

THE INTERSECTION BETWEEN RACE, CLINICAL RESEARCH, AND
MEDICAL EDUCATION WITH EXAMPLES ON STRATEGIES AND
POLICIES TO UNDERSTAND, IDENTIFY, AND MITIGATE THE
EFFECTS OF RACE-BASED MEDICINE / RACISM IN MEDICAL
INSTITUTIONS

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ABSTRACT

Race-based medicine is the belief that people of different races have different biological characteristics that affect the diseases they are prone to, and the types of treatments and procedures that should be used. This belief is reflected in medical education, clinical practice, and research. Race-based medicine was born from slavery. Notions of biological difference between races were used to justify slavery, and the structural racism that was a product of the slavery era gave rise to race-based medicine. Despite the common belief that medicine is evidence-based and objective, science and medicine reflect society, and thus are also flawed and biased. Medicine and medical education cannot be separated from the views of the dominant culture. The belief of today dictates the lens through which physicians and researchers look at patients, procedures, and treatments. Despite more and more evidence that there is no biological basis to our social construction of race, race-based medicine is still being taught in medical schools. Medical vignettes and the United States Medical Licensing Examination (USMLE) display questions that encourage the normalcy of whiteness, reinforce stereotypes, and emphasize that diseases are race-specific. Race-based medicine is dangerous; not only is the concept unscientific and based in, the belief is also a source of trauma for minority students and residents. How does one cope with the daily assault of information that your race is a risk factor for many diseases, a justification for treating you differently, or that your fellow physicians are being trained to believe that the amount of melanin in your skin is enough information upon which to base assumptions? Instead of desperately searching for innate racial differences, society needs to change

their focus to social determinants of health. We are chasing the rabbit hole of biological racial differences, but ignoring social determinants and structural racism, which distracts us from achieving health equity.

DEDICATION

I would like to dedicate this to my friends and family
Who have supported and guided me on this journey of
Self-love and self-discovery that aided me in
Finishing this thesis.

TABLE OF CONTENTS

ABSTRACT.....	II
DEDICATION.....	IV
CHAPTER 1: INTRODUCTION.....	1
What is Race-Based Medicine?	1
The Origins of Race-Based Medicine.....	3
CHAPTER 2: THE EFFECTS OF RACE-BASED MEDICINE.....	4
Race-Based Medicine is Flawed Science	4
The Flawed Science of Race-Based Medicine Leads to Different Treatment.....	6
and Poorer Outcomes for Minority Populations	6
The Effects of Race-Based Medicine of the Black Community.....	15
Race-Based Medicine Affects Not Only the Physical Health	16
of People of Color But Also their Mental Health	16
Race-Based Medicine and How This Interacts Within Medical School Education	18
Race-Based Medicine Exacerbates Health Disparities.....	19
CHAPTER 3: STRATEGIES AND METHODS TO MITIGATE THE EFFECTS OF RACE-BASED MEDICINE.....	22
Acknowledging Bias.....	22
Acknowledging, Recognizing, and Mitigating Bias Through an Adjunctive Course.....	23

Thorough Review of Pre-Clerkship Curriculum	25
Incentivizing Anti-Racism and Anti-Bias Efforts Among Faculty and Staff	26
Anti-Racism and Bias in Clinical Settings	27
Racism in Medicine Conference to Connect and Share Ideas About Anti-Racism and Bias	29
CONCLUSION.....	31
REFERENCES CITED.....	32

CHAPTER 1: INTRODUCTION

Medicine and the scientific community are permanently intertwined. One cannot advance without the other. In June 2003, the White House celebrated the mapping of the entire human genome. The Human Genome Project showcased that mankind shared 99% of their DNA. This discovery was a time to celebrate unity, community, and acceptance. Yet, these findings were unexpected and contrary to popular belief. In American society, many believed that people of different races were very genetically distinct. From phrenology to Benjamin Apthorp Gould's massive anthropometric survey of black and white soldiers at the end of the Civil War, history has repeatedly showcased that humans have been searching for racial differences to attribute to behavior, diseases, and cognition¹. Despite scientists' best efforts, they have been unable to find the genes that cause common diseases²; yet race has been the all-inclusive magical bridge that connects diseases and outcomes³. Various systems and institutions operate as though race is a biological concept – a notion that states there are innate genetic differences among those of different races³⁻⁶; these differences are “science-based evidence” that showcases the ability and capabilities of various groups of people. Medicine is no exception. The intersection of medicine and race as a biological construct has brought to light a new area of focus that needs to be addressed: race-based medicine.

What is Race-Based Medicine?

Race-based medicine is the belief that people of various races have different biological characteristics that affect what diseases they can get and what types of

treatments and procedures should be used^{4,5,7,8}. This belief manifests itself throughout clinical practice, research, and medical school education. Race-based medicine is a dangerous consequence of structural racism that can and has already led to subpar care and adverse outcomes for communities of color and other marginalized groups^{1,3,5,9,10}. Due to the pervasiveness of race-based medicine, this notion can be considered both a microaggression and a macroaggression. Microaggressions are the everyday verbal, nonverbal, and environmental slights, snubs, or insults, whether intentional or unintentional, that communicate hostile, derogatory, or negative messages to target persons based solely upon their marginalized group membership¹¹. Macroaggressions occur at a structural level encompassing actions that are meant to exclude, either by action or omission; are verbal or non-verbal communications that are not only purposeful and deliberate but are meant to create longitudinally debilitating and depressive results in the victim. They are persistent and malicious. Macroaggressions occur in the nebulous space between microaggressions and institutional/structural racism. They move past the subtle, unconscious aspects of microinsults and microinvalidations into a more literal and overt space. The difference between structural racism and macroaggressions is macroaggressions are purposeful, deliberate, and blatantly damaging acts that make an impact at the individual level¹². Structural racism – as well as macro/microaggressions – seeps into every aspect of society, to the point where personal views become politics. The medical field possesses numerous aspects that race-based medicine and structural racism has tainted. Medicine cannot be objective and truly helpful if society's views on minorities are skewed.

The Origins of Race-Based Medicine

There has been a shift in clinical practice and research to utilize medicine that is based on evidence; yet, what happens when the evidence is riddled with racial bias? The result: a flawed science that is presented and absorbed as absolute fact. The lens in which the scientific community looks at diseases, treatments, procedures, and people is dictated by the views of the era. The implication that black and brown people are genetically distinct – and many times considered inferior – to white people is a notion that is relied upon when scientific hypotheses arise involving race². Yet, other scientific questions do not rely on “conventional” understandings before researchers make their hypotheses^{2,13}. How can one obtain objective information when the basis is already distorted? Race-based medicine is not rooted in real evidence. Instead, the view is based on stereotypes and prejudice, finding its origins in slavery and the justification of slavery. This belief influences how healthcare providers interact with and treat their patients, alters how medical institutions teach the basic sciences to students, and traumatizes the minority students who attend these medical schools while potentially impeding their academic success and career advancement.

CHAPTER 2: THE EFFECTS OF RACE-BASED MEDICINE

Race-Based Medicine is Flawed Science

Race based medicine has led to flawed science and biased practices. Currently, pulmonologists will adjust for race when using the spirometer. In the United States, the spirometer uses either correction factors of 10% to 15% for individuals labeled 'black' and 4% to 6% for people labeled 'Asian', or population-specific standards, usually those derived from the third US-based National Health and Nutrition Examination Survey for 'Caucasians', African Americans, and Hispanics^{1,5,8,14}. This practice came about because of "evidence" from the slavery era. Thomas Jefferson was a founding father and slave owner who came up with the foundation that laid the groundwork for this adjustment. Without any evidence, he believed that forced labor was a way to keep the slaves alive because "hard work" will strengthen their lungs. Following suit, Samuel Cartwright established race as a biological factor for pulmonary function measurements. Cartwright said there was a 20% deficiency in the "negro's" pulmonary capacity - without any true evidence. The final nail in the coffin was Benjamin Apthorp Gould's survey of black and white soldiers at the end of the Civil War. His research displayed that "full blacks" had lower lung capacity than whites. However, his study did not adjust for height, age, or the working and living conditions of newly emancipated slaves¹. All these writings laid the infrastructure for racial bias in the pulmonology field for the 21st century. As a result of these attempts to soothe society's cognitive dissonance of the notion that all people are free, but African Americans are property because they are inferior due to their limited lung capacity and differences in skull size, a group of people were kept enslaved and marginalized. The sediments and practices of the slavey era have

permeated into today's perspective. Race-based medicine is the justification of slavery dressed in a different outfit. The current modern-day results are devastating. Minority populations disproportionately suffer from the effects of COVID-19, as evidenced by nearly three times the infection rate and one to two times the death rate among Black, Indigenous, and Latino people compared with White people. One effect of the disease is restrictive ventilatory dysfunction. This defect is indicated by a spirometry measure of forced vital capacity—the total amount of air that can be expelled from total lung capacity—below the lower limits of normal for the appropriate reference population. Clinicians might miss this diagnosis if lower lung capacity measures are considered normal for minority populations. Additionally, spirometers are used in determining severity of ventilatory defects with the measure of forced expiratory volume—the amount of air expelled during the first 1sec of a forced exhalation. These measures can influence treatment plans—e.g., for patients with pulmonary fibrosis caused by COVID-19 induced pneumonia, pulmonary rehabilitation might be needed, including breathing exercises and continual monitoring of pulmonary function. These treatments might not be undertaken if the racial adjustment leads to misdiagnosis. This notion is of particular concern considering Black patients are already less likely than White patients to be referred to pulmonary rehabilitation, despite more frequent pulmonary-related hospitalizations⁴. Sadly, the spirometry's race correction does not only affect the black community. Asian Americans are also impacted. Although nothing could be found that explicitly stated the origins of why Asian people are considered to have a smaller lung capacity compared to their white counterparts, the lengthy and documented history of systemic racism against them could have played a major role. From congressional legislation (e.g., the Chinese

Exclusion Law of 1882), presidential declarations (e.g., Roosevelt’s Executive Order for the Internment of Japanese Americans), and Supreme Court interpretations (*United States v Bhagat Singh Thind*) institutionalized and affirmed discrimination at the federal level have been present against Asian communities. These policies were supported by pseudoscientific “studies” suggesting that specific races themselves were the cause of certain illnesses and arguments that social control of these races would prevent the spread of communicable diseases¹⁵ — a sediment that we see most recently during this COVID-19 pandemic. Additionally, because Pacific Islanders and Asian Americans are more likely than other racial groups to reside in counties that violate the Environmental Protection Agency’s safety standards for small (<2.5 µm) air particles and they are also having race corrections for the spirometry, they are also higher likelihood of having delayed pulmonary lung intervention despite being at a higher risk for pulmonary complication¹⁶. The effects of race-based medicine do not end there.

The Flawed Science of Race-Based Medicine Leads to Different Treatment and Poorer Outcomes for Minority Populations

Race-based medicine is a multi-legged beast that has its claws in all aspects of medicine. This belief has affected how healthcare providers treat and interact with their patients. Take hypertension for example. One would think that treatment for hypertension would be uniform, with treatment varying only due to allergies, differences in lifestyle, and quality of life. However, that is not the case. Calcium channel blockers are recommended for black patients, while ACE Converting Enzyme Inhibitors (ACEIs) are

recommended for white patients ¹⁷. A study called “African Americans, Hypertension and the Renin Angiotensin System,” stated that there is a high prevalence of salt sensitivity (higher retention of salt) in African Americans. A salt sensitivity leads to a higher incidence of hypertension and is also associated with a low circulating plasma renin profile. A low circulating plasma renin profile means that ACEI will not be as effective¹⁸; therefore, the most effective way to treat hypertension in African Americans is through calcium channel blockers.

But the salt sensitivity theory is extremely flawed. The salt-sensitivity theory (also called the slavery hypertension hypothesis) states that African Americans had environmentally selected genes that enabled them to retain more salt¹⁹. This theory was created as a way for researchers to understand the reason behind the high prevalence of hypertension in African Americans. TW Wilson and Grim claimed that because Africa was arid and hot, people had limited access to salt, water, and resources²⁰. Due to the extreme climate, Africans and their descendants developed a genetic predisposition for salt retention as a mechanism to combat against the lack of resources. Higher salt-retention not only enabled the slaves to survive the extreme weather in Africa and the sanitary conditions during the forced migration, but also would eventually cause hypertension. When this theory came under scrutiny -- after a review showcased that there was no historical evidence of a salt deficiency in past or present parts of Africa where the slaves were exported from -- the theory was changed^{21,22}. The new salt-retention theory stated that the abduction from Africa to the New World caused vomiting, heat, diarrhea, and dehydration; these horrid conditions positively selected for slaves who could conserve water and salt; this external selection proved helpful on American

plantations, where the conditions were like the forced migration on the boat²². The fact that the theory had to change due to the lack of empirical evidence highlights that the salt-retention theory is highly erroneous. In addition to the flippancy of the theory, many researchers of the salt-sensitivity theory only contained few references from abstracts only, chapters in books, or whole books. Most of the literature for the salt retention theory possessed very little peer viewed work. For example, Wilson and Grim's publication was a scientific paper that only possessed one solidarity peer-reviewer^{20,22}. In addition, Dr. Richard Cooper, performed a global hypertension comparison study. His research illustrated evidence that refuted that the black community have genetic adaptations that increase their risk of hypertension. The results showed that black people in Nigeria and Jamaica have similar rates of hypertension to white people in the US²³. How can the medical field place enough trust in the salt-hypersensitivity theory -- despite the glaring lack of evidence - to use the theory as a base to give different treatments to African Americans - thus affecting their quality of care? Spirometry and differences in treatment of patients are not the only avenues where race-based medicine affects patients.

Race is also considered in numerous risk score calculations⁵. Race-based medicine is propagated by embedding race into basic data and decisions for healthcare. These race-adjusted algorithms simultaneously increase the health disparity of patients of color versus their white counterparts while decreasing the evidence of positive outcomes for minority patients. There seems to be one in every subspecialty. Cardiology has two risk scores: The American Heart Association's Get with the Guidelines-Heart Failure and The Society of Thoracic Surgeons Short Term Risk Calculator⁵. The former predicts in-hospital mortality in patients with acute heart failure and adds three points to the risk

score if the patient is identified as nonblack. This addition increases the estimated probability of death (higher scores predict higher mortality)⁵. The race correction regards black patients as lower risk and may raise the threshold for using clinical resources for black patients, potentially leading to a delay in aggressive management and thus increasing the risk of death for black patients because they were not treated proactively. This risk calculation denotes nonblack patients as a higher risk for mortality but does not indicate what evidence was used to arrive at this risk stratification⁵, all the while putting minority patients at a higher risk. The Thoracic Surgeons Short Term Risk Calculator increases the risk of mortality and/or complications if the patient is nonwhite. When used preoperatively to assess a patient's risk, these calculations could steer minority patients, deemed higher risk, away from these procedures. The Vaginal Birth after Cesarean (VBAC) Risk Calculator estimates the probability of successful vaginal birth after prior cesarean section. Clinicians can use this estimate to counsel people who must decide whether to attempt a trial of labor rather than undergo a repeat cesarean section. The African American and Hispanic correction factors subtract from the estimated success rate for any person identified as black or Hispanic, thus predicting a lower chance of survival for these groups. These lower estimates may dissuade clinicians from offering trials of labor to people of color and opting immediately for a cesarean. A study showed that between 1991 and 2008 despite an overall increase in the number of cesarean sections performed in the United States, when compared to their white counterparts, African American women had a rate 25% higher rate for cesarean sections, 19% higher for Asian/Pacific Islander women, but 14% lower for Hispanic women²⁴. This surgery is not without its risks and the recovering period is six to eight weeks – potentially causing

those who gave birth to not be able to go back to work and contribute to the finances of the home or take care of their other children if they have no other support. The probability of that scenario occurring is rather high since higher cesarean delivery rates were significantly associated with lower socioeconomic status²⁵. In addition, black mothers and infants have a higher rate of mortality than their white counterparts, so any increased risk of surgery puts them at an even greater disadvantage²⁶. The science that VBAC is based on is another prime example of the gross mishandling of the empiric method. The VBAC was validated by an observational study that that demonstrated being white was associated with greater chance of successful VBAC among women who attempted trial of labor: “VBAC was significantly more likely among women who were younger, had a lower pre-pregnancy BMI, and were of white race²⁷.” This data came from the ever-present assumption that superiority in every and all forms belongs to those who are white. An “explanation” was offered stating that African American and Hispanic women have ethnic variation in pelvic shape²⁸. The notion is rooted in slavery, like many explanations that support race-based medicine. The Caldwell-Moloy classification categorized anatomic pelvic variation into four subtypes -- gynecoid, android, anthropoid, and platypelloid²⁹. The “gynecoid” pelvis was found mostly in white women and described as ideally suited for childbirth. By contrast, the “anthropoid” pelvis was noted to be narrower, more common in non-white women, less suited for childbirth, and described to be seen in lower races²⁸. From decreased aggressiveness of breast cancer screening, osteoporosis evaluations, and kidney stone treatment to less definitive diagnostic testing for black children presenting with symptoms of UTI and a reduction of a pool of African American donors for kidneys, these race-based risk calculations

negatively impact the health and wellness of communities of color particularly the black communities with any explanation or evidence to support their claims or simply faculty science⁵.

Perhaps the most notorious race-based medicine calculation is the Glomerular function rate (GFR) that is used in assessing kidney function based on measuring serum creatinine. The Modification of Diet in Renal Disease (MDRD) equation and the chronic kidney disease - Epidemiology equation (CKD-EPI) report higher eGFR values (given the same creatinine measurement) for patients identified as black, suggesting better kidney function. The notion that African Americans have better kidney function due to increased serum creatinine is rooted in the justification to continue the enslavement of black people. Creatinine is the byproduct of muscle breakdown. The more muscles you have, the higher your serum creatinine is. Those in power when chattel slavery was the backbone of the United States and main reason for the country's wealth likely illustrated the notion that Africans Americans have more muscle mass than the average person and therefore are best suited for the intensive and back-breaking labor that was in store for the enslaved people. This notion was reinforced during the 1999 study that proposed the eGFR and included a coefficient for black patients did so based on three flawed, small, poor-quality studies published between 1970s-1900s³⁰. This concept is rather confusing. How can we look at Arnold Schwarzenegger and Barack Obama and say that solely because Obama is a black man, he has more creatinine than Mr. Schwarzenegger, when clearly Schwarzenegger has more muscle than the former 44th president? The most deadly and devastating aspect of this "higher kidney function" is that these values may delay referral to specialist care or listing for kidney transplantation. According to a

prospective study published by the American Society of Nephrology, patients who are non-Hispanic and Black are four times more likely than patients who are non-Hispanic and White to have kidney disease, but only half as likely to undergo kidney transplantation, the optimal treatment for kidney failure. Black individuals were 25% less likely to even be waitlisted, despite adjusting for medical factors and social determinants of health³¹. One may be wondering, even after adjusting for social factors, why are black patients and nonwhite patients still at a lower likelihood of being placed on a waitlist for a transplant and even getting a transplant? The answer is the eGFR calculation. A study done by Zelnick et. al investigated this claim and the accuracy of the racialized CKD-EPI equation – the less used CKD-EPI(CYS) equation that incorporates cystatin-C, a non-creatinine-based biomarker of kidney function and does not include a Black race coefficient – and its potential contribution to kidney transplant inequities for self-identified Black individuals³². The results of the study highlighted that when the black coefficient was included in the CKD-EPI, the eGFR was overestimated – implying a better kidney function; however, when it was removed, the equation indicated a lower kidney function that met the clinical practice threshold (eGFR <20 mL/min/1.73 m²) of recommend nephrology referrals and early consideration of kidney transplants. As a result, there was a 35% higher instantaneous risk of achieving the transplant referral threshold and 52% (higher instantaneous risk of achieving the nephrology referral and transplant consideration threshold. The analysis also illustrated that black individuals reached the guideline-recommended transplant referral threshold 1.9 years earlier and the nephrology referral threshold 3.6 years earlier. These findings suggest that removing the

race coefficient from the CKD-EPI equation could avert potential systematic delays imposed on Black individuals' receipt of transplant care by several years³².

Most, if not all, of the race-adjusted algorithms either say that nonblack/Hispanic patients are at a higher risk for mortality, and therefore need more aggressiveness management, or they note that minority patients are at a higher risk of complications simply because of their phenotype and thus cannot get the lifesaving measures that they need. Both are atrocious. What makes matters worse is that many of the developers do not give a reason why race was incorporated in these calculations; even if they do, when tracing back the origins, the evidence is based on faulty science^{3,5,10,33} or correlations are seen as causation and those findings are used as baselines and perpetuated^{5,33}. When compiling descriptive statistics, it may be appropriate to record data by race and ethnicity and to study their associations. However, more needs to be done. If one is seeing a higher association for a particular disease or outcome, then context is needed more than ever. One must look at the social, cultural, geographical, and economic circumstances of each patient to draw a thorough and robust conclusion³⁴. Most genetic variants that vary clinically are due to changes across geographic space regardless of racial boundaries. Because the environment generally changes gradually as latitude/longitude changes, most phenotypic variation in humans is clinically distributed across geographic space³⁵. Thus, human phenotypes vary even among the same populations and groups. A vivid example is the genetic diversity that is present on the continent of Africa. There is a considerable amount of genetic variation between the African and African diasporic populations than in other populations, and the genetic variants found outside Africa are largely a subset of those found within it^{35,33}. Essentially, the "bad genes" that researchers are desperately

trying to attribute to race cannot be sustained. There is a large genetic difference between Black descendants of enslaved people vs. first generation children of African immigrants or Afro-Latinos^{10,33,35,36}. The same is true for other groups: immigrants versus their first-generation children, rural China vs. metropolitan China, Vietnam vs. Japanese, and Philipian vs Korean^{33,35}. There is more genetic variation within the races than between them³⁷. In addition, each African, Asian, and Latin/Hispanic country has a torrid history with western imperialism and colonization – greatly diversifying the gene pool³⁶. Even though minority groups tend to look similar within their respective groups, the genetic variation is too much to simply attribute diseases and outcomes based solely on phenotypic presentation³⁵ – especially if the race is not self-reported (another avenue for fallacy and bias to be introduced). If the social, cultural, geographical, and economic circumstances factors were not initially collected, then is it plausible and ethical to make such broad assumptions only on race alone? Even if race does appear to correlate with clinical outcomes, does that justify its inclusion in diagnostic or predictive tools? Will the race change the outcome or what is appropriate for the standard of care?

Another instance where race-based medicine influenced patient care was the notorious marketing of the drug of BiDil. BiDil is a drug that is a combination of two generic drugs that have been used for decades without any indication for race^{3,38}. The clinical trial for BiDil only included African Americans³⁸. For unknown reasons, the researchers, and the Federal Drug Association (FDA) assumed that the positive results of this novel drug would only be applicable to black people while ignoring the fact the FDA never had a problem using white bodies as the standard for all types of human bodies³. Interestingly, the same is not true in the reverse – only reinforcing the unspoken law that

black bodies are different from white bodies and the fault of diseases is their own³. There is nothing wrong with communities of color using BiDil. The drug was proven to work³⁹ and any additional measure to decrease the number of medications a person must take increases adherence to the treatment plan. The issue is that the targeted marketing should have never happened in the first place. Presenting BiDil as a solution for racial gap in mortality of disease points to fault on the black bodies. The message is clear: it is their inert racial difference that causes differences in responses to drugs rather than the systemic, systematic, and environmental differences that various racial groups have^{3,5,35}.

The Effects of Race-Based Medicine of the Black Community

Race-based medicine is a plight that is harming the black community. In August 2019, The New York Times wrote an article that focused on the history of race-based medicine and how its implications have left deep embedded footprints in medical training and practices⁴⁰. Most notably, the article spoke about the notion that black skin is thicker than white skin – a bold-faced lie that Dr. Thomas Hamilton (a respected physician and a trustee of the Medical Academy of Georgia) continuously tortured enslaved man, John Brown, to prove. The savage torture was a tool to justify the lack of pain management and continual enslavement of African Americans. This belief is sadly continued to this day. The Times cited a 2013 review of studies that illustrated the discrepancy of pain management between African Americans and their white counterparts at ages: black patients received inadequate and inferior pain management than those who had a lighter complexion. Residents and physicians alike believe that black people feel less (due to their “insensitive nerve endings”) pain than white people, and therefore need less

medication⁴⁰. Dr. Benjamin Mosely wrote, “What would be the cause of insupportable pain to a white man, a Negro would almost disregard.⁴⁰” An eighteenth-century physician, Dr. Msoely’s statement mirrors what twenty-first century physicians believe about African Americans⁴⁰. Their similarity is astounding and highlights the stagnant thinking that invades medical education.

Race-Based Medicine Affects Not Only the Physical Health of People of Color But Also Their Mental Health

Race-based medicine not only has a negative effect on patients but also an adverse effect on minority healthcare professional students and residents in terms of their mental/emotional health, academic success, and career advancement. Medical schools (and research studies) will describe that the risk of developing diabetes is dependent on one’s race: “It is clear that several subgroups of the population are at particularly high risk for diabetes.⁴¹” However, there is evidence that shows when age, height, weight, health insurance coverage, and socioeconomic status are standardized, there is no significant difference in the rate of developing type 2 diabetes between white and African American people⁴². To hear your skin color being discussed as a risk factor, or the fact that one’s pigment is enough to assume the demographic that they belong to, is traumatizing and dehumanizing⁶. One must sit with the information that your race is riddled with diseases and must ingrain those “facts” into the mind to get questions right on exams. All the while, when asking professors or physicians, “how is it plausible that a

single group of people are at the highest risk for so many common diseases,” they are met with silent blank stares or the all-powerful and unifying answer of genetics. From the constant assault of racial bias and daily microaggressions, minority students and residents harbor a sense of responsibility to speak up when a racial issue is presented in the classroom or in the hospital⁶. This “minority tax” – burden of extra responsibilities placed on minority faculty, residents, and students, in the name of diversity and equity⁴³ – is added stress to the already overwhelming atmosphere of medical training and care giving. When race-based medicine is spewed from the mouths of peers and superiors in a hospital setting, minority residents do not report for fear of retaliation⁴⁴. When race-based medicine rears its ugly head and is displayed in the classroom, minority students are met with silence from their peers and the faculty present. The silence is deafening. The muteness speaks volumes to how the medical world views people of color. These recurrent experiences cause the students to feel isolated and alone⁴³. Coupled together, the social distress that is generated from race-based medicine and the stress of the training may limit educational opportunities for minority residents and contribute to burnout⁴⁴.

Race-based medicine moves from the psyche of minority healthcare students/residents to impede their academic success and career advancement as well. Can a person turn on and off their implicit biases in given situations? Can a physician who has treated patients of color vastly different than their white patients (unbeknownst to the doctor) objectively evaluate a minority resident or student. The answer is no. This implicit (and even explicit) bias carries over to the “standardized” grading sheet, causing major discrepancies in how students of color perform during clerkship rotations⁴⁵. These

rotations represent 50% of the students' grade for ranking, residency selection, gaining membership with the highly prestigious Alpha Omega Alpha Honor Medical Society, and career advancement⁴⁶. Many minority students are not given AOA and therefore can have a more difficult time matching into highly competitive specialties^{46,47} or even programs that students are excited for. In addition, because race-based medicine is so pervasive within hospitals, students of color may need to spend time contextualizing and processing the effects of race-based medicine that causes them to feel othered or excluded^{43,45}. The time that these students take to process their daily traumatizing events, is time that their white counterparts can spend on studying, engaging in research opportunities, or simply relaxing to unwind. Students of color do not get this luxury. Of course, this is not to say that white students don't have their own trials and tribulations, or that students of color cannot spend copious amounts of time studying or doing research. This argument is simply to illustrate the additional struggle that many students of color face. We, as people, may all be running the same race, but many minority groups have fifty-pound chains tied to our ankles while others have little to no weight to carry. Running is not impossible, it's just more difficult.

Race-Based Medicine and How This Interacts Within Medical School Education

Race-based medicine permeates classroom lectures and all levels of medical examinations in one's medical training. Medical vignettes are another tool used to teach medical students and residents. These cases are "classic" scenarios that are utilized in examinations and in small group collaborations. Yet, these "classic cases" fall victim to

race-based medicine. There is a trend: when the patient is white, no description of race/ethnicity is used. Yet, when the patient is non-white, the race or ethnicity is listed and used as central aspect for determining the disease of the patient. By not stating the race or ethnicity in majority of the cases, medical schools emphasize the notion that certain diseases are race specific and reinforces the normalcy of whiteness and racial stereotypes⁴⁸. The standardized United States Medical Licensing Examination (USMLE) is no exception as well. An analytical study was performed to determine the number of cases and the extent that race was mentioned in the USMLE examinations. The results showed that of the 2,011 questions taken, there were 474 mentions of race/ethnicity. Of the 474, 50% of these questions used race as central to the question focused on African Americans. These questions on the USMLE only promote the idea that diseases are race specific and emphasize pattern recognition; any mention of an African American patient causes the student to think *exclusively* of sickle cell, diabetes, fibroses, or thrombolysis. Absolutely no thought of cystic fibrosis is considered for an African American patient in these vignettes because according to the underlying message of medical institutions, cystic fibrosis is a “white-only” disease. The narrow-minded thinking that is a consequence of race-based medicine can lead to misdiagnosis and, in extreme cases, even death. Race and ethnicity should only be used if context is provided, and not as a proxy for genetics, diseases, behavior, or social class^{33,49}

Race-Based Medicine Exacerbates Health Disparities

Race-based medicine is dangerous. The belief will further exacerbate health disparities, by promoting the notion that poor health in minority populations is caused by

genetic differences². Dr. Charles Rotimi, investigator for the National Institution of Health's Inherited Disease Research Branch, stated that, "...It is not plausible that a group of people to be at highest risk for so many common disease (hypertension, diabetes, cancers, maternal and infant mortality, and asthma) that they are just acquiring these natural selections³. Race is not a biological category based on innate differences that produce unequal health outcomes. Rather it is the social category and hierarchy of these groups of people that reflect the impact of the unequal social experiences of health³³. The racial difference that may be present in large datasets often reflects the effects of racism – the experience of being a minority in America, rather than something innate about being a person of color^{5,10}. This hyper focus on looking for innate racial difference, rather than social determinants of health, has led to poor health outcomes for communities of color. This misdirection will create a distortion and a misunderstanding of the relationship between genetics, drugs, and race, widening the gap that causes health disparities among black and brown populations³. Social determinants of health will highly influence and compromise all fields of research. The World Health Organization (WHO) estimates that social conditions affect 35-50% of health outcomes⁵⁰. Without proper consideration and accommodation of socioeconomic status, social needs, behavioral, and biological aspects of a population, the results that come from the research will always be biased and flawed. As a result, past, present, and future research findings will present health disparities as if they are the result of innate genetic differences rather than social inequality³. Rather than nature vs. nurture, there needs to be more focus on nurture affects and influences nature. This disconnect allows researchers and healthcare professionals to ignore their own bias and complicity in healthcare inequalities and blame the circumstances on the individual –

completely disregarding the puppet strings of structural racism – all the while giving power to the notion that black and brown people are biologically inferior to white people.

CHAPTER 3: STRATEGIES AND METHODS TO MITIGATE THE EFFECTS OF RACE-BASED MEDICINE

Acknowledging Bias

All is not lost when attempting to combat race-based medicine. The first step – and potentially the hardest – is acknowledging and recognizing your own biases and the ways they manifest. The next step is discovering strategies to mitigate the effects. Evidence has shown that racial bias causes disparate health outcomes, so racism should be included in medical education curriculum^{51,52} to reduce biases⁵³. As result, not only should the students become educated and well versed in anti-racist and anti-bias education and strategies to intervene, the staff and faculty within the medical school and hospital need the education as well. One study had a training module to tackle racism in medical education because racism is a driver of racial and ethnic minorities to be disproportionately affected by diseases. The results showcased that between the pre survey and post survey, a significant change in attitude and knowledge regarding issues of racism and in participants' personal commitment to address them. The findings also suggested this workshop improved confidence in teaching learners to reduce racism in patient care⁵³. However, there is a question of whether these attitudes would be the same 6 months after the training occurred? 1 year? There needs to be more than a one-time module. This module, or something similar, can be implemented as a part of the onboarding process for new hires with other educational sessions throughout the year that can expand upon the initial training. For staff and faculty, their silence when a racist or biased action/statement has occurred may be seen as a quiet endorsement of the bias

expressed in the report and its conclusions⁶. The change needs to be simultaneously from the bottom-up and top-down if everyone is supposed to feel safe and included. Like how the students have an adjunctive course to instill knowledge and education about health disparities and the history of racism in this country, staff and faculty should do the same. These educational sessions – rather than being called “trainings” because there is the assumption that once the training is completed there is nothing more to learn – would be spread out throughout the academic year. Coupled with these educational sessions, expectations would be made that there is a no tolerance policy for any racist and biased action, ensuring that those who apply and work at the institutions understand how serious the institutions is about making their atmosphere anti-racist, inclusive, and anti-biased.

Acknowledging, Recognizing, and Mitigating Bias Through an Adjunctive Course

Some medical institutions have noticed the need to have something more robust, substantial, and longitudinal for the students so that when they get to the clerkship years, they will not have the anti-racist and anti-bias concepts striped away in the hospital. The change needs to be ingrained and take root so the students can continue to spread the knowledge and lead by example. In accordance with methods to acknowledge, recognize, and mitigate your bias, The University of Chicago Pritzker School of Medicine has provided an adjunctive course for students and faculty to do just that. The University of Chicago has a course spanning their pre clerkship years three times a week titled, *Health Disparities: Equity and Advocacy*. This supplementary and mandatory course is run alongside the medical and doctoring curriculum. In this program, the learning objectives

are to understand how civil discourse in social justice is intertwined with medicine and the hospital system. The topics covered included: Engineering solutions to injustice with the assets of our communities, privilege, equity and advocacy, concepts of advocacy, disparities in the various minority and marginalized populations, the importance of language, the impact of social determinants of health, and the importance of trauma informed care. The progression of this curriculum begins by getting the students familiar with the terminology and history of how social factors have affected healthcare and health outcomes. The following sessions after the grounding lesson further detail and illustrate the effects of oppression and marginalization on various groups. The last aspect of the course is to enable students to become advocates in their own community and empower them with the tools and knowledge to do so. The courses are a mix of lectures, small group breakout sessions, and panels with community members to get their lived experience. In addition, the faculty who are tasked with teaching these sessions are experts in their fields with an enormous amount of research and skill on their subject matter. Jacobs School of Medicine and Biomedical Sciences at The University of Buffalo is also undergoing similar changes⁵⁴. They have adopted anti-racism as their core principle of their curriculum. Some of the recommendations include: providing racial and socioeconomic context behind longstanding health issues in African American communities, directly acknowledging the effects of systemic racism and the threat of police violence on the physical health of people of color, giving instruction in the history of anti-Blackness, discrimination against LGBTQ+ people and other marginalized communities, and how these issues have affected medicine and how it's taught, and providing anti-racism training for professors and lecturers⁵⁴.

Thorough Review of Pre-Clerkship Curriculum

Another avenue to explore to reduce the adverse effects of racism and race-based medicine in academic and community institutions is a thorough review of pre-clerkship and clerkship curriculum. Race based medicine is thoroughly and almost seamlessly woven into the pre-clerkship years. As previously stated, race is used as a risk factor for various diseases and context is never explained. Dermatological findings are mostly illustrated on white skin only. Stereotypes on race are reinforced. To initially combat this, there should be a body of passionate and motivated students and faculty members to review the pre clerkship curriculum: flag concepts, slides, and pictures that steer the institution away from inclusivity, anti-racism, and anti-bias. This task force would be knowledgeable about the hidden curriculum that is right behind medical education as well as possess the foresight to be introspective and have experience with combating various forms of racism. The hidden curriculum is considered as unintended learning experiences in medical education⁵⁵. This may include values, norms, beliefs, skills, and knowledge which could potentially influence learning outcomes⁵⁵. In medical education, the hidden curriculum may consist of unintended messages communicated in lectures and other formal teaching; interpersonal interactions between faculty and students (both in clinical settings and in more informal aspects of classroom interactions); and the larger culture and structure of the medical establishment⁴⁸. The taskforce would also have a system and structure in which they identify content that needs to be reviewed, find evidence (peer reviewed and or lived experience) to support their claim, and present their findings to the institution's curriculum committee. Once reported, follow-up from deans of education,

block directors, and faculty is needed to know whether the changes were accepted and implemented or denied and reasons why. The Mayo Clinic College of Medicine and Science has done just that. For this to be fully functioning and effective, support from the top-down is an absolute necessity. There needs to be a clear order for how each claim will be addressed and processed and what are the consequences if no change is made. While this task force is reviewing curriculum. Faculty, staff, and students (within and outside of this taskforce) are becoming proficient in anti-racist and anti-bias practices. The goal is to eventually have the need for the taskforce to be disbanded because the faculty and staff involved in creating content would be versed well enough to spot their own biases and mistakes. This thorough curriculum review is currently underway at The Lewis Katz School of Medicine – adopted from the Mayo clinic.

Incentivizing Anti-Racism and Anti-Bias Efforts Among Faculty and Staff

In addition, there should be incentives for faculty (pre-clerkship and clerkship) to engage and continue diversity equity and inclusion efforts. These actions can include but not limited to teaching anti-racist and anti-bias classes, mentoring Underrepresented in medicine (URiM), participating in disparities research, or hiring people of color as research assistants, fostering and inclusive atmosphere at work. The Association of American Medical Colleges (AAMC) defines URiM as “racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population.” URiM include individuals from African American, Hispanic/Latino, and Native American racial and ethnic groups⁵⁶. These actions would be evaluated to

allow faculty and staff to get promotions or maintain professorship. In addition, recognizing and rewarding those who have already been doing the work before these changes came about – whether that's in the form of bonuses or raises. Examples of positive reinforcement (both intrinsically and extrinsically) have been positively linked with the performance of employees. Positive reinforcement is highly effective in strengthening and increasing behaviors⁵⁷. This will build a community of anti-racism and bias within the institution itself and have the employees be imbued with the drive to continue the practice among each other.

Anti-Racism and Bias in Clinical Settings

Mitigation of race-based medicine should not only start in the classroom, but also in clinical rotations as well. The first method would be an audit of an institution's third year rotation evaluations. Third year grades (combination of clinical evaluations from physicians and residents and shelf exams - standardized examination at the end of every rotation) are a highly influential aspect of the ranking system and thus AOA nominations. The clinical evaluation comprises 75% of the overall clinical grade, while the shelf exam is only worth 25% of the total score. Studies have shown that students of color often get lower clinical evaluations than their white counterparts^{45,46} which has the high potential to negatively affect their academic success and decrease opportunities for matching into competitive specialties. There should be a review of the types of evaluations each student is getting and what rotation and clinical site have the most bias laced throughout their evaluations. Once that is acquired, investigating who is the biggest/most common

perpetrator of these types of letters is next. There should be a discussion to understand why the person is grading how they grade; then they should be shown their analytics about the way they graded various people. The hope is that when confronted with this information, the faculty will desire to take actionable steps to better themselves and the learning environment that they have created. However, regardless of the feelings of the faculty or staff, expectations, and strategies to achieve those exceptions should be set in place, so if the reaction of the faculty or staff is beyond ideal, as a part of their contract they still need to work towards diversity, equity, inclusion, and anti-racism.

Another method for mitigating or removing race-based medicine from clinical settings is to have journal club that discuss social issues and its impact on medical outcomes, systems, and policies in place in the institution to combat discrimination and keep the those who were adversely affected protected and safe, and grand rounds about diversity equity and inclusion. The more obvious way is to increase representation and retention of URiM in all the specialties and faculty/staff positions. However much more work is needed before this ever becomes a true reality.

For clinical settings, another course of action is removing race correction from risk score calculations and medical equations. According to a study performed by Moffett et. al, Removal led to an increase in the percentage of patients with any pulmonary defect from 59.5% to 81.7%⁸. This change led to a significant increase in the diagnosed prevalence and severity of pulmonary disease among Black patients⁸. With the removal of race from risk score calculations and medical equations many may feel like the data may be inaccurate or incomplete. In addition, one study showed a rather successful alternative. Researchers funded by the National Institutes of Health (NIH) focused on

using biomarkers because they are not affected by race or ancestry. The results illustrated that using the biomarker cystatin C – which is not affected by race or ancestry – as a race-independent replacement biomarker for serum creatinine provided accurate and unbiased results⁵⁸.

In accordance with removing race from clinical tools, the presidents of the American Society of Nephrology (ASN) and the National Kidney Foundation (NKF) have made a statement about eGFR in March 2020⁵⁹. groups' leaders asserted that race modifiers should not be included in equations used to estimate kidney function. The leaders also stated that current race-based equations should be replaced by a substitute that is accurate, representative, unbiased, and provides a standardized approach to diagnosing kidney diseases. In addition, these groups have assembled a task force to reassess the inclusion of race in diagnosing kidney diseases. A final report is in the process of being produced. The ASN and NKF commit to following up the reports of the task force with a multi-pronged approach, informing professionals and patients of these new recommendations, and how they may affect practice and treatment⁵⁹.

Racism in Medicine Conference to Connect and Share Ideas About Anti-Racism and Bias

Lastly, a racism in medicine conference should become a common occurrence within all the regions of the US. Take for example, the Racism in Medicine conference. Since 2015, medical students from Philadelphia and New Jersey have joined in a collaborative effort to host the Racism in Medicine Conference (RiMC) to change the current healthcare narrative and address the issues of racism and discrimination within

the medical field. Temple University is hosting this year's conference; however, they work with a coalition of students from CMSRU, Jefferson, Geisinger, Penn, PCOM, Drexel, and RowanSOM. The conference is a proudly student-run and donor-sponsored event. The RiMC is intersectional and action-oriented, focused on hosting sessions to create salient and realistic solutions to racial disparities in treatment, health outcomes, and insurance. The primary aim is to address the issues of racism and discrimination on a foundational and ideological level to improve our collective knowledge on the issues within the medical field to create actionable, salient, and realistic solutions. If these types of conference were able to occur at all academic institutions on both the hospital and medical school sides, an exchange of ideas and strategies will follow, allowing for the hope that anti-racism and anti-bias practices will become the norm at all medical institutions across the country.

CONCLUSION

Nevertheless, let us remember that medicine is composed of physicians and researchers who are all people. The notion that “insert system” cannot be racist but people can be is ludicrous. When these systems and institutions are composed of those who are implicitly and or explicitly racist/bias we get a racist and biased system. People can be flawed and biased, and they share the views that are present in society. Medicine and medical education are so intersected and connected with race, class, and gender that trying to create a dichotomy between the “medical realm” and the “outside world” is impossible and futile^{6,49}. Rather, there is a desperate need within the medical community and society to truly understand the barriers that prevent others from receiving adequate care and to create interventions to break down those barriers. Francis Collins, leader of the Human Genome Project, stated, “The only race we're talking about is the human race,” and as members of this race we need to expect and demand equality and equity for all of us. We as society need to come to an understanding that race is a social reality, yet the way we have utilized and weaponized this concept to structure and organize our society is very real³⁵. Race based medicine is scientifically flawed yet so politically and socially dangerous. We have seen the result. However, to be clear, physicians and other healthcare professionals should not ignore race. Race is complicated by social class, sex, and geographical context¹. Doing so would blind us to the ways in which race and racism structure our society and influence our actions and thoughts⁵. We need to be able to recognize our intersectionality and privileges and understand that how we move in the world may be different but coming together is the best option.

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