The National Academies of Sciences Engineering Medicine: Achieving Excellence in the Diagnosis of Acute Cardiovascular Events

Gaps in Current Research and Next Steps to Address Disparities

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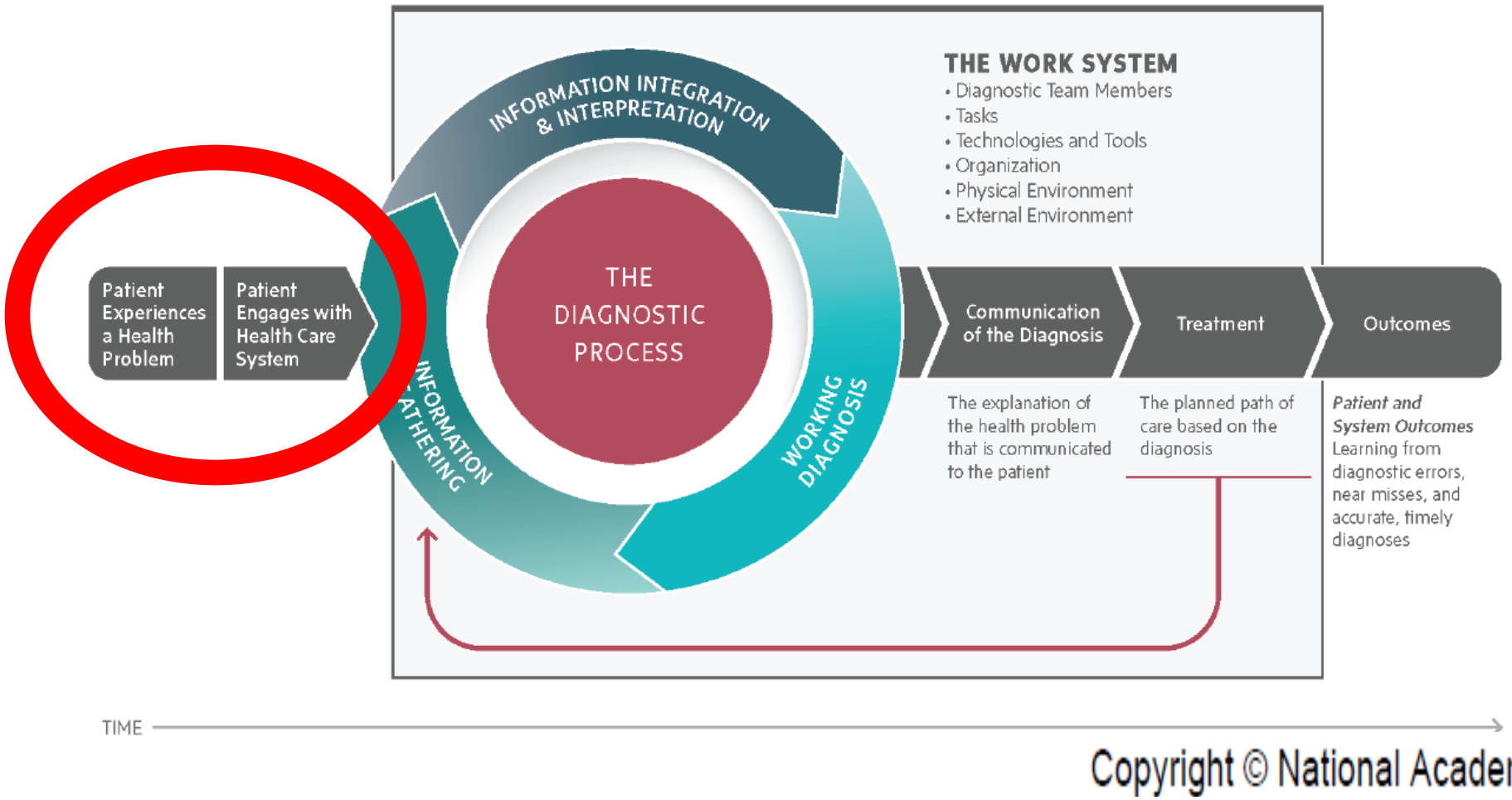
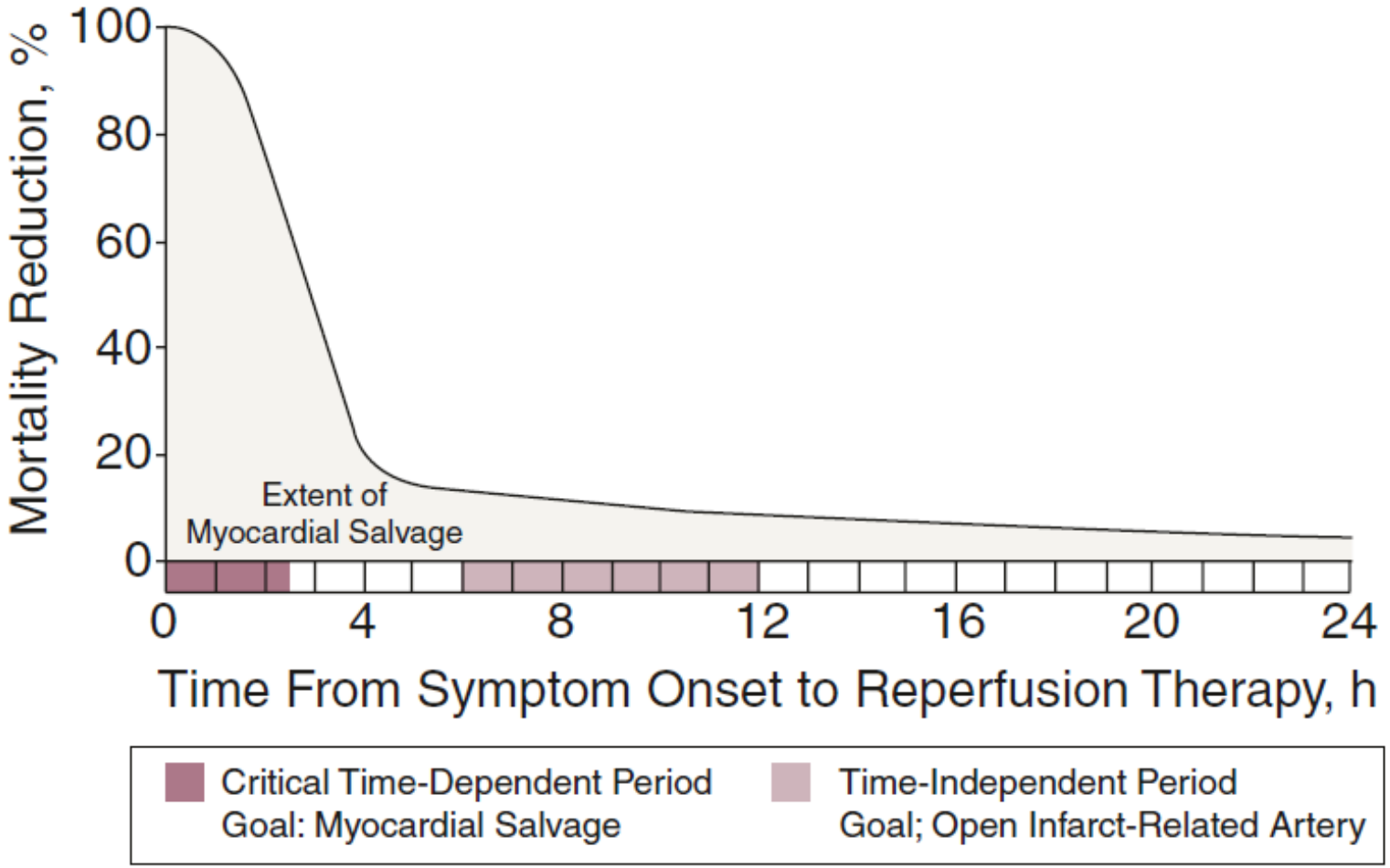
Diagnosis: Complex, Team-based, Iterative

Opportunities for Improving Equity




Mortality Reduction, %
100
80
60
40
20
0
Extent of
Myocardial Salvage
0
4
8
12
16
20
24
Time From Symptom Onset to Reperfusion Therapy, h
Critical Time-Dependent Period
Goal: Myocardial Salvage
Time-Independent Period
Goal; Open Infarct-Related Artery

Prehospital Delay

1980's:

Copper, et al
--Mean delays for African Americans**>300 min for MI pain**

1990's:

REACT 20-City Clinical Trial
-Increased Use in Intervention cities
-No Change in delay times
(Median delays~140 min)

2000's:

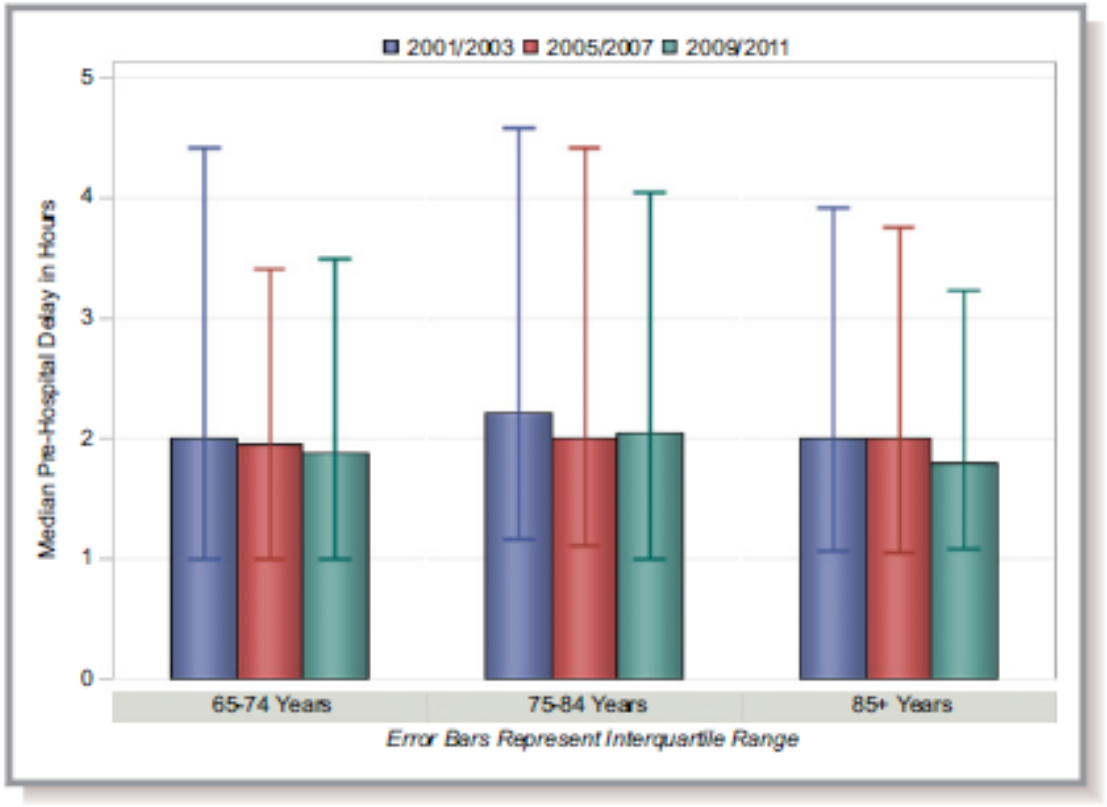


Figure 1. Trends in median duration of prehospital delay in elderly patients hospitalized with acute myocardial infarction according to age strata.

Patient Experience: Factors in Delay

Raczynski, Taylor et al---AJPH 1994

Universal

Denial

Much ado about nothing

More prevalent among Black Americans*

-Misattribution

-“Atypical” Patterns

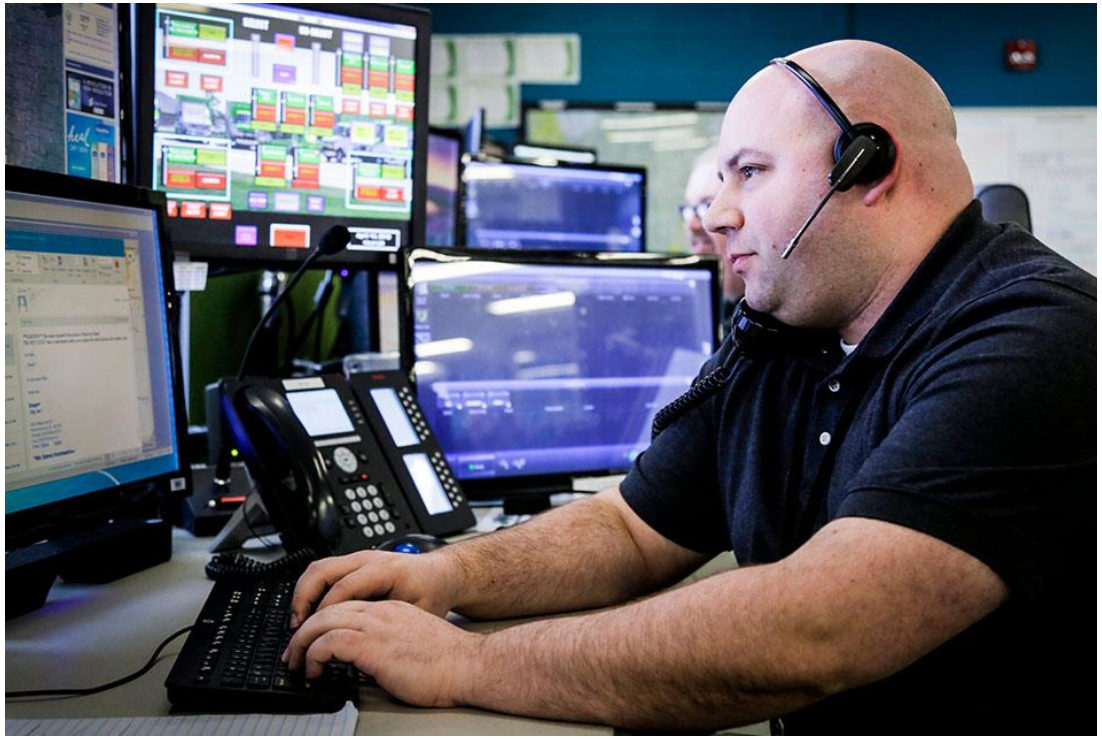
-Social factors (employment, childcare)

-Trust and familiarity

Critical first medical contact

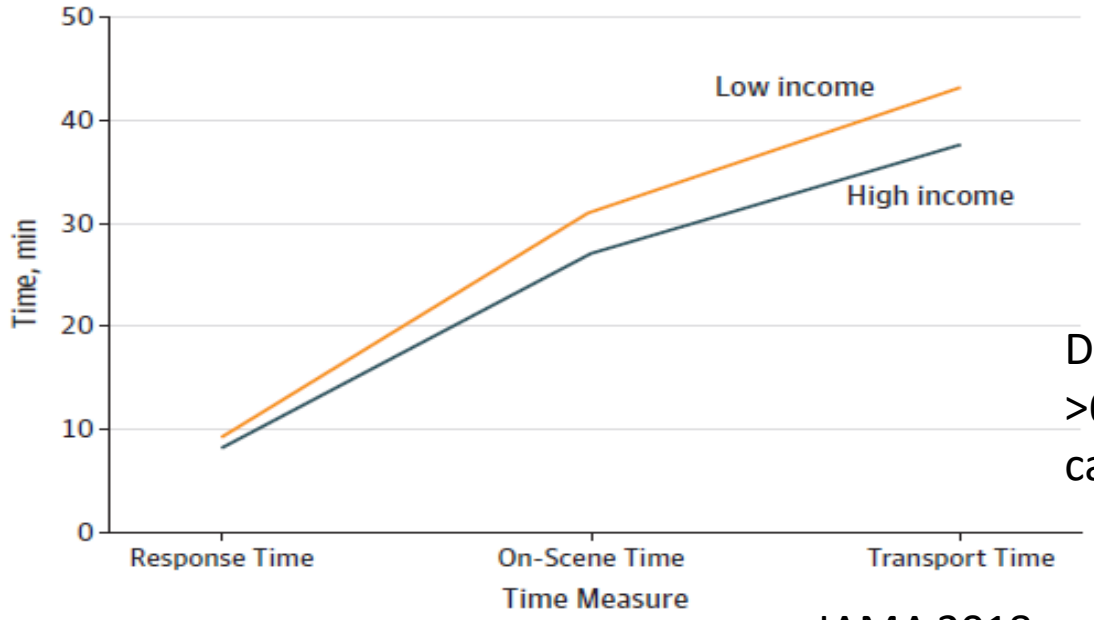
- Lifesaving
- Equitable?

~50-70% of AMI Patients access EMS FIRST



Equity in EMS?

Income and Cumulative Emergency Medical Services Time



Data from >63,000 cardiac arrests

JAMA 2018

First Responders: Where to?

Patient/Family Preference

Proximity

Specialty Care Center

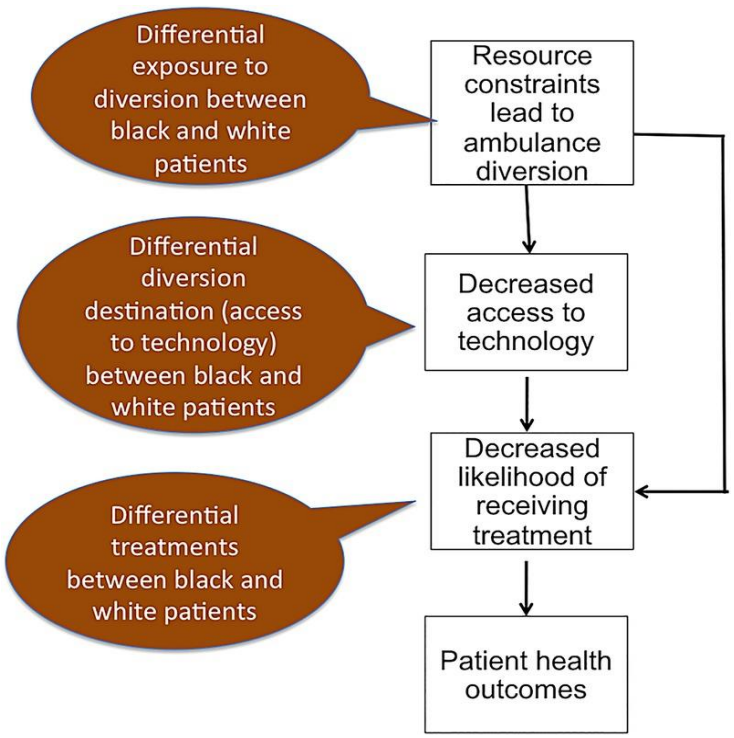
Diversion

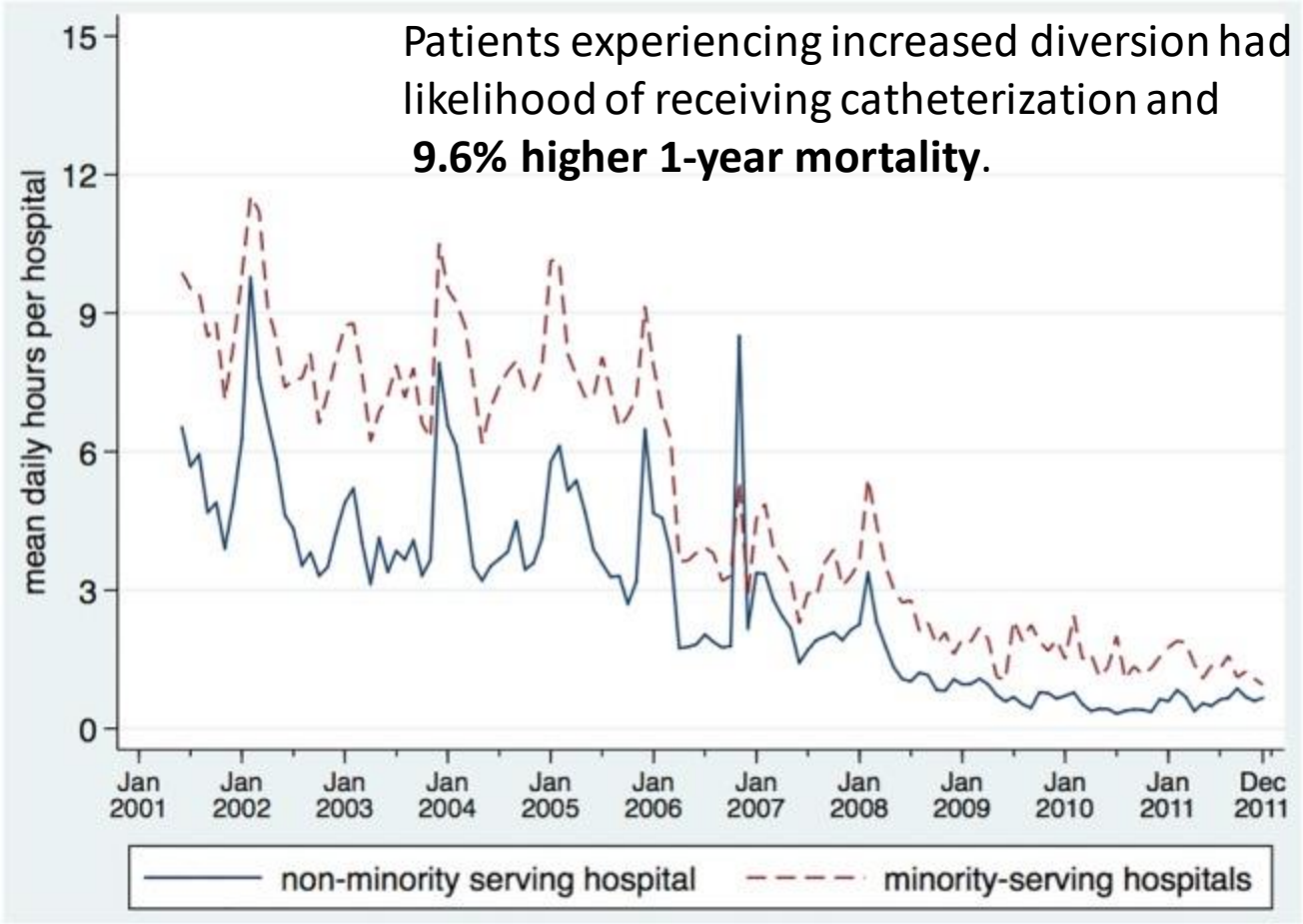
A taxing ED environment

"…often crowded and hectic environment …. Interruptions in the evaluation of ill patients by the arrival of patients who are more overtly ill; conflicts arising in the interactions among patients, their families, staff members, visitors, public-safety personnel, and volunteer members of the medical staff; and patients who sign themselves out during shift changes are some examples… [and] the adequacy of the staffing of nurses represent a sample of internal and external stressors. At any given time the workload may overwhelm even the most experienced and capable physician's capacity for reasoned decision making…." NEJM, correspondence, November, 2000

Resource Constraints: Diversion

Hospitals serving high volume of black patients are more likely to be on diversion





Patients experiencing increased diversion had a 4.3% decreased likelihood of receiving catheterization and **9.6% higher 1-year mortality**.

BMJ Open. 2016.

Advancing Diagnostic Equity

Selected Recommendations

Research:

---Understanding of the epidemiology of delay, pre-hospital death and post hospital mortality
--The relationship between delay and SCD
--CBPR to understand delay and EMS use patterns
Patient and Family factors

--First contact bias
--EMS factors
--Diversion patterns and practices
--Investigate methods to "de-segregate"hospital quality"
--Understand reasons for minority "preference" for underserving hospitals

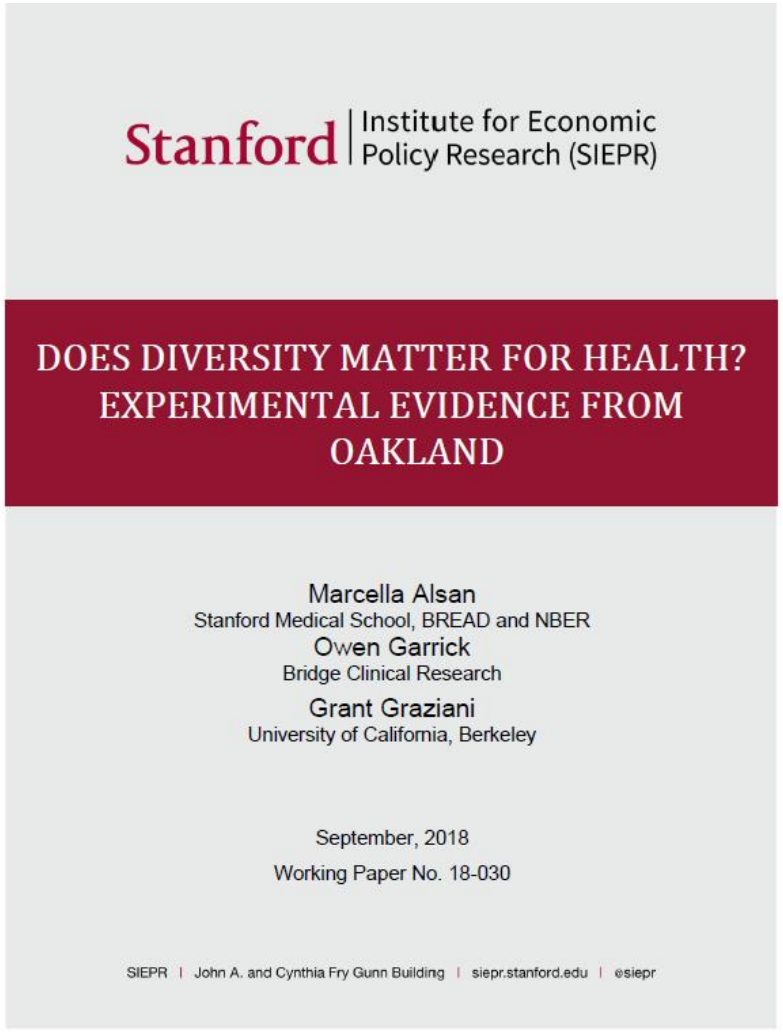
--Protocols to understand and prevent excess risk for VTE in post-surgical setting among Black patients
--Role(if any) of hemoglobinopathies in diagnosis and clinical course of acute CVD
--Develop specific and sensitive biomarker/ AI algorithm (based on clinical hx and presentation data) for stroke

Intervention:

--Partner with patient and community
Actions to increase Knowledge, Agency, Trust in system and providers:
--Acknowledge and address barriers to equitable care

-Avoid worsening disparities by punitive action against minority serving hospitals that show evidence of pre-exisitng resource constraints-

-<u>Active pursuit of diversity at every level of Team and system</u>



Diversification of the Medical Workforce as "Interventional Cardiology' and a Public Health Measure

Subjects [were] much more likely to select every preventive service, **particularly invasive services**, once meeting with a racially concordant doctor.

- Our findings suggest black doctors could help reduce cardiovascular mortality by 16 deaths per 100,000 per year leading to a 19% reduction in the black-white male gap in cardiovascular mortality.