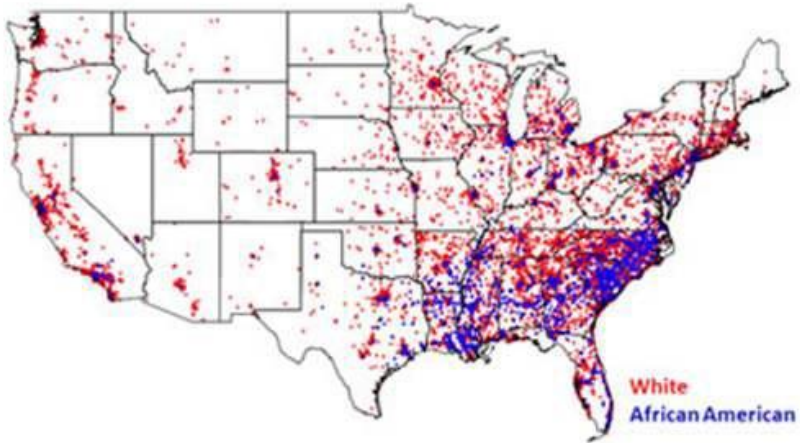


## APPENDIX SA2

**Figure S1: Location of REGARDS participants**



Source: (Howard et al. 2011)

**Figure S2: Text from the card and letter given to REGARDS participants informing them about their blood pressure and the results of their lab tests**

Your Blood Pressure: \_\_\_\_\_ / \_\_\_\_\_ mmHg

	<u>Systolic</u>	<u>Diastolic</u>	<u>Recommended Action</u>
<input type="checkbox"/>	<140	<90	Normal blood pressure: no action required
<input type="checkbox"/>	140-159	90-99	Moderately high blood pressure: should be managed by a doctor within 2 months
<input type="checkbox"/>	160-179	100-109	High blood pressure: should be seen by a doctor within 1 month
<input type="checkbox"/>	>180	>110	Very high blood pressure: should be seen by a doctor within 1 week

**Your Lipid panel (levels of blood fats):**

<u>Your Values</u>	<u>Desirable Values</u>
Total: _____ mg/dL	less than 200 mg/dL
LDL: _____ mg/dL	less than 130 mg/dL
HDL: _____ mg/dL	greater than 40 mg/dL
Triglycerides _____ mg/dL	less than 200 mg/dL

If your values are not within the desirable range, you should discuss this with your doctor at your next visit.

**Glucose (level of sugar in your blood):**

<u>Your Value</u>	<u>Desirable Value</u>
_____ mg/dL	less than 126 mg/dL

If your level for glucose is over 200 mg/dL and you DO NOT have diabetes, you should have this rechecked with your doctor as soon as possible. If your level is above 126 mg/dL, you should have this rechecked with your doctor soon.

**Table S1: Participants' cascade**

	<b>Exclusion</b>	<b>Frequency</b>
	<b>(All REGARDS participants)</b>	30,239
	<b>Data abnormalities</b>	-56
	<b>&lt; 67 years at baseline</b>	-17,651
	<b>No Medicare-Linked data</b>	-2,488
	<b>Died &lt;2 years after REGARDS enrollment</b>	-497
	<b>No Medicare Part A+B-C between 2 years before and 2 years after baseline, for reason other than mortality</b>	-2,976
	<b>No high cholesterol, hypertension, or diabetes</b>	-687
	<b>Included</b>	5,884

**Table S2: Chronic Conditions Warehouse ICD-9 codes related to diabetes, hypertension, and high cholesterol**

<b>Condition</b>	<b>Included ICD-9 and CPT diagnosis codes</b>
<b>Diabetes</b>	ICD-9 codes 249.00, 249.01, 249.10, 249.11, 249.20, 249.21, 249.30, 249.31, 249.40, 249.41, 249.50, 249.51, 249.60, 249.61, 249.70, 249.71, 249.80, 249.81, 249.90, 249.91, 250.00, 250.01, 250.02, 250.03, 250.10, 250.11, 250.12, 250.13, 250.20, 250.21, 250.22, 250.23, 250.30, 250.31, 250.32, 250.33, 250.40, 250.41, 250.42, 250.43, 250.50, 250.51, 250.52, 250.53, 250.60, 250.61, 250.62, 250.63, 250.70, 250.71, 250.72, 250.73, 250.80, 250.81, 250.82, 250.83, 250.90, 250.91, 250.92, 250.93, 357.2, 362.01, 362.02, 362.03, 362.04, 362.05, 362.06, 366.41 in any position
<b>Hypertension</b>	ICD-9 codes 362.11, 401.0, 401.1, 401.9, 402.00, 402.01, 402.10, 402.11, 402.90, 402.91, 403.00, 403.01, 403.10, 403.11, 403.90, 403.91, 404.00, 404.01, 404.02, 404.03, 404.10, 404.11, 404.12, 404.13, 404.90, 404.91, 404.92, 404.93, 405.01, 405.09, 405.11, 405.19, 405.91, 405.99, 437.2 in any position
<b>High cholesterol</b>	272.0, 272.1, 272.2, 272.3, 272.4 in any position
<b>Face-to-face physician contact</b>	HCPCS codes 99024, 99058, 99429, 99499, 99201-99288, 99291-99292, 99301-99337, 99341-99357, 99385-99387, 99395-99404

HCPCS: Healthcare Common Procedure Coding System. ICD-9: International Classification of Diseases, 9th Revision.

Source: The Chronic Conditions Warehouse website (<https://www.ccwdata.org/web/guest/condition-categories>).

**Table S3: Definitions used for diabetes, hypertension, and high cholesterol**

<b>Condition</b>	<b>Status</b>	<b>Definition</b>
<b>Diabetes</b> (self-reported diagnosis, taking diabetes medication, or FPG>126 mg/dl / NFBPG>200mg/dl)	<b>No condition</b>	No self-reported diagnosis of diabetes and FPG<126 mg/dl or NFBPG<200mg/dl
	<b>Undiagnosed</b>	No self-reported diagnosis of diabetes, but FPG>126 mg/dl or NFBPG>200mg/dl
	<b>Diagnosed</b>	Self-reported diagnosis of diabetes (when non-pregnant for women)
<b>Hypertension</b> (self-reported diagnosis, taking hypertension medication, SBP>140mmHg or DBP>90mmHg)	<b>No condition</b>	No self-reported diagnosis, SBP<140mmHg, and DBP<90mmHg
	<b>Undiagnosed</b>	No self-reported diagnosis of hypertension, but SBP>140mmHg or DBP>90mmHg
	<b>Diagnosed</b>	Self-reported diagnosis of hypertension (when non-pregnant for women)
<b>High cholesterol</b> (self-reported diagnosis, taking cholesterol-lowering medication, cholesterol meeting ATP III guidelines)	<b>No condition</b>	No self-reported diagnosis, and cholesterol levels below cut-points defined based on recommendations provided by the ATP III guideline (Table S4).
	<b>Undiagnosed</b>	No self-reported diagnosis, but cholesterol levels above cut-points defined based on recommendations provided by the ATP III guideline (Table S4).
	<b>Diagnosed</b>	Self-reported diagnosis

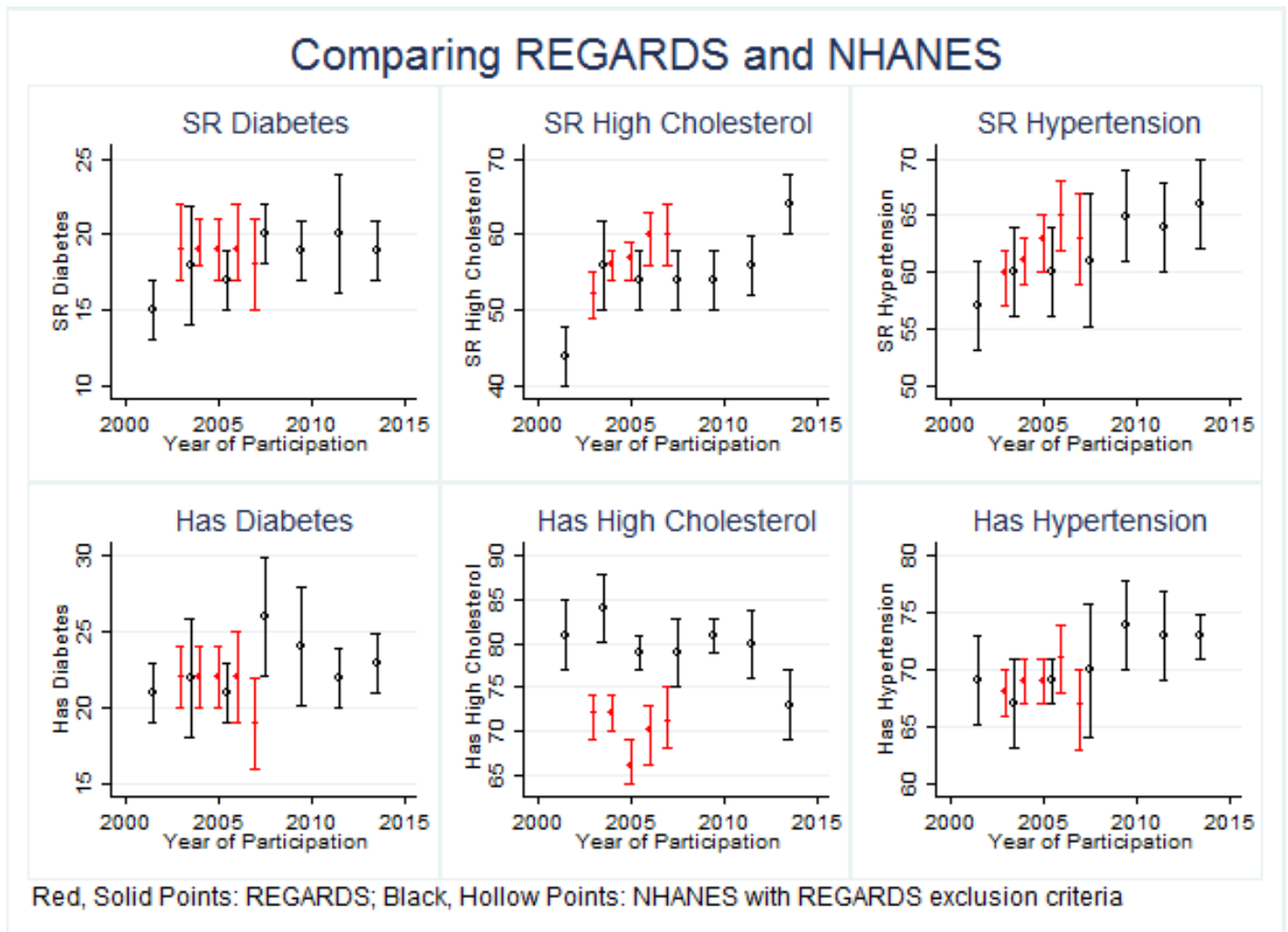
ATP III: Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults; FPG=fasting plasma glucose; NFBPG=non-fasting plasma glucose; SBP=systolic blood pressure; DBP=diastolic blood pressure; HDL=high-density lipoprotein, LDL= low-density lipoprotein. Cholesterol levels recommended by the ATP III are described in Table S4.

**Table S4: Cholesterol levels used as definition of high cholesterol based on target values recommended by the ATP III guideline**

<b>Participants' characteristics</b>	<b>LDL cholesterol for those with fasting blood sample</b>	<b>Non-HDL cholesterol for those with non-fasting blood sample or missing LDL cholesterol</b>
History of CHD, CHD risk equivalents (including a history of stroke or diabetes) or 10-year CHD predicted risk > 20%	≥ 100 mg/dL	≥ 130 mg/dL
Multiple (2 or more) risk factors and 10-year predicted risk 10-20%	≥ 130 mg/dL	≥ 160 mg/dL
0-1 risk factor or multiple (2 or more) risk factors with 10-year predicted risk <10%	≥ 160 mg/dL	≥ 190 mg/dL

ATP III: Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults; CHD: coronary heart disease; HDL=high-density lipoprotein, LDL= low-density lipoprotein

**Figure S3: Comparison of the REGARDS sample with the NHANES sample year by year, using comparable sample restrictions and sample weights**



This figure shows that REGARDS participants have similar trends in biomarkers and levels and trends of self-reported diagnosis of diabetes, hypertension, and high cholesterol as a comparable sample of participants in the National Health and Nutrition Examination Survey in the years of interest. The comparable sample of participants was constructed by limiting the NHANES sample to only include participants who were aged 67 or older, were interviewed in English, and identified as African American or white. SR: Self Reported.

**Table S5: Change in number of semi-annual doctor visits for evaluation and management of previously diagnosed vs. undiagnosed conditions one and two years after REGARDS enrollment (average marginal effects from regression)**

	(1)	(2)	(3)	(4)	(5)	(6)
<b>Diagnosed conditions</b>						
Change after 1 year	0.1 (0 to 0.2)	0 (-0.1 to 0.1)	0 (-0.1 to 0.1)	0.1 (0 to 0.2)	0 (-0.1 to 0.1)	0 (-0.1 to 0.1)
Change after 2 years	0.1 (-0.1 to .2)	0 (-0.1 to .20)	0 (-0.1 to .2)	0.1 (-0.1 to 0.2)	0 (-0.1 to 0.2)	0 (-0.1 to 0.2)
<b>Undiagnosed conditions</b>						
Change after 1 year	0.4*** (0.3 to 0.4)	0.3*** (0.2 to 0.4)	0.3*** (0.2 to 0.4)	0.4*** (0.3 to 0.4)	0.3*** (0.2 to 0.4)	0.3*** (0.2 to 0.4)
Change after 2 years	0.5*** (0.4 to 0.7)	0.4*** (0.3 to 0.6)	0.4*** (0.3 to 0.6)	0.5*** (0.4 to 0.7)	0.4*** (0.3 to 0.6)	0.4*** (0.3 to 0.6)
Fixed effects	N	N	N	Y	Y	Y
Control for hospitalizations	N	Y	Y	N	Y	Y
Background trends vary by biomarkers	N	N	Y	N	N	Y
95% confidence intervals in parentheses *** p<0.01, ** p<0.05, * p<0.1						

The rows of the table include marginal effects from a multivariate panel data regression on the condition level indicating changes in healthcare utilization 1 and 2 years after REGARDS enrollment. The first rows indicate change in doctor visits for diagnosed conditions, and the latter rows indicate change in doctor visits for undiagnosed conditions. The columns indicate six regression specifications. All specifications include the control variables noted in the text. In columns 2, 3, 5 and 6 estimates are adjusted for hospitalizations. In columns 4 through 6, estimates are adjusted for time-invariant individual characteristics using individual-by-condition fixed effects. In columns 3 and 6, background trends in doctor visits are allowed to vary with participants' biomarkers.



**Table S6: Tabulations of raw Medicare claims data: Fraction of previously undiagnosed diabetes, high cholesterol, or hypertension that receives a relevant evaluation and management visit from a doctor each six months**

<b>Months since REGARDS</b>	<b>Has relevant claim</b>	<b>95% CI</b>
<b>Diabetes</b>		
<6 months before	3%	(0% to 5%)
<6 months after	26%	(18% to 34%)
6-11 months after	31%	(22% to 39%)
12-17 months after	35%	(26% to 44%)
18-23 months after	38%	(30% to 47%)
<b>High cholesterol</b>		
<6 months before	4%	(3% to 5%)
<6 months after	16%	(13% to 18%)
6-11 months after	16%	(14% to 19%)
12-17 months after	19%	(16% to 22%)
18-23 months after	21%	(18% to 24%)
<b>Hypertension</b>		
<6 months before	8%	(5% to 11%)
<6 months after	16%	(12% to 20%)
6-11 months after	21%	(16% to 25%)
12-17 months after	25%	(21% to 30%)
18-23 months after	27%	(22% to 32%)

CI: Confidence interval.

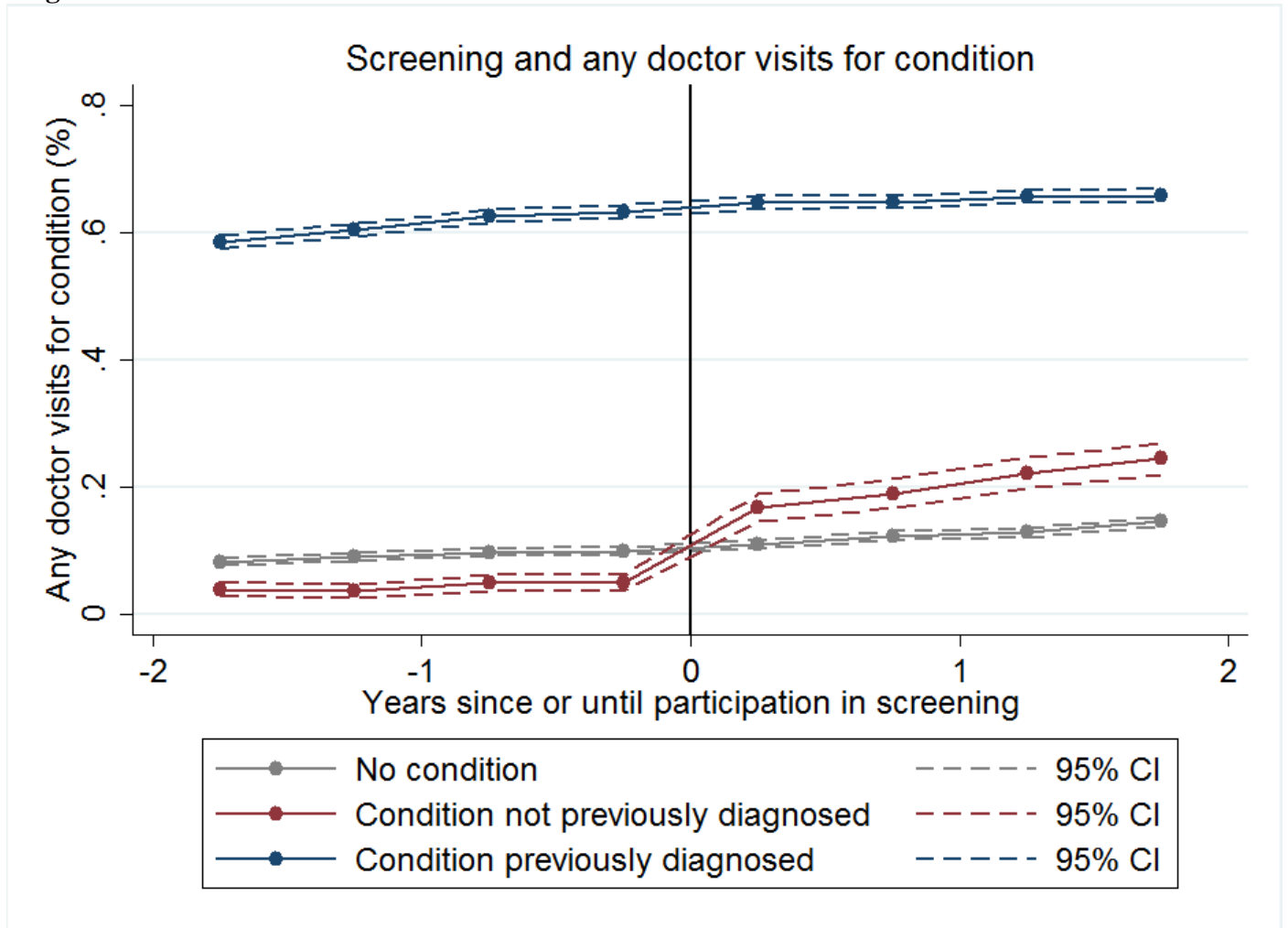
**Table S7: Placebo models: percentage point change in any semi-annual doctor visits for evaluation and management of previously diagnosed vs. undiagnosed conditions one year *before* REGARDS enrollment, using only data from prior to REGARDS enrollment (average marginal effects from regression)**

	(1)	(2)	(3)	(4)	(5)	(6)
<b>Diagnosed conditions</b>						
Change after 1 year	2 (-8 to 12)	3 (-7 to 13)	3 (-6 to 13)	2 (-8 to 12)	3 (-7 to 12)	3 (-7 to 13)
Change after 2 years <i>[If no REGARDS]</i>	3 (-11 to 18)	4 (-10 to 18)	5 (-10 to 19)	3 (-11 to 17)	4 (-10 to 18)	5 (-10 to 19)
<b>Undiagnosed conditions</b>						
Change after 1 year	2 (-11 to 16)	2 (-11 to 16)	3 (-11 to 16)	2 (-12 to 15)	2 (-12 to 15)	2 (-11 to 16)
Change after 2 years <i>[If no REGARDS]</i>	3 (-17 to 23)	3 (-17 to 23)	3 (-17 to 23)	2 (-18 to 22)	2 (-18 to 22)	3 (-17 to 23)
Fixed effects	N	N	N	Y	Y	Y
Control for hospitalizations	N	Y	Y	N	Y	Y
Background trends vary by biomarkers	N	N	Y	N	N	Y
95% confidence intervals in parentheses *** p<0.01, ** p<0.05, * p<0.1						

This table provides evidence that increases in doctor visits for undiagnosed conditions after REGARDS enrollment were not produced by non-linearity in the trends prior to enrollment. The data in these placebo models only use data from prior to REGARDS.

The rows of the table include average marginal effects from a multivariate panel data regression on the condition level indicating changes in healthcare utilization 1 year and (projected) 2 years after the time point 1 year prior to REGARDS enrollment. The columns indicate six regression specifications. All specifications include the control variables noted in the text. In columns 2, 3, 5 and 6 we adjust for hospitalizations. In columns 4 through 6, we adjust for time-invariant individual characteristics using individual fixed effects. In columns 3 and 6, we allow background trends in doctor visits to vary with participants' biomarkers.

**Figure S4: Biomarker assessment via REGARDS and any doctor visits for undiagnosed and diagnosed conditions in the raw data**



The figure shows that trends in doctor visits for diagnosed conditions are smooth before and after enrollment in REGARDS, whereas trends in doctor visits for previously undiagnosed conditions changed just after enrollment in REGARDS. The figure also shows that trends in doctor visits for people without our conditions of interest followed smooth trends before and after REGARDS enrollment. This evidence is consistent with a hypothesis that REGARDS enrollment changed participants' healthcare use patterns by informing participants about previously undiagnosed conditions.

**Table S8: Change in number of semi-annual doctor visits for evaluation and management of previously undiagnosed vs. previously diagnosed conditions one and two years after REGARDS enrollment: re-estimated in two different ways**

	(1)	(2)	(3)	(4)	(5)	(6)
<b>Undiagnosed conditions</b>						
<i>All patients reporting no prior diagnosis coded as undiagnosed regardless of their claims data</i>						
Change after 1 year	12*** (7 to 16)	11*** (7 to 16)	11*** (7 to 16)	12*** (8 to 16)	11*** (7 to 16)	12*** (7 to 16)
Change after 2 years	18*** (11 to 24)	17*** (10 to 23)	17*** (11 to 23)	18*** (11 to 24)	17*** (11 to 24)	17*** (11 to 24)
<i>Excluding data from people with only diagnosed conditions</i>						
Change after 1 year	15*** (11 to 20)	15*** (10 to 19)	15*** (10 to 19)	15*** (11 to 20)	15*** (10 to 19)	15*** (11 to 19)
Change after 2 years	21*** (14 to 28)	20*** (14 to 27)	21*** (14 to 27)	21*** (14 to 28)	21*** (14 to 28)	21*** (14 to 28)
<b>Diagnosed conditions</b>						
<i>All patients reporting no prior diagnosis coded as undiagnosed regardless of their claims data</i>						
Change after 1 year	-1 (-3 to 1)	-1 (-4 to 1)	-1 (-4 to 1)	-1 (-3 to 1)	-1 (-4 to 1)	-1 (-4 to 1)
Change after 2 years	-2 (-6 to 2)	-3 (-7 to 1)	-3 (-7 to 1)	-2 (-6 to 2)	-3 (-7 to 1)	-3 (-7 to 1)
<i>Excluding data from people with only diagnosed conditions</i>						
Change after 1 year	2 (-5 to 9)	2 (-6 to 9)	2 (-6 to 9)	2 (-5 to 9)	2 (-5 to 9)	2 (-5 to 9)
Change after 2 years	3 (-8 to 14)	3 (-8 to 14)	3 (-8 to 14)	3 (-8 to 14)	3 (-8 to 14)	3 (-8 to 14)
Fixed effects	N	N	N	Y	Y	Y
Control for hospitalizations	N	Y	Y	N	Y	Y
Background trends vary by biomarkers	N	N	Y	N	N	Y

95% confidence intervals in parentheses

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

The rows of the tables include marginal effects from multivariate panel data regressions on the condition level indicating changes in healthcare utilization 1 and 2 years after REGARDS enrollment. The columns indicate six regression specifications. All specifications include the control variables noted in the text. In columns 2, 3, 5 and 6 estimates are adjusted for hospitalizations. In columns 4 through 6, estimates are adjusted for time-invariant individual characteristics using individual-by-condition fixed effects. In columns 3 and 6, background trends in doctor visits are allowed to vary with participants' biomarkers.