

Medical Care Research and Review

<http://mcr.sagepub.com/>

Characteristics of VA Patients Who Use Low-Quality Private-Sector CABG Centers in New York

William B. Weeks and Elliott S. Fisher

Med Care Res Rev 2007 64: 691 originally published online 18 September 2007

DOI: 10.1177/1077558707304738

The online version of this article can be found at:

<http://mcr.sagepub.com/content/64/6/691>

Published by:



<http://www.sagepublications.com>

Additional services and information for *Medical Care Research and Review* can be found at:

Email Alerts: <http://mcr.sagepub.com/cgi/alerts>

Subscriptions: <http://mcr.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Citations: <http://mcr.sagepub.com/content/64/6/691.refs.html>

>> [Version of Record](#) - Nov 28, 2007

[OnlineFirst Version of Record](#) - Sep 18, 2007

[What is This?](#)

Characteristics of VA Patients Who Use Low-Quality Private-Sector CABG Centers in New York

William B. Weeks

VA Medical Center, Dartmouth Medical School

Elliott S. Fisher

VA Medical Center, Dartmouth Medical School

Little is known about the quality of care that veterans obtain in the private sector. To explore this issue, we identified the hospital in which 4,008 veterans enrolled in the Veterans Administration (VA) obtained coronary artery bypass graft (CABG) surgery in the New York private sector between 1997 and 2000. We used published risk-adjusted mortality rates to assign New York CABG centers to performance quintiles. VA patients with the lowest incomes were 2.4 times more likely than those in the highest incomes to use the highest-mortality hospitals (95 percent CI: 2.0–3.0). Compared with white patients, black (OR 1.8; 95 percent CI: 1.2–2.8) and Hispanic VA patients (OR 1.6; 95 percent CI: 0.9–2.8) were more likely to use the highest-mortality hospitals. About one third of patients using the highest-mortality hospitals lived closer to low-mortality hospitals. Efforts to direct VA patients' care to high-performance hospitals could improve outcomes and reduce racial and ethnic disparities in care.

Keywords: *Veterans; CABG; quality of care; disparities*

Veterans who are enrolled in the Veterans Health Administration (VA) are likely to have access to government sponsored or private insurance: veterans who are aged 65 and older are commonly concurrently enrolled in Medicare (Fisher and Welch 1995; Shen et al. 2003), while those younger than 65 use Medicare, Medicaid, and private insurance to pay for health care services obtained in the private sector

Authors' Note: This article, submitted to *Medical Care Research and Review* on October 2, 2006, was revised and accepted for publication on April 11, 2007.

This work was supported by VA Health Services Research and Development Grants ACC 01-117-1 and REA 03-098. The views expressed in this article do not necessarily represent the views of the Department of Veterans Affairs or of the U.S. government. This study was approved by Dartmouth Medical School's Committee for the Protection of Human Subjects, Hanover, NH (CPHS # 15468). Please address correspondence to William Weeks MD; VA Medical School; 215 North Main Street, White River Junction, VT 05009; Phone: 802-291-6285; fax: 802-291-6286; e-mail: wbw@dartmouth.edu; or to Elliott S. Fisher, MD, MPH; Strassenburgh Hall, Dartmouth Medical School, Hanover, NH; phone: 603-650-1822; e-mail: Elliott.S.Fisher@dartmouth.edu.

(Shen et al. 2003; Weeks et al. 2006). Both older (Weeks, Bott, et al. 2005; Wright et al. 1997; Wright et al. 1999) and younger (Borowsky and Cowper 1999; Shen et al. 2003; Weeks et al. 2006) VA patients obtain much of their care through the private sector. Evidence indicates that both distance to care (Burgess and DeFiore 1994) and economic factors (Weeks et al. 2002, 2003) influence a veteran's choice to use the private sector instead of the VA. The VA does not currently pay for care that a veteran chooses to obtain in the private sector, nor does the VA currently help veterans identify where they might obtain the highest-quality private-sector care.

Since its reorganization in 1996, the VA has made a major institutional commitment to improve the quality of care provided to veterans who use the VA system (Kizer 1996). Evidence suggests that the reforms have achieved substantial gains (Jha et al. 2003). The high proportion of veterans' care provided in the private sector raises the possibility that the VA could improve veterans' outcomes by influencing the care that VA patients receive *outside* of the VA. For common, high-risk procedures that show substantial variation in outcomes across hospitals—procedures such as cardiac revascularizations—this might be accomplished by taking an active role in helping patients choose high-quality private-sector hospitals. Such efforts would have the greatest impact if they targeted patients who currently use the highest-mortality private-sector hospitals. Others have shown that patient characteristics—such as minority race—not only influence the frequency with which patients obtain coronary artery bypass graft (CABG) surgeries (Jha et al. 2005), even if the surgery is deemed appropriate (Hannan et al. 1999), but also the quality of the hospitals in which care is obtained (Konety, Vaughan Sarrazin, and Rosenthal 2005). With an eye toward identifying a target group for intervention, we linked VA databases and New York State registries to determine whether vulnerable populations—racial and ethnic minorities and lower-income veterans—were more likely to obtain CABG surgery in high-mortality private-sector hospitals.

New Contribution

This study is the first to identify a target population for VA to influence regarding choice of private-sector hospital used for common, high-risk procedures that show substantial variation in outcomes across hospitals. VA might exert this influence by ensuring that targeted, enrolled veterans who choose to use the private sector are aware of choices regarding hospitals used for care and that they have access to information on private-sector hospital quality. The role of collating information on private-sector quality might fall to a central location, such as VA's Office of Quality and Performance. The role of distributing that information might fall to local facilities (for instance, in shared decision-making clinics) and primary care physicians. Although physicians claim that such information is useful in their discussions with patients (Hannan et al. 1997), the mere public availability of the information does not appear to be effective in directing patients to higher-performance

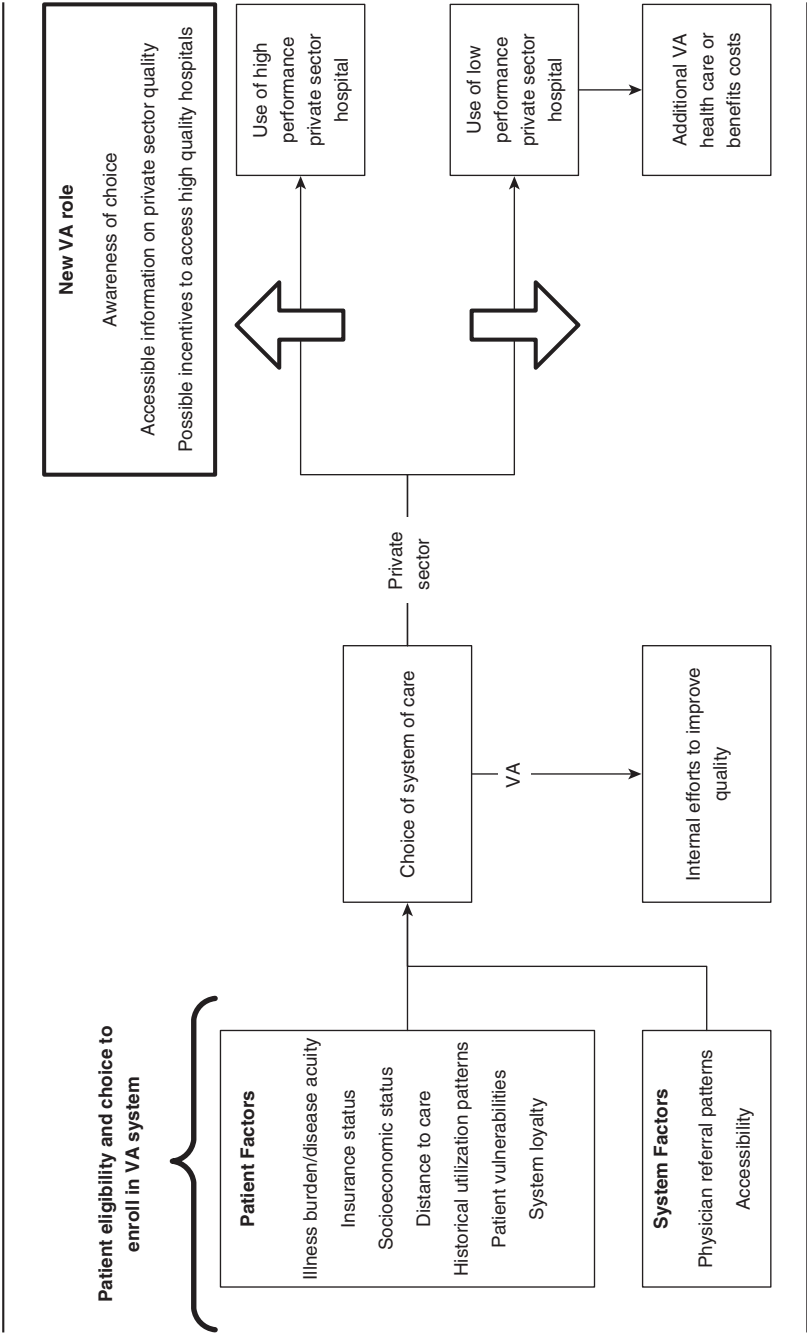
hospitals (Vladek, Goodwin, and Myers 1988; Hannan et al. 1994; Romano and Zhou 2004). We hypothesize that the active distribution of such information could influence VA patients to use high-performance hospitals. Should VA determine that improving veterans' care warrants the development of incentives for patients to use high-performance hospitals—such as VA coinsuring or paying co-payments for care that is provided in high-performance settings—we would anticipate a greater shift to high-performance care. The overall effects are likely to be greatest if the intervention is targeted at those who are most vulnerable to using low-performance private-sector hospitals. It is toward that end that we conducted this study, which is the first to attempt to identify characteristics of patients who are enrolled in the VA system, use the private sector for elective CABG, and stand to have the greatest benefit from VA taking an active role in coordination of private-sector care.

Conceptual Framework

In our conceptual framework, which applies only to veterans who are eligible to enroll in the VA system and choose to do so, a variety of patient and system factors influence the enrolled veteran's choice of system of care used (Figure 1). Should the veteran choose to use the VA system, internal efforts will improve health care quality. Should the veteran use the private sector, a high- or low-performance private-sector hospital might be chosen. At the population level, use of low-performance private-sector hospitals will result in additional morbidity and mortality. This may contribute to higher VA costs because patients with complications may require additional care in the VA system, particularly if such complications cause patients to become more reliant on the VA.

We use CABG surgery as an example within the conceptual framework for several reasons. First, we have previously demonstrated that veterans who are enrolled in the VA obtain the majority of their CABG surgeries in the private sector, that CABG surgery is a relatively frequent occurrence among those veterans, and that insurance status and anticipated out-of-pocket copayments appear to influence which system of care—VA or private sector—veterans choose for CABG surgery (Weeks et al. 2002, 2006). Second, risk-adjusted CABG mortality at the hospital and physician level demonstrates variation in New York (Hannan, Wu, et al. 2003), more so in the nation (Birkmeyer et al. 2002). Third, for CABG, historical risk-adjusted mortality rates are predictive of future mortality rates (Birkmeyer, Dimick, and Staiger 2006) suggesting that hospitals with better performance are identifiable well in advance of need for referral; therefore, performance-based referral is feasible. Finally, redirecting CABG care to high-performance hospitals should save lives (Birkmeyer, Skinner, and Wennberg 2002; Weeks et al. 2006).

Figure 1
Conceptual Framework



Method

We conducted a retrospective analysis of 4,008 male New York State residents who were enrolled in the VA and obtained nonemergent, isolated CABG surgery in the private sector between 1997 and 2000. We linked data from multiple sources to determine which private-sector hospitals these patients used, the risk-adjusted mortality rates for the CABG centers used, and the characteristics of patients who used high- and low-mortality centers.

Identification of VA Patients

From VA administrative databases, we identified 375,361 veterans who were residents of New York State, as determined by zip code, and who were enrolled in the VA system in 1997 to 2000 (VA patients). Enrollment was defined as being listed in the VA enrollment file and using VA health services in the prior 3 years. These criteria were adopted for two reasons. First, the VA enrollment file was established to identify patients for whom the VA has an obligation to provide a medical benefits package (Department of Veterans Affairs 1998). Second, service utilization within 3 years “vests” patients for the purposes of administering the Veterans Equitable Resource Allocation system, a method of allocating VA’s congressionally appropriated budget across geographically defined service networks. Both enrollment and vesting are used to define the VA service population—essentially the “covered lives” for whom VA has a potential medical benefits liability—and replicate methods used previously (Weeks, Bott, et al. 2005; Weeks, Mahar, and Wright 2005; Weeks, Bazos, et al. 2005).

We excluded 66,227 VA patients who were younger than 45 years of age because few CABG operations are obtained by this age group, both historically (Tu et al. 1997) and during the time of this study (during the study period, only 3 percent of CABG operations performed in New York were on patients younger than 45). We also excluded 5,800 females from the analysis because females represent such a small portion (1.8 percent) of the veteran-user population that is at least 45. Our eligible population therefore consisted of 303,334 male, New York State resident, VA patients who were aged 45 and older (Figure 1).

Identification of Isolated, Nonemergent CABG Procedures

To determine whether VA patients underwent revascularization in the private sector in New York, we identified VA patients in New York’s cardiac revascularization registries. We used an established method (Fleming et al. 1992) to probabilistically match social security number, gender, and date of birth from VA databases to those from the New York Department of Health’s Cardiac Surgery Reporting System (CSRS). The CSRS, established in 1989, is a CABG registry that has been described in detail elsewhere (Hannan et al. 1994). It collects patient-level demographics (including county of residence), procedural information, preoperative risk factors, and discharge status for

every revascularization provided in all New York cardiac facilities, except for those operated by the VA. We used procedure documentation from these registries to identify patients who obtained isolated CABG procedures in the private sector and the hospitals in which those procedures were obtained. Because we were interested in evaluating VA patients' health care services that might be reasonably redirected, we eliminated revascularizations that were identified as urgent or emergent in the CSRS data set.

Use of High- and Low-Mortality Private-Sector Hospitals

To determine the mortality rate in hospitals treating VA patients, we obtained published, hospital-specific, risk-adjusted, in-hospital mortality rates and volumes for isolated CABG surgery in 1997 through 2000 from New York State Department of Health publications (New York State Department of Health 2002). The multivariate logistic-regression risk-adjustment model and methods developed by the New York State Department of Health to calculate adjusted mortality rates for CABG incorporate the severity of each patient's cardiac illness as well as existing comorbid factors, and is validated annually (Hannan et al. 1990; New York State Department of Health 2002).

To determine whether VA patients used high- or low-mortality private-sector hospitals, we categorized hospitals into hospital mortality quintiles, in which the quintiles are based on the number of procedures performed, not simply the number of hospitals. Constructing these quintiles required several steps. First, for each year 1997 through 2000, we listed the hospitals in descending order of in-hospital risk-adjusted mortality rank. Second, for each year, we calculated the total number of procedures performed in all New York revascularization centers over the year and divided the total volume into quintiles. We then used hospital-specific volumes to assign each hospital to the appropriate, volume-based mortality quintile for each year. For each VA patient's private-sector CABG, we determined the mortality quintile for the hospital where the care was provided, in the year it was provided.

Collection of Variables

We used VA administrative databases to obtain information on patient age at CABG, race, and zip code. We also determined whether these patients had a VA-connected service disability. Using patient zip codes, we obtained census-level information of annual household incomes and the proportion of the population that had incomes below poverty level. We categorized annual household incomes into terciles: lowest (up to \$38,990), average (\$38,991—\$56,850), and highest (above \$56,851) annual household income.

Using a methodology that accounts for distance, speed limits, and travel congestion (Goodman and Mick 2002), we used zip code centroids to compute travel times to the private sector CABG center used, the nearest VA CABG center, and the nearest private-sector CABG center in the lowest two mortality quintiles.

To determine whether patients obtaining care in high-mortality hospitals had more mortality risk factors, for the subset of patients who obtained CABG in 1999

or 2000 we also obtained clinical information regarding preoperative risks that are associated with higher mortality rates from the CSRS registry.

Statistical Analysis

We used SPSS software (version 11.5, Chicago, IL) to make statistical comparisons across mortality quintiles. Some patients had multiple CABG operations; therefore, we limited our analysis to the first event captured in our data set. We compared proportions using the chi-square test and continuous variables using analysis of variance. We calculated relative risk ratios to determine whether VA patients were distributed as expected across mortality quintiles, and we calculated odds ratios and 95 percent confidence intervals to determine whether minority, poor, and service-connected patients were more likely to obtain care in high-mortality CABG centers.

Results

Over the 4-year study period, 4,008 male, New York State resident, VA patients obtained 4,120 isolated, nonemergent CABG operations in the private sector. For 4,002 of these patients, we were able to assign the hospital where they received CABG to a risk-adjusted mortality-rate quintile (Figure 2).

During the 4-year period, the weighted mean risk-adjusted mortality rates ranged from 1.08 percent in the lowest-mortality quintile to 3.60 percent in the highest-mortality quintile (Table 1). Private sector utilization was evenly distributed across high- and low-mortality hospitals. VA patients' distribution across mortality quintiles did not differ from that of the general population.

When compared with those who used the lowest-mortality hospitals, VA patients who used the highest-mortality hospitals were younger (69 versus 70 years old, $p = .001$), more likely to have a VA service connected disability (10.6 percent versus 7.4 percent, $p < .05$), and lived in zip-code areas wherein a greater proportion of the population had incomes below poverty level (12.1 percent versus 10.0 percent, $p = .001$) (Table 1, top). Patients who obtained care in the highest-mortality CABG centers lived in zip-code areas that had lower mean household incomes (\$44,634 versus \$51,725, $p = .001$).

Patients in the lowest-income tercile had 2.4 times greater odds than those in the highest-income tercile to use the highest-mortality CABG centers (95 percent CI: 2.0–3.0) (Figure 3). When compared with white patients, Hispanic patients had 1.6 times greater odds (though not statistically significant, 95 percent CI: 0.9–2.8) of using the highest-mortality private-sector hospitals, and black patients had 1.8 times greater odds (95 percent CI: 1.2–2.8) of using the highest-mortality private-sector hospitals (Figure 4).

VA patients in each mortality quintile had similar travel times to the private-sector hospital that was used and to the nearest VA CABG center (Table 1, bottom). For patients using higher-mortality private-sector hospitals, the median travel time to the closest private-sector care in the lowest two mortality quintiles was between the

Figure 2
Sample and Method Overview

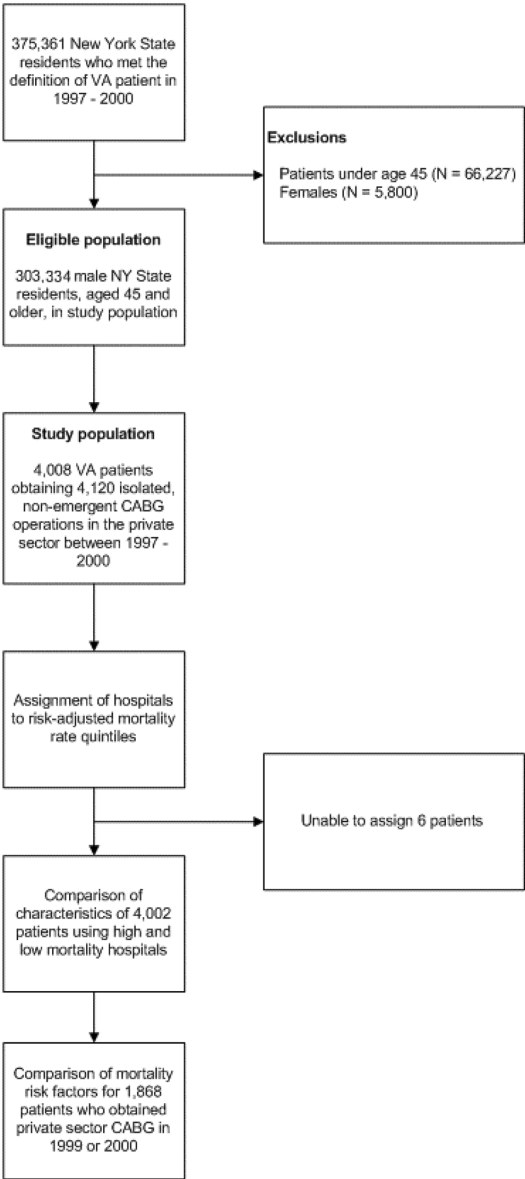


Table 1
Patient Characteristics by Mortality Quintile

	Mortality Quintile				
	Lowest	←————→			Highest
Mean risk-adjusted mortality rate	1.08	1.65	2.04	2.60	3.60
Distribution of enrolled VA patients	756	826	759	829	832
Distribution of the general population	13,587	13,915	13,012	14,788	15,967
Enrolled VA patient characteristics					
Mean age at CABG in years	70.0	71.4	70.2	70.0	69.1
Proportion with service-connected disability (%)	7.4	7.4	7.8	6.9	10.6
Population in zip code below poverty level (%)	10.0	9.1	10.3	10.6	12.1
Mean household income (\$)	51,725	56,730	52,658	50,762	44,634
Travel time to care					
Median time to site where CABG obtained (minutes)	21	22	22	20	23
Median time to nearest VA CABG center (minutes)	54	45	55	54	57
Median time to the closest private-sector care in the lowest two mortality quintiles (minutes)			27	33	45
Low-mortality hospital closer than hospital used (%)			40	36	35
Among blacks			47	61	24
Among Hispanics			50	57	35
Among those in the poorest zip-code areas			42	30	35

Figure 3
Distribution of CABG Surgeries across Mortality Quintiles by Patient Income

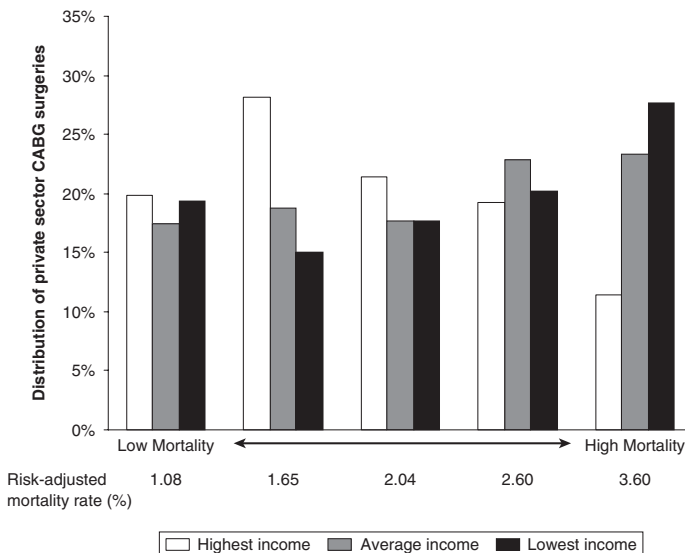
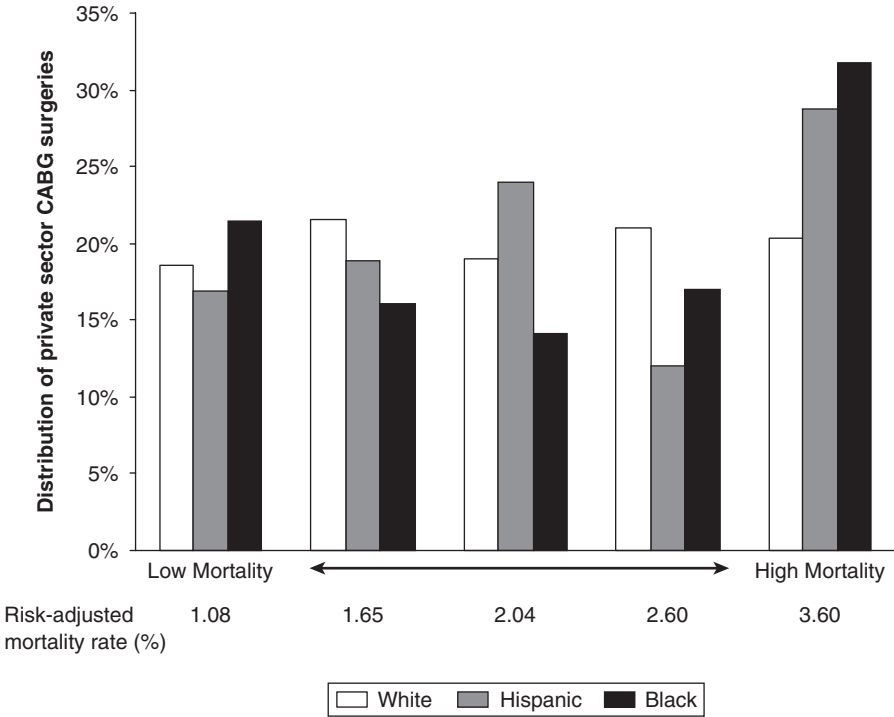


Figure 4
Distribution of CABG Surgeries across Mortality Quintiles by Patient Race



time to that used and the time to the closest VA care. If all VA patients who obtained their CABG surgeries in the highest-mortality rate hospitals had gone to hospitals in one of the lowest two mortality-rate quintiles, their travel burden would have increased; however, for 35 percent of those patients, the lower-mortality rate hospitals were actually closer. Results were similar when restricting the analysis to black (24 percent lived closer to a low-mortality CABG center), Hispanic (35 percent), and poor (35 percent) patients, and were more dramatic for blacks and Hispanics who used hospitals in the fourth mortality quintile.

Our analysis of the subset of patients who obtained CABG in the private sector between 1999 and 2000 revealed that there were no differences in mortality risk factors for CABG when comparing patients who used high- and low-mortality hospitals (Table 2).

Table 2
Mortality Risk Factors for CABG, by Mortality Quintile
of Hospital Used for CABG

Mortality Risk Factor	Mortality Quintile					<i>p</i> Value
	Lowest	←	→		Highest	
Recent MI (> 8 days prior to CABG) (%)	20.4	27.2	16.2	17.4	18.8	.4
Ejection fraction less than 40 (%)	19.7	23.1	20.1	18.6	18.6	.2
Previous CABG surgery (%)	22.3	19.1	20.4	17.2	21.0	.4
Left main occlusion > 50% (%)	16.6	29.0	17.4	18.9	18.0	.07
Three vessel disease (%)	21.3	24.8	17.5	17.2	19.2	.17
Comorbid conditions (%)	19.5	26.3	17.0	17.5	19.7	.12

Discussion

We found that male, New York VA patients who obtained private-sector CABG surgeries in high-mortality CABG centers were younger, more likely to be black, and poorer than those who obtained care in low-mortality CABG centers. These patients were more likely to have a VA service-connected disability but had similar risk factors for CABG mortality when compared with patients who used lower-mortality private-sector CABG centers. While directing care to low-mortality centers would incur a modest additional travel burden on patients using the highest-mortality hospitals, about one third of such patients lived closer to low-mortality CABG centers than to the high-mortality CABG center that they used.

Our findings are important for several reasons. First, we found that VA patients and their referring physicians do not appear to be influenced by publicly available mortality rates when choosing the hospital in which to obtain their cardiac interventions. These findings are similar to those found in the general population (Vladek, Goodwin, and Myers 1988; Hannan et al. 1994; Romano and Zhou 2004), and they suggest that, without external guidance or pressure, referral patterns are unlikely to be dramatically modified by publication of outcomes. Second, we found that disenfranchised VA patients, like the disenfranchised general population, are more likely to obtain care in lower-quality institutions. These findings were striking, with poor, minority, and service-connected patients obtaining a disproportionate share of their care at high-mortality hospitals while higher-income and white patients obtained a disproportionate share of their care at low-mortality hospitals. Third, we found no clear reason why this vulnerable group should use lower-quality hospitals—neither in their proximity to alternative care through the VA, nor in their cardiac illness burden and risk factors. Finally, although redirecting care to low-mortality hospitals would place an additional travel burden on the average patient, it would reduce travel burden for a substantial portion of the most vulnerable population.

While our study was limited to patients who were enrolled in the VA system, our findings highlight a broader concern with quality and location where patients, particularly the most vulnerable, are receiving care. While health care purchasers have coalesced to direct care to high-performance hospitals (*Leapfrog Group* 2004), our findings suggest that insurers (Medicare, Medicaid, Tricare, etc.) and providers should consider efforts to influence where their patients receive care. Pay-for-performance systems that include referral to high-performance health care systems for common, high-risk procedures that show substantial variation in outcomes across hospitals may be one way to effect change more broadly.

Our study has several limitations. First, it is possible that the VA patients that we examined in New York are not representative of the more than five million patients enrolled in the VA nationwide. The utilization patterns of poor and minority VA patients may well vary in different states. Second, because the New York cardiac registries are not billing databases, it is possible that they are incomplete with respect to identifying veterans. To test the completeness of New York State's registries, we identified a sample of 1,867 enrolled veterans with New York residence who had obtained a revascularization procedure through Medicare during our study. We found 1,828 (98 percent) of these cases in the New York State clinical registries that we used, suggesting that they captured the large majority of VA patients' private-sector care.

Third, the risk-adjusted mortality rates that we obtained from New York State Department of Health publications were not age or sex specific, raising the possibility that rates may be different for VA patients who use the private sector. However, we recently found that the risk-adjustment model used by New York State applies well to male VA patients who use the private sector for CABG (Weeks, Bazos, et al. 2005). In addition, readers should be aware that hospitals in New York State have very low risk-adjusted mortality rates for revascularization (O'Brien et al. 2004; Carey et al. 2003; Surgenor et al. 2001) and that the absolute difference between high- and low-performance facilities in other states is likely to be substantially greater than in New York (Hannan, Sarrazin, 2003); therefore, should our findings be replicated elsewhere, the spread in risk-adjusted rates in high- and low-mortality CABG centers is likely to be higher than the nearly threefold spread that we found, and the implications for addressing any differences should be greater.

Finally, we were not able to examine either patients' historical utilization patterns or other quality indicators for hospitals aside from risk-adjusted CABG mortality rates. Other important aspects of the decision-making process for CABG surgery, such as hospital loyalty, hospital culture, or patient psychological comfort, may prove difficult to breach. Until a study of the new VA role that we propose is conducted, the ability to determine providers' willingness to change their referral patterns and the effects of such changes on patient outcomes will remain unknown.

Despite these limitations, our study suggests that VA efforts to influence the quality of care received by veterans treated outside of VA facilities might be most beneficial to poor and minority patients. The impact of directing VA patients'

private-sector care for such procedures may be larger and require less investment than additional efforts at quality improvement within VA, and it may be most efficient to target the most vulnerable populations, which we found to be minorities and those who live in low-income zip-code areas. VA has a commitment to provide high-quality care to its enrolled service population. Our findings suggest that targeting vulnerable subgroups for intervention may be an effective way to reduce racial and ethnic disparities in care and to improve the quality of care provided to veterans outside of the VA's walls.

References

- Birkmeyer, J. D., J. B. Dimick, D. O. Staiger. 2006. Operative mortality and procedure volume as predictors of subsequent hospital performance. *Annals of Surgery* 243 (3): 411–17.
- Birkmeyer, J. D., A. E. Siewers, E. V. Finlayson, T. A. Stukel, F. L. Lucas, I. Batista, H. G. Welch, and D. E. Wennberg. 2002. Hospital volume and surgical mortality in the United States. *New England Journal of Medicine* 346 (15): 1128–37.
- Birkmeyer, J. D., J. S. Skinner, and D. E. Wennberg. 2002. Will volume-based referral strategies reduce costs or just save lives? *Health Affairs (Millwood)* 21 (5): 234–41.
- Borowsky, S. J., and D. C. Cowper. 1999. Dual use of VA and non-VA primary care. *Journal of General Internal Medicine* 14 (5): 274–80.
- Burgess Jr., J. F., and D. A. DeFiore. 1994. The effect of distance to VA facilities on the choice and level of utilization of VA outpatient services. *Social Science & Medicine* 39 (1): 95–104.
- Carey, J. S., J. M. Robertson, G. A. Misbach, and A. L. Fisher. 2003. Relationship of hospital volume to outcome in cardiac surgery programs in California. *American Surgeon* 69 (1): 63–68.
- Department of Veterans Affairs. 1998. Enrollment—Provision of hospital and outpatient care to veterans. Proposed rule. *Federal Register* 63 (132): 37299–307.
- Fisher, E. S., and H. G. Welch. 1995. The future of the Department of Veterans Affairs health care system. *JAMA* 10 (4): 869–78.
- Fleming, C., E. S. Fisher, C. H. Chang, T. A. Bubolz, and D. J. Malenka. 1992. Studying outcomes and hospital utilization in the elderly. The advantages of a merged data base for Medicare and Veterans Affairs hospitals. *Medical Care* 30 (5): 377–91.
- Goodman, D. C., and S. S. Mick. 2002. Development and evaluation of primary care service areas: National study: Final report to Human Resources and Service Administration.
- Hannan, E. L., H. Kilburn Jr., J. F. O'Donnell, G. Lukacik, and E. P. Shields. 1990. Adult open heart surgery in New York State. An analysis of risk factors and hospital mortality rates. *JAMA* 264 (21): 2768–74.
- Hannan, E. L., D. Kumar, M. Racz, A. L. Siu, and M. R. Chassin. 1994. New York State's Cardiac Surgery Reporting System: Four years later. *Annals of Thoracic Surgery* 58 (6): 1852–57.
- Hannan, E. L., M. S. Sarrazin, D. R. Doran, and G. E. Rosenthal. 2003. Provider profiling and quality improvement efforts in coronary artery bypass graft surgery: The effect on short-term mortality among Medicare beneficiaries. *Medical Care* 41 (10): 1164–72.
- Hannan, E. L., C. C. Stone, T. L. Biddle, and B. A. DeBuono. 1997. Public release of cardiac surgery outcomes data in New York: What do New York state cardiologists think of it? *American Heart Journal* 134 (6): 1120–28.
- Hannan, E. L., M. van Ryn, J. Burke, D. Stone, D. Kumar, D. Arani, W. Pierce, S. Rafii, T. A. Sanborn, S. Sharma, J. Slater, and B. A. DeBuono. 1999. Access to coronary artery bypass surgery by race/ethnicity and gender among patients who are appropriate for surgery. *Med Care* 37 (1): 68–77.

- Hannan, E. L., C. Wu, T. J. Ryan, E. Bennett, A. T. Culliford, J. P. Gold, A. Hartman, O. W. Isom, R. H. Jones, B. McNeil, E. A. Rose, and V. A. Subramanian. 2003. Do hospitals and surgeons with higher coronary artery bypass graft surgery volumes still experience lower risk-adjusted mortality rates? *Circulation* 108 (7): 795–801.
- Jha, A. K., E. S. Fisher, Z. Li, E. J. Orav, and A. M. Epstein. 2005. Racial trends in the use of major procedures among the elderly. *New England Journal of Medicine* 253 (7): 683–91.
- Jha, A. K., J. B. Perlin, K. W. Kizer, and R. A. Dudley. 2003. Effect of the transformation of the Veterans Affairs Health Care System on the quality of care. *New England Journal of Medicine* 348 (22): 2218–27.
- Kizer, K. 1996. *Prescription for change*. Washington, DC: Department of Veterans Affairs.
- Konety, S. H., M. S. Vaughan Sarrazin, and G. E. Rosenthal. 2005. Patient and hospital differences underlying racial variation in outcomes after coronary artery bypass graft surgery. *Circulation* 111 (10): 1210–16.
- Leapfrog Group. 2004. Health Action Council. <http://www.healthactioncouncil.org/Initiatives/leapfrog.asp> (accessed July 6, 2007).
- New York State Department of Health. 2002. Coronary artery bypass surgery in New York State 1997–1999. Troy.
- O'Brien, M. M., A. L. Shroyer, T. E. Moritz, M. J. London, G. K. Grunwald, C. B. Villanueva, L. G. Thottapurathu, S. MaWhinney, G. Marshall, M. McCarthy Jr., W. G. Henderson, G. K. Sethi, F. L. Grover, K. E. Hammermeister, and VA Cooperative Study Group on Processes Structures and Outcomes of Care in Cardiac Surgery. 2004. Relationship between processes of care and coronary bypass operative mortality and morbidity. *Medical Care* 42 (1): 59–70.
- Romano, P. S., and H. Zhou. 2004. Do well-publicized risk-adjusted outcomes reports affect hospital volume? *Medical Care* 42 (4): 367–77.
- Shen, Y., A. Hendricks, S. Zhang, and L. E. Kazis. 2003. VHA enrollees' health care coverage and use of care. *Medical Care Research and Review* 60 (2): 253–67.
- Surgenor, S. D., G. T. O'Connor, S. J. Lahey, R. Quinn, D. C. Charlesworth, L. J. Dacey, R. A. Clough, B. J. Leavitt, G. R. Defoe, M. Fillinger, W. C. Nugent, and Group Northern New England Cardiovascular Disease Study. 2001. Predicting the risk of death from heart failure after coronary artery bypass graft surgery. *Anesthesia & Analgesia* 92 (3): 596–601.
- Tu, J. V., C. D. Naylor, D. Kumar, B. A. DeBuono, B. J. McNeil, and E. L. Hannan. 1997. Coronary artery bypass graft surgery in Ontario and New York State: Which rate is right? Steering Committee of the Cardiac Care Network of Ontario. *Annals of Internal Medicine* 126 (1): 13–19.
- Vladek, B. C., E. J. Goodwin, and L. P. Myers. 1988. Consumers and hospital use: The HCFA "death list." *Health Affairs* 7:122–25.
- Weeks, W. B., D. A. Bazos, D. M. Bott, R. Lombardo, M. J. Racz, E. L. Hannan, and E. S. Fisher. 2005. New York's statistical model accurately predicts mortality risk for veterans who obtain private sector CABG. *Health Services Research* 40 (4): 1186–96.
- Weeks, W. B., D. M. Bott, D. A. Bazos, S. L. Campbell, R. Lombardo, M. J. Racz, E. L. Hannan, S. M. Wright, and E. S. Fisher. 2006. VA patients' use of the private sector for coronary revascularization in New York: Opportunities to improve outcomes by directing care to high performance hospitals. *Medical Care* 44 (6): 519–26.
- Weeks, W. B., D. M. Bott, R. P. Lamkin, and S. M. Wright. 2005. Veterans Health Administration and Medicare outpatient health care utilization by older rural and urban New England veterans. *Journal of Rural Health* 21 (2): 65–69.
- Weeks, W. B., P. J. Mahar, and S. M. Wright. 2005. Utilization of VA and Medicare services by Medicare-eligible veterans in Northern New England: The impact of additional access points in a rural setting. *Journal of Health Care Management* 50 (2): 95–106.
- Weeks, W. B., D. J. O'Rourke, L. B. Ryder, and M. M. Straw. 2002. Veterans' care preference for coronary artery bypass grafting in a rural setting. *Military Medicine* 167 (7): 556–59.

- . 2003. Veterans' system-of-care preferences for percutaneous transluminal coronary angioplasty in a rural setting. *Journal of Rural Health* 19 (2): 105–8.
- Wright, S. M., J. Daley, E. S. Fisher, and G. E. Thibault. 1997. Where do elderly veterans obtain care for acute myocardial infarction: Department of Veterans Affairs or Medicare? *Health Services Research* 31 (6): 739–54.
- Wright, S. M., L. A. Petersen, R. P. Lamkin, and J. Daley. 1999. Increasing use of Medicare services by veterans with acute myocardial infarction. *Medical Care* 37 (6): 529–37.