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Racial and Ethnic Disparities in the VA Healthcare System: A Systematic Review

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PREFACE

VA's Health Services Research and Development Service (HSR&D) works to improve the cost, quality, and outcomes of health care for our nation's veterans. Collaborating with VA leaders, managers, and policy makers, HSR&D focuses on important health care topics that are likely to have significant impact on quality improvement efforts. One significant collaborative effort is HSR&D's Evidence-based Synthesis Pilot Project (ESP). Through this project, HSR&D provides timely and accurate evidence syntheses on targeted health care topics. These products will be disseminated broadly throughout VA and will: inform VA clinical policy, develop clinical practice guidelines, set directions for future research to address gaps in knowledge, identify the evidence to support VA performance measures, and rationalize drug formulary decisions.

HSR&D provided funding for the two Evidence Based Practice Centers (EPCs) supported by the Agency for Healthcare Research and Quality (AHRQ) that also had an active and publicly acknowledged VA affiliation—Southern California EPC and Portland, OR EPC—so they could develop evidence syntheses on requested topics for dissemination to VA policymakers. A planning committee with representation from HSR&D, Patient Care Services, Office of Quality and Performance, and the VISN Clinical Management Officers, has been established to identify priority topics and to insure the quality of final reports.

Comments on this evidence report are welcome and can be sent to Susan Schiffner, ESP Program Manager, at Susan.Schiffner@va.gov.

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INTRODUCTION

Background

Numerous studies have demonstrated racial and ethnic differences in health care in the United States.[1] These studies have collectively demonstrated that both the quantity and quality of health care are lower for minority Americans—African Americans and Hispanics in particular—as compared to the white majority. Studies have found racial differences in the use of lifesaving surgeries and other invasive procedures, in technical processes of health care delivery, and in interpersonal interactions between patients and providers. The root causes of racial differences in health care remain unclear, but in general, they are not explained by differences in clinical factors or patient preferences; i.e., the differences represent *inequity* in health care delivery. The Institute of Medicine has referred to these inequitable differences as *disparities*. Differences in ability to pay for care—as measured by health insurance and income—also do not explain the majority of observed racial disparities.[1] Importantly, disparities in health care have been demonstrated in the Veterans Affairs (VA) healthcare system, where financial barriers to receiving care are minimized.

The VA is committed to delivering high-quality care in an equitable manner, and as such, to eliminating racial and ethnic disparities in health care. To inform this effort, the VA has invested in research on disparities by making Equity one of the priority areas within its Health Services Research and Development (HSR&D) Service. Through its Equity portfolio, the VA HSR&D Service seeks to further knowledge of the root causes of racial and ethnic disparities in health care and to develop and test interventions to reduce and eliminate disparities. Over time, evidence about disparities in VA care has accumulated through research supported by HSR&D and other VA and non-VA sponsors. The HSR&D Service sought to take stock of this evidence, to inform future research within its Equity portfolio, particularly intervention research; i.e., what does the accumulated evidence tell us will be the most promising areas for interventions to reduce and eventually eliminate racial and ethnic disparities within the VA?

Scope and Key Questions

The scope and key questions for our review were defined in consultation with representatives from the VA HSR&D Service, the VA Evidence Synthesis Program, and an advisory group of technical experts in VA healthcare disparities (Said Ibrahim, MD, MPH; Judith Long, MD; Eugene Oddone, MD; Donna Washington, MD, MPH; and Elizabeth Yano, PhD).

We reviewed and synthesized the existing knowledge base related to racial and ethnic disparities in VA health care. It is important to note that our review included only studies of racial disparities in *health care*, i.e., the utilization and quality of health care services. We did not review studies examining racial disparities in *health*, i.e., incidence, prevalence, or severity of disease. We did include studies examining intermediate health outcome measures used by the VA as indicators of health care quality (e.g., control of blood pressure, blood glucose, and lipids).

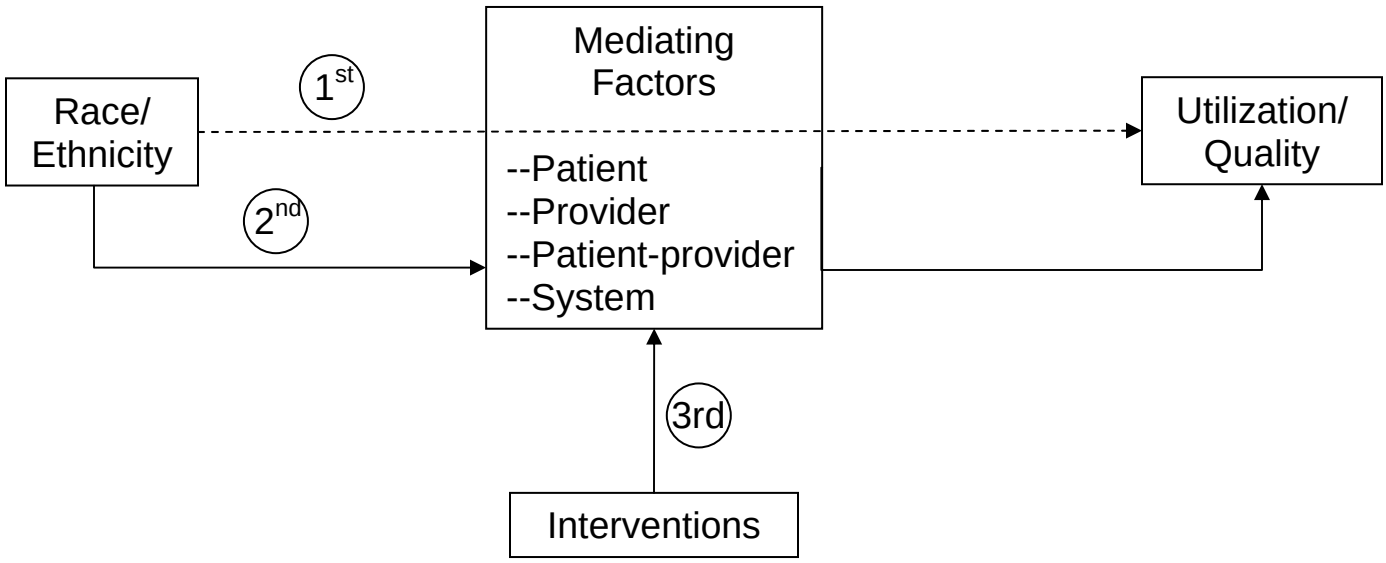
Although studies from outside the VA healthcare system may hold important lessons for reducing racial disparities both within and outside the VA, in consultation with our technical

expert advisory group we chose to limit our review to studies conducted within the VA. The rationale for this restriction on the scope of the review was threefold: 1) as an integrated, staff-model health care organization, the VA is different from the broader U.S. healthcare environment, making the causes of racial and ethnic disparities potentially different as well; 2) as an "equal access" system, the VA reduces the influence of potential confounders of racial disparities, such as insurance and income, and therefore providers a "cleaner laboratory" for studying disparities; and 3) the body of literature on racial disparities in healthcare is sufficiently large that a comprehensive review of both VA and non-VA studies would not have been feasible with the resources available.

We conducted this review with the following objectives:

1. Determine in which clinical areas racial and ethnic disparities are prevalent within the VA;
2. Describe what is known about the sources of those disparities; and
3. Qualitatively synthesize that knowledge to determine the most promising avenues for future research aimed at improving equity in VA health care.

Figure: Conceptual Framework



The Figure illustrates the conceptual framework that guided our review and synthesis. In this framework, studies that document racial and ethnic differences in utilization and/or quality of care are considered 1st-generation studies. These are the studies that shed light on the problem of disparities in health care. In our review, 1st-generation studies were included to address Objective 1, i.e., to determine where racial and ethnic disparities are prevalent within the VA. Studies that examine the association of race with factors that might mediate the association between race and healthcare utilization and/or quality are considered 2nd-generation. These studies examine mediating factors related to patients, providers, patient-provider interactions or relationships, or healthcare facilities and systems. Some studies are simultaneously 1st- and 2nd-generation, demonstrating racial or ethnic disparities and examining mediating factors that might

explain those disparities. However, most 2nd-generation studies examine only the association between race and potential mediating factors, without determining whether those factors truly mediate disparities by race or ethnicity. For example, a study might examine whether race is associated with trust in healthcare providers, without explicitly examining whether trust is a mediator of actual disparities. The potential for mediation is in these cases theoretical. We used 2nd-generation findings to address Objective 2, i.e., to describe likely sources of disparities.

Studies of interventions to reduce racial disparities are considered 3rd-generation studies. There are relatively few of these studies; 3rd-generation disparities research is still nascent. We therefore used our conceptual framework to propose interventions that might reduce racial disparities by targeting likely mediating factors identified by 2nd-generation studies (Objective 3).

METHODS

The review consisted of two components: a review of the existing literature reporting the findings of research on racial disparities within the VA, and an environmental scan of ongoing or recently completed studies of racial disparities within the VA.

Literature Search and Strategy

We conducted a search in Medline (via PubMed) and HealthSTAR of literature published from 1966 to October 9, 2006. The search terms and MeSH headings included the following: VA, veteran(s), United States Department of Veterans Affairs, ethnic, race, racial, disparity(-ies), black(s), Hispanic, population groups, race relations. Appendix I provides the strategy and search terms in detail. All citations were imported into an electronic database (EndNote 9.0)

The search strategy was saved in the PubMed database to provide weekly automatic updates on new publications. We obtained additional articles from reference lists of pertinent studies, and by consulting authors of retrieved studies, our technical expert advisory group, and other known VA disparities researchers. We searched the Health Services Research Projects database to identify ongoing and recently completed VA research projects.

Eligibility Criteria and Study Selection

Two reviewers assessed for relevance the abstracts of citations identified from literatures searches, using the criteria described in Appendix II. Full-text articles of potentially relevant abstracts were retrieved and a second review for inclusion was conducted by reapplying the inclusion criteria.

Eligible articles had English-language abstracts and provided primary data relevant to the key questions. We included studies that were conducted within the VA or with VA beneficiaries, reported outcomes of interest by veteran race and/or ethnicity. Outcomes of interest included on utilization of health care services; quality of health care services including quality metrics (e.g. blood pressure control), process-of-care measures (e.g. use of appropriate screening tests), patient evaluations of care, and direct observations of care (e.g. communication patterns); and

potential mediators of disparities in utilization or quality at various levels (system, provider, or patient). We further selected studies that focused on race—or "patient characteristics" (including race)—as the variable of interest, as indicated in the title or stated objectives of the study. We excluded studies that met other inclusion criteria but that were not specifically focused on comparisons by race or patient characteristics in general, to avoid potential publication bias. In an early assessment, we found that studies reporting comparisons by race despite not indicating those comparisons as part of their study objectives were substantially more likely than race-focused studies to report racial disparities to be present. These "non-race-focused" studies therefore skewed the overall assessment of the degree and distribution of disparities within the VA, since they might not have reported on racial comparisons had disparities not been found.

Data abstraction and quality assessment

We abstracted the following data from included studies: study design, objectives, setting, population characteristics (including sex, age, ethnicity, diagnosis), subject eligibility and exclusion criteria, number of subjects, race/ethnic groups compared, methods of outcome assessment, data sources for race/ethnicity and outcome data, analytic method, potential confounders adjusted for in the analysis, and the results for each outcome.

Because the studies were heterogeneous in design, objectives, and outcomes, we did not systematically rate the validity of individual studies. We instead assessed the level of adjustment for potential confounders and whether race/ethnicity data was gathered by self-report, and considered these indicators in the qualitative synthesis of evidence.

Evidence Synthesis and Data Presentation

We constructed evidence tables showing the study characteristics and results for all included studies, organized by clinical topic. We critically analyzed studies to compare their characteristics, methods, and findings. We compiled a summary of findings for each clinical topic and drew conclusions based on qualitative synthesis of the findings. After summarizing the findings for each clinical topic, we synthesized the descriptions and summaries of the literature for each clinical topic to derive a set of "cross-cutting" themes related to the underlying causes of healthcare disparities. These served as the basis for a proposed set of potential interventions for future research aimed at reducing racial disparities in VA health care.

Environmental Scan

The environmental scan was intended to capture ongoing or recently completed (but unpublished) studies related to racial disparities within the VA. To accomplish this task, we communicated with the HSR&D Center for Health Equity Research and Promotion and consulted with established disparities researchers within the VA, including our technical expert advisory group. We searched the VA HSR&D website for currently and recently funded disparities studies to identify ongoing or recent intervention studies. Finally, we reviewed abstracts from the 2006 and 2007 VA HSR&D Annual Meeting for relevant studies. We compiled an evidence table of all relevant completed but unpublished studies.

RESULTS

The initial electronic literature search generated 1098 titles and abstracts. An additional 7 titles were added through manual and automatic update searches. After applying inclusion/exclusion criteria at the abstract level, 171 full-text articles were reviewed and sorted by clinical content area, as shown in Appendix III. Detailed information about each study is provided in the evidence tables (Appendix IV). The findings for each clinical topic are summarized in the sections that follow. In each section, we define studies that compare health care utilization and/or quality by race as "1st generation" studies, and those that examine potential mediators of racial disparities as "2nd generation." A single study may present both 1st and 2nd generation findings. In each section below, we present 1st and 2nd generation findings separately.

Arthritis and Pain Management

Medication use

Five studies examined racial differences in the use of pain medications for osteoarthritis (Evidence Table 1, Appendix IV).[2-6] Three studies used electronic files to determine race and medication use.[2, 4, 6] Two other studies obtained patient-reported data on race and mediators of medication use, specifically adherence[5] and perception of drug efficacy.[3] Studies identified the following racial differences in medication use:

Blacks were less likely to be prescribed an opioid than whites, and mean annual days' supply of opioids and the maximum morphine equivalent dose were lower among blacks.[2] Blacks had greater use of nonselective NSAIDs and lower use of COX-2 inhibitors, filled a lower mean number of prescriptions, and had shorter duration of use for some medications compared with whites.[6] Hispanics were less likely than whites to be prescribed NSAIDS with some degree of COX-2 selectivity, including newer agents (celecoxib and rofecoxib). Both blacks and Hispanics were prescribed NSAIDS for fewer days at initiation of treatment, even controlling for GI risk factors and the type of drug prescribed. Furthermore, blacks filled fewer prescriptions for the index NSAID than whites, and had a greater risk of NSAID discontinuation.[4] Although the reasons for these differences were not studied, the investigators suggested the possibility that newer, more expensive COX-2 inhibitors may be overutilized among white veterans with a low risk for GI bleeding.

Black veterans rated their current analgesic and anti-inflammatory drugs as being more helpful than did whites, despite that symptom severity was greater among blacks in this study than whites.[3] Blacks had significantly greater odds of non-adherence to medication, in an analysis that adjusted for demographic factors, disease severity, participatory decision making (PDM), and medication side effects. No significant racial differences in PDM were observed, and racial differences in adherence persisted after adjusting for PDM.[5]

Use of diagnostic and invasive procedures for osteoarthritis

A study of lumbar spine radiograph utilization determined that non-whites had lumbar spine films more often than whites (48% v 27%, p=0.024), but race was no longer a significant predictor after adjustment for age, education, income, comorbidities, and severity of pain, and other covariates.[7] A study of the use of total knee arthroplasty found that blacks with OA were

significantly less likely than whites to have received the procedure during the 2-year observation period, in an analysis that adjusted for age, sex, and comorbidity (OR 0.72, 95%CI 0.65-0.80).[8]

Potential mediators of racial disparities in pain management

Ten 2nd-generation research studies of five population samples used cross-sectional patient-level surveys to examine racial differences in perception of symptoms,[9-11] coping strategies,[12-14] willingness to undergo joint replacement surgery,[14, 15] expectation of outcome after joint replacement,[16] patient satisfaction and perception of access to care,[17] and perceptions of the efficacy of various traditional and complementary care modalities.[18]

Self-reported severity of osteoarthritis pain, measured by the WOMAC™ osteoarthritis index score, was significantly greater among blacks (n=51) than whites (n=141) in a single-site study that assessed several arthritis locations (hip, knee, back, foot/ankle),[9] while no racial differences in pain symptoms were observed in a study at a different site that specifically assessed the knee and hip joints among 262 blacks and 334 whites.[10] A third study reported that blacks (n=135) and whites (n=165) with chronic knee or hip osteoarthritis described the quality of their pain differently; veteran descriptions of quality of chronic knee or hip pain did not correlate with radiologic stage of disease.[11]

In a single-site study of risk perception and "willingness" to consider joint replacement, blacks (n=262) were significantly more likely than whites (n=334) to expect a longer hospital course and express concerns about postsurgical pain and difficulty walking, and these differences were not explained by clinical disease status, age, or differences in socioeconomic status.[16] Blacks in this study were more likely to respond that they would not consider hip or knee replacement surgery if their pain were to become more severe and the doctor recommended it, but differential expectations of postsurgical hospital course, pain, and function mediated the observed difference in "willingness"; there was no longer a racial difference in "willingness" with adjustment for expectation of outcomes and familiarity with the procedure (OR 0.86, 95%CI 0.45-1.63).[15]

When the same study population was stratified by perception of prayer, significantly fewer blacks (79.3% v 86.2% of whites, p=0.02) would consider surgery among those who perceived prayer as helpful in the management of arthritis. Among those who considered prayer to be not helpful, there were no ethnic differences in the consideration of surgery. Helpfulness of prayer remained a significant negative predictor of consideration of surgery, regardless of ethnic background (OR 0.64, 95%CI 0.43-0.94).[14]

Confidence in one's primary physician was racially similar in this study population after adjustment for age, income, education, radiographic stage of disease, comorbidity, severity of pain, and function, but significantly more whites than blacks reported that it was difficult to get medical care when they needed it (adjusted black:white OR = 0.54, 95%CI 0.34-0.88).[17] The proportions of veterans who received referrals for specialist care did not differ significantly by race, although there was a tendency favoring white veterans with regard to referral to orthopedics for similar indications (adjusted black:white OR 0.61, 9%CI 0.36-1.03, p=0.07).[17]

Studies of coping with osteoarthritis found minimal racial differences.[12, 13] In one of the studies,[12] however, blacks scored significantly higher on 2 subscales: the Solicitude subscale (i.e. the belief that others should respond solicitously to pain behaviors), and the Praying/Hoping

subscale, consistent with other studies that found that blacks had higher religiosity than whites (77% v 70%, p=0.001) and were more likely to perceive prayer as helpful in the management of arthritis.[14, 18]

In a survey of self-care practices and perceptions of efficacy of various traditional and complementary care modalities for the treatment of osteoarthritis, blacks were more likely than whites to believe that prayer and other forms of "complementary care" were helpful in the treatment of osteoarthritis. Blacks were also more likely to indicate reliance on self-care elements in the management of arthritis, and were less likely than whites to perceive joint replacement therapy as efficacious. When asked about actual use of these forms of treatment, there was no significant difference between the race groups except for greater use among blacks of prescribed medications, massage, and prayer. Although blacks perceived chiropractic care as more efficacious, blacks were significantly less likely than whites to report actual use of chiropractic care for their knee or hip osteoarthritis.[18]

Conclusions

Studies of osteoarthritis and pain management reported racial differences in joint replacement surgery and analgesic medication use that generally indicate less aggressive management of osteoarthritis in blacks compared to whites. These differences are not likely explained by differences in symptom severity, as blacks tend to report similar if not greater levels of pain compared to whites.

Blacks appear less willing than whites to undergo joint replacement surgery. This greater reluctance appears to be due to less familiarity with the procedure and worse expectations with regard to surgical outcomes, including post-operative recovery, chronic pain, and functioning. Blacks also appear to place greater value than whites on non-medical options for managing arthritis, particularly prayer. Belief in the helpfulness of prayer was associated with lower willingness to consider surgical management of arthritis, independent of race or ethnicity. However, the degree to which lower willingness among black veterans explains observed disparities in joint replacement surgery is unknown.

Studies to date have not explored the role of symptom expression, patient-provider communication, provider bias, or patient trust in explaining disparities in the use of analgesic medications or surgery for veterans with arthritis.

Cancer

Four studies [19-22] reported mixed findings on whether the use of surgery, radiation therapy, and chemotherapy differed by race for various types of cancer (Evidence Table 2, Appendix IV). Two derived race data from administrative records, one did not report the source of race data,[21] and one identified race by self-report.[22] Blacks were less likely to have surgical resection for esophageal cancer, lung cancer, and colon cancer in two studies.[20, 21] Two other studies found no association between ethnicity and the use of surgery for prostate cancer[22] or colorectal cancer.[19] Blacks and non-blacks did not significantly differ in the use of radiation[19, 20, 22] or chemotherapy,[19-21] except in a subgroup of veterans with squamous cell carcinoma of the esophagus, among whom blacks were more likely than whites to undergo radiation and chemotherapy.[20] The studies varied in sample size, in the race categories compared and types of

cancer studied, and in the proportions of veterans who received treatment, making their findings difficult to compare. Possible mechanisms for observed racial differences were not explored in these studies. Table 1 summarizes the use of cancer treatment by race category and cancer type.

Five studies examined potential mediators of racial disparities in the treatment of prostate cancer[22] and lung cancer.[23-26] Blacks and whites with prostate cancer were similarly optimistic and involved in their medical care over the 1st year after diagnosis.[22] Among veterans with lung cancer recruited upon presentation to the oncology or thoracic surgery clinic, post-visit trust in physician increased significantly among whites compared with pre-visit trust, while black veterans' trust remained unchanged. Racial differences in trust were primarily explained by the perception among black veterans that their physicians were less supportive, less partnering, and less informative compared with white veterans.[23] Black veterans in this study also engaged less often in participatory communication behaviors (e.g. questions, concerns, assertions) than white veterans, and received less information from their provider as a consequence.[24] In another study of patient-physician interactions during the first consultation after lung cancer diagnosis, active patient participation was greater among white veterans than non-white veterans.[26]

The belief that exposure to air during surgery causes lung tumor spread was found to be significantly more prevalent among blacks than whites (61% v. 29%) in an anonymous self-administered questionnaire.[25] This belief was the basis for opposing lung cancer surgery significantly more among blacks than whites, and blacks were significantly less likely to accept their physician's advice that this belief is false. Despite the high prevalence of this belief, a much smaller proportion of patients (19% of blacks and 5% of whites) indicated that they would oppose surgery on the basis of this belief.

Conclusions

Studies comparing blacks and whites with cancer suggest that for some cancers, blacks are less likely to undergo potentially curative surgical resection but equally likely to undergo non-surgical interventions, such as chemotherapy and radiation. Studies exploring possible reasons for this disparity suggest that physicians engage in less effective partnerships with black veterans and provide them with less information as compared to white veterans. Part of this communication disparity appears to be related to black veterans' being less assertive or active in their conversations with physicians. As a result of less effective partnerships and less information exchange between physicians and black veterans, physicians engender less trust among black as compared to white veterans. The degree to which these differences in communication, partnership, and trust actually explain disparities in cancer surgery is unknown.

One study found that a prevalent "myth" about lung cancer—that exposure to air during surgery causes tumor spread—was more prevalent among blacks compared to whites. However, few veterans stated that they would oppose surgery based on this belief. Whether this belief plays a significant role in explaining disparities in lung cancer surgery is unknown.

Table 1. The use of surgery, radiation, and chemotherapy among veterans by race and cancer type

Author, year	Cancer type	N subjects per race category	Percent of patients treated per race group, unadjusted			Adjusted OR (95%CI), non-white vs. white race		
			Surgery	Chemo-therapy	Radia-tion	Surgery	Chemotherapy	Radiation
Dominitz, 2002[20]	Esophagus	239 black 1282 white	20.5% 35.3%	45.2% 36.0%	44.8% 33.0%	A* 0.54 (0.30-0.96) S* 0.45 (0.29-0.70)	A 1.35 (0.80-2.29) S 1.74 (1.19-2.54)	A 1.29 (0.76-2.17) S 1.72 (1.21-2.47)
Akerley, 1993[21]	Lung or colon	127 black 577 white	20% 29%	---	24% 32%	---		
Dominitz, 1998[19]	Colorectal	569 black 2607 white	70% 73%	23% 23%	17% 16%	0.92 (0.74-1.15)	0.99 (0.78-1.24)	1.10 (0.85-1.43)
Knight, 2004[22]	Prostate	31 black 56 white	29% 31%	---	42%† 26%†	---		

*A = adenocarcinoma. S = Squamous cell carcinoma.

† Radiation/hormonal therapy

Cardiovascular Diseases

Use of invasive procedures

The literature search identified a total of 33 studies on cardiovascular disease (Evidence Table 3, Appendix IV). Studies that examined whether the use of diagnostic tests or invasive procedures differed by race include 4 studies of procedures for stroke,[27-30] 16 studies of coronary heart disease[31-46] and 1 study of peripheral artery disease.[47] Two studies assessed racial differences in the use of cardiac medications.[48, 49]

The use of carotid artery imaging or carotid endarterectomy (CEA) among veterans with stroke/TIA was significantly lower among non-whites compared with whites in two studies,[27, 28] but racial disparities were not observed in two others (Table 2).[29, 30] One study that found significantly less use of ultrasound or angiography among blacks determined that differential use of CEA was associated with level of appropriateness for the procedure: significantly fewer blacks than whites received CEA if appropriateness was uncertain, but there were no significant racial differences among veterans determined to be appropriate candidates for CEA.[28]

Among veterans with heart disease, the use of invasive procedures was significantly less likely among blacks compared with whites in 8 studies (Table 3).[33, 35-37, 40, 41, 45, 46] One study of aortic valve replacement, implantable cardioverter/defibrillator, dual-chambered pacemaker, and percutaneous coronary interventions found lower utilization rates of all 4 procedures among blacks compared with whites. Furthermore, hospitals with larger black populations appeared to have larger racial differences in procedure rates than predominantly white hospitals.[46] Racial disparities in the use of cardiac catheterization, coronary angiography, percutaneous transluminal coronary angioplasty (PTCA), and coronary artery bypass graft surgery (CABG) were absent in 4 studies,[31, 32, 38, 44] and in one study an observed disparity in the use of cardiac catheterization was explained in part by greater overuse of the procedure among whites (i.e. 10% of procedures had a RAND rating of inappropriate) than blacks (7% inappropriate).[31] Four studies reported racially equal use of some invasive procedures, and differential use of others.[34, 39-41] Survival was similar or better among blacks in 3 studies that found racial disparities in treatment,[35, 36, 39] and in 1 study that found no treatment disparities after adjustment for disease severity.[32] In two other studies that found marginal or no disparities in procedure use, survival was worse among blacks.[38, 42]

A study of veterans with peripheral artery disease (PAD) using administrative data found that race was an independent predictor of nontraumatic lower extremity amputation versus lower extremity bypass revascularization.[47] The study included 416 Hispanic, 2337 black, and 8741 non-Hispanic white veterans, and considered the following confounders in a stepwise regression analysis: diabetes mellitus, hypertension, myocardial infarction, congestive heart failure, chronic obstructive pulmonary disease, transient ischemic attach, stroke, impaired sensorium, weight loss, functional status, American Society of Anesthesiologists' physical status classification, smoking, ethanol use, and emergency operation. The proportion of veterans who underwent lower extremity amputation vs. revasculization was 28.9% vs. 17.2% among blacks, 4.9% vs. 3.1% among Hispanics, and 66.2% vs. 79.7% among whites. The adjusted OR (95%CI) for amputation vs. revascularization was 1.5 (1.4-1.7) among blacks, and 1.4 (1.1-1.9) among Hispanics, compared with non-Hispanic whites. Other significant predictors of lower extremity

amputation instead of lower extremity bypass revascularization were older age, poor functional status, congestive heart failure, recent weight loss, prior limb surgery, dialysis, and more severe PAD as captured by a history of rest pain or an open wound infection.

Potential mediators of disparities

Fourteen studies examined potential mediators of racial disparities in quality of care, including patient satisfaction,[50] the role of religion for coping and making treatment decisions,[45, 51] patient-physician communication,[52, 53] refusal of or aversion to surgery,[30, 44, 54-56] adherence to cardiac medications,[48] delays in seeking treatment,[57] regionalization of services,[43] and physician recommendations for revascularization.[58](Table 4)

Aversion to invasive procedures was assessed by patient interview in five studies, with a mixture of findings. Blacks indicated greater aversion or less willingness to undergo procedures in 4 studies,[30, 54-56] but one study found no significant racial differences among veterans who explicitly declined a recommended angiogram.[44] In one study that found that whites were more likely to say they would undergo CABG if recommended or if it would improve symptoms and survival, familiarity with the procedure was a stronger predictor of attitude toward revascularization than race.[56] In another study, the receipt of CEA was racially similar within appropriateness categories, despite that aversion to carotid endarterectomy was higher among blacks. Clinical status was therefore the primary determinant of the receipt of CEA.[30]

Patient-physician communication was examined in two studies.[52, 53] In one study, focus groups were conducted with 6 black veterans and 7 white veterans who had undergone a stress test with or without a subsequent invasive cardiac procedure, to investigate veterans' perceptions of their interaction with providers regarding cardiac testing and treatment decision-making.[52] Veterans of both races expressed concern about communication difficulties with their physicians and a lack of clarity, but themes did not apply equally across the racial groups. White veterans expressed skepticism and asserted the need to be convinced about the need for a procedure, an issue not raised among black veterans. Black veterans expressed the need for trust in their physician but whites did not express the same need for trust in physician before undergoing procedures. In another study, verbal behaviors were coded from audio-recordings of post-angiogram consultations between 93 veterans and 8 cardiologists, to determine factors that affect physicians' information-giving and partnership-building.[53] Physicians provided more information in response to a veteran's question, assertiveness, or expression for concern, but black veterans self-initiated these behaviors less often than did their white counterparts. When examining information-giving that was prompted by the patient, black veterans received, on average, 16.5 fewer information-giving statements from their doctor, even after controlling for covariates. Veterans (and companions) in race concordant visits received significantly more information from their doctors (99.4 vs 62.1 mean utterances, $p<0.001$) and were significantly more active participants (41.7 vs 27.2 mean utterances, $p<0.001$) when compared with veterans in racially discordant visits. Doctors' self-initiated information-giving was not significantly different by doctor-patient racial concordance after controlling for patient and visit characteristics, the presence of a companion, and clustering of veterans by doctor. When examining information-giving prompted by the patient, veterans in racially concordant

consultations received, on average, 18.5 more information-giving statements (p=0.003) from their doctor, adjusted for covariates.

Racial differences in patient satisfaction, attitudes, and health-related beliefs were examined in two studies, with mixed results. One study reported in 2 publications used a self-administered questionnaire among 1045 veterans with cardiac ischemia at 5 VA medical centers to assess racial differences in satisfaction, attitudes, and beliefs, and whether they influence the use of cardiac catheterization (CC).[45, 51] The study reported similar scores between blacks and whites in most domains, including perceived disease severity, veteran evaluation of physicians' interpersonal style, veteran evaluations of VA care, satisfaction with treatment decision making, perceived urgency of CC, vulnerability to CC, and bodily impact of CC. The racial groups differed in that blacks indicated less generalized trust in people, more experiences of racial and class discrimination, and greater importance of God and religion in coping with heart problems and in making treatment decisions. Blacks were also less likely to report that family/friends had had CC and to have been encouraged by family/friends to have a CC. Significantly more whites received CC than blacks in this study, but veterans' health beliefs did not explain the differential use of CC. Physician's ratings of CAD and the importance of CC for a veteran gathered by questionnaire were both higher for white veterans than for black veterans, and these variables contributed to the observed racial disparities in CC use beyond what could be attributed to clinical differences identified by chart review. In another study that assessed patient satisfaction and health-related quality of life by mailed questionnaire, blacks with ischemic heart disease reported lower satisfaction with providers and with organizational aspects of their care compared with whites, but these differences were site-specific and persisted at only 3 of 6 sites after adjustment for covariates.[50]

A cross-sectional survey of cardiologists examined the recommendations for PTCA or CABG in 54 black and 738 white veterans who had undergone coronary angiography at one of two sites: a VA hospital and a private university hospital in the same city, both tertiary care centers affiliated with a university program that performs PTCA and CABG. The study found that cardiologists at the VA site were less likely to recommend revascularization to black veterans than to white veterans, while no differences in revascularization recommendations by veteran race were found at the private university hospital. The observed difference was not accounted for by differences between the racial groups in disease severity (number of stenotic vessels) or veteran age, education level, previous revascularization, or self-rated health status. The reasons given for not recommending PTCA or CABG at the VA site were generally similar, however, in type and frequency for both blacks and whites. Within the VA site, the most frequent reasons for not recommending PTCA, comparing percent of black vs. white veterans, were insignificant myocardium at risk 33% v. 30%, low chance of technical success 26% v 29%, and additional testing needed 16% v 11% white. For CABG the most frequent reasons were insignificant myocardium at risk 26% v 36%, not technically feasible 16% v 21%, and additional testing needed 7% v 12%.[58] In another study of physician's assessments of veterans with cardiac ischemia, the perceived necessity of cardiac catheterization was slightly greater among white veterans than black veterans: 2.59 v 2.76 (p=0.11) on a scale where 1=lifesaving or crucial, 2=benefits outweigh risks, 3=equivocal, and 4=risks outweigh benefits. Doctors rated the pretest probability of coronary artery disease as significantly higher among whites than blacks (74% v 66%, p=0.005). These assessments were significant predictors of the use of CC in this study.[45]

A study of regionalization of services using the national VA database determined that the presence of a cardiac catheterization laboratory or a cardiac surgical program in the local VA facility significantly increased the likelihood that veterans with coronary disease would undergo invasive procedures. The effect of having a local cardiac surgical program on whether CC, PTCA, or CABG was used was significantly greater for blacks than for whites.[43]

A study of medication adherence by drug class within a single VAMC found that blacks and whites prescribed beta-blockers were equally adherent. Among users of ACE inhibitors, calcium channel blockers, and statins, blacks were less likely to be adherent compared with whites. Analyses by age determined that differences in adherence were most prominent at younger (<55) ages.[48] In another VAMC site, a cross-sectional survey of 588 hypertensive veterans found that both intentional and unintentional non-adherence to medication were significantly greater among non-whites. Compared with whites, non-whites were 2.9 times more likely to report intentional non-adherence, and 1.8 times more likely to report unintentional non-adherence. The study measured adherence behaviors using a self-report scale, and the analysis adjusted for education, financial status, diabetes, and number of reported adverse effects.[59]

A study in 753 veterans admitted for heart failure (HF) at a single VAMC examined racial differences in the delay in seeking treatment, defined as the amount of time between the veteran's awareness of symptoms and arrival at the hospital. The delay time was ascertained using information provided by the admitting physician when veterans presented to the hospital for worsening of HF symptoms. The study found that blacks were significantly more likely to delay seeking treatment, with a mean delay time of 3.2 days among blacks compared with 2.8 days among whites (p=0.019). Black race remained significantly associated with greater delay in seeking treatment after adjustment for age, marital status and New York Heart Association functional class.[57]

Conclusions

There were mixed findings across studies on racial disparities in the use of invasive procedures in veterans with cardiovascular diseases, but the majority of studies exploring this association found that non-whites undergo fewer procedures than whites. In two studies, physicians assessed the necessity of revascularization to be greater and were more likely to recommend revascularization to white veterans, compared with black veterans. In one study an observed disparity in the use of cardiac catheterization was partly explained by greater overuse of the procedure among whites than blacks. Among 6 studies that assessed survival in addition to procedure use, blacks had better survival compared with whites in 4 studies despite lower rates of procedure utilization in 3 of these studies, but worse survival in 2 studies that found marginal or no racial disparities in procedure use. Although unequal procedure use did not result overall in higher mortality for blacks, its effect on other outcomes, such as coronary events, symptom severity, and quality of life, was not determined.

Studies of potential mediators found greater aversion to invasive procedures among blacks compared with whites, as well as racial differences in patient satisfaction, beliefs, and attitudes, including lower trust among blacks and greater emphasis on religion as an alternative to medical

care. Notably, blacks were less familiar with cardiovascular procedures, and this lack of familiarity helped explain racial differences in willingness to undergo procedures in at least one study.

Patient-physician communication behaviors differed between black and white veterans in two studies. One study identified a potential cycle of passivity in which black veterans, and veterans interacting with race discordant physicians, received less information overall because they less often engaged in communication behaviors (e.g. questions, concerns, assertions) that typically elicit more information from doctors. In focus groups, black veterans placed a greater emphasis on the need for trust in their physicians in deciding about invasive procedures, while white veterans placed a greater emphasis on clinical indications.

While racial differences were apparent in factors that might influence the use of cardiac care—e.g., aversion to surgery, trust, communication—studies that were able to examine the influence of these factors on actual use of invasive procedures generally found that they did not explain observed disparities. Physician decision making was more influential, and in one study physician recommendations helped explain racial disparities in cardiac procedure use, even after accounting for clinical variables and severity of coronary disease. The degree to which this difference in physician recommendations for black vs. white veterans was driven by clinical factors not captured by the studies, by the influence of patient preferences on physician decision making, or by physician bias, was not determined.

Blacks were more likely to delay seeking treatment for heart failure symptoms and were less adherent (both intentionally and unintentionally) to medication regimens. Among veterans with PAD, blacks had higher rates of limb amputation. The reasons underlying these findings of lower adherence and later presentation were not investigated.

The impact of regionalization of services was greater among blacks than whites in one study. The presence of a local cardiac surgical program increased the likelihood of whether CC, PTCA, or CABG was used to a significantly greater degree among blacks than among whites, suggesting that regionalization of cardiac care may have a greater impact on blacks than whites, exacerbating existing disparities.

Table 2. The use of invasive procedures for stroke among veterans by race, black (Hispanic where noted) vs. white race as referent

Author, year	Patient type	N subjects per race category	Percent of patients treated per procedure and race group	Adjusted OR (95%CI) for black (Hispanic where noted) v. white race as referent	Treatment disparities present or absent
Oddone, 1993[27]	Stroke or TIA	27690 white 6526 black 1162 Hisp.	CA 5.3 v 11, Hisp. 8.3 (--) CEA 14.9 v 38.1, Hisp. 22.7 (--)	CA 0.47 (0.42-0.53) Hisp. 0.78 (0.63-0.98) CEA 0.28 (0.20-0.38) Hisp. 0.45 (0.28-0.73)	Present
Oddone, 1999[28]	Stroke or TIA	389 black 414 white	Ultrasound or angiography: 67 v 79 (*) CE: Appropriate for CE 50 v 67 Uncertain appropriateness 3 v 24	Ultrasound or angiography: 0.67 (0.47-0.94) CE: Appropriate 0.75 (0.40-1.43) Uncertain 0.11 (0.01-0.79)	Present
Oddone, 2002[30]	>=50% stenosis in a carotid artery	91 black 617 white	CA 17 v 20 (ns) CEA 14 v 20 (ns)	CEA 1.0 (0.45-2.0)	Absent
Goldstein, 2003[29]	Stroke	255 non-white 520 white	CA 3.1 v 8.5 (*) CEA 0.8 v 1.5 (ns)	---	Absent

(--) p-value not reported
(*) statistically significant p-value
(ns) p-value not significant
CA = carotid angiography
CEA = carotid endarterectomy
TIA = transient ischemic attack

Table 3. The use of invasive procedures for heart disease among veterans by race, black vs. white race as referent

Author, year	Patient type	N subjects per race category	Percent of patients treated per procedure and race group, black v. white	Adjusted OR (95%CI) of procedure comparing black (Hispanic where noted) to white race as referent	Treatment disparities present or absent
Mirvis, 1994[33]	CAD or VHD	CAD: 3670 black 26630 white	CC: CAD 43.3 v. 50.3 (*) VHD 43.2 v 57.5 (*)	CC: CAD 0.61 (0.57-0.67) VHD 0.50 (0.34-0.74)	Present
		VHD: 141 black 1194 white	Cardiac surgery: CAD 12.4 v 17.9 VHD 35.4 v. 42.4 ns	Cardiac surgery: CAD 0.61 (0.55-0.67) VHD 0.67 (0.98-0.45)	
Ferguson, 1997[35]	CVD or chest pain	211 black 1195 white	CC 11 v 25 (*) PTCA 2 v 4 (*) CABG 1 v 6 (*)	Unadjusted: CC 0.37 (0.24-0.58) PTCA 0.60 (0.25-1.49) CABG 0.22 (0.08-0.63)	Present; survival was similar
Whittle, 1993 [37]	CVD or chest pain	74570 black 353730 white	CC 11.8 v 19.3 (*) PTCA 0.8 v 1.8 (*) CABG 1.6 v 5.0 (*)	CC 0.72 (0.70-0.75) PTCA 0.67 (0.60-0.72) CABG 0.45 (0.48-0.42)	Present
Groeneveld, 2007[46]	Candidates for AVR, DCP, ICD, or PCI	45029 black 255585 white	AVR 9.2 v 5.7 (*) DCP 70 v 51 (*) ICD 57 v 42 (*) PCI 179 v 157 (*)	Hospital <30% black inpatients Academic: AVR (ns); DCP (ns); ICD 0.65 (*); PCI 0.86 (*) Non-academic: AVR (ns); DCP (ns); ICD (ns); PCI (ns) Hospital >=30% black inpatients Academic: AVR 0.45 (*); DCP 0.54 (*); ICD 0.54 (*); PCI 0.69 (*) Non-academic: AVR (ns); DCP 0.69 (*); ICD 0.75 (*); PCI 0.67 (*)	Present
Peterson, 1994[36]	AMI	4522 black 29119 white	CC 33.7 v 36.9 (*) PTCA 6.2 v 4.2 (*) CABG 9.6 v 5.1 (*)	CC 0.67 (0.62-0.72) CABG 0.46 (0.40-0.53) PTCA 0.58 (0.48-0.66)	Present; survival was better at 30 days in blacks, similar at 1-2 years
Kressin, 2004[45]	Reversible cardiac ischemia	236 black 809 white	CC 33 v 47 (*)	CC 0.56 (0.35-0.89)	Present; disparities explained by physician's assessments

Petersen, 2002[40]	AMI	606 black 4005 white	CA 93.7 v 92.8 (ns) PTCA 27.9 v 27.0 (ns) CABG 6.9 v 12.5 (*)	---	Mixed: equal use of CA and PTCA, diff. use of CABG; Unadjusted
Sedlis, 1997[41]	Underwent CC	322 black 1474 white	PTCA 17.4 v 18.9 (ns) Surgery 37.0 v 54.1 (*)	---	Mixed: equal use of PTCA, diff. use of surgery; Unadjusted
Maynard, 2006[34]	AMI	680 black 3529 white	CC 59 v 57 (ns) PTCA 32 v 40 (*) CABG 5 v 8 (*)	PTCA 0.79 (0.71-0.88)	Mixed: equal use of CC, diff. use of PTCA
Conigliaro, 2000[39]	AMI or unstable angina and had CC	326 black 340 white	PTCA 17.8 v 26.5 CABG 10.7 v 20.6	All RAND indications: PTCA 0.86 (0.51-1.45) CABG 0.60 (0.35-1.06) CABG necessary: CABG 0.44 (0.20-0.86)	Mixed; survival similar at 1 and 5 yrs
Mickelson, 1997[42]	AMI	84 black 37 Hisp. 232 white	CC 51 v 63, Hisp 57 (*) PTCA 17 v 23.3, Hisp 19 (ns) CABG 7.1 v 10.3, Hisp 16 (ns)	CC 0.59 (0.35-1.02) Hisp. 0.76 (0.35-1.67)	Marginal; survival worse (ns) among blacks and Hispanics in-hospital and at 22 months
Ferguson, 1998[31]	CVD or chest pain	100 black 100 white	CC 14 v 41 (*) PTCA 4v 6 (--) CABG 3 v 11 (--)	---	Absent; 10% CC overuse in whites
Hassapoyannes, 2006[32]	CAD, CHF, cardiomyopathy, arrhythmias	92 black 222 white	CA 11.8 v 61.4 (*)	CA 0.10 (0.04-0.26)	Absent with adjustment for disease severity; survival was similar
Gordon, 2004[44]	Had treadmill test or coronary angiography	160 black 48 Hisp. 473 white	CA 79 v 90, Hisp 67 (ns) PTCA 100 v 87, Hisp 63 (ns) Surgery 50 v 78, Hisp 67 (ns)	---	Absent
Peniston, 2000[38]	Had CA	726 black 734 white	PTCA 0.96 v 1.23 (ns) CABG 0.83 v 1.50 (ns)	CABG: no significant difference, results not shown	Absent; survival was similar until 2-3 years, then worse for blacks

(--) p-value not reported
(*) statistically significant p-value
(ns) p-value not significant
AMI = acute myocardial infarction
AVR = aortic valve replacement
CABG = coronary artery bypass graft surgery
CAD = coronary artery disease
CC = cardiac catheterization
CHF = congestive heart failure
CVD = cardiovascular disease
DCP = dual-chambered pacemaker
ICD = implanted cardioverter/defibrillator
PCI = percutaneous coronary intervention
PTCA = percutaneous transluminal coronary angioplasty
VHD = valvular heart disease

Table 4. Potential mediators of racial disparities in the use of invasive procedures among veterans with CVD

Author, year	N subjects per race group	Subjects	Potential mediator studied	Summary of findings
Mirvis, 1998[43]	3652 black 26593 white	CAD	Region: presence v. absence of a local cath lab or surgical program	The presence of a cardiac catheterization laboratory and a cardiac surgical program in the local VA facility significantly increased the likelihood that patients with CAD would undergo CC, PTCA, and CABG. The effect of having a local cardiac surgical program on whether CC, PTCA, or CABG was used was greater for blacks than for whites.
Ibrahim, 2003[58]	54 black 738 white	Had CA	Physician recommendation for PTCA or CABG	Black patients were less likely than whites to receive physician recommendation for PTCA or CABG. OR (95%CI) adjusted for age, disease severity, history of revascularization, educational level, and health status, blacks v. whites, by site: VA hospital: 0.31 (0.12-0.77); University hospital: 1.69 (0.69-4.14) The disparity occurred in the VA but not in the private hospital. Within the VA site, the most frequent reasons for not recommending revascularization did not differ significantly between blacks and whites.
Kressin, 2002[51] Kressin, 2004 [45]	175 black 679 white; 236 black 809 white	Cardiac ischemia	Patient attitudes including religion; physician assessments	(Kressin, 2002) Very few racial differences found in 8 domains of patients' healthcare beliefs and attitudes. Differences observed only in attitudes toward religion: blacks placed stronger importance on God and religion in coping with heart problems and in making treatment decisions. Blacks were less likely to report that family/friends had had CC and less likely to have been encouraged by family/friends to have a CC. (Kressin, 2004) Blacks indicated less generalized trust in people and more experiences of racial and class discrimination. Patients' health beliefs, however, did not explain the observed racial differences in CC use. Physician's assessments of CAD and the importance of CC did explain some of the observed variation in CC use.
Charles, 2003[48]	833 black 4436 white	Prescribed cardiac meds	Medication adherence	Blacks were less likely than whites to be adherent to ACEIs (81.4% v 87.6%, p=0.004), CCBs (75.3% v 81.7%, p=0.003), and statins (59.9% v 74.1%, p<0.001). These differences were most prominent among younger African Americans taking CCBs or statins.
Evangelista, 2002[57]	220 black 36 Hispanic 456 white	Heart failure	Delay in seeking treatment	Blacks were more likely to delay seeking treatment. Mean delay time was significantly longer (p=0.019) for blacks than other races: blacks = 3.2 days, whites = 2.8, Asians = 2.9, Hispanics = 2.8
Ohldin, 2004[50]	1281 black 1801 white	Angina	Patient satisfaction, attitudes	Ethnic differences in satisfaction with patients' providers and their medical treatment were site-specific. Blacks reported significantly lower satisfaction with care for their IHD compared with whites, but these differences persisted at 3 of 6 sites after adjustment for covariates.
Collins, 2002[52]	6 black 7 white	Positive cardiac stress test	Patient-physician communication	Veterans expressed concern about poor communication with their physicians. A theme expressed by black veterans was the desire to build a relationship with a physician before making a decision on an invasive procedure. White veterans expressed a desire for receiving information before agreeing to an invasive procedure, without the need of knowing the physician.

Gordon, 2005[53]	18 black 75 white	Had CC	Patient-physician communication	Compared to their interactions with white veterans, physicians generally self-initiated less information to black veterans, but provided more information in response to a veteran's question, assertiveness, or expression for concern. Black veterans self-initiated these behaviors less often than did their white counterparts.
Bosworth, 2004[54]	207 black 858 white	Had carotid ultrasound	Refusal/aversion to surgery	Blacks were significantly more averse to CEA than whites. Increased age, no previous surgery, lower level of chance locus of control, less trust of physicians, and less social support were significant predictors of surgery aversion independently of race.
Gordon, 2004[44]	160 black 48 Hispanic 473 white	Had treadmill test or CA	Refusal/aversion to surgery	Veteran refusals of recommended invasive cardiac procedures were infrequent and may explain only a small fraction of racial disparities in the use of invasive cardiac procedures.
Oddone, 1998[55]	44 black 46 white	Had stroke, TIA, or carotid artery imaging	Refusal/aversion to surgery	Blacks appear to have a stronger aversion to CEA than do white veterans. Prior surgical experience and veterans' perceptions about their current health state play a role in this aversion, independently of race.
Oddone, 2002[30]	>98% male 91 black 617 white	50%+ carotid artery stenosis	Refusal/aversion to surgery	Black and white veterans were equally likely to receive CEA. Despite that blacks had a greater aversion to CE, this difference did not influence receipt of CEA. Clinical status was the primary determinant of the receipt of CEA.
Whittle, 1997[56]	114 black 234 white	Prescribed cardiac meds	Refusal/aversion to surgery	Whites were more likely to say they would undergo CABG if recommended, and that they would elect CABG if it would improve symptoms and survival, but much of the black-white difference in patient preferences seemed to be explained by questions that addressed familiarity with the procedures. Blacks were less familiar with each of the revascularization procedures, less likely to have had a previous revascularization or to be awaiting CATH. In multivariate analysis, measures of familiarity with the procedure were the most important predictors of attitude toward revascularization. Race was not a significant predictor of attitudes toward revascularization except for PTCA recommended by their physician: adjusted OR, whites v blacks: 1.69 (95%CI 1.03-2.79)

Diabetes

Three studies reported mixed findings on racial/ethnic disparities in diabetes care processes (Evidence Table 4, Appendix IV).[60-62] All 3 studies found lower rates of lipid profile/low-density lipoprotein (LDL) testing in African American veterans with diabetes, compared to white veterans. Regarding the use of HbA1c testing, one study did not detect racial disparities between self-identified black and white veterans, based on survey responses and VA medical record data.[61] Another study similarly found no racial disparities based on VA data alone, but upon incorporating Medicare data for VA patients, determined that Hispanic and black veterans were less likely than whites to receive HbA1c testing, as well as LDL testing.[60]

Among 3 studies that evaluated outcome measures among veterans with diabetes, poorer glycemic control among blacks compared with whites was found in 2 studies,[63, 64] but was not observed in the third.[61] A study conducted at 21 VAMCs found no racial differences among 115 black and 801 white veterans in the odds of having an elevated HbA1c (i.e. 7% or greater), but determined that blacks were more likely than whites to have poor cholesterol and blood pressure control.[61] A smaller study conducted at 3 VAMCs in the southwest reported that mean HbA1c varied significantly with race, with blacks (n=35) having the highest mean HbA1c level, Hispanics (n=72) the second highest level, and non-Hispanic whites (n=226) the lowest level.[64] The latter study found no racial differences in lipid or blood pressure control,[64] in contrast with the former study.[61] Both of these studies used survey and medical record data but varied in sample size and region. The third study used regional VA data from 6,222 veterans with diabetes on chronic insulin therapy to determine HbA1c levels and adherence to prescribed insulin regimens.[63] Blacks and Hispanics had significantly higher HbA1c levels and poorer adherence to insulin therapy in adjusted analyses, compared with whites.

In a study evaluating the 1-year incidence of lower extremity amputation among veterans with diabetes (with and without renal disease), American Indians had the highest risk of amputation compared with whites.[65] Among veterans with renal disease, American Indians had a 2.7-fold higher risk, blacks had a 1.4-fold higher risk, and Hispanics had a 1.2-fold higher risk of amputation in adjusted analyses, compared with whites. Similarly elevated risks in these ethnic groups occurred among veterans with diabetic nephropathy. The risk of amputation among Asians, however, was 73% (CI 53%-84%) less than whites among veterans with end-stage renal disease, and 74% (CI 52%-86%) less among veterans with diabetic nephropathy. In a similar pattern, proportionally fewer Asians had prevalent amputations at the inception of the study, while American Indians had the highest prevalence (0.69% of Asians compared with 4.2% of American Indians, 3.7% of blacks, 3.3% of Hispanics, and 2.5% of whites).

A single-site, 2nd-generation study of 26 Hispanic and 29 non-Hispanic white veterans with type 2 diabetes evaluated the use of a set of specific ecological and cultural domains, for which ethnicity may be a proxy, as a more inclusive and holistic construct that may account for variances in health outcomes.[66] The study defined this summation of ecocultural domains as "patient adaptation" (the patients' ability to adapt to illness). Patient adaptation correlated positively with adherence to treatment and quality of life, and correlated negatively with poor disease management and utilization of urgent/emergent services. Patient adaptation accounted for more variance in all outcomes than did ethnicity but was correlated with ethnicity, and Hispanic veterans tended to have higher scores on adaptation than non-Hispanic whites.

Conclusions

Existing studies reveal mixed results regarding racial disparities in diabetes care, but overall, the quality of diabetes care—as measured by process measures (appropriate test ordering) and outcome measures (control of blood pressure, glucose, and lipids)—appears to be worse for non-white veterans compared to whites. Some of the difference in outcomes may be explained in part by lower adherence among non-white veterans.

Importantly, one study found no disparities in quality measures when examining VA data. However, when non-VA health care use was included, the study revealed poorer chronic disease monitoring for black and Hispanic as compared to white veterans with diabetes, since white veterans were more likely than non-whites to receive care outside the VA.

The potential consequences of disparities in care were suggested by a study demonstrating that American Indian, black, and Hispanic veterans with diabetes were more likely than whites or Asians to undergo lower limb amputation.

Finally, a small but innovative study attempted to "unpack" the influence of race and ethnicity on diabetes care by directly measuring variables that might mediate this association. The investigators found that a set of "ecocultural" variables was correlated with ethnicity and had greater explanatory power than ethnicity in predicting utilization, disease management, adherence, and quality of life.

HIV and Hepatitis C

There were five studies that examined associations between race and treatment among veterans with human immunodeficiency virus (HIV) infection (Evidence Table 5, Appendix IV). Three studies examined adherence to HIV medications,[67-69] and 2 studies assessed adherence to clinical practice guidelines.[69, 70] One study examined the intensity of diagnostic and therapeutic care among veterans hospitalized with pneumocystis carinii pneumonia (PCP).[71]

Racial disparities in HIV medication adherence were observed in in a single-site study based on computerized pharmacy refill records,[67] but had similar adherence in a larger 3-site study (VACS3) based on patient surveys.[69] A qualitative study of adherence behaviors suggested that non-white veterans were more likely than whites to report incidents that indicated the absence of an established medication plan, and that supportive interactions with health care providers, family, and friends play a key role in increased medication adherence among non-whites.[68] No racial disparities in clinical management were observed in a study of lipid screening guidelines among HIV patients using protease inhibitors,[70] or in a study of veterans hospitalized with PCP.[71]

Despite findings of no racial differences in clinical management or in adherence to HIV medication, age-adjusted mortality was higher in black and Hispanic veterans than in whites, among nationally identified HIV-positive veterans (n=5676) as well as among participants in the VACS3 study (n=865).[69] Among nationally identified veterans, blacks (20%) and Hispanics

(16%) were more likely than whites (11%, $p<0.001$) to have been first identified as HIV positive at an inpatient visit. Non-white veterans in VACS3 had a poorer prognosis as assessed by providers, lower CD4 count, more medical comorbidities, and were more likely to have 3 or more HIV conditions, compared with whites. Taken together, these findings suggest that within the VA, minority veterans are diagnosed with HIV later and have more severe illness at the time of diagnosis, which may compromise survival.

Three studies examined whether racial differences exist in the treatment of hepatitis C virus (HCV) infection, and reported mixed findings.[72-74] Racial disparities in HCV treatment were found in two studies that used national administrative data and excluded a large proportion of veterans with missing race data, and did not examine treatment eligibility.[72, 73] The study authors noted that 15-25% of HCV-infected persons clear the viremia spontaneously and are not candidates for treatment, and patients with evidence of liver disease from HCV may choose to forego or defer treatment.[72] In another study that used self-reported race data, equal proportions of Hispanic and white veterans with HCV infection received treatment, though significantly more Hispanics were eligible or considered for treatment, and Hispanics were more likely to discontinue treatment early.[74] The differences in the methods and populations studied limit comparisons between studies.

Conclusions

Our review indicated that clinical management of veterans with HIV was generally similar across racial groups. Self-reported medication adherence was similar for black and white veterans, though objective data based on computerized pharmacy refill records revealed lower adherence among blacks. Non-white veterans with HIV suggested ways to improve adherence, including use of a medication plan and more supportive health care and social interactions. Despite inconsistent findings on medication adherence and racially similar clinical management, age-adjusted mortality is higher among nonwhite veterans with HIV. Minority veterans appear to be diagnosed with HIV at a later stage and have more severe illness at the time of diagnosis, which may contribute to survival disparities.

Black and Hispanic veterans with HCV appear overall less likely than whites to receive antiviral treatment, and Hispanic veterans in one study were more likely than whites to discontinue treatment. The reasons underlying these disparities were not explored.

Mental Health and Substance Abuse

Substance abuse treatment and outcomes

Four cross-sectional studies examined associations between race and treatment for alcohol dependency or substance abuse, and reported mixed findings (Evidence Table 6, Appendix IV).[75-78] In one study, American Indians were more likely, and blacks and Hispanics less likely, to complete inpatient treatment for alcohol dependency, compared with whites.[75] A study in women veterans similarly found that American Indians were more likely to undergo inpatient treatment for alcohol dependency compared to Whites.[77] In studies of substance abuse treatment, blacks were significantly more likely to complete a residential treatment program for substance abuse[78] and had higher positive perceptions of their residential treatment program, worked more hours, and had greater sobriety improvements, compared with whites.[76] The authors of the latter study further determined that the racial composition of the residential treatment group may be a predictor of improvement in sobriety for blacks.

Diagnosis of psychiatric illness

Three studies examined racial differences in diagnosing psychiatric illness.[79-81] A retrospective cohort study of over 3000 veterans found that blacks were significantly less likely than whites to be granted service-connection claim for post-traumatic stress disorder (PTSD) despite similar disease severity, whereas blacks were as likely as whites to be granted service-connection for other illnesses.[81] In a study of elderly veterans with inpatient diagnoses of psychosis, blacks were significantly more likely than whites and Hispanics to be diagnosed with cognitive, psychotic or substance abuse disorders, and significantly less likely to be diagnosed with mood disorders.[80] In a cross-sectional analysis of 100,000+ veterans, blacks and Hispanics were significantly more likely to be diagnosed with schizophrenia or schizoaffective disorder rather than bipolar disorder, compared with whites.[79]

Treatment and outcomes of psychiatric disease

Six studies examined racial differences in treatment practices for various psychiatric illnesses,[82-87] and four studies examined differences in treatment outcomes.[88-91]

A study of veterans with depression found that blacks were treated with antidepressants at inadequate doses and duration more often than whites.[85] Black veterans with bipolar disorder were less likely than whites to be prescribed mood stabilizers and more likely to be prescribed antipsychotics in one study.[87] In another study, blacks were less likely to have a follow-up visit within 90 days after an initial outpatient visit for bipolar disorder, but there were no racial differences in classes of drug treatment.[82] A third study of bipolar disorder reported that blacks were more likely than whites to have cocaine abuse, and more likely to be involuntarily committed to inpatient stays.[83]

Racial differences in the use of novel antispychotics for schizophrenia were observed in two studies. Blacks and Hispanics with schizophrenia received ziprasidone less often than whites, during the early use of the novel antipsychotic.[86] In a study of veterans recently admitted for

schizophrenia, non-whites were significantly less likely than whites to receive prescriptions for novel antipsychotics.[84]

Of four studies of treatment outcomes, one reported mixed results for outcome disparities in intensive inpatient PTSD treatment.[88] Blacks had greater improvement in PTSD severity and were perceived by their physicians as more committed to treatment, but blacks had less improvement in violent behavior compared with whites. Hispanics had greater satisfaction with the program but smaller post-treatment gains in employment income than whites. There were multiple comparisons in this study, some of which individually met significance but none of which were significant after correcting for multiple comparisons. A prospective, single-site cohort study in 197 elderly veterans admitted for behavioral disturbances observed no differences in treatment outcomes.[90] Diagnoses were made using validated interview questionnaires and treatments were determined by a pre-specified protocol, which might have led to more similar patient outcomes than typically occur in inpatient settings. A study of treatment outcomes in 156 black and 236 white homeless men with chronic mental illness, improvement was similar among those who received residential treatment, but less improvement occurred among blacks than whites among those who received only case management services without residential treatment.[89] A study of 224 veterans with schizophrenia or schizoaffective disorders randomly selected from 2 mental health clinics found that blacks were somewhat more likely than non-blacks to receive poor management of antipsychotic side effects.[91]

Mental health services utilization

Nine studies reported findings on mental health services utilization among veterans.[92-100] Some studies were national in scope, while others were regional or local. Some studies focused on women while others focused solely on a specific racial group. None of the studies were disease-specific, although in one study most of the subjects had PTSD. The inclusion/exclusion criteria and outcome variables varied substantially, making comparisons of the studies difficult. The outcomes examined included inpatient hospitalizations, outpatient visits, use of self-help groups, and scores from patient satisfaction surveys.

Among the more robust studies was a study of 500+ women at a women's comprehensive health clinic at a single VAMC that reported that blacks desired mental health services more often than whites.[99] Veterans of both racial groups were equally likely to receive mental health services, however, after adjustment for potential confounders including education, symptoms of depression, and eating disorders. Another study described readmission and outpatient visit patterns among elderly psychiatric patients recently discharged from inpatient psychiatric units, and found mixed results.[97] Blacks with psychosis had fewer outpatient visits compared with whites and Hispanics, but blacks with substance abuse had more outpatient visits following discharge. The strengths of these two studies include the large sample size, self-report data on race, cohort design, and adjustment for appropriate variables.

Other studies of utilization reported varied findings. Among veterans of the Vietnam era, blacks and Hispanics were less likely to use non-VA mental health care than whites.[92] Changes in health care utilization and patient satisfaction during the 1990s VA organizational change—including the establishment of Veterans Integrated Service Networks and managed care

models—were examined in two studies by the same investigators.[95, 101] Using several measures of inpatient quality, outpatient quality and continuity of care, the authors found mixed results. Blacks were less likely than whites, but as likely as Hispanics, to have post-hospitalization outpatient visits. Among those with outpatient visits, all three groups had similar numbers of outpatient visits. Disparities between whites and blacks decreased over time, but disparities between Hispanics and whites appeared to increase over time.[95] In the study of patient satisfaction, blacks were more satisfied with mental health care than Hispanics in some domains but not others, and this difference in satisfaction did not change substantially over time.[101]

Potential mediators of racial disparities

Four studies examined potential mediators of racial disparities in treatment and outcomes among veterans with psychiatric illness or substance abuse.[76, 100, 102, 103]

One study of a residential work therapy program for addiction disorders.[76] examined thirteen measures of program participation. Whites had higher participation scores than blacks on 2 of 13 measures, to a non-significant degree. Blacks had higher participation scores in the remaining 11 measures, but only 2 of these reached statistical significance. Analysis of treatment outcomes determined that blacks had significant improvement compared to whites on three measures: sobriety at 3 months, the Addiction Severity Index, and days housed (i.e. not homeless) in the past three months. The investigators postulated that a greater percentage of black participants in the program would lead to improved outcomes, and found that a high composition of blacks (>50%) was predictive of sobriety at 3 months compared to low composition (<30%), but not predictive of improved participation, ASI or days housed. After correcting for multiple comparisons, the predictive value of racial composition for sobriety at 3 months was attenuated to non-significance.

Another study by the same investigators examined whether racial concordance vs. discordance of the clinician-patient pair was associated with participation and outcomes in PTSD care.[102] The study assessed 24 measures of participation in treatment, and 15 measures of improvement. Blacks had significantly lower participation than whites on 10 of 24 measures. Whites had lower participation on three of these measures, though none reached statistical significance. Blacks had lower improvement ratings than whites on 14 of 15 measures, though none of these differences were significant. An analysis of the effect of patient-physician racial concordance found that black veterans treated by white clinicians had significantly lower participation scores on 4 of 24 measures, and lower improvement on 1 of the 15 measures, compared with racially concordant pairs. There were no significant differences between racially discordant and concordant pairs on most measures.

A study of medical inpatients at a single VAMC found strong correlations between religious coping during inpatient stays, severity of physical illness, and decreased depressive symptomatology.[103] Black race was associated with higher levels of religious coping.

A community-based survey of American Indian veterans in the Upper Midwest reported that many perceived barriers to VA mental health care exist, and most often occur among those who use alternative traditional medicine and have higher rates of psychiatric illness. Interviews with

subjects revealed the lack of coordination between the Indian Health Service and VA as a barrier.[100]

Conclusions

Studies comparing utilization and outcomes of mental health care by veteran race do not reveal consistent patterns. In general, the quality of inpatient and residential treatment for substance abuse and psychiatric illness appeared to be similar across racial groups; disparities were observed more often in outpatient settings

Clinicians tend to more frequently diagnose black veterans with mental illness as having psychotic disorders (e.g., schizophrenia) and white veterans as having affective disorders (e.g., bipolar disorder, depression). Accordingly, black veterans with bipolar disorder were more likely than whites in one study to be treated with antipsychotics vs. mood stabilizers. However, among patients with schizophrenia, black veterans were less likely than whites to be prescribed a newer (2^{nd} generation) agent. The underlying causes of these disparities in diagnostic and treatment patterns remain unclear.

Studies investigating the effect of the "racial environment" on mental health and substance abuse outcomes suggest that black veterans may derive benefit from having a racially concordant clinician, and from being in a racially concordant treatment group. These findings are considered preliminary and warrant validation in future studies.

Preventive and Ambulatory Care

Colorectal cancer screening

Three studies examined colorectal cancer screening and follow-up by veteran race (Table 5 and Evidence Table 7, Appendix IV).[104-106] A single-site study evaluated rates of physicians' recommendations for colorectal cancer screening tests (fecal occult blood test or FOBT, flexible sigmoidoscopy/colonoscopy) and patients' completion of these tests among 1599 veterans. Rates of physician recommendation for screening tests were similar across racial groups (71% of black vs. 68% of white veterans among unscreened veterans). Actual screening rates for blacks were higher than for whites (36.3% v. 28.9%, p=0.03).[104] A similar, larger study used data from 39,870 veterans in the VA's Office of Quality and Performance evaluation process.[106] Sixty-one percent of eligible veterans were screened, and blacks were marginally less likely to be screened than whites (RR 0.92, 95%CI 0.89-0.96). Fifty-nine percent of veterans in the follow-up sample had a follow-up test performed, and there were no significant racial differences in the likelihood of receiving follow-up care. The third study examined rates of follow-up evaluation (i.e. colonoscopy or double contrast barium enema plus flexible sigmoidoscopy) after a positive FOBT, based on chart abstraction of 538 veterans at a single VAMC.[105] Approximately 44% of the sample underwent full colon evaluation within 12 months of positive FOBT, and the proportion increased to 50% after 18 months. Blacks and whites were equally likely to receive full colon evaluation follow-up. Taken together, these findings suggest that while racial disparities in colon cancer screening appear to be minimal, screening is underutilized overall.

Hypertension

Studies at two separate VAMCs in the South reported that black veterans with hypertension had lower rates of blood pressure control compared with whites (Table 6).[107, 108] Factors contributing to racial differences in blood pressure control were examined in two studies.[59, 107] One study examined intentional and unintentional non-adherence behaviors. Low education and non-white race increased the likelihood of both types of non-adherence. Those reporting more than 5 adverse events were 3.6 (95%CI 1.9 to 7.0) times more likely to report intentional non-adherence than those who reported fewer adverse events.[59] In another study conducted at the same VAMC, blacks reported greater non-adherence to blood pressure medications compared with whites. Adjustment for non-adherence and other characteristics, however, did not fully explain the increased likelihood of poor blood pressure control among blacks.[107]

Cardiovascular risk factors

A multi-site study of 236 black and 809 white veterans with coronary heart disease found no racial differences in the use of cholesterol screening, treatment, and in achievement of target LDL levels (Table 7).[109] A single-site study of 127 black and 522 white veterans taking simvastatin monotherapy determined that blacks had a greater average decline in cholesterol than whites, but were less likely to achieve the target LDL-C of 100 dg/mL due to higher baseline levels. The target LDL-C was achieved by 56.9% of whites compared with 40.9% of blacks (p=0.001).[110]

Results of two studies of nicotine replacement and smoking cessation therapies were mixed, with the larger (n=1606) showing disparities in use of these treatments.[111] Blacks were more likely than whites to attempt smoking cessation, but both blacks (adjusted OR, 0.53; 95% CI, 0.34-0.83) and Hispanics (adjusted OR, 0.55; 95% CI, 0.28-1.08) were less likely than whites to use nicotine replacement therapy. The other study (n=1045) found no disparity in nicotine replacement therapy or the use of aspirin in veterans with established coronary artery disease.[112]

In focus groups conducted among 39 white and 27 black veterans at a single VAMC, stress due to racism was perceived by some black participants as a contributor to heart disease.[113] Although several participants of both races described difficulties in communication with their physicians, one participant viewed his physician's dismissal of his concerns as an example of racism. Blacks indicated less health literacy and knowledge of cardiovascular disease risk factors, and displayed less assertiveness in their interactions with physicians than whites.

Influenza vaccination

A survey on influenza vaccination mailed to 121,738 veterans receiving care at VA outpatient clinics during flu season determined that non-Hispanic blacks were significantly less likely than non-Hispanic whites to be vaccinated (75% v. 81%), after adjustment for age and other confounders.[114] Adjusted rates of vaccination among Hispanics, American Indian/Alaska Natives, and Asian/Pacific Islanders were similar to whites. The majority (59.2%) of unvaccinated respondents reported that they did not want a flu shot, and blacks and whites cited this reason in similar proportions. Among those who received the vaccination, blacks and Hispanics were more likely than whites to report that a reminder by a healthcare provider

influenced their decision to get a flu shot (39.8% of whites vs. 58.7% blacks and 54.5% Hispanic; p<.01). Among those not vaccinated, blacks and Hispanics were more likely than whites to report that they did not know that they needed a flu shot (9.5% of blacks and 16.8% of Hispanics vs. 5.8% whites; p<.01). The study did not assess veteran knowledge, preferences, beliefs, and attitudes regarding immunization, and could therefore not determine whether racial disparities in vaccination resulted from differences in these patient-level factors or in interpersonal care and health education efforts by providers.

Patient satisfaction

A mailed survey assessed quality of care and patient satisfaction of women veterans seen in VA primary care clinics or women's clinics in 5 states.[115] Respondents included 1234 white, 164 black, and 49 women of other race. The study reported that race was not associated with any domain of satisfaction or primary care quality. Black women in the study tended to be younger, unmarried, more educated, and of higher income, compared with white respondents. Black women more frequently reported having a regular female VA provider, and that gynecological care was provided in the VA, compared with whites.

Ambulatory care use

The association between racial differences in ambulatory care use and the presence of unmet health care needs was examined using data form the 1992 National Survey of Veterans (Table 8).[116] The distribution of self-reported race among the 7549 participants was 85.4% white, 9.6% black, 3.7% Hispanic, 0.8% American Indian or Alaska Native, and 0.5% Pacific Islander. After adjustment for confounders, blacks and Hispanics were significantly more likely than whites to use VA ambulatory care, while American Indians/Alaska Natives and Asian/Pacific Islanders did not significantly differ from whites in use of VA ambulatory care. Overall, 6.4% of veterans reported they needed medical care at some point in the 12 months preceding the study but were unable to get it due to lack of insurance or financial barrier. After adjustment for sociodemographic characteristics, having insurance, and use of VA vs. use of only non-VA ambulatory care, American Indian/Alaska Natives and Hispanics were significantly more likely than whites to report an inability to obtain needed medical care, while blacks and Asian/Pacific Islanders were similar to whites on this outcome measure.

A more recent study by the same authors assessed racial/ethnic variations in patterns of VA ambulatory care use among veterans within VISN22 (southern California and southern Nevada).[117] The study involved a telephone survey of ambulatory care utilization in the prior 12 months, among 3227 users and non-users of VA care. The distribution of self-reported race among respondents was 37% white, 28% black, 28% Hispanic, and 8% Asian/Pacific Islander. Overall, 38.3% of respondents reported no healthcare visits in the past 12 months, while 12.3% reported any VA use, and 49.4% reported use of only non-VA ambulatory care. In an analysis that adjusted for sociodemographic and health-related characteristics, blacks, Hispanics, and Asian/Pacific Islanders were significantly less likely than whites to use any ambulatory care, whether VA or non-VA. Among nonusers of VA health care, interpersonal aspects of care were the most commonly cited barrier among ethnic minorities, followed by lack of knowledge about VA eligibility and services, and dissatisfaction with the VA.

Conclusions

Studies of preventive and ambulatory care use by veteran race reveal mixed findings. For some services—e.g., colorectal cancer screening, lipid lowering therapy—racial disparities do not appear to be prevalent. Studies did reveal disparities in some primary care outcome measures, including achieving blood pressure and lipid goals, but these findings may have explained in part by more severe disease among non-whites. Non-whites with hypertension were less adherent to medications, both unintentionally and intentionally, part of which was related to medication side effects. Qualitative research findings suggested that disparities in cardiovascular risk management may be related to low health literacy, less knowledge, and less assertiveness with physicians among black, as compared to white, veterans.

Blacks were less likely than whites to receive influenza vaccinations. Additionally, both blacks and Hispanics were less likely than whites to know they needed a vaccination and more likely to rely on physician recommendations and reminders to receive vaccinations.

Non-white veterans are generally more likely than white veterans to use the VA healthcare system. American Indian/Alaska Natives and Hispanics were more likely than whites to have unmet health needs, while blacks and Asian/Pacific Islanders were similar to whites on this outcome measure. Non-white veterans identified interpersonal care, knowledge about VA services and eligibility, and dissatisfaction with the VA as barriers to obtaining VA care, though a study of women veterans found no racial differences in satisfaction among women using VA primary care.

Table 5. Racial disparities in colon cancer screening in the VA healthcare system

Author, year	Aims	N subjects	Characteristics of study population	Results
Fisher, 2006[105]	To document the factors associated with undergoing a full colon evaluation after a positive Fecal Occult Blood Test.	538	312 white 154 black 72 missing	Approximately 44% of the sample underwent full colon evaluation within 12 months of positive FOBT and if the time was extended to 18 months that number rose to 46%. African American race was not associated with performance of full colon evaluation, although subjects with missing race data were less likely to undergo FCE than those with recorded race data.
Dolan, 2005[104]	To evaluate rates of physicians' recommendations for colorectal cancer-screening tests and patients' completion of these tests among white and African American veterans who received care at an urban VA general medicine clinic.	905	480 African American 425 white	Among the 905 unscreened veterans: physician recommendation rates for colorectal cancer screening were similar and actual screening rates for African Americans were 1.3 times higher than those for white veterans.
Etzioni, 2006[106]	To examine patterns of colorectal screening and follow-up among VA patients.	Screening: 39,870 Follow-Up: 313	Screening population: 26, 029 white 4,242 black 9,599 other Follow-up population: 219 white 33 black 61 other	Black veterans were slightly less likely to be screened than white veterans. There were no significant racial or ethnic differences in the likelihood of receiving follow-up care.

Table 6. Racial disparities in hypertension and its treatment in the VA healthcare system

Author, year	Aims	N subjects	Characteristics of study population	Results
Bosworth, 2006[107]	The research sought to determine the social, economic, and physical factors that may explain racial differences in blood pressure controls and determine the extent to which modifiable and non-modifiable factors are related to blood pressure control.	569	98% male veterans 41% African American 59% white	African Americans were more likely to have inadequate blood pressure control compared with whites and more likely to be non adherent. African Americans were likely to perceive high BP as very serious vs. serious, to report a relative with HTN, to be illiterate, and to report increased urination as a side effect all of which were linked to poor blood pressure control. After adjustment, odds of AA having poor blood pressure control remained significant, as did increased urination.
Rehman, 2005[108]	To determine if the VA does better at reducing disparities in blood pressure control between African American and white hypertensive men than non-VA healthcare.	12366 VA, 7734 non-VA	Black men: 4379 VA, 2754 non-VA; White men: 7987 VA, 4980 non-VA	Among VA patients whites were more likely to have BP controlled at the last visit. African American and white veterans received a similar number of prescriptions at VA sites; African Americans, however, had more clinic visits in the previous year.
Lowry, 2005[59]	To examine associations between patient characteristics, including reported adverse events, and both intentional and uninterntional non adherence among hypertension patients.	588	42.5% non white	Individuals who reported intentional non-adherence were significantly more likely to be non-white, report more than 5 adverse effects, and were less likely to have diabetes. Unintentional non-adherence was more likely among non-white veterans, those with less than a 10th grade education. In general, those reporting nonadherence were more likely to have uncontrolled blood pressure.
Sharkness, 1992[118]	To examine veterans' understanding of hypertension control and relate it to medication compliance.	125	74% black	Univariate analysis showed that although 70% viewed hypertension as a symptomatic condition, symptoms were not signficantly associated with pharmacy compliance. Univariate analysis showed that perceived lifetime treatment of hypertension, a greater than 5 year history of medication use, perceived cause of hypertension other than diet, use of more than one hypertension drug, lack or reported departure from prescribed regimen, absence of drug abuse history and Caucasian race were associated with compliance. In multivariate analysis, drug abuse history, perceived cause of hypertension and pattern of medication use best predicted compliance with hypertension regimens.

Table 7. Racial disparities in cardiovascular risk factors (excluding hypertension) and their treatment in the VA healthcare system

Author, year	Aims	N subjects	Characteristics of study population	Results
Williams, 2002[110]	To evaluate compliance with NCEP goals and ATP III clinical guidelines in white and African American veterans at high risk for cardiovascular disease after implementation of a Lipid Management Program.	649	127 African American (AA); 522 white	AAs had significantly higher baseline total, LDL-C, and HDL measures than white veterans. Additionally, AAs experienced a significantly greater decline in LDL-C after simvastatin therapy. Nonetheless, AA veterans were less likely to achieve the target LDL-C measure of 100 dg/mL (40.94% AAs achieved it while 56.9% of white veterans achieved it (p=.001). AAs and white were not significantly different in the rates of hypertension and statin dose.
Woodard, 2004[109]	To examine whether racial differences exist in cholesterol monitoring, use of lipid lowering agents, and achievement of guideline recommended LDL levels for secondary prevention of coronary heart disease.	1045	236 AA; 809 white	AAs and whites were equally likely to receive cholesterol monitoring. Among all veterans AAs were less likely to receive lipid-lowering agents; however, when analysis was restricted to the 544 veterans who met the definition of ideal candidate for treatment with lipid-lowering agents, AAs and whites were equally likely to receive treatment. AA and white veterans were equally likely to achieve target LDL levels.
Fu, 2005[111]	To examine ethnic variations in the use of nicotine replacement therapy (NRT) in an equal access health care system.	1606	1153 white; 307 AA; 146 Hispanic	AA and Hispanic smokers were less likely than white smokers to have used nicotine replacement therapy and less likely to have attended a group smoking cessation program.
Ambriz, 2004[112] (see Woodard 2004)	To examine whether disparities exist in guideline-recommended secondary treatment for CAD, in the use of aspirin and smoking cessation interventions in a cohort of veterans with established CAD.	1045	236 AA; 809 white	AAs and whites were equally likely to receive smoking advice or to be prescribed smoking cessation medications. There were no differences between the race groups in the rate of aspirin therapy and among hypertension patients AAs were more likely to receive aspirin therapy. Among veterans with hypercholesteremia and previous CVA, white veterans were more likely to receive aspirin.
Woodard, 2005[113]	To explore coronary heart disease (CHD) health care experiences and beliefs of African American and white veterans to elicit potential causes of racial disparities in CHD outcomes.	24	14 white and 10 AA: Group 1: 8 white males, 56-75 years old; Group 2: 6 white males, 57-68 years old; Group 3: 4 AA males 48-83 years old; Group 4: 6 AA males 52-80 years old.	Four themes emerged in the discussions: Risk-factor knowledge, physician-patient communication, access to care, and treatment beliefs. AAs reported experiencing racism and they displayed less specific knowledge of cardiovascular risk factors and the impact of these factors on heart disease. Overall the findings suggest lower health literacy among AA veterans. Racial differences in physician-patient communication were revealed in the level of patient assertiveness, with whites being more likely to be assertive than AAs. White participants believed that perhaps they would receive better care from health care providers if they could pay and AAs worried that the generic medications used by the VA were not as effective as brand name medications.

Table 8. Studies of racial disparities in access to the VA healthcare system

Author, year	Aims	N subjects	Characteristics of study population	Results
Washington, 2005[117]	Assess racial/ethnic variations in patterns of ambulatory care use among Department of Veterans Affairs health-care eligible veterans.	3227	27% white 28% black 28% Hispanic 8% Asian/Pacific Islander	Among this VISN 22 sample, minority veterans were less likely to use the VA compared to white veterans. Minority veterans were more likely to report the following barriers to VA health care use: poor interpersonal quality of VA car, dissatisfaction with VA, and Hispanic veterans were more likely to report lack of knowledge about eligibility.
Washington, 2002[116]	To describe racial and ethnic variation in VA ambulatory care use and to examine the association of these variations with the presence of unmet health care needs.	7549	85.4% white 9.6% black 3.7% Hispanic 0.8% American Indian or Eskimo .5% Pacific Islander	In this national sample, black, Hispanic, and American Indian/Eskimo veterans were more likely to use VA ambulatory care than white veterans while Asian/Pacific Island veterans were less likely to use VA ambulatory care. After adjusting for VA health care use or not and other sociodemographic and other variables, the data show that American Indian/Eskimo and Hispanic veterans were more likely than white veterans to report an inability to get needed medical care. VA-only users were less likely than non-VA only users to report an inability to get needed medical care however those who use both VA and non VA healthcare had the greatest inability to obtain needed medical care.

Rehabilitative and Palliative Care

Five studies examined racial differences in rehabilitative or palliative care among veterans, and reported mixed findings (Evidence Table 8, Appendix IV).[119-123] Three studies assessed racial differences in hospice care perceptions or utilization. A pilot program for an outpatient palliative care clinic determined that black veterans (n=64) delayed hospice enrollment longer than did white veterans (n=33).[123] In a study of 254 veterans with advanced cancer, significantly fewer black veterans had advanced planning directives (49.7% v 72.5%) or knowledge of hospice care (46.7% v 77.1%) compared with white veterans, and a greater proportion of black veterans than whites died in the hospital (78.4% v 52.9%, $p<0.0001$).[122] In another study by the same investigators, there were no significant racial differences in referral to hospice care among 89 veterans who died of prostate cancer (49% of blacks v. 34% of whites) or in the percent who died in the hospital (64% of blacks v. 54% of whites).[121] The selection of subjects and study design differed between these two studies, and the reasons for these apparently inconsistent findings are unclear.

A study of percutaneous endoscopic gastrostomy (PEG) tube feeding for 6,464 veterans with dementia reported that black veterans were 77% more likely than whites to have a PEG tube placed. The use of PEG tubes over time differed by race as well, and the year of highest PEG tube use occurred 2 years later for blacks than white dementia patients.[119]

A study in 738 veterans with acute stroke who were hospitalized within the VA between 1995-1997 and referred to inpatient rehabilitation found no differences between blacks and whites in the total number of in-hospital contacts with rehabilitation personnel, in the proportion of stroke patients who were referred to inpatient rehabilitation, or in the intensity of rehabilitation.[120]

Conclusions

Studies of end-of-life care were mixed but suggest that in some cases, black veterans are less likely than whites to have advanced directives or to engage in hospice care. Black veterans in one study were more likely to die in the hospital and in another study were more likely to undergo PEG tube placement. Together, these studies suggest that black veterans receive a less palliative approach to care at the end of life. Reasons for these findings have not been explored.

Other Clinical Topics

Disparities in treatment, process of care, and use of new technology

A study of dental procedures determined whether the use of tooth extraction vs. tooth-preserving root canal treatments varied by race (Evidence Table 9, Appendix IV).[124] The study included 54423 veterans in the national VA Patient Treatment File (PTF) database who had received any tooth extraction or root canal therapy in fiscal year 1998, excluding prophylactic extractions of third molars. Frequency of root canal therapy varied by race and eligibility for VA dental care. Fewer blacks (20.1%) and more Asians (31%) received root canal therapy instead of tooth extraction. Although fewer blacks (24.8%) and Hispanics (38.7%), and more Asians (67.9%) and whites (45.3%) were eligible for comprehensive dental care.($p=0.0001$), adjustment for dental insurance coverage did not eliminate variations in care. The adjusted odds (95%CI) of

receiving root canal over tooth extraction over all types of dental care coverage, compared with whites, was 0.597 ($p<0.05$) among blacks, 0.881 (p=ns) among Hispanics, and 1.633 ($p<0.05$) among Asians, after controlling for medical and psychiatric comorbidities, sociodemographic characteristics, prior use of preventive dental care services (considered a proxy for the value patients place on tooth preservation), prior tooth extraction and root canal therapy, and clustering by geographic region. The study notes that in the PTF database, race is assigned by the registration clerk based on visual inspection. Self-reported race data from "the 1999 Large Survey of Veterans" was also used in this study, decreasing unknown race from 26% to 17%.

A study of the use of antiresorptive drug treatments among 41 white women and 26 black women with low bone mass at a single VAMC found that white women were significantly more likely to be taking calcium or antiresorptive medications than black women.[125] Information about veterans' race and use of medications was gathered by self-administered, mailed questionnaire, with a 68% response rate. Ninety percent of white women v. 69% of black women were using calcium supplements (p=0.048). Clinical practice guidelines recommend calcium supplements for all postmenopausal women with low bone mass, regardless of osteopenia or osteoporosis. Seventy-one percent of white women and 35% of black women were using antiresorptive drugs.(p=0.004) White women were 3.7 (95%CI 1.24-11.1) times more likely than black women to be using antiresorptive medication, even after adjusting for the higher prevalence of osteoporosis and fractures among whites.

A study of referrals for liver transplantation reviewed the medical records of 199 veterans with liver disease for 1) any mention of liver transplantation within 1 year of encounter; 2) documented intention of referral for possible liver transplant; or 3) documented consultation initiated by a referral.[126] Additional data included demographics, etiology and severity of liver disease, potential contraindications to liver transplantation, and adherence to guidelines for referral for liver transplant. For encounters that did not result in mention or referral of transplant, reasons for the lack of mention/referral were ascertained, either documented or inferred. The veteran sample included 44 blacks, 23 Hispanics, and 132 whites. Among all veterans, only 21% (41 of 199) who had an identifiable potential indication for liver transplant had any mention of liver transplantation in the medical record. In an analysis that adjusted for age, HCV, hepatitis B infection, alcoholic liver disease, spontaneous bacterial peritonitis, encephalopathy, child-Turcotte-Pugh B or C class, active alcohol use, and congestive heart failure, blacks were significantly less likely than whites to have mention of liver transplantation in their medical record. The adjusted OR (95%CI) of mention of liver transplantation in encounters with veterans satisfying AASLD referral guidelines for possible liver transplantation was 0.15 (0.02-0.96) for blacks, and 0.12 (0.01-1.40) for Hispanics, compared with whites. Authors note the limitation that study depends on the accuracy of documentation of discussions pertaining to liver transplantation, and that undocumented attitudes of patients and providers toward liver transplantation might have influenced mention of liver transplantation in the medical record.

The use of the medical futility rationale in do-not-attempt-resuscitation orders was examined in a survey of 44 residents leading inpatient medicine or cardiology teams, who were interviewed weekly by telephone about each of 145 patients who had received a do-not-attempt-resuscitation (DNAR) order in the preceding week at one of two hospitals, a VAMC and a municipal hospital. The scripted phone interviews were conducted 0-23 days after a DNAR order was written.

Questions about the patient included demographics, underlying chronic illnesses, and acute medical conditions; organ failure; functional status, immobile, in intractable pain or discomfort, or unable to communicate; and the probability of patient surviving to hospital discharge after cardiopulmonary resuscitation (CPR). Residents were asked whether 1) patient or surrogate choice and 2) medical futility applied to the patient, and 3) whether quantitative and/or qualitative futility applied to the patient. Of 44 residents, 25 were women (57%), and 40 were non-Hispanic whites (91%); of 4 non-whites, 2 were Asian, 1 was black, 1 was American Indian. Of 145 patients, 27 were non-whites (14 blacks, 10 Asian/Pacific Islander, 2 Hispanic, 1 American Indian), 11% were female, and 2/3 of patients were hospitalized at the VAMC, 1/3 at the municipal hospital. Medical futility applied in 91 of the 145 DNAR orders and was the only rationale for the DNAR order in 17 cases (i.e. without patient or surrogate choice). In all cases, residents reported that they discussed the DNAR order with either the inpatient attending physician or the individual patient's primary care physician before writing the order. There were 11 patients for whom quantitative futility was invoked as a rationale for the DNAR order, in the absence of patient or surrogate choice. The study found that non-white race was a strong predictor of the use of the quantitative-futility rationale (i.e. a very low or no likelihood of surviving to hospital discharge after CPR) even after controlling for severity of disease and for the residents' prediction of CPR survival: the adjusted OR (95%CI) of quantitative futility associated with non-white race was 2.7 (1.1-6.3) compared with white race. There were 61 patients for whom qualitative futility was invoked (i.e. the intervention is futile because it will not produce an acceptable quality of life). Race was not a significant predictor for the use of the qualitative futility rationale. Controlling for hospital site had minimal effects on the estimates for both quantitative and qualitative futility analyses. The study authors suggest as one explanation that white patients might have been more likely to request DNAR orders when futility was not perceived by the physicians, creating the association between race and quantitative futility. However, since resident's prediction of the probability of surviving CPR was controlled for, this finding suggests that residents may have been influenced by race per se in determining quantitative futility.

A case-control study based on PTF data studied process of care among inpatients hospitalized for diabetes (DM), congestive heart failure (CHF), or chronic obstructive pulmonary disease (COPD) during 1987-1989.[127] Veterans readmitted within 30 days of the index stay served as cases in the study. Controls were matched with cases based on hospital, diagnosis, and one of four 6-month periods of hospital discharge, and were not readmitted within 30 days of the index admission. For each veteran, an adherence score was computed as the percentage of applicable criteria performed during the hospital stay, using diagnosis-specific explicit criteria for process of hospital care. The criteria were categorized with respect to timeline of hospitalization: 1) admission work-up, 2) evaluation and treatment during hospital stay, and 3) readiness for discharge. The patient sample included 875 veterans with CHF (22.7% black, 4.3% Hispanic), 1299 veterans with COPD (12.4% black and 2.2% Hispanic), 678 veterans with DM (25.5% black and 5.3% Hispanic). In analyses adjusted for age, severity of illness (APACHE score), comorbidities, teaching hospital status, number of previous hospitalizations, and other covariates, the resulting admission adherence scores, treatment, and discharge scores were similar among black, Hispanic, and white veterans with any of the three diagnoses. In stratified analysis, veterans admitted to a teaching hospital had higher admission and treatment scores compared

with non-teaching hospitals. Process of inpatient care did not differ by race after adjusting for admission to a teaching hospital and other covariates.

In a study of racial differences in the adoption of laparoscopic cholecystectomy in place of open cholecystectomy, PTF data were used to identify 1932 black and 14249 white veterans with gallbladder disease who underwent either procedure during the year before introduction of laparoscopic cholecystectomy (1991) and the first 4 years of the procedure's use (1992-1995).[128] A separate, nurse-compiled dataset contained detailed clinical information about veterans who had gallbladder or biliary disease and underwent either procedure during the same years. Among veterans undergoing cholecystectomy at VAMCs from 1992 to 1995, 35.4% of black veterans and 42.6% of white veterans underwent laparoscopic cholecystectomy ($p<0.001$). After adjustment for potential confounders, blacks were 0.74 (95%CI 0.66-0.83) times as likely as whites to undergo the laparoscopic procedure during the 4 study years. In the nurse-compiled prospective clinical data set, laparoscopic cholecystectomy was performed in 22.1% of black veterans and 28.6% of white veterans ($p<0.001$). After adjustment for confounders, blacks were 0.68 (95%CI 0.55-0.84) times as likely as white veterans to undergo laparoscopic vs. open cholecystectomy. The differences in rates of adoption of laparoscopic surgery did not appear to be from more comorbid illnesses among black veterans, and the study did not determine whether veterans differed by race in their preference for new surgical procedures, or whether VA physicians may have been less likely to recommend laparoscopic cholecystectomies to black veterans.

In a survey of attitudes toward innovative medical technology, 171 veterans in waiting areas of primary clinics at a single VAMC were asked to complete a self-administered survey (5-point Likert-scale) with 6 items on attitudes toward new concepts in general, and 6 items on attitudes toward new medical drugs, devices, and procedures.[129] A final component was a vignette describing either a hypothetical implantable device or new prescription drug, each to reduce risk of heart disease. The survey asked veterans about their attitudes toward the new technology. The study included 108 blacks and 63 whites. Sixty to 65% of participants had cardiovascular disease. Black veterans had less positive attitudes toward new medical technology ($p=0.01$) compared with whites. The analysis adjusted for sex, age, annual income, education, cardiovascular disease, having >2 comorbid conditions, having <2 prior medical procedures, and risk-attitude score. Whites had more positive attitudes towards new medical technology and were more likely to accept the hypothetical new prescription drug, but did not differ from blacks in acceptance of the new implantable device.

Conclusions

These studies collectively suggest that black and other non-white veterans tend to receive less aggressive medical care than whites. Part of this may relate to greater skepticism among black veterans towards new medications and medical technology. Some of the variation seen in large national database studies may also be related to regional or facility-level practice variation, but findings of racial variation in single-center studies indicate that this explanation cannot account for many of the observed disparities. The degree to which racial bias among healthcare providers is responsible for racial disparities in care remains unclear but is suggested by the finding in one study that physicians were more likely to write do-not-resuscitate orders based on medical

futility among non-white compared to white patients, independent of the same physicians' predictions of the likelihood that the patients would survive resuscitation efforts.

Patient satisfaction

Two studies assessed patient satisfaction in different veteran populations and settings.[130, 131] In a study that assessed patient perceptions of ward atmosphere among 17 black and 17 white inpatients in the psychiatric ward of a VA hospital, blacks rated the ward lower than whites on all 10 subscales of the questionnaire, though a significant racial difference occurred on only 5 subscales, namely: involvement, spontaneity, autonomy, personal problem orientation, and anger and aggression. The analysis did not adjust for age, chronicity, or SES, though previous surveys of different veterans on the unit had shown general racial agreement on these factors.[130]

Another study analyzed 34,359 mailed surveys to examine patient satisfaction with inpatient medicine, inpatient surgery, and hospital-based outpatient care among 135 VA hospitals.[131] The analysis adjusted for demographic and institutional characteristics, and found that non-white veterans reported lower satisfaction than did white veterans to a significant degree in all 3 settings. The study further determined that most of the variation in patient satisfaction scores for hospital care was not attributable to either the demographic characteristics of veterans or the institutional characteristics of the hospitals, which accounted for between 8% and 15% of the variation in patient satisfaction scores. Based on this finding, the study authors suggested that hospital managers and clinicians can affect patient satisfaction through improvements in service processes.

These studies suggest that non-white veterans might experience lower quality interpersonal care than white veterans do in hospital settings. Notably, though, these studies are somewhat dated, and improvements in overall customer satisfaction with VA care over the last decade warrant a more up-to-date look at veteran ratings of quality by race and ethnicity.

Race and the provider-patient relationships

Focus groups with 174 veterans about access and acceptability of VA health care determined that only 8 of the 174 participants expressed the preference that their physician be of the same ethnicity.[132] Overall, the focus group participants indicated that it was not necessary for doctors to be of the same racial/ethnic group as their patients to effectively treat them. The study's recruitment methods included community-based strategies aimed at minority veterans, and participants included blacks, Asians, and Hispanics. The distribution of ethnicity among the focus group participants was not reported, although the authors noted that the 8 who preferred same-ethnicity practitioners were spread about equally across the ethnic/racial groups.

In a study of VA social counselors' perspectives on their cross-racial effectiveness, 33 white and 20 non-white VA employees who provided counseling services to Vietnam veterans in outreach centers in the southeastern US were asked to fill out a questionnaire while attending a training conference.[133] Counselors were asked: On a scale of 1 to 7, how successful do you think you are in working with minority clients/with white clients? The study found that white and minority counselors perceived themselves to work about equally well with white clients, but white counselors perceived themselves to be less successful with minority clients, compared with

minority counselors. Minority counselors reported a greater frequency of racism during cross-racial counseling experiences than white counselors, and white counselors reported that their non-white clients perceived them to have insufficient understanding of what it means to be a member of the client's racial group. Counselors were also asked to indicate the factor they believed contributed most to their white and minority client's problems: the clients themselves, other people, or situations in clients' environment. Both white and minority counselors perceived a difference in the source of the problems experienced by white versus minority clients: the source of white clients' problems was perceived by 62% of counselors to exist within the clients themselves. In contrast, the source of minority clients' problems was perceived by 62% of counselors to be a function of situations in client's environment. The authors suggest that both white and non-white practitioners may need to be more cognizant of their class biases in their perceptions and subsequent treatment of client difficulties, particularly for low-income white clients who may be ascribed greater responsibility for their misfortunes than is warranted by their social realities and life opportunities.

General medication adherence

A single-site study of medication adherence among 319 men with chronic conditions found that non-whites were at greater risk for non-adherence than whites.[134] Adherence was defined as between 80-110% of the dose taken for any prescribed medications, which ranged from 1-7 prescriptions per patient. Thirty-three percent of white veterans were adherent, compared with 18% of non-whites (p=0.009). Ethnicity remained a significant predictor of non-adherence in a multivariate analysis that adjusted for age, Standard Depression Scale index, Mini Mental State score, number of pills, and marital status (OR for noncompliance comparing non-whites to whites: 1.44, p=0.03).

Health education and communication

In a postal survey sent to 5000 veterans from 4 war eras, participants were asked to rate the helpfulness of different media for obtaining health information on a 10-pt scale, and to answer items regarding access to and use of the Internet.[135] Veterans of all races assigned the highest helpfulness mean rating to "own doctor: 7.3 among whites, 6.8 among non-whites (p=ns). Non-whites rated a variety of media more favorably than did whites, suggesting greater receptivity to a wider array of information sources (e.g. VSO newsletter, web site, and television). Internet access and use was greater among whites compared with non-whites, and this difference was largest (nearly 20%, p<0.001) among older participants (i.e. Vietnam veterans) and narrowed over time (12% for Persian Gulf War veterans, p<0.001 and 2% for Bosnia-Kosovo veterans, p=ns). The study authors note that these findings reinforce the role of the primary health care provider as the most helpful resource for health risk communication. Despite that non-whites used the Internet less than whites, Internet access among Vietnam veterans (77%, 50-87 years old) was higher than that among the general US population (62% of 50-58-year-olds, 46% of 59-68-year-olds). The authors suggested that these findings indicated high Internet use among veterans and that the Internet may offer an important channel for delivering health risk information to combat veterans. In another study that did not report results by race for VA subjects separately, among patients undergoing radiotherapy for prostate cancer, only 5% of VA patients owned a home computer and 8% used the Internet, compared with 64% of patients at an

academic center who owned a home computer and 48% used the Internet. Blacks overall owned a home computer and used the internet significantly less in this study.[136]

In a study of the effectiveness of the informed consent procedure, 59 male veterans consecutively scheduled for the screening sigmoidoscopy were interviewed before and after the procedure in a tertiary care academic health center, to assess whether veterans understood the indications for the procedure, its associated risks, benefits, and alternatives, and the name of their treating physician.[137] The study included 6 black, 5 Hispanic, and 46 white veterans. The study observed a similar lack of informed consent across all ethnic groups studied, including being informed of risks and alternatives to the proposed procedures (e.g. 60% read none of the form; 14% read all of the form; 14% had never heard the word "polyp" before; 39% could describe no indication other than doctor recommendation). Despite the lack of informed consent, most of the veterans failed to ask further questions of their physicians and claimed that they had sufficient information to proceed with the procedure. The study also reported that only 27% of non-whites associated polyp with malignancy, compared with 78% of whites (p=0.001). The study authors note that this ethnic difference in understanding the relationship between polyps and cancer emphasizes the need to engage veterans in asking questions, as this may emphasize important issues to them as well as remind physicians of the variations in the veteran's baseline knowledge and subsequent comprehension.

ONGOING AND RECENTLY COMPLETED RESEARCH

Our environmental scan identified 43 ongoing or recently completed studies of racial disparities in VA populations, the results of which have not yet been published (Evidence Table 10, Appendix IV). Data available from these studies were primarily in abstract form and were thus not fully evaluable. We describe the content of those studies here.

Three studies are randomized controlled trials of intervention strategies to improve racial equity in healthcare. One study tests whether a decision aid video and motivational interviewing techniques improve willingness to consider knee replacement for osteoarthritis (Ibrahim SA). Another study examines whether the use of a plain-language decision aid among prostate cancer patients is effective for decision-making and interacting with physicians, and influences the receipt of active treatment (Fagerlin A). The third study is a physician-based intervention that employs computerized reminders and training on patient-centered counseling to improve communication with patients about hypertension medication use (Kressin NR).

Nineteen studies conducted/are conducting 1st-generation research to determine racial differences in indicators of utilization or quality, listed below by clinical topic (and indicating the number of studies):

Cardiovascular disease (2)

- The use of invasive cardiac procedures (Kressin NR; Urech TH)

Diabetes (4)

- Processes of care and intermediate outcomes (Bean-Mayberry B; Heisler M; Wright SM)

- The use of angiotensin converting enzyme inhibitors and angiotensin receptor blockers in patients with diabetes and hypertension (Barnett MJ)

HIV/Hepatitis C (2)
- Utilization of HIV screening (Owens D)
- Receipt of antiviral treatment for hepatitis C (Rousseau CM)

Mental health and substance abuse (3)
- Participation in treatment for PTSD (Spoont MR)
- Pharmacotherapy for bipolar disorder (Kilbourne AM)
- Validity of psychometric test data used in evaluation for PTSD (Boggs CD)

Palliative care (3)
- Deaths occurring in-hospital (Mularski RA)
- Utilization of aggressive medical treatments in end-of-life care (Yu W)
- Use of noninvasive vs. mechanical ventilation for COPD (Cannon KT)

Preventive care (2)
- Completion of FOBT screening (Fisher D)
- Use of pneumococcal and influenza vaccinations (Bean-Mayberry B)

Other topics (3)
- Use of procedures by hospital racial composition of patients (Groeneveld PW)
- 30-day mortality and outcomes by hospital racial composition (Jha AK)
- Diagnosis setting and treatment for epilepsy (Hope OA)

Potential mediators of racial disparities are investigated in 22 ongoing 2nd-generation studies:

Arthritis/pain management (5)
- Patient expectations regarding joint replacement (Groeneveld PW)
- Patient perceptions and willingness to consider joint replacement (Kwoh K)
- Patient referrals, acceptance, and satisfaction with joint replacement surgery, and the role of patient-physician communication (Ibrahim SA)
- Patient preferences and perceptions of physician's participatory decision-making style (Golightly YM)
- Provider decision-making for pain management in inpatient and outpatient settings (Crowley-Matoka M)

Cancer (1)
- Effect of health literacy, social support, and use of screening tests on stage of presentation for prostate, colorectal, and lung cancer (Arozullah AM)

Cardiovascular disease (4)
- Relationship of physician-patient communication to outcomes in chronic heart failure (Gordon HS)

- Recognition of stroke warning signs/symptoms and appropriate first action (Ellis C and Egede L)
- Physician's attitudes about race-based therapies—BiDil for congestive heart failure (Frank D)
- Interactions, views, and decisions of patients and providers regarding invasive v. noninvasive diagnosis and treatment of ischemic heart disease (Siminoff LA)

Diabetes (2)

- Trust in physicians and distrust of health care systems, in relation to personal health practices and outcomes (Egede LE)
- Barriers to glucose control (Shacter HE)

Mental health and substance abuse (4)

- Impact of 2002 policy increase in prescription copayment on medication use and psychiatric admissions for schizophrenia (Zeber JE)
- Perceptions of the trust and satisfaction with healthcare environment in relation to medication adherence in bipolar disorder (Zeber JE)
- Severity of psychiatric disorders and readiness for change at initiation of psychiatric treatment, and satisfaction with treatment after 6 months (Tiet QQ)
- PTSD service connection (receiving vs. not receiving disability benefits) and long-term outcomes, including symptom severity, social adjustment, functioning, income, employment, health care utilization and costs, homelessness, and mortality (Murdoch M)

Preventive and ambulatory care (4)

- Patient factors in colorectal screening behavior including knowledge, values and preferences, and stage of readiness (Partin MR)
- Physician-patient communication in engaging patients in hypertension management and adherence (Bokhour B)
- Associations between patient race, experiences with clinicans, attitudes and beliefs about hypertension and medication adherence (Kressin NR)
- Examines dual utilization of VA and Indian Health Services among AIAN veterans to identify barriers, fragementation and overlap of services (Kramer B)

Other areas (1)

- Factors (e.g. insurance, income, caregiver distress, social support, distance) that affect hospitalizations for ambulatory care sensitive conditions such as diabetes and hypertension, among community-residing veterans with dementia (Van Houtven CH)

SUMMARY AND SYNTHESIS

Prevalence of disparities

In the tables below, we categorize the findings of reviewed studies by clinical content area (Table 9) and by utilization or outcome measure (Table 10).

Table 9. Presence of Disparities by Clinical Content Area

Clinical Content Area	Disparities Present	Disparities Not Present
Arthritis/pain management	6	1
Cancer treatment	2	2
Diabetes	7	2
Heart and vascular disease	20	10
HIV/Hepatitis C	4	3
Mental health/substance abuse	11	10
Preventive/ambulatory care	8	4
Rehabilitation and palliative care	2	2

Table 10. Presence of Disparities by Utilization or Outcome Measure

Utilization or Outcome Measure	Disparities Present	Disparities Not Present
Surgery and invasive procedures	21	11
Medication use		
Prescribing	9	7
Adherence	5	0
Basic services/processes of care*	13	10
Referral	1	2
Patient satisfaction	2	3
Intermediate outcomes **	5	1

* E.g., lab tests, outpatient visits

** E.g., control of blood pressure, blood glucose, lipids

In Table 9, we categorized each unique study in our review as finding disparities to be present vs. not present. When a single study examined multiple utilization or outcome measures, the findings for each measure were entered into Table 10 (e.g., if a study found racial differences in the use of a surgical procedure but no racial differences in the use of a prescription medication, it would have contributed one point to the "Disparities Present" column under "Surgery and Invasive Procedures," and one point to the "Disparities Not Present" column under "Medication Use/Prescribing." In addition, when studies found more or higher-quality care for non-white veterans compared to whites, that study was counted in the "Disparities Not Present" column, to maintain consistency with the vast majority of the literature demonstrating less or lower quality care for non-whites. The one exception to this rule involved cases in which non-whites received more services that generally indicate lower quality care or worse outcomes (e.g., limb amputation).

These tables are intended to provide a rough "landscape" of the existing literature. They should not be construed as an accurate quantification of the distribution of disparities within the VA, since they do not account for the quality, sample size, or generalizability of the individual

studies, or for the degree of disparities found (i.e., effect size). In addition, studies under the "Disparities Not Present" column did not necessarily establish the *absence* of disparities, but rather did not find disparities to be present; these studies often did not have adequate power to definitively demonstrate equivalence between racial groups.

There are several points worth noting with regard to the presence of disparities within the VA.

- There is no clear indication that disparities are more prevalent in some clinical content areas than others. Although there have been more studies in the area of cardiovascular disease than in other realms (as is also true in the non-VA literature), disparities appear to exist in all clinical arenas.
- Disparities appear to be more consistently observed for processes that entail more risk or require more intensive decision making, communication, or effort on the part of patients and/or providers: surgery/invasive procedures and medication adherence.
- In studies examining quality indicators that represent intermediate health outcomes—such as control of blood sugar, blood pressure, or cholesterol—non-white veterans generally fared worse than whites. This is a troubling finding, in that it may indicate that disparities in healthcare delivery are contributing to real disparities in health outcomes. Alternatively, these studies suggest that racial disparities might reflect "regressive" healthcare delivery; i.e., minority veterans are receiving *less* and *lower* quality health care despite needing *more* and *higher* quality care, as reflected by poor control of their diabetes, hypertension, and hyperlipidemia.
- Most of the reviewed studies compared African American and white veterans. Fewer studies examined Hispanics, American Indians, and Asians. In general, disparities in the VA appear to affect African American and Hispanic veterans most significantly.
- Not all disparities should be assumed to reflect underuse of health care among non-whites, particularly in the realm of surgical and other invasive procedures. In at least one study, differential use of cardiovascular procedures was found to reflect overuse among whites rather than underuse among African Americans.[31] However, in many cases, disparities do appear to represent inappropriate underuse of procedures (i.e., lower quality care) among non-whites.
- Because white veterans tend to use non-VA care more often than non-white veterans do, studies that do not capture non-VA utilization, particularly those using administrative data, may underestimate the degree of disparities, find disparities to be absent when they in fact exist,[60] or find "reverse" disparities (non-whites receive more/better care) when in fact no disparities exist.[138] At least two studies have demonstrated this misleading effect of not capturing non-VA utilization.[60, 138]

Sources of disparities

Firm conclusions about the sources of disparities within the VA are limited by several issues. First, relative to the number of studies examining the presence or absence of disparities, there are far fewer studies examining potential causes of disparities. Second, the VA disparities literature is complex. Studies are highly varied in terms of study settings and populations, clinical topics and services, data collection methods, and measures. This variability makes it difficult to generate unifying theories that are generalizable across settings and services. Finally, most studies examining potential sources of disparities focus on whether a hypothesized cause (e.g., communication patterns) varies by veteran race or ethnicity, but not on the degree to which that cause helps explains the disparity that motivated the study (e.g., differential use of cancer surgery by race). For example, one study found that African American veterans with lung cancer are less likely to undergo surgical tumor resection than white veterans.[21] In a subsequent study, investigators hypothesized that this disparity might be explained by different patterns of patient-physician communication and veteran trust in physicians, by race.[23, 24] They found that communication patterns and trust did indeed differ by race. However, because of the relatively small number of patients in their study, they were not able to examine whether differential communication patterns and trust helped explain differences in lung cancer surgery. This is a pervasive limitation, because the detailed data needed for studies exploring potential causes of disparities—which often involve surveys, chart review, or qualitative research methods—are often difficult to collect in numbers large enough to determine whether those potential causes explain observed disparities, which are often documented using large administrative data sets.

Acknowledging the limitations described above, several themes emerged from our review as likely contributors to racial disparities in VA health care. These themes are rooted in our systematic review of the evidence but are based on qualitative rather than quantitative synthesis (e.g., meta-analysis). Our synthesis of research findings should therefore be considered a guide for future research, as opposed to firm, statistically derived conclusions.

- **Veteran medical knowledge and information sources.** Non-white and white veterans differ in their degree of familiarity with and knowledge about medical interventions. This difference stems from different levels of experience with those interventions among minority vs. white veterans and their families, friends, and communities; from different amounts of information conveyed by healthcare providers; and from different levels of health literacy and understanding among veterans. Different knowledge and information may affect patients' perceptions of, or degree of uncertainty about, the necessity and benefits of medical interventions in relation to their risks. Uncertainty about the necessity of interventions may in turn reduce patients' willingness to accept and adhere to them. Several studies indicate that minority veterans are less informed about their care, as compared to white veterans, and that this difference affects decision making.[23, 24, 53, 113, 114, 122, 137]

- **Veteran trust and skepticism.** Minority veterans also tend to harbor less trust and more skepticism about the benefits of medical interventions, relative to their risks. These perceptions appear to be influenced by lack of familiarity with medical interventions (described above), by historical or personally experienced discrimination, and for some African American veterans in particular, by a reliance on religious and spiritual avenues

for coping with illness as opposed to medical therapies. Studies in our review suggest that minority veterans are more skeptical of information provided by healthcare professionals, as compared to white veterans.[23, 45, 51, 52, 54] It is important, however, not to misconstrue this skepticism as unwarranted. White veterans' general lack of skepticism may be more problematic if it leads to acceptance of unnecessary or undesired care.

- **Racial/cultural milieu.** Some have suggested that a more racially and culturally congruent healthcare environment (including racially concordant healthcare providers) for minority veterans may elevate trust, reduce skepticism, and enhance the acceptability of care. Two studies directly examined this issue and found that African American veterans experienced better interactions and fared somewhat better clinically, when cared for by African American vs. white providers.[53, 102] Another study suggested that black patients in group therapy might fare better when grouped with other black patients.[76]

- **Patient participation.** Several studies suggest that non-white veterans are less active participants in their care as compared to white veterans.[24, 26, 53, 102,113] Non-white veterans tend to ask fewer questions of their providers, who in turn provide less information. Less information, as discussed above, may lead to lower acceptance of and adherence to medical interventions. In addition, lower patient participation diminishes the strength of the patient-provider partnership, which may in turn lead to less investment by both parties in following recommended care plans, and to lower trust and greater skepticism among minority veterans.

- **Clinician judgment.** Studies suggest that clinicians' diagnostic and therapeutic decision making varies by veteran race. The degree to which this differential decision making is based on clinical factors vs. non-clinical factors, including racial stereotypes, is unclear. For instance, in one study clinicians judged African American veterans to be less appropriate candidates for coronary interventions, even after accounting for chart-documented variables.[45] The degree to which this judgment reflected undocumented clinical factors vs. non-clinical influences was not clear. Similarly, clinicians prescribe opioid medications less frequently to African American vs. white veterans[2] and are more likely to diagnose African American veterans presenting with mental illness as having psychotic vs. affective disorders.[79, 80] The degree to which these phenomena are driven by racial differences in co-existing substance abuse disorders, by cross-cultural misunderstanding of symptom presentations, or by racial bias, remains unclear.

- **Veteran social support and resources.** Non-white veterans may have fewer social support and other external resources to help with both illness management and decision making. This is particularly relevant in that minority veterans may rely more heavily on external resources than on healthcare professionals for information and support. This may particularly affect adherence and decision making around high-risk procedures.[68]

- **Healthcare facility characteristics.** Some disparities are at least partly explained by the fact that minority and white veterans tend to receive care at different VA Medical Centers.[61] (Heisler M, unpublished; Groeneveld PW, unpublished) In some cases, VA Medical Centers that disproportionately serve minority veterans have fewer available

services or deliver lower quality care overall than VAMCs serving predominantly white veterans. This potential source of disparities, however, remains underexplored. It should be noted that many studies have demonstrated disparities within single VAMCs, suggesting that system-level factors are unlikely to explain all observed disparities.

Future Research Recommendations

The findings of our review suggest several promising areas for future research to further elucidate and reduce/eliminate racial disparities in health care within the VA.

- **Decision aids and information tools.** Because disparities may arise from different levels of familiarity with and information about medical interventions, tools that provide accurate information about the rationale, risks, and benefits of interventions have the potential to "even the playing field" among minority and white veterans in terms of knowledge. Such tools, many of which use computer technology to help patients better understand not only medical interventions but also their own preferences, also have the potential to make patients more active participants in their medical care, which may improve understanding and adherence. In designing decision aids and information tools for minority veterans, investigators should pay attention to issues of literacy, language, and culture.

- **Patient activation interventions.** Interventions to make patients more active participants in their interactions with healthcare providers and in the management of their illnesses have been shown to improve health outcomes. They may also reduce disparities by breaking the cycle of passivity that leads to less information exchange between minority veterans and their healthcare providers. More active patient participation has the potential to improve patient adherence as well as to strengthen patient-provider partnerships and mutual trust.

- **Patient-centered communication training.** Interventions to make veterans more active participants in their interactions with healthcare providers can also target providers. Clinicians can adopt communication strategies that help solicit patient perspectives and engage patient participation. As with patient activation interventions, patient-centered approaches to healthcare interactions hold the potential to strengthen patient-provider partnerships and mutual trust.

- **Determining sources of variation in clinician judgment by patient race.** As described above, studies have found that clinicians make different judgments based on veteran race. However, the degree to which this variation is driven by clinical characteristics vs. non-clinical factors, such as racial bias, remains unclear. Studies exploring how and why patient race is associated with different clinical decisions would help determine the need for and inform interventions to reduce adverse consequences of racial bias among clinicians.

- **Interventions to promote evidence-based decision making by providers.** Similar to decision aids and information tools for patients, guidelines and decision rules for providers hold the potential to improve equity by "standardizing" care. To the extent that providers may be biased by patient race, guidelines, decision rules, and other quality improvement tools that promote evidence-based decision making may reduce the influence of provider bias and enhance equity of care among veterans of different race and ethnicity.

- **Adherence support interventions.** Minority veterans appear consistently across studies to be less adherent to treatment plans than whites. Studies suggest that this may in part be due to less social support and planning among minority veterans. Interventions to provide adherence support—e.g., education, assistance with care planning—may help reduce this disparity.

- **Determining facility characteristics associated with healthcare quality and equity.** Some disparities are explained by differences in the healthcare facilities where minority vs. white veterans seek care. Determining the differences in structures and processes across minority- vs. majority-serving VAMCs would inform interventions to eliminate system-level sources of disparities. In addition, studies examining facility-level characteristics associated with more equitable care within VAMCs—including those related to the racial and cultural context at VAMCs, such as the racial composition of clinical staff—would help inform system-level interventions to eliminate disparities.

Future research on disparities in VA healthcare should explicitly define how race is conceptualized within a given study. A group of VA investigators has developed a survey/interview tool to assess the "ecocultural" factors for which veterans' race and ethnicity often serve as proxies.[66] "Unpacking" race and ethnicity in studies of disparities will promote understanding and inform future interventions. Researchers should also be mindful that some disparities represent overuse of medical services among white veterans rather than underuse among non-whites. Clearly, interventions to promote greater use of services among non-whites in these instances is unwarranted. Finally, future studies should attempt to account for non-VA utilization. Because non-VA care is more prevalent among white veterans than among non-whites, ignoring non-VA utilization may generate misleading results.

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APPENDIX I. SEARCH STRATEGY

Search terms and MeSH headings:

((VA [tw] OR veteran* [tw]) OR (United States Department of Veterans Affairs [mh] OR veterans [mh] OR veterans hospitals [mh])) AND ((ethnic* [tw] OR race [tw] OR racial [tw] OR disparity [tw] OR disparities [tw] OR blacks [tw] OR black [tw] OR Hispanic* [tw]) OR (population groups [mh] OR race relations [mh]))

Databases searched: Medline via PubMed, HealthSTAR, and Health Services Research Projects (HSRProj). The HSRProj database identified ongoing and completed VA research projects, and indicated whether these studies had been published.

Dates searched: 1966-October 9, 2006.

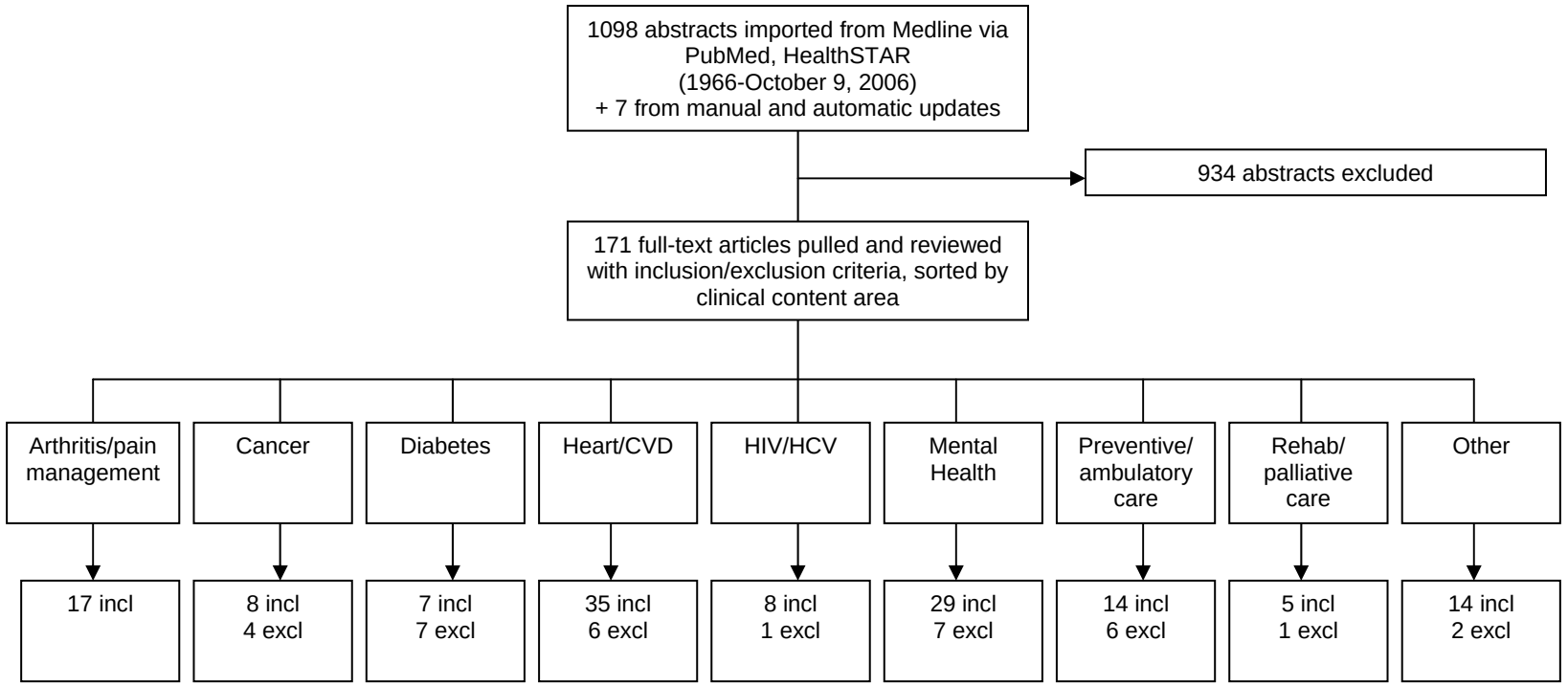
Automatic updates: The search strategy is saved in the PubMed database to provide weekly updates on new publications.

APPENDIX II. INCLUSION / EXCLUSION CRITERIA

Inclusion / Exclusion Codes for abstracts and full-text articles

Code	Include / Exclude	*Reason*
I1	Include	Published studies that: a. Are conducted within VHA or with VA beneficiaries AND b. Report data by patient race and/or ethnicity AND c. Report data on i. Utilization of health care services ii. Quality of health care services 1. Process-of-care measures (e.g., use of appropriate screening tests) 2. Outcome measures used by VHA as quality metrics (e.g., blood pressure control) 3. Patient evaluations of care (e.g., patient satisfaction) 4. Direct observations of care (e.g., communication patterns) iii. Potential mediators of racial/ethnic disparities in utilization or quality 1. System level mediators (e.g., distribution of services) 2. Provider level mediators (e.g., racial bias) 3. Patient level mediators (e.g., trust) 4. Patient-provider level mediators (e.g., communication)
I2	Include	Systematic review or meta-analysis of studies meeting I1
I3	Include	Unpublished research meeting I1
I4	Include	Background or review articles relevant to racial disparities in VHA (for review of reference lists)
I5	Include	Other (specify)
X1	Exclude	Outcomes that are not clear indicators of utilization or quality of care or potential mediators of disparities in utilization/quality (e.g., reports on health outcomes that are not clearly markers of health care quality)
X2	Exclude	Non-U.S.VHA setting and non-VA population
X3	Exclude	Data not stratified by patient race and/or ethnicity
X4	Exclude	No original data
X5	Exclude	Non-English language, no abstract
X6	Exclude	Non-human, animal
X7	Exclude	Other (specify) e.g. NRF

APPENDIX III. SEARCH AND SELECTION OF LITERATURE



APPENDIX IV. EVIDENCE TABLES

Please see MS Excel spreadsheets available for download from the HSR&D website:
www.hsrd.research.va.gov/publications/esp/AppendixIV-EvidenceTables.xls

This MS Excel file contains all ten Evidence Tables as well as the List of Abbreviations.