Race-based medicine in the point-of-care clinical resource UpToDate: A systematic content analysis

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Summary

Background Race-based practices in medical education and clinical care may exacerbate health inequities. Misguided use of race in popular point-of-care clinical decision-making tools like UpToDate® may promote harmful practices of race-based medicine. This article investigates the nature of mentions of Black/African American race in UpToDate®.

Methods We conducted a systematic content analysis of UpToDate® articles mentioning Black or African American race to assess for biological interpretations of racial categories. Following a simple text search for the terms "Black" and "African American" in UpToDate® on January 24 and March 19, 2020, respectively, removal of duplicates yielded an analytical sample of 208 documents. We adopted a deductive coding approach and systematically applied 16 *a priori* codes to all documents, refining the codebook to achieve a final inter-rater reliability of 0.91. We then developed these codes into two themes: (1) biologization of race and (2) racialized research and practice.

Findings Biologization of race occurred nearly universally across all documents (93.3%), with discussions of inherent physiological differences between racial groups and presentation of epidemiologic disparities without context emerging most frequently. Sixty-eight documents (32.7%) included codes related to racialized biomedical research and clinical practice, including references to racialized patterns of behavior and cultural practices, insufficient data on Black populations, research limiting study to a specific racial group, and race-based clinical practices guidelines.

Interpretation Our findings suggest that UpToDate® articles often inappropriately link Black race to genetics or clinical phenotype—without considering socio-structural variables or the health effects of structural racism—thus perpetuating a false narrative that race is inherently biological. UpToDate® articles may also promote unequal treatment by recommending race-based clinical practices. Such racial essentialism risks exacerbating racialized health inequities.

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Keywords: Racism; UptoDate; Clinical decision-making; Point-of-care; Black/African American

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Research in context

Evidence before this study

A search of PubMed for peer-reviewed articles relating to racialized populations—particularly mentions of Black or African American race—in point-of-care tools yielded 351 results between 1989 and 2022. Two studies focused on race/ethnicity in clinical education materials and only analyzed an evidence-based diagnostic resource (DynaMed). This content analysis identified persistent uses of race and ethnicity in relation to clinical diagnoses, despite unclear definitions for either term, and these associations were not accurately represented in citation trails.

Added value of this study

This is the first content analysis of mentions of Black or African American race in UpToDate, the most popular point-of-care clinical resource. Using a deductive coding scheme informed by critical race scholarship, this study assessed for evidence of race-based medicine, or treatment of race as an inherent, biological characteristic that shapes health risk. In this analysis, biologization of race occurred nearly universally across all UTD documents (93.3%), with discussions of inherent physiological differences between racial groups and presentation of epidemiologic disparities without context emerging most frequently. Sixty-eight documents (32.7%) included codes related to racialized biomedical research and clinical practice, including references to racialized patterns of behavior and cultural practices, insufficient data on Black populations, research limiting study to a specific racial group, and race-based clinical practices guidelines.

Implications of all the available evidence

Study findings suggest that UpToDate® articles often inappropriately link Black race to genetics or clinical phenotype—without considering socio-structural variables or the health effects of structural racism—thus perpetuating a false narrative that race is inherently biological. UpToDate® articles may also promote unequal treatment by recommending race-based clinical practices. Such racial essentialism risks exacerbating racialized health inequities.

Introduction

Racism, or the systematic oppression of Black, Indigenous, and other people of color based upon false ideas of intrinsic biological difference,[1] pervades multiple dimensions of medical research, education, and practice.[2–4] Biological, racial 'types' emerged during European colonization as a tool to divide and control populations worldwide.[2] Such embedded notions of biologized race pervade pre-clinical and clinical training,[4–6] medical licensing examinations,[7–9] and clinical guidelines.[2,3,10,11] Such racial essentialism may exacerbate racialized health inequities.[2] Race and ethnicity are sociopolitical identifiers constructed relative to a dominant group and often signify both political-economic stratification and cultural identity.[12] Despite the discrepancy between conventional biomedical treatment of race as a marker of underlying genetic or physiologic variation—and the reality of its political construction—race continues to emerge as a risk factor or indicator to direct clinical management in scholarly literature and society guidelines.[3,13]

Due to advancements in medical technology and increasing scope of practice, especially amid an aging population,[14] many clinicians rely on point-of-care references—such as UpToDate® or DynaMed®—to inform clinical care.[15] Use of UpToDate®, a clinical decision-making support tool with over 11,800 clinical topics peer-refereed by more than 7,300 authors and editors, has been shown to improve clinical outcomes,[16,17] increase provider efficiency,[15,18] and enhance medical education.[19] More than 2 million clinicians and other healthcare professionals in 190 countries rely on UpToDate® for routine clinical reference; In the United States, two-thirds of hospitals and health systems and 90% of teaching hospitals routinely use UpToDate®.[20] Given the near ubiquitous use of this medical resource among trainees and senior clinicians, we must have a clear understanding of how race is used in reference articles in order to ensure we do not exacerbate racial health inequities. Prior research suggests that mentions of race or ethnicity in DynaMed, another point-of-care clinical tool involve spurious associations with medical conditions that are not accurately represented in citation trails and may promote racial biases among clinicians.[21,22]

We conducted a systematic content analysis of UpToDate® articles mentioning Black or African American race to assess for biological interpretations of racial categories.

Methods

Data collection

We conducted a simple text search in UpToDate® for the terms "Black" and "African American," on January 24, 2020, and March 19, 2020, respectively. Our search retrieved 225 documents; after excluding duplicates, our final analytical sample included 208 documents (see Figure 1). We downloaded articles as PDFs and applied codes in Google Sheets.

Qualitative analysis

We conducted a directed content analysis to situate and structure our study within discourses of race-based medicine and critical race theory. We developed a preliminary set of 16 codes based on published literature

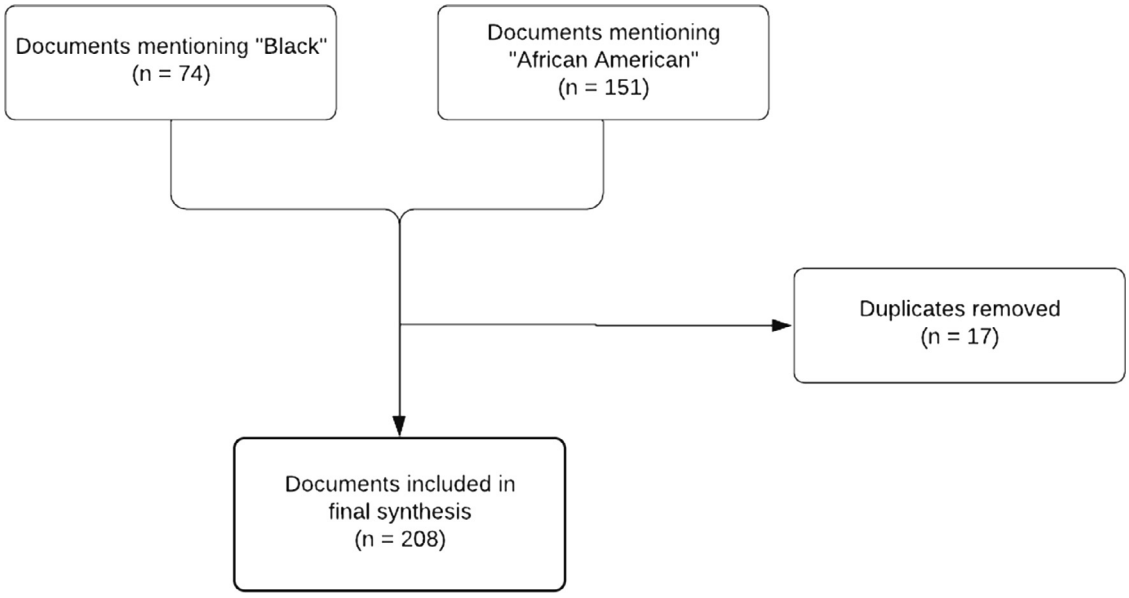

Figure 1. Flow diagram for data collection arriving at final sample of 208 documents.

on race in clinical care and research, including common ways in which race occurs, co-occurring terms (i.e., ethnicity, ancestry, genetics), and critiques about its misuse from scholars of race-based medicine.[1,23] We then completed a first read of a sample of documents to determine whether to add additional codes to the draft codebook. Following this initial review, we did not add any codes and elaborated upon the draft codebook (i.e., code, definition, inclusion criteria, exclusion criteria) prior to analysis of the entire dataset.[24] J.P.C., E.N.A., and M.V.P. systematically applied these codes to all 208 documents, adding just one code during analysis. Initial disagreement emerged from varying interpretations of codebook definitions and redundancy in the codebook. The team iteratively refined the codebook definitions through discussion until agreement between J.P.C. and E.N.A. reached >80% (κ = 0.91). As Black and Brown women representing various intersections of racial minoritization and Blackness, our perspectives empowered us to notice implicit allusions to race, ethnicity, or genetics where others might not, and to engage our experiential differences to enhance the replicability of the codebook. The final codebook contains 11 codes, which we categorized into two themes: (1) biologization of race, and (2) racialized research and practice (see Table 1). We present our thematic analyses below. We followed the Standards for Reporting Qualitative Research (http://www.equator-network.org/reporting-guidelines/srqr/).

Role of the funding source

The funding agencies had no role in the study design, data collection and analysis, preparation of the manuscript, data interpretation, or writing of the report, or decision to publish. Both JPC and ENA have directly accessed and verified the underlying data reported in the manuscript. All authors approved the manuscript for submission and take final responsibility for the decision to submit the manuscript for publication.

Results

Biologization of race

Biologization of race occurred nearly universally across all documents (93.3%). This theme encompasses references to inherent physiological differences between racial or ethnic groups, the presentation of health disparities absent any sociostructural—or hierarchical organization of status produced by mutually reinforcing inequitable institutions—context, the use of broad geographic (i.e., continental) ancestry as a risk factor for disease, and when members of an entire racial group are ascribed a particular allelic variation (see Table 1). This theme also includes the interchangeable use of geographic ancestry with race or ethnicity and when environmental factors, inequitable access to care, or racism are used to contextualize disparate health outcomes. Discussions of inherent physiological differences between races and the presentation of health disparities without context occurred most frequently, in more than 4 out of every 5 documents. For example, in the "Pathogenesis" section of an article on bacterial vaginosis, "ethnicity" was said to "impact the vaginal microbial community." Additionally, an article on the importance of parental education and support in breastfeeding listed "Non-hispanic black" alongside "cigarette smoking," "delivery of a low birth weight infant," and "participation in WIC" as maternal characteristics independently associated with a "failure to initiate breastfeeding." Many articles

Code	Definition	Prevalence (*n*, %)	Representative quotes
Biologization of race			
ancestry as code for race/ethnicity	This **code** is used when ancestry (i.e., geographic heritage) is conflated with race or ethnicity (e.g., African American, Hispanic).	5 (2.4)	• "The Study of Environment, Lifestyle, and Fibroids (SELF) trial is specifically studying risk factors such as vitamin D deficiency and African ancestry among African American women." • "BEN is most common in people of African descent, West Indians, Sephardic Jews, Yemenites, Greeks, and Arabs, but it may be seen in individuals of any ancestry."
ancestry + disease condition	This **code** is used when ancestry (i.e., geographic heritage) is considered to be a risk factor for a disease condition, such as sickle cell disease.	15 (7.2)	• "Ethnicity may modify C-peptide levels in children with new onset T1DM, with Hispanic (but not African American children) demonstrating higher C-peptide levels than non-Hispanic white children, after controlling for confounders." • "A 45-year-old black man is noted to have a blood pressure of 150/100. He has been hypertensive for at least 10 years. What abnormality is shown on the electrocardiogram?"
biologization of race / decontextualized epidemiology	This **code** is used when biological processes (e.g., physiological, genetic) are suggested to be inherently distinct between members of different racial group OR when race is isolated as a risk factor for a disease condition OR When statistics or clinical data regarding racial disparities in disease conditions or treatment outcomes are presented *in the absence of* discussion of structural determinants relating to racial inequality.	176 (84.6)	• "Ethnicity and age are additional factors that appear to impact the vaginal microbial community." • "However, it should be recognized that the Duffy null phenotype is not specific for BEN, as it is present in the large majority of Blacks, yet most do not have BEN." • "Failure to initiate breastfeeding is associated with the following maternal characteristics: Non-Hispanic black."
genetics + race/ethnicity	This **code** is used when members of particular racial or ethnic groups are described as having allele frequencies or single nucleotide polymorphisms (SNPs) relative to members of other racial or ethnic groups.	46 (22.1)	• "Although low birth weight and bias in diagnosis based upon the patient's race may be involved, the recognition of an association between two independent sequence variants in the apolipoprotein 1 (APOL1) gene on chromosome 22 and renal disease in African Americans, including focal segmental glomerular sclerosis and hypertension-related ESRD, provides a much more likely pathophysiologic mechanism and suggests that hypertensive nephrosclerosis in black and white patients may be distinct diseases." • "Why black patients preferentially develop the class IV sclerosing lesion is unclear, but it may be related to genetic factors such as polymorphisms in APOL-1"
social/structural context	This **code** is used when discussion regarding racism, structural violence, social inequality, social determinants of health, environmental factors, etc. are provided to contextualize racial disparities.	36 (17.3)	• "Black men were approximately 50 percent less likely to be referred to a medical oncologist and to receive chemotherapy, but these differences were also not statistically significant." • "In this regard, an analysis showed that the higher risk of death in African-American (asthma) patients compared to white patients is not explained by race differences in deaths occurring in hospital and are therefore likely due to differences that precede hospitalization, such as differences in management at home or during transportation to the emergency department."

Table 1 *(Continued)*

Code	Definition	Prevalence (*n*, %)	Representative quotes
Racialized research and practice			
behavioral/cultural	This **code** is used when risk factors are described in terms of individual behaviors (e.g., diet, lifestyle), culture, beliefs, or values or treatment plans aimed to modify unhealthful individual behaviors are recommended to manage disease conditions in members of particular racial/ethnic groups.	17 (8.2)	• "black patients more frequently ingest a high-sodium/low-potassium diet" • "On average, African-American parents believed in starting toilet training at 18 months of age, in comparison with 25 months of age for Caucasian parents"
Black populations understudied	This **code** is used when a lack of research studying a specific disease condition or clinical phenomenon in Black or African American patients is described.	16 (7.7)	• "nonpharmacologic interventions to lower blood pressure have not been well studied in black populations" • "Most studies examining smoking as a risk factor for prostate cancer have focused on white populations."
race-specific research	This **code** is used when studies are described that investigated disease conditions in a particular racial group, with the presumption of a biological basis of the disease in members of that racial group.	25 (12.0)	• "One study randomized 46 black men with severe untreated hypertension to antihypertensive therapy alone or with regular exercise. . ." • "A randomized trial assigned 742 patients with moderate-to-severe asthma who were of African American descent to budesonide-formoterol (320 microg-9microg twice daily) or budesonide (320 microg twice daily) for 52 weeks."
race-specific treatment	This **code** is used when recommendations to treat patients differently according to their race are provided OR when disparities in applications of treatments are discussed OR, by contrast, when it is explicitly stated that treatment should not be influenced by race.	39 (18.8)	• "Suspicion for a diagnosis of central centrifugal cicatricial alopecia (CCCA) should arise in a patient with clinical findings of a centrifugally expanding area of alopecia on the central scalp, especially when the patient is a woman of African descent." • "If monotherapy is used for black hypertensive patients, we suggest a dihydropyridine calcium channel blocker, although a thiazide diuretic such as chlorthalidone is a reasonable alternative"
skin pigment[a]	This **code** is used when race is more specifically discussed in terms of variation in skin pigmentation.	2 (1.0)	• "Lesions can also be skin colored or pigmented, particularly in individuals with darker skin types." • "Other potential explanations for apparent differences in outcome according to race include. . . difficulty in interpreting skin findings (eg, cutaneous GVHD) in patients with dark skin complexion."

***Table 1*: Thematic codes, definitions, prevalence, and representative quotes.**
[a] Code developed during analysis.

used single nucleotide polymorphisms to explain disease occurrence across an entire racial group. *APOL-1* emerged in multiple articles to explain kidney disease rates among Black people across heterogenous renal pathologies. Fewer than 1 in 5 articles (17.3%) provided structural context in their discussion of disparate disease rates. For example, an article on breast cancer in men acknowledged that Black men were less likely to be referred to a medical oncologist when discussing the tendency of Black men to present with later stage disease. Discussions of ancestry either as code for race or as a risk factor for disease occurred least frequently.

Racialized research and practice

Sixty-eight documents (32.7%) included codes related to racialized biomedical research and clinical practice (see Figure 2). These include references to racialized patterns of behavior and cultural practices, insufficient data on Black populations, research limiting study to a specific racial group, racialized clinical practices and recommendations, and variations in skin pigmentation. Discussions of racialized treatment occurred most often, in nearly twenty percent of documents. These include descriptions of varied treatment modalities and guidelines across racial groups. For instance, an article on hypertensive complications in Black patients reviewed racial differences in target blood pressure for patients with essential hypertension based on a consensus statement by the International Society on Hypertension in Blacks. Additional examples address the inclusion of race in risk assessments, such as for treatment resistant hypertension, prostate cancer, stroke, central centrifugal alopecia, precocious puberty,

Figure 2. Waffle plot demonstrating the prevalence of themes across documents. Biologization of race occurred most commonly, followed by both biologization of race and racialized research and practice, then racialized research and practice alone. Red indicates biologitization of race, blue indicates racialized research and practice, an yellow indicates both.

glucose-6-phosphate dehydrogenase deficiency, sickle cell disorders, pediatric type 2 diabetes, kidney failure, kidney donation, iron-deficiency anemia during pregnancy, and colorectal cancer. Fewer documents addressed research findings with racialized study populations and behavioral or cultural attributions to racial health inequities. Finally, "skin pigment," which the coders developed *a posteriori*, discussed clinical guidance relating to skin tone, pigment, or complexion, including for squamous cell carcinoma and cutaneous graft-versus-host disease.

Discussion

Our analysis revealed that biologized conceptions of race greatly outnumbered sociostructural articulations of the relationship between race and disease in UpToDate®. Less than 20% of articles included discussions of the relationship between ethnoracial disease disparities and inequitable access to care, environmental factors, or racism. Instead, most entries defaulted to genetics or inherent physiological difference as explanations for disparate disease outcomes. One of the most striking features of the articles surveyed was their inclusion of obvious contradictions or uncertainty. Many articles conceded uncertainty about why some aspect of a disease appears to differ between racial or ethnic groups. What often followed, though, was the proposal of a speculative, race-based genetic hypothesis for disparate disease rates without the concominant articulation of any specific or biologically plausible causal pathway. Another common trope was discussion of epidemiologic risk in terms of biologically constructed racial difference alongside the presentation of data that demonstrated screening for a highly specific biomarker predicted disease with higher fidelity than did ethnoracial proxies for genetic difference.

Very few articles (1.0%) mentioned Black or African American race when presenting diagnostic or management guidelines for patients of different skin phenotypes. Since skin pigmentation varies widely among members of a racial group, race or ethnicity should not substitute more measurable assessments of skin tone or photosensitivity that impact clinical care. Medical education should further elaborate materials and instruction on skin of color to improve diagnostic accuracy and ensure timeliness of care.[9,25]

Multiple studies have demonstrated that structural racism underlies differential health access and treatment in the United States, explaining the vast majority of disparate health outcomes among ethnoracial groups.[26–28] Systematic underfunding of preventative health services in health departments serving largely minoritized communities, limited access to affordable care in state governments that refuse to expand Medicaid, limitations in coverage on the basis of documentation even within expansion states, and disproportionate incarceration and detention of Black, Indigenous, and other people of color are just a few of the ways that structural racism precedes health inequities.[29] Despite the political-economic character of race and its poor correspondence with human genetic diversity, our analysis shows that purportedly evidence-based clinical decision-making tools continue to treat race as a biological signifier. The continued salience of genetic explanations for ethnoracial disease difference in biomedicine has implications for health equity.

Our analysis identifies differences in clinical management and reporting of outcomes by patient race. Racially-tailored care may exacerbate inequities by inappropriately narrowing differential diagnoses, restricting treatment options for racialized patients, and defaulting to White bodies as normative while pathologizing Black and Brown bodies.[23,30] Such unequal treatment can contribute to medical error, hinder receipt of specialized care and disability benefits, reinforce hamful, biologized notions of race, and direct attention away from policy imperatives to reduce the health impacts of structural

racism.[2] For instance, recent analyses found that race-based algorithms that assign higher kidney function levels to Black patients, solely based on race may contribute to disparities in kidney care, including inadequate health insurance benefits and delayed placement on transplant waiting lists.[31–33] Other studies have demonstrated that racialized guidelines may contribute to unnecessary testing, clinician bias, medical waste, and inappropriate interventions.[34–36] These algorithms disregard the health consequences of structural racism, including reduced healthcare access and physiologic effects of chronic stress.[37–39] By contrast, revised equations that omit race are demonstrably more accurate assessments of kidney function.[40]

Multiple clinical societies have abandoned the use of race in risk estimates and practice guidelines, including recent removals of race from the vaginal birth after Cesarean (VBAC) outcome calculator and recommendations for treatment of pediatric urinary tract infections.[41,42] However, current assessments of cardiovascular disease risk, lung function, outcomes of kidney donation, hypertension management, and pharmacologic dosing continue to include imprecise racial or ethnic modifiers. Persistence of race-based medicine in these domains—as well as in point-of-care clinical guides like UpToDate®—risks harm to patients.

Published guidelines exist for the thoughtful use of race in medical research and practice that emphasize the conceptualization and contextualization of race as a signifier of social and political hierarchies that influence health and healthcare.[43,44] Point-of-care resources can reference these guidelines to facilitate editorial review of articles that mention race. Additionally, in the same way that editors might seek out nephrologists for an article on the renal manifestations of amyloidosis, point-of-care resources should seek out physician-scientists, social scientists, and medical humanists that study the intersection of racism and medicine to ensure accurate references to race.

Our results should be interpreted in light of multiple limitations. First, UpToDate® articles are updated often and our analysis may not reflect recent revisions, including following the widespread reckoning of racism in medicine following anti-racist uprisings responding to the murders of George Floyd, Breonna Taylor, Ahmaud Arbery, Tony McDade, and others in 2020. Scholarly attention to racism demonstrates cyclical patterns, responding to flashes of racial violence as during the U. S. Civl Rights Movement, the failure to convict the police involved in brutalizing Rodney King, and post-9/11 anti-Arab racism. Since 2020, multiple academic and popular media outlets have promoted harmful notions of biologized race[45–47]—or denial of structural racism and White supremacy[48]—which suggests the need for ongoing evaluation and intervention. This research further provides a comparison point for any follow-up studies that seek to assess the efficacy of purported antiracism interventions in medicine. Second, we focused on one racial group—Black or African Americans—and our findings may not address the ways in which other racial and ethnic groups experience racialization in clinical practice guidelines. Many instances of race-based medicine and scientific racism center on presumed differences between Black and White bodies,[2,10,13] and we believe this research serves as an important foundation for further inquiries into racism embedded in clinical guidelines.

Future directions include analysis concerning other racial and ethnic groups, examination of other clinical reference tools such as DynaMed® and OnlineMedEd, and assessments of the efficacy of interventions to abandon race-based clinical practice guidelines.Ultimately, we advocate for greater attention to the impacts of structural racism on racialized health inequities—and their attendant policy remedies—rather than perpetuating harms of race-based medicine or engaging in superficial virtue signaling with regarding antiracism in medicine.

Contributors

J.P.C. conceptualized the study, analyzed and interpreted study data, and wrote the first draft of the manuscript. E.N.A. analyzed and interpreted study data and wrote the first draft of the manuscript. M.V.P. conceptualized the study and critically the revised manuscript. R. R.H. critically revised the manuscript and provided overall project supervision. Both J.P.C. and E.N.A. have directly accessed and verified the underlying data reported in the manuscript.

Data sharing statement

UpToDate® is available through a user license; however, the articles included in this analysis may have been updated. The PDFs used in this analysis may be obtained by contacting the corresponding author.

Declaration of interests

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