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 MINI-SYMPOSIUM ON HEALTH DISPARITIES

## Racial and Ethnic Disparities in the VA Health Care System: A Systematic Review

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**OBJECTIVES:** To better understand the causes of racial disparities in health care, we reviewed and synthesized existing evidence related to disparities in the “equal access” Veterans Affairs (VA) health care system.

**METHODS:** We systematically reviewed and synthesized evidence from studies comparing health care utilization and quality by race within the VA.

**RESULTS:** Racial disparities in the VA exist across a wide range of clinical areas and service types. Disparities appear most prevalent for medication adherence and surgery and other invasive procedures, processes that are likely to be affected by the quantity and quality of patient-provider communication, shared decision making, and patient participation. Studies indicate a variety of likely root causes of disparities including: racial differences in patients’ medical knowledge and information sources, trust and skepticism, levels of participation in health care interactions and decisions, and social support and resources; clinician judgment/bias; the racial/cultural milieu of health care settings; and differences in the quality of care at facilities attended by different racial groups.

**CONCLUSIONS:** Existing evidence from the VA indicates several promising targets for interventions to reduce racial disparities in the quality of health care.

**KEY WORDS:** racial and ethnic disparities; medication adherence; health care utilization.

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### INTRODUCTION

Numerous studies have demonstrated racial and ethnic disparities in health care in the United States.<sup>1</sup> The Institute of Medicine defines disparities as “racial or ethnic differences in the quality of health care that are not caused by access-related factors or clinical needs, preferences, and appropriateness of intervention.”<sup>1</sup> Although studies have clearly documented that

both the quantity and quality of health care are lower for minority Americans—African Americans and Latinos in particular—compared to the white majority, the root causes of these disparities are not well understood.<sup>1</sup>

Disparities in health care have been demonstrated in the Veterans Affairs (VA) health care system. The VA is a national network of health care facilities administered by the federal government, that provides care to over 5 million veterans of U.S. military service, approximately 21% of whom are from racial or ethnic minorities (including 13% African American).<sup>2</sup> The VA offers a comprehensive set of physical and mental health services including ambulatory and inpatient care, pharmaceuticals, and medical equipment. Eligible veterans have access to the same set of services and pay no premiums. Most veterans are subject to copayments for medications, and some with financial means surpassing a specified threshold also pay copayments for other services. The VA uses a state-of-the-art electronic medical record system and continuously collects data on cost, quality, and utilization. These features of the VA make it an ideal “laboratory” for studying the root causes of disparities in health care use and quality. Specifically, it is a system that provides a wide spectrum of health services to a racially diverse population and collects data on utilization and quality. Moreover, because most financial barriers present in private-sector U.S. health care are removed, VA studies are able to examine racial disparities without confounding by racial differences in insurance coverage, income, or other factors influencing patients’ ability to pay for care. Studies from the VA are therefore likely to be particularly informative in helping understand racial disparities in health care.

We reviewed and synthesized the existing knowledge base related to racial and ethnic disparities in the VA, to:

- 1) Determine in which clinical areas and service types 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 promising avenues for future interventions to reduce disparities in health care.

### METHODS

#### Conceptual Framework

We used a conceptual framework to guide our review and synthesis in which studies were considered to be first gener-

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ation (descriptive studies examining the extent of disparities), second generation (analytical studies examining factors that might explain disparities), or third generation (interventional studies to reduce disparities). Some studies are simultaneously first and second generation, demonstrating racial or ethnic disparities and examining mediating factors that might explain those disparities. However, most second-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 health care providers, without explicitly examining whether trust is a mediator of actual disparities. The potential for mediation in these cases is theoretical.

There are relatively few third-generation studies; interventional 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 second-generation studies.

## Literature Search and Study Selection

We conducted a search in Medline and HealthSTAR of literature published from 1966 to October 9, 2006. We entered the following string of terms, using the PubMed search engine: ((VA [tw] OR veteran\* [tw]) OR (United States Department of Veterans Affairs OR veterans OR veterans hospitals)) 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 OR race relations)).

The search strategy was saved in PubMed to provide weekly automatic updates on new publications until February 28,

2007. We obtained additional articles from reference lists of pertinent studies and consulted authors of retrieved studies and other known experts on disparities within the VA.

Two reviewers assessed abstracts using the criteria described in Table 1. Full-text articles of potentially relevant abstracts were retrieved, and a second review for inclusion was conducted by reapplying the inclusion and exclusion criteria.

## Data Abstraction and Synthesis

We abstracted detailed data from the studies meeting inclusion criteria and critically analyzed them to compare study characteristics, methods, and findings. We compiled a summary of findings by clinical topic and drew conclusions based on qualitative synthesis of the findings. Because the studies were heterogeneous in design, objectives, and outcomes, we did not systematically rate the validity of individual studies. We assessed the level of adjustment for potential confounders and whether race/ethnicity data were gathered by self-report and considered these indicators in our qualitative synthesis of evidence.

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 disparities. We also sorted findings by categories of health care utilization and quality (e.g., use of surgery and invasive procedures, patient satisfaction, etc.), to provide additional insight.

## RESULTS

The initial electronic literature search generated 1,098 titles and abstracts. An additional 7 titles were added through manual and automated update searches. After applying inclusion and exclusion criteria at the abstract level, 171 full-text articles were reviewed and sorted by clinical content area, as shown in Figure 1. Details of these studies including sample sizes and other study characteristics are available in the Appendix.

In Table 2, we present numbers of studies in which disparities were found, and not found, by clinical content area. In the table, a single study might contribute to both columns if the study found disparities in 1 measure of quality or utilization and no disparities in another measure. Most second-generation studies in our review examined potential sources of disparities (e.g., patient trust) without examining actual disparities in quality or utilization. These studies did not contribute data to either column of the table. Table 3 presents similar data stratified by categories of utilization and quality measures.

Tables 2 and 3 are intended not for statistical comparisons but as qualitative “balance sheets” to provide a broad overview of first-generation disparities studies in the VA. There are several points worth noting. First, there is no indication that disparities are more prevalent in some clinical content areas than others. Second, disparities appear most prevalent for surgery and other invasive procedures and medication adherence, processes that are likely to be affected by the quantity and quality of patient–provider communication, shared decision making, and patient participation.

Table 1. Inclusion and Exclusion Criteria

Criteria
Published articles that:
a. Were conducted within the VA health care system or with VA beneficiaries AND
b. Report data stratified 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 the VA 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)
Exclusion Criteria
a. 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)
b. Non-U.S. setting, non-VA setting, or non-VA population
c. Data not stratified by patient race and/or ethnicity
d. No original data
e. Non-English language
f. Non-human study

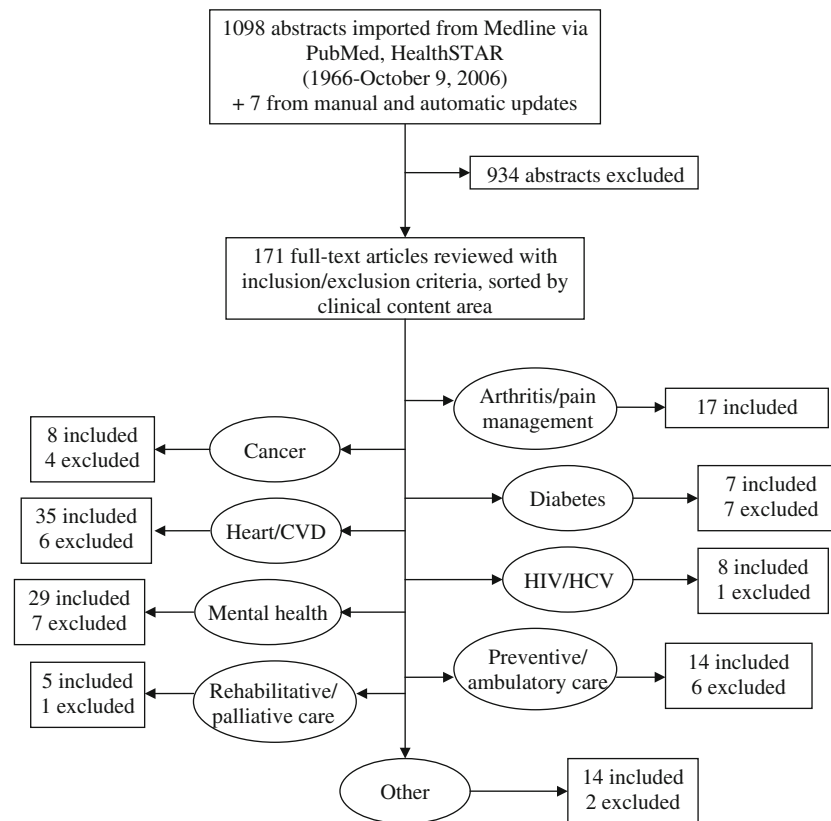


Figure 1. Search and selection of literature. CVD cardiovascular disease, HIV human immunodeficiency virus infection, HCV hepatitis C virus infection.

Third, in studies examining quality indicators that represent intermediate health outcomes, non-white patients generally fared worse than whites. This potentially indicates that disparities in service intensity are contributing to real disparities in health outcomes, or that minorities are receiving fewer and lower quality services despite greater need, as reflected by less adequate chronic illness management, or both. Finally, because white patients tend to use non-VA care more often than non-white patients 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,<sup>3</sup> or find “reverse” disparities (non-whites receive more/better care) when in fact no disparities exist.<sup>4</sup> Two studies demonstrated this misleading effect of not capturing non-VA utilization.<sup>3,4</sup>

In the sections below, we provide findings from our review on selected clinical topics that illustrate many of the principal themes of our analysis (for a complete review of all clinical topics,

Table 2. 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

\* Figures represent numbers of studies in each clinical content area in which disparities in health care quality and utilization were found to be present, and in which such disparities were not found to be present. A single study might contribute to both columns if it found disparities in 1 measure of quality or utilization and no disparities in another measure. Most second-generation studies in our review examined potential sources of disparities (e.g., patient trust) without addressing racial differences in measures of quality or utilization by race. These studies did not contribute data to either column of the table.

Table 3. 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

\* Figures represent numbers of studies of each measure of utilization or outcome measure in which disparities were found to be present, and in which such disparities were not found to be present. A single study might contribute to both columns if it found disparities in 1 measure of quality or utilization and no disparities in another measure.

†For example, lab tests, outpatient visits

‡For example, control of blood pressure, blood glucose, lipids

our full report is available at <http://www.hsrd.research.va.gov/publications/esp/RacialDisparities-2007.pdf>).

**Arthritis and pain management.** 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 African Americans and Latinos compared to whites.<sup>5-7</sup> These differences do not appear to be explained by differences in symptom severity, as African Americans tend to report similar if not greater levels of pain compared to whites.<sup>8-10</sup>

African Americans were generally less willing than whites to undergo joint replacement surgery.<sup>11</sup> This greater reluctance appears to be caused by less familiarity with the procedure and worse expectations of surgical outcomes, including post-operative recovery, chronic pain, and functioning.<sup>12</sup> African Americans also appear to place greater value than whites on non-medical options for managing arthritis, particularly prayer.<sup>13-15</sup> However, the degree to which lower willingness among African-American patients explains observed disparities in joint replacement surgery is unknown.

**Cancer.** For some cancers, African Americans are less likely to undergo potentially curative surgical resection, but equally likely to undergo non-surgical interventions, such as chemotherapy and radiation.<sup>16-19</sup> Studies exploring possible reasons for this disparity suggest that physicians engage in less effective partnerships with African-American patients and provide them with less information as compared to white patients.<sup>20-22</sup> Part of this communication disparity appears to be related to African-American patients' being less assertive or active in their conversations with physicians. As a result of less effective partnerships and less information exchange between physicians and African-American patients, physicians engender less trust among African American as compared to white patients.<sup>20</sup> The degree to which these differences in communication, partnership, and trust actually explain disparities in cancer surgery is unknown.

**Cardiovascular diseases.** There were mixed findings across studies on racial disparities in the use of invasive procedures in patients with cardiovascular diseases, but the majority of studies found that non-whites undergo fewer procedures than whites.<sup>23-43</sup> In 1 study, an observed disparity in the use of cardiac catheterization was partly caused by greater overuse of the procedure among whites than African Americans.<sup>27</sup>

Studies found greater aversion to invasive procedures among African Americans compared with whites,<sup>26,44-46</sup> as well as lower trust among African Americans and greater emphasis on religion as an alternative to medical care.<sup>41,47</sup> Notably, African Americans were less familiar with cardiovascular procedures, and this lack of familiarity helped explain racial differences in willingness to undergo procedures in 1 study.<sup>46</sup>

Patient-physician communication behaviors differed between African American and white patients. One study identified a cycle of passivity in which African American patients, and patients interacting with race discordant physicians, received less information overall because they engaged less

often in communication behaviors (e.g., questions, assertions) that typically elicit more information from doctors.<sup>48</sup> In focus groups, African-American patients placed greater emphasis on the need for trust in their physicians in deciding about invasive procedures, whereas white patients placed greater emphasis on clinical indications.<sup>49</sup>

Whereas 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 the actual use of invasive procedures generally found that they did not explain observed disparities. Physician decision making was more influential, and in 1 study physician recommendations helped explain racial disparities in cardiac procedure use, even after accounting for clinical variables and severity of coronary disease.<sup>41</sup>

African Americans were more likely to delay seeking treatment for heart failure symptoms and were less adherent (both intentionally and unintentionally) to medication regimens.<sup>50</sup> Among patients with peripheral arterial disease, African Americans and Latinos had higher rates of limb amputation.<sup>43</sup> The reasons underlying these findings of lower adherence and later presentation were not investigated.

**Mental health and substance abuse.** Clinicians tend to more frequently diagnose and treat African-American patients with mental illness as having psychotic disorders (e.g., schizophrenia) and white patients as having affective disorders (e.g., bipolar disorder, depression).<sup>51,52</sup> 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 African-American patients may derive benefit from having a racially concordant clinician, and from being in a racially concordant treatment group.<sup>53,54</sup>

**Preventive and ambulatory care.** Studies of preventive and ambulatory care use by patient race reveal mixed findings. For some services—e.g., colorectal cancer screening, lipid lowering therapy—racial disparities do not appear prevalent.<sup>55-58</sup> Studies did reveal disparities in some primary care outcome measures, including achieving blood pressure and lipid goals, but these findings may have been explained in part by more severe disease among non-whites.<sup>59,60</sup> Non-whites with hypertension were less adherent to medications, both unintentionally and intentionally, part of which was related to medication side effects.<sup>60,61</sup> Qualitative research suggested that disparities in cardiovascular risk management may be related to low health literacy, less knowledge, and less assertiveness with physicians among African-American patients.<sup>62</sup>

African Americans were less likely than whites to receive influenza vaccines. In addition, both African Americans and Latinos were less likely than whites to know they needed a vaccination and more likely to rely on physician recommendations and reminders to receive vaccinations.<sup>63</sup>

## Sources of Disparities

Several themes emerged from our qualitative review as likely contributors to racial disparities in VA health care.

- *Patient medical knowledge and information sources.* Non-white and white patients differ in their familiarity with and knowledge about medical interventions. This difference stems from different levels of experience with those interventions among minority versus white patients and their families, friends, and communities; from different amounts of information conveyed by health care providers; and from different levels of health literacy and understanding among patients. 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 patients are less informed about their care and that this difference affects decision making.<sup>20,21,48,62-65</sup>
- *Patient trust and skepticism.* Minority patients also harbor less trust and more skepticism about medical interventions. 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 patients in particular, by a reliance on religious and spiritual avenues, as opposed to medical therapies, for coping with illness. Studies in our review suggest that minority patients are also more skeptical than whites of information provided by health care professionals.<sup>20,41,44,47,49</sup>
- *Patient participation.* Several studies suggest that non-white patients are less active participants in their care as compared to white patients.<sup>21,22,48,53,62</sup> Non-white patients tend to ask fewer questions of their providers, who in turn provide less information. Less information 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 lead to less investment by both parties in following recommended care plans, and to lower trust and greater skepticism among minority patients.
- *Patient social support and resources.* Non-white patients may have less social support and fewer external resources to help with both illness management and decision making. This is particularly relevant in that minority patients may rely more heavily on external resources than on health care professionals for information and support. This may particularly affect adherence and decision making around high-risk procedures.<sup>66</sup>
- *Clinician judgment.* Studies suggest that clinicians' diagnostic and therapeutic decision making varies by patient race. The degree to which this differential decision making is based on clinical factors versus non-clinical factors, including racial stereotypes, is unclear. For instance, in 1 study clinicians judged African-American patients to be less appropriate candidates for coronary interventions, even after accounting for chart-documented variables.<sup>41</sup> The degree to which this difference was driven by unmeasured clinical factors, by the influence of patient preferences on physician decision making, or by physician bias, was not determined. Similarly, clinicians prescribe opioid medications less frequently to African-American versus white patients<sup>6</sup> and are more likely to diagnose African-American patients presenting with mental illness as having psychotic versus affective disorders.<sup>51,52</sup> The degree to which these phenomena are driven by racial differences in coexisting substance abuse disorders, by cross-cultural misunderstanding of symptom presentations, or by racial bias, remains unclear. The presence of racial bias was suggested by the finding in 1 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.<sup>67</sup>
- *Racial/cultural milieu.* Some have suggested that a more racially and culturally congruent health care environment (including racially concordant health care providers) for minority patients may elevate trust, reduce skepticism, and enhance the acceptability of care. Two studies directly examined this issue and found that African-American patients experienced better interactions and fared somewhat better clinically, when cared for by African-American versus white providers.<sup>48,53</sup> Another study suggested that African-American patients in group therapy might fare better when grouped with other African-American patients.<sup>54</sup>
- *Healthcare facility characteristics.* Some disparities are at least partly explained by the fact that minority and white patients tend to receive care at different medical centers.<sup>42,68-70</sup> In some cases, centers that disproportionately serve minority patients have fewer available services or deliver lower quality care overall than centers serving predominantly white patients. This potential source of disparities, however, remains underexplored. It should be noted that many studies have demonstrated disparities within single centers, suggesting that system-level factors are unlikely to explain all observed disparities.

## DISCUSSION

Our review reveals that racial disparities in the VA health care system exist across a wide range of clinical areas and service types. The existence of these disparities is noteworthy in a health care system where financial barriers are minimized. Our review also reveals several potential sources of racial disparities in health care. It should be noted, however, that important limitations make it difficult to draw firm conclusions about the sources of racial disparities elucidated in our review. First, studies were highly varied in terms of 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. Second, most studies examining potential sources of disparities focused on whether a hypothesized cause (e.g., communication patterns) varied by patient race or ethnicity, but not on the degree to which that cause helped explain the disparity that motivated the study (e.g., differential use of cancer surgery). For example, 1 study found that African-American patients with lung cancer are less likely to undergo surgical tumor resection than white patients.<sup>18</sup> In a subsequent study, investigators hypothesized that this disparity might be explained by different patterns of patient-physician communication and patient trust in physicians, by

race.<sup>19,20</sup> 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 these cautions, we believe the findings of our review suggest some promising areas for future research to further elucidate and reduce racial disparities in health care.

**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 patients 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 patients, investigators should pay attention to issues of literacy, language, and culture.

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

**Patient activation interventions.** Interventions to make patients more active participants in their interactions with health care 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 patients and their health care providers. More active patient participation has the potential to improve patient adherence and to strengthen patient–provider partnerships and mutual trust.

**Patient-centered communication training.** Interventions to make patients more active participants in their interactions with health care providers can also target providers. Clinicians can adopt communication strategies that help elicit patient perspectives and engage patient participation. As with patient activation interventions, patient-centered approaches to health care 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 patient race. However, the degree to which this variation is driven by clinical characteristics versus 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. 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 patients of different races and ethnicities.

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

In exploring these areas of future research on disparities in health care, researchers should explicitly define how race is conceptualized within a given study. A group of investigators has developed a survey/interview tool to assess the ecocultural factors for which patients' race and ethnicity often serve as proxies.<sup>71</sup> “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 patients rather than underuse among non-whites. Clearly, interventions to promote greater use of services among non-whites in these instances is unwarranted. Most VA studies to date have examined differences between whites and African Americans and have either excluded other groups or not included them in sufficient numbers for meaningful analysis. As the VA patient population becomes more diverse, it will be important to include sufficient numbers of Latinos and other minority groups in future studies. Finally, future studies should attempt to account for non-VA utilization. Because non-VA care is more prevalent among white patients than among non-whites, ignoring non-VA utilization may generate misleading results.

Our review represents a snapshot of research on racial and ethnic disparities within the VA. The VA is a unique health care system within the U.S. with a unique patient population that includes few women and suffers a greater burden of illness compared to the general population.<sup>72</sup> As such, our findings may not be entirely relevant to other systems or populations.

However, because research in the VA can examine potential sources of racial disparities in an "equal access" setting relatively free of financial incentives and barriers, we believe that the studies reviewed, and our synthesis of them, represent a unique and important contribution to the literature on racial disparities in health care. Periodic efforts such as this one to take stock of what is known about racial disparities in health care are necessary to ensure that the pressing task of reducing and eliminating disparities is carried out in an evidence-based and efficient way.

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**Conflict of Interest:** None disclosed.

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## REFERENCES

- Smedley BD, Stith AY, Nelson AR. Institute of Medicine Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care. Unequal treatment: confronting racial and ethnic disparities in health care. Washington, D.C.: National Academies Press; 2003.
- Department of Veterans Affairs. 2001 National Survey of Veterans. Final Report. Available at <http://www1.va.gov/vetdata/docs/NSV%20Final%20Report.pdf> (accessed November 25, 2007).
- Halanych JH, Wang F, Miller DR, Pogach LM, Lin H, Berlowitz DR, et al. Racial/ethnic differences in diabetes care for older veterans: accounting for dual health system use changes conclusions. *Medical Care*. 2006;44(5):439-45.
- Gurmankin AD, Polsky D, Volpp KG. Accounting for apparent "reverse" racial disparities in Department of Veterans Affairs (VA)-based medical care: influence of out-of-VA care. *Am J Public Health*. 2004;94(12):2076-8.
- Dominick KL, Bosworth HB, Jeffreys AS, Grambow SC, Oddone EZ, Horner RD. Racial/ethnic variations in non-steroidal anti-inflammatory drug (NSAID) use among patients with osteoarthritis. *Pharmacoepidemiol Drug Saf*. 2004;13(10):683-94.
- Dominick KL, Bosworth HB, Dudley TK, Waters SJ, Campbell LC, Keefe FJ. Patterns of opioid analgesic prescription among patients with osteoarthritis. *J Pain Palliat Care Pharmacother*. 2004;18(1):31-46.
- Dominick KL, Dudley TK, Grambow SC, Oddone EZ, Bosworth HB. Racial differences in health care utilization among patients with osteoarthritis. *J Rheumatol*. 2003;30(10):2201-6.
- Dominick KL, Bosworth HB, Hsieh JB, Moser BK. Racial differences in analgesic/anti-inflammatory medication use and perceptions of efficacy. *J Natl Med Assoc*. 2004;96(7):928-32.
- Golightly YM, Dominick KL. Racial variations in self-reported osteoarthritis symptom severity among veterans. *Aging Clin Exp Res*. 2005;17(4):264-9.
- Ang DC, Ibrahim SA, Burant CJ, Kwok CK. Is there a difference in the perception of symptoms between African Americans and whites with osteoarthritis? *J Rheumatol*. 2003;30(6):1305-10.
- Ibrahim SA, Siminoff LA, Burant CJ, Kwok CK. Understanding ethnic differences in the utilization of joint replacement for osteoarthritis: the role of patient-level factors. *Med Care*. 2002;40(1 Suppl):144-51.
- Ibrahim SA, Siminoff LA, Burant CJ, Kwok CK. Differences in expectations of outcome mediate African American/white patient differences in "willingness" to consider joint replacement. *Arthritis Rheum*. 2002;46(9):2429-35.
- Tan G, Jensen MP, Thornby J, Anderson KO. Ethnicity, control appraisal, coping, and adjustment to chronic pain among black and white Americans. *Pain Med*. 2005;6(1):18-28.
- Ang DC, Ibrahim SA, Burant CJ, Siminoff LA, Kwok CK. Ethnic differences in the perception of prayer and consideration of joint arthroplasty. *Med Care*. 2002;40(6):471-6.
- Ibrahim SA, Siminoff LA, Burant CJ, Kwok CK. Variation in perceptions of treatment and self-care practices in elderly with osteoarthritis: a comparison between African American and white patients. *Arthritis & Rheumatism*. 2001;45(4):340-5.
- Knight SJ, Siston AK, Chmiel JS, Slimack N, Elstein AS, Chapman GB, et al. Ethnic variation in localized prostate cancer: a pilot study of preferences, optimism, and quality of life among black and white veterans. *Clin Prostate Cancer*. 2004;3(1):31-7.
- Dominick JA, Samsa GP, Landsman P, Provenzale D. Race, treatment, and survival among colorectal carcinoma patients in an equal-access medical system. *Cancer*. 1998;82(12):2312-20.
- Dominick JA, Maynard C, Billingsley KG, Boyko EJ. Race, treatment, and survival of veterans with cancer of the distal esophagus and gastric cardia. *Med Care*. 2002;40(1 Suppl):114-26.
- Akerley WL 3rd, Moritz TE, Ryan LS, Henderson WG, Zacharski LR. Racial comparison of outcomes of male Department of Veterans Affairs patients with lung and colon cancer. *Arch Intern Med*. 1993;153(14):1681-8.
- Gordon HS, Street RL Jr., Sharf BF, Kelly PA, Soucek J. Racial differences in trust and lung cancer patients' perceptions of physician communication. *J Clin Oncol*. 2006;24(6):904-9.
- Gordon HS, Street RL Jr., Sharf BF, Soucek J. Racial differences in doctors' information-giving and patients' participation. *Cancer*. 2006;107(6):1313-20.
- Street RL Jr., Gordon HS. The clinical context and patient participation in post-diagnostic consultations. *Patient Educ Couns* 2006;(in press).
- Oddone EZ, Horner RD, Monger ME, Matchar DB. Racial variations in the rates of carotid angiography and endarterectomy in patients with stroke and transient ischemic attack. *Arch Intern Med*. 1993;153(24):2781-6.
- Oddone EZ, Horner RD, Sloane R, McIntyre L, Ward A, Whittle J, et al. Race, presenting signs and symptoms, use of carotid artery imaging, and appropriateness of carotid endarterectomy. *Stroke*. 1999;30(7):1350-6.
- Goldstein LB, Matchar DB, Hoff-Lindquist J, Samsa GP, Horner RD. Veterans Administration Acute Stroke (VAs) Study: lack of race/ethnic-based differences in utilization of stroke-related procedures or services. *Stroke*. 2003;34(4):999-1004.
- Oddone EZ, Horner RD, Johnston DC, Stechuchak K, McIntyre L, Ward A, et al. Carotid endarterectomy and race: do clinical indications and patient preferences account for differences? *Stroke*. 2002;33(12):2936-43.
- Ferguson JA, Adams TA, Weinberger M. Racial differences in cardiac catheterization use and appropriateness. *Am J Med Sci*. 1998;315(5):302-6.
- Hassapoyannes CA, Giurgutiu DV, Eaves G, Movahed MR. Apparent racial disparity in the utilization of invasive testing for risk assessment of cardiac patients undergoing noncardiac surgery. *Cardiovasc Revasc Med*. 2006;7(2):64-9.
- Mirvis DM, Burns R, Gaschen L, Cloar FT, Graney M. Variation in utilization of cardiac procedures in the Department of Veterans Affairs

- health care system: effect of race. *J Am Coll Cardiol*. 1994;24(5):1297-304.
30. **Maynard C, Sun H, Lowy E, Sales AE, Fihn SD.** The use of percutaneous coronary intervention in black and white veterans with acute myocardial infarction. *BMC Health Serv Res*. 2006;6:107.
  31. **Ferguson JA, Tierney WM, Westmoreland GR, Mamlin LA, Segar DS, Eckert GJ, et al.** Examination of racial differences in management of cardiovascular disease. *J Am Coll Cardiol*. 1997;30(7):1707-13.
  32. **Peterson ED, Wright SM, Daley J, Thibault GE.** Racial variation in cardiac procedure use and survival following acute myocardial infarction in the Department of Veterans Affairs. *Jama*. 1994;271(15):1175-80.
  33. **Whittle J, Conigliaro J, Good CB, Lofgren RP.** Racial differences in the use of invasive cardiovascular procedures in the Department of Veterans Affairs medical system. *N Engl J Med*. 1993;329(9):621-7.
  34. **Peniston RL, Lu DY, Papademetriou V, Fletcher RD.** Severity of coronary artery disease in black and white male veterans and likelihood of revascularization. *Am Heart J*. 2000;139(5):840-7.
  35. **Conigliaro J, Whittle J, Good CB, Hanusa BH, Passman LJ, Lofgren RP, et al.** Understanding racial variation in the use of coronary revascularization procedures: the role of clinical factors. *Arch Intern Med*. 2000;160(9):1329-35.
  36. **Petersen LA, Wright SM, Peterson ED, Daley J.** Impact of race on cardiac care and outcomes in veterans with acute myocardial infarction. *Medical Care*. 2002;40(1 Suppl):186-96.
  37. **Sedlis SP, Fisher VJ, Tice D, Esposito R, Madmon L, Steinberg EH.** Racial differences in performance of invasive cardiac procedures in a Department of Veterans Affairs Medical Center. *J Clin Epidemiol*. 1997;50(8):899-901.
  38. **Mickelson JK, Blum CM, Geraci JM.** Acute myocardial infarction: clinical characteristics, management and outcome in a metropolitan Veterans Affairs Medical Center teaching hospital. *J Am Coll Cardiol*. 1997;29(5):915-25.
  39. **Mirvis DM, Graney MJ.** Impact of race and age on the effects of regionalization of cardiac procedures in the Department of Veterans Affairs Health Care System. *Am J Cardiol*. 1998;81(8):982-7.
  40. **Gordon HS, Paterniti DA, Wray NP.** Race and patient refusal of invasive cardiac procedures. *J Gen Intern Med*. 2004;19(9):962-6.
  41. **Kressin NR, Chang BH, Whittle J, Peterson ED, Clark JA, Rosen AK, et al.** Racial differences in cardiac catheterization as a function of patients' beliefs. *Am J Public Health*. 2004;94(12):2091-7.
  42. **Groeneveld PW, Kruse GB, Chen Z, Asch DA.** Variation in cardiac procedure use and racial disparity among Veterans Affairs Hospitals. *American Heart Journal*. 2007;153(2):320-7.
  43. **Collins TC, Johnson M, Henderson W, Khuri SF, Daley J.** Lower extremity nontraumatic amputation among veterans with peripheral arterial disease: is race an independent factor? *Med Care*. 2002;40(1 Suppl):1106-16.
  44. **Bosworth HB, Stechuchak KM, Grambow SC, Oddone EZ.** Patient risk perceptions for carotid endarterectomy: which patients are strongly averse to surgery? *J Vasc Surg*. 2004;40(1):86-91.
  45. **Oddone EZ, Horner RD, Diers T, Lipscomb J, McIntyre L, Cauffman C, et al.** Understanding racial variation in the use of carotid endarterectomy: the role of aversion to surgery. *J Natl Med Assoc*. 1998;90(1):25-33.
  46. **Whittle J, Conigliaro J, Good CB, Joswiak M.** Do patient preferences contribute to racial differences in cardiovascular procedure use? *J Gen Intern Med*. 1997;12(5):267-73.
  47. **Kressin NR, Clark JA, Whittle J, East M, Peterson ED, Chang BH, et al.** Racial differences in health-related beliefs, attitudes, and experiences of VA cardiac patients: scale development and application. *Med Care*. 2002;40(1 Suppl):172-85.
  48. **Gordon HS, Street RL Jr., Kelly PA, Soucek J, Wray NP.** Physician-patient communication following invasive procedures: an analysis of post-angiogram consultations. *Soc Sci Med*. 2005;61(5):1015-25.
  49. **Collins TC, Clark JA, Petersen LA, Kressin NR.** Racial differences in how patients perceive physician communication regarding cardiac testing. *Med Care*. 2002;40(1 Suppl):127-34.
  50. **Evangelista LS, Dracup K, Doering LV.** Racial differences in treatment-seeking delays among heart failure patients. *J Card Fail*. 2002;8(6):381-6.
  51. **Blow FC, Zeber JE, McCarthy JF, Valenstein M, Gillon L, Bingham CR.** Ethnicity and diagnostic patterns in veterans with psychoses. *Soc Psychiatry Psychiatr Epidemiol*. 2004;39(10):841-51.
  52. **Kales HC, Blow FC, Bingham CR, Copeland LA, Mellow AM.** Race and inpatient psychiatric diagnoses among elderly veterans. *Psychiatr Serv*. 2000;51(6):795-800.
  53. **Rosenheck R, Fontana A, Cottrol C.** Effect of clinician-veteran racial pairing in the treatment of posttraumatic stress disorder. *Am J Psychiatry*. 1995;152(4):555-63.
  54. **Rosenheck R, Seibyl CL.** Participation and outcome in a residential treatment and work therapy program for addictive disorders: the effects of race. *Am J Psychiatry*. 1998;155(8):1029-34.
  55. **Dolan NC, Ferreira MR, Fitzgibbon ML, Davis TC, Rademaker AW, Liu D, et al.** Colorectal cancer screening among African-American and white male veterans. *Am J Prev Med*. 2005;28(5):479-82.
  56. **Fisher DA, Jeffreys A, Coffman CJ, Fasanello K.** Barriers to full colon evaluation for a positive fecal occult blood test. *Cancer Epidemiol Biomarkers Prev*. 2006;15(6):1232-5.
  57. **Etzioni DA, Yano EM, Rubenstein LV, Lee ML, Ko CY, Brook RH, et al.** Measuring the quality of colorectal cancer screening: the importance of follow-up. *Dis Colon Rectum*. 2006;49(7):1002-10.
  58. **Woodard LD, Kressin NR, Petersen LA.** Is lipid-lowering therapy underused by African Americans at high risk of coronary heart disease within the VA health care system? *Am J Public Health*. 2004;94(12):2112-7.
  59. **Williams ML, Morris MT 2nd, Ahmad U, Youssef M, Li W, Ertel N.** Racial differences in compliance with NCEP-II recommendations for secondary prevention at a Veterans Affairs medical center. *Ethn Dis*. 2002;12(1):S158-S162.
  60. **Bosworth HB, Dudley T, Olsen MK, Voils CI, Powers B, Goldstein MK, et al.** Racial differences in blood pressure control: potential explanatory factors. *Am J Med*. 2006;119(1):70.e9-15.
  61. **Lowry KP, Dudley TK, Oddone EZ, Bosworth HB.** Intentional and unintentional nonadherence to antihypertensive medication. *Ann Pharmacother*. 2005;39(7-8):1198-203.
  62. **Woodard LD, Hernandez MT, Lees E, Petersen LA.** Racial differences in attitudes regarding cardiovascular disease prevention and treatment: a qualitative study. *Patient Educ Couns*. 2005;57(2):225-31.
  63. **Straits-Troster KA, Kahwati LC, Kinsinger LS, Orellien J, Burdick MB, Yevich SJ.** Racial/Ethnic differences in influenza vaccination in the veterans affairs healthcare system. *Am J Prev Med*. 2006;31:5375-82.
  64. **Hwang SS, Chang VT, Cogswell J, Srinivas S, Kasimis B.** Knowledge and attitudes toward end-of-life care in veterans with symptomatic metastatic cancer. *Palliat Support Care*. 2003;1(3):221-30.
  65. **Basson MD, Gomez R, Fishman L, Panzini L.** Informed consent for screening sigmoidoscopy in a Veterans Administration population. *Dis Colon Rectum*. 2004;47(11):1939-46.
  66. **Kempainen JK, Levine RE, Mistal M, Schmidgall D.** HAART adherence in culturally diverse patients with HIV/AIDS: a study of male patients from a Veteran's Administration Hospital in northern California. *AIDS Patient Care STDS*. 2001;15(3):117-27.
  67. **Curtis JR, Park DR, Krone MR, Pearlman RA.** Use of the medical futility rationale in do-not-attempt-resuscitation orders. *JAMA*. 1995;273(2):124-8.
  68. **Heisler M, Smith DM, Hayward RA, Krein SL, Kerr EA.** Racial disparities in diabetes care processes, outcomes, and treatment intensity. *Med Care*. 2003;41(11):1221-32.
  69. **Heisler M, Zemencuk JK, Krein SL, Hayward RA, Piette JD, Kerr EA.** Racial disparities in diabetes care processes, outcomes, and treatment intensity. In: *HSR&D National Meeting*; 2006; Washington, DC; 2006.
  70. **Jha AK, Stone RA, Lave J, Chen H, Klusartz H, Volpp KG.** Where do black veterans receive hospital care? Variability in disparities within the VA healthcare system. In: *HSR&D National Meeting*; 2007; Washington, DC; 2007.
  71. **Walsh ME, Katz MA, Sechrest L.** Unpacking cultural factors in adaptation to type 2 diabetes mellitus. *Med Care*. 2002;40(1 Suppl):129-39.
  72. **Agha Z, Lofgren RP, VanRuiswyk JV, Layde PM.** Are patients at Veterans Affairs Medical Centers sicker? A comparative analysis of health status and medical resource use. *Arch Intern Med*. 2000;160(27):3252-7.



APPENDIX

Evidence Summary Tables

TABLE OF CONTENTS

Table 1. The use of surgery, radiation, and chemotherapy by race and cancer type ..... 2  
 Table 2. The use of invasive procedures for stroke among veterans, by race ..... 3  
 Table 3. The use of invasive procedures for heart disease among veterans, by race..... 4  
 Table 4. Potential mediators of disparities in the use of invasive procedures among veterans with cardiovascular disease ..... 7  
 Table 5. The use of colon cancer screening among veterans, by race ..... 9  
 Table 6. Management of hypertension, by race..... 10  
 Table 7. Management of cardiovascular risk factors (excluding hypertension), by race ..... 11  
 Table 8. Access to the VA healthcare system, by race ..... 12  
 References ..... 13

Table 1. The Use of Surgery, Radiation, and Chemotherapy Among Veterans by Race and Cancer Type

Author, year	Cancer type	Subjects (N)	Percent of patients treated, by race group, unadjusted			Adjusted OR (95%CI), non-white versus white race		
			Surgery (%)	Chemotherapy (%)	Radiation (%)	Surgery	Chemotherapy	Radiation
Dominitz, 2002 <sup>1</sup>	Esophagus	239 AA	20.5	45.2	44.8	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)
		1,282 white	35.3	36.0	33.0			
Akerley, 1993 <sup>2</sup>	Lung or colon	127 AA 577 white	20 29	– –	24 32	–		
Dominitz, 1998 <sup>3</sup>	Colorectal	569 AA	70	23	17	0.92 (0.74–1.15)	0.99 (0.78–1.24)	1.10 (0.85–1.43)
		2,607 white	73	23	16			
Knight, 2004 <sup>4</sup>	Prostate	31 AA	29	–	42†	–		
		56 white	31	–	26†			

\*A adenocarcinoma, S squamous cell carcinoma, AA African American, OR odds ratio, CI confidence interval

†Radiation/hormonal therapy

Table 2. The Use of Invasive Procedures for Stroke Among Veterans by Race

Author, year	Conditions	Subjects (N)	Percent of patients treated per procedure and race per procedure and race group, AA v. white (Hispanic where noted)	Adjusted OR (95%CI) for AA (or Hispanic where noted) v. white race as referent	Treatment disparities present or absent
Oddone, 1993 <sup>5</sup>	Stroke or TIA	27,690 white	CA 5.3 v 11, Hisp 8.3 (–)	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
		AA 1162 Hisp	CEA 14.9 v 38.1, Hisp 22.7 (–)		
Oddone, 1999 <sup>6</sup>	Stroke or TIA	389 AA 414 white	Ultrasound or CA: 67 v 79 (*)	Ultrasound or CA: 0.67 (0.47–0.94) CEA: Appropriate for 0.75 (0.40–1.43) Uncertain 0.11 (0.01–0.79) CEA 1.0 (0.45–2.0)	Present
			CEA: Appropriate for CE 50 v 67 Uncertain appropriateness 3 v 24		
Oddone, 2002 <sup>7</sup>	> = 50% stenosis in a carotid artery	91 AA 617 white	CA 17 v 20 (ns) CEA 14 v 20 (ns)		Absent
Goldstein, 2003 <sup>8</sup>	Stroke	255 non-white	CA non-white 3.1 v white 8.5 (*)	–	Absent
		520 white	CEA non-white 0.8 v white 1.5 (ns)		

(–) p value not reported

(\*) statistically significant p value

(ns) p value not significant

AA African American, Hisp Hispanic, CA carotid angiography, CEA carotid endarterectomy, CI confidence interval, OR odds ratio, TIA transient ischemic attack

Table 3. The Use of Invasive Procedures for Heart Disease Among Veterans by Race

Author, year	Conditions	Subjects (N)	Percent of patients treated per procedure and race group, AA v. white (Hispanic where noted)	Adjusted OR (95%CI) of procedure comparing AA (Hispanic where noted) to white race as referent	Treatment disparities present or absent
Mirvis, 1994 <sup>9</sup>	CAD or VHD	CAD: 3,670 AA 26,630 white VHD: 141 AA 1,194 white	CC: CAD 43.3 vs 50.3 (*) VHD 43.2 vs 57.5 (*) Cardiac surgery: CAD 12.4 vs 17.9 VHD 35.4 vs 42.4 (ns)	CC: CAD 0.61 (0.57–0.67) VHD 0.50 (0.34–0.74) Cardiac surgery: CAD 0.61 (0.55–0.67) VHD 0.67 (0.98–0.45)	Present
Ferguson, 1997 <sup>10</sup>	CVD or chest pain	211 AA 1,195 white	CC 11 vs 25 (*) PTCA 2 vs 4 (*) CABG 1 vs 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 <sup>11</sup>	CVD or chest pain	74,570 AA 353,730 white	CC 11.8 vs 19.3 (*) PTCA 0.8 vs 1.8 (*) CABG 1.6 vs 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 <sup>12</sup>	Candidates for AVR, DCP, ICD, or PCI	45,029 AA 255,585 white	AVR 9.2 vs 5.7 (*) DCP 70 vs 51 (*) ICD 57 vs 42 (*) PCI 179 vs 157 (*)	Hospital <30% AA inpatients Academic AVR (ns) DCP (ns) ICD 0.65 (*) PCI 0.86 (*) Non-academic AVR (ns) DCP (ns) ICD (ns) PCI (ns)	Present
Peterson, 1994 <sup>13</sup>	AMI	4,522 AA 29,119 white	CC 33.7 vs 36.9 (*) PTCA 6.2 vs 4.2 (*) CABG 9.6 vs 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 AAs, similar at 1–2 years
Kressin, 2004 <sup>14</sup>	Reversible cardiac ischemia	236 AA 809 white	CC 33 vs 47 (*)	CC 0.56 (0.35–0.89)	Present; disparities explained by physician's assessments
Petersen, 2002 <sup>15</sup>	AMI	606 AA 4,005 white	CC 93.7 vs 92.8 (ns) PTCA 27.9 vs 27.0 (ns) CABG 6.9 vs 12.5 (*)	–	Mixed: equal use of CC and PTCA, differential use of CABG; Unadjusted
Sedlis, 1997 <sup>16</sup>	Underwent CC	322 AA 1,474 white	PTCA 17.4 vs 18.9 (ns) Surgery 37.0 vs 54.1 (*)	–	Mixed: equal use of PTCA, differential use of surgery; Unadjusted
Maynard, 2006 <sup>17</sup>	AMI	680 AA 3,529 white	CC 59 vs 57 (ns) PTCA 32 vs 40 (*) CABG 5 vs 8 (*)	PTCA 0.79 (0.71–0.88)	Mixed: equal use of CC, differential use of PTCA
Conigliaro, 2000 <sup>18</sup>	AMI or unstable angina and had CC	326 AA 340 white	PTCA 17.8 vs 26.5 CABG 10.7 vs 20.6	All cases: PTCA 0.86 (0.51–1.45) CABG 0.60 (0.35–1.06) Only for cases where CABG deemed necessary (by RAND appropriateness criteria): CABG 0.44 (0.20–0.86)	Mixed; survival similar at 1 and 5 yrs
Mickelson, 1997 <sup>19</sup>	AMI	84 AA 37 Hisp 232 white	CC 51 vs 63, Hisp 57 (*) PTCA 17 vs 23.3, Hisp 19 (ns) CABG 7.1 vs 10.3, Hisp 16 (ns)	CC 0.59 (0.35–1.02) Hisp 0.76 (0.35–1.67)	Marginal; survival worse (ns) among AAs and Hispanics in-hospital and at 22 months
Ferguson, 1998 <sup>20</sup>	CVD or chest pain	100 AA 100 white	CC 14 vs 41 (*) PTCA 4 vs 6 (-) CABG 3 vs 11 (-)	–	Absent: 10% CC overuse in whites
Hassapoyannes, 2006 <sup>21</sup>	CAD, CHF, cardiomyopathy, arrhythmias	92 AA 222 white	CC 11.8 vs 61.4 (*)	CC 0.10 (0.04–0.26)	Absent with adjustment for disease severity; survival was similar
Gordon, 2004 <sup>22</sup>	Had treadmill test or CC	160 AA 48 Hisp 473 white	CC 79 vs 90, Hisp 67 (ns) PTCA 100 vs 87, Hisp 63 (ns) Surgery 50 vs 78, Hisp 67 (ns)	–	Absent

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Table 3. (continued)

Author, year	Conditions	Subjects (N)	Percent of patients treated per procedure and race group, AA v. white (Hispanic where noted)	Adjusted OR (95%CI) of procedure comparing AA (Hispanic where noted) to white race as referent	Treatment disparities present or absent
Peniston, 2000 <sup>23</sup>	Had CC	726 AA 734 white	PTCA 0.96 vs 1.23 (ns) CABG 0.83 vs 1.50 (ns)	CABG: no significant difference, results not shown	Absent; survival was similar until 2–3 years, then worse for AAs

(\*) statistically significant *p* value

(-) *p* value not reported

(ns) *p* value not significant

AA African American, Hisp Hispanic, 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, CI confidence interval, CVD cardiovascular disease, DCP dual-chambered pacemaker, ICD implantable cardioverter/defibrillator, OR odds ratio, 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 Cardiovascular Disease

Author, year	Subjects (N)	Conditions	Potential mediator studied	Summary of findings
Mirvis, 1998 <sup>24</sup>	3,652 AA 26,593 white	CAD	Region: presence vs. absence of a local catheterization 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 AAs than for whites.
Ibrahim, 2003 <sup>25</sup>	54 AA 738 white	Had CC	Physician recommendation for PTCA or CABG	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 AAs and whites.
Kressin, 2002 <sup>26</sup> Kressin, 2004 <sup>14</sup>	175 AA 679 white; 236 AA 809 white	Cardiac ischemia	Patient attitudes including religion; physician assessments	(Kressin, 2002) Very few racial differences found in 8 domains of patients' health care beliefs and attitudes. Differences observed only in attitudes toward religion: AAs placed stronger importance on God and religion in coping with heart problems and in making treatment decisions. AAs 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) AAs 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.

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Table 4. (continued)

Author, year	Subjects (N)	Conditions	Potential mediator studied	Summary of findings
Charles, 2003 <sup>27</sup>	833 AA 4,436 white	Prescribed cardiac meds	Medication adherence	AAs 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 <sup>28</sup>	220 AA 36 Hispanic 456 white	Heart failure	Delay in seeking treatment	AAs were more likely to delay seeking treatment. Mean delay time was significantly longer (p=0.019) for AAs than other races: AAs =3.2 days, whites =2.8, Asians =2.9, Hispanic =2.8
Ohldin, 2004 <sup>29</sup>	1281 AA 1,801 white	Angina	Patient satisfaction, attitudes	Ethnic differences in satisfaction with patients' providers and their medical treatment were site-specific. AAs reported significantly lower satisfaction with care for their CAD compared with whites, but these differences persisted at 3 of 6 sites after adjustment for covariates.
Collins, 2002 <sup>30</sup>	6 AA 7 white	Positive cardiac stress test	Patient-physician communication	Veterans expressed concern about poor communication with their physicians. A theme expressed by AA 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 <sup>31</sup>	18 AA 75 white	Had CC	Patient-physician communication	Compared to their interactions with white veterans, physicians generally self-initiated less information to AA veterans, but provided more information in response to a veteran's question, assertiveness, or expression for concern. AA veterans self-initiated these behaviors less often than did their white counterparts.
Bosworth, 2004 <sup>32</sup>	207 AA 858 white	Had carotid ultrasound	Refusal/aversion to surgery	AAs 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.

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Table 4. (continued)

Author, year	Subjects (N)	Conditions	Potential mediator studied	Summary of findings
Gordon, 2004 <sup>22</sup>	160 AA 48 Hispanic 473 white	Had treadmill test or CC	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 <sup>33</sup>	44 AA 46 white	Had stroke, TIA, or carotid artery imaging	Refusal/aversion to surgery	AAs 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, independent of race.
Oddone, 2002 <sup>7</sup>	>98% male 91 AA 617 white	50%+ carotid artery stenosis	Refusal/aversion to surgery	AA and white veterans were equally likely to receive CEA. Despite that AAs had a greater aversion to CEA, this difference did not influence receipt of CEA. Clinical status was the primary determinant of the receipt of CEA.
Whittle, 1997 <sup>34</sup>	114 AA 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 AA-white difference in patient preferences seemed to be explained by questions that addressed familiarity with the procedures. AAs were less familiar with each of the revascularization procedures, less likely to have had a previous revascularization or to be awaiting CC. 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 AAs: 1.69 (95%CI 1.03–2.79)

AA African American, Hisp Hispanic, ACEI angiotensin converting enzyme inhibitor, CABG coronary artery bypass graft surgery, CAD coronary artery disease, CC cardiac catheterization, CCB calcium channel blocker, CEA carotid endarterectomy, CI confidence interval, OR odds ratio, PTCA percutaneous transluminal coronary angioplasty, Statin HMG-CoA reductase inhibitor, TIA transient ischemic attack, VA Veterans Affairs

**Table 5. The Use of Colon Cancer Screening Among Veterans, by Race**

Author, year	Aims	Subjects (N)	Characteristics of study population	Results
Fisher, 2006 <sup>35</sup>	To document the factors associated with undergoing a full colon evaluation after a positive FOBT.	538	312 white 154 AA 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 full colon evaluation than those with recorded race data.
Dolan, 2005 <sup>36</sup>	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 AA 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 <sup>37</sup>	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 AA 9,599 other Follow-up population: 219 white 33 AA 61 other	AA 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.

AA African American, FOBT fecal occult blood test, VA Veterans Affairs

**Table 6. Management of Hypertension, by Race**

Author, year	Aims	Subjects	Characteristics of study population	Results
Bosworth, 2006 <sup>38</sup>	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 nonmodifiable factors are related to blood pressure control.	569	98% male veterans 41% AA 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 blood pressure 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 African Americans having poor blood pressure control remained significant, as did increased urination.
Rehman, 2005 <sup>39</sup>	To determine whether the VA does better at reducing disparities in blood pressure control between African American and white hypertensive men than non-VA health care	12 366 VA, 7,734 non-VA	AA men: 4379 VA, 2754 non-VA; White men: 7987 VA, 4980 non-VA	Among VA patients whites were more likely to have blood pressure controlled at the last visit. AA and white veterans received a similar number of prescriptions at VA sites; African Americans, however, had more clinic visits in the previous year.

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Table 6. (continued)

Author, year	Aims	Subjects	Characteristics of study population	Results
Lowry, 2005 <sup>40</sup>	To examine associations between patient characteristics, including reported adverse events, and both intentional and unintentional nonadherence 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 nonadherence 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 <sup>41</sup>	To examine veterans' understanding of hypertension control and relate it to medication compliance.	125	74% AA	Univariate analysis showed that although 70% viewed hypertension as a symptomatic condition, symptoms were not significantly 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 1 hypertension drug, lack or reported departure from prescribed regimen, absence of drug abuse history and white 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.

AA African American, HTN hypertension, VA Veterans Affairs

Table 7. Management of Cardiovascular Risk Factors (excluding hypertension), by Race

Author, year	Aims	N subjects	Characteristics of study population	Results
Williams, 2002 <sup>42</sup>	To evaluate compliance with clinical guidelines in white and African American veterans at high risk for cardiovascular disease after implementation of a Lipid Management Program.	649	127 AA 522 white	AAs had significantly higher baseline total, LDL, and high-density lipoprotein (HDL) measures than white veterans. Additionally, AAs experienced a significantly greater decline in LDL after statin therapy. Nonetheless, AA veterans were less likely to achieve the target LDL measure of 100 mg/dL (40.94% AAs achieved it, whereas 56.9% of white veterans achieved it ( $p=.001$ ). AAs and white were not significantly different in the rates of hypertension and statin dose.

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Table 7. (continued)

Author, year	Aims	N subjects	Characteristics of study population	Results
Woodard, 2004 <sup>43</sup>	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 <sup>44</sup>	To examine ethnic variations in the use of nicotine replacement therapy in an equal access health care system.	1,606	1153 white 307 AA 146 Hisp	AA and Hisp 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 <sup>45</sup> (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.	1,045	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 hypercholesterolemia and previous stroke, white veterans were more likely to receive aspirin.
Woodard, 2005 <sup>46</sup>	To explore CAD health care experiences and beliefs of African American and white veterans to elicit potential causes of racial disparities in CAD outcomes.	24	14 white and 10 AA men	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.

AA African American, Hisp Hispanic, CAD coronary artery disease, HDL high-density lipoprotein cholesterol, LDL low-density lipoprotein cholesterol



Table 8. Access to the VA Healthcare System, by Race

Author, year	Aims	N subjects	Characteristics of study population	Results
Washington, 2005 <sup>47</sup>	Assess racial/ethnic variations in patterns of ambulatory care use among Department of Veterans Affairs health-care eligible veterans.	3,227	27% white 28% AA 28% Hisp 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 after barriers to VA health care use: poor interpersonal quality of VA care, dissatisfaction with VA, and Hispanic veterans were more likely to report lack of knowledge about eligibility.
Washington, 2002 <sup>48</sup>	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.	7,549	85.4% white 9.6% AA 3.7% Hisp 0.8% American Indian or Alaska Native 0.5% Pacific Islander	In this national sample, AA, Hispanic, and American Indian/Eskimo veterans were more likely to use VA ambulatory care than white veterans, whereas 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 health care had the greatest inability to obtain needed medical care.

AA African American, Hisp Hispanic, VISN Veterans Integrated Service Network

## REFERENCES

1. **Dominitz JA, Maynard C, Billingsley KG, Boyko EJ.** Race, treatment, and survival of veterans with cancer of the distal esophagus and gastric cardia. *Med Care.* Jan 2002;40(1 Suppl):114–26.
2. **Akerley WL, 3rd, Moritz TE, Ryan LS, Henderson WG, Zacharski LR.** Racial comparison of outcomes of male Department of Veterans Affairs patients with lung and colon cancer. *Arch Intern Med.* 1993;153(14):1681–1688.
3. **Dominitz JA, Samsa GP, Landsman P, Provenzale D.** Race, treatment, and survival among colorectal carcinoma patients in an equal access medical system. *Cancer.* 1998;82(12):2312–2320.
4. **Knight SJ, Siston AK, Chmiel JS, et al.** Ethnic variation in localized prostate cancer: a pilot study of preferences, optimism, and quality of life among black and white veterans. *Clin Prostate Cancer.* 2004;3(1):31–37.
5. **Oddone EZ, Horner RD, Monger ME, Matchar DB.** Racial variations in the rates of carotid angiography and endarterectomy in patients with stroke and transient ischemic attack. *Arch Intern Med.* 1993;153(24):2781–2786.
6. **Oddone EZ, Horner RD, Sloane R, et al.** Race, presenting signs and symptoms, use of carotid artery imaging, and appropriateness of carotid endarterectomy. *Stroke.* 1999;30(7):1350–1356.
7. **Oddone EZ, Horner RD, Johnston DC, et al.** Carotid endarterectomy and race: do clinical indications and patient preferences account for differences? *Stroke.* 2002;33(12):2936–2943.
8. **Goldstein LB, Matchar DB, Hoff-Lindquist J, Samsa GP, Horner RD.** Veterans Administration Acute Stroke (VAST) Study: lack of race/ethnic-based differences in utilization of stroke-related procedures or services. *Stroke.* 2003;34(4):999–1004
9. **Mirvis DM, Burns R, Gaschen L, Cloar FT, Graney M.** Variation in utilization of cardiac procedures in the Department of Veterans Affairs health care system: effect of race. *J Am Coll Cardiol.* 1994;24(5):1297–1304.
10. **Ferguson JA, Tierney WM, Westmoreland GR, et al.** Examination of racial differences in management of cardiovascular disease. *J Am Coll Cardiol.* 1997;30(7):1707–1713.
11. **Whittle J, Conigliaro J, Good CB, Lofgren RP.** Racial differences in the use of invasive cardiovascular procedures in the Department of Veterans Affairs medical system. *N Engl J Med.* Aug 26 1993;329(9):621–627.
12. **Groeneveld PW, Kruse GB, Chen Z, Asch DA.** Variation in cardiac procedure use and racial disparity among Veterans Affairs Hospitals. *American Heart Journal.* Feb 2007;153(2):320–327.
13. **Peterson ED, Wright SM, Daley J, Thibault GE.** Racial variation in cardiac procedure use and survival following acute myocardial infarction in the Department of Veterans Affairs. *Jama.* Apr 20 1994;271(15):1175–1180.
14. **Kressin NR, Chang BH, Whittle J, et al.** Racial differences in cardiac catheterization as a function of patients' beliefs. *Am J Public Health.* Dec 2004;94(12):2091–2097.
15. **Petersen LA, Wright SM, Peterson ED, Daley J.** Impact of race on cardiac care and outcomes in veterans with acute myocardial infarction. *Medical Care.* Jan 2002;40(1 Suppl):186–96.
16. **Sedlis SP, Fisher VJ, Tice D, Esposito R, Madmon L, Steinberg EH.** Racial differences in performance of invasive cardiac procedures in a Department of Veterans Affairs Medical Center. *J Clin Epidemiol.* Aug 1997;50(8):899–901.
17. **Maynard C, Sun H, Lowy E, Sales AE, Fihn SD.** The use of percutaneous coronary intervention in black and white veterans with acute myocardial infarction. *BMC Health Serv Res.* 2006;6:107.

18. **Conigliaro J, Whittle J, Good CB, et al.** Understanding racial variation in the use of coronary revascularization procedures: the role of clinical factors. *Arch Intern Med.* May 8 2000;160(9):1329-1335.
19. **Mickelson JK, Blum CM, Geraci JM.** Acute myocardial infarction: clinical characteristics, management and outcome in a metropolitan Veterans Affairs Medical Center teaching hospital. *J Am Coll Cardiol.* Apr 1997;29(5):915-925.
20. **Ferguson JA, Adams TA, Weinberger M.** Racial differences in cardiac catheterization use and appropriateness. *Am J Med Sci.* May 1998;315(5):302-306.
21. **Hassapoyannes CA, Giurgutiu DV, Eaves G, Movahed MR.** Apparent racial disparity in the utilization of invasive testing for risk assessment of cardiac patients undergoing noncardiac surgery. *Cardiovasc Revasc Med.* Apr-Jun 2006;7(2):64-69.
22. **Gordon HS, Paterniti DA, Wray NP.** Race and patient refusal of invasive cardiac procedures. *J Gen Intern Med.* Sep 2004;19(9):962-966.
23. **Peniston RL, Lu DY, Papademetriou V, Fletcher RD.** Severity of coronary artery disease in black and white male veterans and likelihood of revascularization. *Am Heart J.* May 2000;139(5):840-847.
24. **Mirvis DM, Graney MJ.** Impact of race and age on the effects of regionalization of cardiac procedures in the Department of Veterans Affairs Health Care System. *Am J Cardiol.* Apr 15 1998;81(8):982-987.
25. **Ibrahim SA, Whittle J, Bean-Mayberry B, Kelley ME, Good C, Conigliaro J.** Racial/ethnic variations in physician recommendations for cardiac revascularization. *Am J Public Health.* Oct 2003;93(10):1689-1693.
26. **Kressin NR, Clark JA, Whittle J, et al.** Racial differences in health-related beliefs, attitudes, and experiences of VA cardiac patients: scale development and application. *Med Care.* Jan 2002;40(1 Suppl):172-85.
27. **Charles H, Good CB, Hanusa BH, Chang CC, Whittle J.** Racial differences in adherence to cardiac medications. *J Natl Med Assoc.* Jan 2003;95(1):17-27.
28. **Evangelista LS, Dracup K, Doering LV.** Racial differences in treatment-seeking delays among heart failure patients. *J Card Fail.* Dec 2002;8(6):381-386.
29. **Ohldin A, Young B, Derleth A, et al.** Ethnic differences in satisfaction and quality of life in veterans with ischemic heart disease. *J Natl Med Assoc.* Jun 2004;96(6):799-808.
30. **Collins TC, Clark JA, Petersen LA, Kressin NR.** Racial differences in how patients perceive physician communication regarding cardiac testing. *Med Care.* Jan 2002;40(1 Suppl):127-34.
31. **Gordon HS, Street RL, Jr., Kelly PA, Soucek J, Wray NP.** Physician-patient communication following invasive procedures: an analysis of post angiogram consultations. *Soc Sci Med.* Sep 2005;61(5):1015-1025.
32. **Bosworth HB, Stechuchak KM, Grambow SC, Oddone EZ.** Patient risk perceptions for carotid endarterectomy: which patients are strongly averse to surgery? *J Vasc Surg.* Jul 2004;40(1):86-91.
33. **Oddone EZ, Horner RD, Diers T, et al.** Understanding racial variation in the use of carotid endarterectomy: the role of aversion to surgery. *J Natl Med Assoc.* Jan 1998;90(1):25-33.
34. **Whittle J, Conigliaro J, Good CB, Joswiak M.** Do patient preferences contribute to racial differences in cardiovascular procedure use? *J Gen Intern Med.* May 1997;12(5):267-273.
35. **Fisher DA, Jeffreys A, Coffman CJ, Fasanella K.** Barriers to full colon evaluation for a positive fecal occult blood test. *Cancer Epidemiol Biomarkers Prev.* Jun 2006;15(6):1232-1235.
36. **Dolan NC, Ferreira MR, Fitzgibbon ML, et al.** Colorectal cancer screening among African-American and white male veterans. *Am J Prev Med.* Jun 2005;28(5):479-482.
37. **Etzioni DA, Yano EM, Rubenstein LV, et al.** Measuring the quality of colorectal cancer screening: the importance of follow-up. *Dis Colon Rectum.* Jul 2006;49(7):1002-1010.
38. **Bosworth HB, Dudley T, Olsen MK, et al.** Racial differences in blood pressure control: potential explanatory factors. *Am J Med.* Jan 2006;119(1):70 e79-15.
39. **Rehman SU, Hutchison FN, Hendrix K, Okonofua EC, Egan BM.** Ethnic differences in blood pressure control among men at Veterans Affairs clinics and other health care sites. *Arch Intern Med.* May 9 2005;165(9):1041-1047.
40. **Lowry KP, Dudley TK, Oddone EZ, Bosworth HB.** Intentional and unintentional nonadherence to antihypertensive medication. *Ann Pharmacother.* Jul-Aug 2005;39(7-8):1198-1203.
41. **Sharkness CM, Snow DA.** The patient's view of hypertension and compliance. *Am J Prev Med.* May-Jun 1992;8(3):141-146.
42. **Williams ML, Morris MT, 2nd, Ahmad U, Yousseff M, Li W, Ertel N.** Racial differences in compliance with NCEP-II recommendations for secondary prevention at a Veterans Affairs medical center. *Ethn Dis.* Winter 2002;12(1):S1-58-62.
43. **Woodard LD, Kressin NR, Petersen LA.** Is lipid-lowering therapy underused by African Americans at high risk of coronary heart disease within the VA health care system? *Am J Public Health.* Dec 2004;94(12):2112-2117.
44. **Fu SS, Sherman SE, Yano EM, van Ryn M, Lanto AB, Joseph AM.** Ethnic disparities in the use of nicotine replacement therapy for smoking cessation in an equal access health care system. *Am J Health Promot.* Nov-Dec 2005;20(2):108-116.
45. **Ambriz EH, Woodard LD, Kressin NR, Petersen LA.** Use of smoking cessation interventions and aspirin for secondary prevention: are there racial disparities? *Am J Med Qual.* Jul-Aug 2004;19(4):166-171.
46. **Woodard LD, Hernandez MT, Lees E, Petersen LA.** Racial differences in attitudes regarding cardiovascular disease prevention and treatment: a qualitative study. *Patient Educ Couns.* May 2005;57(2):225-231.
47. **Washington DL, Villa V, Brown A, Damron-Rodriguez J, Harada N.** Racial/ethnic variations in veterans' ambulatory care use. *American Journal of Public Health.* Dec 2005;95(12):2231-2237.
48. **Washington DL, Harada ND, Villa VM, et al.** Racial variations in Department of Veterans Affairs ambulatory care use and unmet health care needs. *Military Medicine.* Mar 2002;167(3):235-241.