Defense Health Board Report

Eliminating Racial and Ethnic Health Disparities in the Military Health System

November 29, 2023

President's Memo

DEFENSE HEALTH BOARD
7700 ARLINGTON BOULEVARD, SUITE 5101
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MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE FOR HEALTH AFFAIRS

SUBJECT: Eliminating Racial and Ethnic Health Disparities in the Military Health System

The Defense Health Board (DHB) is pleased to submit its report on Eliminating Racial and Ethnic Health Disparities in the Military Health System. This review summarizes the DHB's findings and presents recommendations to address health disparities within the Military Health System (MHS).

On May 12, 2022, the Assistant Secretary of Defense for Health Affairs (ASD(HA)) directed the DHB, through its Health Systems Subcommittee, to provide recommendations to address racial and ethnic health disparities in the MHS. The Health Systems Subcommittee reviewed the current state of MHS racial and ethnic health disparities in peer-reviewed scientific literature, along with relevant policies and practices within the DoD. The Subcommittee received briefings from, and consulted with, experts from both government and civilian institutions.

The Subcommittee presented its report to the DHB on November 29, 2023. Many of the DHB's findings and recommendations focus on supporting efforts to identify and reduce racial and ethnic health outcome disparities. This focus mirrors concerns at the national and international levels. The DHB's recommendations aim to leverage the MHS' unique structure to decrease disparities through comprehensive data collection and analysis, local leadership, and efforts to promote interventions that target the non-medical contributors to health. This work requires Department-level leadership to ensure disparity mitigation efforts are evidence-based, measurable, and sustained over time. Following two rounds of public deliberation on the findings and recommendations, the DHB approved the report.

On behalf of the Board, I appreciate the opportunity to provide this independent review to the Department. I hope that it drives lasting positive change for MHS beneficiaries.

Karen Guice, M.D., M.P.P.
President, Defense Health Board

Attachment:
As stated

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Executive Summary

The Military Health System (MHS) health care benefit was designed to produce a uniform level of optimized health and is an essential contributor to active duty force readiness. The MHS serves a diverse population: nearly 25 percent of the total DoD military force self-identifies as a racial minority, three percent as Multiracial, and 18 percent with Hispanic ethnicity.[1] Health equity has become a high priority in recent years across the federal government.[2-4] In the DoD, racial and ethnic health disparities are seen as a potential threat to readiness.[5]

In May 2022, the Acting Assistant Secretary of Defense for Health Affairs (ASD(HA)) tasked the Defense Health Board (DHB) to provide recommendations to eliminate racial and ethnic health disparities in the MHS. The DHB's Health Systems Subcommittee investigated racial and ethnic health disparities in the MHS during 2022 and 2023. The Subcommittee conducted a literature review of MHS health disparities; received briefings from Defense Health Agency (DHA) leadership, military and civilian health care providers, and researchers; participated in discussions with representatives of civilian health systems with experience identifying and addressing racial and ethnic health disparities; and made a site visit to Naval Medical Center San Diego. During this visit, the Subcommittee met with a dedicated group of health care providers who have led many initiatives to document and address racial and ethnic health disparities.

Conversations with other military personnel revealed a belief that racial and ethnic health disparities do not exist in the universal access MHS. However, studies document that health disparities exist within the MHS despite presumed equality in access to care. In particular, the DHB found statistically significant disparities in maternal health outcomes by race that warrant immediate attention and action. Unfortunately, fundamental problems with available race and ethnicity data prevent a thorough identification and analysis of potential disparities in other clinical domains.

There are many intersecting root causes of poor health outcomes. These include factors less commonly considered within the clinical encounter, such as Social Determinants of Health and Health-Related Social Needs. A systematic, proactive, and accountable commitment to address medical and non-medical root causes is essential to eliminating health disparities and ensuring health equity in the MHS. The DHB identified five action streams to guide this work:

Leadership, Commitment, and Culture

Driving culture change requires dedicated leaders who communicate their vision and strategy to the organization. The Under Secretary of Defense for Personnel and Readiness (USD(P&R)) is optimally situated to oversee the mitigation of non-medical

and medical causes of racial and ethnic health disparities. USD(P&R) should convene and chair a standing Health Equity Committee of senior medical and health leaders plus those responsible for Social Determinants of Health (SDOH) to plan, direct, and sustain this work.

Research Activity

The research available on racial and ethnic health disparities is limited by current data. Most studies of MHS racial and ethnic health disparities have been performed by individuals conducting one-time data pulls and analyses. Such ad hoc and inadequately supported research is unlikely to provide definitive evidence on existing racial and ethnic health disparities.

Data and Data Systems

The DHB identified fundamental problems with currently available race and ethnicity data – problems which prevent a thorough analysis of disparities, development of data-backed strategies to promote better health outcomes, and opportunities to leverage the existing organizational structure to identify, eliminate, and prevent health disparities. The MHS needs a standardized approach to data collection that meets federal standards. Service members and their beneficiaries should have easy access and mechanisms to verify, update, or self-report their own identity data.

Algorithms

Studies of the inappropriate use of race in clinical decision algorithms and medical equipment design have revealed significant errors that contribute to disparate health outcomes. The blindingly fast yet mostly invisible processes of Artificial Intelligence magnify exponentially the risk of errors from invalid assumptions buried within their algorithms. Health care providers, researchers, and policy makers must understand the proper use – and risks of misuse – of race and ethnicity data in medical decision-making tools and device design.

Workforce and Training

People ultimately receive health care from other people. Patients deserve health care providers with cultural competence and humility to provide care attuned to the needs of individuals and populations. The MHS can promote better outcomes and reduced health disparities through efforts to achieve a healthcare workforce more fully representative of the racial, ethnic, and cultural background of its beneficiaries.

These action streams are woven throughout the 10 findings and 32 recommendations that follow. The findings and recommendations provide a roadmap for the reduction of racial and ethnic health disparities in the MHS. This work is imperative; it paves the way to health equity in a system uniquely structured to achieve it.

Findings and Recommendations

Finding 1: When Federal agencies collect data on race and ethnicity, they must comply with the Office of Management and Budget's (OMB) Statistical Policy Directive No. 15 (SDP 15) minimum standards. Within the DoD, race and ethnicity data for Service members are captured in Service-specific personnel systems and transferred to the DoD DEERS data system. DEERS provides data to other databases, including many in the MHS. While DEERS does contain OMB SPD 15 minimal standards, DEERS has been providing reformatted race and ethnicity data to the MHS that is not compliant with OMB SPD 15.

Furthermore, there is no requirement for DEERS to collect race and ethnicity data for civilian dependents. OMB SPD 15 states that self-report is the best method of collecting such data. Similarly, there is no requirement for DEERS to allow viewing, self-entry, or self-correction of race and ethnicity within its data system, unlike Service personnel systems which do allow Service members to view and correct these data. The end result is insufficient validated data to ensure equity of care across the MHS for all beneficiaries.

Recommendation 1. A: The DoD should ensure that self-reported race and ethnicity data is collected and in compliance with the current OMB SPD 15 minimal Standards for the Classification of Federal Data on Race and Ethnicity across all DoD databases that contain, use or report health information. Furthermore, non-Service member beneficiaries, such as civilian dependents and retirees, should be able to conveniently input, view and self-correct their race and ethnicity information within DEERS, and all beneficiaries must be able to do so within MHS GENESIS. DoD must ensure that beneficiaries are provided with the relevant information and directions to do so.

Recommendation 1. B: DoD should modify the current OMB SPD 15 standards for the following circumstances:

- DEERS should use the term "Multiracial" and not the term "Other" when reporting collapsed race information for those who selected more than one race.

- Civilian beneficiaries should be provided a new category of "Decline to State" when selecting their race and ethnicity.

Recommendation 1. C: DoD should ensure that TRICARE purchased care data can be collected and analyzed with a race and ethnicity stratification.

Recommendation 1. D: DoD should ensure MTF patient check-in workflow requires confirmation of patients' current race and ethnicity categorization in MHS GENESIS and includes a mechanism for helping patients update their data when needed not less than annually.

Recommendation 1. E: Ensure that DEERS, DMDC, and MHS GENESIS are harmonized with regard to identity and demographic data.

Finding 2: Most of the literature on MHS health equity/disparities has been created by ad hoc, individual-initiated, one-time data analyses, or local Quality Improvement projects. These are neither cumulative nor systematic efforts. The MHS' and DHA's centralized outcomes tracking – internally and through external reporting in national registries – does not consistently include racial and ethnic stratification or make such analyses easy to access.

The Subcommittee observed high variation in outcomes across MHS sites including mental health, maternal health, and surgical outcomes. Such high variation may have a disproportionate impact on racial and ethnic minority groups, particularly those also experiencing adverse Social Determinants of Health. Without racial and ethnic stratification of patient outcomes, the Subcommittee could not identify sites whose disparities were attributable to race and ethnicity. These data limitations prevented the Subcommittee from making more targeted recommendations.

Recommendation 2. A: DHA should include racial and ethnic stratification of results in all internal and applicable external patient care reporting (e.g., Joint Commission, National Committee for Quality Assurance (NCQA), Healthcare Effectiveness Data and Information Set (HEDIS®), registry reports, Patient-Reported Outcome Measures). The DHA should ensure its contracts with external reporting entities include available racial and ethnic stratification and analysis with benchmarking, at both the MTF and systemwide levels. The DHA should analyze its progress in reducing identified disparities.

Recommendation 2. B: DHA should identify and designate a centralized group of epidemiologists, statisticians, and analysts (such as personnel in the Armed Forces Health Surveillance Division) to investigate potential racial and ethnic health disparities. This group should stay abreast of findings in the civilian sector and be a resource for other analysts and clinicians in the MHS. These investigations should be prioritized according to areas of greatest impact for the DoD and in areas of known disparities.

Recommendation 2. C: Design initiatives and countermeasures to improve overall health outcomes by incorporating specific interventions (by race, ethnicity, region, Sponsor rank, or other factors) to reduce and eliminate known disparities and prevent future disparities when new treatments are introduced.

Recommendation 2. D: To improve health equity, standardize to best practice throughout the MHS to reduce variation and improve outcomes across the MHS.

Finding 3: The DHB could find little evidence of systematic and sustained interventions to reduce racial and ethnic health disparities across the MHS.

> **Recommendation 3. A:** DHA should prioritize maternal and infant health by reevaluating as well as accelerating current efforts to adopt known best practices in the MHS systemwide to eliminate the demonstrated racial disparities in these outcomes.
>
> **Recommendation 3. B**: Prioritize additional clinical areas for improvement in disparities by those which have the greatest likely impact:
> - Clinical conditions that affect a large population
> - Clinical conditions that affect large number of actual or quality of life-years lost
> - Clinical conditions that impact readiness of the force
> - Clinical areas of known racial or ethnic disparity. Preliminary evidence suggests the existence of disparities by race and ethnicity in these areas among others:
>   i. Cardiovascular (e.g., hypertension, heart disease, diabetes)
>   ii. Obstetrics (e.g., maternal and infant health)
>   iii. Pediatrics (e.g., vaccination, well-child visits, obesity, asthma)
>   iv. Oncology (e.g., screening and outcomes)
>   v. Mental Health (e.g., access and outcomes)

Finding 4: Race and ethnicity should be carefully considered in the context of all variables affecting patients' health. Artificial Intelligence (AI) and Clinical Decision Support (CDS) tools have great potential to improve clinical treatments and health outcomes. However, biases in the underlying data stemming from poor study design, data collection and entry, algorithm choice, and dissemination of results can contribute to health disparities. This is also true for some tools used in the calculation of health care costs.

Some medical risk calculators, decision-making tools, and equipment in use by MHS health care personnel introduce inappropriate or unjustified racial and ethnic bias. The U.S. Government has outlined standards for the appropriate development and use of AI, including for health.[6,7]

> **Recommendation 4. A**: Create a centralized mechanism within the MHS to review data use, new protocols, and equipment to prevent inappropriate incorporation of race-biased algorithms in MHS clinical practice. At a minimum, AI algorithms and CDS tools should include individual patient symptoms, family history, and genetic screening results. Follow guidance from the federal government on appropriate development and use of AI. The DHB recommends that DHA participate in groups such as the Coalition for Health AI (CHAI™), which is developing guidelines and principles for the transparent, appropriate, and equitable use of AI in health care.

Recommendation 4. B: Use this centralized mechanism to review, replace, or eliminate existing race-biased tools, protocols, AI, Machine Learning algorithms, and equipment with the best-performing race-agnostic alternatives.

Recommendation 4. C: Develop, implement, and monitor clinical guidelines that include the outcome of AI and CDS tools, to be applied in the context of individual patients' symptoms, family history, and genetic screening results.

Finding 5: Clinical trials are often conducted with homogeneous patient populations, leading to insufficient understanding of potential impacts of treatments on diverse populations. The DoD is a significant source of national funding for clinical trials and health research.

Recommendation 5: DoD should ensure that investigators include patients and participants from diverse and minority racial and ethnic populations in DoD-supported clinical trials and health research as appropriate to the scientific study under question.

Finding 6: Evidence shows that up to 50% of variation in health outcomes is attributable to Social Determinants of Health (SDOH) factors. The MHS, like civilian systems, is at risk of disparate outcomes due to SDOH. SDOH screenings are necessary and must be supported by other data to truly capture the lived experience of MHS beneficiaries who attempt to access and receive care and manage their health. Addressing Health-Related Social Needs (HRSN) allows health systems to proactively reduce disparities due to SDOH. Most studies of MHS racial and ethnic health disparities omit other potential explanatory variables - such as socioeconomic status (approximated as rank in the MHS), geographic location (e.g., urban/rural), or primary language. Such variables may correlate with race and ethnicity and their omission limits the interpretation and response to research findings. The DoD has implemented Service-specific community and family support programs that address SDOH and HRSN.

Recommendation 6. A: DoD should institute annual, best practice standardized SDOH screenings of MHS beneficiaries in adult primary care, pediatrics, and obstetrics and record results in MHS GENESIS. Data must be accessible and reportable. These tools and emerging best practices should be kept current through regular updates on a 3–5-year cycle.

Recommendation 6. B: Use Patient-reported Outcome Metrics and Patient-reported Experience Metrics, in addition to SDOH screenings, to better understand the experience of MHS beneficiaries as they navigate the MHS and access community resources.

Recommendation 6. C: Offer trainings to clinicians on the impacts of SDOH and how to identify HRSN and appropriately document those needs in the medical record. Incorporate these trainings into MHS health professional education.

Recommendation 6. D: Proactively analyze results of SDOH screenings MHS-wide, to assess needs and trends by both local and regional levels, and then connect patients to resources and interventions to address the specific needs of MHS beneficiaries.

Recommendation 6. E: Include socioeconomic status (or surrogates thereof), a measure of regional health services availability, and beneficiary's primary language when analyzing health outcomes.

Recommendation 6. F: DoD should evaluate HRSN factors to identify and prioritize the most pressing needs of the beneficiary population and provide priority areas to address the factors that are contributing to racial and ethnic health disparities. Tailor military-wide programs, such as Total Force Fitness, Service-specific programs (such as Army Community Services, Marine Corps Community Services, Navy Fleet and Family Support, Airman and Family Readiness, and Coast Guard Work-Life Program), and community-based partnerships to best address these needs.

Recommendation 6. G: Promote culturally appropriate health literacy initiatives designed for specific audiences at each location based on health outcomes data, community input, and best practice health messaging.

Finding 7: All virtual visits in the MHS revenue, registration, and scheduling system require entering the patient's preferred language, but in-person visits have no such requirement. Therefore, clinic staff spend time during the appointment attempting to connect to interpretation services or serving as interpreters themselves. Language barriers can contribute to adverse patient experience, a driver of variation in health outcomes.

Recommendation 7: Request and enter the patient's preferred language as a required field when making in-person appointments. Ensure appropriate interpretation services are available for all visits.

Finding 8: While data are limited on the direct impact of health equity training initiatives on health outcomes, some training methods appear to promote empathy and reduce bias which can improve health outcomes.

Recommendation 8: Carefully consider the qualities of any health equity training before implementing it and leverage trainings that have demonstrated positive results in practice. Effectiveness should ultimately be measured by the training's impact on reducing racial and ethnic disparities in patient experiences and outcomes.

Finding 9: Increased clinician-patient racial and ethnic concordance can lead to improved patient care experiences through better communication, greater cultural competency, and reduced inadvertent implicit bias.

> **Recommendation 9. A**: DoD should expand the pathway for military careers as clinicians and allied health professionals for underrepresented in health and medicine racial and ethnic groups through ROTC, Health Professions Scholarship Program, and other recruitment activities at MSIs such as Historically Black Colleges and Universities, Hispanic-serving institutions, and Tribal Colleges and Universities, particularly those that have nursing, pre-medical, and other pre-health career curricula. Consider ways to expand these recruitment pathways to the community college, vocational, and high school levels.
>
> **Recommendation 9. B**: Promote workforce diversity through recruitment activities and collaborations with academic organizations focused on racial and ethnic groups underrepresented in health and medicine and existing groups that are already promoting workforce racial and ethnic diversity in healthcare.
>
> **Recommendation 9. C**: Assess the effectiveness of these recruitment and retention efforts by documenting changes in the supply of underrepresented clinicians and allied health professionals.
>
> **Recommendation 9. D**: Assess the feasibility of leveraging Virtual Health solutions to broaden the range of options for patients to select health care providers that culturally meet their needs.

Finding 10: The DHB's review of best practices and the recommendation of the U.S. Centers for Medicare & Medicaid Services (CMS) to reduce health care disparities stress leadership and sustained commitment effort at all organizational levels. We agree with the Joint Commission's (JC) summary of the actions required to reduce health care disparities as stated in the June 20, 2022 R3 Report[8]:

- Designate an individual to lead activities to reduce disparities for the organization's patients
- Assess patients' health-related social needs
- Stratify quality and safety data by sociodemographic characteristics
- Develop a written action plan to address disparities
- Inform leaders and staff about progress to reduce disparities at least annually

Recommendation 10. A: Commit to achieving the goal of eliminating any racial and ethnic health disparities among all MHS beneficiaries. The DHA should:

- Measure disparities
- Set goals to reduce disparities by specific dates
- Allocate sufficient dedicated staff at both centralized and local levels to eliminate disparities
- Assess progress regularly

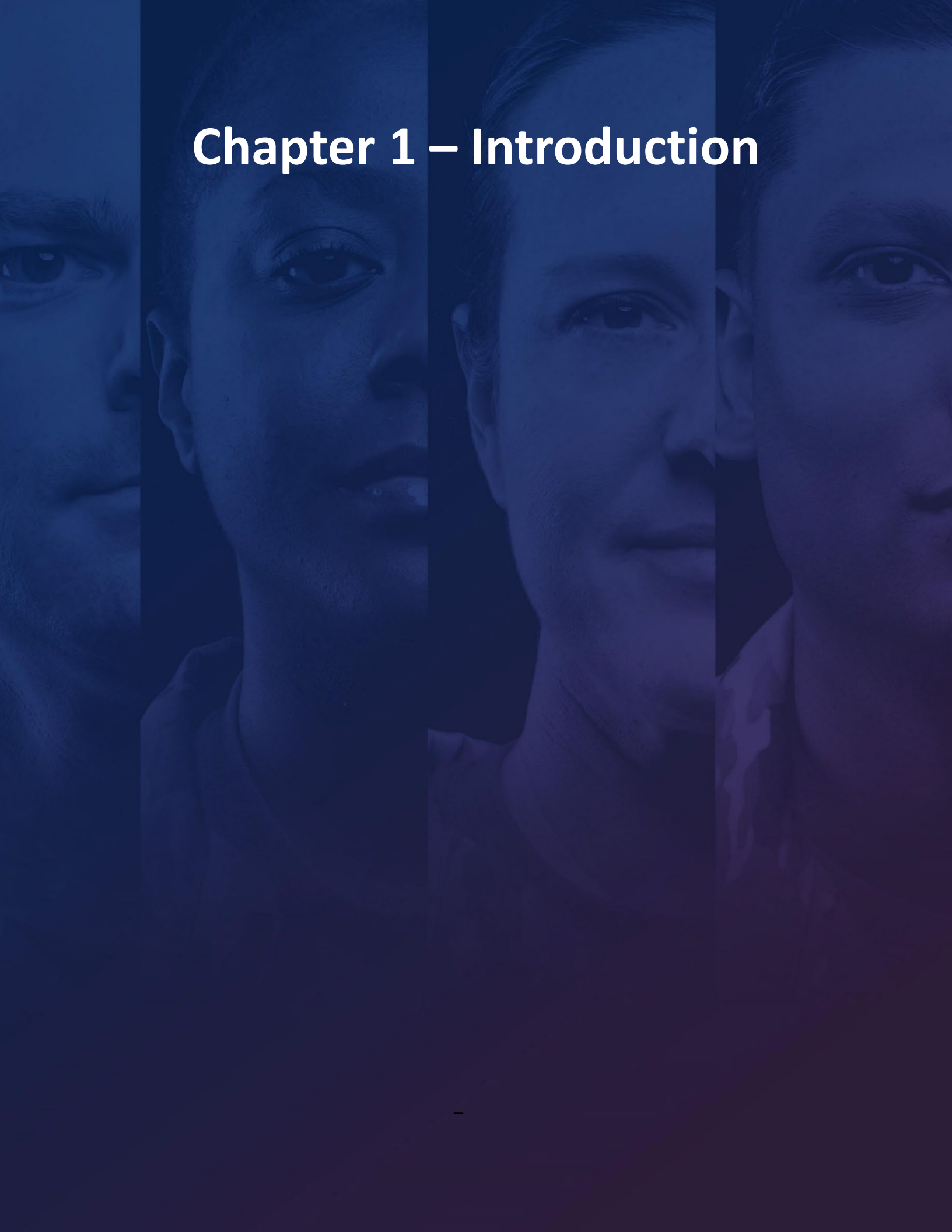
Recommendation 10. B: The DHB recommends that the Under Secretary of Defense for Personnel and Readiness (USD(P&R)) be the accountable leader for ensuring that health disparities are eliminated, and that USD(P&R) charter a Health Equity Committee by the end of Fiscal Year 2024. The Committee will:

- Report progress toward eliminating health disparities
- Include representative groups

Recommendation 10. C: The Assistant Secretary of Defense for Health Affairs (ASD(HA)) should report health outcomes, stratified by race and ethnicity, and report on ongoing initiatives to eliminate disparities, to the USD(P&R) no less than annually and quarterly when feasible

Recommendation 10. D: Incorporate health equity performance metrics and goals into quality and patient incentive programs for personnel providing care and managing military health services, such as those found in the Integrated Resourcing and Incentive System.

Chapter 1 – Introduction



Research documents health inequities across numerous sociodemographic characteristics, including age, sex, race/ethnicity, education, geographic location, socioeconomic status, and health insurance coverage.[9-11] Lack of health care access and limited health insurance coverage are key drivers of disparate health outcomes; improved coverage leads to better health outcomes among disadvantaged groups.[10] Race and ethnicity remain prominent predictors of negative health outcomes even in a universal health coverage system such as the MHS.

These findings are highly relevant to the U.S. military. Approximately 25% of active duty personnel self-identify as a racial minority (Black or African American, Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, or Multiracial), and over 18% are of Hispanic or Latino ethnicity.[1] All Service members, dependents, and retirees are eligible for TRICARE, the DoD's universal health care benefit – but health inequities persist even in universal access federal health systems.[12-14]

Tasking and Response

In May 2022, the Acting Assistant Secretary of Defense for Health Affairs tasked the DHB to investigate racial and ethnic health outcome disparities in the MHS, identify systemic barriers to eliminating them, and provide recommendations to address them. The current report responds to the tasking by answering the following questions:

1) What is the current state of knowledge and action regarding racial and ethnic health care disparities? (Chapter 2 – Racial and Ethnic Health Disparities in the MHS: Evidence, Action, and Context)
2) What barriers impact DoD's ability to understand and eliminate racial and ethnic health disparities? (Chapter 3 – DoD and MHS Data Systems; Chapter 4 - Race and Ethnicity Data: Research, Quality Metrics, and Population Health)
3) What elements should be included in an agenda for research, action, and evaluation? (Chapter 5 – An Agenda for Research, Action, and Evaluation)
4) How can DoD ensure race and ethnicity are appropriately incorporated into clinical decision making? (Chapter 6 – Use and Misuse of Race and Ethnicity Data)
5) Can DoD impact health outside the medical encounter? (Chapter 7 – The Role of Social Determinants of Health in Health Outcome Disparities)
6) How can DoD harness the workforce to mitigate health disparities? (Chapter 8 – Workforce and Training Initiatives to Promote Better Health Outcomes)
7) How can DoD best direct and sustain Racial and Ethnic Health Disparity reduction efforts? What knowledge can DoD leaders leverage from other systems? (Chapter 9 – Leadership, Accountability, and Structure for Sustainable Progress)

Relevant Guidelines

OMB Statistical Policy Directive Number 15

Government-wide guidelines regarding race and ethnicity classification standards provide important context for this report. In May 1977, the Office of Management and Budget (OMB) published Directive Number 15: Race and Ethnic Standards for Federal Statistics and Administrative Reporting. "This Directive provides standard classifications for record keeping, collection, and presentation of data on race and ethnicity in Federal program administrative reporting and statistical activities." These standards applied to 13 Federal statistical agencies, including the Bureau for Justice Statistics, and the National Center for Health Statistics. The original standards were comprised of four race categories: American Indian or Alaska Native, Asian or Pacific Islander, Black, and White.[15]

In October 1997, OMB revised its standards to better measure equal access in housing, education, and employment, and to enforce civil rights laws. The revisions were published as OMB Statistical Policy Directive Number 15: Standards for Maintaining, Collecting, and Presenting Federal Data on Race and Ethnicity ("minimum standard").[16] Significant changes included separation of the "Asian or Pacific Islander" category into two categories, "Asian" and "Hawaiian or Other Pacific Islander." The resulting categorization scheme is as follows:

- American Indian or Alaskan Native
- Asian
- Hawaiian or Other Pacific Islander
- Black or African American
- White

OMB Statistical Policy Directive (SPD) 15 also "[underscored] that self-identification is the preferred means of obtaining information about an individual's race and ethnicity," and that individuals should be allowed to select more than one racial category.[16]

OMB SPD 15 is still in use today. Notably, the minimum standard – written to guide Federal program administrative reporting and statistical activities – has become a best practice in health care organizations, as well.[17] An update to OMB SPD 15 is anticipated during the summer of 2024.[18]

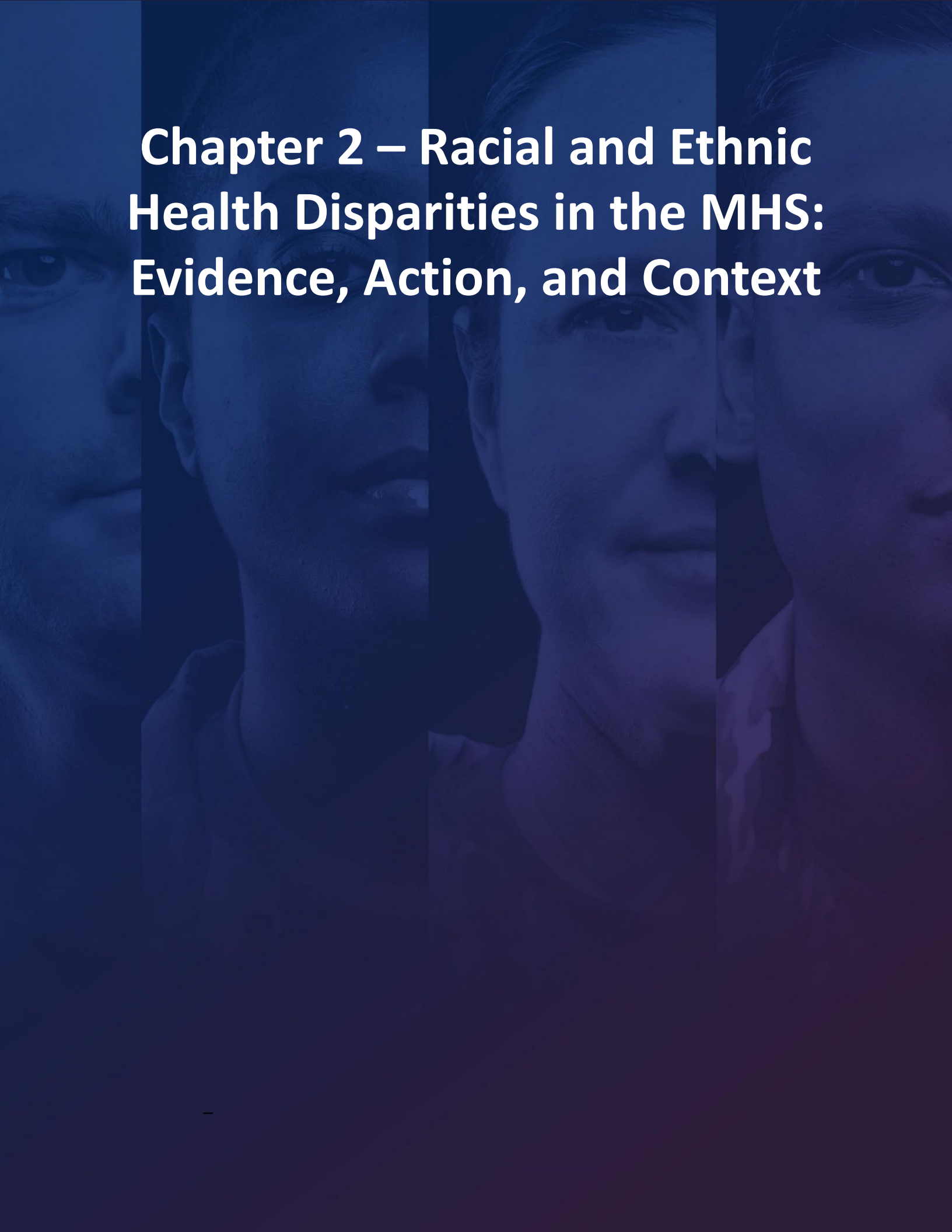
Joint Commission R3 Report

All Military Treatment Facilities (MTF) are accredited by the Joint Commission (JC).[19] Effective January 1, 2023, the JC set a new requirement that accredited organizations must implement specific activities to reduce health care disparities.[8] The JC requirement includes designating an individual to lead activities to reduce health care disparities for patients, assess patients'

health-related social needs, and identify disparities by using patients' sociodemographic categories to stratify quality and safety data. The new JC standard also requires that all patients' medical records include race and ethnicity data.[8] While the JC does not require specific categories for race and ethnicity, health care organizations are encouraged to use, at a minimum, the race and ethnicity categories from the OMB.[20]

Methods

The Subcommittee examined existing, and implementation of existing, policies and guidance; conducted a literature review of MHS health disparities; received briefings from DHA leadership, military and civilian health care providers and researchers; participated in discussions with representatives of civilian health systems with experience in identifying and addressing racial and ethnic health disparities; and made a site visit to Naval Medical Center San Diego. During this visit, the Subcommittee met with a dedicated group of health care providers who have led many initiatives to document and address racial and ethnic health disparities in the MHS.



Chapter 2 – Racial and Ethnic Health Disparities in the MHS: Evidence, Action, and Context

Evidence

Studies of racial and ethnic health disparities in the MHS have yielded varied results (See Appendix F for a full description of studies). Numerous studies from the MHS demonstrate narrowing, or even elimination, of disparate health outcomes across race and ethnicity over a wide range of conditions and age groups – including diabetes, coronary artery disease, trauma care, prostate cancer care, pediatric bone infections, breast and cervical cancer screening, and pregnancy and birth outcomes (See Appendix F for references). However, consistent, statistically significant differences between racial and ethnic groups are evident in several clinical areas. Examples of areas where studies showed clear outcome disparities by race or ethnicity include:

- Maternal and infant health: A 2018 study calculated the preterm birth rate in the MHS from 2008 to 2012, including both direct and purchased care, and found that infants with at least one Black parent were 30% more likely to be born prematurely, independent of the parent's rank, maternal age, or socioeconomic status.[21] Another study from the MHS found that despite a 7% lower preterm delivery incidence compared to the U.S. civilian rate for the same cohort, there was a significant difference in neonatal mortality for non-Hispanic Black infants compared to non-Hispanic White infants in the MHS. This study also found no significant difference in neonatal mortality when comparing Officer and Enlisted status of the patient's sponsor.[22] A 2020 longitudinal study of TRICARE insurance claims data found that Black patients in the MHS were slightly more likely than White patients to have potentially avoidable maternal complications (PAMCs) and Asian women were significantly less likely to experience PAMCs than White women.[23]

- Health related quality of life: Analyzing data from the Health Care Survey of Department of Defense Beneficiaries, researchers found a statistically significant difference in the prevalence of fair or poor health (rather than good, very good, or excellent) by race and ethnicity.[24] This result was similar to an analysis of data from the nationwide Behavioral Risk Factor Surveillance System.[25]

- Well-child visits: A retrospective cohort analysis of MHS beneficiary children found disparities on the number of well-child visits. The study found achievement of the national Healthcare Effectiveness Data and Information Set (HEDIS) metric of six well visits during the first 15 months of life to be 86% among the study population. However, there were statistically fewer recommended well-child visits for enrolled infants among junior Enlisted, Black, and Air Force sponsors.[26]

- Minimally-invasive Hysterectomy: Analysis of TRICARE claims data from 2006-2010 of women aged 18 years and older who underwent a hysterectomy showed evidence of a racial disparity in receipt of the minimally-invasive approach to the procedure.[27] This study found that Black and Asian patients were significantly less likely than White patients to receive the minimally invasive procedure both for patients with benign or malignant indications and for patients in the direct and private care systems. Given the consistent results, study authors concluded that surgical indications were not a cause for the disparity. They suggest investigating clinician and system-level factors that could influence surgical decision-making, including cultural dexterity, clinician unconscious bias, availability of a surgical team to perform minimally invasive surgery, and presence of protocol based care as is the case in the direct care system.[28,29]

Action

The MHS has begun to take action to improve care and decrease disparities in maternal health. These efforts include implementation of evidence-based best practices such as the ongoing rollout of the Alliance for Innovation on Maternal Health Postpartum Hemorrhage (PPH) bundle at all MTFs, decreasing the first-birth cesarean rate, promoting in-hospital initiation of breast feeding, and perinatal training for all health care staff caring for pregnant persons and staff.[30] Discharge data in the direct care network from October 2021 – September 2022 show that the PPH rate for Black patients is higher than the National Perinatal Information Center (NPIC) database national average and that the PPH rate for the Asian or Pacific Islander population is higher than both the Black direct care population and the NPIC database average.[31]

Context

Existing research and action on racial and ethnic health disparities is best understood in context. Health disparities in the MHS have come into focus relatively recently. The current state is shaped by issues and challenges in data systems and data gathering practices that impact measurement and management. Use of race and ethnicity in clinical decision making is more nuanced than once thought. The impact of non-medical factors on health outcomes among MHS beneficiaries is not well understood.

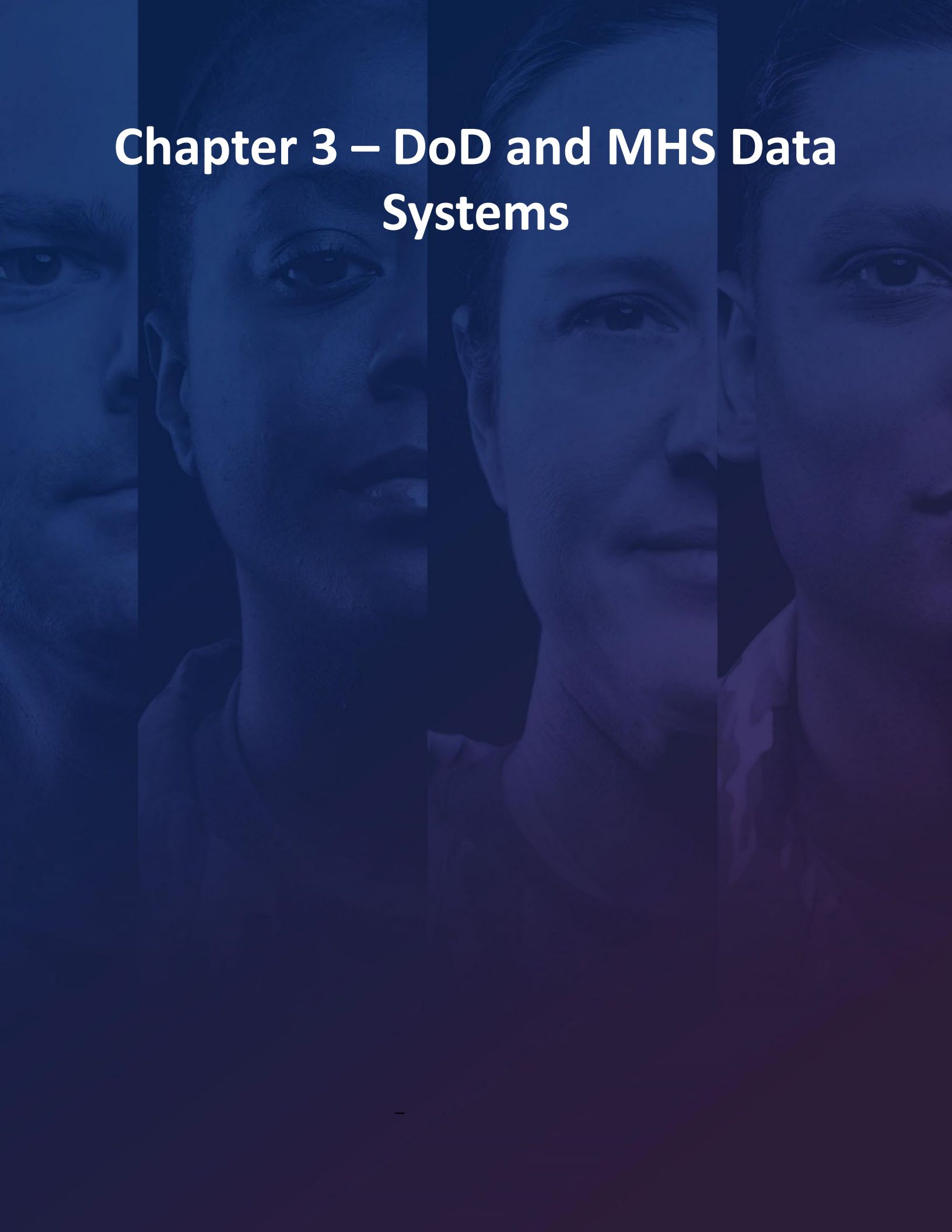
Finally, as might be expected, an institutionally planned, organized, and administered approach to measurement and management of racial and ethnic health disparities does not yet exist. Local efforts to assess and address health equity are underway within the MHS; these are led by dedicated champions, which limits their scope and sustainability. The Navy Medicine Readiness and Training Command – San Diego Graduate Medical Education Committee Working Group on Diversity, Equity, and Inclusion consists of a group of dedicated volunteers to educate health care providers on how to improve health equity. The group has produced a number of published and unpublished studies showing evidence of health disparities in the MHS.[26,32] In

addition, various health care providers conduct research on racial and ethnic disparities in maternal health in the MHS.[33]

Conclusion

The individuals and teams responsible for most of the research on MHS racial and ethnic health outcome disparities often spend time outside of their duty hours to conduct these analyses. They advocate for more accurate race and ethnicity data, building cultural competency into medical training, and promoting the inclusion of staff and patients from all backgrounds to advocate for patients' needs. Military researchers note that when they look for disparities, they often find them.

Chapter 3 – DoD and MHS Data Systems



Demographic and health-related data is collected and managed within many data systems across the DoD. These systems contain data from disparate sources; data is not collected or managed in a standardized format. The following descriptions highlight organizations and systems which might be used to improve the capture and management of race and ethnicity data to better address health disparities. However, they cannot fully capture the complexity of health-related data management across the Department.

DoD Data Systems

Service Personnel Systems

Each of the Services, Army, Navy (includes the Marine Corps), and Air Force (includes the Space Force), maintains a personnel system. The Services collect race and ethnicity data on all active duty Service members, Reserves, and National Guard upon entry into service. DD Form 1966 *Record of Military Processing - Armed Forces of the United States* allows race selection from the 5 racial categories identified by OMB SPD 15, and selection of ethnicity from two categories ("Hispanic or Latino", or "Not Hispanic or Latino").[34] Per Military Personnel Manual 1000-090, Service members may select from one of the five racial categories identified by OMB SPD 15, more than one category, or decline to respond.[35] Service members can view and edit their race and ethnicity through their personnel systems online or at a Real-Time Automated Personnel Identification System (RAPIDS) location.[36,37]

Defense Manpower Data Center/Defense Enrollment Eligibility Reporting System

The Defense Manpower Data Center (DMDC) collects and collates data from multiple sources, including the Service personnel systems, and has an extensive mission-set including verifying eligibility for medical benefits. DMDC maintains the Defense Enrollment Eligibility Reporting System (DEERS). Per DoD Instruction 1341.02 *DEERS Program and Procedures*, DEERS is the authoritative data source for demographic data for active duty Service members, Reserve, and National Guard.[38] Data from DEERS, including data on race and ethnicity, is transmitted to downstream data systems by DMDC. Active duty and dependents are currently unable to view or correct their self-reported race and ethnicity in DEERS, although Service members can view and edit their race and ethnicity online through their personnel systems.[36,37] Active duty Service members are enrolled in DEERS at accession into the military.[37] Military dependents and other beneficiaries enroll in DEERS and receive their military identification cards at a RAPIDS location.[37] The DEERS enrollment form (DD Form 1172-2), does not include a section for race or ethnicity for civilian dependents.[39] Entry of beneficiary race and ethnicity data at RAPIDS locations is sometimes performed without confirmation by the sponsoring Service member or beneficiary.[40] DHB conversations with DEERS leadership confirmed that when DEERS reports data, it uses the race category "Other" to denote individuals who have selected more than one race category.[41] The DHB encourages the DoD to consider the effect of these

data gathering and dissemination practices on data quality as it evaluates and addresses health disparities.

MHS Data Systems

Enterprise Intelligence and Data Solutions/MHS Information Platform

The MHS Information Platform (MIP) houses MHS data in a "system of systems" that includes data warehouses, data virtualization tools, and visualization solutions. It includes more than 150 DoD data sources, including the Defense Medical Surveillance System (DMSS) and the MHS Data Repository (MDR).[42]

Enterprise Intelligence and Data Solutions (EIDS) supports the MIP and plans to update the user-view of the MDR race table with the following codes and descriptions in December 2023[43]:

Code	Description
A	American Indian or Alaskan Native
B	Asian
C	Black
D	Native Hawaiian or Other Pacific Islander
E	White
X	Other
Z	Unknown

EIDS also plans to "tag" all records that contain legacy race codes, including those in the MDR, but there is currently no funding for this initiative for all historical records. While this update will separate the "Asian" and "Native Hawaiian or Other Pacific Islander" categories, this plan will still include a race category called "Other." If "Other" race is the reporting nomenclature for individuals who select more than one race, the DHB recommends this be changed to "Multiracial" to reflect an individual's self-reported race more accurately. Additionally, the DHB recommends a "Decline to State" category be added for civilian beneficiaries.

One DHB Health Systems Subcommittee member emphasizes the importance of capturing the experience of individuals who identify as more than one race, and suggests including "Multiracial" as an option on reporting forms for these individuals. The member raises concerns that:

- Attributing poor health outcomes suffered by multiracial people to all their multiple racial groups will negate and obscure health disparities impacting this group.
- Not offering people the option to self-report as "Multiracial" may result in more people from this growing demographic choosing to decline stating their race(s).

Armed Forces Health Surveillance Division/Defense Medical Surveillance System

The Armed Forces Health Surveillance Division (AFHSD) is the central epidemiologic health resource for the U.S. military and has satellite personnel at each of the Service Defense Centers for Public Health (which also independently conduct epidemiological studies for the Service they represent). AFHSD operates the DMSS, a continuously expanding relational database that documents military and medical experiences of Service members throughout their careers. The Epidemiology and Analysis branch of AFHSD publishes the Medical Surveillance Monthly Report (MSMR), which includes regular reports on the incidence, distribution, impact, and trends related to illness and injuries among members of the U.S. Military Services and other beneficiaries of the MHS. The most widely read issues focus on the annual absolute and relative morbidity burden attributable to various illness and injuries among Service members and beneficiaries (the 'burden issue').[44] DMSS includes data on race and ethnicity, but racial data in the MSMR is not reported according to OMB standards, i.e., "Hawaiian or Other Pacific Islander" is not separated from "Asian."

MHS Data Repository

The MDR is the centralized data repository that captures, archives, and distributes Defense Health Agency (DHA) corporate health care data, including TRICARE data, worldwide. It includes data from the direct care system (MTFs), "the DoD's worldwide network of more than 260 health care facilities, and non-DoD data sources, covering approximately 9.2 million beneficiaries."[45]

The MDR receives race and ethnicity data from a variety of sources, including DEERS. Storage of the received information is in the form of data tables which can be used for research, analysis, and reporting. The MDR data elements are being updated in accordance with a 2022 DoD Inspector General advisory.[46]

Electronic Health Record and MHS GENESIS

TRICARE is the DoD's health care program which serves active duty Service members, National Guard and Reserve members, retirees, their families, survivors, certain former spouses, and others registered in DEERS. DHA utilizes a suite of forms for TRICARE enrollment actions, none of which include sections for race or ethnicity.[47]

The DoD transitioned from paper to electronic order entry with implementation of the Composite Health Care System (CHCS) in 1988.[48] Following the Gulf War, President Bill Clinton directed creation of "a comprehensive, life-long medical record..." which resulted in significant updates to CHCS (CHCS II). CHCS II deployed worldwide in 2004 and was rebranded as the Armed Forces Health Longitudinal Technology Application (AHLTA).

After several years of planning, in 2017, the DoD began implementation of MHS GENESIS, a new electronic health record by Oracle Cerner©. By mid-2023, MHS GENESIS was fully deployed to all U.S.-based military hospitals and clinics. On 23 July 2023, implementation of MHS GENESIS began overseas.

MHS GENESIS replaces CHCS II and is the military's global electronic health record. It contains encounter and demographic information for Service members, dependents, retirees, and anyone who receives care at a military hospital, emergency department, or clinic in the direct care system.[49] MHS GENESIS receives enrollment data, including race and ethnicity data, from the Service personnel offices through DEERS via a dedicated feed. Race and ethnicity can also be entered at the point of care during an encounter at an MTF. To capture the race and ethnicity information of those dependents who exclusively receive care through the purchased care network, and thus do not have the opportunity to enter it at an MTF, the DHA could modify TRICARE enrollment forms to include these data fields.

Role of Enterprise Intelligence and Data Solutions/MHS Information Platform in Data Harmonization

The MIP, supported by EIDS, hosts many of the MHS databases and data sets that researchers use to assess health disparities. The DoD should work to standardize data across all these datasets to reflect the OMB SPD 15 guidelines going forward (i.e., "harmonize" the data), addressing legacy data as possible. The DoD should implement mechanisms and business rules to harmonize data between systems – those that impact health care at minimum but all DoD systems preferably – to ensure consistency in patient demographic data. For example, these rules could initiate a process to harmonize records to reflect a beneficiary's self-reported race or ethnicity when information in one system does not match that of another. The Department of Veterans Affairs (VA) Master Veteran Index database provides an example of a harmonized system that serves as "the authoritative identity service within the VA" that establishes, maintains, and synchronizes identities for Veterans and beneficiaries.[50] The DoD should look to Information Technology (IT) organizations to advise how best to achieve an authoritative single source of race and ethnicity data, such as the Scottsdale Institute, "an executive organization of leading health systems" that shares best practices in health IT.[51]

Conclusion

Given that the MIP is a major source of data for the MHS research community, it will be important for the MIP to provide OMB SPD 15 compliant data to researchers. Ensuring that DEERS collects, stores, and transmits data to MIP/MDR data tables that meet or exceed minimum OMB SPD 15 standards for all beneficiaries is fundamental. Race and ethnicity data tables should include relevant data dictionaries with information on OMB SPD 15 to improve the research communities' understanding of Federal standards, along with the collection and use of the data. Race and ethnicity should be self-reported. Policies and mechanisms need to

be established for dependent beneficiaries to view and correct their race and ethnicity. Trainings and DEERS website information need to be provided to provide awareness and instructions for all users.

Race and ethnicity data for all beneficiaries could be obtained through DEERS as the DoD's authoritative source for demographic data, by collecting and validating these data at points of care within the direct system, by creating easy and accessible online methods, and by including these variables in the TRICARE enrollment collected data. Identification of health disparities requires robust data stratification and analyses by relevant variables, including race and ethnicity. Currently, MHS data systems do not include sufficient dependent beneficiary information to analyze and identify health disparities based on race and ethnicity. To support Federal agencies that collect and use race and ethnicity data, OMB provides minimum standards for collection of these data and provides guidance on flexibility and best practices for using these data.[52]

Findings and Recommendations from Chapter 3

Finding 1: When Federal agencies collect data on race and ethnicity, they must comply with the Office of Management and Budget's (OMB) Statistical Policy Directive No. 15 (SDP 15) minimum standards. Within the DoD, race and ethnicity data for Service members are captured in Service-specific personnel systems and transferred to the DoD DEERS data system. DEERS provides data to other databases, including many in the MHS. While DEERS does contain OMB SPD 15 minimal standards, DEERS has been providing reformatted race and ethnicity data to the MHS that is not compliant with OMB SPD 15.

Furthermore, there is no requirement for DEERS to collect race and ethnicity data for civilian dependents. OMB SPD 15 states that self-report is the best method of collecting such data. Similarly, there is no requirement for DEERS to allow viewing, self-entry, or self-correction of race and ethnicity within its data system, unlike Service personnel systems which do allow Service members to view and correct these data. The end result is insufficient validated data to ensure equity of care across the MHS for all beneficiaries.

Recommendation 1. A: The DoD should ensure that self-reported race and ethnicity data is collected and in compliance with the current OMB SPD 15 minimal Standards for the Classification of Federal Data on Race and Ethnicity across all DoD databases that contain, use or report health information. Furthermore, non-Service member beneficiaries, such as civilian dependents and retirees, should be able to conveniently input, view and self-correct their race and ethnicity information within DEERS, and all beneficiaries must be able to do so within MHS GENESIS. DoD must ensure that beneficiaries are provided with the relevant information and directions to do so.

Recommendation 1. B: DoD should modify the current OMB SPD 15 standards for the following circumstances:

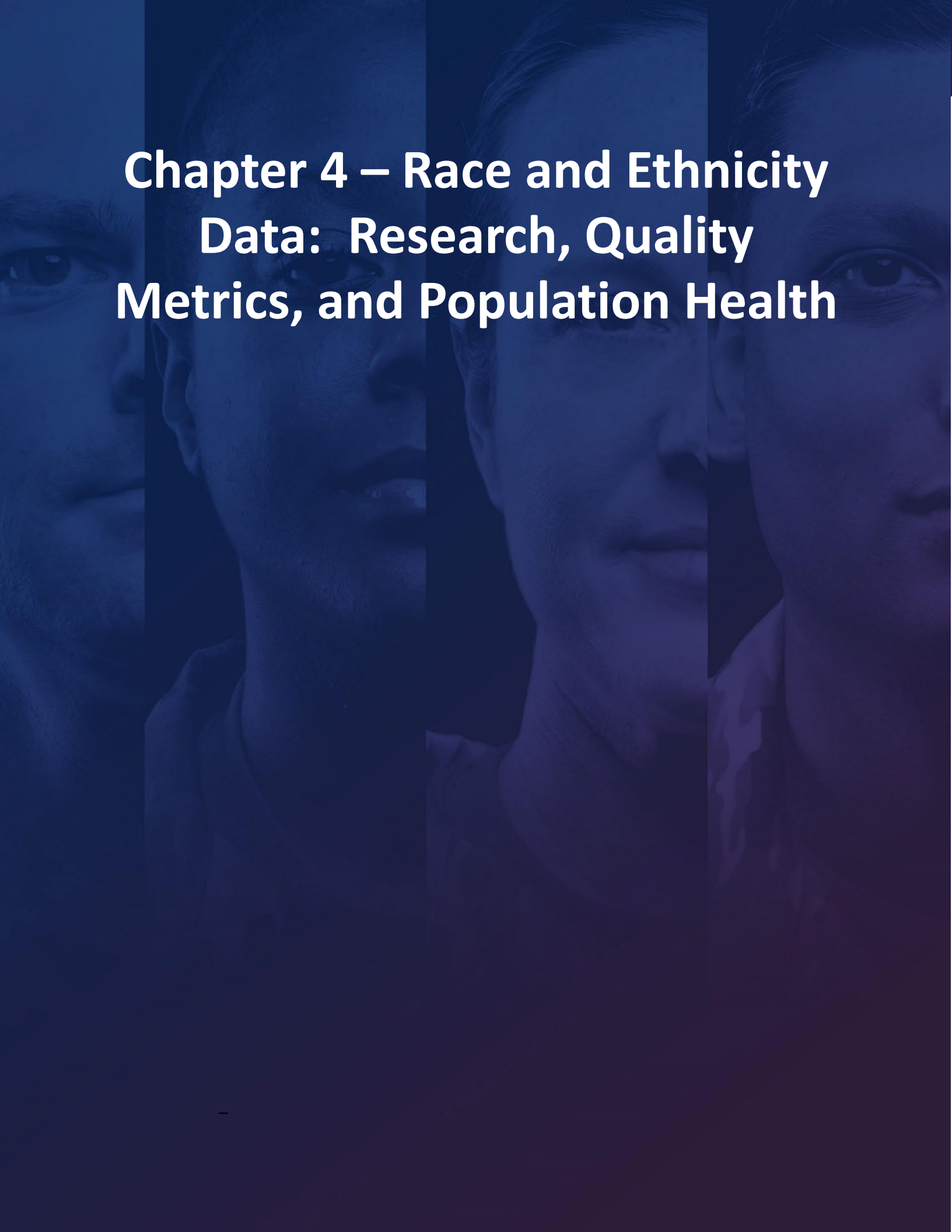
- DEERS should use the term "Multiracial" and not the term "Other" when reporting collapsed race information for those who selected more than one race.

- Civilian beneficiaries should be provided a new category of "Decline to State" when selecting their race and ethnicity.

Recommendation 1. C: DoD should ensure that TRICARE purchased care data can be collected and analyzed with a race and ethnicity stratification.

Recommendation 1. D: DoD should ensure MTF patient check-in workflow requires confirmation of patients' current race and ethnicity categorization in MHS GENESIS and includes a mechanism for helping patients update their data when needed not less than annually.

Recommendation 1. E: Ensure that DEERS, DMDC, and MHS GENESIS are harmonized with regard to identity and demographic data.



Chapter 4 – Race and Ethnicity Data: Research, Quality Metrics, and Population Health

The previous chapter discussed the variability in coding and transmitting race and ethnicity information across data systems in the DoD. This chapter describes three major uses of race and ethnicity data: research, quality metrics, and population health. This chapter also discusses current processes for collecting and analyzing information, along with current results.

Research

Most of the research literature on MHS health equity/disparities has been created by ad hoc, individual-initiated, one-time data analyses, or local Quality Improvement projects. These are neither cumulative nor systematic efforts. DHA should identify and designate a centralized group of epidemiologists, statisticians, and analysts (such as personnel in the Armed Forces Health Surveillance Division) to investigate potential racial and ethnic health disparities. This group should stay abreast of findings in the civilian sector and be a resource for other analysts and clinicians in the MHS. These investigations should be prioritized according to areas of greatest impact for the DoD and in areas of known disparities.

As discussed in Chapter 2, the DHB review of MHS disparities literature revealed studies demonstrating racial or ethnic disparities in health outcomes in some clinical areas and other studies demonstrating no apparent evidence of disparities in other clinical domains (See Appendix F – Literature Review for a full description of the review). Although a few studies also included potentially explanatory co-variates besides race and ethnicity (e.g., rank, location, language), this review showed there is no systematic or multivariate analyses examining the relative effect size of these and other factors systemwide. Most of the studies came from one-time data pulls of TRICARE claims or analysis of population-wide survey results that had limited disaggregation by beneficiary group, making it difficult to pinpoint disparities among specific subpopulations.

Many studies in the literature review noted that race data was missing for military dependents and other beneficiaries not on active duty. In some studies, the authors imputed data related to race and ethnicity as a result. Other studies included “Other Race” as a racial category. “Other Race” is an ill-defined category with many potential meanings including another unspecified race, or multiple racial categories, and limits results and conclusions in disparities research.[53]

Stratification of race and ethnicity varied across studies and was based on methods determined by the researchers themselves. Most of the studies used data from the MDR and were stratified by a limited number of races, e.g., White, Black or African American, or Other. It is not clear from the design of many of these studies whether limited race stratification was based on the decision of the researchers or limited by data files provided.

Quality Metrics

MHS' and DHA's quality metrics reporting – internally and through external reporting in national registries – does not consistently include racial and ethnic stratification or make such analyses easy to access. HEDIS metrics have only recently stratified outcomes by race and ethnicity using the minimum standard for collection and reporting of the five race categories specified by OMB SPD 15. The DHA participates in the HEDIS program and could benefit from the opportunity to compare outcomes stratified by race and ethnicity to HEDIS national level data.

In addition to reporting HEDIS metrics, the MHS has other efforts to improve health care quality such as partnering with the National Perinatal Information Center (NPIC) and participating in the National Surgical Quality Improvement Program (NSQIP). The MHS is taking steps to stratify NPIC outcomes by race and ethnicity but has not yet done so for NSQIP.

The Subcommittee observed high variation in outcomes across MHS sites including mental health[40], maternal health, and surgical outcomes.[33,54] Without racial and ethnic stratification of patient outcomes, the Subcommittee could not identify sites whose disparities were attributable to race and ethnicity. These data limitations prevented the Subcommittee from making more targeted recommendations.

Population-Based Studies

Population-based studies performed by the Defense Centers for Public Health and AFHSD could provide a rich source of information related to health disparities. AFHSD, as the DoD's Public Health Authority and central epidemiological resource, is positioned to assume a leadership role in collection, standardization, and reporting on illnesses and injury stratified by appropriate racial and ethnic categories and has the added capacity to further stratify and control for other important variables including age, sex, rank, educational level, and other variables. Reporting by race and ethnicity in the annual "burden issue" is a particularly promising approach to improving the DoD's understanding of health disparities. Finally, improved reporting by AFHSD may require improvements with TRICARE's or DEERS' capture of civilian dependent information and transmission of data to include an update to the business rules surrounding race and ethnicity data in DMSS.

Conclusion

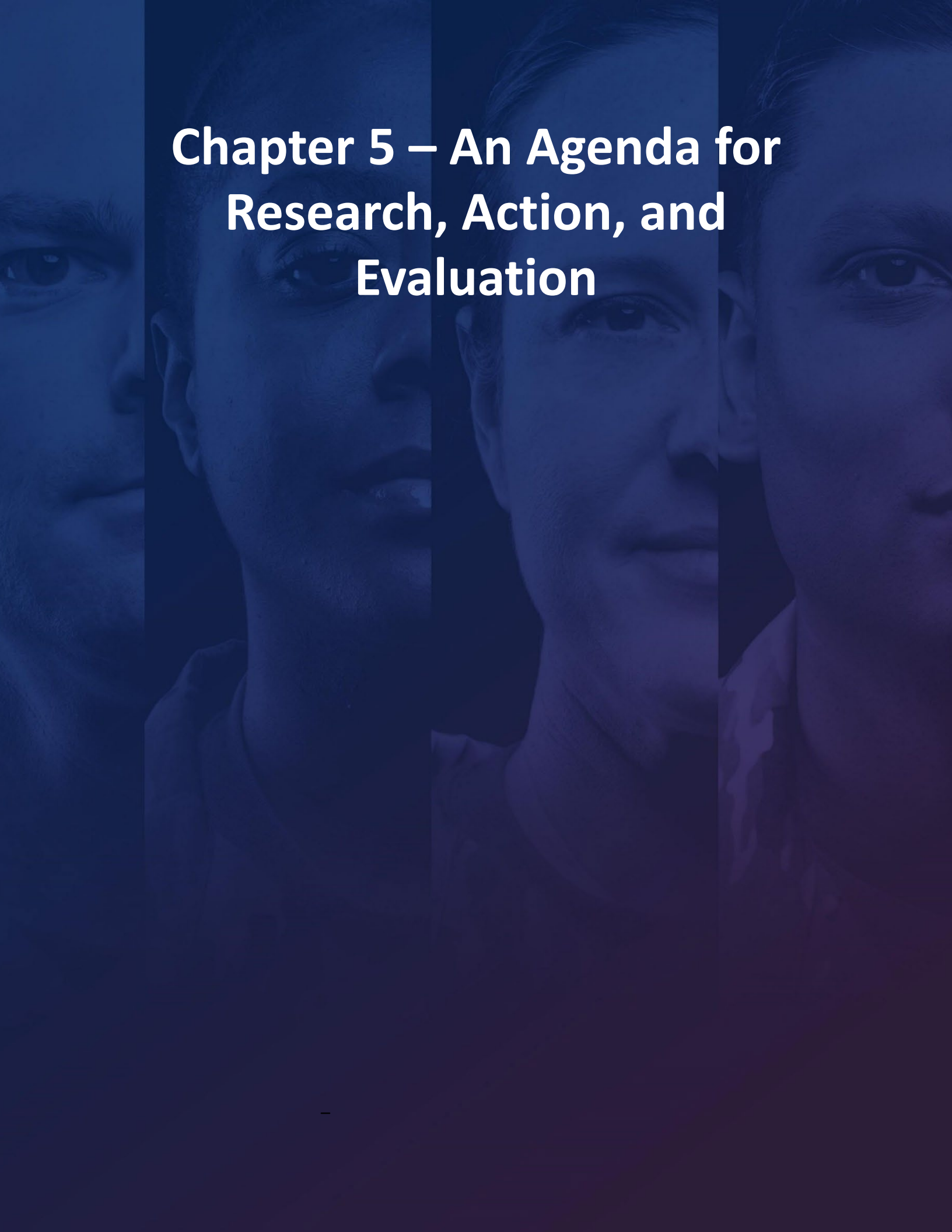
This chapter highlights the importance of improving race and ethnicity data utilization across research, quality metrics, and population health within the MHS. Current practices, often ad hoc and individual-initiated, lack consistency in reporting racial and ethnic stratification. The absence of such data in quality metrics reporting poses challenges, hindering accessibility for meaningful analyses. The potential richness of population-based studies by organizations like the Defense Centers for Public Health and AFHSD emphasizes the need for comprehensive efforts to enhance the effectiveness of data collection and analysis in addressing health disparities.

Findings and Recommendations from Chapter 4

Finding 2: Most of the literature on MHS health equity/disparities has been created by ad hoc, individual-initiated, one-time data analyses, or local Quality Improvement projects. These are neither cumulative nor systematic efforts. The MHS' and DHA's centralized outcomes tracking – internally and through external reporting in national registries – does not consistently include racial and ethnic stratification or make such analyses easy to access.

The Subcommittee observed high variation in outcomes across MHS sites including mental health, maternal health, and surgical outcomes. Such high variation may have a disproportionate impact on racial and ethnic minority groups, particularly those also experiencing adverse Social Determinants of Health. Without racial and ethnic stratification of patient outcomes, the Subcommittee could not identify sites whose disparities were attributable to race and ethnicity. These data limitations prevented the Subcommittee from making more targeted recommendations.

> **Recommendation 2. A**: DHA should include racial and ethnic stratification of results in all internal and applicable external patient care reporting (e.g., Joint Commission, National Committee for Quality Assurance, Healthcare Effectiveness Data and Information Set (HEDIS®), registry reports, Patient-Reported Outcome Measures). The DHA should ensure its contracts with external reporting entities include available racial and ethnic stratification and analysis with benchmarking, at both the MTF and systemwide levels. The DHA should analyze its progress in reducing identified disparities.
>
> **Recommendation 2. B**: DHA should identify and designate a centralized group of epidemiologists, statisticians, and analysts (such as personnel in the Armed Forces Health Surveillance Division) to investigate potential racial and ethnic health disparities. This group should stay abreast of findings in the civilian sector and be a resource for other analysts and clinicians in the MHS. These investigations should be prioritized according to areas of greatest impact for the DoD and in areas of known disparities.
>
> **Recommendation 2. C**: Design initiatives and countermeasures to improve overall health outcomes by incorporating specific interventions (by race, ethnicity, region, Sponsor rank, or other factors) to reduce and eliminate known disparities and prevent future disparities when new treatments are introduced.
>
> **Recommendation 2. D**: To improve health equity, standardize to best practice throughout the MHS to reduce variation and improve outcomes across the MHS.



Chapter 5 – An Agenda for Research, Action, and Evaluation

The DHB could find little evidence of systematic and sustained interventions to reduce racial and ethnic health disparities across the MHS. The following sections include suggestions for a planful and high-impact agenda for health disparities research and action. Evaluation should be an integral part of these efforts. This chapter also presents examples of potential assessment strategies and measures.

Literature Review

Several clinical areas emerged as having clear disparities due to consistent, statistically significant differences between racial and ethnic groups. Given this evidence, the DHB urges the MHS not to wait until it reforms the data ecosystem to take action to address care in these areas. Examples of areas where studies showed clear outcome disparities by race or ethnicity include maternal and infant health, health related quality of life, well-child visits, and minimally invasive hysterectomy (see Appendix F for full results of the DHB literature review).

The DHB's 2020 report on Active Duty Women's Health Care Services has identified several existing best practices in maternal health in the civilian sector and MHS itself that can and should be implemented across the system.[55] More in-depth analysis provided by a dedicated group of statisticians may reveal other explanatory variables including rank, health care access, and Social Determinants of Health (SDOH). The DoD should promote proactive, ongoing analysis of these variables, along with race and ethnicity, on health outcomes to set priorities and focus initiatives that will reduce health disparities in the MHS.

High-Impact Medical Conditions

Detailed analyses of health disparities should include the relationships between SDOH, race and ethnicity, and health outcomes (see Chapter 7 for more information on SDOH). High-impact medical conditions, informed by benchmarked data such as those collected by the HEDIS®, the National Perinatal Information Center (NPIC), and National Surgical Quality Improvement Program (NSQIP), should also be considered for further study and action. Criteria for selecting conditions for deep analysis as well as interventions include, among others[56]:

- Clinical conditions that affect a large population
- Clinical conditions that affect large number of actual or quality of life-years lost
- Clinical conditions that impact readiness of the force
- Clinical areas of known racial or ethnic disparity. Preliminary evidence suggests the existence of disparities by race in these areas (in no particular order):
  i. Cardiovascular (e.g., hypertension, heart disease, diabetes)
  ii. Obstetrical/perinatal (e.g., maternal and infant health)
  iii. Pediatrics (e.g., immunization, well-child visits, obesity, asthma)
  iv. Oncology (e.g., screening and outcomes)
  v. Mental health (e.g., access and outcomes)

Tracking Progress: MHS and DHA Centralized Outcomes Tracking Through National Databases (NPIC, NSQIP, NCDB)

Current MHS initiatives can support the effort to better track disparities in key clinical areas and measure the effectiveness of interventions to reduce them. For example, the MHS currently contracts with external databases and registries such as NPIC, NSQIP, National Cancer Database (NCDB), and others. NPIC attempts to improve the quality of perinatal care and outcomes for mothers and infants by providing hospitals with risk-adjusted data, benchmarks, and resources to support their quality improvement efforts, such as its PPH bundle initiative. NSQIP collects and analyzes clinical data from surgical procedures performed in participating hospitals across the United States. NSQIP helps hospitals improve the quality of surgical care by providing risk-adjusted benchmarks for comparison along with tools and resources to improve care and track improvements. While both NPIC and NSQIP databases can report outcomes by race and ethnicity, the MHS does not use this feature within NSQIP, and examines outcomes for its population only as a whole or by facility. MHS should work with NSQIP to access the race and ethnicity information in their databases to identify potential health inequities and track the needed improvements. Some MTFs are accredited by the American College of Surgeons Commission on Cancer and participate in the American College of Surgeons NCDB. However, the MHS does not routinely examine their results within the NCDB by race or ethnicity to understand potential health disparities.

Measurement Strategies

Voice of the Customer (Patient-Reported Outcome Measures)

Patient-reported Outcome Measures (PROM) can promote health equity in several ways[57,58]:

- Identifying Disparities: PROMs can help identify disparities in health outcomes and access to healthcare among different demographic groups. By collecting data on patient-reported experiences and outcomes, healthcare providers and policymakers can gain insights into the unique needs of different populations, including those who are historically marginalized and underserved.
- Tailoring Treatment: PROMs can also help tailor treatments to meet the specific needs of different patient groups. For example, if a particular population consistently reports higher levels of pain or poorer quality of life, healthcare providers can adjust treatment plans accordingly to improve outcomes.
- Patient-Centered Care: PROMs promote patient-centered care by allowing patients to provide feedback on their own experiences and outcomes. This will help healthcare providers to meet the unique needs and preferences of each patient, and produce better health outcomes.

- Accountability and Quality Improvement: PROMs can be used to hold healthcare providers and systems accountable for providing equitable care. By collecting and reporting data on patient outcomes, healthcare providers and systems can identify areas for improvement and take steps to address care disparities.

Surveys

The MHS collects information about patient experience through the Health Care Survey of DoD Beneficiaries (HCSDB). The HCSDB provides comprehensive information on beneficiary opinions about their health preventive services, access to care, and overall satisfaction with their health care experience.[59] The HCSDB includes questions modeled from the Consumer Assessment of Health Care Providers and Systems (CAHPS), a nationally recognized set of standardized questions to report health care experience information.[59] The MHS can use CAHPS metrics from the HCSDB, which includes the TRICARE purchased care network, to benchmark results against national patient satisfaction rates. The HCSDB collects respondent information including education level, race and ethnicity, primary language, and age.[60] However, quarterly and annual reports of survey results do not include these demographic variables in their analyses.[60] A 2021 DHA Issue Brief did examine disparities in the use of preventive care by race and ethnicity from the 2016-2020 HCSDB, but this was not part of any ongoing analysis.[61]

TRICARE beneficiary surveys also include demographic information and document access to and quality of care. The DHB received an unpublished analysis of the 2017-2020 TRICARE Select Survey of Beneficiaries that measured access to and ratings of care by beneficiary race and ethnicity, income, and other beneficiary characteristics. The analysis showed variation in access to and quality of care by race and ethnicity.[62] These examples of existing beneficiary surveys show that patient experience data are available, although comprehensive analysis of these data are not widespread in the MHS.

The DHB learned that some health systems capture the "voice of the customer" to better understand their needs (Appendix I). Cleveland Clinic has developed targeted interventions to understand and meet the needs of the communities they serve. It formed a health equity council consisting of leaders from Cleveland Clinic and representatives from the community. Providence has also implemented a similar strategy of community engagement to promote trust, develop interventions that address the community's needs, and promote better outcomes for communities most in need. Kaiser Permanente has developed social needs screening tools for members and connects members with community resources to address poor SDOH conditions.

Overall, patient experience data and PROMs play a critical role in promoting health equity by identifying disparities, tailoring treatments, promoting patient-centered care, and holding healthcare providers and systems accountable for providing equitable care. The DHB

encourages the DoD to enhance the collection and analysis of PROMs to better understand the lived experience of Service members and other beneficiaries.

Conclusion

Through continued data collection and implementation of dedicated resources to conduct in-depth, systematic analysis of these data the MHS will be better able to identify areas where health outcome disparities exist. Efforts to implement or expand outcomes data capture will improve the accuracy of such analyses. Beyond implementing this dedicated analysis resource, the MHS should take urgent action to address disparities in maternal health and other clinical areas that current analyses provide clear and consistent evidence for their existence, and the dangers they pose to Service members and beneficiaries.

Findings and Recommendations from Chapter 5

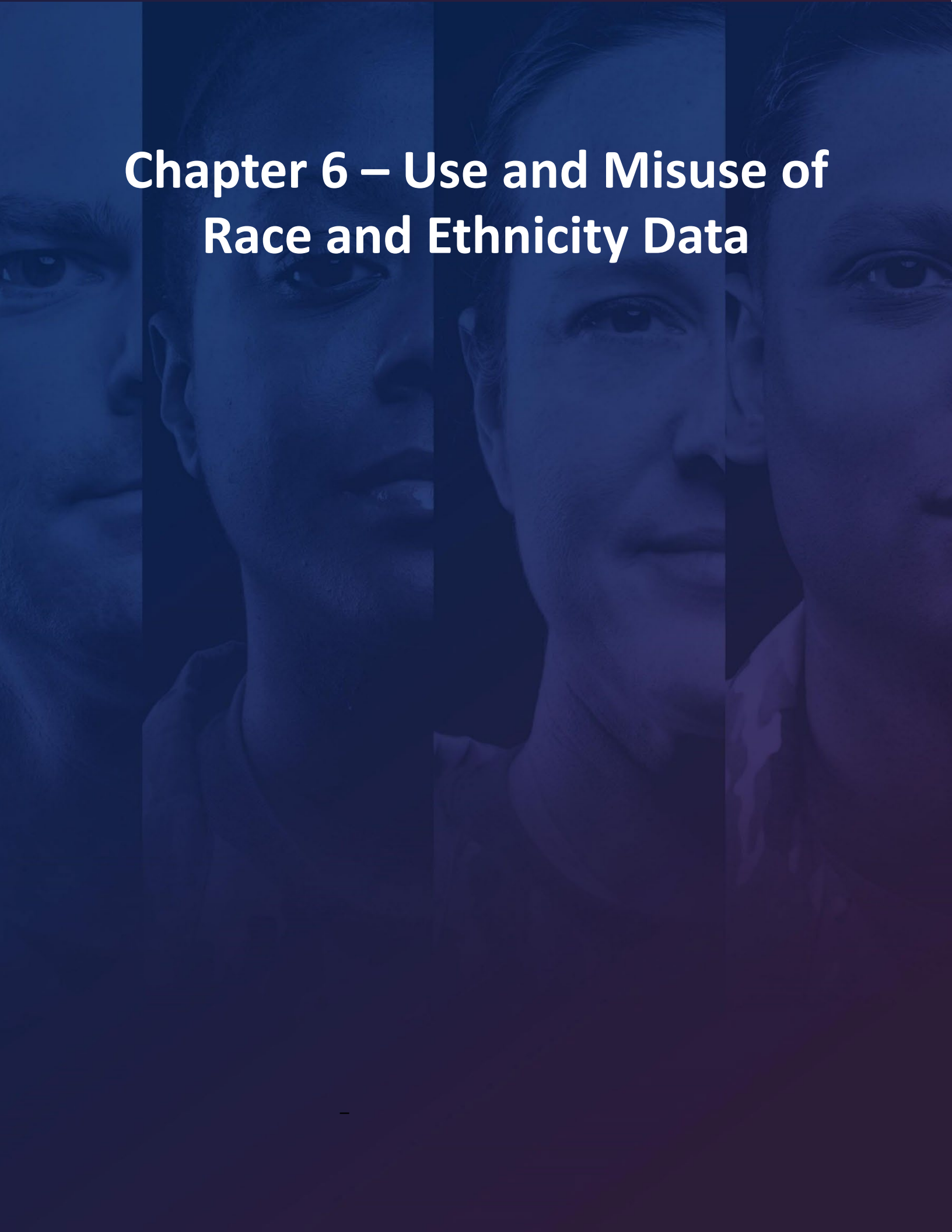
Finding 3: The DHB could find little evidence of systematic and sustained interventions to reduce racial and ethnic health disparities across the MHS.

Recommendation 3. A: DHA should prioritize maternal and infant health by reevaluating as well as accelerating current efforts to adopt known best practices in the MHS systemwide to eliminate the demonstrated racial disparities in these outcomes.

Recommendation 3. B: Prioritize additional clinical areas for improvement in disparities by those which have the greatest likely impact:

- Clinical conditions that affect a large population
- Clinical conditions that affect large number of actual or quality of life-years lost
- Clinical conditions that impact readiness of the force
- Clinical areas of known racial or ethnic disparity. Preliminary evidence suggests the existence of disparities by race and ethnicity in these areas among others:
    i. Cardiovascular (e.g., hypertension, heart disease, diabetes)
    ii. Obstetrics (e.g., maternal and infant health)
    iii. Pediatrics (e.g., vaccination, well-child visits, obesity, asthma)
    iv. Oncology (e.g., screening and outcomes)
    v. Mental Health (e.g., access and outcomes)

Chapter 6 – Use and Misuse of Race and Ethnicity Data



> "Standardized data collection…is critically important in the effort to understand and eliminate racial and ethnic disparities in healthcare…[but] The need for data on patients' race and ethnicity and quality of care must be balanced against other significant considerations."
>
> From Institute of Medicine's *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*[9]

Reducing health care outcome disparities requires appropriate use of accurate race and ethnicity data and these data can also be used to inform clinical decisions. However, race and ethnic data can also be used inappropriately. Inappropriate uses include: (1) historical medical injustices toward racial and ethnic minority populations; (2) biases in the application of race and genetic ancestry in medical decision-making, particularly in Clinical Decision Support (CDS) tools and Artificial Intelligence (AI) applications; and (3) misuse of these data by payors and others. Health care systems, including the Military Health System (MHS), should have a deliberate process to ensure the proper use of race and ethnicity data in health care decisions, including potentially adverse second- and third-order effects on historically marginalized populations.

Collection of Race and Ethnicity Data within the Context of Historical Medical Injustice

Medical injustices contributed to adverse health outcomes and current medical mistrust.[63] Collecting information on race and ethnicity may drive fears among minority populations, including denial of care on the basis of race and ethnicity, an illegal practice known as *redlining*[64], and concerns about deportation and other adverse immigration actions.[65,66] Highly granular stratification of race and ethnicity data can raise privacy concerns.[67] Correct and responsible collection of race and ethnicity data, therefore, must consider both present data regulations and past injustices. Patient information practices should protect confidentiality, and ensure that data collection activities have a favorable benefit-cost ratio, and do not negatively impact patient care.[9] Leaders should follow best practice data collection policies, ensuring that race and ethnicity data are used only to improve patients' health.[68]

Race and Genetic Ancestry in Medical Decision-Making

> **Race** is "a social construct used to divide human populations into groups, often based on physical appearance, social factors, and cultural backgrounds."[69]
>
> **Genetic ancestry** refers to fixed characteristics of the genome that can be objectively defined and measured.[70]

Race and ethnicity subjectively categorize people based on certain physical characteristics and cultural practices. In contrast, genetic ancestry describes the presence of genetic variants within individuals and populations. While genetic ancestry frequently overlaps with race and ethnicity categories, the social categorization of race is an imprecise proxy for genetic ancestry and may not accurately predict health outcomes.[69] Genetic ancestry predicts the presence of genetic variants that affect an individual's health better than self-reported race and ethnicity data.[70]

Nevertheless, race and ethnicity data can provide useful information to improve diagnosis and treatment for some medical conditions. Understanding that Tay-Sachs disease is more prevalent in people of Ashkenazi Jewish descent or that Sickle Cell Disease is more prevalent in people of African descent can help clinicians diagnose a medical condition and start treatment more rapidly. Knowing that skin keloid formation is more common in those of African or Chinese ethnicity, clinicians may recommend different approaches to surgical excision of skin lesions or treatment of acne to improve outcomes for these patients.[71] In these examples, race and ethnicity, integrated with other variables, can be useful for medical decision-making, however relying only on race or ethnicity data would be inappropriate and insufficient. For example, a clinical decision support tool that assumed all people of Ashkenazi Jewish descent carried the trait for Tay-Sachs Disease, when only one in every 27 Jews in the United States is a carrier, would be inappropriate use. Conversely, with one in 250 people in the general U.S. population carrying the trait, it would be inappropriate to assume that individuals from other ethnicities could not have Tay-Sachs Disease.[72] Similarly, Sickle Cell Trait is found among some non-African individuals whose ancestors originated in areas where malaria was endemic, such as the Middle East and western India.[73]

Clinical Decision Support (CDS) and AI Algorithms Are Only As Good As The Underlying Data

> "To tackle discrimination in health care and insurance coverage, we must evaluate and act on how algorithmic decision making contributes to the inequalities within our health care system."[74]

Health systems deploy CDS and AI algorithms to standardize, improve, and streamline health care. The logic and statistical models underlying these tools use aggregated clinical trial and patient data, often based on historically homogenous and unrepresentative data sets.[74] Despite the best intentions of developers, clinicians, and health care leaders, CDS and AI algorithms can inadvertently contribute to disparate patient treatments across race, ethnicity, and other demographic dimensions.

Algorithms that "individualize risk assessment and guide clinical decisions" through application of race-adjusted rules can distort apparent disease risk for racial and ethnic minority groups, and exacerbate or perpetuate existing racial and ethnic health outcome disparities due to delays in diagnosis or delivery of treatment mismatched with the clinical severity or need. [74] A 2020 *New England Journal of Medicine* article on race correction in clinical algorithms provides an extensive, but not exhaustive, overview of race-based calculators currently in use across medical fields including cardiology, cardiac surgery, endocrinology, nephrology, obstetrics, oncology, pulmonology, and urology.[75] The article explores how the use of race as a proxy for human genetic diversity leads to worse outcomes for different races when used without consideration of the social context in which people live.[75] The researchers, in developing the algorithms for estimating disease risk across a range of medical specialties, used regression analyses to determine the relationship between clinical outcomes and patient characteristics, including race. The statistical analyses, while finding associations between health outcomes

and race and ethnicity, omitted the contribution to disease risk from SDOH and genetic ancestry, variables correlated with race and ethnicity.[76-79] Other disease risk calculation guidelines do not provide any rationale for including race as a factor.[14,80,81] Maglo, *et al*. explain that population-wide studies show considerable genetic overlap between racial groups, implying that race may not be a reliable measurement of genetic difference and should not be used in clinical algorithms as a proxy for genetic variation.[69]

In summary, clinical risk calculators based on empirical data may mistakenly infer race as a causal rather than correlated variable for disease risk. Any use of race or ethnicity in a clinical decision tool should be meticulously scrutinized to determine if it introduces bias and limits the benefits of the tool to racial and ethnic groups. Any such determination would reveal the need for a calculator that better reflects the biological reality of an individual's risk level.

Examples of How Race Data in Clinical Risk Calculators Can Exacerbate Racial and Ethnic Health Disparities

The DHB identified several examples where inclusion of race in a clinical risk calculator exacerbates racial and ethnic health disparities. It also identified instances when revising risk calculators to include factors associated with race improved their performance.

Nephrology

Glomerular Filtration Rate (GFR), a measure of how well kidneys filter blood as it passes through the blood vessel filters (glomeruli) in the kidney, is the best-established means of quantifying kidney function.[82] Directly measuring GFR requires a nuclear medicine study that is time-consuming, expensive, and uses an intravenous injection. In practice, health care providers usually estimate GFR using a combination of endogenous markers (e.g., creatinine, cystatin C) present in routine blood tests along with other patient variables, such as age, sex, and often race, using an algorithm. This faster and less expensive estimated GFR (eGFR) helps health care providers determine a patient's risk for kidney disease.[83]

Data from the Modification of Diet in Renal Disease (MDRD) Study, a multicenter controlled trial, informed the development of the eGFR calculation. The MDRD Study showed that Black study participants had higher serum creatinine values than White participants at a given measured GFR level.[84] Later genomic research identified increased disease risk for those individuals with Apolipoprotein L1 (APOL1) polymorphisms, a genetic characteristic associated with West African ancestry.[85] However, the calculation for eGFR assumes that all Black patients have this APOL1 trait.[86] The higher eGFR values for Black patients at the same serum creatinine levels as non-Black patients, indicating better kidney function, can result in delayed referral to specialist care or delayed listing on the kidney transplant waiting list.[75] Analysis of the impact of the race coefficient in the eGFR indicates the race-adjusted estimate is less accurate than

another calculator, the Chronic Kidney Disease Epidemiology Collaboration equation, that calculates eGFR using serum creatinine and cystatin C but omits race.[87,88]

The Kidney Donor Risk Index (KDRI) predicts the risk that a donated kidney will fail. The KDRI predicts allograft longevity and includes Black race as a risk factor for failure, based on research that showed Black donors with two APOL1 renal-risk variants failed sooner than other donors with fewer variants.[93] However, further research found an improvement of 85-90% in KDRI scores when APOL1 genotype replaced race in the calculation.[94] This finding lends support for considering genetic ancestry rather than race for clinical risk measures.[95]

Obstetrics

Pulse Oximetry Equipment Contributes to Differential Treatment

Pulse oximetry estimates arterial oxygen saturation (SaO2), or the amount of oxygen circulating in the blood, by shining a light through the skin at two different wavelengths and measuring the difference in light absorption. Jubran and Tobin document over 30 years of inaccuracies in pulse oximetry readings, specific to patients with darker skin pigmentation.[89]

An observational study of COVID-19 patients provides an example of systematic error in pulse-oximeter measurements. This study found that pulse oximetry measured higher levels of SaO2 among patients with darker skin than those with lighter skin. This artificially high reading places patients with darker skin at higher risk of delayed or insufficient treatment for COVID-19.[90] In 2021, the FDA issued a warning to the public and health care providers on the limitations of pulse oximeters for estimating blood oxygen levels, including inaccuracies among patients with dark skin pigmentation.[91]

Since current pulse oximetry devices put patients with darker skin tones at higher risk for undertreating hypoxia, a current clinical strategy for more accurate SaO2 measurement is to obtain more arterial blood gases through invasive testing. However, this subjects the patient to a higher risk of complications and physical pain.[92] Clinicians need to be aware the pulse oximetry may not accurately reflect the level of oxygen deprivation in their patients with darker skin tones and conduct further investigations when clinically warranted.

The U.S. has significant disparities in maternal morbidity and mortality.[96] A commonly used clinical tool estimates success rates for vaginal birth among women with a previous cesarean delivery. Vaginal delivery has several well-established benefits over cesarean delivery, including avoidance of surgical complications, lower risk of postpartum hemorrhage and infection, and lower risk of complications in future pregnancies.[97] The Vaginal Birth After Cesarean (VBAC) calculator includes two race correction factors that predict Black and Hispanic women of the same age and BMI to be at greater risk of VBAC failure than White patients, causing them to have a lower likelihood of being offered the VBAC option.[79] The VBAC calculator, therefore, contributes to disparities in cesarean deliveries nationwide and to significant existing disparities in maternal morbidity and death.[98]

The original research leading to inclusion of race and ethnicity in the VBAC calculator used scientifically questionable (at best) or explicitly racist descriptions of Black and Indigenous women to explain why their pelvic anatomy made vaginal birth more dangerous for them.[99-101] The VBAC calculator, by assigning the same weighting to all women in a racial category, produced biased risk scores. Research for Swedish and Canadian variations of the VBAC calculator found that maternal race and ethnicity were not significant factors for maternal

risk.[102,103] These latter studies show how health care providers can accurately assess VBAC risk without including patients' race and, thereby, can avoid increasing racial and ethnic maternal health disparities.

Effects of Race-based Medication Prescribing

Personalized or precision medicine has identified the hormonal, metabolic, and genetic reasons for the individually-varying medication responses long observed and previously unpredictable by clinicians. Modifying medication choice or dosing based on genetic ancestry or specific genes is the field of *pharmacogenomics*. Pharmacogenomic guidelines advise health care providers how to choose and adjust medication dosage based on a person's specific genetic variant. Before the discovery of these genes, and continuing today, race and ethnicity often served as a short-cut and surrogate for pharmacogenomics-informed medication prescribing. As with clinical calculators, CDS, and AI tools, health systems and clinicians should meticulously evaluate whether the use of race or ethnicity to inform medication decisions in the absence of available pharmacogenomics data benefits or harms individuals, and work to improve the timeliness and availability of pharmacogenomics data to obviate the need to use race or ethnicity as a surrogate.

Race and ethnicity are generally poor surrogates for genetic ancestry related to medication metabolism. Different expression of genes among patients with the exact same variant, and of the same race or ethnicity, may lead to extremely different reactions to certain drugs.[104] The U.S. Food and Drug Administration (FDA) provides guidance on when to perform pharmacogenetic screening (using race and ethnicity as proxies for genetics, without testing the genetic variants in individual patients) to make dosage decisions. They recommend using ancestry to determine whom to screen for pharmacogenetic variants and to wait to initiate treatment until results are available. However, the FDA also acknowledges the limitations for some drugs "due to wide variability…within ethnic groups, [and] the difficulty in ascertaining ethnic ancestry and the likelihood of mixed ancestry."[105] For example, the FDA cautions that simply using Chinese ancestry as the screening basis for pharmacogenomic testing before dosing Tegretol can miss some patients who should be tested for optimal dosing. Additionally, the body of literature that informs race-based pharmacogenetic guidelines underrepresents non-European patients, which can lead to race-based differences in utilization of genomic testing and dosing practices where applicable.[106,107] Due to the variation in alleles among individuals within the same race category, race and ethnicity are not always appropriate surrogates of genetic ancestry for health care providers to make pharmacogenomic decisions.

For example, one common gene, CYP2D6, results in a liver enzyme that metabolizes 25% of all prescription drugs.[108] Variations in this gene result in different levels of enzyme function and medication metabolism depending on the combination of alleles present in an individual.[104] This has important implications for medication type and dosage as the same dosage can place individuals with "ultrarapid" metabolism at risk of inadequate treatment and "poor

metabolizers" unable to process the medication and be at risk for adverse reactions from high levels of the medication or its byproducts.

A review of over 100 pharmacogenetic papers involving the CYP genes concludes that broad race categories contain ethnic subgroups with too much allele variation within the same race category to accurately assess a particular patient's allele frequency; therefore, one cannot accurately predict an individual's drug metabolism response based on race alone.[109] For example, studies show different dose-dependent reactions to warfarin among individuals of African descent depending on allele concentration in the CYP2C9 gene.[110]

Nevertheless, in the absence of easily obtainable, affordable, and timely lab testing for genetic ancestry, some health care providers continue to use race and ethnicity to make pharmacogenomic testing decisions and even dosing decisions. Ascertaining additional information to better assess a patient's genetic ancestry through discussion of family history, geographic origin, and known genetics from other sources can better approximate genetic ancestry than race or ethnicity alone in some cases. One study found that routine, proactive CYP3A5 genotyping of kidney transplant patients avoided adverse effects of allele variation by utilizing genotype over race as a more accurate predictor of drug response.[111] In this case, all patients listed for kidney transplant were tested for CYP3A5 as part of standard clinical care and the results reported in the electronic medical record. The study concluded this practice was both sustainable and resulted in better patient outcomes.[111]

The MHS should ensure health care providers have the training and resources to determine the best course of action, such as a genetic screening, when a patient presents with a condition whose treatment may be affected by pharmacogenomic decisions. The DHB recommends a review process for all protocols to prevent the exclusive use of race for clinical decisions when genotype would yield a more beneficial result for the patient without undue delay in initiating treatment.

Example of Using Race and Ethnicity as a Surrogate for Pharmacogenomics

A rheumatologist diagnoses gout in a patient who identifies as Asian American. She knows allopurinol is the best preventive medication and that patients with Chinese Han ethnicity are more likely to have severe skin reactions with allopurinol due to a higher prevalence of an HLA-B gene variant. Testing for the HLA-B gene will take several days. Based on race and ethnicity, the rheumatologist defers the decision to initiate this medication until HLA-B test results return or starts therapy with a less-effective or more-expensive alternative.

The benefit is avoidance of a potentially fatal complication; risks include delay in initiating optimal treatment, venipuncture, and the expense of cost-sharing for the laboratory test.

Artificial Intelligence Magnifies the Risk

Increasing automation of medical algorithms through CDS and AI-based calculations magnifies the risk of inappropriate use of race and ethnicity in health care. Even when CDS and AI serve as an adjunct to direct patient observation and conversation, the efficiency and autonomy of

these tools can introduce racial and ethnic bias that is unobservable to the patient or clinician. With AI in its infancy, and evidence already demonstrating risks to patient safety from overreliance on AI, all AI systems should be carefully evaluated before being placed into widespread use.[112]

Despite these concerns, AI possesses great potential to improve patient outcomes to individuals and populations of all races and ethnicities if designed and applied in a responsible manner[74]:

- Improving diagnostic accuracy: AI can analyze large amounts of patient data to help identify patterns and detect diseases earlier than traditional methods. This can lead to earlier diagnosis and more effective treatments.
- Enhancing patient care: AI can be used to develop personalized treatment plans based on patient data and medical history, leading to better health outcomes.
- Reducing healthcare costs: AI can help healthcare providers identify high-risk patients and provide early interventions to prevent costly hospitalizations and complications.
- Streamlining administrative tasks: AI can be used to automate routine administrative tasks, such as appointment scheduling and billing, freeing up healthcare providers to focus on patient care.

AI can also promote patient safety with appropriate evaluation and adaptation in clinical operational settings. Similar to the use of AI in diagnosis, design of treatment plans, cost reduction, and administrative efficiency, patient safety applications require clear guidance to ensure appropriate use and avoid inappropriate use of race and ethnicity data for the best possible patient outcomes. Classen, *et al*. describe evidence of improved safety processes due to AI tools, but warn that these same systems can increase risk if the algorithms are tuned to give overly confident results.[112] Implementation of AI tools requires rigorous evaluation to determine the benefit to patient safety and importance of evaluating potential negative effects.[112] For example, one large commercial Electronic Health Record (EHR) vendor disseminated its self-developed AI model for sepsis detection in hundreds of U.S. hospitals, without critical evaluation. The model identified 7% more patients with sepsis than a clinician but still missed 67% of the patients with sepsis, raising concerns about sepsis management and potential consequences of overreliance on AI in general.[113]

Appropriate use of AI depends on both accurate source data for its calculations and informed interpretation of its results by providers. The FDA, in its 2022 guidance on the use of AI in CDS, acknowledged that AI improved the accuracy and efficiency of CDS systems and helped healthcare providers make more informed decisions. However, the FDA also cautioned that AI-based CDS systems must be evaluated for safety and effectiveness before they are used in clinical settings.[114] It emphasized the importance of transparency in the development and deployment of AI-based CDS systems, including clear explanations of how the system works, how it was developed, and its limitations.[114] Overall, the FDA continues to support the use of AI

in CDS but emphasizes the need for careful evaluation and transparency to ensure patient safety and improve healthcare outcomes.[114] The World Health Organization (WHO) also calls for rigorous oversight on health care uses of AI to ensure that AI advances equity and inclusion.[115]

In October 2023, the White House released an Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence. This Executive Order provides guidance for the responsible development and use of AI to protect against "societal harms such as fraud, discrimination, bias, and disinformation" through a coordinated effort across the Federal Government.[6,7]

Developed by the DoD's Chief Digital and Artificial Intelligence Office (CDAO), the 2023 DoD Data, Analytics, and Artificial Intelligence Adoption Strategy outlines the department's strategy for adopting AI to support broader U.S. Government policy and specifies that the DoD's AI policy places quality data at the foundation of its strategy. Building on quality data, the strategy includes analytics and metrics to understand the impact of decisions. The strategy places "Responsible AI, the Department's dynamic approach to the design, development, deployment, and use of AI capabilities in accordance with the DoD AI Ethical Principles" as a fundamental concept.[116]

The DHB encourages the MHS to heed the U.S. Government and WHO's cautions about appropriate use of AI, and work with the existing CDAO to ensure appropriate use of AI for health.[117] Centralized evaluation of these tools and guidelines can prevent inadvertent contribution to racial and ethnic health disparities in the MHS. The MHS should meticulously review CDS and AI tools to ensure that their clinical guidelines, risk calculation algorithms, and equipment do not introduce or promote racial and ethnic health disparities. When evidence shows clinical decision-making tools or guidelines promote inappropriate differential treatment and outcomes based on race and ethnicity, the MHS should implement change to rectify the inappropriate use. In its Equity Action Plan, the DoD outlined a plan for adopting ethical principles, including equity, in its development, deployment, and use of AI technologies in its operations.[3] The MHS should ensure its use of AI complies with the DoD strategy for ethical and equitable AI and all U.S. Government guidance on the development and use of AI for health. To support this strategy, the DoD could look to the Coalition for Health AI (CHAI™), "a community of academic health systems, organizations, and expert practitioners of AI and data science" with the mission of providing guidelines regarding the changing landscape of health AI tools to ensure high quality care, increase credibility amongst users, and meet health care needs.[118] Current U.S. Government observers of CHAI include AHRQ, CMS, FDA, HHS, ONC, NIH, and the White House Office of Science and Technology Policy.[118]

In formulating a plan to avoid inappropriate use of race and ethnicity in future CDS and AI, the MHS can adopt strategies recommended by the FDA and other leaders in the field of patient

safety. In their 2021 article, Christensen, *et al*. recommend developing a regulatory framework that promotes transparency and accountability.[74] This includes:

- The best possible quality data are used to reduce risks and discriminatory outcomes
- Transparency of details related to the purpose, development, and risks of health care AI and machine learning
- Appropriate human oversight measures to reduce risk

The authors cite the FDA's AI/Machine Learning-Based Software as a Medical Device Action Plan as an example of the type of review of medical AI and Machine Learning that the U.S. Government should undertake.[119]

Efforts to Replace Race-based Algorithms in MHS/VA with more Accurate Alternatives

In the 2010s, some MTFs added automatic calculation and display of race-based eGFR to lab results that included serum creatinine. The display in the MHS legacy EHR, AHLTA/CHCS, listed an 'AA GFR' and a 'non-AA GFR' for patients 18 years or older. Health care providers at Walter Reed National Military Medical Center led an independent initiative to replace the use of race as a coefficient for eGFR with a race-neutral equation in accordance with recommendations put forward by the National Kidney Foundation and American Society of Nephrology. Distributed decision-making in DHA's legacy EHR system led to some MTFs updating their GFR calculation and display with a more accurate and race-neutral equation from the CKD-EPI.[120] Others did not. In DHA's National Capital Region Market, the A. T. Augusta Military Medical Center (previously known as Fort Belvoir Community Hospital) adopted the new GFR calculation while Walter Reed National Military Medical Center notably did not. With the transition to MHS GENESIS and its centralized laboratory decision-making, all MTFs now use the CKD-EPI equation. In its March 2023 visit to a large MTF, the DHB Health Systems Subcommittee observed a de-identified nephrology patient's health record in MHS GENESIS. This record included recent eGFR results calculated using the race-agnostic formula. A similar effort by health care providers at the Jesse Brown VA Medical Center succeeded in replacing the eGFR calculator that included a race coefficient after efforts by a group of health care providers lobbied leadership for the change.[121] In both cases, local clinicians, supported by higher leadership, drove the change. Centralized authority and decision-making were key to broad systems-wide adoption of the race-agnostic equation.

Health Insurance

While MHS beneficiaries generally enjoy greater health coverage than many civilians, using race-based algorithms developed for civilian insurance programs can harm MHS beneficiaries. One nationwide risk-prediction tool uses past health care expenditures to calculate a patient's clinical risk level and to target interventions that improve outcomes and prevent more costly

care in the future. Analysis of this calculation found that "at a given level of health, Blacks generate lower costs than Whites."[122] The algorithm systematically classified Black patients with the same number of chronic conditions as White patients as healthier (because their historic costs were lower), despite being equally medically complex, erroneously indicating a lower need for care or other support services. Given this baseline difference in costs and resulting predictive bias in the algorithm, researchers demonstrated that among the 3.7 million commercially insured patients in a national dataset, nearly 50,000 Black patients had more active chronic conditions than White patients at the same algorithm-predicted risk level.[122] The algorithm manufacturer, Optum, independently replicated and confirmed this analysis. When researchers removed race, the discrepancy decreased by 84%.[122]

This study demonstrates that historical health care costs are a poor predictor of future health needs. Study authors concluded that using race in the algorithm's calculations can inadvertently lead to widening health disparities.[122] The authors noted that all risk-prediction tools in use in the United States, including the Johns Hopkins Adjusted Clinical Group tool used by the MHS, likely have the same built-in, but correctible, bias.[122]

Diversity in Medical Research

The FDA has also published guidelines for increasing the diversity of clinical trial populations which will lead to clinical trials that better reflect the populations most likely to use the drug if it is approved.[123] Clinical trials have tended to included homogeneous patient populations leading to a lack of understanding of potential impacts of treatments on diverse populations.[124] Trial recruitment methods may contribute to this lack of diversity in clinical trials due to the use of convenience sampling to quickly gather data from enough study participants and sampling from a geographic area with a homogenous population. If researchers do not intentionally stratify the study population to recruit participants from underrepresented groups, there may be insufficient clinical data to draw meaningful conclusions for these groups and contribute to disparities.[124] The National Institutes of Health "All of Us" Research Program is building a database of clinical trial participants that represent the diversity of the United States and aims to support medical research by increasing data availability for all population groups. [125] The "All of Us" program can be a valuable resource for promoting diversity in clinical trials.

The DoD allocates funds for medical research that benefits Service members, retirees, family members, and civilians through the Congressionally Directed Medical Research Programs (CDMRP). The CDMRP managed 35 Congressional Special Interest programs in Fiscal Year 2022 and appropriated over $1.5 billion that year alone.[126] This represents a significant contribution to medical research and an opportunity to promote diversity in clinical trials. The DoD should ensure that the clinical trials it supports include subjects from diverse and minority populations appropriate to the scientific study under question.

Conclusion

While accurate data are essential for identifying and rectifying racial and ethnic health disparities, the data must be used correctly and responsibly. Health care providers, researchers, and health systems need to be aware of the negative impact on racial and ethnic minority groups when such data are used inappropriately in medical decision-making and algorithms. Patient race and ethnicity can significantly inform and misinform diagnosis and treatment. CDS algorithms can perpetuate bias and discrimination in health care. More powerful AI can magnify those biases in the quest for higher efficiencies. Race-adjusted algorithms must be evaluated to determine the appropriateness of race as a variable, the presence of inherent bias, and other contextual factors. If deemed inappropriate, biased, and harmful, policy makers should replace race and ethnicity variables with alternative and better predicting metrics.[74]

Vyas, *et al.* assert that "Researchers and health care providers must distinguish between the use of race in descriptive statistics, where it plays a vital role in epidemiologic analyses, [versus] in prescriptive clinical guidelines, where it can exacerbate inequities."[75] A health system can reduce health disparities by critically evaluating the use of race in its clinical risk calculators, AI tools, and equipment. The MHS can and should use existing guidelines to review the use and misuse of race and ethnicity in clinical decision-making algorithms and AI (Table 1 and Table 2) to eliminate bias, improve outcomes, and reduce disparities.

Table 1. Best practices for evaluating the use of race-adjusted clinical algorithms[75]

Is the need for race correction based on robust evidence and statistical analyses (e.g., with consideration of internal and external validity, potential confounders, and bias)?
Is there a plausible causal mechanism for the racial difference that justifies the race correction?
Would implementing this race correction relieve or exacerbate health inequities?

Table 2. Areas of Focus for AI and Patient Safety[112]

1. Develop AI/advanced analytics implementation models, implementation approaches, and methods for integration into clinical workflows 2. Create a patient safety framework to guide measurement of AI impact: How to use AI to improve each dimension of safety from retrospective analysis to real-time monitoring to future use of prediction 3. Build an AI patient safety financial business case 4. Reduce cognitive and total work burden with AI which should be interpretable and usable for frontline users. 5. AI patient and consumer focused issues: study how patients and consumers will view and use these tools and how their use will impact patient-doctor 6. and patient-healthcare team relationships 7. Create ways to engage all the relevant stakeholders in AI use and design 8. Develop effective governance/oversight and accountability for AI in clinical care 9. Develop methods to learn and loop back to adjust AI algorithms to ensure equity—refine or change for different or changing populations 10. Create AI to enhance adverse event/near miss monitoring and real time safety surveillance 11. Create Use Cases for the application of AI to specific problems in patient safety

Findings and Recommendations from Chapter 6

Finding 4: Race and ethnicity should be carefully considered in the context of all variables affecting patients' health. Artificial Intelligence (AI) and Clinical Decision Support (CDS) tools have great potential to improve clinical treatments and health outcomes. However, biases in the underlying data stemming from poor study design, data collection and entry, algorithm choice, and dissemination of results can contribute to health disparities. This is also true for some tools used in the calculation of health care costs.

Some medical risk calculators, decision-making tools, and equipment in use by MHS health care personnel introduce inappropriate or unjustified racial and ethnic bias. The U.S. Government has outlined standards for the appropriate development and use of AI, including for health.[6,7]

> **Recommendation 4. A**: Create a centralized mechanism within the MHS to review data use, new protocols, and equipment to prevent inappropriate incorporation of race-biased algorithms in MHS clinical practice. At a minimum, AI algorithms and CDS tools should include individual patient symptoms, family history, and genetic screening results. Follow guidance from the federal government on appropriate development and use of AI. The DHB recommends that DHA participate in groups such as the Coalition for Health AI (CHAI™), which is developing guidelines and principles for the transparent, appropriate, and equitable use of AI in health care.
>
> **Recommendation 4. B**: Use this centralized mechanism to review, replace, or eliminate existing race-biased tools, protocols, AI, Machine Learning algorithms, and equipment with the best-performing race-agnostic alternatives.
>
> **Recommendation 4. C**: Develop, implement, and monitor clinical guidelines that include the outcome of AI and CDS tools, to be applied in the context of individual patients' symptoms, family history, and genetic screening results.

Finding 5: Clinical trials are often conducted with homogeneous patient populations, leading to insufficient understanding of potential impacts of treatments on diverse populations. The DoD is a significant source of national funding for clinical trials and health research.

> **Recommendation 5:** DoD should ensure that investigators include patients and participants from diverse and minority racial and ethnic populations in DoD-supported clinical trials and health research as appropriate to the scientific study under question.

Chapter 7 – The Role of Social Determinants of Health in Health Outcome Disparities

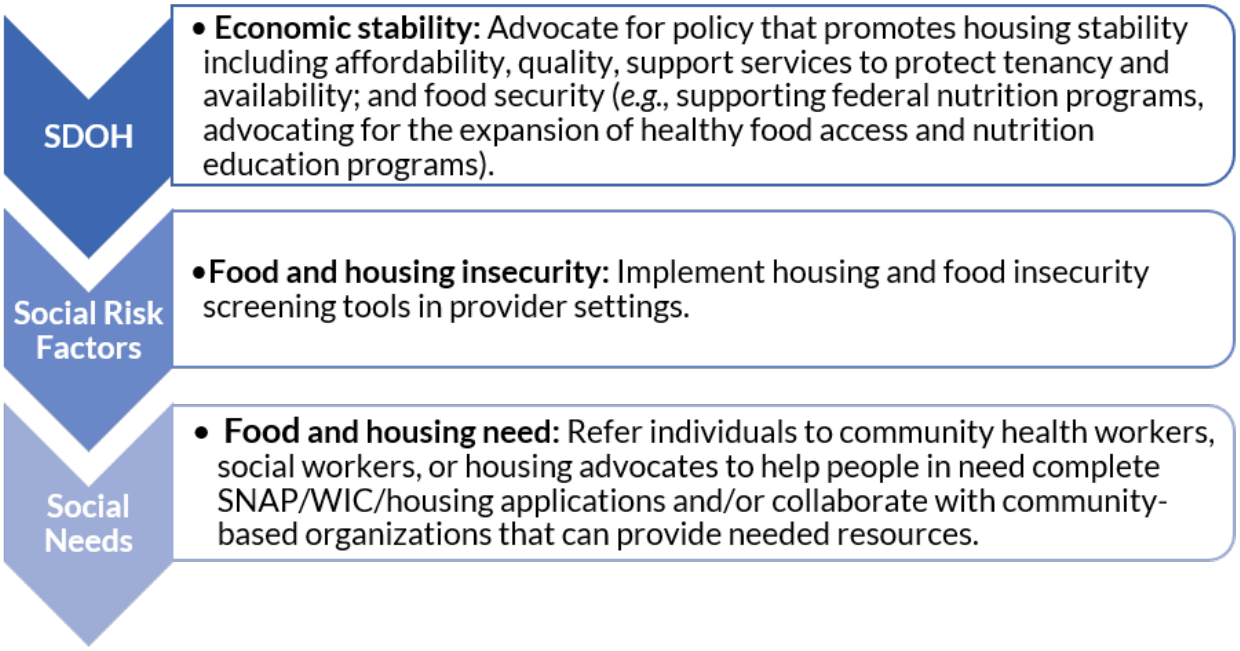
Health care delivery accounts for only a small portion of the variation in a population's health outcomes. Up to 50% of the variation in health outcomes derives from differences in the SDOH, the conditions in the environment where people are born, live, learn, work, play, worship, and age.[127-130] SDOH factors influence patients' access to clinical care and how they receive and respond to care. They also influence the likelihood that patients will follow health enhancing behaviors.[131] Importantly, SDOH are critical factors in understanding health disparities.[132] Policy and systems change can effectively promote health equity by addressing underlying SDOH factors.[131]

The impact of long-standing and present-day SDOH correlate with race and ethnicity.[133-135] By examining how SDOH influence disparities in patient outcomes, along with race and ethnicity, the MHS can identify more effective interventions and solutions to address and eliminate disparities.[136,137]

Addressing Social Determinants of Health and Health-Related Social Needs

SDOH encompass broad societal and environmental influences that can adversely affect an individual's health. SDOH factors include economic instability, stemming from unemployment and poverty, sub-standard and unsafe housing, food insecurity, and limited access to healthcare.[138] Adverse SDOH can be addressed by targeted policy interventions to remedy the shortfalls, such as by improving access to safe and healthy housing, nutritious food, and high-quality medical care. Social risks represent specific adverse social factors at an individual level, and often stem from or are exacerbated by social determinants.[138] Figure 1 illustrates the relationship between SDOH, social risks, and social needs.[139]

Figure 1. Examples of Interventions Across the Continuum of Social Determinants of Health, Social Risk Factors, and Social Needs[139]



The American Medical Association (AMA) explains that social needs are "individual-level material resources and psychosocial circumstances required for wellbeing of one's physical and mental health…[and include] specific adverse social conditions that are associated with poor health."[140] Health-Related Social Needs (HRSN) are the individual level experiences often derived from SDOH that influence health.[141] HRSNs are based on a person's priorities and perceptions of what is necessary to achieve good health – "distinguishing between social risks and social needs emphasizes the patient's role in identifying and prioritizing social interventions."[138] HRSNs include housing instability, housing quality, food insecurity, employment, personal safety, lack of transportation and affordable utilities.[141]

Disparities in HRSN are related to, but distinct, from SDOH. Addressing HRSNs, or the conditions in which people live and their underlying factors, often falls outside the areas of care for which primary care practices are responsible. However, health systems can address HRSNs through understanding which ones their patients face, connecting them to local community services, partnering with community-based organizations, or developing their own interventions that would most benefit their unique patient populations.[141]

The Accountable Health Communities (AHC) HRSN Screening Tool, developed by CMS, helps health care providers gather self-reported HRSN data across domains that map onto SDOH, but with a focus on patients' individual priorities.[142] The tool allows health care providers to

identify HRSNs systematically and incorporate these data into clinical workflows to refer patients to appropriate resources. The domains covered by the AHC HRSN Screening Tool are[142]:

- Housing instability
- Food insecurity
- Transportation problems
- Utility help needs
- Interpersonal safety

Considerations for Using HRSN Screening Tools

Garg, *et al*. note that social risk screening does not necessarily identify the most important factors that contribute to health for individuals and can reinforce patterns in health care provision that lead to disparities.[143] For this reason, health care systems should review any social needs screening protocols regularly to ensure they use the most up-to-date tools and practices. Citing "inherent fallibilities including false-positives and false-negatives" and inadvertent emphasis of "paternalistic care whereby clinicians attempt to address patient risks with motivational interviewing techniques to promote behavioral changes," the authors explain that many health systems use such screening methods without understanding the potential for causing mistrust of the health system and potential harm from reliance on these tools.[143] Unlike disease screening tools that may be verified against clinical data, HRSN screening does not lead to an objective conclusion about a patient's social risk and providers must view the result of any screening in the context of a patient's personal situation and their priorities. The authors emphasize that "health care professionals must respect each patient's decision to seek, or not seek, assistance for social needs."[143]

Measurement of SDOH in the Civilian Sector

The impact of SDOH is prominently featured in the Department of Health and Human Services' Healthy People 2030 initiative. This initiative, launched in 2020 and building upon similar initiatives dating back to 1979, aims to promote health and well-being by preventing disease, eliminating health disparities, promoting healthy behaviors, and engaging leadership to design polices that improve health. Healthy People 2030 includes SDOH in five domains with 358 core measurable objectives[127]:

Domain: Economic Stability **Goal**: Help people earn steady incomes that allow them to meet their health needs	**Examples**: • Reduce the proportion of people living in poverty • Increase employment in working-age people • Increase the proportion of children living with at least one parent who works full time
Domain: Education Access and Quality **Goal**: Increase educational opportunities and help children and adolescents do well in school	**Examples**: • Increase the proportion of children who participate in high-quality early childhood education programs • Increase the proportion of children with developmental delays who get intervention services by age 4 years • Increase interprofessional prevention education in health professions training programs
Domain: Health Care Access and Quality **Goal**: Increase access to comprehensive, high-quality health care services	**Examples**: • Increase the proportion of adults who get recommended evidence-based preventive health care • Increase the proportion of adolescents who had a preventive health care visit in the past year • Increase the proportion of adults who get screened for lung cancer
Domain: Neighborhood and Built Environment **Goal**: Create neighborhoods and environments that promote health and safety	**Examples**: • Increase the proportion of adults with broadband internet • Reduce the amount of toxic pollutants released into the environment • Reduce the proportion of families that spend more than 30 percent of income on housing
Domain: Social and Community Context **Goal**: Increase social and community support	**Examples**: • Increase the proportion of children and adolescents who show resilience to challenges and stress • Increase the health literacy of the population • Eliminate very low food security in children

Access to health care, a SDOH measured in part by health insurance coverage in the United States, contributes disproportionately to health disparities, including disparities by race and ethnicity.[131] While the military's near-universal health coverage for Service members and beneficiaries may decrease the relative impact of this SDOH domain, access issues remain.

SDOH in the MHS

The health status of MHS beneficiaries reflects in part the constellation of SDOH experienced prior to military life. But even with MHS' universal health benefits, SDOH, such as income, transportation, place of residence, and available social support, negatively impact health across all domains among current Service members and beneficiaries:

- Poor access to healthy foods and sufficient nutrition[144,145]
- Misuse of alcohol[146]
- Child abuse and neglect[147]
- Financial Stressors[148]
- Suboptimal Housing[149-151]
- Obesity[152,153]
- Language Difficulties – including discordant use of preferred language by healthcare providers[154,155]
- Low Spouse Education Level[156-158]
- Lack of Reliable Transportation and other Logistical Concerns[159-161]

The DHB's examination of health disparities identified three military relevant SDOH factors − financial stressors, food insecurity, and Adverse Childhood Experiences (ACE) − that negatively impact the health of Service members and their families.

Financial Stressors

Socioeconomic factors have the highest impact on health outcomes of all the Healthy People 2030 SDOH domains[130], and addressing economic instability though spousal employment opportunities, access to affordable housing, and adequate wages can reduce stress, improve mental health outcomes, and support healthy community relationships.[131] Although Service members are employed, their spouses often have challenges finding stable employment (due to factors such as frequent moves), which contributes to family financial stress. The unemployment rate for a potential second-earner in military families is 4-6 times the national average.[162,163] Military families often face financial stressors related to housing costs, due to limited family housing options, fast-rising home prices, and tight rental markets. Many families spend more than their basic allowance for housing to cover basic housing needs.[148]

Food Insecurity

Lower total household incomes can lead to food insecurity among military families, which adversely affects Service member readiness and retention.[164] The U.S. Department of Agriculture uses the term *food insecurity* to describe "a household-level economic and social condition of limited or uncertain access to adequate food"[165] and *food security* as "access by all people at all times to enough food for an active, healthy life."[166]

Results from the 2018 and 2020 Status of Forces Survey of Active Duty Members show that military households experience food insecurity at rates higher than the general population, with "25.8% of Army, Navy, Marine Corps, Air Force, and Coast Guard personnel [reported being] food insecure" in 2018 and 24% in 2020.[164,167] In contrast, only 10.2% of all U.S. households experienced food insecurity.[168] Some subgroups of military families, such as those with young children and those with lower ranks and incomes, experience higher rates of food insecurity.[164] For example, 26% of enlisted active-duty family respondents reported some level of food insecurity.[144] Single military parents with children may have even higher rates.[164] In addition, military family members who have at least one non-White racial or ethnic identity report food insecurity at twice the level of White, non-Hispanic active duty family respondents.[169] Military families, however, underutilize supplemental nutrition programs like the Supplemental Nutrition Assistance Program (SNAP) and the Women, Infants, and Children (WIC) program. Families who did use SNAP benefits were primarily junior enlisted Service members (E1-E4) with multiple children.[164]

The ready availability of unhealthy foods and lack of affordable healthy alternatives on military installations inhibit families living on base from choosing healthy foods.[145] Army Soldiers reported that lack of access to healthy food options contributed to their sense of powerlessness to sustain their health. Soldiers perceived that healthy food options were available only to those who could afford them, reinforcing social and economic disparities within the study population. Suggested remedies include increased access to healthy food options, improved financial support, and addressing broader social and economic factors that contribute to food insecurity.[145] The DoD developed a food security strategy that outlines evidence-based efforts to improve food and economic security of Service members and their families.[167] As part of this strategy, DHA introduced a validated food insecurity screening tool ("the Hunger Vital Sign") in MHS GENESIS and published a Clinical Practice Recommendation to provide an overview of food insecurity as an SDOH and suggest approaches to addressing food insecurity, with a focus on local program development.[167]

Adverse Childhood Experiences

The pre-accession life experience of Service members and their family members play a role in current and future health. ACEs, "potentially traumatic events that occur in childhood," are perhaps the best studied example of the relationship between lived experience and health.[170] A dose-response effect exists with multiple ACEs increasing the likelihood of poor health outcomes. In addition, multiple chronic health problems including heart disease, cancer, chronic lung disease, liver disease, and depression also have associations with ACEs.[170,171]

While ACEs and SDOH are related, they are distinct concepts that can have a bi-directional relationship. For example, children who grow up in a low income household with poor access to nutritious foods and little community support may also face an elevated risk for ACEs such as abuse, neglect, and household dysfunction.[172] These experiences, in turn, make that same child

less likely to succeed academically or have healthy social relationships leading to increased risk of future poor socioeconomic prospects – perpetuating this cycle. Addressing SDOH can prevent or reduce the development of ACEs or mitigate the effects of ACEs from prior lived experience, and in turn promote better current and future health outcomes for those at risk.

The 2019 DHB report, "Healthy Military Family Systems: Examining Child Abuse and Neglect" details existing research on the prevalence and effects of ACEs and the implications of ACE screening for military readiness. For example, research on ACEs among men with a history of military service shows this population has twice the prevalence of experiencing more than four ACE categories than men without military service histories (27.3% vs. 12.9%).[173] In its report, the DHB recommended "an improved focus on rigorous, outcomes-based research" to inform ACE risk and protective factors in military populations.[147]

Efforts to Address SDOH within DoD

SDOH's influence on physical, mental, emotional, and spiritual health ultimately affects readiness, as noted by a military physician in a 2022 *Military Medicine* article[174]:

> *In order to fulfill its ethical obligations to the social determinants of health of its active-duty service members, a military must make determined efforts to manifest social determinants of health conducive to healthy living through various modalities, including its built environment, organizational culture, and policies. Further, enacting these changes is in the interest of a military's principal mission of ensuring force readiness… Although many current and proposed program initiatives and policy interventions may contribute to fulfilling this responsibility within the U.S. Military, more comprehensive approaches are required.*

DoD has several avenues to address financial stressors for active duty Service members and their families. First, Congress can increase Service member pay in its annual National Defense Authorization Act. Second, DoD can alter the basic allowance for housing based on local conditions, as it did in the Tidewater area in 2023.[175,176] Third, the DoD can advocate for military spouse-friendly state and federal policies for employment as it has done by encouraging preferential hiring of military spouses into state and federal government positions, reimbursement of state licensing fees for military spouses, and interstate compacts that allow for reciprocity in professional licensure. Fourth, DoD can expand childcare and subsidize its costs, facilitating spouses' ability to work.

The DoD outlined a strategy to improve access to healthy foods and minimize food insecurity in the July 2022 publication *Strengthening Food Security in the Force: Strategy and Roadmap*.[167] Service members receive a monthly Basic Allowance for Subsistence, a non-taxable pay intended to cover food costs. In 2023, eligible Service members could also receive the Basic Needs Allowance to bring their household income up to 130% of the federal poverty guidelines.

The MHS has several isolated efforts to increase WIC and SNAP enrollment, and the Uniformed Services University recently received a grant from the USDA to conduct a pilot at Fort Campbell, Kentucky to increase WIC enrollment. The DoD also operates its own grocery store system, the Defense Commissary Agency (DeCA), and dining facilities for active-duty Service members. Grocery items bought at Commissaries cost 22% less than civilian grocery stores, and in 2023, the DeCA reduced prices by an additional 3-5% on staple items.[177] DoD and DeCA can control the inventory and placement of food items within commissaries and dining facilities to promote healthier food choices.

Other examples of improving health by addressing SDOH include decreasing access to tobacco products and interventions that decrease obesity rates.[178,179] These efforts, developed with the guidance of the Community Preventive Services Task Force (CPSTF), use evidence-based interventions and policy initiatives to address SDOH outlined in the CPSTF Community Guide.[180]

Social Determinants of Health Frameworks

MHS Frameworks

Addressing SDOH in the MHS requires centralized, systemwide governance complemented by local leadership that provides clear communication to MHS leaders about the needs of each location to reduce health disparities. These would include reports on incidence and prevalence of health disparities by location. Total Force Fitness (TFF), the military's existing framework for optimizing performance through a holistic approach to fitness, can be leveraged to improve health among military family members. The TFF framework covers eight domains that promote top performance by promoting tools and services that help Service members develop the skills that strengthen those specific areas (Figure 2).[181]

Figure 2. Total Force Fitness

TFF domains can help to guide interventions to reduce SDOH that contribute most to existing health disparities experienced by Service members and their families. TFF lines of effort include performance measures for each domain and regular reporting of results to leadership. Further disaggregation of performance measures by adding variables such as race, ethnicity, and rank would provide insight into disparities in the TFF domains and inform strategies to address them.

Service-Specific Family Programs

The DoD has implemented community and family support programs to address the needs of Service members and families to promote family readiness. These Service-specific programs provide resources for employment, family advocacy, financial readiness, relocation and deployment support, Service member transition assistance for return to duty or separation from service, suicide prevention, and survivor outreach, among other services. All these programs link to one or more domains of the TFF framework and promote SDOH:

- Army Community Services[182]
- Marine Corps Community Services[183]
- Navy Fleet and Family Support[184]
- Airman and Family Readiness (Includes Space Force)[185]
- Coast Guard Work-Life Program[186]
- Army Reserve Family Program[187]
- Marine Corps Reserve Family Resources[188]
- Navy Reserve Family Readiness[184]

The Building Healthy Military Communities (BHMC) pilot is a DoD-wide effort to better understand the challenges of Service members, recruits, and their families and is part of an effort to operationalize TFF across the military, including the Active Duty and Reserve Components through partnership with local community resources.[189] Under the direction of the Office of the Under Secretary for Personnel and Readiness (OUSD(P&R)), the pilot connects state and local partners with the DoD to develop joint strategies that support readiness through the TFF domains. BHMC includes an evaluation component to assess the upstream effect on Force readiness and resiliency by connecting Service members, families, and communities to local resources that positively affect SDOH. Evaluation of BHMC includes interim outcomes such as effect on retention rates, change in percent of the population not able to deploy, and average Army Physical Fitness Test scores.

Health in All Policies Approach

The Veterans Health Administration (VHA) is now focused on improving equity through a "health in all policies approach."[190] This approach incorporates a process for integrating health into policy making – acknowledging the much larger roles on health outcomes of healthy behaviors, socioeconomic factors, and the built environment in which people live and work relative to the benefits produced from actual delivery of medical care.[131,191] The approach gives VHA leaders a framework for addressing the upstream contributors to health outcomes.[192]

Application of the CMS Framework for Health Equity to MHS Efforts

The Centers for Medicare & Medicaid Services (CMS) developed a framework to advance health equity and improve health outcomes.[193] Many of the framework's recommendations can be applied in the MHS.

The CMS Framework for Health Equity features five priorities:

1. Expand the Collection, Reporting, and Analysis of Standardized Data
2. Assess Causes of Disparities Within CMS Programs, and Address Inequities in Policies and Operations to Close Gaps
3. Build Capacity of Health Care Organizations and the Workforce to Reduce Health and Health Care Disparities
4. Advance Language Access, Health Literacy, and the Provision of Culturally Tailored Services
5. Increase All Forms of Accessibility to Health Care Services and Coverage

Priority One calls for expanding data collection, reporting, and analysis of standardized data, a recommendation supported by a coalition of the National Committee for Quality Assurance, the Joint Commission, and the National Quality Forum. The DHB recommends adopting a validated and standardized screening instrument that accurately identifies the social needs of Service members and their families, and integrating these data into the patient's EHR. The coalition also recommended a Fast Healthcare Interoperability Resources®-based approach to integrate digital SDOH data across health records and allow for longitudinal results tracking across sites.[194]

The Health IT End-Users Alliance, an organization of health information professionals, health care providers, and hospitals to advance health IT policy and standards development also advocates collecting, connecting, and using SDOH data. The coalition calls for training on collecting SDOH data with appropriate tools and processes, and learning how to promote better health outcomes through better understanding of patients' SDOH needs.[195]

Existing screening instruments in use by the MHS capture some SDOH measures. The Survey of Well-being of Young Children (SWYC™) is a childhood development screening tool for developmental ability, emotional/behavior status, and family support. The SWYC will serve as the MHS' standardized process for child screening from June 2023 onwards.[196] MTFs will administer the SWYC to parents and caregivers of all 9-, 18-, 24-, and 30-month-old children in their facilities. While the SWYC screens for family and home-life factors, including social support, food insecurity, and domestic violence, it does not identify the full SDOH needs of patients. The MHS should institute SDOH screenings of all MHS beneficiaries, throughout the life course, by integrating annual standardized SDOH screening tools and workflows in MHS GENESIS, particularly in adult primary care, pediatrics, and obstetrics.

The MHS can incorporate SDOH screening into the MHS GENESIS Patient Portal through the Clipboard feature that allows patients to fill out screening forms ahead of their appointments. This would allow clinicians to view important risk factors before appointments and address them during a patient visit.[197] Routine, at least annual, SDOH screening should be done in MHS primary care settings (Pediatrics, Gynecology, Obstetrics, Family Practice, and Adult Internal Medicine) and also included in TRICARE network primary care practices. MHS health care providers should receive training on SDOH screening tools and appropriate documentation of patient SDOH needs in MHS GENESIS. The MHS can look to guidance from the Office of the National Coordinator for Health IT, the principal federal entity that coordinates nationwide efforts to implement health information technology. The Office provides technical guidance for documenting SDOH domains and promotes SDOH data standardization in electronic health records.[198]

Clinical Communities should develop guidelines and trainings for how to respond when a patient has an adverse SDOH indicator. For example, providers should be trained to refer a patient identified with food insecurity to appropriate resources. Such a referral is analogous to the existing process for referring patients with an unhealthy Body Mass Index metric for a glucose test or a lifestyle medicine consultation. The MHS should train health care providers to document SDOH needs in the EHR and use clinical practice guidelines to address them as they would for other health conditions. Systematical and reliable measurements of a patient population's SDOH will lead to improved response to environmental risk factors and, subsequently, improved health outcomes.

Priority Two of the CMS Framework describes methods to assess program impacts to promote health equity.[193] CMS regularly reports to Congress the impact of social risk factors on drivers of disparities and assesses the extent to which Medicare's value-based purchasing programs respond to social risk factors. The Boston Medical Center's Health Equity Accelerator addresses poor and disparate health outcomes by prioritizing data analysis to better understand the drivers of disparities and proactively investigating potential explanatory variables for poor health outcomes. Boston Medical Center's approach merges SDOH and clinical data from hospital and community partner sites to create a data-rich environment for analyzing correlations between SDOH and health outcomes. It strives to understand all the causes of inequitable outcomes, "many of which are cumulative from a life-course perspective."[199]

Priority Three focuses on building the capacity of health care organizations to reduce disparities. The MHS should leverage its global scale and standardized processes to identify and address barriers to care and ensure that all beneficiaries get the care appropriate for them. Informed by SDOH screenings and other personnel data, MHS leadership can address disparities by targeting resources to initiatives that address social risk factors and unmet needs. The CMS Framework for Health Equity includes a Disparities Impact Statement tool that guides organizations toward health equity for its patient populations, including identifying health disparities, defining goals, establishing an organizational health equity strategy, implementation

requirements, and strategies for monitoring and evaluating progress toward reducing disparities.[200]

Priority Four of the CMS Framework concerns language access, health literacy, and culturally tailored services. *Health literacy* refers to the ability of individuals to obtain, understand, and use information related to health and healthcare in order to make informed decisions about their own health and wellbeing.[201] Health literacy seeks to understand how patients' unique perspectives and experiences affect their ability to internalize and act on clinicians' advice. The relationship between health literacy and SDOH is complex, as low health literacy can contribute to poor health outcomes and SDOH can influence an individual's health literacy level. For example, individuals with limited access to education, healthcare services, or adequate housing may not understand how they can manage their own health, or may lack the ability to do so. In turn, low health literacy can make it more difficult for them to navigate the healthcare system and access the resources they need to maintain good health. MHS' near-universal health coverage is not synonymous with near-universal access to health care.

Language Concordance

Health encounters where the patient and provider do not speak the same language lead to worse health outcomes and lower access to healthcare services.[202-204] A site visit by the DHB Health Systems Subcommittee revealed a wide range of primary languages spoken among Service members, their families, and MTF staff. They also learned that all virtual visits in the MHS revenue, registration, and scheduling system require entering the patient's preferred language, but in-person visits have no such requirement. Therefore, clinic staff spend time during the appointment attempting to connect to interpretation services or serving as interpreters themselves. Local medical staff noted their concerns about communication challenges caused by the diversity of patients' primary languages to Health Systems Subcommittee members. English proficiency varies among Service members and, more broadly, among their family members. The military, recognizing the benefits of a force with cultural and linguistic diversity, has opened pathways for applicants whose first language is not English to enlist and receive English language training.[205,206] The military does provide English as a Second Language courses for family members on large installations, but this benefit is not available at all locations.[207,208] Non-DoD organizations, such as Military OneSource, provide free language interpretation services for spoken and written English, but policy prevents these services for use when discussing or delivering medical information.[209]

Civilian health systems are increasing the availability of medical interpreter services for patients with limited English proficiency (LEP).[210] Several individual and organizational factors currently restrict interpretive services being more widely used, including[211]:

- Patients not feeling empowered to request interpretive services
- Clinicians' under-valuing the benefits from interpretive services or believing, erroneously, that their own language skills are sufficient
- Organizations under-valuing interpreter use relative to other priorities and, therefore, underinvesting in infrastructure that facilitates their use by clinicians during a medical encounter

Recommendations for increasing interpreter use include[211]:

- Assign patients to language-concordant health navigators
- Automatically schedule interpreters for patients with a non-English (or non-dominant language) preference
- Increase certification and deployment of bilingual staff and clinicians
- Establish written policies that prioritize interpreter use; for example, require that hospitalized LEP patients have at least one interpreted conversation with their treating clinician per day

LEP among network providers abroad may also lead to worse care experiences for English-speaking MHS beneficiaries. The MHS should also include availability of English language health resources and interpretation services for overseas beneficiaries.

Priority Five of the CMS Framework for Health Equity emphasizes increasing accessibility to health care services and coverage. Transportation can be a large barrier for patients to access regular care, which the MHS can overcome by identifying the transportation and other accessibility needs of its beneficiaries and taking steps to address them. All beneficiaries should have convenient access to care, regardless of disability.

Conclusion

MHS beneficiaries' differing life experiences affect their current health status. By collecting SDOH data - or surrogate measures such as rank of primary Sponsor and residence location - along with race and ethnicity, will help the MHS to better understand the needs of its beneficiary population. The MHS should strive to eliminate health disparities associated with SDOH and work to meet the HRSNs of its beneficiaries.

Findings and Recommendations from Chapter 7

Finding 6: Evidence shows that up to 50% of variation in health outcomes is attributable to Social Determinants of Health (SDOH) factors. The MHS, like civilian systems, is at risk of disparate outcomes due to SDOH. SDOH screenings are necessary and must be supported by other data to truly capture the lived experience of MHS beneficiaries who attempt to access and receive care and manage their health. Addressing Health-Related Social Needs (HRSN) allows health systems to proactively reduce disparities due to SDOH. Most studies of MHS racial and ethnic health disparities omit other potential explanatory variables - such as socioeconomic status (approximated as rank in the MHS), geographic location (e.g., urban/rural), or primary language. Such variables may correlate with race and ethnicity and their omission limits the interpretation and response to research findings. The DoD has implemented Service-specific community and family support programs that address SDOH and HRSN.

Recommendation 6. A: DoD should institute annual, best practice standardized SDOH screenings of MHS beneficiaries in adult primary care, pediatrics, and obstetrics and record results in MHS GENESIS. Data must be accessible and reportable. These tools and emerging best practices should be kept current through regular updates on a 3-5-year cycle.

Recommendation 6. B: Use Patient-reported Outcome Metrics and Patient-reported Experience Metrics, in addition to SDOH screenings, to better understand the experience of MHS beneficiaries as they navigate the MHS and access community resources.

Recommendation 6. C: Offer trainings to clinicians on the impacts of SDOH and how to identify HRSN and appropriately document those needs in the medical record. Incorporate these trainings into MHS health professional education.

Recommendation 6. D: Proactively analyze results of SDOH screenings MHS-wide, to assess needs and trends by both local and regional levels, and then connect patients to resources and interventions to address the specific needs of MHS beneficiaries.

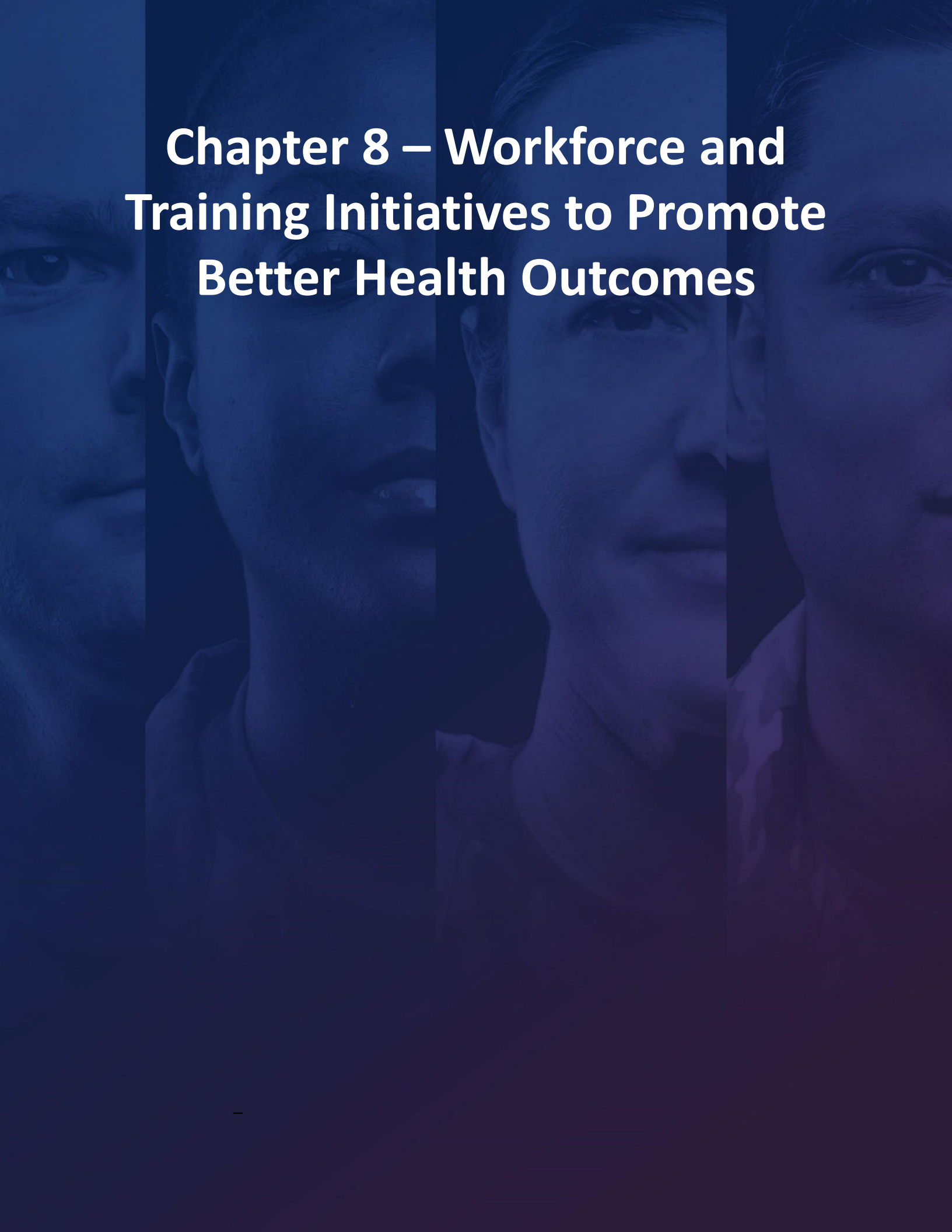
Recommendation 6. E: Include socioeconomic status (or surrogates thereof), a measure of regional health services availability, and beneficiary's primary language when analyzing health outcomes.

Recommendation 6. F: DoD should evaluate HRSN factors to identify and prioritize the most pressing needs of the beneficiary population and provide priority areas to address the factors that are contributing to racial and ethnic health disparities. Tailor military-wide programs, such as Total Force Fitness, Service-specific programs (such as Army Community Services, Marine Corps Community Services, Navy Fleet and Family Support, Airman and Family Readiness, and Coast Guard Work-Life Program), and community-based partnerships to best address these needs.

Recommendation 6. G: Promote culturally appropriate health literacy initiatives designed for specific audiences at each location based on health outcomes data, community input, and best practice health messaging.

Finding 7: All virtual visits in the MHS revenue, registration, and scheduling system require entering the patient's preferred language, but in-person visits have no such requirement. Therefore, clinic staff spend time during the appointment attempting to connect to interpretation services or serving as interpreters themselves. Language barriers can contribute to adverse patient experience, a driver of variation in health outcomes.

Recommendation 7: Request and enter the patient's preferred language as a required field when making in-person appointments. Ensure appropriate interpretation services are available for all visits.



Chapter 8 – Workforce and Training Initiatives to Promote Better Health Outcomes

Successful workforce diversity initiatives facilitate access to health care professions for underrepresented populations. The benefits of a diverse workforce go beyond professional opportunities, as it can improve patient care experiences through increased concordance of provider and patient race and ethnicity. Increased concordance according to patient preference enables a better patient care experience through improved communication, greater cultural competency or humility, and reduced implicit bias.[212-214]

One recent cohort study of survival outcomes among Black patients who received care from Black physicians shows the benefit of racial and ethnic concordance in health care encounters.[215] Patients in this study were more likely to receive preventive care and chronic disease management services, less likely to undergo unnecessary testing or procedures, and had lower mortality rates than those who received care from non-Black physicians. Additionally, every 10 percent increase in county-level Black Primary Care Physician (PCP) representation was associated with higher life expectancy among Black individuals on average. Analysis showed that greater Black PCP representation was also associated with a smaller difference in all-cause mortality rates between Black and White individuals.[215]

Health care provider/patient racial and ethnic concordance is not a panacea, and many factors impact outcomes. Additionally, increased medical workforce racial and ethnic diversity "should not be a means to reinforce care segregation," but rather to broaden patients' choice for selecting PCPs and strengthen all physicians' cultural humility.[215] While provider/patient racial concordance is one factor that can promote better health outcomes, it should be a matter of patient preference and never a mandatory component of assigning clinicians to patients. Increased focus on patient-centeredness, partnership building, and patient engagement in communication processes are valuable skills that promote higher quality communication between all clinicians and patients.[213]

Increasing Diversity in the Military Health System

The DoD has several ongoing recruitment efforts that the MHS could take advantage of to expand the diversity of its clinical workforce.

For example, the Navy addresses diversity of experience in its scoring rubric for medical students applying to internship in the Navy. Sections five and six of the scoring guidance awards a higher score for applicants who "have demonstrated potential by persevering through unique circumstances." While this is not explicitly related to race and ethnicity, this type of experience-based recruiting decision can support the inclusion of applicants from more varied backgrounds.[216]

The U.S. Government has committed to expanding Reserve Officers' Training Corps (ROTC) programs to Historically Black Colleges and Universities (HBCU) with Science, Technology, Engineering, and Mathematics (STEM) programs and without ROTC programs as a pathway to

admitting more under-represented minorities to the Armed Services. Of note, nearly half of HBCUs with nursing programs are unaffiliated with an ROTC program.[217] In 2020, the Air Force added 100 ROTC scholarships at HBCUs to increase Black representation and overall diversity.[218] The Air Force also participated in a collaborative effort with Hispanic-serving institutions (HSI) and Hispanic/Latino affinity groups to identify opportunities to Hispanic/Latino student participation in ROTC programs.[219] In related efforts to expand recruiting pathways for students in STEM, the 2022 DoD Equity Action Plan outlines the department's plan to establish Centers of Excellence for AI and Machine Learning at minority-serving institutions (MSI), strategies for recruiting in the STEM fields through its Science, Mathematics, and Research for Transformation Scholarship-for-Service program. The DoD is also developing a strategy for increasing the STEM talent pool through strategic plans for K-12 and K-20 educational programs.[3] However, expansion of ROTC programs and scholarships to MSIs, including HBCUs, HSIs, and Tribal Colleges and Universities with nursing, pre-medical, and other pre-health career curricula could lead to increased recruitment of racial and ethnic minority healthcare professionals in the MHS.

To support the preparation of enlisted Service members for medical school, the Uniformed Services University coordinates the Enlisted to Medical Degree Preparatory Program. In partnership with a civilian university, Enlisted to Medical Degree Preparatory Program provides rigorous premedical coursework, Medical College Admissions Test preparation, clinical experience, and pre-health advising for Service members interested in pursuing a medical degree.[220] This program is open to all eligible enlisted Service members and provides greater support for preparation to enter the medical workforce than applicants may find at civilian universities. The Health Professions Scholarship Program provides an opportunity for tuition-free medical education at any fully accredited U.S. medical school with four years of obligated service for accepted scholarship recipients.[221]

Future Initiatives

The MHS could benefit from additional strategies to promote workforce diversity.
The MHS should aim to increase recruiting at MSIs (Appendix A), academic institutions either designated as such by statute or "whose enrollment of a single minority or a combination of minorities exceeds fifty percent of the total enrollment," can promote diversity in the military.[222]

For example, recruitment activities could be geared to underrepresented professionals in medicine affinity academic and professional organizations such as the National Medical Association (the largest and oldest national organization representing African American physicians and their patients in the United States), the National Hispanic Medical Association, the Asian Pacific American Medical Student Association, and the Association of American Indian Physicians. Additionally, the MHS could leverage Virtual Health (VH) to expand the reach of underrepresented health care providers to give beneficiaries greater choice.[223] The DHB's 2023

report, *Optimizing Virtual Health in the MHS,* provides a comprehensive overview of VH resources and strategies the MHS could use to achieve this.[224]

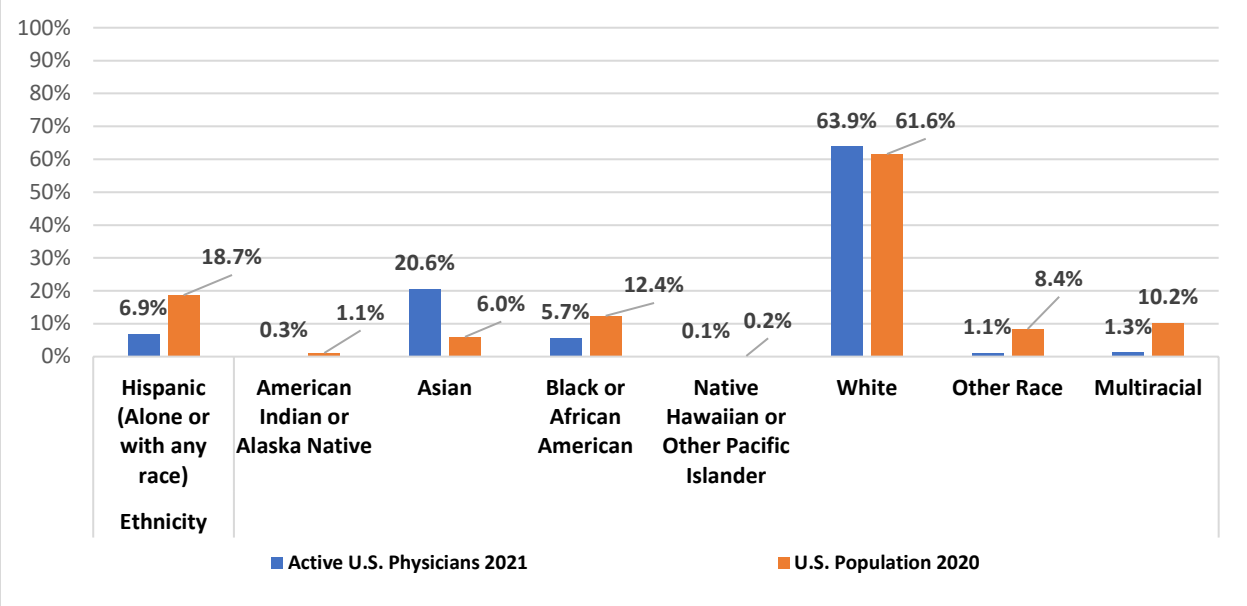
Finally, the MHS should collaborate with existing groups that are already promoting workforce racial and ethnic diversity in healthcare. These include but are not limited to the AMA and the American Association of Colleges of Nursing.

The DHB notes the importance of expanding the recruiting pathway for pre-health careers and STEM among institutions whose students represent the ethnic, racial, and geographic diversity of the nation. The MHS should assess efforts to increase clinician-patient race and ethnicity concordance for effectiveness by documenting change in the supply of health care providers by a range of stratifications including location and clinical service type. The DHB also notes the importance of retention efforts to retain minority health care personnel. Talent management efforts, recently begun in the MHS, should include retention of racial and ethnic minority health professionals.

Increasing and Maintaining Diversity in the Clinical Workforce: Challenges and Strategies

Maximizing opportunities for provider/patient racial and ethnic concordance depends upon provider availability and a health system's recruitment power and effort relative to other health systems. In the United States, there is a discrepancy in the racial and ethnic makeup of the physician workforce compared to the general population (Figure 3).[225,226] This discrepancy highlights the significance of effective recruitment and retention strategies to increase provider representation in health systems.

Figure 3. Proportion of Active U.S. Physicians (2021) and U.S. Population (2020), by Race



Experts emphasize recruitment, retention, and training activities across four broad categories:

1. **Opportunity**: Emphasize mentorship and pathways programs and activities.[227,228] Train mentors in "racism, microaggression, unconscious bias, and cultural understanding."[227] Continue professional development with coaching and leadership training for health care professionals from underrepresented groups.[228] Social support is important to increase the likelihood of success for students from underrepresented backgrounds.[227]

2. **Funding**: Eliminate financial barriers to graduate level health education.[227-229] The AMA urges[229]:

   > *[Advocacy] for funding to support the creation and sustainability of Historically Black College and University (HBCU), Hispanic-Serving Institution (HSI), and Tribal College and University affiliated medical schools and residency programs, with the goal of achieving a physician workforce that is proportional to the racial, ethnic, and gender composition of the United States population.*

   Funding must be integrated into a long-term budget strategy to maintain program continuity.[227]

3. **Representation**: Ensure diversity of membership on and transparent membership selection processes for admissions and leadership committees.[227,228] Encourage students of minority backgrounds to participate in decision making and leadership of curriculum committees and oversight boards.[227]

4. **Institutional policies**: Ensure hiring, pay, and promotion practices are fair and transparent and designed to encourage a diverse faculty and mentorship pool.[227,228]

In a personal reflection, DHB First Vice President, Dr. Lenworth Jacobs, provides an account of his experiences as a Black physician and emphasizes the importance of mentorship for new physicians and how institutional policies can promote racial equity. He explains that medical institutions can engage faculty in values and policies of anti-racism to "help integrate minority persons with the majority group" and promote an environment of professionalism and respect. Dr. Jacobs provides examples from Hartford HealthCare and the American College of Surgeons illustrating institutional strategies to measure and address racial equity. These strategies include enhancing the organizations' mentorship programs, engaging leadership in consultation with outside experts to develop the organizational plan, and regular reporting of the results of these efforts.[230]

Health Equity Training to Reduce Disparities in Health Outcomes

Health equity is a state in which everyone has a fair and just opportunity to attain their full health potential.[231] Health equity is a product of access to healthcare services and the social, economic, and environmental conditions (including discrimination and racism) that influence health outcomes.[231]

Health equity training aims to raise awareness about the SDOH that contribute to health inequities and the systemic underlying biases and barriers that impact access and quality of care. Health equity training is different from training designed to impact clinician attitudes about race and ethnicity, which is not supported by evidence.[232-234]

The goals of health equity training include[235-237]:

1. **Education and Awareness**: Health equity training seeks to educate healthcare professionals, researchers, policymakers, and the broader community about the root causes of health disparities, including SDOH such as poverty, discrimination, education, and access to healthcare.

2. **Cultural Competencies**: Training programs aim to enhance the cultural competence or humility among healthcare providers, helping them understand and respect the diverse backgrounds, beliefs, and values of their patients. This involves developing skills to effectively communicate, collaborate, and provide care that is sensitive to the cultural, linguistic, and social needs of individuals and communities.

3. **Bias and Discrimination Awareness**: Health equity training addresses implicit biases and discriminatory practices that can negatively impact healthcare delivery. By recognizing and challenging these biases, healthcare professionals can provide more equitable and patient-centered care.

4. **Structural and Systemic Change**: Health equity training promotes advocacy for policy changes and systemic interventions to address the underlying causes of health disparities. This may involve collaborating with community organizations, policymakers, and public health agencies to implement evidence-based strategies aimed at reducing health inequities.

By improving awareness and understanding of health disparities, healthcare professionals can be equipped to address the unique needs of diverse patient populations. Health care delivered with cultural humility can enhance patient trust and engagement, leading to improved patient-provider communication, adherence to treatment plans, and health outcomes. Health equity training can also help identify and address disparities in access to healthcare services, resulting in improved healthcare utilization and reduced barriers to care. By challenging biases and

discriminatory practices, training programs can contribute to a more inclusive and equitable healthcare system, ensuring that all individuals have equal opportunities to achieve optimal health outcomes. Further, health equity training can inspire research and innovation focused on addressing health disparities. It can foster collaboration between different sectors and members of the care team to develop and implement interventions that tackle SDOH, ultimately working towards achieving health equity for all individuals and communities.

A Robert Wood Johnson Foundation® program to develop health system and community leaders' abilities to promote health equity specifies key characteristics of health equity training curricula[238]:

1. **Foundational knowledge**: The curriculum should provide a comprehensive understanding of health disparities, SDOH, and the impact of inequities on population health. This serves as the basis for addressing health equity.
2. **Cultural humility**: Training programs should focus on developing cultural humility among healthcare providers. This involves understanding and respecting diverse cultural beliefs, values, and practices, and being able to communicate effectively with diverse patient populations.
3. **Implicit bias training**: Implicit biases can influence healthcare decision-making and perpetuate health inequities. The curriculum should address implicit bias by promoting self-awareness and providing strategies to mitigate bias in clinical encounters.
4. **Health literacy**: Training should emphasize the importance of health literacy and provide skills for healthcare providers to communicate complex health information in a way that is easily understood by diverse populations.
5. **Community engagement**: The curriculum should emphasize the value of engaging with communities and involving them in decision-making processes. This approach fosters trust and helps healthcare providers understand community needs, assets, and barriers to health.
6. **Advocacy and policy**: To address health disparities effectively, healthcare providers should be equipped with the knowledge and skills to advocate for policies and systems that promote health equity. The curriculum should include training on policy analysis, development, and implementation.
7. **Interprofessional collaboration**: Collaborative approaches involving diverse healthcare professionals are crucial for addressing health disparities. The training curriculum should promote teamwork and interprofessional communication to enhance care delivery effectiveness.
8. **Continuous evaluation and improvement**: Regularly evaluate the training curriculum's effectiveness and make necessary improvements based on feedback and emerging evidence.

The Association of American Medical Colleges developed a competency-based education curriculum "to prepare physicians who are culturally responsive and trained to address" inequities that are compounded by social risk factors such as low-quality housing, food

insecurity, and inadequate access to transportation.[239] The curriculum describes competencies that enhance providers' effectiveness in providing care for patients from marginalized groups.[239] The AMA provides resources for health equity education and training through its online Health Equity Education Center. The AMA Center for Health Equity curates these trainings "to help physicians, health providers and health systems address root causes of inequities."[240]

The DHB encourages the MHS to carefully consider the qualities of any health equity training before implementing it and use vendors that have demonstrated positive results in practice. Effectiveness should ultimately be measured by the training's impact on reducing racial and ethnic disparities in patient experiences and outcomes. As evidence for the effectiveness of specific health equity training emerges, the DHA should consider including a requirement for such training in the TRICARE health network contracts. Vendors selected for such training should have a proven record of delivering effective health equity training programs.

Health equity education is a continual work in progress. Adding a few learning activities to the existing curriculum is not sufficient; success involves a culture shift.[241] Health equity education must provide learners with "the opportunity to become actively engaged in fostering a level of critical awareness of the health care provider's position of power and privilege in society.[242] Good outcomes for all depend on a workforce-wide understanding of and investment in health equity.

Conclusion

Health equity training and workforce diversity can promote better outcomes and lower disparities in the MHS. Diversity and inclusion in the workplace requires commitment from leadership, assessment of current practices, education and training, and accountability and measurement to track the effectiveness of health equity training and workforce diversity efforts.[243] The following chapter offers suggestions for the structure in which training and workforce diversity efforts can be implemented and managed.

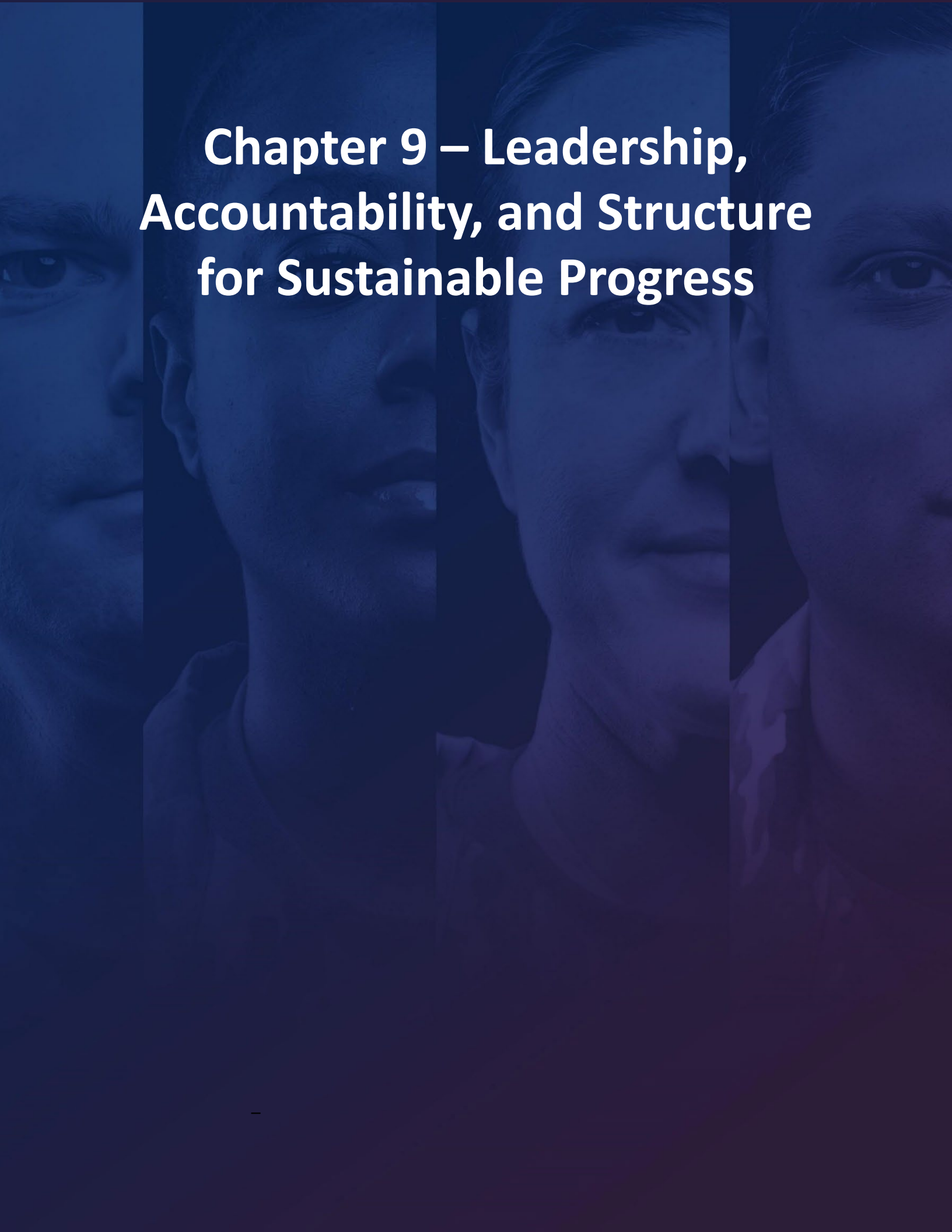
Findings and Recommendations from Chapter 8

Finding 8: While data are limited on the direct impact of health equity training initiatives on health outcomes, some training methods appear to promote empathy and reduce bias which can improve health outcomes.

> **Recommendation 8**: Carefully consider the qualities of any health equity training before implementing it and leverage trainings that have demonstrated positive results in practice. Effectiveness should ultimately be measured by the training's impact on reducing racial and ethnic disparities in patient experiences and outcomes.

Finding 9: Increased clinician-patient racial and ethnic concordance can lead to improved patient care experiences through better communication, greater cultural competency, and reduced inadvertent implicit bias.

> **Recommendation 9. A**: DoD should expand the pathway for military careers as clinicians and allied health professionals for underrepresented in health and medicine racial and ethnic groups through ROTC, Health Professions Scholarship Program, and other recruitment activities at MSIs such as Historically Black Colleges and Universities, Hispanic-serving institutions, and Tribal Colleges and Universities, particularly those that have nursing, pre-medical, and other pre-health career curricula. Consider ways to expand these recruitment pathways to the community college, vocational, and high school levels.
>
> **Recommendation 9. B**: Promote workforce diversity through recruitment activities and collaborations with academic organizations focused on racial and ethnic groups underrepresented in health and medicine and existing groups that are already promoting workforce racial and ethnic diversity in healthcare.
>
> **Recommendation 9. C**: Assess the effectiveness of these recruitment and retention efforts by documenting changes in the supply of underrepresented clinicians and allied health professionals.
>
> **Recommendation 9. D**: Assess the feasibility of leveraging Virtual Health solutions to broaden the range of options for patients to select health care providers that culturally meet their needs.



Chapter 9 – Leadership, Accountability, and Structure for Sustainable Progress

DHA leadership must commit to valid measurement of racial and ethnic health disparities, with a timeline to reduce and eliminate them. At present, DHA lacks a central, coordinated, and sustained effort to measure and reduce racial and ethnic health disparities. Instead, investigator led work has measured disparities generally as single studies on a clinical topic of interest by individuals or small groups of individuals. Commitment to understanding racial and ethnic health disparities, and their root causes, and working to eliminate identified disparities requires organizational culture change. Culture change is a process that takes time, and only happens with strong leadership commitment to build it into their strategy, mission, and vision.

National health care organizations have demonstrated commitment to health equity and provide resources for organizational change that the DoD can adapt as it works to eliminate racial and ethnic health disparities. These include the Joint Commission, National Committee for Quality Assurance, and the Institute for Healthcare Improvement.[8,244,245] In addition, the DHB Health Systems Subcommittee examined the work of several civilian health care organizations focusing on health equity. Efforts include organizational changes, driven by leadership, to proactively implement and measure efforts to identify disparities, gather feedback for initiatives from internal and external colleagues, disseminate findings, and adapt processes for continued progress toward health equity. Collaboration between leadership, staff, patients, and community members was a common theme. No single best practice was employed by all organizations, but each contributed valuable lessons that could be productively applied within the MHS. Appendix I contains a summary of the DHB's learnings from other health care institutions and their best practices, including:

- Designate accountable leaders and establish a reporting structure
- Implement a framework for analysis of health equity within the organization
- Examine care quality and social determinants of health among all patient groups
- Focus on key equity areas using nationally benchmarked measures, such as HEDIS®, Patient-Reported Outcomes, and other metrics stratified by race and ethnicity
- Develop social needs screening tools for member population
- Proactively look for disparities through primary research and revisiting conclusions derived from standard statistical analyses
- Engage with institution leadership, health care providers, patients, and community leaders to identify community needs and institutional capabilities
- Foster collaboration between health systems and community organizations to design and implement health equity improvement efforts. Set goals at local levels to reduce disparities with input from providers, beneficiaries, and community organizations.
- Establish goals at the organizational level to reduce disparities and measure progress in eliminating any disparities
- Incorporate Health Equity performance metrics and goals into quality and patient incentive programs for personnel providing care and managing military health services

Measuring Progress

The National Committee for Quality Assurance has published a review of the most promising approaches for measuring equity in health care quality as part of an examination of standardized health equity quality measurement. This review includes health equity quality measures that can be applied across a health system and provides examples of strategies that the DoD may adapt to develop health equity metrics.[246] These strategies include[246,247]:

- Identifying and selecting indicators of social determinants of health
- Selecting a reference group (a "standard" comparison group independent of the data vs. the data informing the comparison group)
- Selection of health care quality metrics. These could include composites (e.g., vaccination rates, quality measures, infant mortality rates).
- Using benchmarks (e.g., compare results to national estimates)

The Office of the Assistant Secretary for Planning and Evaluation also developed a guide for developing health equity measures that provides guidelines for health equity measurement.[248]

The State Health Equity Measure Set, a curated set of existing clinical measures in use by national measurement bodies, is a resource for evaluating progress towards health equity that includes health status and healthcare measures to assess how healthcare processes impact population health status.[249] This set of measures focuses on health and healthcare measures, not SDOH, as the authors indicate these are best addressed through separate measures.

Leveraging MHS Organizational Structure for Health Equity

Health systems that are leading the way to health equity have instituted centralized bodies to initiate and sustain systematic and proactive efforts to identify and eliminate health disparities. The DHB recommends that the MHS follow this best practice by establishing a centralized Health Equity Committee. Its work would include:

- Investigating health disparities
- Disseminating findings
- Developing policies and initiatives to address disparities
- Implementing ongoing improvements
- Reporting results

The Health Equity Committee would include representatives of leadership, providers, health benefit administrators, and patients, such as from the following list:

- Under Secretary of Defense for Personnel & Readiness
- Assistant Secretary of Defense (Health Affairs), Assistant Secretary of Defense (Manpower & Reserve Affairs), Director (Defense Human Resources Activity), Assistant Secretary of Defense (Readiness), Director (Office of Force Resiliency)
- DHA Director
- Military Service Surgeons General
- Clinical Community leaders who practice in locations across the MHS
- TRICARE Health Plan administrators (CMO TRICARE Health Plan)
- Individuals with expertise in reducing health inequities
- Service members, particularly Enlisted, who will widen the ethnic, racial, and geographic composition of the committee and represent beneficiaries and patients

The Health Equity Committee, in consultation with relevant groups, would develop strategies for reducing disparities and have responsibility for their successful execution. The Health Equity Committee would ensure existing efforts are appropriately measured and supported, and identify future interventions based on regular reporting from representative groups.

To ensure sustainability, a sponsor with the authority to implement its recommendations and appropriately allocate resources for its initiatives is essential. The DHB recommends the Under Secretary of Defense for Personnel & Readiness (USD(P&R)) sponsor the Health Equity Committee. The USD(P&R) has responsibility for not only the MHS, but also for many aspects of military life that contribute to SDOH (housing, salary, food, fitness, community, etc.). Additionally, the DEERS personnel record keeping system, which is central to properly identifying military beneficiaries' race and ethnicity, is the under the span of control of the USD(P&R). See Figure 8 in Appendix G for a full description of their areas of responsibility.

The USD(P&R) should receive regular briefings on the Health Equity Committee's progress from the Assistant Secretary of Defense for Health Affairs (ASD(HA)), who should also Chair the Health Equity Committee. ASD(HA) should send a report containing health outcomes for both ambulatory and inpatient settings, stratified by race and ethnicity, along with current initiatives and results in eliminating disparities at least annually to the USD(P&R). The other Assistant Secretaries of Defense, Surgeons General of the Services, and the DHA Director should also report challenges to implementing initiatives to the ASD(HA). The USD(P&R) should advocate for the needed resources to implement the Health Equity Committee's recommendations.

The Health Equity Committee should task each Market, MTF, and TRICARE region with reviewing their data, setting targets for improvement in consultation with local providers and beneficiaries, implementing changes, and reporting their progress, needs, and barriers to the Health Equity Committee. The Health Equity Committee would serve as a focal point for receiving reports on MHS-wide health data, disaggregated by race and ethnicity, and providing recommendations to address them. It would disseminate its findings through regular reporting to DHA leadership, individual MTF Command, and market administrators. The main deliverable

of the Health Equity Committee would be an annual health disparities report card which will provide insight into the implementation of both the recommendations in this report but also future efforts to eliminate racial and ethnic health disparities.

The Health Equity Committee needs a strong focus on data analysis and performance monitoring, using metrics to identify disparities and track progress toward reducing them. It should promote local data quality and collection initiatives to determine the needs of different MTF populations. As part of this effort, a centralized statistical team should be tasked with analysis and dissemination of MTF-level findings to local leadership and aggregated findings to the Health Equity Committee. This team should analyze not only clinical quality outcomes but also PROMs to understand patient experience. The Department of Veterans Affairs Survey of Healthcare Experiences of Patients provides an example of PROMs that measure patient experience.[250] The Health Equity Committee should use and promote the expansion of tools that can compare MTF data with national data. The MHS Transparency Wizard is one such comparison tool; however, it does not yet stratify by race and ethnicity.[251] This tool should be enhanced by adding a race and ethnicity stratification for better data transparency and understanding. Another relevant example comes from Providence St. Joseph Health, which found that unifying expertise in market-based teams was a successful method for understanding local trends and measuring local health equity initiatives. The Health Equity Committee could use this model to inform its process disseminating local concerns to organizational leadership.

The Health Equity Committee should hear from representative groups to gain insight into providers' and patients' lived experiences, drawing from the experience of health systems like Providence, which utilizes partnerships with community organizations and advocacy groups to engage in outreach and education efforts to promote health equity. The Health Equity Committee should serve to convene subject matter experts from inside and outside the MHS with experience implementing and measuring health equity efforts. Consultations with individuals who have personal experience with the MHS are vital to this effort. Listening is an essential aspect of understanding the current state for the MHS beneficiaries. Eventually, the Health Equity Committee could develop a "train the trainer" program to disseminate learnings about health equity promotion to local leaders at individual MTFs.

The DHB recommends that individuals in the MHS with expertise investigating and advocating for the elimination of racial and ethnic health disparities assist in the establishment of this body. The Health Equity Committee should also leverage members of existing groups, e.g., the Clinical Communities or the Senior Military Medical Advisory Committee (SMMAC) to expand its area of responsibility. For example, the SMMAC could make racial and ethnic health disparities a standard agenda item for discussion and could regularly provide input to inform the Health Equity Committee's work.

Conclusion

To reduce racial and ethnic health disparities, the DoD must leverage its existing structure to implement accountability for ongoing efforts to identify and eliminate racial and ethnic health disparities. Utilizing best practices from other health systems, the DoD leadership must commit to a culture change to accomplish this goal. Leadership must ensure the implementation of needed improvements in the data ecosystem. Measurement is a tool. Acknowledgement is an early step. Action that resolves current and prevents new avoidable disparities is the goal of health equity. The DHB recommends the creation of a Health Equity Committee within the existing organizational structure that is equipped with tools and resources to implement change and provides a focus on data and accountability.

Findings and Recommendations from Chapter 9

Finding 10: The DHB's review of best practices and the recommendation of the U.S. Centers for Medicare & Medicaid Services (CMS) to reduce health care disparities stress leadership and sustained commitment effort at all organizational levels. We agree with the Joint Commission's (JC) summary of the actions required to reduce health care disparities as stated in the June 20, 2022 R3 Report[8]:

- Designate an individual to lead activities to reduce disparities for the organization's patients
- Assess patients' health-related social needs
- Stratify quality and safety data by sociodemographic characteristics
- Develop a written action plan to address disparities
- Inform leaders and staff about progress to reduce disparities at least annually

Recommendation 10. A: Commit to achieving the goal of eliminating any racial and ethnic health disparities among all MHS beneficiaries. The DHA should:

- Measure disparities
- Set goals to reduce disparities by specific dates
- Allocate sufficient dedicated staff at both centralized and local levels to eliminate disparities
- Assess progress regularly

Recommendation 10. B: The DHB recommends that the Under Secretary of Defense for Personnel and Readiness (USD(P&R)) be the accountable leader for ensuring that health disparities are eliminated, and that USD(P&R) charter a Health Equity Committee by the end of Fiscal Year 2024. The Committee will:

- Report progress toward eliminating health disparities
- Include representative groups

Recommendation 10. C: The Assistant Secretary of Defense for Health Affairs (ASD(HA)) should report health outcomes, stratified by race and ethnicity, and report on ongoing initiatives to eliminate disparities, to the USD(P&R) no less than annually and quarterly when feasible

Recommendation 10. D: Incorporate health equity performance metrics and goals into quality and patient incentive programs for personnel providing care and managing military health services, such as those found in the Integrated Resourcing and Incentive System.

Appendix A – Glossary

Ethnicity/Ethnic – Ethnicity provides a more nuanced view of a person's background and belonging to a social group. A person's ethnicity includes geographic history, language, religion, and other cultural characteristics that distinguish groups of people. On the role of ethnicity on health, the AMA explains, "The lack of major systematic [biological] differences between ethnic groups, together with the extensive differences in lifestyle means that ethnic differences in mortality and morbidity to some extent provide evidence against the importance of genetic factors and for the importance of environmental factors."[252]

Genetic Ancestry – Unlike race and ethnicity, which are subjective categorizations related to presentation of certain physical characteristics and culture, genetic ancestry refers to fixed characteristics of the genome that can be objectively defined and measured.[253] Genetic ancestry describes the presence of genetic variants within individuals and populations. Genetic studies show substantial variation in genetic ancestry within the same racial populations and similarities between racial groups.[254] While genetic ancestry frequently overlaps with race and ethnicity categories, genetic ancestry predicts the presence of genetic variants that affect health better than race and ethnicity.[70] Race and ethnicity are subjective, societally-defined, and often imposed categorizations that do not always align with the way an individual defines themselves, while genetic ancestry is a fixed, objective measure of the genome.[253]

Health Disparity – The U.S. Department of Health and Human Services (HHS) defines health disparities as "differences in health outcomes that are closely linked with social, economic, and environmental disadvantages" and are "often driven by the social conditions in which individuals live, learn, work and play."[255] The Centers for Disease Control and Prevention (CDC) defines health disparities as "preventable differences in the burden of disease, injury, violence or opportunities to achieve optimal health that are experienced by populations that have been disadvantaged by their social or economic status, geographic location, and environment."[231] The National Institutes of Health states "a health disparity is a health difference that adversely affects disadvantaged populations in comparison to a reference population, based on one or more health outcomes."[256]

Health Equity – The CDC defines Health Equity as "the state in which everyone has a fair and just opportunity to attain their highest level of health" and advises that "achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and healthcare disparities. Achieving health equity also requires addressing social determinants of health and health disparities."[231]

Health-Related Social Needs – The Oregon Health Authority defines Health-Related Social Needs as "the social and economic needs that individuals experience that affect their ability to

maintain their health and well-being. They include things such as housing instability, housing quality, food insecurity, employment, personal safety, lack of transportation and affordable utilities, and more." They contrast Health-Related Social Needs with Social Determinants of Health, as these "[refer] to the conditions in which people are born, grow, work, live, and age that are shaped by the distribution of money, power and resources and impacted by factors such as institutional bias, discrimination, racism, and more."[141]

Minority-serving institution – Minority-serving institutions include[222]:
1. Historically Black Colleges or Universities
2. Hispanic-serving institutions
3. Tribal College or Universities
4. Alaska Native-serving institutions or Native Hawaiian-serving institutions
5. Predominantly Black Institutions
6. Asian American and Native American Pacific Islander-serving institutions
7. Native American-serving nontribal institutions

Race/Racial - The National Human Genome Research Institute defines race as "a social construct used to group people" and adds that "…race divides human populations into groups often based on physical appearance, social factors, and cultural backgrounds."[257] Race is not a discrete biological attribute. However, this categorization of people frequently aligns with physical characteristics such as skin color or hair texture, among other traits. The American Medical Association (AMA) states that race is "a symbolic category, based on phenotype or ancestry and constructed to specific racial and historical contexts, that is misrecognized as a natural category" and that "our [human] species does not have enough genetic variability among its populations to justify either the identification of geographically based races or of evolutionarily distinct lineages."[252] Some genetic similarities among people classified as the same group are linked to health conditions.

Social Determinants of Health – According to Healthy People 2030, "Social determinants of health (SDOH) are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks."[127] This definition groups SDOH into 5 domains: Economic stability; education access and quality; health care access and quality; neighborhood and built environment; and social and community context. Each of these categories affect health and addressing SDOH is a key strategy for improving population health.

Underrepresented in Medicine – The Association of American Medical Colleges explains "Underrepresented in medicine means those racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population."[258]

Underrepresented Population – The National Center for Advancing Translational Sciences states "An underrepresented population refers to a subgroup of the population whose representation is disproportionately low relative to their numbers in the general population, or in the case of clinical trials or patient registries, disease population."[259]

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Appendix C – Terms of Reference

THE ASSISTANT SECRETARY OF DEFENSE

1200 DEFENSE PENTAGON
WASHINGTON, DC 20301-1200

HEALTH AFFAIRS

MEMORANDUM FOR PRESIDENT, DEFENSE HEALTH BOARD

SUBJECT: Request for Defense Health Board Review, Eliminating Racial and Ethnic Health Disparities in the Military Health System

Pursuant to the attached Terms of Reference on "Eliminating Racial and Ethnic Health Disparities in the Military Health System," I direct that the Defense Health Board, working through its Health Systems Subcommittee, provide recommendations to address racial and ethnic health disparities in the Military Health System (MHS). Specifically, the Board should identify systemic barriers to eliminating racial and ethnic health outcome disparities within the MHS, considering policy, processes, staffing, and training.

The point of contact for this action is CAPT Gregory Gorman, Designated Federal Officer. He may be reached at (703) 275-6060, or gregory.h.gorman.mil@mail.mil. Thank you for your support and commitment to optimizing the health and force-readiness of the military.

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Seileen Mullen
Acting

Attachment:
As stated

cc:
Group Federal Officer
Advisory Committee Management Officer
Defense Health Board Designated Federal Officer

Defense Health Board
Eliminating Racial and Ethnic Health Disparities in the Military Health System
TERMS OF REFERENCE

These terms of reference (TOR) establish the objectives for the Defense Health Board ("the Board") to review, through the Health Systems Subcommittee ("the Subcommittee"), and prescribe remedies to racial and ethnic health disparities in the Military Health System (MHS).

Mission Statement: The mission of the Board is to provide independent advice and recommendations to maximize the safety and quality of, as well as access to, health care for members of the Armed Forces and other Department of Defense (DoD) beneficiaries.

Issue Statement: Health inequities are well documented across numerous sociodemographic characteristics, including age, sex, race/ethnicity, education, geographic location, socioeconomic status, and health insurance coverage.[1-3] Lack of health care access and limited health insurance coverage are key drivers of disparate health outcomes; improved coverage leads to better health outcomes among disadvantaged groups.[2] However, race and ethnicity remain prominent predictors of negative health outcomes even when health care access and coverage are provided.[1-3] Racial and ethnic minorities shoulder a disproportionate burden of negative physical and mental health outcomes in the United States – a disparity attributed to systemic racism affecting many of the social determinants of health such as intergenerational wealth accumulation, educational opportunities, and employment.[1,4] Systemic racism in health care may take many forms such as implicit bias in treatment decisions and underrepresentation of Black and Hispanic individuals among health care professionals.[4,5]

The MHS, a large federal health system caring for a geographically and racially diverse population of 9.6 million, provides an important opportunity to examine the factors leading to racial and ethnic health outcome disparities.[6] Thirty-one percent of Active Duty personnel self-identify as a racial minority (Black or African American, Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, Multi-Racial, or Other/Unknown), and 16% have Hispanic ethnicity.[7] Numerous studies from the MHS demonstrate narrowing, or even elimination, of disparate health outcomes across race and ethnicity over a wide range of conditions and age groups – including diabetes, coronary artery disease, trauma care, prostate cancer care, pediatric bone infections, breast and cervical cancer screening, and pregnancy and birth outcomes.[8-10] However, other physical and mental health inequities persist in the MHS and in other large universal access federal health systems, and demand a closer examination of other determinants of racial and ethnic health disparities and ways to eliminate them.[11-13]

Objectives and Scope: The Subcommittee should:

- Review the existing literature on disparities in health outcomes of active duty Service members and other MHS beneficiaries by race and ethnicity. Compare those disparities to those experienced in other U.S. health care systems.
- Identify systemic barriers to eliminating racial and ethnic health outcome disparities within the MHS, considering policy, processes, staffing, and training.
- Provide recommendations to address health disparities by race and ethnicity within the MHS.

Methodology:

1. The Subcommittee may conduct interviews and site visits as appropriate.
2. The Subcommittee may seek input from other sources with pertinent knowledge or experience.
3. In accordance with the November 26, 2018 Deputy Secretary of Defense memo, "Advisory Committee Management," the Subcommittee shall receive full and timely cooperation of each OSD or DoD Component Head in providing analyses, briefings, and other DoD information or data necessary for the fulfillment of its responsibilities as provided for by this TOR.

Compliance:

The Board and Subcommittee will operate in conformity with and pursuant to the Federal Advisory Committee Act, the Government in the Sunshine Act, and other applicable federal statutes and regulations. Individual Board and Subcommittee members do not have the authority to make decisions or recommendations on behalf of the Board, nor report directly to any federal representative. The members of the Board and Subcommittee are subject to certain Federal ethics laws, including 18 U.S. Code §208, governing conflicts of interest, and the Standards of Ethical Conduct regulations in 5 C.F.R., Part 2635.

Deliverables:

The Subcommittee will complete its work within one year of being tasked and report to the Board in a public forum for full and thorough deliberation. The Board will report to the Assistant Secretary of Defense for Health Affairs, who has been delegated the authority to evaluate the independent advice and recommendations received from the Board and, in consultation with the Under Secretary of Defense for Personnel and Readiness, identify actions or policy adjustments to be made by DoD in response. The Subcommittee will provide progress updates at each Board meeting while working the tasking.

Required Support:

1. The Defense Health Board Support Division will provide any necessary research, analytical, administrative, and logistical support for the Board.

2. Funding for this review is included in the division's operating budget.

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Appendix D – Meetings and Presentations

March 30, 2022: Defense Health Board Meeting
Virtual

The DHB met virtually and received a briefing from Dr. Tracey Koehlmoos on the Racial Disparities in the MHS.

June 6, 2022: Defense Health Board Meeting
Virtual

The DHB met virtually and Dr. Browne presented the DHB with an overview of the tasking.

June 22, 2022: Health Systems Subcommittee Kickoff Meeting
Virtual

The Subcommittee met virtually and received a briefing on the Racial and Ethnic Disparities in the Military Health System from Dr. Tracey Koehlmoos, Director, Center for Health Services Research, Uniformed Services University of the Health Sciences (USUHS). COL Jessica Bunin, Associate Dean for Diversity, Equity, and Inclusion, USUHS, presented on how USUHS is addressing disparities.

July 27, 2022: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and received an overview of the MHS data systems and available race and ethnicity data by CAPT Greg Gorman, Executive Director, DHB. Dr. K. Aletha Maybank, Chief Health Equity Officer and Senior Vice President of the American Medical Association and DHB member, provided an overview of racial and ethnic health disparities in the United States. She also provided the American Medical Association's strategic plan toward health equity.

August 10, 2022: Defense Health Board Meeting
North Chicago, IL

The DHB met in person and received a briefing from Dr. Natasha Nichols and Dr. Ambareen Khan, Jesse Browne VA Medical Center, on moving towards health equity for Veterans. Dr. Browne provided an update on the tasking for the DHB.

August 24, 2022: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and LCDR Eric Luehrs, Staff Psychiatrist with the 6th Marine Regiment, briefed on efforts to reduce healthcare disparities and promote health equity in the MHS.

September 28, 2022: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and Ms. Theresa Hull, Deputy Inspector General, Diversity and Inclusion and Extremism in the Military, provided information on the MHS' data repository containing noncompliant race coding values and categories.

October 26, 2022: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and received 2 panel discussions. The first discussion was on how the MHS reports race and ethnicity data for national benchmarking organizations. Col Larissa Weir, Chief women's Health Consultant to the Air Force Surgeon General, and Ms. Theresa Hart, Senior Nurse Consultant, DHA, spoke specifically to the DHA's Women and Infant Clinical Community and MHS National Perinatal Information Center data. Ms. Mollie Mullen, Co-Chair of the DoD National Surgical Quality Improvement Program Collaborative Steering Panel, detailed the data reporting for the American College of Surgeons National Surgical Quality Improvement Program. The second discussion was on addressing the racial and ethnic maternal health outcome disparities in the MHS. Dr. Anju Ranjit, fellow in maternal and fetal medicine at the University of California, San Francisco, and Dr. Catherine Witkop, Associate Dean for Medical Education and Professor of Preventive Medicine and Gynecologic Surgery and Obstetrics, USUHS, spoke on their research investigating universal health care coverage mitigating racial disparities in potentially avoidable maternal health complications. LTC Erin Keyser, program director for the Department of Gynecologic Surgery and Obstetrics at Brooke Armey Medical Center, provided an overview of maternal morbidity in the MHS.

November 30, 2022: Defense Health Board Meeting
Falls Church, VA

The DHB met in person and Dr. Browne provided an update on the tasking.

December 5, 2022: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed mental health disparities research. CAPT Monica Lutgendorf, Chair of the Department of Gynecologic Surgery and Obstetrics at USUHS, presented on psychiatric conditions during pregnancy and postpartum among MHS beneficiaries. Dr. David Riggs, Professor and Chair of the Department of Medical and Clinical Psychology, USUHS, and Dr. Raquel Martin, Assistant Professor at Tennessee State University, presented on differences in minority adolescent mental health diagnoses in a national sample.

January 19, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed health equity initiatives from the Mayo Clinic. Dr. Adam Milam, Enterprise Medical Director for the Office of Health Equity & Inclusion, Mayo Clinic, Ms. Dawn Peters, Administrator in Quality, Mayo Clinic, and Ms. Marquita Davis, Director of Programs and Initiatives, Office of Health Equity & Inclusion, Mayo Clinic, presented on the Mayo Clinic's infrastructure, culture, and strategies for moving towards health equity.

February 16, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed recent informational meetings from various health systems. Dr. Browne summarized findings from the Institute of Healthcare Improvement, Rush University, Kaiser Permanente, and Boston Medical Center. Dr. Medows provided an overview from Providence. The members discussed the report outline and potential recommendations.

March 2, 2023: Health Systems Subcommittee Meeting
San Diego, CA

The Subcommittee met in person at Naval Medical Center San Diego and received briefings from military and civilian Subject Matter Experts on topics related to the tasking. The Subcommittee visited the child development center, as well as the clinical departments of: internal medicine, oncology, obstetrics/gynecology, labor and delivery & postpartum, and pediatrics.

The SMEs who briefed at the meeting

- CDR Erin Blevins, Pediatric Hematologist/Oncologist
- Ms. Karin Davis, Child Development Center
- Mr. Greg Eng, Health System Specialist Medical Administrative Officer
- CDR John Ewing, Chief Medical Officer

- Ms. Sandra Gharabaghli, Nursing Consultant
- Dr. Christine Johnson, General Pediatrician
- Ms. Joy Legaspi-Sosa, Health System Specialist
- CAPT Gene Lujan, Director of Professional Education
- CAPT Nancy Miller, Nephrologist
- Ms. Mollie Mullen, Co-Chair DoD NSQIP Collaborative Steering Panel
- LCDR Stacey Schmiedecke, Chief Medical Information Officer
- LCDR Gabriel Valerio, Staff Ophthalmologist
- CAPT Tim Wilks, Executive Officer
- Mr. Brandon Workman, Fleet and Family Readiness Program Director

March 16, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and debriefed from the site visit to San Diego. The members discussed sections of the report, including findings and recommendations. There were no briefings at this meeting.

March 22, 2023: Defense Health Board Meeting
Falls Church, VA

The DHB met in person and Dr. Browne provided an update on the tasking.

April 12, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and debriefed from the DHB meeting. The members discussed the report outline, including findings and recommendations. There were no briefings at this meeting.

April 26, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed sections of the report, including findings and recommendations. There were no briefings at this meeting.

May 10, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed sections of the report, including findings and recommendations and the executive summary. There were no briefings at this meeting.

May 24, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed sections of the report, including findings and recommendations and the executive summary. There were no briefings at this meeting.

June 7, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed sections of the report, including findings and recommendations. There were no briefings at this meeting.

June 28, 2023: Defense Health Board Meeting
Falls Church, VA

The DHB met in person and Dr. Browne provided an update on the tasking.

July 12, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed sections of the report. Dr. Paul Cordts, Deputy Assistant Director for Medical Affairs, DHA, and Ms. Karla Loper, Chief of the Clinical Measurement Program, briefed on the MHS data measures stratified by equity and health-related social needs variables.

July 26, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed sections of the report, including findings and recommendations. There were no briefings at this meeting.

August 9, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed sections of the report. There were no briefings at this meeting.

August 23, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed the report. There were no briefings at this meeting.

September 11, 2023: Defense Health Board Meeting
Portsmouth, VA

Dr. Browne provided a decision brief to the DHB Members. During deliberation, the DHB voted to send the report back to the Subcommittee to include additional information based on the discussion.

October 2, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and debriefed from the DHB meeting. The members discussed the report format and framework. There were no briefings at this meeting.

October 13, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed the report. There were no briefings at this meeting.

October 27, 2023: Health Systems Subcommittee Meeting
Virtual

The Subcommittee met virtually and discussed the report. There were no briefings at this meeting.

November 29, 2023: Defense Health Board Meeting
Falls Church, VA

Dr. Browne provided an updated decision brief to the DHB Members. After some amendments to the language, the DHB voted to approve the report and its findings and recommendations.

Appendix E – MHS Background

The MHS is an Open-Access No-to-Low Cost Health Benefit for a Representative U.S. Population

The MHS provides care for approximately 9.6 million beneficiaries worldwide.[260] Service members, their family members, and military retirees and their family members comprise the vast majority of the beneficiary population.[260] The MHS provides care to Service members and beneficiaries through two mechanisms, referred to as "direct care" and "private care," managed by the TRICARE health plan. In direct care, beneficiaries receive care in MTFs. Service members and family members enrolled in certain TRICARE health plans have priority for appointments at MTFs, while all other beneficiaries receive care at MTFs only on a space-available basis.[261] TRICARE is the DoD health benefit that reimburses private providers who agree to be part of the TRICARE network and receive MHS beneficiary patients.[262] Two Managed Care Support Contractors administer the TRICARE private care component of MHS care. This network of direct and private care provides services throughout the United States and worldwide in MTFs and through contracted TRICARE partners.[263]

The MHS differs from other U.S. health systems in several important domains. MHS beneficiaries enjoy open-access and low-to-no cost health care, which reduces financial barriers and unequal access that contribute to disparate health care outcomes, by race and ethnicity, among the U.S. civilian population. Figure 4 shows the racial and ethnic similarity of the Total DoD Military Force (N=2,071,451) and the U.S. population.

The MHS has representation from the broader U.S. population and can serve as a reference group to examine the effects of universal health care access on health outcomes.[264-266] See Figure 5 which shows the number of individuals affected by major disease category among the military's Active Component. Table 3 shows the distribution of the non-Service member population by age and the distribution of care at direct and private care facilities.

Figure 4. DoD Total Military Force (2022) and U.S. Population (2020) by Race and Ethnicity[1,226]

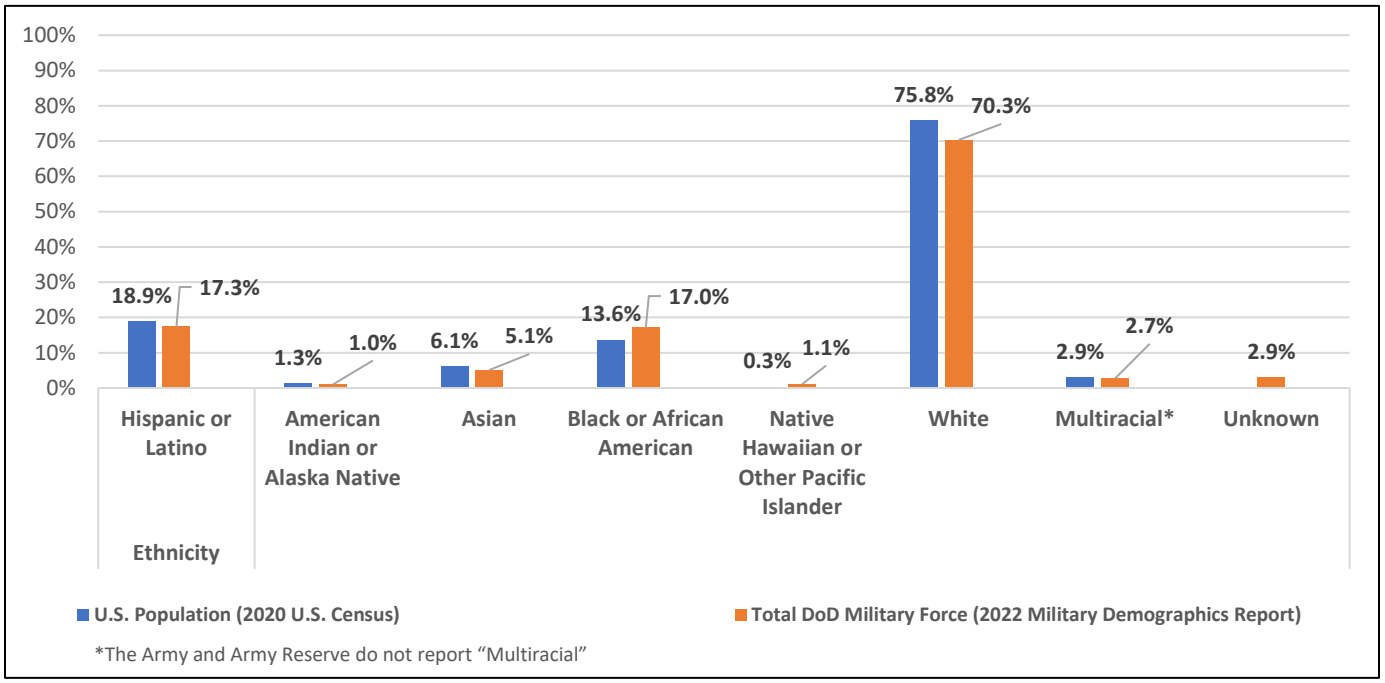


Figure 5. Individuals Affected by Major Disease Category, Active Component (2020)[267]

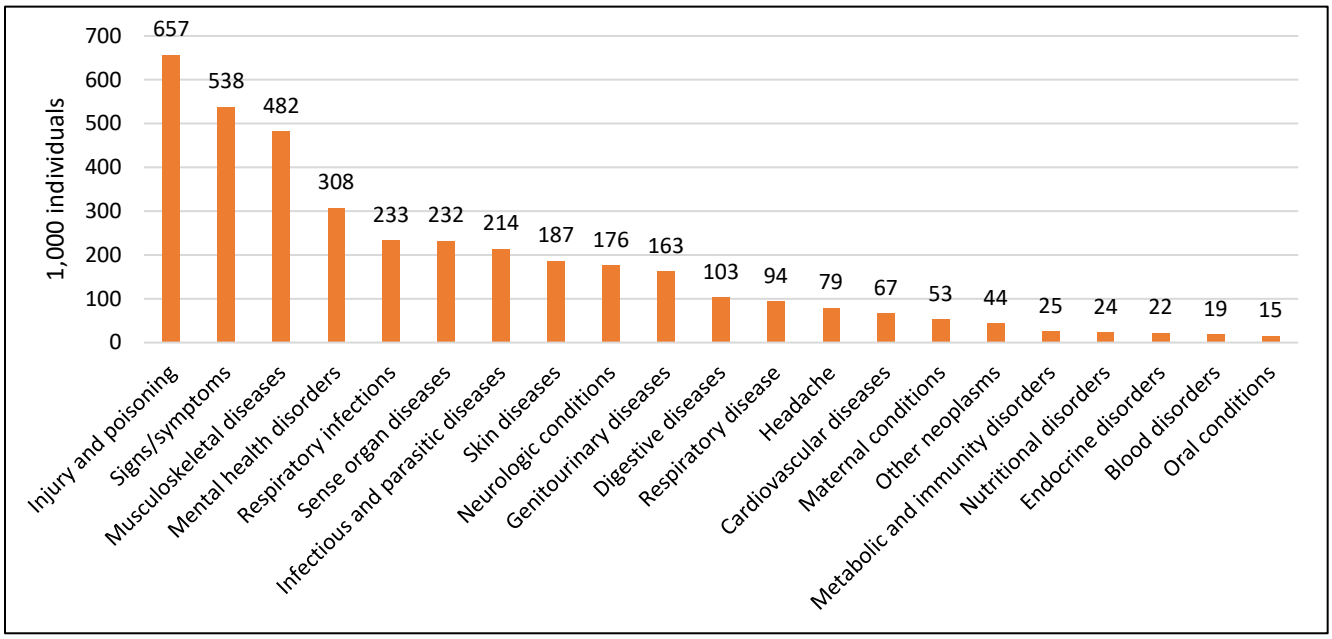


Table 3. Medical Encounters, Individuals Affected, and Hospital Bed Days, by Source and Age Group, non-Service Member Beneficiaries, 2020[267]

		Medical encounters		Individuals affected		Hospital bed days		Medical encounters per individual affected
		No.	% total	No.	% total	No.	% total	
	All non-Service member beneficiaries	82,165,960	-	6,283,982	-	6,040,345	-	13.1
Source								
	Direct care only	8,029,056	9.8	659,160	10.5	406,559	6.7	n/a
	Outsourced care only	74,136,904	90.2	4,654,433	74.1	5,633,786	93.3	n/a
	Direct and outsourced care	n/a	n/a	970,389	15.4	n/a	n/a	n/a
Age group								
	0-17 years	11,236,430	13.7	1,350,529	21.5	448,418	7.4	8.3
	18-44 years	12,376,592	15.1	1,416,484	22.5	680,173	11.3	8.7
	45-64 years	17,188,968	20.9	1,446,057	23.0	915,790	15.2	11.9
	65 years or older	41,363,957	50.3	2,070,901	33.0	3,995,964	66.2	20.0

Appendix F – Literature Review

The Defense Health Board (DHB) conducted a review of Military Health System (MHS) studies focused on racial and ethnic health disparities across a range of clinical care areas and health conditions. The review found that, relative to other U.S. health systems, some studies observe the MHS has more narrow or the absence of racial and ethnic health outcome disparities across a range of conditions and age groups – including, pregnancy and birth outcomes, mental health, pediatric osteomyelitis, and surgical outcomes.[23,268-270] Studies show outcome differences between racial and ethnic groups within some areas of care.[21-23,26,61,271] Table 4 provides the results of the DHB's MHS-specific literature review and the areas in which there is evidence or absence of racial and ethnic health disparities. See Table 5 for a concise list of all studies included in the DHB's review.

For those conditions with evidence of racial and ethnic health outcome disparities in the MHS, they are lower than those described in other U.S. populations across multiple health conditions.[272] Most differences in health outcomes between demographic groups in the United States relate to differences in health care access, Social Determinants of Health, or different treatment of health conditions.[272,273] The MHS provides a universal health benefit, through which all beneficiaries are entitled to no- or low-cost care. This reduces the possible confounding effect of access to care in analysis of racial and ethnic disparities within a health system, since inadequate health care coverage and variable access to care are major factors that contribute to racial and ethnic health disparities in the United States.[274,275] However, the DHB emphasizes that universal health coverage does not mean universal access to care.

Access to care encompasses more than the opportunity to seek and obtain health care services, with geographic variation in the availability of services an access-to-care issue to which MHS beneficiaries are particularly vulnerable given its worldwide scope. MTF-based catchment areas have lower utilization and higher costs than community-based civilian facilities due to geography-based variation in care utilization in both direct and private care.[276] Variation in utilization and cost may indicate ineffective care.[277] Despite its universal benefit status and lower costs for patients compared to other U.S. health systems, MHS beneficiaries still face barriers to access.[276]

Analysis of the relationship between causes of racial and ethnic disparities must consider possible confounders which the MHS' universal benefit may hide. While all MHS beneficiaries are entitled to care throughout the system, their ability to access care may not be universal. Mancuso, *et al.* explain that "equal eligibility for care does not necessarily result in equal access to care."[5] When studying health outcomes in a universal benefit system such as the MHS, identifying how and where beneficiaries receive care leads to understanding of the source of negative – or positive - outcomes.[278] Identifying the contributing factors of disparate health

outcomes is the first step in eliminating them and, in the case of the MHS, achieving its mission of promoting medical readiness and great outcomes for all.

Maternal and Child Health Outcome Disparities

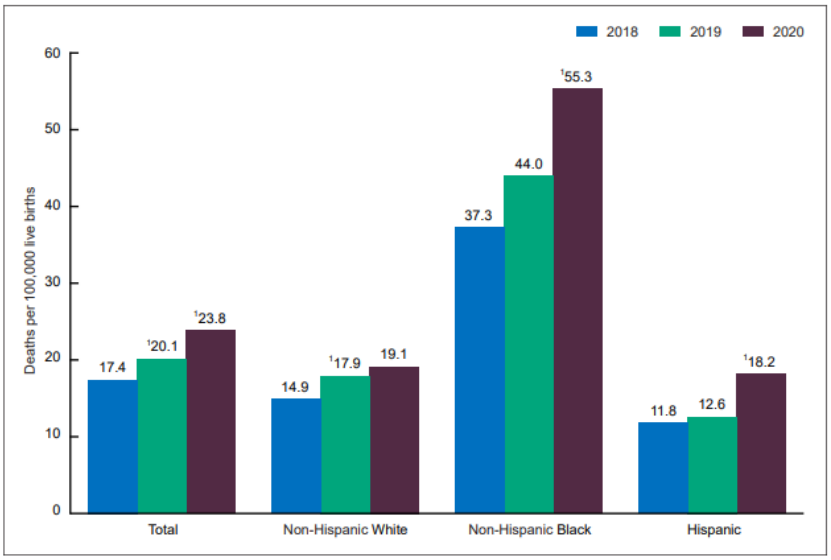
Maternal and Child Health Disparities in U.S. Health Systems

The maternal mortality rate has dramatically fallen in the United States, and worldwide, from the early 20th century thanks to healthier living conditions, advances in maternity services, safer medical procedures, and access to antibiotics.[279] However, the United States has seen worsening maternal mortality rates for Non-Hispanic White, Non-Hispanic Black, and Hispanic mothers in recent years. The maternal mortality rate increased each year for these mothers from 2018 to 2020 (Figure 6). These data show an increase in maternal mortality across all race and ethnicity categories as age increases including, notably, a much larger increase among Black and American Indian women in the older age groups.

Race of the mother has a significant effect on maternal morbidity, despite health coverage status. A 2022 report found that regardless of their insurance status, Black women in the 35-44 age category had 66% higher rates of Severe Maternal Morbidity (SMM) compared to White women.[280] The report examined disparities in risk factors linked to SMM events and found that the rates of these risk factors were highest among Black women for all risk factors except for delivery over age 36. This trend was the same or greater among women with Medicaid compared to those with commercial insurance.[280]

Data also show race-based differences in quality of care, as SMM occurs more frequently in hospitals that serve high and medium Black-serving hospitals.[281] In addition, findings from examinations of historical community data using zip codes paired with obstetric data sets documents the cumulative effects of historical race-based redlining practices on maternal health outcomes and reveals a significant difference in pregnancy outcomes.[282,283]

Figure 6. Maternal Mortality Rates, by Race and Hispanic Origin: United States, 2018–2020[96]



†Statistically significant increase in rate from previous year ($p < 0.05$).
NOTE: Race groups are single race.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

Maternal and Child Health Disparities in the MHS

As in civilian health systems, Black female beneficiaries and their infants experience worse perinatal outcomes than White beneficiaries in the MHS. However, perinatal outcomes for both Black and White women in the MHS are better, and the differences narrower, than the U.S. population. The MHS partners with the National Perinatal Information Center (NPIC) to provide analytics, benchmarking, and aggregation of MTF data on a quarterly basis. The MHS, with its universal health coverage, performs better in maternal outcomes overall than national figures provided by NPIC, except for maternal readmission within 30-42 days of delivery (see Figure 7).[284]

Figure 7. National Perinatal Information Center Comparative Data[284]

	CY 2020 Q2			CY 2020 Q3			CY 2020 Q4			CY 2021 Q1		
Total Deliveries	7,612			8,276			6,783			6,126		
Maternal Outcome Measures	**MHS Avg**	**NPIC Avg**		**MHS Avg**	**NPIC Avg**		**MHS Avg**	**NPIC Avg**		**MHS Avg**	**NPIC Avg**	
Inpatient Quality Indicator (IQI) 33 Primary Cesarean Delivery Rate	15.8%	18.5%	●	14.7%	18.4%	●	16.9%	18.9%	●	14.0%	17.8%	●
Postpartum Hemorrhage (PPH) Rate	5.1%	5.0%	●	5.2%	5.3%	●	5.8%	5.3%	●	5.6%	5.3%	●
Severe Maternal Morbidity Overall Rate	2.4%	2.4%	●	2.6%	2.5%	●	2.9%	2.7%	●	2.5%	2.8%	●
Maternal Readmit Rate to Delivery Hospital	1.9%	1.2%	●	2.3%	1.6%	●	2.1%	1.6%	●	2.0%	1.6%	●

A 2018 study calculated the preterm birth rate in the MHS from 2008 to 2012 and found that infants with at least one Black parent were 30% more likely to be born prematurely, independent of the parent's rank, maternal age, or socioeconomic status.[21] While this compares favorably to the general U.S. prematurity rate disparity (Black mothers have a 50% higher premature delivery rate than White mothers)[285], this disparity needs urgent assessment and action in the MHS.

Another study from the MHS found that despite a 7% lower preterm delivery incidence compared to U.S. civilian rate for the same cohort, there was a significant difference in neonatal mortality for non-Hispanic Black infants compared to non-Hispanic White infants in the MHS. This study also found no significant difference in neonatal mortality when comparing officer and enlisted status of the patient's sponsor.[22] As most of the neonatal deaths in the study occurred among those born preterm, study authors attribute the excess mortality in the neonatal period on higher rates of preterm delivery for non-Hispanic Black neonates.[22]

When examining potentially avoidable maternal complications (PAMCs), an indicator of reduced access to health care, researchers found that Black patients in the MHS were slightly more likely than Whites to have PAMCs. This longitudinal study of TRICARE insurance claims data of patients who had a delivery between 2006 and 2014 found that Asian women were significantly less likely to experience PAMCs than White women. Researchers observed this when analyzing both direct care and private care.[23] Universal health care coverage may not have resulted in equal access to, or quality of, health care.

An analysis of 2018-2019 perinatal discharge data collected from 13 high-volume MTFs (defined as 1000 deliveries per year) found statistically significant differences between Black and White women in several maternal outcomes, including likelihood of cesarean delivery, ICU admission, and SMM.[54] The study did not find a statistically significant difference in SMM associated with postpartum hemorrhage.[54] Analysis of new psychiatric conditions during pregnancy or within one year of delivery showed a statistically significant elevated risk for developing a psychiatric disorder during this period among Black and Asian mothers compared to White women in the MHS.[286] Study authors suggest that despite the universal coverage in the MHS, trends in maternal outcomes including SMM are related to systems-based barriers to accessing care or implicit biases in healthcare delivery.[54] The authors recommend investigating the role of socioeconomic disparities in the MHS on maternal disparities.[54]

Once mothers in the MHS deliver, disparities in care persist – this time for their children. A retrospective cohort analysis of MHS beneficiary children found disparities on the number of well-child visits. The study found achievement of the national HEDIS metric of six well visits during the first 15 months of life to be 86% among the study population. However, there was a significant association of less health care delivery of these recommended well-child visits for enrolled infants among junior Enlisted, Black, and Air Force sponsors. Researchers also found

an association between enrollment at a single site and also having a pediatrician for a primary care manager with higher rates of meeting the HEDIS measure.[26]

Minimally Invasive Hysterectomy

Hysterectomy is a common procedure with multiple methods to perform them. Minimally invasive approaches to hysterectomy have advantages to open surgical hysterectomy such as reduced blood loss, faster recovery, shorter hospital stay, and reduced costs. Overall rates of all hysterectomies are decreasing, while rates for less invasive procedures have increased as a proportion of all hysterectomies.[287,288] Analysis of TRICARE claims data from 2006-2010 of women aged 18 years and older who underwent a hysterectomy showed evidence of a racial disparity in receipt of the minimally-invasive approach to the procedure.[27] This study found that Black and Asian patients were significantly less likely than White patients to receive the minimally invasive procedure both for patients with benign or malignant indications and for patients in the direct and private care systems. Given the consistent results, study authors concluded that surgical indications were not a cause for the disparity. They suggest investigating clinician and system-level factors that could influence surgical decision-making, including cultural dexterity, clinician unconscious bias, availability of a surgical team to perform minimally invasive surgery, and presence of protocol based care as is the case in the Direct Care system.[27,28]

Preventive Care

Universal health coverage is a major driver of access to preventive care. One study on the effect of enrollment in Medicare found that universal coverage resulted in an increase in preventive care use and appears to reduce access disparities by race and ethnicity.[289] The universal coverage of Medicare mirrors the eligibility of MHS beneficiaries for preventive care services. A 2021 DHA issue brief examined preventive care use among military health care beneficiaries by race and ethnicity.[61] As preventive care can improve health outcomes and reduce expenditures, it is important to identify beneficiaries who do not utilize, or cannot access, such preventive care.[290] The DHA analysis showed variance in preventive care use by type of care.[61] White beneficiaries were most likely to receive flu shots and blood pressure checks. Black women were less likely than White women to receive annual influenza immunization; however, they were more likely to receive a mammogram and pap smear. The brief's authors recommend that DHA first examine which groups are less likely to receive preventive care and then take a tailored approach to patient outreach and education for those who are not receiving certain types of care. Citing research that shows the importance of culturally sensitive care on health behavior and outcomes, they encourage DHA to provide opportunities for clinicians to learn about culturally sensitive care with a special focus on preventive care.[61] The findings and recommendations are relevant to the described previously disparities in well-child care, where clinicians deliver child preventive care.

Related to preventive care, health-related quality of life (HRQOL) measures for people with chronic conditions are important metrics that describe population-level disease burden and can reveal disparities between groups. Research shows an association between multiple morbidities and poor HRQOL.[291] Researchers and health systems decision makers can use HRQOL to assess overall disease burden on a health care system given that patients with multimorbidity may account for two-thirds of health care expenditures.[292] A 2019 DHA issue brief examined the relationship between HRQOL measures and disease severity among MHS beneficiaries. Analyzing data from the Health Care Survey of Department of Defense Beneficiaries, researchers found a statistically significant difference in the prevalence of fair or poor health (rather than good, very good, or excellent) by race and ethnicity.[24] This result was similar to an analysis of data from the nationwide Behavioral Risk Factor Surveillance System.[25]

COVID-19

COVID-19 testing and vaccination differed by race and ethnicity in the U.S. military Active Component (AC). A 2021 study of AC Service members found that non-Hispanic Black and Hispanic Service members had increased rates of testing compared with non-Hispanic White SMs after adjusting for age, sex, rank, comorbidities, service branch, geographic region, occupation, and marital status. Despite Service members' equal eligibility for care, and higher testing rate among ethnic minority Service members, all racial and ethnic groups in the AC had a significantly greater risk of testing positive for COVID-19 than the non-Hispanic White reference group.[293] Prior to the military's mandate of COVID-19 vaccination, Black military personnel had a lower (54%) and statistically significant (*P=0.03*) uptake of the COVID-19 vaccine than the overall sample (61%) which included both AC personnel and members of Reserve and National Guard units.[294]

Cancer Screening

Screening improves cancer outcomes by decreasing mortality for cancers for which earlier diagnosis and treatment is more effective than later treatment.[295,296] The MHS delivers primary care cancer screening for colorectal cancer and cervical cancer at unequal rates by race – with White beneficiaries receiving screening at lower rates than Black beneficiaries. Breast cancer screening rates are similar by race in the MHS. Besides the reversal of the usual racial disparity seen in cancer screening in the U.S. general population, a more striking difference may be an overall lower rate of several cancer screening tests for MHS beneficiaries regardless of race.

Colorectal cancer (CRC) screening is an important measure that promotes earlier diagnosis and reduced mortality from CRC.[295,297] Black patients in the MHS received CRC screening at higher rates than White patients, a reversal from screening rate trends in the general U.S. population.[298] Of the eligible patients in a 2018 study of TRICARE claims, the screening rate was 56.5% for Black patients and 53.5% for White patients.[298] This represents a large increase in screening for Black patients in the MHS compared to civilian settings which can be a low as 30%

while the rate for White patients in the MHS was similar to civilian rates (58.5%).[299,300] Despite these CRC screening rates in the MHS, they fall short of the American Cancer Society goal of reaching CRC screening rates of 80% or higher.[301]

A 2021 review of 2011-2016 claims data from the MHS Data Repository found that approximately 50% of Service Women received cervical cancer screenings in the direct care system.[302] This is much lower than the 79% goal recommended by Healthy People 2030, the U.S. Department of Health and Human Services' Office of Disease Prevention and Health Promotion's initiative to improve Americans' health.[303] Besides the overall proportion of Service Women not receiving cervical cancer screenings, the analysis did reveal that White women were statistically less likely than all race categories to receive a screening during the study period.[302] This retrospective cross-sectional study found that American Indian and Alaska Native Service Women were most likely to adhere to U.S. Preventive Services Task Force cervical cancer screening recommendations. Of the study population, this group was significantly more likely to receive cervical cancer screenings than White Service Women. These results reveal a reversal of racial disparities observed in the provision of cervical cancer screenings in the United States.[304]

Mammogram utilization among Service Women from 2006-2015 showed no racial disparities.[305] The study authors point to a U.S. Preventive Services Task Force policy change in 2009 as the reason for a marked increase in the proportion of Service Women who received breast cancer screening.[305] They note that the guideline change had a positive effect on mammogram utilization for both Black and White Service Women.[305]

Diabetes Readmission

A 2020 analysis of both direct care and private care diabetic patients showed an increased likelihood for readmission of American Indian and Alaska Native patients when compared to White patients. Differences existed between direct and private care, with an 18-times increased risk for re-admission of American Indian and Alaska Native beneficiaries compared to White beneficiaries in the direct care system and a 4.5 times increased readmission rate in the private care network. The study authors noted that risk for re-admission at both 60 and 90 days after initial hospital admission was higher than the 30-day readmission risk, indicating differences in outpatient management rather than inpatient care.[271]

Self-Reported Health Status

A 2009 analysis of TRICARE beneficiaries yielded mixed results of self-reported health characteristics. A significantly higher proportion of White than Black or Hispanic active duty beneficiaries described their health as "good or excellent."[299] White retirees were also significantly more likely to report "good or excellent" health compared to Black retirees.[299] Yet, a significantly higher proportion of Black active duty beneficiaries reported no problems finding

both a personal doctor and specialty care than White active duty beneficiaries.[299] Additionally, TRICARE beneficiaries from racial minority groups reported greater satisfaction with their health care experiences than the overall U.S. population.[299] These discrepancies in self-reported health and access to care are consistent with other studies measuring self-rated health in the civilian population.[306,307] As lower self-rated health status is linked to higher mortality rates, declines in functional ability, and reflect both mental and physical health domains, self-rated health status is an important measure for assessing the health status of the MHS population.[308]

Summary of Literature Review and Research Considerations

Some racial and ethnic disparities in health outcomes experienced in the U.S. general population are reduced or eliminated in the MHS. Most major areas of care in the MHS - primary, specialty, perinatal, inpatient, surgical, and emergency care - have some disparities research published. The body of MHS disparities literature documents the relative health outcomes of Black MHS beneficiaries the most, followed by studies of the relative outcomes of Hispanic ethnicity. Very little research documents the relative outcomes of Asian and American Indian or Alaska Native MHS beneficiaries.

Studies examining Service members and retirees have reliable race and ethnicity data since they are self-reported. Many studies of beneficiaries rely on imputation of missing race and ethnicity data with validated methods. However, the DHB notes that imputed data relies on the accuracy of the existing data and that self-reported race and ethnicity is preferable to imputed data to ensure accurate and representative results. Relevant to changing patterns of care associated with the MHS transformation, place of care can impact racial health outcome disparities. While several studies documented lack of outcomes disparity by race or ethnicity in the direct care system, disparities are more likely to exist when MHS beneficiaries receive care in the private care network.

Table 4 Definitions:

- CDC Definition of Health Disparity: "Preventable differences in the burden, disease, injury, violence or in opportunities to achieve optimal health experienced by socially disadvantaged racial, ethnic, and other population groups and communities."[231]
- NIH Definition of Health Disparity: "A health difference that adversely affects disadvantaged populations in comparison to a reference population, based on one or more health outcomes."[256]

The DHB review of MHS disparities literature (Table 4) labels "Disparity" for any metric that showed a significant difference in outcome for a health condition that was worse for the non-White population compared to the reference White population. The label "No Disparity" refers to a study that showed no significant difference between the White and non-White study populations or a significant difference that showed a better outcome for the non-White study population.

Table 4. MHS Disparities Literature by Type of Care (Direct, Purchased, or Both)

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Cancer						
Alexander, 2019[309]						
Overall Survival after Prostate Cancer diagnosis						
Black, non-Hispanic		X				
Bibb, 2000[310]						
Odds for being diagnosed with late-stage Breast Cancer						
Black		X				
Brounts, 2009[311]						
Up-to-date with current colorectal cancer screening recommendations						
Black			X			
Hispanic			X			
Brzezniak, 2015[312]						
Mortality after Non-Small Cell Lung Cancer Diagnosis						
Asian/Pacific Islander		X				
Black		X				
Hispanic		X				
Changoor, 2018[298]						
Likelihood of receiving any colorectal cancer screening						
Asian						X
Black						X
Other						X
Cole, 2017[313]						
Prostate Specific Antigen screening rate						
Asian		X		X		
Black		X		X		
Other		X		X		
Eaglehouse, 2019[314]						
Risk of death among patients receiving breast-conserving surgery						
Black, non-Hispanic					X	
Enewold, 2012[315]						
Mammography screening prevalence						
Asian/Pacific Islander		X				
Black, non-Hispanic		X				
Hispanic		X				
Gill, 2014[316]						
Colon cancer treatment - chemotherapy						
Black, non-Hispanic						X

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Colon cancer treatment - surgery						
Black, non-Hispanic						X
Gill, 2015[317]						
Adequacy of lymph node resection during colon cancer surgery						
Asian/Pacific Islander						X
Black, non-Hispanic						X
White, Hispanic						X
Jatoi, 2003[318]						
Survival stratified by Breast Cancer stage						
Black		X				
Lee, 2013[319]						
Odds of chemotherapy in patients with distant pancreatic cancer						
Black		X				
Odds of chemotherapy in patients with locoregional pancreatic cancer						
Black		X				
Odds of radiotherapy in patients with locoregional pancreatic cancer						
Black		X				
Odds of surgery + adjuvant therapy in patients with locoregional pancreatic cancer						
Black		X				
Odds of surgical intervention in patients with locoregional pancreatic cancer						
Black		X				
Overall survival for distant pancreatic cancer						
Black		X				
Overall survival for locoregional pancreatic cancer						
Black		X				
Lin, 2015[320]						
Mortality among clear cell renal cell carcinoma patients						
Black						X
Pak, 2020[321]						
Use of limb-sparing resection						
Black						X
Paquette, 2003[322]						
Positive Margins after Prostatectomy						
Black		X				
Pope, 2021[302]						
Likelihood of receiving cervical cancer screening						

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
American Indian/Alaska Native		X				
Asian		X				
Black		X				
Other		X				
Rizzo, 2015[323]						
Death after early Stage 1/2 breast cancer diagnosis						
Asian		X				
Black		X				
Wells, 2010[324]						
Prostate Cancer Diagnosis						
Black, non-Hispanic	X					
Other		X				
Young, 2020[269]						
Receipt of surgical intervention for osteomyelitis						
Black						X
Cardiology						
Bagchi, 2011[12]						
Congestive heart failure-related potentially avoidable hospitalization						
Black						X
Hispanic						X
Received beta-blockers following a Congestive Heart Failure diagnosis						
Black					X	
Hispanic					X	
Eckart, 2006[325]						
Death from Sudden Collapse in ADW recruits only						
Black	X					
Roger, 2023[326]						
Clinical Heart Failure						
American Indian/Alaska Native					X	
Asian/Pacific Islander					X	
Black					X	
Other						X
Preclinical Heart Failure						
American Indian/Alaska Native					X	
Asian/Pacific Islander					X	
Black					X	
Other					X	
COVID-19						

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Young, 2021[293]						
Risk of COVID-19 infection						
Black, non-Hispanic	X					
Hispanic	X					
Other		X				
Unknown		X				
Risk of hospitalization from COVID-19						
Black, non-Hispanic	X					
Hispanic	X					
Other	X					
Unknown		X				
Diabetes Care						
Frankel, 2020[271]						
Readmission after hospitalization for diabetes within 90 days						
American Indian/Alaska Native	X		X			
Asian		X		X		
Black		X		X		
Other		X		X		
Unknown				X		
Health Care Access						
Zogg, 2016 (2/2)[327]						
Risk-adjusted relative odds of perforated appendix admission rate						
Asian, Non-Hispanic						X
Black, non-Hispanic						X
Hispanic						X
Health Care Access, Satisfaction, and Use of Preventive Services						
Bagchi, 2009[299]						
(Active Duty Dependent) - No problem seeing a specialist						
Black, non-Hispanic						X
Hispanic						X
(Active Duty Dependent) - Receipt of smoking cessation counseling						
Black, non-Hispanic						X
Hispanic					X	
(Active Duty Dependent) - Self-rated health good or excellent						
Black, non-Hispanic					X	
Hispanic					X	
(Retiree) - No problem seeing a specialist						

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Black, non-Hispanic					X	
Hispanic					X	
(Retiree) - Receipt of smoking cessation counseling						
Black, non-Hispanic						X
Hispanic					X	
(Retiree) - Self-rated health good or excellent						
Black, non-Hispanic					X	
Hispanic						X
HIV						
Silverberg, 2006[328]						
Disease progression to AIDS (HAART era)						
Black		X				
Disease progression to AIDS (pre-HAART era)						
Black		X				
Disease progression to death (HAART era)						
Black		X				
Disease progression to death (pre-HAART era)						
Black		X				
Mortality after HIV diagnosis						
Black		X				
Weintrob, 2009[329]						
Good treatment response to HAART with viral load < 400 Counts/mL						
Black	X					
Hospital Mortality						
Meyers, 2008[330]						
Hospital Death						
Black		X				
Maternal Health						
Andriotti, 2022[286]						
Risk for developing psychiatric disorder during pregnancy or postpartum (within 12 months after delivery)						
Asian					X	
Black					X	
Other					X	
Engelhardt, 2018[21]						
Odds of preterm birth						
Black, non-Hispanic					X	
Grob, 2023[331]						
Postpartum Hemorrhage						

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Asian/Pacific Islander	X					
Severe maternal morbidity excluding transfusion						
Asian/PI	X					
Severe maternal morbidity including transfusion						
Asian/PI		X				
Hall, 2020[332]						
Infant small for gestational age						
American Indian/Alaska Native		X				
Asian/Pacific Islander		X				
Black, non-Hispanic	X					
Hispanic		X				
Prenatal care initiation after first trimester						
American Indian/Alaska Native	X					
Asian/Pacific Islander	X					
Black, non-Hispanic	X					
Hispanic		X				
Hamilton, 2021[54]						
Likelihood of being admitted to an adult ICU						
Black	X					
Likelihood of cesarean delivery						
Black	X					
Risk of severe maternal morbidity						
Black	X					
Hatch, 2006[333]						
Preterm Delivery all deliveries						
Black	X					
Preterm delivery spontaneous						
Black		X				
Lundeberg, 2023[334]						
Overall risk of severe maternal morbidity						
Asian/Pacific Islander	X					
Black	X					
Risk for cesarean delivery						
Asian/Pacific Islander	X					
Black	X					
Risk for ICU admission						
Asian/Pacific Islander	X					
Black		X				
Ranjit, 2017 (1/2)[29]						

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Received laparoscopic surgery for ectopic pregnancy within 30 days						
Asian		X		X		
Black		X	X			
Ranjit, 2017 (2/2)[27]						
Likelihood of receiving total laparoscopic hysterectomy						
Asian					X	
Black					X	
Likelihood of receiving total vaginal hysterectomy and total laparoscopic hysterectomy						
Asian					X	
Black					X	
Ranjit, 2021[23]						
Likelihood of PAMCs						
Asian or Pacific Islander						X
Black					X	
Other						X
Vereen, 2023[22]						
Risk of neonatal mortality						
Black, non-Hispanic					X	
Mental Health						
Martin, 2022[335]						
Diagnosis of anxiety disorders						
American Indian/Alaska Native						X
Asian/Pacific Islander						X
Black						X
Other						X
Diagnosis of depressive disorders						
American Indian/Alaska Native					X	
Asian/Pacific Islander					X	
Black						X
Other						X
Diagnosis of impulse control disorders						
American Indian/Alaska Native						X
Asian/Pacific Islander						X
Black					X	
Other						X
Diagnosis of multiple concurrent disorders						
American Indian/Alaska Native						X
Asian/Pacific Islander						X

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Black						X
Other						X
Musculoskeletal						
Chaudhary, 2018[336]						
Failure to rescue (mortality after sentinel complication) within 30 days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Failure to rescue (mortality after sentinel complication) within 90 days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Major complication within 30 days of days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Major complication within 90 days of days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Mortality within 30 days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Mortality within 90 days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Outpatient care utilization within 30 days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Outpatient care utilization within 90 days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Readmission within 30 days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Readmission within 90 days of hospital discharge following inpatient trauma encounter						
Black		X		X		
Sulsky, 2000[337]						
Discharge from military for knee injury (men)						
Black+Hispanic		X				
Discharge from military for knee injury (women)						
Black+Hispanic		X				
Nephrology						
Oliver, 2009[338]						
Kidney transplant graft loss 6 years or more after transplant						

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Black	X					
Pain Management						
Chaudhary, 2017 (1/2)[339]						
Odds of Opioid Prescription After Hospital Discharge for Traumatic Injury among Opioid-Naïve Patients						
Asian/Pacific Islander						X
Black					X	
Other					X	
Chaudhary, 2017 (2/2)[340]						
Discontinuation of prescription opioid one year after traumatic injury						
Asian/Pacific Islander						X
Black						X
Other						X
Chaudhary, 2021[341]						
Likelihood of opioid discontinuation during 6-month postoperative period						
Asian						X
Black						X
Hispanic						X
Other						X
Dalton, 2021[342]						
Discontinuation of prescription opioid 6 months after discharge following combat-related injury						
Asian						X
Black						X
Other						X
Lu, 2020[343]						
Odds of receiving opioid refill						
Asian					X	
Black					X	
Hispanic						X
Native/Other						X
Pediatrics						
Forester, 2008[344]						
Oral Steroids within last 12 months						
Black		X				
Hispanic		X				
Prescription of Inhaled Corticosteroids						
Black		X				
Hispanic		X				

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Receipt of Asthma Action Plan						
Black		X				
Hispanic		X				
Receipt of Asthma Education						
Black		X				
Hispanic		X				
Receipt of Influenza Vaccine						
Black		X				
Hispanic		X				
Unscheduled ED/Acute Visit in last 12 months						
Black		X				
Hispanic		X				
Hammon, 2023[26]						
Likelihood of meeting well-child metric of 6 well visits from age 0-15 months						
Asian or Pacific Islander						X
Black					X	
Other					X	
Lundquist, 2015[345]						
Breastfeeding initiation						
Asian						X
Black					X	
Latina						X
Sharma, 2018[346]						
At least 1 outpatient visit within 30 days: post-discharge following inpatient trauma admission						
Black						X
At least 1 outpatient visit within 90 days: post-discharge following inpatient trauma admission						
Black						X
Complication within 90 days: post-discharge following inpatient trauma admission						
Black						X
Complications within 30 days: post-discharge following inpatient trauma admission						
Black						X
Readmission within 30 days: post-discharge following inpatient trauma admission						
Black						X
Readmission within 90 days: post-discharge following inpatient trauma admission						
Black						X
Stewart, 2010[347]						

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Asthma diagnosis: 11-17 year old Asthma-related ED visit						
Black	X					
Hispanic		X				
Asthma diagnosis: 11-17 year old asthma-related Potentially Avoidance Hospitalization (PAH)						
Black	X					
Hispanic		X				
Asthma diagnosis: 11-17 year old receipt of asthma medication prescription						
Black		X				
Hispanic	X					
Asthma diagnosis: 11-17 year old receipt of inhaled corticosteroid						
Black		X				
Hispanic	X					
Asthma diagnosis: 11-17 year old Specialist visit for asthma						
Black	X					
Hispanic		X				
Asthma diagnosis: 2-4 year old Asthma-related ED visit						
Black	X					
Hispanic		X				
Asthma diagnosis: 2-4 year old asthma-related Potentially Avoidance Hospitalization (PAH)						
Black	X					
Hispanic		X				
Asthma diagnosis: 2-4 year old receipt of asthma medication prescription						
Black		X				
Hispanic		X				
Asthma diagnosis: 2-4 year old receipt of inhaled corticosteroid						
Black		X				
Hispanic		X				
Asthma diagnosis: 2-4 year old Specialist visit for asthma						
Black	X					
Hispanic		X				
Asthma diagnosis: 5-10 year old Asthma-related ED visit						
Black	X					
Hispanic	X					
Asthma diagnosis: 5-10 year old asthma-related Potentially Avoidance Hospitalization (PAH)						
Black	X					

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Hispanic	X					
Asthma diagnosis: 5-10 year old receipt of asthma medication prescription						
Black		X				
Hispanic		X				
Asthma diagnosis: 5-10 year old receipt of inhaled corticosteroid						
Black		X				
Hispanic		X				
Asthma diagnosis: 5-10 year old Specialist visit for asthma						
Black	X					
Hispanic	X					
Primary Care						
Embry, 2021[61]						
Percentage of beneficiaries in 2020 who had a blood pressure check within the last two years and know the result						
American Indian/Alaska Native, Native Hawaiian/Pacific Islander, or Unknown						X
Asian, non-Hispanic or Pacific Islander					X	
Black, non-Hispanic						X
Hispanic					X	
Multiracial, non-Hispanic					X	
Percentage of non-service member beneficiaries in 2020 who received a flu vaccine within the last year						
American Indian/Alaska Native, Native Hawaiian/Pacific Islander, or Unknown						X
Asian, non-Hispanic or Pacific Islander					X	
Black, non-Hispanic					X	
Hispanic					X	
Multiracial, non-Hispanic					X	
Percentage of pregnant women in 2020 who received prenatal care in their first trimester						
Black, non-Hispanic						X
Hispanic						X
Percentage of women in 2020 who received a pap smear within the last three years						
American Indian/Alaska Native, Native Hawaiian/Pacific Islander, or Unknown						X
Asian, non-Hispanic or Pacific Islander						X
Black, non-Hispanic						X
Hispanic						X
Multiracial, non-Hispanic						X
Percentage of women over age 40 in 2020 who received a mammogram within the last two years						

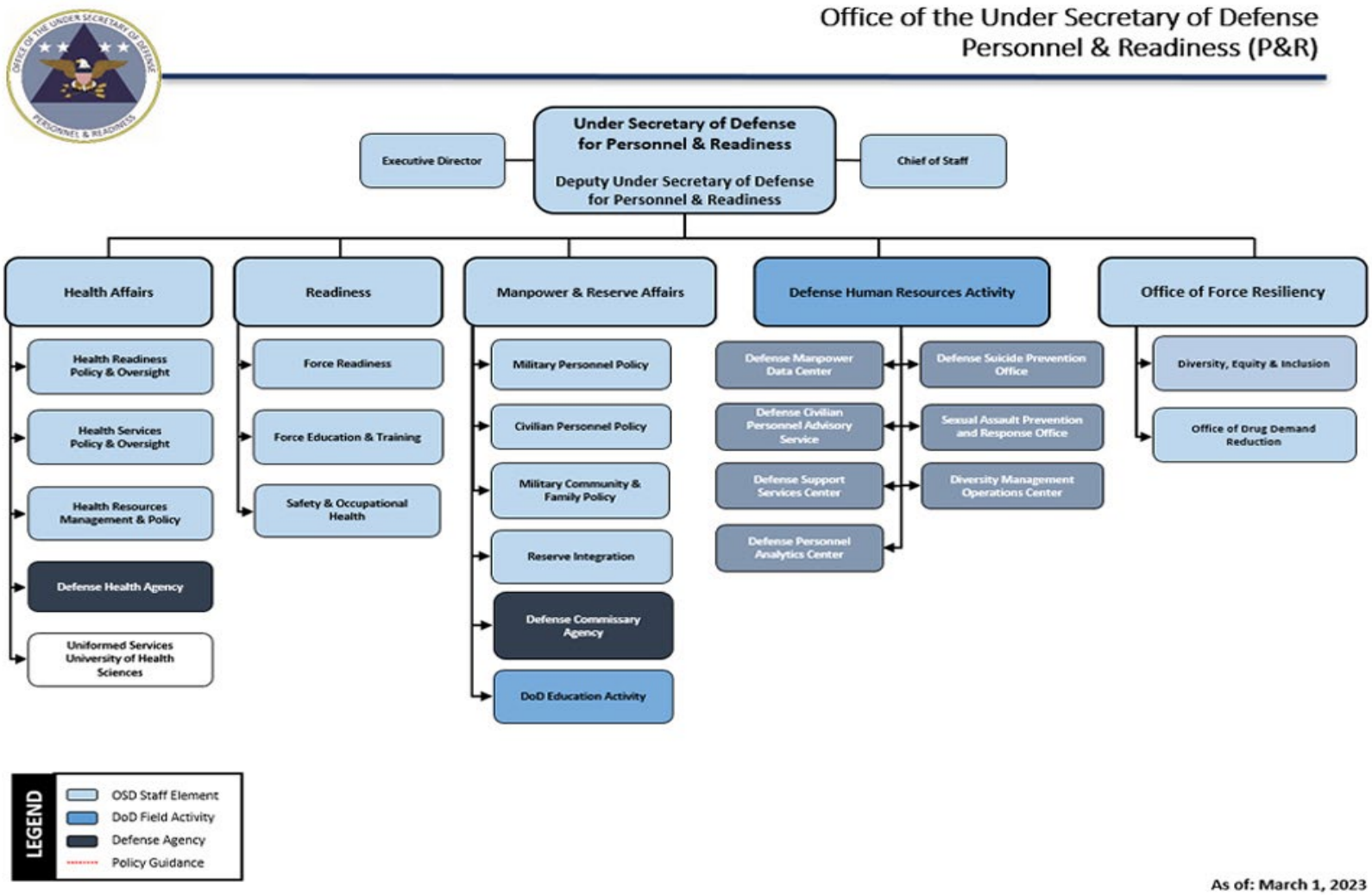
MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
American Indian/Alaska Native, Native Hawaiian/Pacific Islander, or Unknown						X
Asian, non-Hispanic or Pacific Islander						X
Black, non-Hispanic						X
Hispanic						X
Multiracial, non-Hispanic						X
Keshaviah, 2019[24]						
Prevalence of fair or poor health						
Latino					X	
Non-Latino Asian						X
Non-Latino Black					X	
Non-Latino Multiracial					X	
Other/unknown					X	
Substance Use Disorders						
Tippit, 2023[348]						
Receipt of medication for opioid use disorder (OUD) within 1 year of index OUD diagnosis						
American Indian/Alaska Native						X
Asian/PI						X
Black					X	
Latinx					X	
Other					X	
Surgery						
Chaudhary, 2019[349]						
Beta-blocker prescription at discharge						
Black						X
Readmission to the same hospital or another facility within thirty days of surgery						
Black						X
Statin prescription at discharge						
Black						X
Chowdhury, 2016[350]						
Duration of stay for coronary artery bypass graft operation						
Black					X	
Schoenfeld, 2017[266]						
Complications						
Black		X	X			
Failure to Rescue						
Black		X		X		
Length of Stay						

MHS Disparities Literature by Type of Care	Direct		Purchased		Both	
	Disparity	No Disparity	Disparity	No Disparity	Disparity	No Disparity
Black		X		X		
Mortality						
Black		X		X		
Readmission						
Black		X		X		
Zogg, 2016 (1/2)[270]						
180-day Major acute care surgery-related morbidity						
Asian		X		X		
Black	X		X			
Other		X		X		
180-day Mortality						
Asian		X		X		
Black		X		X		
Other		X		X		
Readmission at 180 days						
Asian		X		X		
Black		X		X		
Other		X		X		

Table 5. List of Studies in DHB Literature Review by First Author's Last Name, Year

First Author, Year Study Title	
Alexander, 2019 - Race and overall survival in men diagnosed with prostate cancer in the Department of Defense Military Health System, 1990-2010	Keshaviah, 2019 - The Importance of Quality-of-Life
Andriotti, 2022 - Psychiatric Conditions During Pregnancy and Postpartum in a Universally Insured American Population	Lee, 2013 - Race Does Not Impact Pancreatic Cancer Treatment and Survival in an Equal Access Federal Health Care System
Bagchi, 2009 - Racial and Ethnic Health Disparities in TRICARE	Lin, 2015 - Survival among Black and White patients with renal cell carcinoma in an equal-access health care system
Bagchi, 2011 - Treatment and outcomes for congestive heart failure by race/ethnicity in TRICARE	Lu, 2020 - Opioid Prescriptions After Hemorrhoidectomy
Bibb, 2000 -	Lundeberg, 2023 - Military healthcare system mitigates racial disparities for severe maternal morbidity from preeclampsia
Brounts, 2009 - Improved rates of colorectal cancer screening in an equal access population	Lundquist, 2015 - Do black–white racial disparities in breastfeeding persist in the military community
Brzezniak, 2015 - Survival and Racial Differences of Non-Small Cell Lung Cancer in the United States Military	Martin, 2021 - Minority adolescent mental health diagnosis differences in a national sample
Changoor, 2018 - Effect of an equal-access military health system on racial disparities in colorectal cancer screening	Meyers, 2008 - Racial Differences in Mortality among Men Hospitalized in Military Hospitals
Chaudhary, 2017 (1/2) - Incidence and predictors of opioid prescription at discharge after traumatic injury	Oliver, 2009 - Influence of Race on Kidney Transplantation in the Department of Defense Healthcare System
Chaudhary, 2017 (2/2) - Patterns of use and factors associated with early discontinuation of opioids following major trauma	Pak, 2020 - Racial Differences in Extremity Soft Tissue Sarcoma Treatment in a Universally Insured Population
Chaudhary, 2018 - Universal insurance and an equal access healthcare system eliminate disparities for Black patients after traumatic injury	Paquette, 2003 - Predictors of extracapsular extension and positive margins in African American and White men
Chaudhary, 2019 - No Racial Disparities In Surgical Care Quality Observed After Coronary Artery Bypass Grafting In TRICARE Patients	Pope, 2021 - The Mitigation of Racial Disparities in Cervical Cancer Screening Among U.S. Active Duty Service Women
Chaudhary, 2021 - Identifying Patterns and Predictors of Prescription Opioid Use After Total Joint Arthroplasty	Ranjit, 2017 (1/2) - Disparities in receipt of a laparoscopic operation for ectopic pregnancy among TRICARE beneficiaries
Chowdhury, 2016 - Race-based differences in duration of stay among universally insured coronary artery bypass graft patients in military versus civilian hospitals	Ranjit, 2017 (2/2) - Does Universal Insurance Mitigate Racial Differences in Minimally Invasive Hysterectomy?
Cole, 2017 - The use of prostate specific antigen screening in purchased versus direct care settings: data from the TRICARE® military database	Ranjit, 2021 - Does Universal Coverage Mitigate Racial Disparities in Potentially Avoidable Maternal Complications?
Dalton, 2021 - Long-term prescription opioid use among US military service members injured in combat	Rizzo, 2015 - Racial disparity in survival from early breast cancer in the department of defense healthcare system
Eaglehouse, 2019 - Racial Differences in Time to Breast Cancer Surgery and Overall Survival in the US Military Health System	Roger, 2023 - Prevalence of Heart Failure Stages in a Universal Health Care System: The Military Health System Experience
Eckart, 2006 - Causes of sudden death in young female military recruits	Schoenfeld, 2017 - Association Between Race and Postoperative Outcomes in a Universally Insured Population Versus Patients in the State of California
Embry, 2021 - Disparities in the Use of Preventive Care by Race/Ethnicity	Sharma, 2018 - Universal Health Insurance and its association with long term outcomes in Pediatric Trauma Patients
Enewold, 2012 - Mammography screening by race/ethnicity among U.S. servicewomen, 2009-2010	Silverberg, 2006 - Effectiveness of highly-active antiretroviral therapy by race/ethnicity
Engelhardt, 2018 - Lower Preterm Birth Rates but Persistent Racial Disparities in an Open-Access Health Care System	Stewart, 2010 - Differences in prevalence, treatment, and outcomes of asthma among a diverse population of children with equal access to care: findings from a study in the military health system
Forester, 2008 - Can equal access to care eliminate racial disparities in pediatric asthma outcomes?	Sulsky, 2000 - Case-control study of discharge from the U.S. Army for disabling occupational knee injury: the role of gender, race/ethnicity, and age
Frankel, 2020 - Examining Racial Disparities in Diabetes Readmissions in the United States Military Health System	Tippit, 2023 - Racialized and beneficiary inequities in medication to treat opioid use disorder receipt within the US Military Health System
Gill, 2014 - Colon cancer treatment: are there racial disparities in an equal-access healthcare system?	Vereen, 2023 - Neonatal mortality and disparities within the military health system
Gill, 2015 - Colon cancer lymph node evaluation among military health system beneficiaries: an analysis by race/ethnicity	Weintrob, 2009 - Virologic response differences between African Americans and European Americans initiating highly active antiretroviral therapy with equal access to care
Grob, 2023 - Increased maternal morbidity and mortality among Asian American and Pacific Islander women in the military health system	Wells, 2010 - Racial Differences in Prostate Cancer Risk Remain Among US Servicemen With Equal Access to Care
Hall, 2020 - Racial Disparities in Prenatal Care Utilization and Infant Small for Gestational Age Among Active Duty U.S. Military Women	Young, 2020 - Does Universal Insurance and Access to Care Influence Disparities in Outcomes for Pediatric Patients with Osteomyelitis?
Hamilton, 2021 - Race matters: maternal morbidity in the Military Health System	Young, 2021 - Racial and Ethnic Disparities in COVID-19 Infection and Hospitalization in the Active Component US Military
Hammon, 2023 - Well-Child Care Disparities in U.S. Military Health System	Zogg, 2016 (1/2) - Racial disparities in emergency general surgery - Do differences in outcomes persist among universally insured military patients?
Hatch, 2006 - Race, cardiovascular reactivity, and preterm delivery among active-duty military women	Zogg, 2016 (2/2) - Differential access to care: The role of age, insurance, and income on race/ethnicity-related disparities in adult perforated appendix admission rates
Jatoi, 2003 - Widening disparity in survival between white and African-American patients with breast carcinoma treated in the U. S. Department of Defense Healthcare system	

Appendix G – Office of the Under Secretary of Defense for Personnel and Readiness



Appendix H – SMMAC and MHSER Structures

Senior Military Medical Action Council (SMMAC)[352]

The SMMAC is the highest governing body in the MHS, which presents enterprise-level guidance and operational issues for decision making by the ASD(HA). The SMMAC is comprised of the following senior military health leaders:

- ASD(HA) (Chair);
- Principal Deputy Assistant Secretary of Defense (Health Affairs) (PDASD[HA]);
- Military Service Surgeons General;
- DHA Director;
- Joint Staff Surgeon (JSS);
- other attendees as required.

Military Health System Executive Review (MHSER)[352]

The MHSER serves as a senior-level forum for DOD leadership input on strategic, transitional, and emerging issues. The MHSER advises the SECDEF and the Office of the Deputy Secretary of Defense (DEPSECDEF) about performance challenges and direction. The MHSER is composed of the following senior DOD leaders:

- Under Secretary of Defense (Personnel and Readiness) (USD[P&R]) (Chair);
- Principal Deputy Under Secretary of Defense (Personnel and Readiness);
- ASD(HA);
- Military Service Vice Chiefs;
- Military Department Assistant Secretaries for Manpower and Reserve Affairs;
- Director of Cost Assessment and Program Evaluation;
- Principal Deputy Under Secretary of Defense (Comptroller);
- Director of the Joint Staff;
- Military Service Surgeons General (ex-officio members).

Appendix I – Health System Best Practices for Health Equity

Institute for Healthcare Improvement

- IHI Pursuing Equity – Collaboration of health systems to disseminate health equity best practices
- Levels of health equity analysis:
  - Infrastructure
  - Process and outcome measures
  - Examine care quality among groups with known inequities
  - Examine social determinants of health
- Make health equity a priority for the organization
- Recommendations at the departmental level should include plans for implementation and measurement at the local level

Defense Health Board 2

Rush University

- Importance of data quality and frequency of data pulls
- Along with race and ethnicity, Rush disaggregates data by other social determinants of health such as payor, zip code, and other factors
- Behavior change begins with education and supported in policy and practice
- Recommendation to start with data and build strategy based on gaps
- Participates in Illinois Health and Hospital Association Racial Equity in Healthcare Progress Report
- On provider bias, research shows patient -provider racial concordance supports positive effect on outcomes due to improved communication

Defense Health Board 3

Kaiser Permanente (1/2)

- Developed social needs screening tools for member population
- Investments in community resources to address social deficits
- Partners with Unite Us – software company that builds networks of social services providers and connects users to those organizations
- Improvement Goals focused on key equity areas using HEDIS metrics and stratified by race and ethnicity
- Data and Measurement Workgroup analyzes patient survey data to identify trends in member health by race
- Focus on high morbidity conditions with greatest impact on metrics such as years of life lost

Kaiser Permanente (2/2)

- Senior Executive leaders are health equity sponsors: Participate in health equity workgroups across the organization
- Permanente Medical Groups in every Market have health equity leaders

Boston Medical Center (1/2)

- BMC Health Equity Accelerator approach to health equity:
  - Revisit conclusions derived from standard statistical analyses (averages can obscure inequities)
  - Analytics team proactively looks for disparities
  - Seek novel insights through primary research with appropriate mix of patients
  - Engage with institution leadership, providers patients, and community leaders to identify community needs and institutional capabilities
- Patient profile: 65% identify as "nonwhite"
- Identify points in care process that could exacerbate disparities and adapt institutional standards to address (stroke response time and diabetes care examples)

Boston Medical Center (2/2)

- Training evaluation: Qualitative evidence for measuring provider education but no results showing effect of trainings on outcomes
- Equity Oversight Group includes entire Executive Board
- 2/10 corporate goals that impact executive compensation related to health equity (trainings; diabetes care)
- Board of community leaders meets quarterly to inform Health Equity Accelerator groups

Providence Health (1/2)

- Goal setting and strategic planning:
  - Five-year strategic plan: start small and implement with phased approach
  - By population within each community
  - Select disparities and urgent priorities
- Engaged communities to advise areas to focus on: Key element is trust
  - Partner with community leaders
  - Recruit diverse voices for patient advisory councils
  - Follow-up: What did Providence do with the information community provided?
- Prevention of new disparities:
  - Upstream focus to prevent harm
  - Integration of health equity framework, data integration, and strategies

Providence Health (2/2)

- Data, inputs, and advanced analytics: cannot wait until the data is perfect, begin making change now
  - Self-reported identification data
  - Consumer and community input on health disparities and resource inequities
  - Patient report health and experience
- Data informed interventions: evidence-based
  - Best practices and lessons learned
  - Focus on reducing inequities and outcomes will improve for all groups
- Accountability for health equity is placed on all levels of the organization, including leadership

Mayo Clinic

- Improving access
  - Telehealth expansion
  - Partnering with safety net hospitals and Federally Qualified Health Centers
- Addressing barriers to achieve optimal health by addressing Social Determinants of Health
- Community Engagement: Internal Community Coalition
- Improving Workforce Diversity

Appendix J – Acronyms

AC: Active Component
ACE: Adverse Childhood Experience
ACS: American College of Surgeons
AFHSD: Armed Forces Health Surveillance Division
AHC: Accountable Health Communities
AHLTA: Armed Forces Health Longitudinal Technology Application
AI: Artificial Intelligence
AMA: American Medical Association
APOL1: Apolipoprotein L1
ASD(HA): Assistant Secretary of Defense for Health Affairs
BHMC: Building Healthy Military Communities
CAHPS: Consumer Assessment of Health Care Providers and Systems
CDC: Centers for Disease Control and Prevention
CDMRP: Congressionally Directed Medical Research Programs
CDS: Clinical Decision Support
CHAI: Coalition for Health AI
CHCS: Composite Health Care System
CKD-EPI: Chronic Kidney Disease Epidemiology Collaboration
CMS: Centers for Medicare and Medicaid
CPSTF: Community Preventative Services Task Force
CRC: Colorectal Cancer
DeCA: Defense Commissary Agency
DEERS: Defense Enrollment Eligibility Reporting System
DHB: Defense Health Board
DMDC: Defense Manpower Data Center
DMSS: Defense Medical Surveillance System
eGFR: estimated Glomerular Filtration Rate
EHR: Electronic Health Record
EIDS: Enterprise Intelligence and Data Solutions
FDA: Food and Drug Administration
GFR: Glomerular Filtration Rate
HBCU: Historically Black Colleges and Universities
HCSDB: Health Care Survey of DoD Beneficiaries
HEDIS: Healthcare Effectiveness Data and Information Set

HRQOL: Health-Related Quality of Life
HRSN: Health-Related Social Needs
IT: Information Technology
JC: Joint Commission
KDRI: Kidney Donor Risk Index
LEP: Limited English Proficiency
MDR: MHS Data Repository
MDRD: Modification of Diet in Renal Disease
MHS: Military Health System
MILPERSMAN: Military Personnel Manual
MIP: MHS Information Platform
MSI: Minority-Serving Institution
MSMR: Medical Surveillance Monthly Report
MTF: Military Training Facility
NCDB: National Cancer Database
NPIC: National Perinatal Information Center
NSQIP: National Surgical Quality Improvement Program
OMB: Office of Management and Budget
PAMC: Potentially Avoidable Maternal Complication
PCP: Primary Care Physician
PPH: Postpartum Hemorrhage
PROM: Patient-reported Outcome Measures
RAPIDS: Real-Time Automated Personnel Identification System
ROTC: Reserve Officers' Training Corps
SDOH: Social Determinants of Health
SMM: Severe Maternal Morbidity
SMMAC: Senior Military Medical Advisory Committee
SNAP: Supplemental Nutrition Assistance Program
SPD: Statistical Policy Directive
STEM: Science, Technology, Engineering, Math
SWYC: Survey of Wellbeing of Young Children
TFF: Total Force Fitness
USD(P&R): Under Secretary of Defense for Personnel and Readiness
VA: Department of Veterans Affairs
VBAC: Vaginal Birth After Cesarean
VH: Virtual Health
WIC: Women, Infants, and Children


DEFENSE
HEALTH BOARD