Tuskegee and the Health of Black Men

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Motivation-two strands of literature

- (1) The **origins of trust** (Nunn & Wantchekon, 2011) and its **importance for development** (Guiso, Zingales and Sapeinza, 2008; Knack and Keefer, 1997).

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  - Particularly in relationships with incomplete information (Grief, 1989; Fafchamps, 2006).
- (2) The "puzzle" of **health seeking behavior of the poor** (see Dupas, 2011; Chapter 3 of "Poor Economics") **and of minority populations** (Institute of Medicine, 2003).

This Paper

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- Because we cannot randomize mistrust, we use an historic episode.
- The **Tuskegee Study** is perhaps the most infamous case of medical exploitation in American history, and we use it to identify the effects of mistrust on the **health-seeking behaviors** and **health outcomes** of black men.

Outline

- Background on the Tuskegee Study.
- Data and Empirical Specification.
- Results.
- Concluding Remarks.

Tuskegee Study of Untreated Syphilis in the Negro Male (TSUS)

- For 40 years the United States Public Health Service followed ˜600 black men in Tuskegee, Alabama, ˜400 of whom had syphilis.

Tuskegee Study of Untreated Syphilis in the Negro Male (TSUS)

source: CDC National Archives

Tuskegee Study of Untreated Syphilis in the Negro Male (TSUS)

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- Men were actively prevented from obtaining medical treatment well after the discovery of Penicillin (mid 1940s).
  - Offered routine checkups, hot meals, burial payments and told they had "Bad Blood".
- TSUS lasted from 1932 to 1972.
  - Details of the study leaked to the press in 1972 and became the subject of a multi-article expose by Jean Heller of the AP.

Hypothesis

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- We will test our hypothesis using a quadruple difference framework (detailed description in a few slides).

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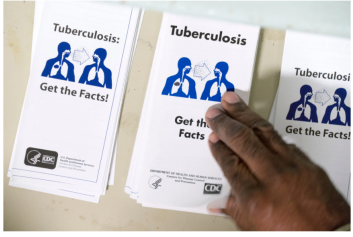
   - Recent episode of ABC's "Black-*ish*" begins with a discussion of TSUS and the effect it has on the health-seeking behavior of the protagonist's aging black father.
   - In the medical literature, dozens of qualitative and quantitative studies of the Tuskegee effect on medical mistrust and low participation in clinical trials.

Motivating Evidence (NYT)

The New York Times

In Rural Alabama, a Longtime Mistrust of Medicine Fuels a Tuberculosis Outbreak



Pamphlets were distributed at a community meeting last week in Marion, Ala., that was hosted by the Alabama Department of Public Health to educate residents about the tuberculosis outbreak. Meggan Hadler for The New York Times

By Alan Blinder

Jan. 17, 2016

MARION, Ala. — When Patricia Church, a 41-year-old warehouse worker, felt sick recently, she suspected that she had a cold. But she also feared something more deadly that has been going around this small, impoverished city: tuberculosis.

"I feel like I had been around someone that had it, and I might die from it if I don't find out whether I got it or not and get it treated," Ms. Church said after she learned last week that she did not have the disease. "I was nervous. I was real nervous."

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   - Recent episode of ABC's "Black-*ish*" begins with a discussion of TSUS and the effect it has on the health-seeking behavior of the protagonist's aging black father.
   - In the medical literature, dozens of qualitative and quantitative studies of the Tuskegee effect on medical mistrust and low participation in clinical trials/delayed preventive care (again, particularly among African-American men).
2. Prior to 1972, black and white male mortality statistics were on a path to convergence, but the mid-1970s witnessed a divergence

▸ DivergenceConvergence

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2. Significant increase in mortality after 1972 for older black men.
3. Increased medical mistrust among black men.
4. Those with prior experience with the medical community (including women and veterans) are less affected.

Data

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- HEALTH OUTCOMES
  - In raw form: annual mortality statistics, by county, race, gender, age and cause (1968-1988).
    - We collapse to biennial rates by State Economic Area (SEA) on recommendation from the demography literature
  - Generate an **all cause age-adjusted older mortality rate** for adults 45-74 per 1000 population.
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- MISTRUST
  - Opinion survey (GSS) questions on medical mistrust and perceptions taken at odd intervals. Earliest mistrust data from 1998.

Motivate with a Series of Double Difference Regressions

To assess the post-1972 treatment effect of being a black male, we estimate

$$Y_{rat}^{k} = \alpha \ + \beta^{k} \left(\mathrm{I}_{r}^{black-male} \cdot \mathrm{I}_{t}^{post} \right) + \gamma^{k} (\mathrm{I}_{t}^{post}) + \phi_{a,black-male} + \varepsilon_{rat},$$

across SEAs grouped into K bins of 150 kilometers distance in our data, using multiple pre-and post-observations for each SEA to identify each β.

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- Comparing black males to white males
- Comparing black males to black females

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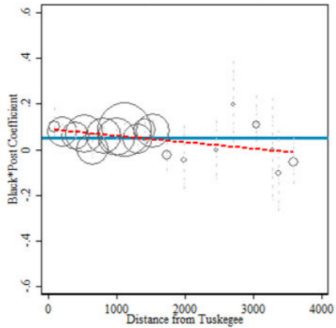
- Comparing black males to white males
- Comparing black males to black females
- (We cannot report this for utilization data.)

A Stark Geographic Gradient Emerges. . .

Panel A. β- All Male Sample

Average DD Coefficient: 0.053

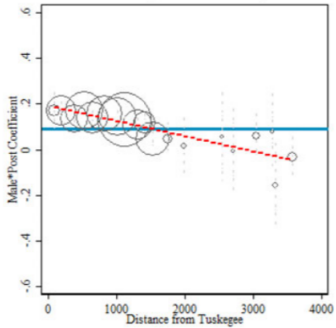
95% CI: [0.034, 0.072]



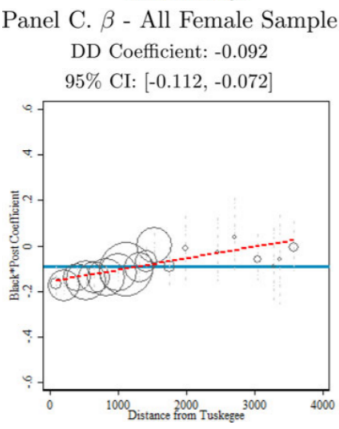
Panel B. β - All Black Sample

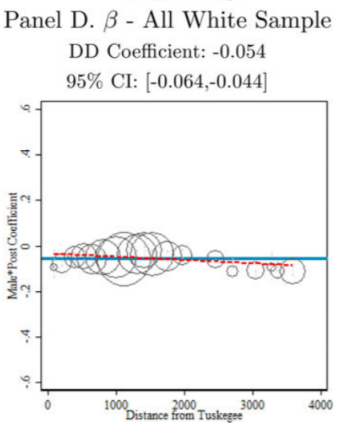
Average DD Coefficient: 0.091

95% CI: [0.065, 0.118]



. . . That Does Not Appear for White Men, Moves the Other Way for Black Women. . .



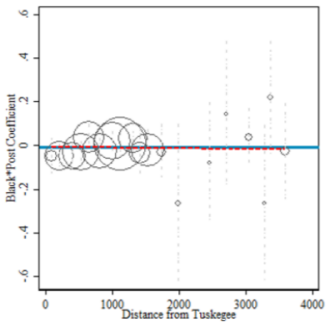


. . . And Is Not Apparent Prior to 1972.

Panel E. β- All Male Sample with False Post

DD Coefficient: -0.006

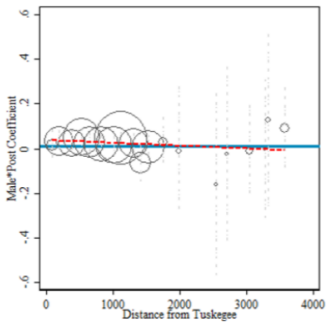
95% CI: [-0.040,0.027]



Panel F: β- All Black Sample with False Post

DD Coefficient: 0.014

95% CI: [-0.036,0.063]



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  - *Voting Rights Act*– Cascio and Washington (QJE, 2014).

Empirical Strategy

- The DD results inform our estimation strategy, which seeks to capture the impact of Tuskegee, using a pooled **Difference-in-Difference-in-Differences (DDD) design.**
- Comparing behavior/outcomes **before and after 1972,** by demographic proximity to study subjects (**black, male)**.
- Interacted with a measure of **proximity** (P_s)
  - Geographic proximity (in 000 km)
  - Migration rates from Alabama for black residents

▸ Connectedness

Estimating Equation - Healthcare Utilization from NHIS Survey

- Estimate, for individual i of gender g and race r, measured in locale s at time t:

$$\begin{aligned} Y_{igrst} &= \alpha + \beta_1(P_s \cdot \mathbb{I}_t^{post} \cdot \mathbb{I}_r^{black} \cdot \mathbb{I}_g^{male}) + \beta_2(P_s \cdot \mathbb{I}_t^{post} \cdot \mathbb{I}_g^{male}) + \\ &\quad \beta_3\left(P_s \cdot \mathbb{I}_t^{post} \cdot \mathbb{I}_r^{black}\right) + X_{it}'\Phi + \theta_{rgt} + \phi_{rgs} + \tau_{st} + \varepsilon_{igrst}. \end{aligned}$$

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- Controlling for the effects of being in each demo group in each year (θ_{grt}), being in close geographic proximity in each year (τ_{st}), and of being in a particular demo group in close proximity (ϕ_{srg}).

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Mortality regressions similar, but individual-level covariates replaced with SEA-level.

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Estimates of β_1 are **plausibly attributable to Tuskegee** if there are no other **systematic shocks** to black men, in particular, that affect utilization and mortality after 1972 that are **correlated with proximity to Macon County** but not due to the timing of the study's disclosure. Such shocks cannot affect (married) black women or white men.

Outcomes

Utilization Outcomes:
Probability of physician visit in the past 12 months
Number of outpatient physician interactions (different question)
Probability of hospital admission in the past 12 months
Number of hospital admissions (different question)

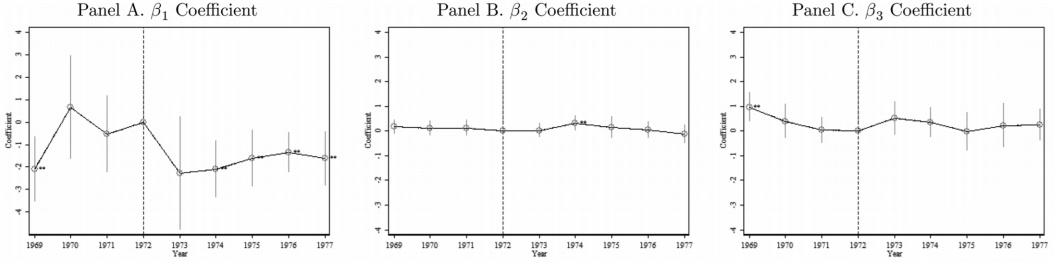
Mortality Outcomes:
Log age-adjusted mortality
Log chronic-cause age-adjusted mortality

Event Study Specification

$$
\begin{aligned}
Y_{irgst} \;=\; & \alpha + \sum_{n \neq 1972} \beta_1^n (P_s \cdot \mathsf{I}_{t=n} \cdot \mathsf{I}_r^{black} \cdot \mathsf{I}_g^{male}) \\
& + \sum_{n \neq 1972} \beta_2^n (P_s \cdot \mathsf{I}_{t=n} \cdot \mathsf{I}_g^{male}) + \sum_{n \neq 1972} \beta_3^n (P_s \cdot \mathsf{I}_{t=n} \cdot \mathsf{I}_r^{black}) \\
& + \mathsf{X}_i' \Phi + \theta_{rgt} + \phi_{srg} + \tau_{st} + \varepsilon_{igrst},
\end{aligned}
$$

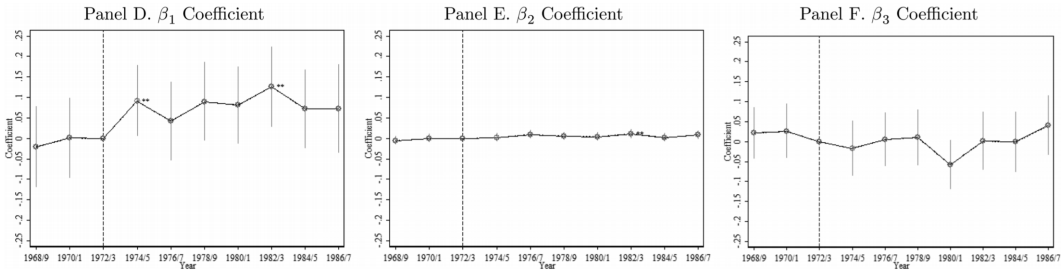
Event Studies

Utilization



Event Studies

Chronic Disease Mortality Rates



▸ Additional Event Studies

Results — Healthcare Utilization

TABLE I

BASELINE ESTIMATES UTILIZATION AND MORTALITY

	Dependent variable:							
	Number outpatient visits (1)	Any outpatient visit (2)	Any hospital admission (3)	Number nights in hospital (4)	Log age-adjusted all-cause mortality (5)	Level age-adjusted all-cause mortality (6)	Log age-adjusted chronic mortality (7)	Level age-adjusted chronic mortality (8)
	Panel A: Utilization				Panel B: Mortality			
Mean of dep var for black men before 1973	4.10	0.62	0.14	2.26	3.42	30.68	3.14	23.37
P_j*$post_t$*$black_r$*$male_g$	−1.328***	−0.037***	−0.015	0.738**	0.071***	2.142**	0.087***	1.566**
	(0.354)	(0.007)	(0.013)	(0.363)	(0.023)	(0.851)	(0.022)	(0.770)
P_j*$post_t$*$male_g$	−0.022	0.004	0.004	0.067	0.005*	−0.045	0.008***	−0.031
	(0.080)	(0.005)	(0.004)	(0.075)	(0.003)	(0.047)	(0.003)	(0.040)
P_j*$post_t$*$black_r$	−0.052	0.011*	0.006	0.123	−0.017	−0.765	−0.018	−0.682
	(0.110)	(0.006)	(0.004)	(0.104)	(0.019)	(0.658)	(0.020)	(0.663)
Fixed effects	State-year, race-gender-year, race-gender-state				SEA-year, race-gender-year, race-gender-SEA			
Observations	220,954	220,954	220,954	220,954	17,737	18,600	17,611	18,600
No. clusters	49	49	49	49	465	465	465	465
Adj. R-squared	0.017	0.025	0.010	0.010	0.812	0.303	0.804	0.226

Results — Mortality

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Results — Placebo Coefficients

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BASELINE ESTIMATES UTILIZATION AND MORTALITY

	Dependent variable:							
	Number outpatient visits (1)	Any outpatient visit (2)	Any hospital admission (3)	Number nights in hospital (4)	Log age-adjusted all-cause mortality (5)	Level age-adjusted all-cause mortality (6)	Log age-adjusted chronic mortality (7)	Level age-adjusted chronic mortality (8)
	Panel A: Utilization				Panel B: Mortality			
Mean of dep var for black men before 1973	4.10	0.62	0.14	2.26	3.42	30.68	3.14	23.37
P_j*$post_t$*$black_r$*$male_g$	−1.328***	−0.037***	−0.015	0.738**	0.071***	2.142**	0.087***	1.566**
	(0.354)	(0.007)	(0.013)	(0.363)	(0.023)	(0.851)	(0.022)	(0.770)
P_j*$post_t$*$male_g$	−0.022	0.004	0.004	0.067	0.005*	−0.045	0.008***	−0.031
	(0.080)	(0.005)	(0.004)	(0.075)	(0.003)	(0.047)	(0.003)	(0.040)
P_j*$post_t$*$black_r$	−0.052	0.011*	0.006	0.123	−0.017	−0.765	−0.018	−0.682
	(0.110)	(0.006)	(0.004)	(0.104)	(0.019)	(0.658)	(0.020)	(0.663)
Fixed effects	State-year, race-gender-year, race-gender-state				SEA-year, race-gender-year, race-gender-SEA			
Observations	220,954	220,954	220,954	220,954	17,737	18,600	17,611	18,600
No. clusters	49	49	49	49	465	465	465	465
Adj. R-squared	0.017	0.025	0.010	0.010	0.812	0.303	0.804	0.226

Threats to Identification

Again, our results are plausibly attributable to Tuskegee only if there are no other systematic shocks to black men that affect utilization and mortality after 1972 that are correlated with proximity to Macon County but not due to the timing of the study's disclosure.

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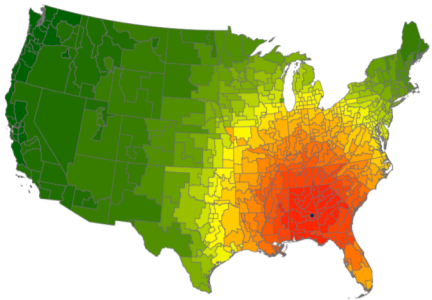
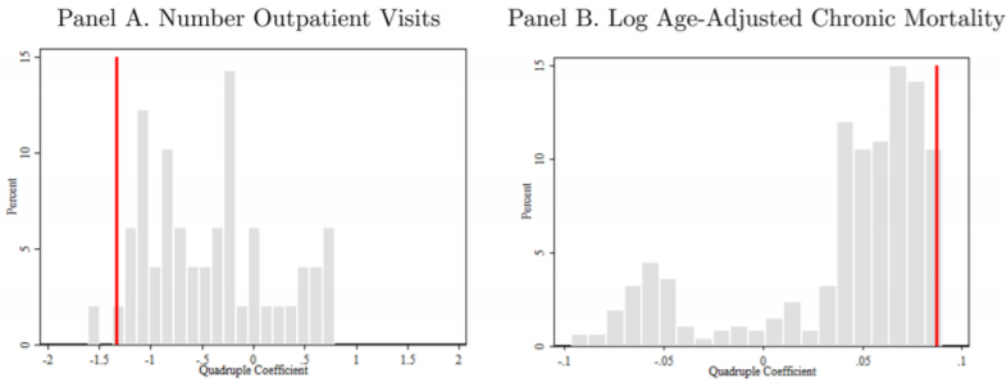


▸ Heat Maps

Permutation test



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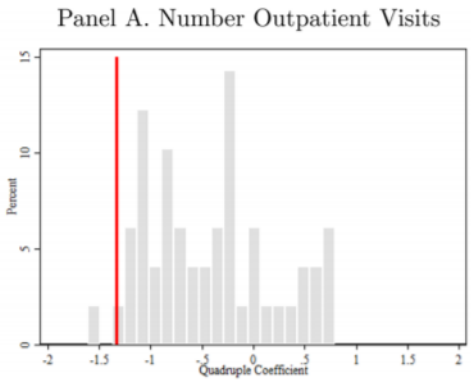

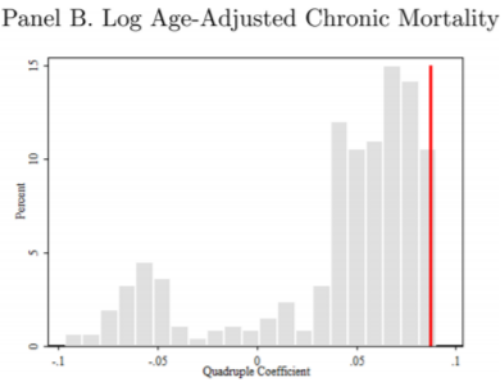

- $|\beta_1|$ Macon $>$ 96% of other States
- $|\beta_1|$ Macon $>$ 98% of other SEAs

Robustness and Placebos

Our **results are robust** to:

1. A South-only sample
2. Alternative measures of proximity
3. Alternative empirical specifications (county rather than SEA-level, annual data, balanced panel, no weights, fully parametric specification, etc.)

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3. Alternative empirical specifications (county rather than SEA-level, annual data, balanced panel, no weights, fully parametric specification, etc.)

The following **placebo tests** hold:

1. No effect on children
2. No effect on dental visits

Alternative Proximity Measures

TABLE III

ALTERNATIVE MEASURES OF PROXIMITY, ROBUSTNESS CHECKS

	Dependent variable:							
	Number of outpatient visits				Log age-adjusted chronic mortality			Level age-adjusted child mortality
	Migrant treatment	South only		Kids (placebo)	Migrant treatment	South only		Kids (placebo)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Utilization				Panel B: Mortality			
$P_j{*}post_t{*}black_r{*}male_g$			−1.794*	−0.152			0.066**	0.171
			(1.027)	(0.151)			(0.033)	(0.548)
$P_j{*}post_t{*}male_g$			0.417	0.016			0.003	−0.019*
			(0.423)	(0.030)			(0.012)	(0.010)
$P_j{*}post_t{*}black_r$			0.794*	0.148			−0.040	−0.386***
			(0.434)	(0.112)			(0.027)	(0.125)
$Migrant_j{*}post_t{*}black_r{*}male_g$	−10.18***	−8.356**			0.220***	0.140**		
	(3.307)	(3.351)			(0.072)	(0.069)		
$Migrant_j{*}post_t{*}male_g$	0.838	0.099			0.016	0.015		
	(1.306)	(1.715)			(0.018)	(0.023)		
$Migrant_j{*}post_t{*}black_r$	2.775	3.071			−0.090	−0.092*		
	(1.755)	(1.981)			(0.069)	(0.048)		
Fixed effects	State-year, race-gender-year, race-gender-state				SEA-year, race-gender-year, race-gender-SEA			
Observations	216,984	65,495	69,465	299,688	17,103	6,973	7,413	18,600
No. clusters	48	16	17	49	451	175	186	465
Adj. R-squared	0.017	0.016	0.016	0.044	0.799	0.920	0.923	−0.027

Outcomes Within the South

TABLE III

ALTERNATIVE MEASURES OF PROXIMITY, ROBUSTNESS CHECKS

	Dependent variable:						
	Number of outpatient visits			Log age-adjusted chronic mortality			Level age-adjusted child mortality
	Migrant treatment	South only		Kids (placebo)	Migrant treatment	South only		Kids (placebo)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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More (but not all) Robustness Checks

Appendix Table A.5: Additional Robustness Checks - Mortality

	(1)	(2)	(3)	(4)	(5)	(6)
	Include SF and LA	Weighting	Parametric-Incarcerated & Unemployed	Weighting	County-Level	Parametric-Incarcerated & Unemployed
$Migrant_j * post_t * black_r * male_g$	0.233***	0.200***	0.165**			
	(0.071)	(0.071)	(0.075)			
$Migrant_j * post_t * male_g$	0.016	0.013	0.003			
	(0.017)	(0.019)	(0.021)			
$Migrant_j * post_t * black_r$	-0.133**	0.016	-0.094			
	(0.067)	(0.017)	(0.072)			
$P_j * post_t * black_r * male_g$				0.082***	0.048***	0.062***
				(0.016)	(0.019)	(0.022)
$P_j * post_t * male_g$				0.007**	0.013**	0.008**
				(0.003)	(0.005)	(0.003)
$P_j * post_t * black_r$				-0.033**	-0.024	-0.028
				(0.014)	(0.015)	(0.023)
Fixed Effects	SEA-Year, Race-Gender-Year, Race-Gender-SEA (unless parametric)					
Observations	17,261	17,103	17,071	17,611	94,344	17,580
No. Clusters	453	451	449	465	3,070	463
Adj R-squared	0.796	0.866	0.719	0.868	0.715	0.725

Evidence on Channels

1. Heterogeneous effects by income, education and distribution of black medical doctors.
2. Comparisons between veterans and non-veterans.
3. Survey data on medical mistrust.

Income

TABLE II

HETEROGENEOUS EFFECTS, UTILIZATION

Dependent variable: number outpatient visits								
	By income level		By educational status		By prevalence black doctors		By marital status	
	income > black male median (1)	income ≤ black male median (2)	educ > black male median (3)	educ ≤ black male median (4)	black MD > median (5)	black MD ≤ median (6)	married (7)	unmarried (8)
$P_j{*}post_t{*}black_r{*}male_g$	−0.546	−1.725**	−0.061	−2.801***	−1.359***	−2.052	−1.398***	−1.665
	(0.548)	(0.705)	(0.409)	(0.839)	(0.373)	(1.460)	(0.326)	(1.061)
$P_j{*}post_t{*}male_g$	0.060	−0.049	−0.013	−0.130	0.042	−0.110	0.029	−0.188
	(0.084)	(0.184)	(0.092)	(0.294)	(0.082)	(0.238)	(0.106)	(0.240)
$P_j{*}post_t{*}black_r$	−0.150	−0.211*	−0.465**	0.468	−0.019	−0.566	0.419**	−0.511**
	(0.221)	(0.108)	(0.215)	(0.617)	(0.115)	(0.726)	(0.204)	(0.191)
Fixed effects	State-year, race-gender-year, race-gender-state							
Observations	143,554	77,400	178,756	42,198	176,032	44,922	160,335	60,619
No. clusters	49	49	49	49	25	24	49	49
Adj. R-squared	0.013	0.030	0.014	0.036	0.016	0.017	0.014	0.030

Education

TABLE II

HETEROGENEOUS EFFECTS, UTILIZATION

Dependent variable: number outpatient visits								
	By income level		By educational status		By prevalence black doctors		By marital status	
	income > black male median (1)	income ≤ black male median (2)	educ > black male median (3)	educ ≤ black male median (4)	black MD > median (5)	black MD ≤ median (6)	married (7)	unmarried (8)
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Prevalence of Black Doctors

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Dependent variable: number outpatient visits								
	By income level		By educational status		By prevalence black doctors		By marital status	
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Evidence on Mechanism: Experience (Veterans)

TABLE V

ALL MALE SAMPLE, VETERANS VERSUS NONVETERANS

Outcome	Number outpatient visits (1)	Any outpatient visit (2)	Any hospital admission (3)	Number nights in hospital (4)
P_j*$post_t$*$black_r$*$nonvet_g$	−1.161***	−0.040***	−0.027***	−0.417
	(0.347)	(0.009)	(0.007)	(0.312)
P_j*$post_t$*$nonvet_g$	0.146**	0.004	0.002	0.051
	(0.072)	(0.005)	(0.003)	(0.056)
P_j*$post_t$*$black_r$	−0.592***	−0.024**	−0.012	0.280
	(0.179)	(0.011)	(0.010)	(0.247)
Fixed effects	State-year, race-nonveteran-year, race-nonveteran-state			
Observations	135,635	135,635	135,635	135,635
No. clusters	49	49	49	49
R-squared	0.020	0.023	0.016	0.014

Evidence on Mechanism: Medical Mistrust in 1998

- *"I trust doctors judgment about my medical care."*

Evidence on Mechanism: Medical Mistrust in 1998

- *"I trust doctors judgment about my medical care."*
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$$\begin{aligned} Mistrust_{irgs} &= \alpha + \beta_1(P_s \cdot \mathsf{I}_r^{black} \cdot \mathsf{I}_g^{male}) + \beta_2(P_s \cdot \mathsf{I}_r^{black}) + \beta_3(P_s \cdot \mathsf{I}_g^{male}) \\ &\quad + \tau_s + \theta_{rg} + \mathsf{X}_i'\Lambda + \epsilon_{irgs} \end{aligned}$$

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- where *i=individual, g=gender, r=race, s=state*.

Mistrust Results

TABLE IV

EFFECT OF TUSKEGEE ON BELIEFS ABOUT MEDICAL CARE

Outcome	Medical mistrust (1)	Deny treatment (2)	General mistrust (3)
P_j*$black_r$*$male_g$	0.176**	0.157	−0.073
	(0.071)	(0.127)	(0.197)
P_j*$male_g$	−0.016	−0.002	−0.005
	(0.030)	(0.039)	(0.048)
P_j*$black_r$	−0.051	−0.024	−0.052
	(0.047)	(0.115)	(0.055)
Fixed effects		$State_{1998}$, race*gender	
Observations	801	801	801
Adj. R-squared	0.024	0.054	0.103
No. clusters	36	36	36

Mistrust Results

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Other Demographic Groups

Is it puzzling that black women are unaffected by the news of Tuskegee?

- Demographics of the Tuskegee victims.
- Differences in *how* women form trust.
- Differences in prior experience with the medical profession.

Results-Women's Utilization, by Marital Status

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Concluding Remarks

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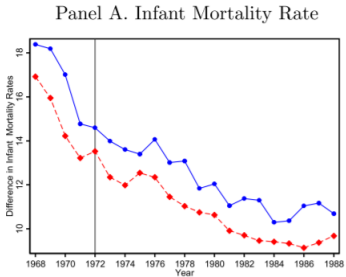
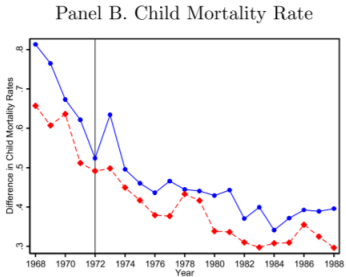
- **Thank you!**

Age-Specific Mortality Rates

preview





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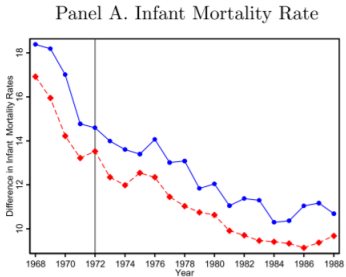
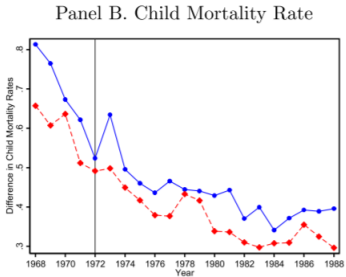
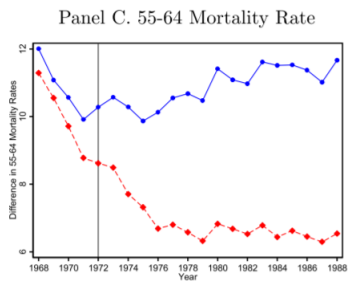
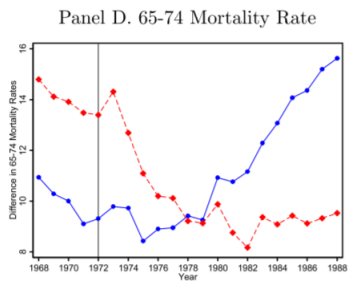




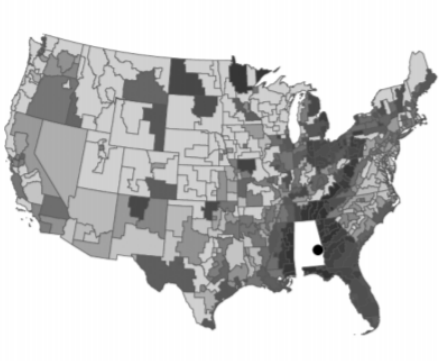




Maps of Treatment Intensity

Panel A. Distance to Tuskegee

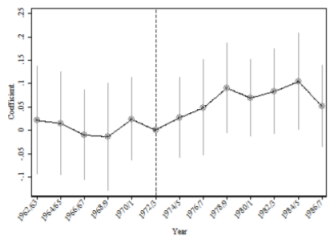
Panel B. Fraction Black Migrants from Alabama



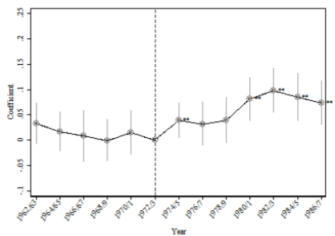
Additional Event Studies

▸ Event Study Mortality

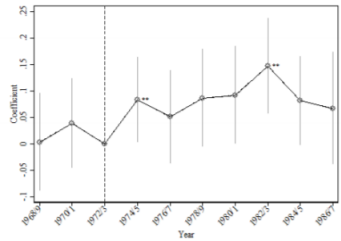
Panel A. Extended Period (1962-1987)
(β_1 Coefficient: limited sample)



Panel B. Extended Period (1962-1987)
(β_1 Coefficient: limited & weighted)



Panel C. Main Sample (1968-1987)
(β_1Coefficient)



Heat Map

Empirical Distribution I