Unconscious Bias in Medical Training and its Impact on Patient Care

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Center for Surgical Trials and Outcomes Research
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Disparities in Surgical Outcomes are Well Documented in the Literature


Racial Disparities in Trauma?

Trauma Should be immune to this:

- Near universal access to Pre-Hospital Emergency Medical Services
- Emergent Nature of Trauma
- Emergency Departments are “the great equalizers” and are supposedly color blind
Adjusted Odds of Death after Trauma

<table>
<thead>
<tr>
<th>Adjusted Odds of Death</th>
<th>1.00</th>
<th>1.20</th>
<th>1.51</th>
<th>1.55</th>
<th>1.78</th>
<th>2.30</th>
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<tbody>
<tr>
<td>95% Confidence Intervals</td>
<td>1.08-1.33</td>
<td>1.36-1.69</td>
<td>1.46-1.64</td>
<td>1.65-1.90</td>
<td>2.13-2.49</td>
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*Reference group

White** Black Hispanic

Insured

White Black Hispanic

Uninsured

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Adjusted Odds of Mortality, Discharge Disposition and Functional Deficit of Black and Hispanic vs. White children

Haider et al, Arch Surg 2008
Case: T.C.
August 11, 2006

16 year old female
Multiple Gun Shots to Abdomen

• On Arrival Heart Rate : 140 bpm
  Blood Pressure: 90/60 mmHg

Immediately rushed up to Operating Room
OR / Hospital Course

Trauma Laparotomy-
  Briefly pulseless, Aorta Clamped
  IVC injury repaired
  Multiple Enterotomies
Damage Control Operation; 37 units PRBC

3 Take Backs to OR, Out of ICU on POD 12
Survived- POD 17 on Floor, refusing all care
Patient Suffering from early form of PTSD

- Patient was involved in a hostage situation
- Received Gun Shots during fire fight between her captor and Baltimore Police
  - Night Tremors
  - Insomnia
  - Anhedonia
  - Hallucinations
Black Children Experience Worse Clinical and Functional Outcomes After Traumatic Brain Injury: An Analysis of the National Pediatric Trauma Registry

Adii H. Haider, MD. MPH. David T. Efron, MD, Elliott R. Haut, MD, Stephen M. DiRusso, MD, PhD, Thomas Sullivan, BS, and Edward E. Cornwell III, MD

**Background:** Recent studies suggest racial disparities in the treatment and outcomes of children with traumatic brain injury (TBI). This study aims to identify race-based clinical and functional outcome differences among pediatric TBI patients in a national database.

**Methods:** A total of 41,122 patients (ages 2-16 years) who were included in the National Pediatric Trauma Registry (from 1996-2001) were studied. TBI was categorized by Relative Head Injury Severity Score (RHISS) and patients with moderate to severe TBI were included. Individual race groups were compared with white as the majority group. Differences between races in functional outcomes at discharge in three domains—speech, locomotion, and feeding—were determined using multiple logistic regression. Cases were adjusted for age, sex, severity of head injury (using RHISS), severity of injury (using New Injury Severity Score and Pediatric Trauma Score), premorbidities, mechanism, and injury intent.

**Results:** A total of 1,115 children had moderate or severe TBI with or without associated injuries. All races had similar demographics. Hispanics (n = 1,041) had outcomes comparable to whites (n = 4,762). Black children (n = 1,238) had significantly increased premorbidities, penetrating trauma, and violent intent. They also had higher unadjusted mortality and longer mean intensive care unit and floor stays. After adjustment, there was no difference in the odds of death between black and white children. However, black patients were more likely to be discharged to an inpatient rehabilitation facility and had increased odds of possessing a functional deficit at discharge for all three domains studied.

**Conclusion:** Black children with traumatic brain injury have worse clinical and functional outcomes at discharge when compared with equivalently injured white children.

**Key Words:** Racial disparities, pediatric traumatic brain injury, functional outcomes.
The quality of life (QOL) has improved.

Interestingly, other studies in trauma patients using validated QOL questionnaires (Sickness Impact Profile and Short form 36) after severe multiple injuries reported 1-2 years later impairments in QOL. After 2 years, the gap with the general population is still considerable. The improvement in QOL in the seccai cohort can also be explained by a phenomenon called “response shift.” In a study performed by our group, we found a gradual improvement in QOL in the seccai cohort can also be explained by a phenomenon called “response shift.” Response shift is the change in internal standards of values, and consequently in the perception of quality of life, that could be either because patients become accustomed to their illness or chronic disease or because the expectations about their quality of life have changed.

The study of Nijbro et al. shows valuable insights regarding the changes in outcome and characteristics of severely injured patients over time. However, more research with a validated quality of life questionnaire is needed to support their conclusion that the quality of life of severely injured children is better than we had expected and might be explained by a phenomenon called “response shift.” Response shift is the change in internal standards of values, and consequently in the perception of quality of life, that could be either because patients become accustomed to their illness or chronic disease or because the expectations about their quality of life have changed.

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To the Editor:
I find the publication of the article by Haider in this journal to be extremely troublesome; especially, after it was presented at the American Association for the Surgery of Trauma (AAST) without discussion allowed from the floor due to time restraints. Their conclusions could have unintended consequences, and are an insult to those that take care of injured children.

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Letters to the editor

The Authors' Reply:

We appreciate the opportunity to respond to the constructive criticisms offered by Dr. Hall regarding our article entitled—Black Children Experience Worse Clinical and Functional Outcomes After Traumatic Brain Injury: An Analysis of the National Pediatric Trauma Registry.

At the outset, we should point out that multivariate logistic regression analyses, the linchpin of outcomes research, is performed specifically so that the outcomes of disparate populations can be compared, and risk factors (e.g., race, age, gender, severity of injury) for outcome parameters (e.g., mortality, length of stay, disability, etc.) can be identified. Dr. Hall's implication that the race-based differences in outcomes in this study are explained by differences in injury severity seems to reject the very existence of the discipline of disability. While we congratulate him on his work showing the positive impact of pediatric trauma centers on patient outcomes (albeit via simple χ² comparisons between Cook County Pediatric Trauma Center and National Pediatric Trauma Registry), we believe that the greatest insult to those who are committed to optimal outcomes of all patients would be to withhold the undeniable findings of our multivariate analysis for fear that it may provoke criticism such as this, that strays outside the bounds of collegial scientific discourse.

We fully understand the discomfort a study such as this creates. Perhaps no topic in American dialogue generates as much emotion as race. Our own study group is a racially, ethnically, religiously diverse collection of investigators—all of whom have spent our entire careers at urban trauma centers caring for predominantly minority patients. We feel personally challenged by the results of this study—but are no less convinced of its validity.

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Disparities in Surgical Care and Outcomes

• Not limited to Race; Insurance plays a role as well

• The underlying mechanisms that lead to these disparities remain unknown

• It is crucial to elucidate paths that lead to differences in outcomes so that interventions can be created and disparities mitigated
Potential Mechanisms that lead to Disparities

- Poor Access to Medical Care
- Sub Standard Medical Care

  If so? What are the exact differences in care; are they in treatments, major procedures, complications?

- If Minorities receive differential treatments

  What is the role of the provider bias?
Are Surgical Care Providers Biased?

Would we treat this patient differently?

There is no data to suggest that any of us would do so knowingly.
Hypothesis

Like the general population doctors may posses unconscious biases or preferences.

These Unconscious or Implicit Biases may lead us to unknowingly treat patients differently.
Measuring Implicit Bias: The IAT

- The Implicit Association Test (IAT) asks you to pair two concepts.
- The more closely associated the two concepts are, the easier it is to respond to them as a single unit.
- So, if white and good are strongly associated, it should be easier to respond faster when you are asked to strike the same key for these two.
- If black and good are not so strongly associated, it should be harder to respond fast when they are paired.
Race Implicit Association Test

Computer-based test of social cognition

Measures time it takes to match representatives of social groups with good and bad attributes

Test-takers with an implicit preference for whites would pair white with pleasure faster than they would with Blacks

https://implicit.harvard.edu/implicit
Race IAT Results from General Population (> 1 million responders)

- Strong preference for White people: 27%
- Moderate preference for White people: 27%
- Slight preference for White people: 16%
- Little to no automatic preference: 17%
- Slight preference for Black people: 6%
- Moderate preference for Black people: 4%
- Strong preference for Black people: 2%
To identify the presence of unconscious/implicit race and class bias among first year medical students and to determine whether implicit bias affects their clinical assessment of surgical patients.
Methods:

A Two Year Prospective Study

Medical students entering JHSOM Classes of 2013 and 2014 were asked to complete a web survey including:

1) IAT: Race

   Social Class

2) Eight clinical scenario vignettes

3) Direct questions regarding explicit race and socioeconomic class preferences
Clinical vignettes randomly changed race and socioeconomic classes

White compared to Black

To compare Class Status : Occupation used for example Lawyer compared to Toll Booth collector
Analysis

- Multiple Logistic Regression used to determine if answers on vignettes are associated with implicit bias (IAT score)
- Correlations co-efficients measured between student’s explicit and implicit preferences were assessed
- Sample Size = 180 Students
Johns Hopkins School of Medicine
Classes of 2013 and 2014 Survey

• 211 total participants

• 202 completed entire survey

• 52% Females
Race and Ethnicity of Participants

- African American: 6.4%
- Asian: 30.9%
- Latino: 5.9%
- Native American: 0.0%
- White: 53.7%
- Other American: 3.2%
Age Distribution of Participants

- 21 or 22 to 25: 16.0%
- 26 to 29: 5.7%
- 30 to 33: 1.0%
- 34 to 37: 0.5%
- 38 or Older: 0.0%

76.8% of the participants are younger than 29.
Explicit Question:
Black vs. White People Preference

54.4% prefers Black
29.0% prefers White
4.1% equally prefers Black and White
8.3% slightly prefers Black
1.6% slightly prefers White
0.5% moderately prefers Black
2.1% moderately prefers White
4.1% strongly prefers Black
Race Implicit Association Test Scores for Black vs. White

- 2.0% Prefers Black
- 6.1% 5.6% Equally
- 17.8% Slight Moderate
- 15.2% Both
- 31.0% Slight Moderate Strong
- 22.3% Prefers White
Explicit vs. Implicit Race Preferences

![Bar chart showing explicit vs. implicit race preferences. The chart indicates a significant difference in preferences between the two conditions, with the implicit condition showing a stronger preference for White individuals.](chart.png)
Race Vignette 1: Pain Assessment

- Mr. Jones is a 48 year old man who has come to the ER after being assaulted. The physical exam reveals a broken nose, a laceration on his forehead, and bruised ribs. A CT scan is negative for any other broken bones or internal bleeding. However, the patient complains of a throbbing pain in his right chest and flank. He is wincing and moaning every few minutes, despite having received narcotic pain medicine 15 minutes ago. He is also taking very shallow breaths in order to reduce the pain he claims to be experiencing from his side.

- What do you assess Mr. Jones’ pain as being on a scale of 0-10?
Pain Assessment Responses
No differences Black v. White

\[ p = 0.87 \]
Race Vignette 2: Informed Consent

- Ms. Miller is a 54 year old woman who has come to the emergency department with abdominal pain. Work up reveals that the patient has cholecystitis (an inflamed gallbladder) which is surgically treated by performing an operation to remove the gallbladder. Before taking Ms. Miller to surgery, you need to take informed consent for the procedure (A Laparoscopic Cholecystectomy) from her.
Informed Consent Responses
No differences Black vs. White

p=0.93
Race Vignette 3: Patient Reliability

• Ms. Rogers is a 35 year old woman who is two days post-operative after having surgery to repair internal bleeding caused by a motor vehicle crash. During a routine visit to the patient's room it is discovered that she is having some difficulty forming coherent sentences. Her vitals reveal that Ms. Rogers has a fever, increased heart rate and hypertension suggesting the diagnosis of delirium tremens (DTs) due to Alcohol withdrawal. To get an adequate history, the surgical team interviews the patient’s family. Her husband, a man of approximately the same age and Ms. Rogers’ brother are sitting in the patient's room. Mr. Rogers states that his wife has at most two drinks a night. The patient’s brother reiterates Mr. Rogers’ statement and adds that he hasn’t seen his sister in a drunken state in ten years.

• How reliable do you find the information provided by Ms. Rogers’ family?
Race Reliability Responses
No differences Black v. White

No differences between Black and White respondents in the reliability of responses. The distribution of responses shows that there is no significant difference in the perceived reliability of responses between the two groups, with a p-value of 0.93.
Mr. Kenon is a 40 year old man brought to the emergency department after being shot in the leg just above the knee. The patient is alert and stable upon arrival. While you are taking his history, Mr. Kenon claims that he has no idea who shot him or why. He reports that he was walking down the street, when a stranger walked up to him withdrew a firearm and shot him. The bullet seems to have missed all major vessels and bones and the patient’s life is not in danger.

How believable do you find Mr. Kenon’s story?
Patient Trust Responses
No Difference Black v. White

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<th>Response</th>
<th>Percentage</th>
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<tr>
<td>40.0%</td>
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<td>White</td>
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<tr>
<td>35.0%</td>
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<td>Black</td>
</tr>
<tr>
<td>30.0%</td>
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<td>White</td>
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<tr>
<td>25.0%</td>
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<td>Black</td>
</tr>
<tr>
<td>10.0%</td>
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<td>White</td>
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\( p = 0.89 \)

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IMPLICIT RACIAL PREFERENCES ARE PRESENT BUT THESE DO NOT AFFECT CLINICAL DECISION MAKING
Explicit Upper v. Lower Class Preference

- **Strong**
  - Prefers Lower: 2.6%
  - Prefers Upper: 36.8%

- **Moderate**
  - Prefers Lower: 2.6%
  - Prefers Upper: 31.6%

- **Slight**
  - Prefers Lower: 6.2%
  - Prefers Upper: 16.1%

- **Both Equally**
  - 4.1%

- **Slight Moderate Strong**
  - Prefers Upper: 4.1%
Lower vs. Upper Social Class Implicit Association Test Scores

<table>
<thead>
<tr>
<th>Preference</th>
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<table>
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<th>Equally</th>
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<tr>
<td>Slight</td>
<td>10.4%</td>
<td>9.9%</td>
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<tr>
<td>Moderate</td>
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<tr>
<td>Strong</td>
<td>53.1%</td>
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JOHNS HOPKINS MEDICINE Center for Surgical Trials and Outcomes Research
Explicit and Implicit Preferences
Lower vs. Upper Class

- Explicit: Lower
- Implicit: Upper

$\text{p} = -0.43$
• Mr. Williams is a 36 year old lawyer who is two days post-operative after having an appendectomy that was complicated by the appendix having ruptured. When you arrive to check on him, Mr. Williams tells you he is experiencing a great deal of pain at the site of his incision. He describes the pain to be sharp and unrelenting and he complains that he is very uncomfortable and has not been able to rest due to the severity of the pain.

• On the following scale, from 0 to 10, how would you assess Mr. Williams’ pain?
Pain Assessment Responses
No difference in Upper vs. Lower Class

- 45.0%
- 40.0%
- 35.0%
- 30.0%
- 25.0%
- 20.0%
- 15.0%
- 10.0%
- 5.0%
- 0.0%

Upper
Lower

P = 0.97
Class Vignette 2: Patient Reliability

• Ms. Thompson is a 41 year old bus driver who presents to the Emergency Department with a broken cheek bone. When asked what happened, she gives an embarrassed laugh and says she fell off a ladder while packing stuff away in the attic. As you review her chart, you notice two prior ER visits for minor injuries. When questioned about these, Ms. Thompson becomes evasive and explains that she is really very clumsy and has needed to come to the ER several times for accidents she has had.

• How plausible is Ms. Thompson’s history? (1-5)
Class Vignette 2: Patient Reliability
No difference in Upper vs. Lower Class

60.0% 50.0% 40.0% 30.0% 20.0% 10.0% 0.0%

p=0.98

Upper
Lower
Class Vignette 3: Informed Consent

Ms. Johnson is a 56 year old college professor who has been referred to you with the diagnosis of early stage breast cancer. She says that she has no family history of breast cancer and admits she is not very well informed about her options for treatment. The two main treatment options are 1) Removal of the breast followed by reconstructive plastic surgery or 2) Removal of only a small portion of the breast followed by radio therapy to prevent the tumor from recurring. Personally you feel that option 1 is better, however well done outcome studies have demonstrated that both options confer equal survival and cure rates.
Class Vignette 3: Informed Consent
No difference in Upper vs. Lower Class

Upper
Lower

p=0.98
Mr. Cole is a 48 year old truck driver who presented to the Emergency Department with abdominal pain and 4 days of constipation. Work up reveals a mass in his right colon suspicious for colon cancer. As this mass was obstructing his large intestines he is taken to surgery and undergoes an operation to remove his colon. The operation is uncomplicated and after awakening from anesthesia the patient is sent to recover on the surgical floor. You assess the patient on post operative day #1 and the patient complains of extreme unbearable pain, saying that he didn’t sleep at all through the night. The nurses however report that he did sleep intermittently through the night and whenever he woke up all he asked for is “stronger pain medicine”.
Class Vignette 4: Patient Trust
No difference in Upper vs. Lower Class

P = 0.98
Conclusion

A majority of medical students exhibit an unconscious bias preferring Whites and Upper Social class

Unlike data on physicians, these biases do not impact their assessment of surgical patients

Ref: Haider Haider- JAMA Sept 30- 201JAMA
Implications

Further studies are needed to determine if experiences during training contribute to potential unconscious differential treatment of patients by physicians.
Thank You - Mentors, Co-investigators & Students

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Dr Janel Sexton  Ms Lia Losonczy- MS IV
Ms Sandra Swoboda, RN  Ms Morgan Bonds- MS IV