Physician-Patient Race-Match & Patient Outcomes

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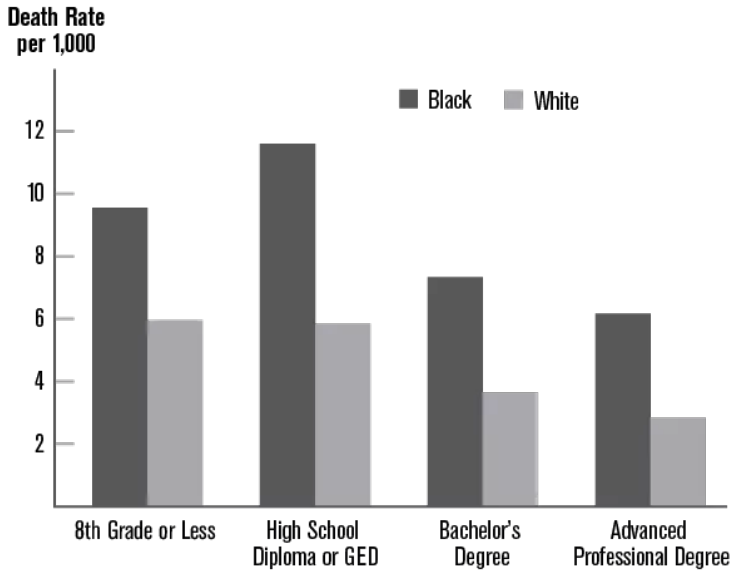
Two motivating facts

- #1: Despite substantial convergence during the 20th century, large black-white health disparities remain in the US
  - As of 2011, black life expectancy roughly 4 years shorter than whites
  - Black infant mortality higher than whites



Source: Centers for Disease Control and Prevention (Wonder), Linked Birth/Infant Death Records, 2007–13

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- #2: African-Americans are dramatically underrepresented amongst physicians
  - 4 pct. of physicians vs. 13 pct. of the population

Two facts

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- #2: African-Americans are dramatically underrepresented amongst physicians

- These are both complicated phenomena with many potential explanations, but some have suggested a relationship…
- For instance, an influential HHS report from 1985 noted that…
  - "Most minorities receive health care from providers who do not share their own ethnic/cultural background" and that efforts should be made to improve minority representation in medicine in order to reduce minimize racial health disparities

Our paper

- Question: Does physician-patient race-match impact patient outcomes?

- Approach:
  - Draw on patient encounter-level administrative data from FL hospitals, paired with data identifying physicians' race/ethnicity
  - Main outcome: Patient mortality while in the hospital
  - Restrict attention to uninsured patients, admitted through the ER.
  - We'll argue that amongst this set of patients, assignment to doctors (and therefore to race-match) is random, conditional on the rich set of fixed effects we'll include.
  - Plus, a specification with IV

- Finding: Patient-physician race-match improves patient mortality by 13-15%.

Mechanisms

- Why does race-match matter?

- Two broad possibilities:
  - Physician bias / discrimination
  - Better communication in race-matched physician-patient interactions
    - Lots of work from medical literature on racial match & communication

- Our results point more towards the 'communication' mechanism

Other papers, briefly

- Some papers in the literature document differences in treatment and outcomes for black and white patients
  - Representative examples: Black patients less likely to be prescribed pain medication (Singhal et al., 2016), doctors underestimate pain of black patients (Hoffman et al., 2016)
  - Would race-match fix this?
- There are papers on race-match, but usually not on patient outcomes
  - Instead, lots of work showing that race-match leads to higher patient satisfaction and better patient communication
    - Representative example: Relative to white patients, black patients get less information from white physicians and engage less with the physicians. This difference goes away for black patients with black physicians.
    - Worth noting: these are usually purely correlational studies, not aiming to make causal claims
  - But, does this lead to improvements in outcomes?
  - Recent exception: Alsan et al. (2018) randomly assign black male patients to black or white physicians in an Oakland clinic
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Contributes to a broader literature on race-match in a variety of settings…

- Education
  - "A Teacher Like Me" (Dee, 2005), "TAs Like Me" (Lusher et al., 2015), "A Community-College Instructor Like Me" (Fairlie et al., 2014)
- Grissom and Keisser (2011): same-race principal leads to higher teacher retention and satisfaction
- Fisman et al. (2017): in-group loan officer increases credit access
- Shayo and Zussman (2017): in Israeli small claims court, in-group judge increases likelihood a claim is accepted

Data

- Data from Florida hospitals
  - Unit of observation: patient encounter-level data, 2011-2014
  - Universe of patient encounters during that time period
    - Identifies:
      - Patient diagnosis
      - Patient's attending physician license number
      - Patient's operating physician license number (if patient has an operation)
      - Some demographics
      - Discharge status, which includes death in the hospital
    - No patient ID to allow linking of patient encounters across multiple visits
- Florida Physician Workforce Survey
  - Identifies physician race, and has license number so we can link to patient data

Sample restrictions

- Set of restrictions #1:
  - Include only if uninsured and admitted through ER
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  - Obviously, these restrictions only generate essentially-random assignment to race-match once the patient is in the hospital… but we'll have hospital (and other) fixed effects, so that's the level that's relevant

Sample restrictions

- Set of restrictions #2:
  - Restrict to black and white patients, black and white physicians
  - Why?
    - Next largest group would be Hispanic, but:
      - (a) Race-match may be less likely to be randomly assigned due to language
      - (b) If there is a race-match effect, it may be due to language, which is a different phenomenon
    - Plus, as noted, a lot of the existing literature has focused on black/white differences

Specification

- Naïve version:

$$y_{ipd} = \alpha + \beta_1 RaceMatch_{ip} + \beta_2 race_i + \beta_3 gender_i + \beta_4 age_i + \boldsymbol{\gamma}_d$$

  - Patient *i*, Attending physician *p*, Diagnosis *d*
  - Race-match$_{ip}$=1 if patient race = physician race, 0 otherwise

- Problems (already alluded to):
  - From the literature: black patients more likely to go to hospitals with more black doctors, but those hospitals are also less likely to be equipped to provide quality care (Bach et al., 2004; Chandra and Skinner, 2003)
  - Chandra and Skinner (2003) note geographical disparities in access to care more generally across areas populated by blacks and whites
  - → Important to control for hospital and patient's place of residence

Conditionally random assignment to race-matched physician

- After accounting for hospital and patient residence (and patient diagnosis), patient race is uncorrelated with physician race.

	Black Physician			
Black Patient	0.0905**	0.0211***	0.0067*	0.0045
	(0.0365)	(0.0069)	(0.0036)	(0.0030)
Observations	153,264	153,264	153,264	153,264
R-squared	0.0095	0.1533	0.2472	0.2684
Diagnosis FE		Y		Y
Hospital FE			Y	Y
Patient Zip FE		Y		Y

Notes. Estimates are obtained from linear regression models using patient-physician encounter-level data with varying fixed effects. The table reports the additional probability that a black patient relative to a white patient is treated by a black physician.
Heteroskedastic-robust standard errors clustered by hospital in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Main specification

$$y_{idpht} = \beta_1 RaceMatch_{ip} + \beta_2 race_i + \beta_3 gender_i + \beta_4 age_i + \boldsymbol{\gamma}_d + \boldsymbol{\zeta}_p + \boldsymbol{\eta}_h + \boldsymbol{\theta}_z + \boldsymbol{\lambda}_t$$

Year-quarter FEs

Some patient outcome, usually mortality (=1 if died in hospital, 0 otherwise)

Diagnosis FEs

Physician FEs

Hospital FEs

Patient ZIP FEs

- Our main specification (above) goes a step further and includes physician FEs as well
- Identification of race-match is within-hospital, within-physician
- Given sample restrictions and fixed effects, assignment of patients to race-matched physician is essentially random

Results

	Died				
A. Full Sample					
Patient Same Race as Physician	-0.0008	-0.0004	-0.0012*	-0.0012*	-0.0014**
	(0.0007)	(0.0006)	(0.0006)	(0.0006)	(0.0007)
Observations	153,264	153,264	153,264	153,264	153,264
R-squared	0.0759	0.0792	0.1594	0.1604	0.1769
Year×Quarter FE	Y	Y	Y	Y	Y
Patient Age	Y	Y	Y	Y	Y
Patient Gender	Y	Y	Y	Y	Y
Patient Race	Y	Y	Y	Y	Y
Diagnosis FE	Y	Y	Y	Y	Y
Physician FE			Y	Y	Y
Hospital FE		Y		Y	Y
Patient Zip FE					Y

Notes. Estimates are obtained from linear regression models using patient-physician encounter-level data with varying fixed effects. The table reports the change in the probability of within-hospital mortality when the physician and patient are of the same race. Panel A includes all patient-physician observations, while Panel B only includes patients with diagnoses that that have led to death for at least one patient in our study period.
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- Final column, all of our fixed effects
- Mortality rate in sample is 1.1%
- Race-match reduces mortality by about 12% relative to baseline
- Card et al. (2009): gaining access to Medicare reduces in-hospital mortality by 20%

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Patient Gender	Y	Y	Y	Y	Y
Patient Race	Y	Y	Y	Y	Y
Diagnosis FE	Y	Y	Y	Y	Y
Physician FE			Y	Y	Y
Hospital FE		Y		Y	Y
Patient Zip FE					Y

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B. Excluding Patients with Zero-Mortality Diagnoses					
Patient Same Race as Physician	-0.0013	-0.0006	-0.0020*	-0.0021**	-0.0026**
	(0.0010)	(0.0010)	(0.0010)	(0.0011)	(0.0011)
Observations	92,345	92,345	92,345	92,345	92,345
R-squared	0.0875	0.0932	0.1886	0.1903	0.2098
Year×Quarter FE	Y	Y	Y	Y	Y
Patient Age	Y	Y	Y	Y	Y
Patient Gender	Y	Y	Y	Y	Y
Patient Race	Y	Y	Y	Y	Y
Diagnosis FE	Y	Y	Y	Y	Y
Physician FE			Y	Y	Y
Hospital FE		Y		Y	Y
Patient Zip FE					Y

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- Panel A included a lot of patients with diagnoses that *never* lead to death
- Exclude them in Panel B
- Not surprisingly: larger effect size
- But also, higher mortality rate: 1.5%
- Race-match reduces mortality by 15%

IV Approach

- We also estimate a 2SLS specification
- Instrument for race-match ($RaceMatch_{ip}$):
  - Suppose Patient X arrives at Miami Beach Hospital at 5pm on a Tuesday in the early months of 2012.
  - Measure same-race share of physicians typically at that hospital on Tuesday evenings in 2012
  - Specifically: for each patient, measure same-race share of physicians who worked in hospital they visit, at hour of day, on day of week, in the year-quarter they visited
  - Use that as instrument ($TypicalSameRaceShare_{hosp,time,day,year\text{-}qtr}$)

IV Approach

- Specification with full set of FEs, excluding patients with zero-mortality diagnoses:

	First-Stage: Patient Same Race as Physician	Second-Stage: Died
B. Excluding Patients with Zero-Mortality Diagnoses		
Instrument	0.9602***	
	(0.0877)	
	[F-stat: 202.28]	
Patient Same Race as Physician		-0.0044**
		(0.0021)
Observations	92,345	92,345
R-squared	0.5837	0.2098

Results: Split by physician race

	Died	
	Conditional on White Physician	Conditional on Black Physician
Dependent Variable. Mean:	0.0118	0.0075
A. Full Sample		
Black Patient	0.0001	-0.0041***
	(0.0007)	(0.0012)
Observations	118,379	34,080
R-squared	0.1902	0.1535
B. Excluding Patients with Zero-Mortality Diagnoses		
Black Patient	0.0002	-0.0070***
	(0.0012)	(0.0020)
Observations	71,374	20,510
R-squared	0.2270	0.1866

- Split sample by physician race
- Results are entirely driven by black patients being matched with black physicians
- Arguably more consistent with "communication" mechanism than "bias" mechanism

Other results

Pointing towards a mechanism…

1. Slightly larger results amongst patients with diagnoses that feature a larger variance in outcomes…
   - Could be diagnoses where treatment is less clear and good communication is more important
2. No impact of race-match with *operating* physician

Other results of interest…

1. No impact of same-gender or close-in-age physician
   - Papers in med literature that found enhanced communication when race-matched also found no impact of gender-match
2. No impact of race-match on other outcomes (total cost of treatment, likelihood of staying overnight, etc.)

Conclusion

- Physician-patient race-match reduces mortality rates
- Primarily driven by positive effect on black patients matched with black physicians (no clear negative from black patients with white physicians)
- Effect size: Reduces mortality by 10-15%
  - Card et al. (2009): gaining access to Medicare reduces in-hospital mortality by 20%