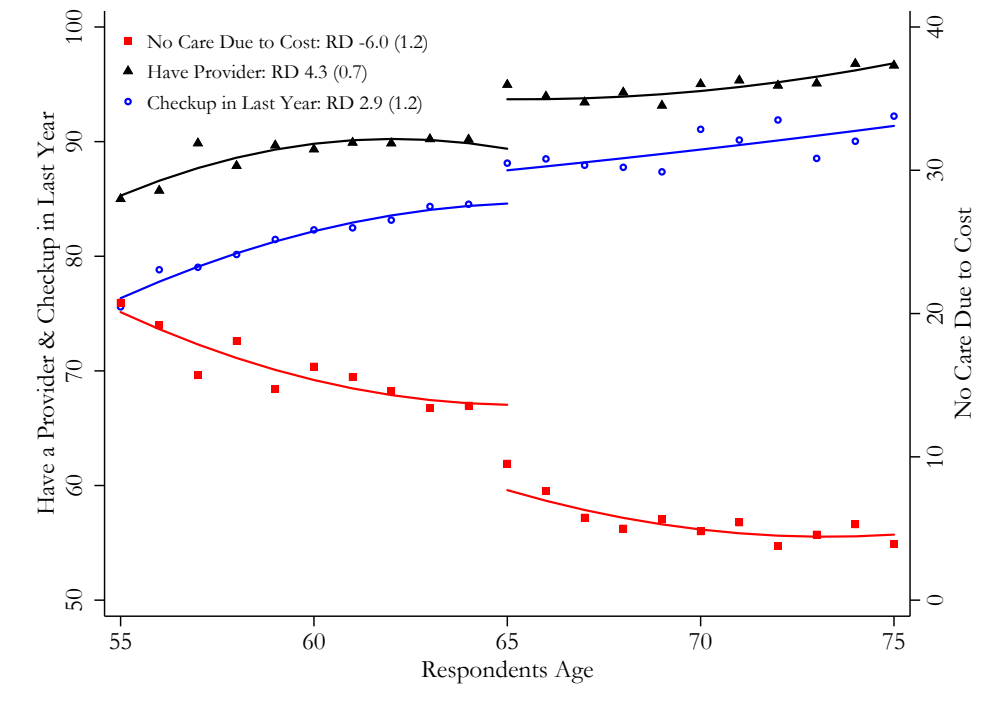
Notes: These estimates are from the Behavioral Risk Factor Surveillance System.

FIGURE A6. AGE PROFILE OF HEALTH CARE ACCESS FOR CALIFORNIA POST ACA



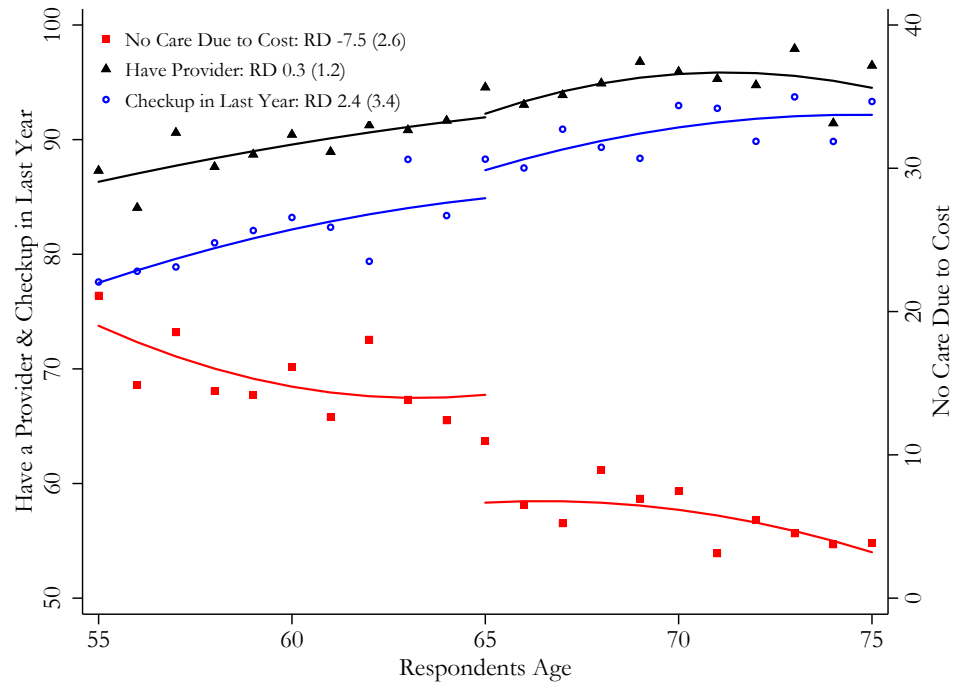
Notes: These estimates are from the Behavioral Risk Factor Surveillance System.

FIGURE A7. AGE PROFILE OF HEALTH CARE ACCESS FOR NORTH CAROLINA PRE ACA



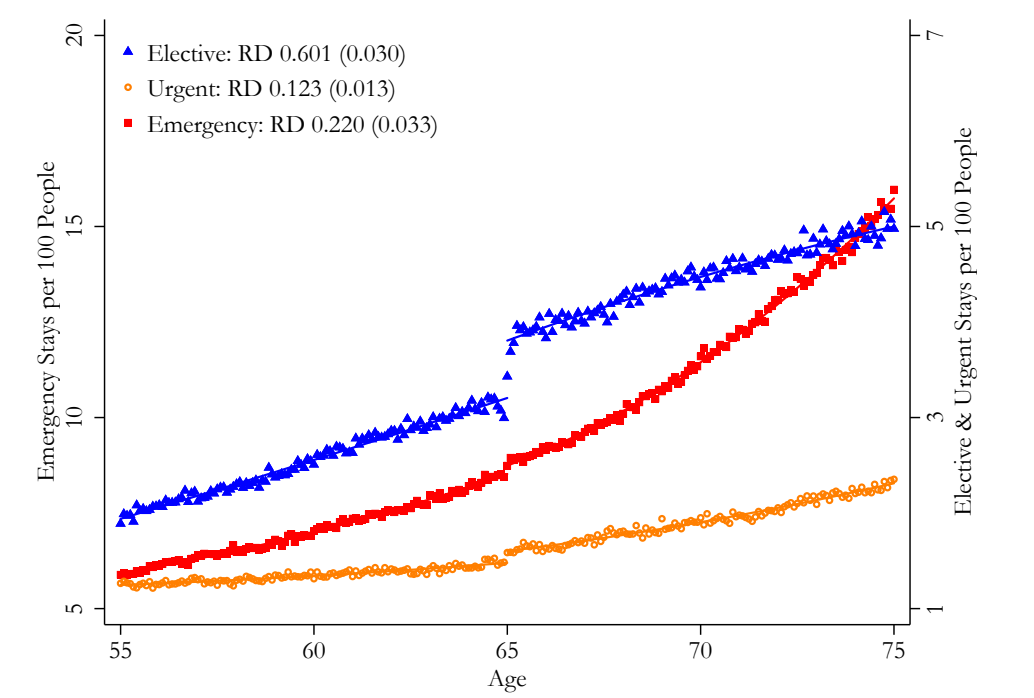
Notes: These estimates are from the Behavioral Risk Factor Surveillance System.

FIGURE A8. AGE PROFILE OF HEALTH CARE ACCESS FOR NORTH CAROLINA POST ACA



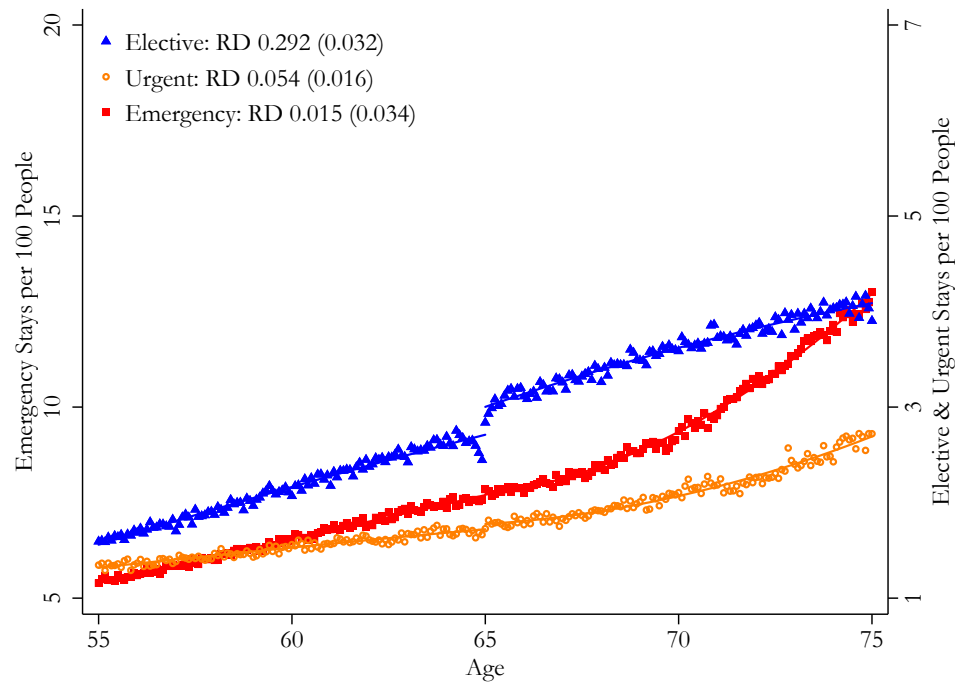
Notes: These estimates are from the Behavioral Risk Factor Surveillance System.

FIGURE A9. AGE PROFILE OF HOSPITALIZATIONS FOR CALIFORNIA PRE ACA



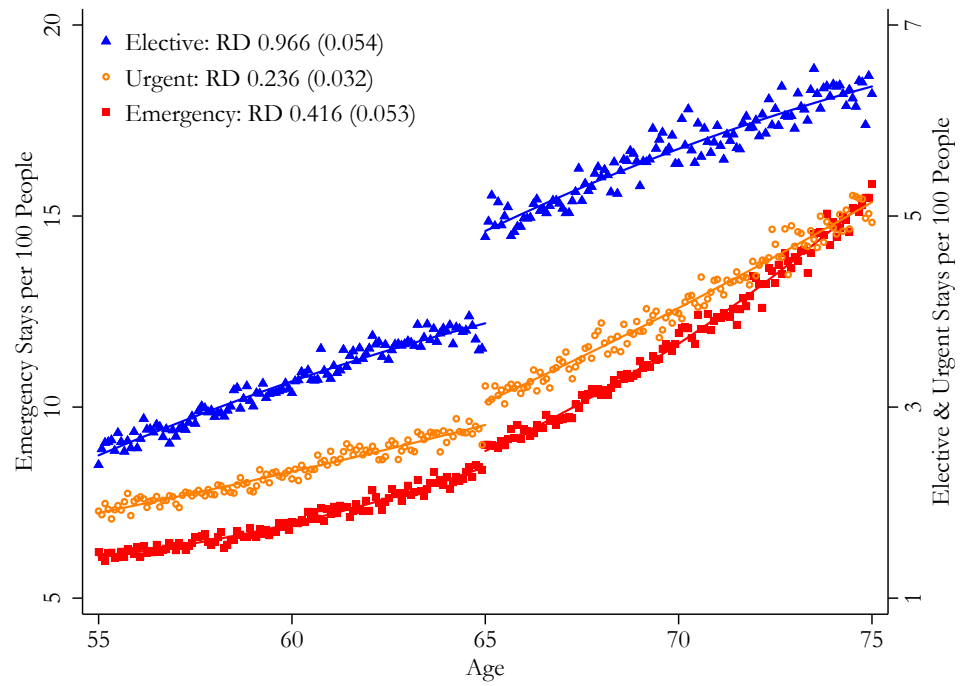
Notes: These estimates are from the HCUP.

FIGURE A10. AGE PROFILE OF HOSPITALIZATIONS FOR CALIFORNIA POST ACA



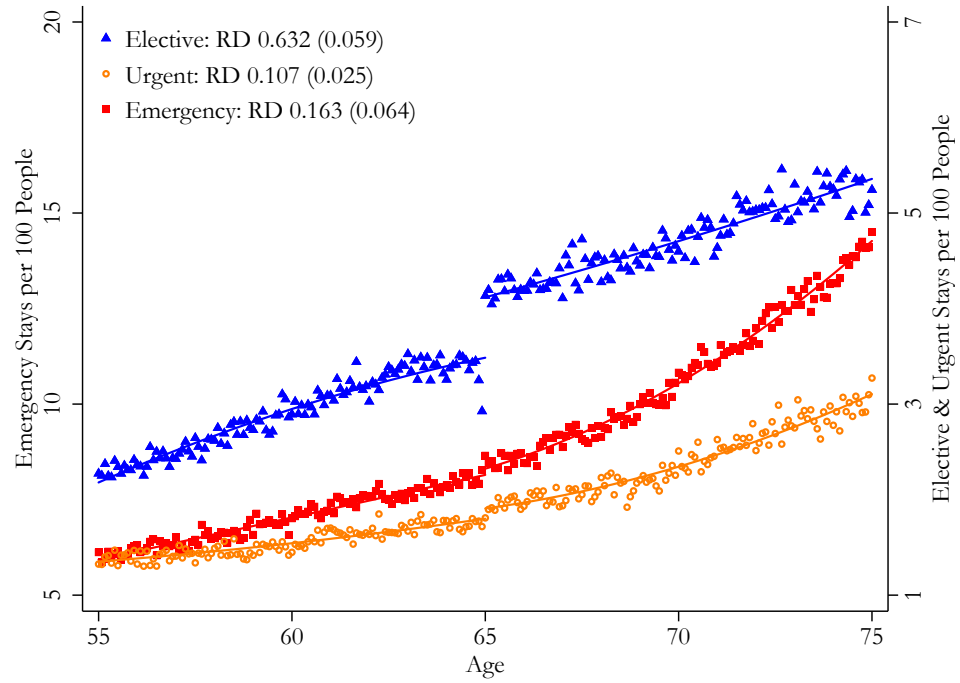
Notes: These estimates are from the HCUP.

FIGURE A11. AGE PROFILE OF HOSPITALIZATIONS FOR NORTH CAROLINA PRE ACA



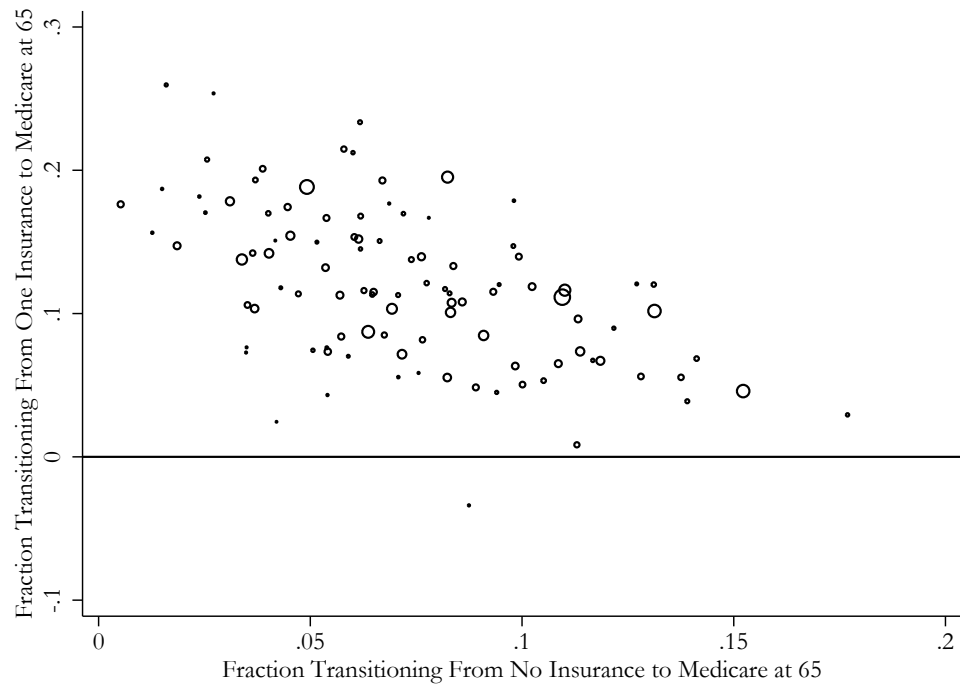
Notes: These estimates are from the HCUP.

FIGURE A12. AGE PROFILE OF HOSPITALIZATIONS FOR NORTH CAROLINA POST ACA



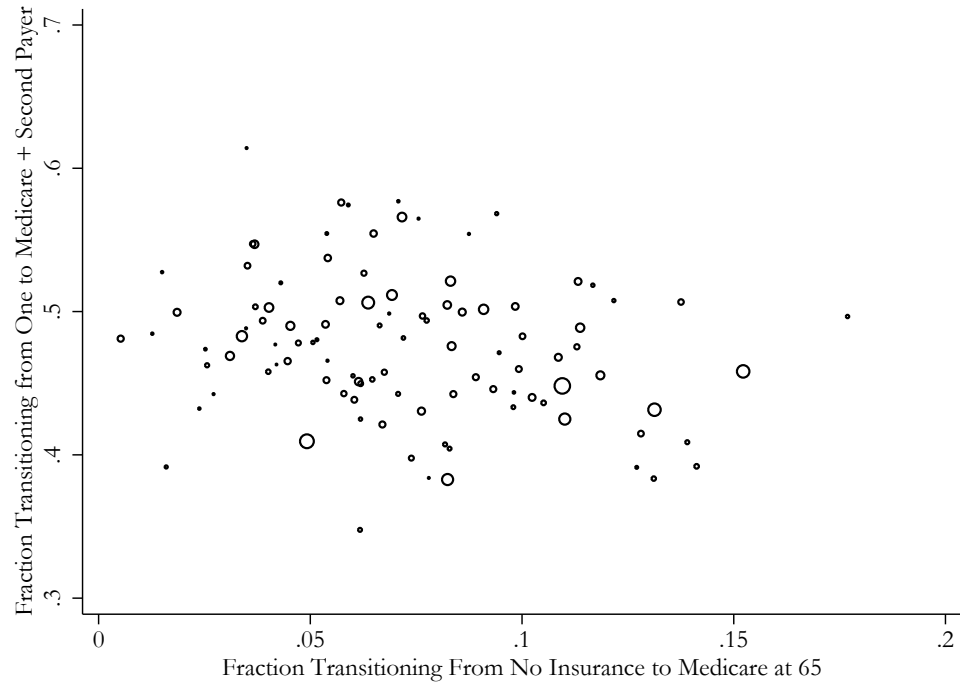
Notes: These estimates are from the HCUP.

FIGURE A13. VARIATION IN INSURANCE TRANSITIONS ACROSS STATES AND TIME PERIODS



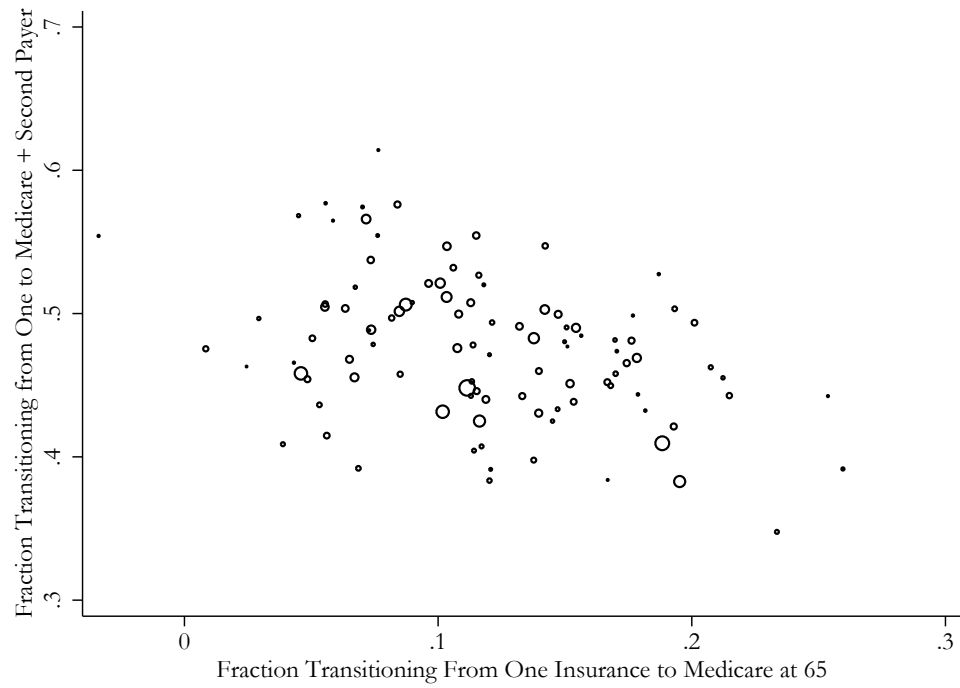
Notes: These estimates are by state and time period with the size of the circle determined by the state population.

FIGURE A14. VARIATION IN INSURANCE TRANSITIONS ACROSS STATES AND TIME PERIODS

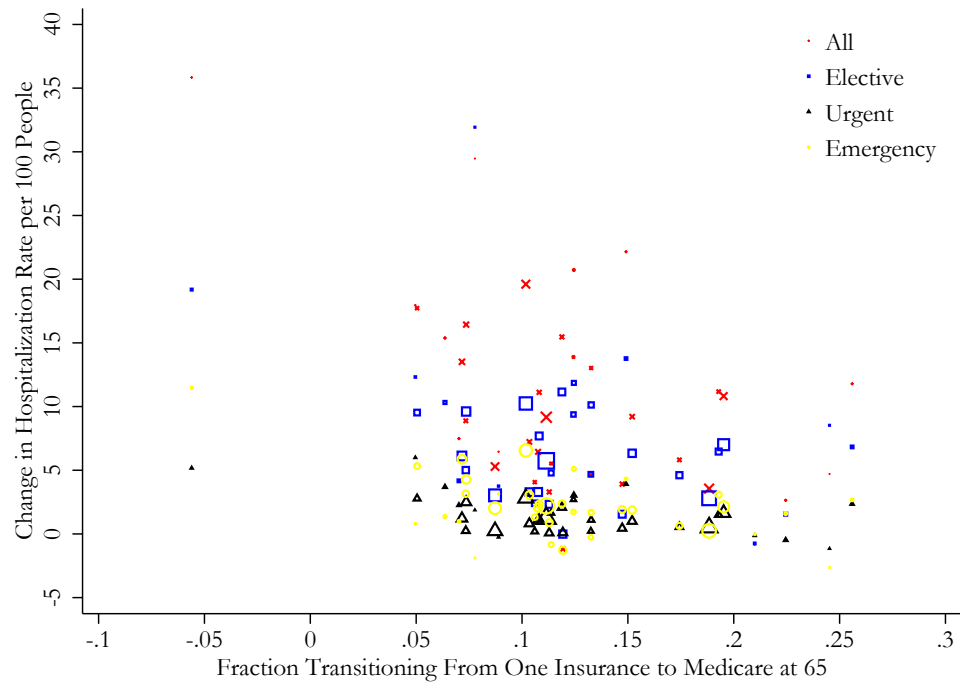


Notes: These estimates are by state and time period with the size of the circle determined by the state population.

FIGURE A15. VARIATION IN INSURANCE TRANSITIONS ACROSS STATES AND TIME PERIODS

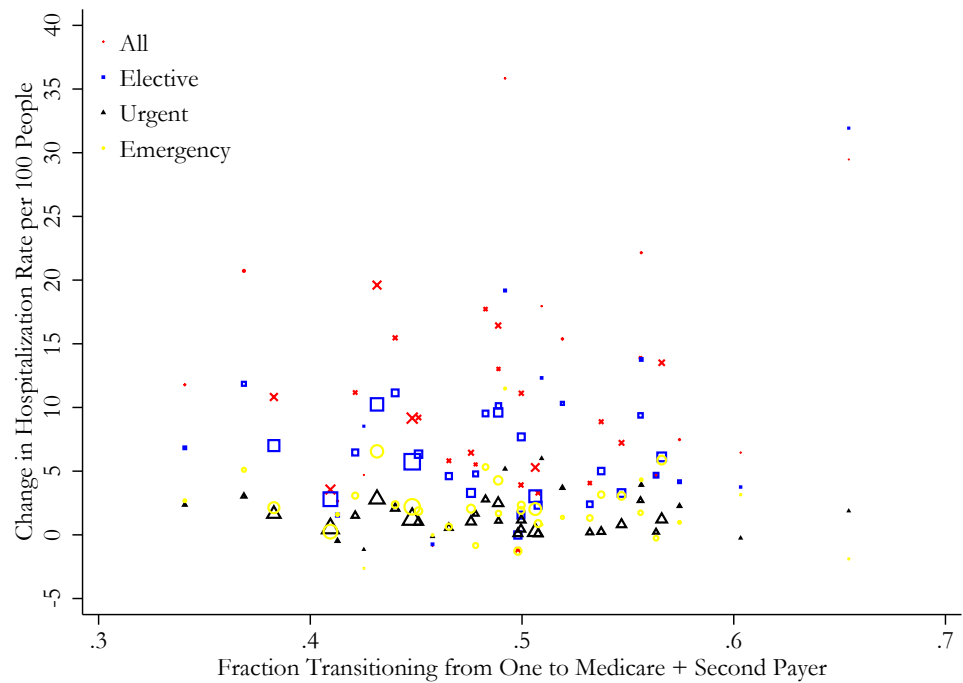


Notes: These estimates are by state and time period with the size of the circle determined by the state population.

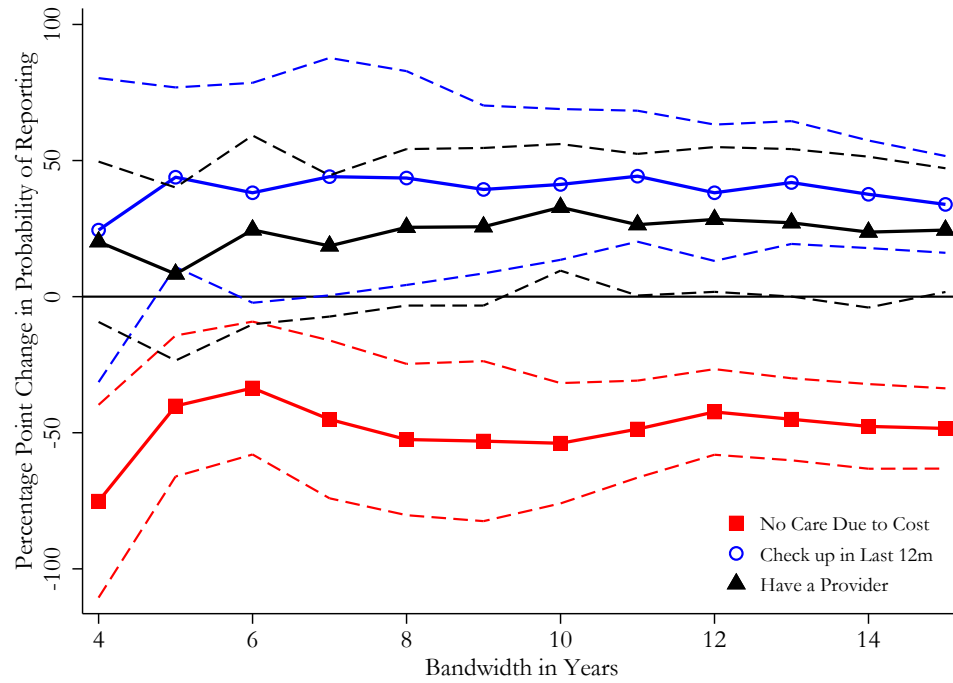
FIGURE A16. INSURANCE TRANSITION: ONE $\rightarrow$ MEDICARE

Notes: Data from ACS and HCUP.

FIGURE A17. INSURANCE TRANSITION: ONE $\rightarrow$ MEDICARE + 2ND PAYER

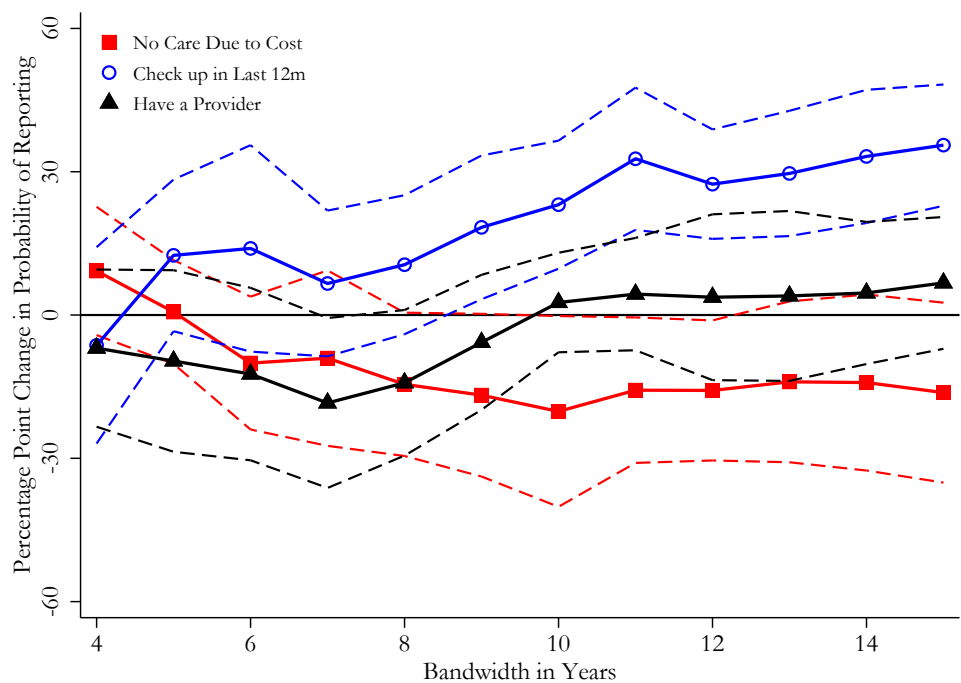


Notes: Data from ACS and HCUP.

FIGURE A18. ROBUSTNESS TO BANDWIDTH: NO INSURANCE $\rightarrow$ MEDICARE

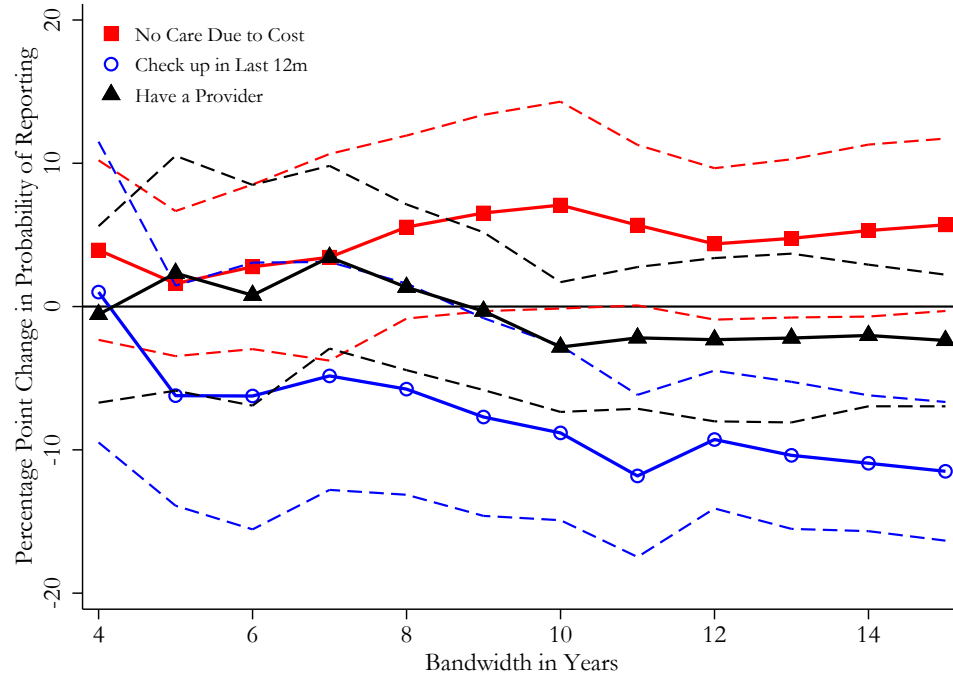
Notes: These estimates are for the no insurance to Medicare transition. The solid lines with the markers are the point estimates and the dashed lines are the confidence intervals.

FIGURE A19. ROBUSTNESS TO BANDWIDTH: INSURED → MEDICARE

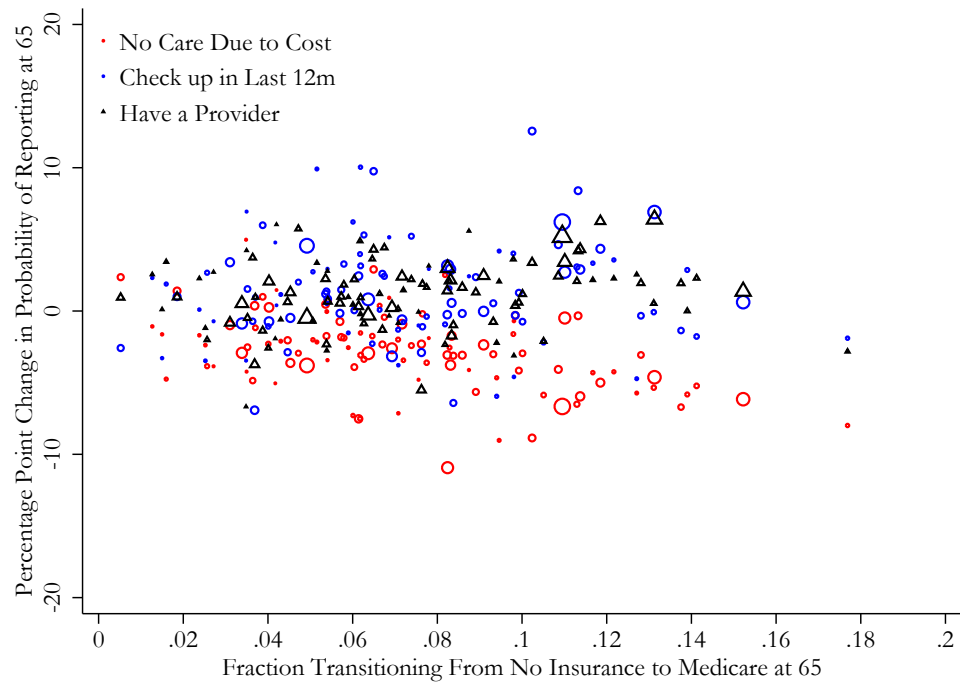


Notes: These estimates are for the insured to Medicare transition. The solid lines with the markers are the point estimates and the dashed lines are the confidence intervals.

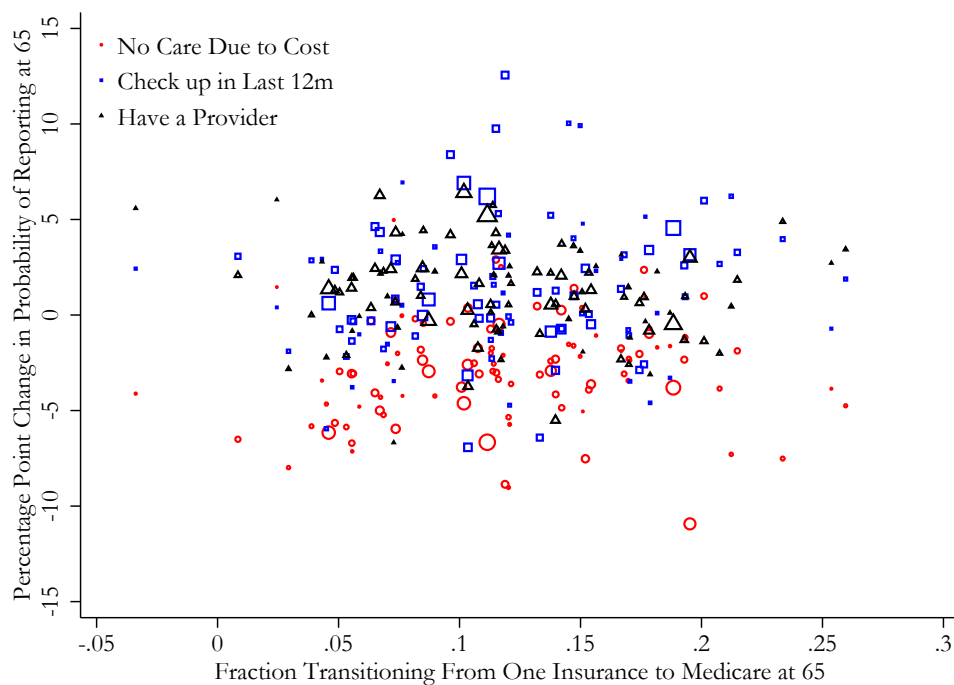
FIGURE A20. ROBUSTNESS TO BANDWIDTH: INSURED $\rightarrow$ MEDICARE AND SECOND PAYER



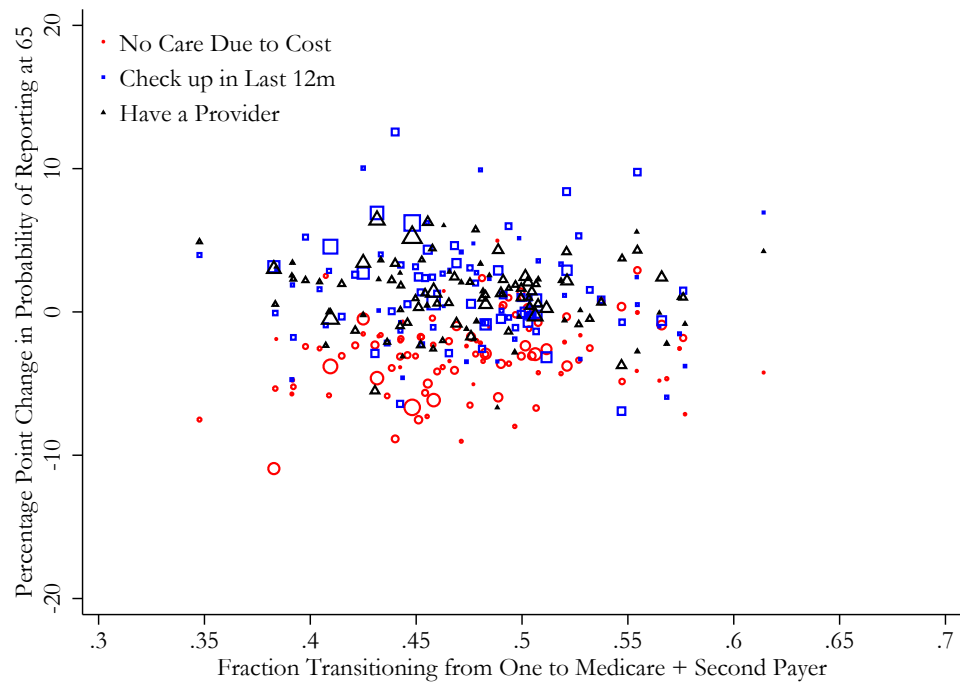
Notes: These estimates are for the insurance to Medicare and second payer transition. The solid lines with the markers are the point estimates and the dashed lines are the confidence intervals.

FIGURE A21. INSURANCE TRANSITION: NONE $\rightarrow$ MEDICARE

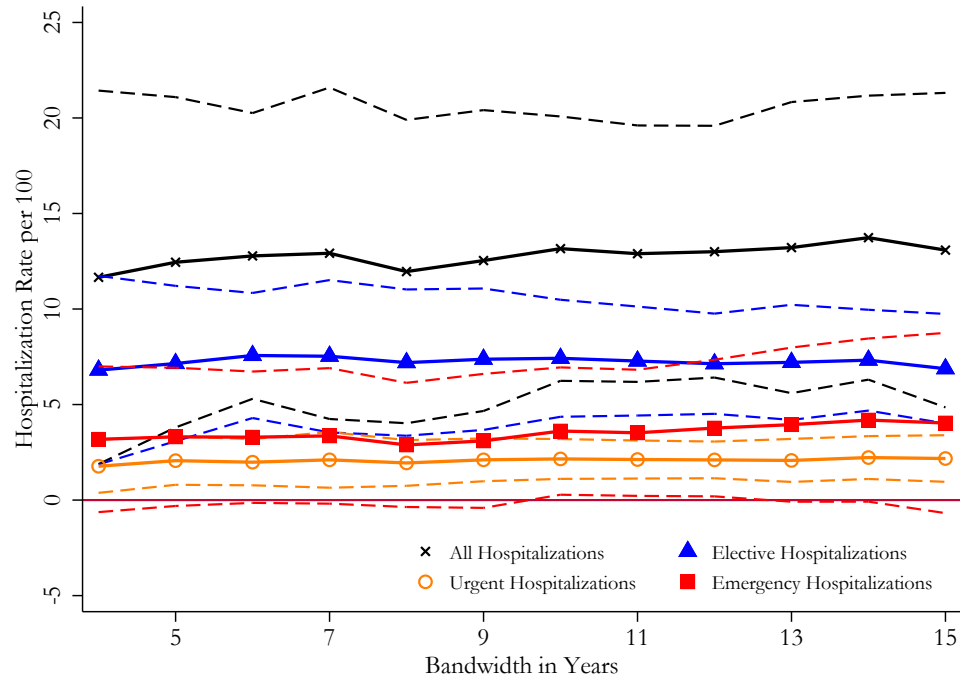
Notes: Data from ACS and BRFSS. Each marker corresponds to a state and time period and the marker size reflects the sample size for the state and time period.

FIGURE A22. INSURANCE TRANSITION: ONE $\rightarrow$ MEDICARE

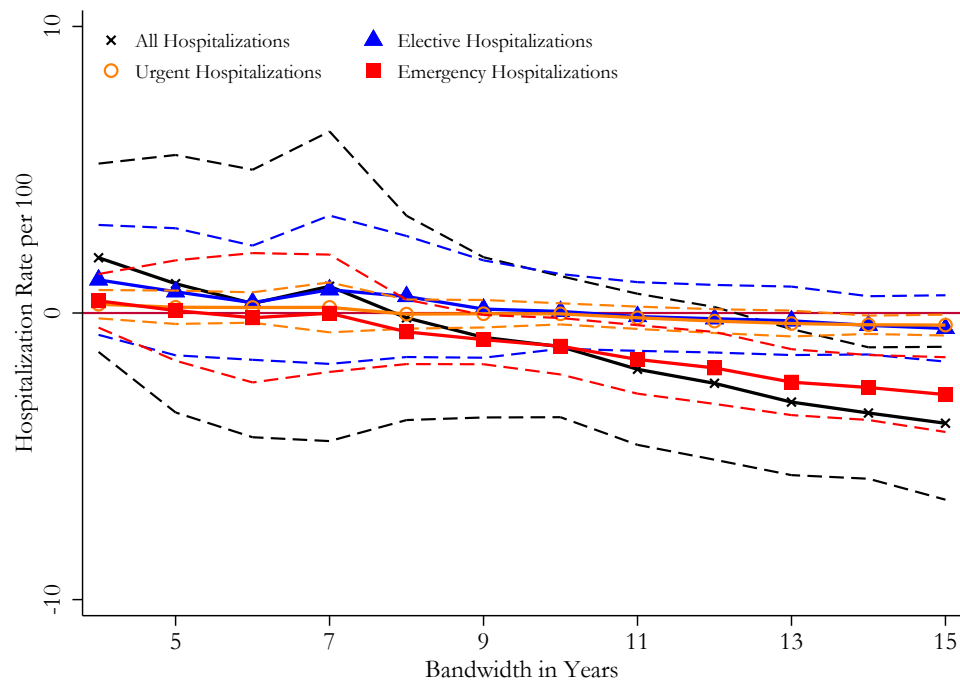
Notes: Data from ACS and BRFSS. Each marker corresponds to a state and time period and the marker size reflects the sample size for the state and time period.

FIGURE A23. INSURANCE TRANSITION: ONE $\rightarrow$ MEDICARE + 2ND PAYER

Notes: Data from ACS and BRFSS. Each marker corresponds to a state and time period and the marker size reflects the sample size for the state and time period.

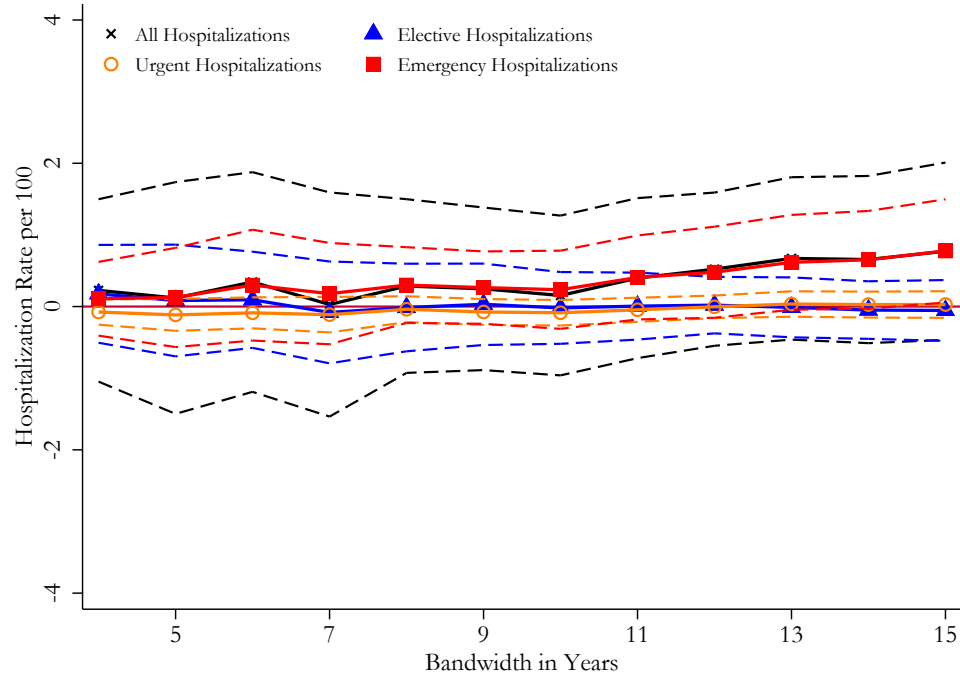
FIGURE A24. ROBUSTNESS TO BANDWIDTH: NO INSURANCE $\rightarrow$ MEDICARE

Notes: These estimates are for the no insurance to Medicare transition. The solid lines with the markers are the point estimates and the dashed lines are the confidence intervals.

FIGURE A25. ROBUSTNESS TO BANDWIDTH: INSURED $\rightarrow$ MEDICARE

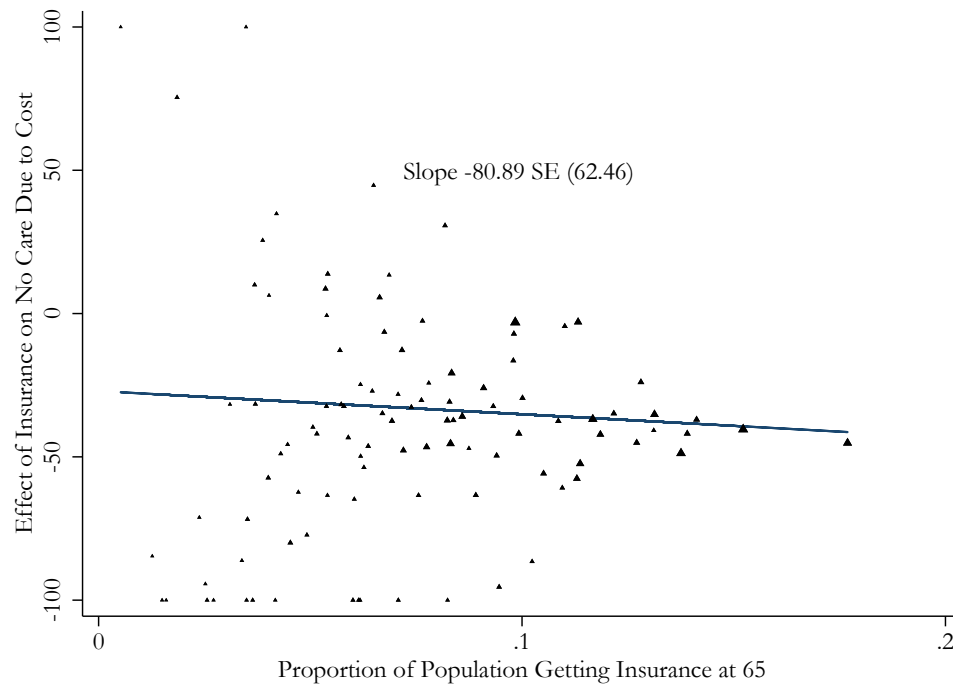
Notes: These estimates are for the insured to Medicare transition. The solid lines with the markers are the point estimates and the dashed lines are the confidence intervals.

FIGURE A26. ROBUSTNESS TO BANDWIDTH: INSURED $\rightarrow$ MEDICARE AND SECOND PAYER



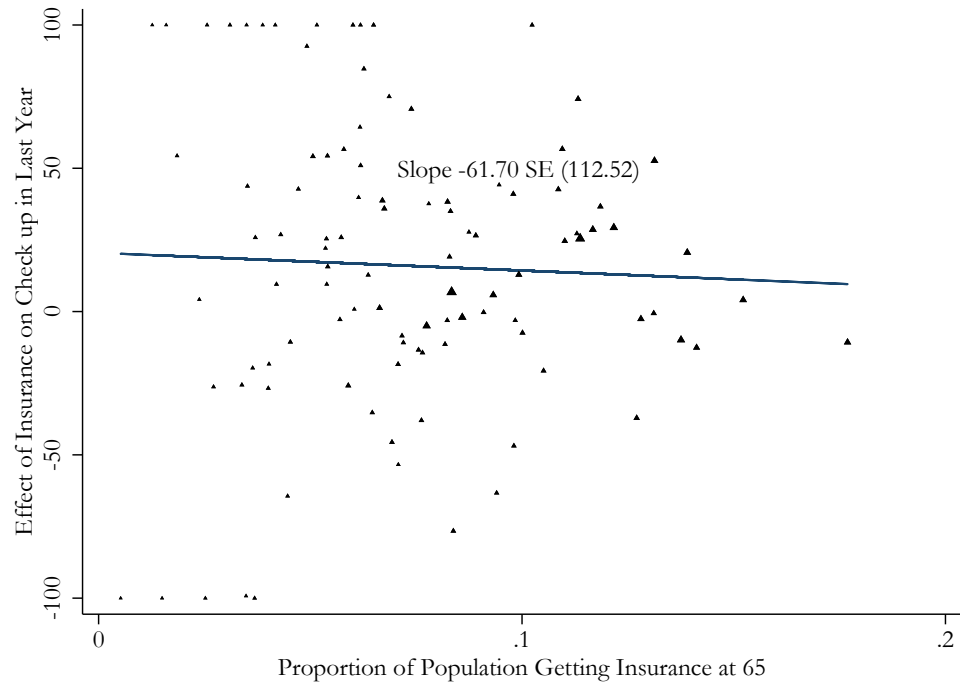
Notes: These estimates are for the insurance to Medicare and second payer transition. The solid lines with the markers are the point estimates and the dashed lines are the confidence intervals.

FIGURE A27. VARIATION IN EFFECT OF GAINING INSURANCE BY FRACTION GAINING INSURANCE IN STATE



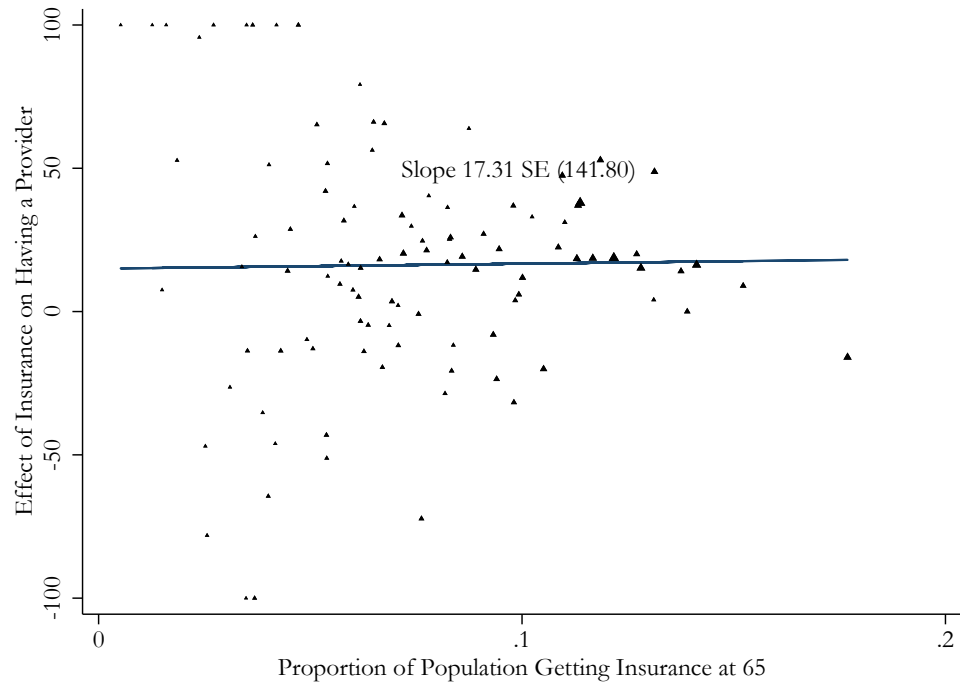
Notes: Effects greater than 100 have been set to 100 after line is fit.

FIGURE A28. VARIATION IN EFFECT OF GAINING INSURANCE BY FRACTION GAINING INSURANCE IN STATE



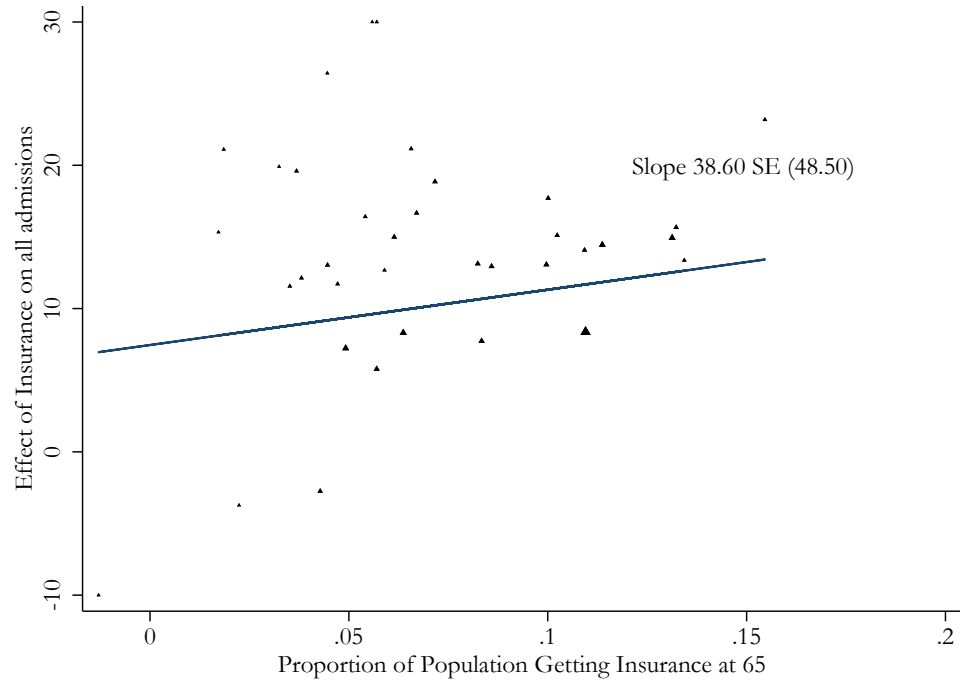
Notes: Effects greater than 100 have been set to 100 after line is fit.

FIGURE A29. VARIATION IN EFFECT OF GAINING INSURANCE BY FRACTION GAINING INSURANCE IN STATE



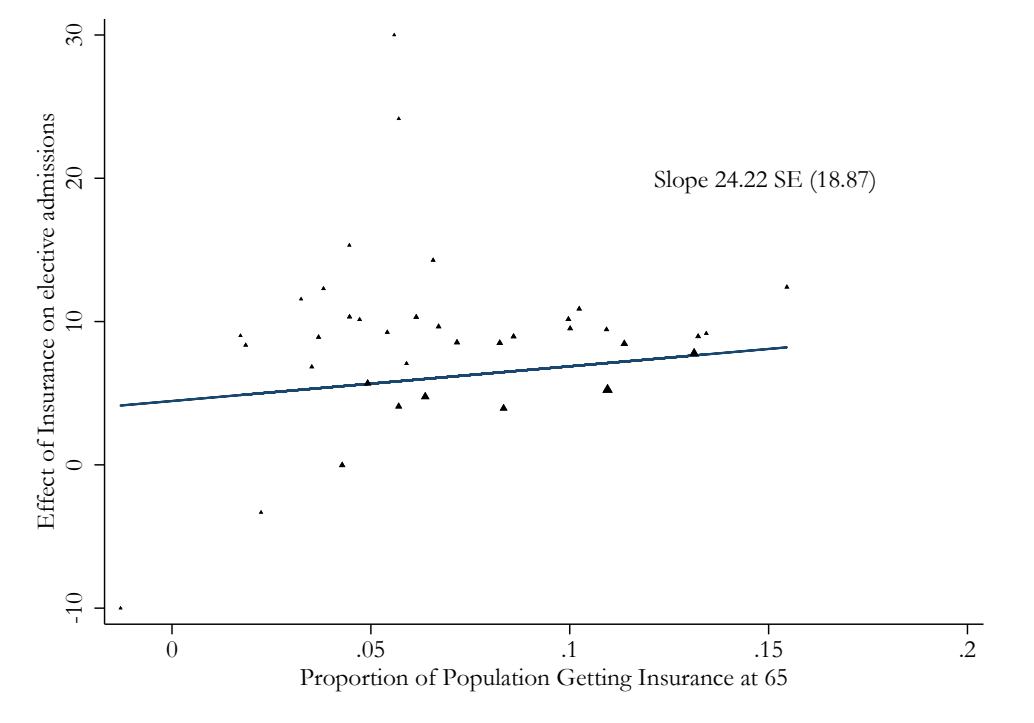
Notes: Effects greater than 100 have been set to 100 after line is fit.

FIGURE A30. VARIATION IN EFFECT OF GAINING INSURANCE BY FRACTION GAINING INSURANCE IN STATE



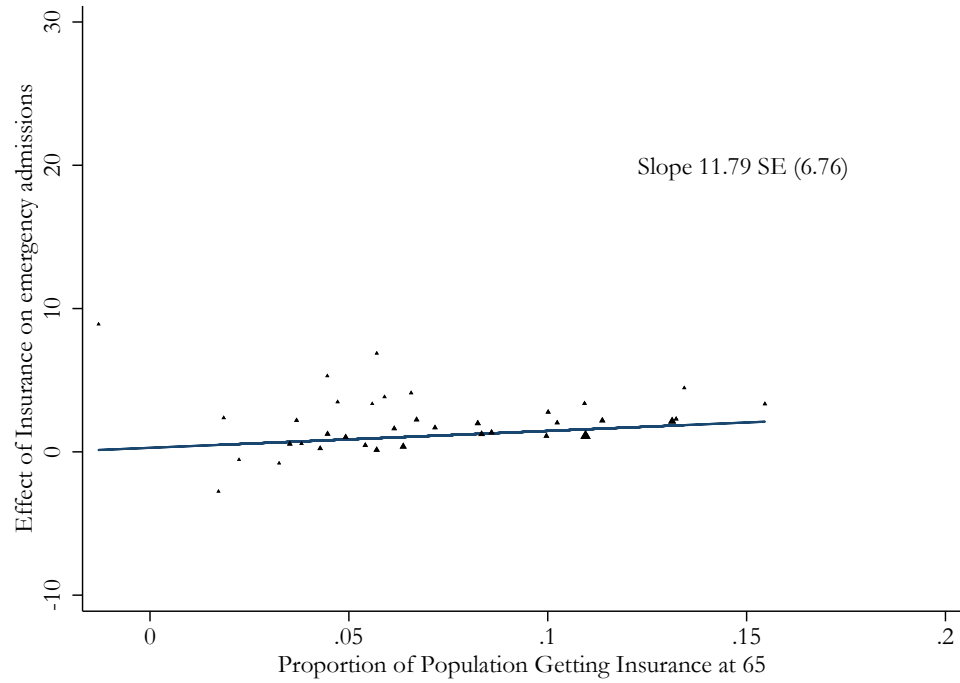
Notes: Effects greater than 30 and less than -10 have been set to 30 and 10 respectively after the line is fit.

FIGURE A31. VARIATION IN EFFECT OF GAINING INSURANCE BY FRACTION GAINING INSURANCE IN STATE



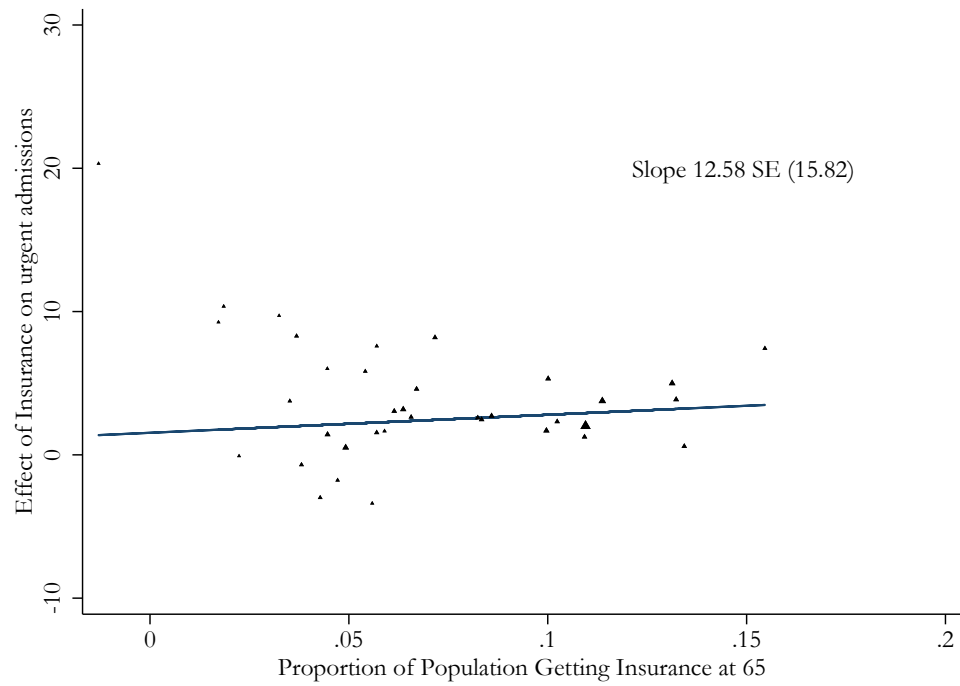
Notes: Effects greater than 30 and less than -10 have been set to 30 and 10 respectively after the line is fit.

FIGURE A32. VARIATION IN EFFECT OF GAINING INSURANCE BY FRACTION GAINING INSURANCE IN STATE



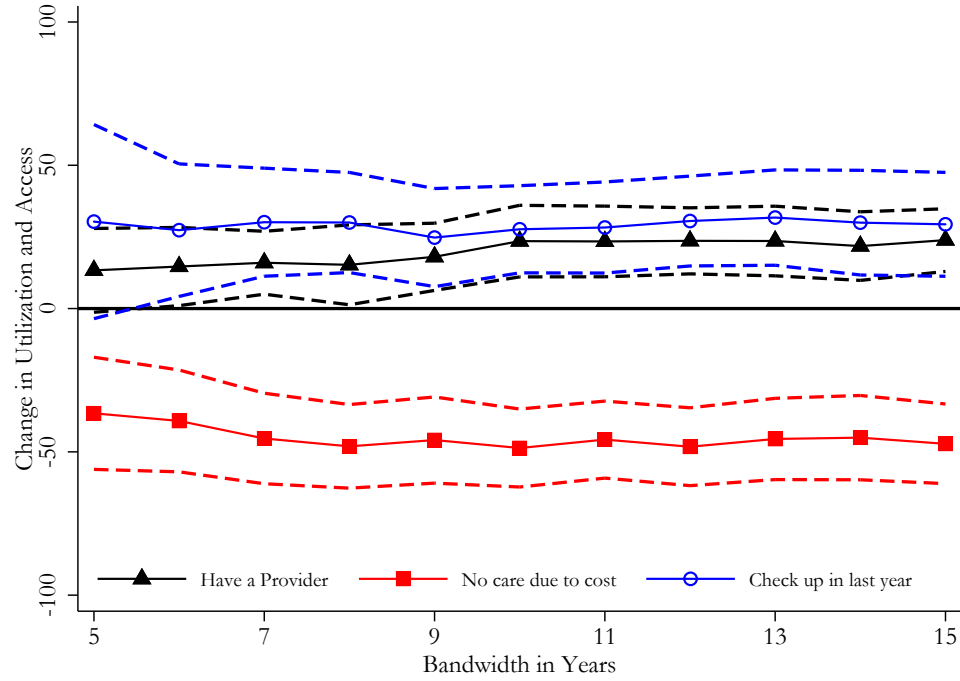
Notes: Effects greater than 30 and less than -10 have been set to 30 and 10 respectively after the line is fit.

FIGURE A33. VARIATION IN EFFECT OF GAINING INSURANCE BY FRACTION GAINING INSURANCE IN STATE



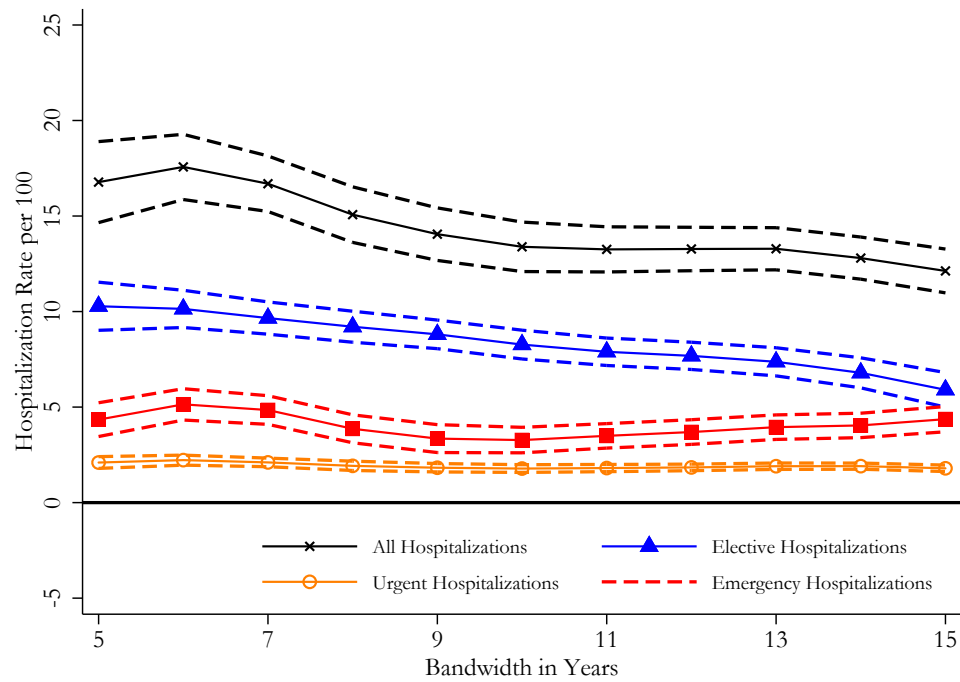
Notes: Effects greater than 30 and less than -10 have been set to 30 and 10 respectively after the line is fit.

FIGURE A34. ROBUSTNESS TO BANDWIDTH: EFFECT OF INSURANCE TWO SAMPLE IV



Notes: These estimates are from a two sample IV approach with the first stage change in insurance from the ACS and the access measures from the BRFSS. The solid lines with the markers are the point estimates and the dashed lines are the confidence intervals.

FIGURE A35. ROBUSTNESS TO BANDWIDTH: EFFECT OF INSURANCE TWO SAMPLE IV



Notes: These estimates are from a two sample IV approach with the first stage change in insurance from the ACS and the access measures from administrative hospital records. The solid lines with the markers are the point estimates and the dashed lines are the confidence intervals.

TABLE A1—ESTIMATED HEALTH INSURANCE TRANSITION RATES WITH MEPS, AGE 62-63 PLACEBO TRANSITION

		Age 63			
		None	One, Not Medicare	Medicare	Two or More
	None	12.0	2.0	0.1	0.0
Age 62	One, Not Medicare	0.9	68.7	0.1	0.9
	Medicare	0.0	0.0	4.7	0.4
	Two or More	0.0	0.2	0.5	9.6

Notes: Transition percentages estimated from the Medical Expenditure Panel Survey (MEPS) as in Table 2, but between the ages of 62 and 63.

TABLE A2—COMPARISON OF ESTIMATED HEALTH INSURANCE TRANSITION RATES PRE VS POST ACA

		Age 65				
		ACA	None	One, Not Medicare	Medicare	Two or More
Age 64	None	Pre	1.5	0.0	9.8	0.0
		Post	1.4	0.0	5.7	0.0
	One, Not Medicare	Pre	0.0	6.0	9.2	48.1
		Post	0.0	7.9	15.4	45.8
	Medicare	Pre	0.0	0.0	5.7	0.0
		Post	0.0	0.0	6.5	0.0
	Two or More	Pre	0.0	0.0	0.0	19.7
		Post	0.0	0.0	0.0	17.4

Notes: Transition percentages are obtained using the estimation method described in the Section II. The estimates are for all states and the District of Columbia 2008-2017.

TABLE A3—COMPARISON OF ESTIMATED HEALTH INSURANCE TRANSITION RATES POST ACA (EXPANDERS VS NON EXPANDERS)

			Age 65			
			None	One, Not Medicare	Medicare	Two or More
Age 64	None	Expand	1.3	0.0	4.5	0.0
		Didn't Expand	1.7	0.0	8.3	0.0
	One, Not Medicare	Expand	0.0	8.5	15.9	47.0
		Didn't Expand	0.0	6.6	14.2	43.1
	Medicare	Expand	0.0	0.0	5.9	0.0
		Didn't Expand	0.0	0.0	7.8	0.0
	Two or More	Expand	0.0	0.0	0.0	16.9
		Didn't Expand	0.0	0.0	0.0	18.4

Notes: ACS transition percentages are obtained using the estimation method described in the Section II.

TABLE A4—EFFECT OF CHANGE IN INSURANCE COVERAGE ON ACCESS TO CARE (WITHIN STATE VARIATION)

	No Care Due to Cost	Have a Medical Provider	Checkup in the Past Year	Hospitalizations per 100			
				All	Elective	Urgent	Emergency
None → Medicare	-60.7 (29.1) [0.363]	24.4 (39.6) [0.999]	-10.8 (32.4) [0.999]	10.7 (4.0) [0.319]	5.5 (1.9) [0.319]	0.98 (0.63) [0.819]	3.9 (2.7) [0.819]
Insured → Medicare	-21.6 (27.3) [0.999]	-10.5 (17.5) [0.999]	-16.6 (20.2) [0.999]	-1.3 (2.0) [0.999]	-0.17 (0.93) [0.999]	-0.34 (0.32) [0.999]	-0.87 (1.36) [0.999]
Insured → Medicare + 2nd Payer	7.0 (9.9) [0.999]	3.8 (9.6) [0.999]	10.0 (7.8) [0.857]	1.4 (1.5) [0.999]	1.1 (0.7) [0.819]	0.34 (0.23) [0.819]	0.13 (1.01) [0.999]
F test (quadratics and interactions)	1.07 0.3979	0.28 0.9430	0.47 0.8247	1.47 0.3457	1.11 0.4647	0.12 0.9878	0.64 0.6984
Mean Age 64							
Uninsured	36.7	64.4	54.7	4.9	0.48	0.43	4.0
Insured	7.9	93.6	82.7	15.1	3.8	1.7	9.5
All	10.8	90.5	79.8	13.9	3.4	1.6	8.8
Observations							
State Cells	102	102	102	36	36	36	36
American Community Survey	7,125,102	7,125,102	7,125,102	3,157,108	3,157,108	3,157,108	3,157,108
BRFSS/Hospitalizations	1,803,710	1,803,226	1,790,630	41,865,902	10,253,559	4,836,319	26,571,641

Notes: Estimates on data collapsed pre and post ACA weighted by population ages 55 to 75. The outcomes in the first three columns are from the BRFSS and are scaled so they can be interpreted as percentage point changes. Parentheses contain standard errors. Square brackets contains false discovery rate (FDR) adjusted p-values that control FDR for the entire table, computed using the Benjamini, Krieger, and Yekutieli two-stage sharpened procedure described in Anderson (2008). For context the estimated hospitalization rate at age 64 for each group (from MEPS) None → Medicare: 7.7; Insured → Medicare: 9.0; Insured → Medicare + Second Payer: 18.0. The p-value of the F-test is presented directly below the F-Statistic.

TABLE A5—EFFECT OF CHANGE IN INSURANCE COVERAGE ON ACCESS TO CARE (PRE ACA)

	No Care Due to Cost	Have a Medical Provider	Checkup in the Past Year	Hospitalizations per 100			
				All	Elective	Urgent	Emergency
None → Medicare	-54.9 (9.4) [0.001]	33.9 (14.6) [0.082]	36.7 (17.3) [0.085]	12.9 (4.8) [0.074]	7.2 (1.7) [0.011]	2.3 (0.9) [0.074]	3.4 (2.62) [0.286]
Insured → Medicare	-7.9 (11.0) [0.385]	21.6 (13.4) [0.174]	42.2 (17.2) [0.074]	-4.4 (4.3) [0.315]	-1.2 (2.0) [0.421]	-0.58 (0.84) [0.385]	-2.5 (2.1) [0.315]
Insured → Medicare + 2nd Payer	4.7 (3.2) [0.206]	-6.1 (3.8) [0.174]	-10.4 (4.7) [0.082]	0.88 (1.1) [0.385]	0.27 (0.53) [0.446]	-0.002 (0.180) [0.647]	0.56 (0.53) [0.315]
F test (quadratics and interactions)	0.88 0.5167	0.49 0.8123	1.77 0.1296	2.79 0.0571	2.05 0.1302	3.47 0.0284	1.14 0.3924
Observations							
State Cells	51	51	51	22	22	22	22
American Community Survey	4,034,651	4,034,651	4,034,651	1,911,664	1,911,664	1,911,664	1,911,664
BRFSS/Hospitalizations	1053347	1,053,314	1,045,761	26,250,300	6,601,289	3,176,848	16,342,508

Notes: Estimates on data collapsed pre ACA weighted by population ages 55 to 75. The outcomes in the first three columns are from the BRFSS and are scaled so they can be interpreted as percentage point changes. Parentheses contain standard errors. Square brackets contains false discovery rate (FDR) adjusted p-values that control FDR for the entire table, computed using the Benjamini, Krieger, and Yekutieli two-stage sharpened procedure described in Anderson (2008). For context the estimated hospitalization rate at age 64 for each group (from MEPS) None → Medicare: 7.7; Insured → Medicare: 9.0; Insured → Medicare + Second Payer: 18.0. The p-value of the F-test is presented directly below the F-Statistic.

TABLE A6—EFFECT OF CHANGE IN INSURANCE COVERAGE ON ACCESS TO CARE (BETWEEN STATE VARIATION)

	No Care Due to Cost	Have a Medical Provider	Checkup in the Past Year	Hospitalizations per 100			
				All	Elective	Urgent	Emergency
None → Medicare	-51.7 (16.3) [0.008]	26.1 (8.4) [0.008]	33.8 (10.7) [0.008]	14.6 (4.1) [0.008]	8.4 (1.4) [0.001]	2.7 (0.75) [0.008]	3.5 (2.4) [0.132]
Insured → Medicare	-22.8 (10.0) [0.033]	15.7 (7.4) [0.046]	43.8 (12.2) [0.007]	-2.5 (3.7) [0.337]	-0.93 (1.81) [0.394]	-0.50 (0.61) [0.323]	-1.1 (1.6) [0.337]
Insured → Medicare + 2nd Payer	7.4 (2.8) [0.015]	-5.0 (2.7) [0.071]	-12.7 (3.4) [0.007]	0.31 (0.95) [0.448]	0.11 (0.46) [0.448]	-0.04 (0.14) [0.448]	0.22 (0.45) [0.394]
F test (quadratics and interactions)	0.73 0.6286	0.24 0.9591	0.86 0.5285	1.00 0.4640	1.67 0.2014	0.88 0.5361	0.64 0.6993
Mean Age 64							
Uninsured	36.7	64.4	54.7	4.9	0.48	0.43	4.0
Insured	7.9	93.6	82.7	15.1	3.8	1.7	9.5
All	10.8	90.5	79.8	13.9	3.4	1.6	8.8
Observations							
State Cells	51	51	51	23	23	23	23
American Community Survey	7,125,102	7,125,102	7,125,102	3,157,108	3,157,108	3,157,108	3,157,108
BRFSS/Hospitalizations	1,803,710	1,803,226	1,790,630	41,865,902	10,253,559	4,836,319	26,571,641

Notes: Estimates on data collapsed pre and post ACA weighted by population ages 55 to 75. The outcomes in the first three columns are from the BRFSS and are scaled so they can be interpreted as percentage point changes. Parentheses contain standard errors. Square brackets contains false discovery rate (FDR) adjusted p-values that control FDR for the entire table, computed using the Benjamini, Krieger, and Yekutieli two-stage sharpened procedure described in Anderson (2008). For context the estimated hospitalization rate at age 64 for each group (from MEPS) None → Medicare: 7.7; Insured → Medicare: 9.0; Insured → Medicare + Second Payer: 18.0. The p-value of the F-test is presented directly below the F-Statistic.

TABLE A7—EFFECT OF CHANGE IN INSURANCE COVERAGE ON ACCESS TO CARE (EIV)

	No Care Due to Cost	Have a Medical Provider	Checkup in the Past Year	Hospitalizations per 100			
				All	Elective	Urgent	Emergency
None → Medicare	-58.6 (11.6) [0.001]	35.0 (11.3) [0.005]	45.6 (14.0) [0.004]	13.9 (2.9) [0.001]	7.8 (1.6) [0.001]	2.3 (0.45) [0.001]	3.8 (1.3) [0.006]
Insured → Medicare	-23.8 (10.2) [0.023]	2.8 (6.3) [0.533]	27.9 (8.0) [0.002]	-1.6 (1.5) [0.226]	-0.11 (0.71) [0.546]	-0.08 (0.26) [0.546]	-1.4 (0.7) [0.041]
Insured → Medicare + 2nd Payer	8.8 (3.8) [0.023]	-3.2 (2.6) [0.179]	-10.7 (3.5) [0.005]	0.16 (0.57) [0.546]	-0.04 (0.28) [0.546]	-0.09 (0.10) [0.262]	0.26 (0.26) [0.236]
Mean Age 64							
Uninsured	36.7	64.4	54.7	4.9	0.48	0.43	4.0
Insured	7.9	93.6	82.7	15.1	3.8	1.7	9.5
All	10.8	90.5	79.8	13.9	3.4	1.6	8.8
Observations							
State Cells	102	102	102	36	36	36	36
American Community Survey	7,125,102	7,125,102	7,125,102	3,157,108	3,157,108	3,157,108	3,157,108
BRFSS/Hospitalizations	1,803,710	1,803,226	1,790,630	41,865,902	10,253,559	4,836,319	26,571,641

Notes: The outcomes in the first three columns are from the BRFSS and are scaled so they can be interpreted as percentage point changes. Parentheses contain standard errors. Square brackets contains false discovery rate (FDR) adjusted p-values that control FDR for the entire table, computed using the Benjamini, Krieger, and Yekutieli two-stage sharpened procedure described in Anderson (2008). For context the estimated hospitalization rate at age 64 for each group (from MEPS) None → Medicare: 7.7; Insured → Medicare: 9.0; Insured → Medicare + Second Payer: 18.0.

TABLE A8—EFFECT OF INSURANCE ON HOSPITALIZATION RATES BY DRG FAMILY WITH LARGEST GROWTH IN EMERGENCY ADMISSIONS

DRG Description	DRGs	All	Elective	Urgent	Emergency
All DRGs (All Admissions)		13.4 (0.64)	8.3 (0.37)	1.8 (0.10)	3.3 (0.33)
Septicemia or severe sepsis	870-872	0.289 (0.046) 0.612	0.020 (0.007) 0.013	0.039 (0.012) 0.059	0.228 (0.041) 0.540
Cardiac arrhythmia & conduction disorders	308-310	0.271 (0.032) 0.332	0.030 (0.008) 0.023	0.042 (0.010) 0.040	0.197 (0.028) 0.268
Renal failure	682-684	0.194 (0.036) 0.290	0.009 (0.005) 0.011	0.018 (0.011) 0.034	0.167 (0.033) 0.244
Esophagitis, gastroent & misc digest disorders	391-392	0.248 (0.046) 0.387	0.023 (0.007) 0.015	0.066 (0.011) 0.046	0.157 (0.044) 0.326
Psychoses	885	0.356 (0.043) 0.278	0.044 (0.010) 0.029	0.163 (0.020) 0.094	0.146 (0.028) 0.153
Circulatory disorders except AMI, w card cath	286-287	0.241 (0.028) 0.215	0.056 (0.008) 0.020	0.038 (0.008) 0.029	0.146 (0.024) 0.166
G.I. hemorrhage	377-379	0.142 (0.031) 0.236	0.005 (0.005) 0.007	0.029 (0.008) 0.025	0.108 (0.027) 0.204
Respiratory infections & inflammations	177-179	0.107 (0.019) 0.088	0.001 (0.003) 0.004	0.007 (0.007) 0.012	0.098 (0.018) 0.072
Cholecystectomy	411-419	0.171 (0.025) 0.151	0.054 (0.011) 0.022	0.023 (0.007) 0.018	0.093 (0.019) 0.112
Chronic obstructive pulmonary disease	190-192	0.130 (0.051) 0.532	0.032 (0.008) 0.019	0.010 (0.015) 0.061	0.086 (0.044) 0.451
Simple pneumonia & pleurisy	193-195	0.112 (0.032) 0.341	0.013 (0.006) 0.013	0.022 (0.013) 0.041	0.077 (0.032) 0.287
Other digestive system diagnoses	393-395	0.088 (0.020) 0.118	0.009 (0.004) 0.007	0.008 (0.008) 0.015	0.071 (0.018) 0.096
Major gastrointestinal disorders & peritoneal infections	371-373	0.079 (0.021) 0.072	0.001 (0.003) 0.003	0.009 (0.007) 0.010	0.068 (0.017) 0.059
Complications of treatment	919-921	0.085 (0.013) 0.053	0.010 (0.004) 0.005	0.017 (0.005) 0.009	0.059 (0.010) 0.038

Notes: Single-channel IV estimates for the None → Medicare channel for the Diagnosis Related Groups that had the largest increases in elective admissions at age 65. The first row of each block contains the estimate of the increase in admissions per 100 people that transitioned from not having to having insurance at 65. The standard errors are in parenthesis below the point estimates and the final row in each block presents the admission rate per 100 people at age 64 regardless of insurance status. The first row contains estimates for all DRGs as shown in Table 4.

TABLE A9—EFFECT OF INSURANCE ON HOSPITALIZATION RATES BY DRG FAMILY WITH LARGEST GROWTH IN ELECTIVE ADMISSION

DRG Description	DRGs	All	Elective	Urgent	Emergency
All DRGs (All Admissions)		13.4 (0.64)	8.3 (0.37)	1.8 (0.10)	3.3 (0.33)
Major joint replacement or reattachment of lower extremity	469-470	2.680 (0.190) 0.923	2.495 (0.182) 0.861	0.130 (0.011) 0.029	0.051 (0.012) 0.032
Major male pelvic procedures	707-708	0.346 (0.031) 0.110	0.330 (0.030) 0.105	0.013 (0.003) 0.004	0.002 (0.001) 0.001
Major small & large bowel procedures	329-331	0.410 (0.039) 0.222	0.330 (0.033) 0.130	0.039 (0.007) 0.018	0.039 (0.014) 0.073
Spinal fusion	456-460	0.301 (0.027) 0.163	0.278 (0.027) 0.149	0.023 (0.005) 0.006	0.001 (0.005) 0.008
Cervical spinal fusion	471-473	0.268 (0.020) 0.087	0.257 (0.019) 0.077	0.009 (0.003) 0.004	0.002 (0.004) 0.006
Perc cardiovasc proc	246-251	0.386 (0.037) 0.400	0.250 (0.016) 0.093	0.100 (0.015) 0.061	0.030 (0.028) 0.244
O.R. procedures for obesity	619-621	0.248 (0.021) 0.044	0.234 (0.021) 0.042	0.012 (0.002) 0.002	0.002 (0.001) 0.000
Coronary bypass	231-236	0.302 (0.024) 0.125	0.224 (0.017) 0.065	0.061 (0.008) 0.017	0.016 (0.010) 0.042
Extracranial procedures	37-39	0.206 (0.020) 0.070	0.194 (0.018) 0.055	0.010 (0.004) 0.004	0.002 (0.005) 0.010
Other vascular procedures	252-254	0.221 (0.030) 0.140	0.185 (0.017) 0.065	0.021 (0.009) 0.020	0.010 (0.015) 0.055
Uterine & adnexa proc for non-malignancy	742-743	0.167 (0.021) 0.074	0.159 (0.020) 0.068	0.009 (0.003) 0.004	-0.001 (0.003) 0.003
Back & neck proc exc spinal fusion	490-491	0.138 (0.018) 0.076	0.145 (0.017) 0.065	0.005 (0.004) 0.004	-0.012 (0.004) 0.007
Cardiac valve & oth maj cardiothoracic proc	216-221	0.161 (0.019) 0.079	0.135 (0.017) 0.057	0.014 (0.005) 0.007	0.013 (0.008) 0.014
Rehabilitation	945-946	0.194 (0.017) 0.084	0.135 (0.014) 0.057	0.043 (0.008) 0.021	0.013 (0.004) 0.004
Bilateral or multiple major joint procs of lower extremity	461-462	0.126 (0.016) 0.029	0.119 (0.015) 0.028	0.005 (0.002) 0.001	0.002 (0.001) 0.000

Notes: Single-channel IV estimates for the None → Medicare channel for the Diagnosis Related Groups that had the largest increases in elective admissions at age 65. The first row of each block contains the estimate of the increase in admissions per 100 people that transitioned from not having to having insurance at 65. The standard errors are in parenthesis below the point estimates and the final row in each block presents the admission rate per 100 people at age 64 regardless of insurance status. The first row contains estimates for all DRGs as shown in Table 4.

TABLE A10—EFFECT OF INSURANCE ON HOSPITALIZATION RATES BY DRG FAMILY WITH LARGEST GROWTH IN URGENT ADMISSIONS

DRG Description	DRGs	All	Elective	Urgent	Emergency
All DRGs (All Admissions)		13.4 (0.64)	8.3 (0.37)	1.8 (0.10)	3.3 (0.33)
Psychoses	885	0.356 (0.043) 0.278	0.044 (0.010) 0.029	0.163 (0.020) 0.094	0.146 (0.028) 0.153
Major joint replacement or reattachment of lower extremity	469-470	2.680 (0.190) 0.923	2.495 (0.182) 0.861	0.130 (0.011) 0.029	0.051 (0.012) 0.032
Perc cardiovasc proc	246-251	0.386 (0.037) 0.400	0.250 (0.016) 0.093	0.100 (0.015) 0.061	0.030 (0.028) 0.244
Alcohol/drug abuse or dependence	894-897	0.137 (0.029) 0.131	0.062 (0.008) 0.018	0.089 (0.009) 0.022	-0.013 (0.023) 0.090
Esophagitis, gastroent & misc digest disorders	391-392	0.248 (0.046) 0.387	0.023 (0.007) 0.015	0.066 (0.011) 0.046	0.157 (0.044) 0.326
Coronary bypass	231-236	0.302 (0.024) 0.125	0.224 (0.017) 0.065	0.061 (0.008) 0.017	0.016 (0.010) 0.042
Rehabilitation	945-946	0.194 (0.017) 0.084	0.135 (0.014) 0.057	0.043 (0.008) 0.021	0.013 (0.004) 0.004
Cardiac arrhythmia & conduction disorders	308-310	0.271 (0.032) 0.332	0.030 (0.008) 0.023	0.042 (0.010) 0.040	0.197 (0.028) 0.268
Septicemia or severe sepsis	870-872	0.289 (0.046) 0.612	0.020 (0.007) 0.013	0.039 (0.012) 0.059	0.228 (0.041) 0.540
Major small & large bowel procedures	329-331	0.410 (0.039) 0.222	0.330 (0.033) 0.130	0.039 (0.007) 0.018	0.039 (0.014) 0.073
Circulatory disorders except AMI, w card cath	286-287	0.241 (0.028) 0.215	0.056 (0.008) 0.020	0.038 (0.008) 0.029	0.146 (0.024) 0.166
Heart failure & shock	291-293	0.098 (0.036) 0.439	0.012 (0.006) 0.014	0.035 (0.012) 0.046	0.048 (0.035) 0.379
G.I. hemorrhage	377-379	0.142 (0.031) 0.236	0.005 (0.005) 0.007	0.029 (0.008) 0.025	0.108 (0.027) 0.204
Major chest procedures	163-165	0.116 (0.018) 0.084	0.091 (0.016) 0.064	0.024 (0.004) 0.005	0.001 (0.006) 0.014
Postoperative & post-traumatic infections	862-863	0.076 (0.014) 0.055	0.004 (0.004) 0.006	0.023 (0.006) 0.012	0.049 (0.012) 0.038

Notes: Single-channel IV estimates for the None → Medicare channel for the Diagnosis Related Groups that had the largest increases in elective admissions at age 65. The first row of each block contains the estimate of the increase in admissions per 100 people that transitioned from not having to having insurance at 65. The standard errors are in parenthesis below the point estimates and the final row in each block presents the admission rate per 100 people at age 64 regardless of insurance status. The first row contains estimates for all DRGs as shown in Table 4.