Office of Policy and Planning
Department of Veterans Affairs

Program Evaluation of Cardiac Care Programs in the Veterans Health Administration

Part 4
Final Report Summary

April 11, 2003

FINAL REPORT SUMMARY

As a requirement of the Government Performance and Results Act of 1993 (GPRA), the Department of Veterans Affairs (VA) conducted a formal evaluation of the provision of cardiac care within the Veterans Heath Administration (VHA). Cardiac care was selected because it represents the largest set of diagnoses within the VA's health care system. The VA Office of Policy and Planning awarded the contract for this program evaluation to PricewaterhouseCoopers in 1999 as primary contractor, with both Harvard Medical School and The Lewin Group as subcontractors. PricewaterhouseCoopers continued to provide overall project management for this program evaluation through project completion; however, formal ownership of the contract was transferred to IBM Business Consulting Services in October 2002.

The statement of work designed for this evaluation was intended to yield a more comprehensive evaluation than previous program evaluations; striving not only to meet the minimum legislative requirements of GPRA, but also endeavoring to understand some of the intensely complex outcomes for veterans with ischemic heart disease (IHD). This program evaluation was designed by VA to evaluate the extent to which the VHA's cardiac care delivery program and system met its stated goal of providing a continuum of high quality healthcare in a convenient, responsive, and caring manner at a reasonable cost to veterans with ischemic heart disease. The results of the program evaluation will enable VA to improve upon care provided to a large and important segment of the veteran population.

Building upon the specifications set forth in the statement of work, the program evaluation team developed a clinically rich and statistically sound analytic model to drive this and future program evaluation activities. In fact, this is the most comprehensive program evaluation of disease-specific services sponsored by a healthcare delivery system in the United States and is an excellent model to leverage for additional disease-specific program evaluations. The VA is to be commended for undertaking such an aggressive program evaluation in search of opportunities to improve upon the quality of

care provided to one of the nation's most important patient populations, United States veterans.

The statement of work detailing this program evaluation was originally centered around eight research questions. Due to differences in the methodological approaches used to address the research questions, the questions have been divided into three separate reports:

- **Part 1 – Heart Attack (AMI) and Angioplasty (PCI) Cohort Analyses (Research Questions 1-6)**. This report is centered around two cohorts; patients with an acute myocardial infarction (AMI), more commonly referred to as a heart attack, and patients who underwent a percutaneous coronary intervention (PCI) (e.g., angioplasty). The project team reports utilization, mortality and readmission measures for both of these cohorts as well as level of service and travel distance results for the AMI cohort.

- **Part 2 – Veterans' Satisfaction with Contracted and Non-Contracted Care (Research Question 7)**. This report compares satisfaction measures for veterans who underwent coronary artery bypass graft (CABG) surgery in the VA (non-contracted care) versus those who underwent the procedure through a contracted provider in VISN 15.

- **Part 3 – Inpatient Cost Analysis for Patients with Heart Attack (Research Question 8)**. This report compares the cost per heart attack patient in the VA to the cost of care provided to similar patients in the private sector (Medicare).

A summary of the methods, findings, and recommendation for each of these three reports follows. To obtain an electronic version of each of the three sections of the full report, visit: **www.va.gov/opp/organizations/progeval.htm**.

Program Evaluation of Cardiac Care Programs in the VHA

PART 1

HEART ATTACK (AMI) AND ANGIOPLASTY (PCI) COHORT ANALYSES

(RESEARCH QUESTIONS 1-6)

OVERVIEW OF THE METHODS

The evaluation involved two primary sets of comparisons. First, we compared cardiac care and outcomes among Veterans Integrated Service Networks (VISNs) among VA patients of all ages. In order to benchmark care within the VA to that provided in the private sector, we also compared care received by a national sample of elderly (age ≥ 65) male veterans to care received by a national sample of male Medicare beneficiaries.

Two clinical cohorts were developed. The first cohort—the acute myocardial infarction (AMI) cohort—included individuals who had an AMI, more commonly referred to as heart attack. Within this cohort, we examined utilization of cardiac catheterization, percutaneous coronary interventions (PCI) (e.g., angioplasty), and coronary artery bypass graft (CABG) surgery and outcomes such as mortality and readmission. A number of measures to assess the level of cardiac health services provided within the VHA were also examined. The second cohort—the PCI cohort—included individuals that underwent a percutaneous coronary intervention (e.g., angioplasty) and who had not had a heart attack or revascularization procedure (either angioplasty or bypass surgery) in the previous 90 days. Utilization and outcomes were measured for the PCI cohort. For both of these cohorts, patients treated in fiscal years (October 1-September 30) 1997 to 1999, with an additional baseline year (fiscal year 1994) for the within VA analyses were studied.

The project team linked diagnosis and treatment information from various administrative data sources to create a complete picture of each patient's episode of care and to define variables related to utilization, readmission, and mortality. Based upon the original selection criteria—International Classification of Disease, 9th Revision, Clinical Modification (ICD-9-CM) codes for diagnoses and the American Medical Association's Current Procedural Terminology, 4th Revision (CPT-4) codes for procedures—there were over 127,00 unique individuals (representing all VISNs) in the VA cohorts and over 1.5 million unique individuals in the Medicare data with ischemic heart disease, from which

the project team created subsets of heart attack (33,829 VA; 345,843 Medicare) and angioplasty (17,589 VA; 228,624 Medicare) patients. Many of the data files were enormous, significantly adding to the complexity of this task. For example, the team obtained more than 238 million Medicare records pertaining to individuals with ischemic heart disease. Records from many of the following data sources were linked for each individual in the AMI and PCI cohorts:

- Patient Treatment (PTF) files (including Main, Bedsection, Surgery, and Procedure)
- Outpatient Clinic (OPC) files (including Visit, Event, Diagnosis, and Procedure)
- Medicare Hospital Inpatient, Hospital Outpatient, Physician/Supplier, and Enrollment
- Beneficiary Identification and Records Locator System (BIRLS)
- National Death Index (NDI)
- 1990 U.S. Census
- American Hospital Association Survey
- (Hospital) Blue Book
- Short Form 36 (for Veterans)
- A variety of smaller data sources including many unique VHA lists and surveys associated with cardiac care services

Comparisons within the VA and between the VA and Medicare required adjustments for differences in patient characteristics across VISNs and between the two systems of care. Several case mix variables were included in the analytic models. These included demographic variables (age, gender, race), 37 clinical comorbid disease indicators derived from administrative data (e.g., diabetes, CHF, hypertension, etc.) and socioeconomic variables derived from the 1990 U.S. Census data (e.g., percent with college degree in zip code of residence, etc.). We used a propensity score approach to create a matched sample of VA and Medicare patients; to our knowledge no other study has attempted to use this approach on such large cohorts over so many years of study.

Results for the heart attack and angioplasty cohorts were presented in two major categories; the within VA analyses, which enabled comparisons to be made across VISNs and the Matched VA and Medicare analyses, which enabled comparisons to be made between the VA and private sector (Medicare) patients. For both of these categories, results were presented at the national and VISN level. As specified in the statement of work, all measures were evaluated at a 90 percent confidence level (P < 0.10). Facility

level analyses could not be conducted due to the small number of patients in each facility for each cohort.

FINDINGS

Within VA Analyses for Heart Attack (AMI) Cohort (all ages)

       <u>Adjusted Procedure Utilization, Length of Stay, Readmission and Mortality</u>**.** National procedure utilization, length of stay, readmission, and mortality rates are presented in Table 1. Within the VA, for patients of all ages, cardiac procedure utilization increased over time, while the length of stay associated with a heart attack admission decreased over time (P < 0.10). Readmission rates and long- and short-term mortality rates showed a slight decrease over time in the heart attack cohort, although there were no statistically significant trends. There was considerable variation across networks (VISNs) in procedure utilization, length of stay, readmissions, and mortality.

Table 1: Utilization, Length of Stay, Readmission and Mortality for VA Patients with a Heart Attack, all cohort years					
	Cohort				Statistically[a]
	FY 1994 (n=8677)	FY 1997 (n=8135)	FY 1998 (n=8353)	FY 1999 (n=8664)	Significant Trend?
Utilization and Length of Stay Measures					
Catheterization within 30 days (%)	45.4	47.9	48.7	49.6	No
Angioplasty within 30 days (%)	**11.6**	**15.3**	**16.8**	**18.4**	**Yes**
% of angioplasty procedures using stents	**NA**	**56.2**	**72.0**	**83.7**	**Yes**
Bypass surgery within 30 days (%)	8.2	8.0	8.0	8.0	No
Revascularization (either angioplasty or bypass surgery) within 30 days (%)	**20.0**	**24.1**	**25.7**	**27.3**	**Yes**
Length of stay (Days)	**13.8**	**11.6**	**10.9**	**10.2**	**Yes**
Readmission Measures					
Readmission for CHF within 30 days (%)	1.1	1.3	1.3	1.4	No
Readmission for CHF within 6 months (%)	5.9	5.4	5.3	5.2	No
Readmission for IHD within 30 days (%)	5.8	6.0	6.1	6.2	No
Readmission for AMI within 6 months (%)	6.6	6.9	7.0	7.2	No
Readmission for IHD within 6 months (%)	18.6	17.0	16.5	16.1	No
Readmission for cardiac disease within 6 months (%)	27.7	26.0	25.5	25.0	No
Mortality Measures					
30 Day Mortality (%)	10.6	10.0	9.8	9.7	No
1 Year Mortality (%)	21.9	21.1	20.9	20.7	No
2 Year Mortality (%)	28.6	28.5	27.4	NA	No
3 Year Mortality (%)	34.5	34.1	NA	NA	No
6 Year Mortality (%)	50.8	NA	NA	NA	NA

[a] at the 10% level (P < 0.10)

Program Evaluation of Cardiac Care Programs in the VHA

Adjusted Utilization and Mortality by Gender. Pooling comparisons across all cohorts (FY 1994, 1997-1999), we found that male veterans were significantly more likely to undergo cardiac catheterization and bypass surgery within 30 days compared to female veterans. This pattern is consistent with observations made in the private sector. Male veterans had significantly higher adjusted mortality rates at 2 and 3 years following their heart attacks compared to similar females.

Adjusted Utilization by Race. African Americans were significantly less likely to undergo all procedures (cardiac catheterization, angioplasty, and bypass surgery) and had shorter lengths of stay compared to white patients. Similar data for the private sector agree with this observation. Among patients undergoing angioplasty, African American veterans were also less likely to receive a stent compared to white veterans. Hispanic patients were significantly less likely to undergo cardiac catheterization, bypass surgery, and revascularization (angioplasty or bypass surgery) procedures within 30 days of their index admission and had shorter lengths of stay compared to white patients.

Adjusted Mortality by Race. There were significant differences in mortality across racial groups. African Americans had significantly lower mortality at both 30 days and 1 year; however, there were no significant differences in adjusted mortality between African American and white veterans at 2, 3 or 6 years post-AMI. There were no significant differences in short- or long-term mortality between Hispanic and white veterans.

Adjusted Physical and Functional Capacity. The project team analyzed reports of physical and functional capacity for 20-25% of the patients in each heart attack cohort at numerous time intervals (e.g. 1-6 months post-heart attack, 7-12 months post-heart attack, etc.) and observed that there were no major changes—when compared to veterans' capacity prior to heart attack—in either physical or functional capacity after a heart attack. However, at each time point, adjusted (for clinical and demographic variables) scores for both the physical and functional capacity scales were significantly below the mean score for the general population. The scores are remarkably consistent across cohorts and across VISNs.

Access to Invasive Procedures within the VA. There are a significant number of VHA facilities that provided fewer numbers of invasive cardiac procedures on certain days of the week, which suggests that some facilities have the capabilities to perform invasive services, but are limited by staffing or other resources from making full use of their capabilities. In FY 1999 over half (43 out of 80) of the VA facilities with some invasive procedure capabilities were not operating at full capacity. Level of access to invasive procedures at VHA hospitals was significantly related to use of catheterization, angioplasty, and overall revascularization (angioplasty or bypass surgery) procedures. Patients admitted to a "full service" VA facility (defined as one with the capability to perform catheterization, angioplasty *and* bypass surgery) were also more likely to undergo bypass surgery than those admitted to a VA facility with neither catheterization nor bypass surgery capabilities. There were, however, no differences in adjusted 30 day or 1 year mortality according to facility type.

Matched VA and Medicare Comparisons for Heart Attack Cohort (males age ≥ 65)

Patients with heart attack treated in the VA were younger, but were more likely to have higher rates of selected comorbid diseases compared to Medicare patients with heart attack. The VA cohorts also had larger numbers of racial and ethnic minorities, and VA patients were more likely to live in areas with lower levels of education and income. VA patients also traveled longer distances to their admitting hospital compared to Medicare patients. However, after matching, the VA and Medicare patients were similar in these observed characteristics. All of the matched cohort results have been adjusted for demographic, clinical, and socioeconomic variables.

Adjusted Procedure Utilization. National matched procedure utilization rates are presented in Table 2. VA patients underwent significantly fewer procedures than their matched Medicare counterparts. For patients 65 years of age or older, utilization rates for catheterization, bypass surgery, angioplasty, and revascularization (either bypass surgery or angioplasty) within 30 days of the index admission were significantly lower for veterans than for similar Medicare patients treated in a private sector hospital. For example, in FY 1999 the private sector cardiac catheterization rates were about 66% higher, bypass surgery rates were about 133% higher, and angioplasty rates were about

100% higher than corresponding VA rates. The percentage of angioplasty procedures performed with stents was the same in both groups in FY 1997 and 1999, but lower among VA patients in FY 1998.

Table 2: Utilization in Matched Cohorts—Males age 65 and older, FY 1997-1999								
	FY 1997			FY 1998			FY 1999		
	VA (n=3992)	MED (n=3992)	p-value	VA (n=4277)	MED (n=4277)	p-value	VA (n=4502)	MED (n=4502)	p-value
Catheterization w/in 30 days (%)	**40.6**	**62.3**	**<.001**	**38.9**	**63.4**	**<.001**	**40.0**	**63.1**	**<.001**
Bypass surgery w/in 30 days (%)	**9.1**	**19.2**	**<.001**	**7.9**	**18.4**	**<.001**	**7.6**	**17.7**	**<.001**
Angioplasty w/in 30 days (%)	**12.8**	**26.0**	**<.001**	**13.1**	**28.9**	**<.001**	**14.5**	**30.3**	**<.001**
Revascularization w/in 30 days (%)	**21.4**	**44.1**	**<.001**	**20.7**	**46.0**	**<.001**	**22.0**	**46.8**	**<.001**
% of angioplasty procedures using stents	54.3 (n=510)	53.6 (n=1038)	0.78	**69.6** (n=562)	**76.1** (n=1239)	**0.004**	82.9 (n=655)	85.2 (n=1365)	0.19
Length of stay (days)	**11.9**	**9.3**	**<.001**	**11.2**	**9.0**	**<.001**	**11.1**	**8.8**	**<.001**

Bolded numbers represent significant differences at a 10% level

Adjusted Readmission. VA patients are readmitted more often than matched Medicare patients. As illustrated in Table 3, readmission rates for heart attack (AMI) (at 6 months), ischemic heart disease (IHD) (at 30 days and 6 months), and cardiac disease (at 6 months) were higher for veterans treated in a VHA hospital than patients treated in the private sector, although there was no difference in readmission rates for patients with a congestive heart failure (CHF) diagnosis (at 30 days and 6 months).

Table 3: Percent of Patients with a Heart Attack Readmitted in Matched Cohorts Males age 65 and Older, FY 1997-1999								
	FY 1997			FY 1998			FY 1999		
	VA (n=3992)	MED (n=3992)	p-value	VA (n=4277)	MED (n=4277)	p-value	VA (n=4502)	MED (n=4502)	p-value
Readmission for CHF w/in 30 days (%)	2.0	1.9	.68	**1.6**	**2.5**	**.005**	2.2	2.3	.776
Readmission for IHD w/in 30 days (%)	**5.7**	**4.2**	**.001**	**5.8**	**3.5**	**<.001**	**5.3**	**3.8**	**<.001**
Readmission for CHF w/in 6 months (%)	7.9	6.9	.087	7.7	7.4	.68	8.0	7.4	.27
Readmission for AMI w/in 6 months (%)	**7.5**	**5.8**	**<.001**	**8.5**	**5.9**	**<.001**	**8.2**	**5.9**	**<.001**
Readmission for IHD w/in 6 months (%)	**15.6**	**10.7**	**<.001**	**15.1**	**9.7**	**<.001**	**14.5**	**10.0**	**<.001**
Readmission for cardiac disease w/in 6 months (%)	**25.7**	**20.6**	**<.001**	**25.9**	**19.7**	**<.001**	**25.9**	**20.1**	**<.001**

Bolded numbers represent significant differences at a 10% level

Adjusted Short- and Long-Term Mortality. VA patients had higher short- and long-term mortality after a heart attack than similar patients treated in the private sector. As shown in Table 4, there were statistically significant differences (p < 0.1) in mortality between elderly male VA and elderly male Medicare patients in the FY 1997, 1998 and 1999 matched cohorts. Within service networks (VISNs), mortality rates among elderly VA patients were generally higher than among matched Medicare patients, although often these differences were not statistically significant. There was no VISN in which VA patients had a significantly lower mortality rate compared to matched Medicare patients.

Table 4: Regression-Adjusted[a] Mortality in Matched Cohorts Males age 65 and older, FY 1997-1999								
	FY 1997			FY 1998			FY 1999		
	VA (n=3992)	MED (n=3992)	p-value	VA (n=4277)	MED (n=4277)	p-value	VA (n=4502)	MED (n=4502)	p-value
30 day mortality	**18.3**	**15.0**	**0.003**	15.4	15.5	0.87	**15.5**	**14.1**	**0.066**
1 year mortality	**34.6**	**28.3**	**<.001**	**32.7**	**29.7**	**0.009**	**35.3**	**29.1**	**0.001**
2 year mortality	**43.9**	**34.6**	**<.001**	**42.0**	**36.8**	**<.001**	NA	NA	
3 year mortality	**50.2**	**40.5**	**<.001**	NA	NA		NA	NA	

Bolded numbers represent significant differences at 10% level

[a] Adjusted for age, race, median household income in zip code of residence, percentage of residents in zip code that are African American, percentage of residents in zip code that are Hispanic, distance to admitting hospital and a set of clinical variables based on primary and secondary diagnoses codes from inpatient encounters from the index admission as well as from the prior year.

Access to Invasive Procedures. In each year (FY 1997-1999), VA patients age 65 and older were much less likely to be admitted to high volume facilities with the ability to perform invasive cardiac procedures than matched Medicare patients (see Table 5).

Table 5: Structure of AMI Care Among Matched Patients treated in VHA and under Medicare FY 1997-1999 Cohorts (Males age 65 and over)								
	FY 1997			FY 1998			FY 1999		
	VA (N=4383)	MED (N=4383)	P-value	VA (N=4667)	MED (N=4667)	P-value	VA (N=4881)	MED (N=4881)	P-value
Admitted to High Volume Facility (%)	**9.6**	**42.0**	**<0.001**	**14.8**	**44.4**	**<0.001**	**24.6**	**45.2**	**<0.001**
Admitted to a Low Volume (%)	15.4	14.3	0.16	**8.9**	**13.2**	**<0.001**	**8.0**	**13.7**	**<0.001**
Admitted to Facility with catheterization capabilities (%)	**68.0**	**75.7**	**<0.001**	**68.4**	**76.3**	**<0.001**	**69.1**	**77.1**	**<0.001**
Admitted to Facility with angioplasty capabilities (%)	**47.2**	**51.8**	**<0.001**	**47.6**	**53.1**	**<0.001**	**48.1**	**54.3**	**<0.001**
Admitted to Facility with bypass surgery capabilities (%)	**40.1**	**49.5**	**<0.001**	**38.1**	**50.9**	**<0.001**	**37.4**	**51.6**	**<0.001**

Bolded numbers represent significant differences at 10% level

Utilization and Outcomes Among Patients Admitted to Facilities with On-site Capabilities to Perform Invasive Procedures. The project team compared a matched cohort of patients admitted to VHA versus private sector "full service" facilities—facilities with on-site capability to perform catheterization, angioplasty, *and* bypass surgery—to determine if differences observed in utilization and mortality persisted even when comparing patients admitted to similar types of facilities. Compared to rates observed for all patients, utilization rates are higher for both VA and Medicare patients who received care in "full service" facilities, but large differences in the provision of procedures for VA and Medicare patients remained when we limited our analysis to "full service facilities. Mortality differences were similar to those observed in patients admitted to all types of facilities, except differences in 30 day and 1 year mortality between the two systems in FY 1999 were no longer statistically significant due to a decrease in the number of patients.

Level of Service Findings

Characteristics of Facilities. VHA hospitals were more likely to be teaching hospitals than were hospitals in the private sector. Most hospitals in both the VA and the private sector had general ICUs, but fewer hospitals in either sector had cardiac ICUs. Private sector hospitals tended to admit more patients with a heart attack. In FY 1999, VA facilities were more likely to have cardiac catheterization, angioplasty and bypass surgery capabilities, but these facilities tended to perform fewer angioplasty and bypass surgery procedures (for any diagnosis) compared to non-VA hospitals.

Level of Service. Within the VA system, there are more hospitals with cardiac catheterization capabilities and more hospitals with bypass surgery capabilities per expected heart attack than in the private sector. The number of facilities with cardiac catheterization capabilities per 100 expected heart attack patients varied substantially across the service networks. Within the VA system, there are considerably more ICU/CCU beds per expected number of patients with heart attack than in private sector facilities. The number of ICU/CCU beds per 100 expected heart attack patients also varied substantially across the service networks.

Distance Between Patient's Residence and Facilities. VA patients 65 years of age or older traveled almost twice as far to the admitting hospital compared to Medicare patients (30 miles versus 15 miles). Approximately 8% of elderly VA patients were transferred to a different facility to receive a cardiac catheterization (an average of 140-150 miles from their home). Compared to Medicare patients, fewer elderly VA patients were transferred for invasive cardiac procedures and those transferred traveled longer distances.

Mean Distance to Nearest Hospital. Patients 65 years of age or older who had a heart attack and who were treated in a VA hospital lived an average of more than 25 miles from the nearest VA facility compared to about 7 miles from a private sector hospital. For all years, there was an 80 mile differential between the nearest private sector hospital with bypass surgery facilities and the nearest VA facility able to provide bypass surgery.

Within VA Analyses for Angioplasty (PCI) Cohort (all ages)

Adjusted Utilization and Outcomes. The only significant trend for the within VA angioplasty cohort was a decrease in length of stay over time (Table 6). Bypass surgery procedures (performed during the index admission or within 6 months), repeat angioplasty procedures (performed during the index admission, within 30 days, or within 6 months), readmission for heart attack within 6 months, and short-term (30 day and 1 year) mortality all remained stable across the cohort years (FY 1994, 1997-1999). There was some variation across networks in outcomes following PCI.

Table 6: Adjusted Outcomes following Angioplasty VA Patients all Ages, all cohort years					
	Cohort				Statistically[a] Significant Trend?
	FY 1994 (n=3321)	FY 1997 (n=4453)	FY 1998 (n=4839)	FY 1999 (n=4967)	
Bypass surgery following angioplasty within index admission (%)	2.3	1.6	1.4	1.3	No
Bypass surgery within 6 months of angioplasty (%)	6.7	5.4	5.1	4.8	No
Repeat angioplasty within index admission	1.8	2.1	2.2	2.3	No
Repeat angioplasty within 30 days (%)	2.9	3.6	3.9	4.2	No
Repeat angioplasty within 6 months (%)	11.7	11.5	11.5	11.6	No
Length of stay (Days)	**10.8**	**8.6**	**7.8**	**7.1**	**Yes**
30 Day Mortality (%)	0.8	0.9	0.9	0.9	No
1 Year Mortality (%)	4.4	4.4	4.4	4.4	No
Readmission for heart attack within 6 months (%)	1.8	1.9	1.9	2.0	No

[a] at the 10% level

Matched VA and Medicare Comparisons for Angioplasty Cohort (males ≥ age 65)

Adjusted Utilization and Outcomes. Patients undergoing an angioplasty procedure within the VA were significantly *less* likely to receive a repeat angioplasty during the index admission and had longer lengths of stay than similar Medicare patients during all study years (FY 1997-1999) as illustrated in Table 7. In FY 1998, patients in the VA were more likely to undergo bypass surgery during the index admission following their angioplasty than similar Medicare patients; however, in FY 1999 this did not hold. In FY 1999, 1 year mortality and readmission for heart attack within 6 months were statistically significantly higher for VA patients compared to Medicare patients.

Table 7: Outcomes in Matched Cohorts Males age 65 and older undergoing angioplasty, FY 1997-1999								
	FY 1997			FY 1998			FY 1999		
	VA (n=1711)	MED (n=1711)	p-value	VA (n=1964)	MED (n=1964)	p-value	VA (n=2110)	MED (n=2110)	p-value
Bypass surgery following angioplasty within index admission (%)	2.2	2.1	0.91	**2.1**	**1.2**	**0.03**	1.1	1.6	0.18
Bypass surgery within 6 months of angioplasty (%)	6.4	5.1	.12	**6.1**	**4.7**	**0.06**	4.5	4.3	0.65
Repeat angioplasty within index admission (%)	**3.1**	**8.2**	**<0.001**	**3.2**	**7.0**	**<0.001**	**3.1**	**6.3**	**<.001**
Repeat angioplasty within 30 days (%)	**4.8**	**10.2**	**<0.001**	**4.9**	**9.4**	**<0.001**	**5.3**	**8.0**	**<.001**
Repeat angioplasty within 6 months (%)	**12.6**	**18.5**	**<0.001**	**11.9**	**17.4**	**<0.001**	**12.2**	**14.8**	**0.01**
Length of stay (Days)	**9.7**	**5.2**	**<0.001**	**8.5**	**4.9**	**<0.001**	**7.6**	**4.9**	**<.001**
30 Day Mortality (%)	**2.6**	**1.7**	**0.06**	2.1	1.5	0.12	**2.0**	**1.3**	**0.07**
1 Year Mortality (%)	9.6	8.6	0.29	8.7	8.2	0.56	**8.8**	**6.6**	**0.008**
Readmission for heart attack within 6 months (%)	2.9	2.6	0.60	3.2	2.6	0.25	**4.0**	**2.5**	**0.005**

Bolded numbers represent significant differences at a 10% level

RECOMMENDATIONS

Veterans treated for a heart attack within the VA traveled farther to their admitting hospital, underwent fewer procedures, and had higher mortality when compared to similar Medicare patients treated in the private sector. To further understand these results and identify appropriate programmatic implications, the VA should

- Check 30-day mortality in the later years (FY 2000 – 2002) to determine if mortality continues to trend downward and check time periods *beyond* 30-day mortality to assess the efficacy of programs introduced in FY 1999 (e.g., diabetes management, hypertension management, etc.) to improve quality of care.

- Compare recent care provided in the VHA for patients with heart attack against clinical guidelines, particularly for cardiac catheterization utilization.

- Review extent to which VHA cardiac catheterization facilities operate at full capacity.

- Assess extent to which cardiac surgery schedules can accommodate urgent/emergent cases.

- Consider benchmarking the VHA against accepted guidelines (e.g., staffing ratios, use of intensivists, etc.) related to structure of care.

- Consider reducing long distances traveled by many veterans to arrive at VHA facilities.

- Examine post-heart attack care delivered in the outpatient setting (e.g., drug therapy and compliance, rehabilitation, specialist care).

- Consider implementing multiple and different interventions—designed by a group of VHA experts with outside consultants—across VISNs to evaluate potential benefits of various interventions.

PART 2

VETERANS' SATISFACTION WITH CONTRACTED AND NON-CONTRACTED CARE
(RESEARCH QUESTION 7)

OVERVIEW OF THE METHODS

Veterans who seek health care within the Veterans Affairs (VA) system sometimes receive services from contracted providers when access to appropriate VA facilities is not convenient. The objective of this analysis was to evaluate whether the quality of care provided in contracted facilities is equivalent to the quality of care provided in VA facilities.

We compared reports of satisfaction provided by Veterans who underwent coronary artery bypass graft (CABG) surgery in a Veterans Affairs Medical Center (VAMC) with reports of Veterans who underwent bypass surgery in contracted facilities located in VISN 15, the only VISN within the VA system that sent elective, non-emergent cases to contracted providers. We obtained data on patient satisfaction through collaboration with the National Performance Data Feedback Center (NPDFC), which annually administers a survey, based on the patient satisfaction questionnaire developed by the Picker Institute, to users of VA services. The NPDFC agreed to enrich their sample so that it included all patients who underwent bypass surgery in either a VAMC or contracted facility between October 1, 1999 and March 31, 2001.

FINDINGS

We calculated problem rates for ten domains of satisfaction measured by the survey. We compared problem rates for those who underwent bypass surgery in a contracted facility with rates for those who underwent bypass surgery in a VAMC anywhere in the VA system and with those who underwent bypass in a VAMC located in VISN 15 only. Problem rates for Veterans who underwent bypass surgery in contracted facilities did not differ from the rates for Veterans who underwent bypass surgery in a VAMC anywhere in the system. Within VISN 15; however, those who underwent bypass surgery in a contracted facility had higher problem rates for one domain, Overall Impression of Quality, than those who underwent surgery in a VA facility (P < .10).

15

Although the problem rates for this domain differed between groups, the absolute problem rates for both groups of patients were low (< 7%).

Figure 1: Satisfaction Reported by CABG Patients treated in VAMC (VISN 15) versus Contracted Facilities
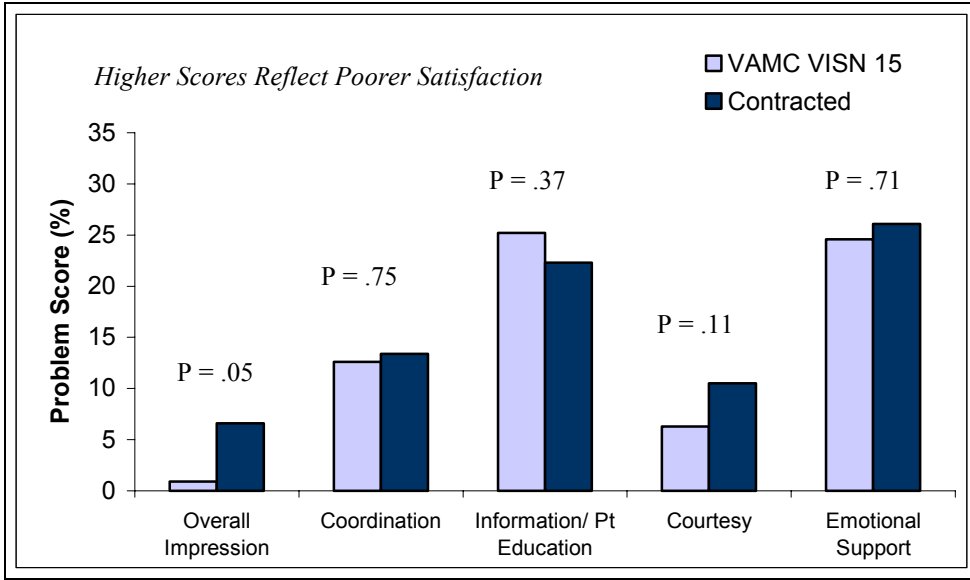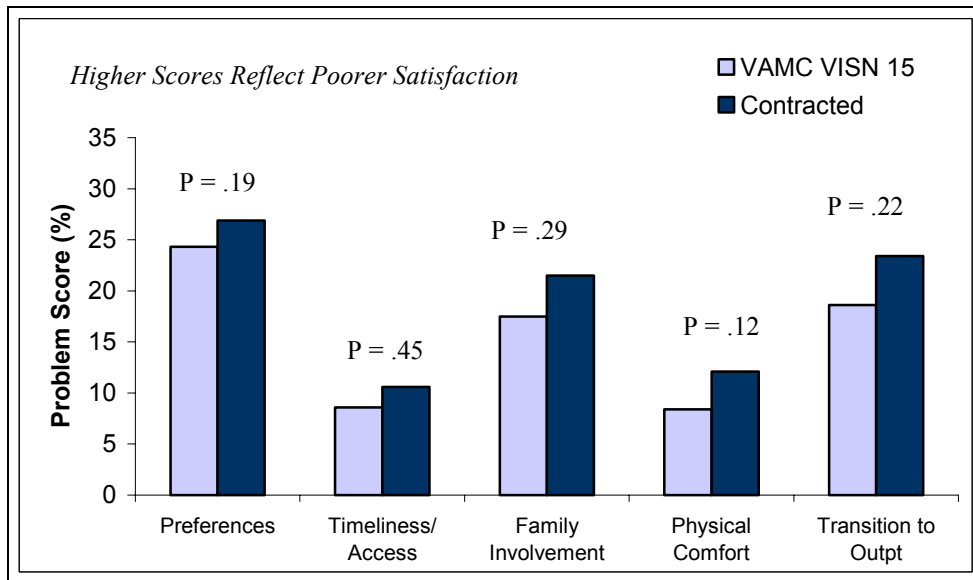

Figure 2: Satisfaction Reported by CABG Patients treated in VAMC (VISN 15) versus Contracted Facilities

Based on an analysis of each domain's problem rate and its correlation with Overall Impression of Quality, we used an approach previously used by the VA to identify opportunities for quality improvement. The pattern of opportunities differed

according to type of hospital. In VAMCs, Courtesy and Timeliness/Access met criteria for High Priority opportunities. In contracted facilities, Emotional Support and Respect for Patients' Preferences met criteria for Top Priority status and Courtesy, Timeliness/ Access and Physical Comfort met the criteria for High Priority status.

RECOMMENDATIONS

- If the VA is interested in comparing outcomes for contracted and non-contracted services throughout the system, then it will need to pick procedures, diagnoses, or services that occur frequently inside and outside VAMCs. The specific outcomes to be compared will depend on the services and conditions to be studied. Nevertheless, with appropriate case-mix adjustment, the VA should be able to compare more generic outcomes such as length of stay, mortality, readmission and health-related quality of life if it can adequately integrate data on who received services in contracted facilities and the services provided in these facilities with data routinely collected for Veterans treated in VAMCs.

- Within VISN 15, although the absolute problem rates for Overall Impression of Quality were low for both VAMC patients and patients treated in contracted facilities, the VA might explore why patient satisfaction for this domain was *lower* (P< 0.10) for patients treated in *contracted* facilities.

- Within the VAMC as a whole, quality improvement activities related to Courtesy and Timeliness/Access are likely to be the most important.

- Within contracted facilities, quality improvement activities related to Emotional Support, Respect for Patients' Preferences, Courtesy, Timeliness/Access, Family Involvement, and Physical Comfort are likely to be the most important.

Program Evaluation of Cardiac Care Programs in the VHA

PART 3

INPATIENT COST ANALYSIS FOR PATIENTS WITH HEART ATTACK

(RESEARCH QUESTION 8)

OVERVIEW OF THE METHODS

The purpose of this research question was to compare the cost of care for ischemic heart disease patients treated within the VA to similar patients treated in non-VA settings. To do so, the project team obtained inpatient cost data from the VA's Decision Support System (DSS) for veterans who had an acute myocardial infarction (AMI), or heart attack, between October 1, 1998 and September 30, 1999 (Fiscal Year 1999). The project team created a matched sample of veteran and non-veteran (Medicare) heart attack patients for this time frame and obtained hospital and procedure utilization and charge data from the Medicare Hospital Inpatient (Part A) files. For physician services associated with the inpatient episode for these individuals, we obtained relative value unit (RVU) weighted dollar values from Medicare's Resource Based Relative Value Scale (RBRVS) physician fee schedule. Based on the analysis of these data, we are able to describe the observable costs that were incurred in both the VA and Medicare inpatient settings, and compare them in the aggregate. Due to DSS resource limitations, this analysis focuses exclusively on inpatient costs associated with a heart attack.

FINDINGS

▪ For the index admissions, average cost per patient with a heart attack for the Matched VA cohort is $13,530. Average total cost for the Matched Medicare cohort (including facility costs and estimated physician charges) is $16,445. When both the facility costs and physician charges are included, the Matched VA cohort costs for the index heart attack admission are 17.7% lower than Matched Medicare costs. This difference is statistically significant (P < .01).

▪ The gap between Matched VA and Medicare costs remains relatively stable as inpatient costs accumulate over the 90-day period following the index admission.

Table 1: Summary of Inpatient Costs per Heart Attack Patient (FY 1999)				
	Matched VA (N=3,758) (Including Facility and Physician Costs)	**Matched Medicare (N=3,758)**		
		Part A (Facility Costs)	**Estimated Physician Charges (RVU weighted $ value)**	**Total Medicare (Facility Costs + Physician Charges)**
Inpatient Cost per AMI Patient by Episode Increment				
Index Admissions	**$13,530**	$13,793	$2,652	**$16,445**
Cumulative Inpatient Costs per AMI Patient				
1-30 Days	**$14,491**	$14,553	$2,800	**$17,353**
31-60 Days	**$14,954**	$15,074	$2,892	**$17,966**
61-90 Days	**$15,253**	$15,347	$2,950	**$18,297**

- We note that although LOS in the VA is greater than in Medicare, costs are lower. However, patients receiving care for a heart attack in the VA received substantially fewer procedures than those in Medicare. In FY 1999, for the episode increment up to 30 days following a heart attack:

  - Matched VA patients received 245 bypass surgery procedures (6.5%) compared to 673 (17.9%) in the matched Medicare cohort.

  - Matched VA patients received 475 angioplasty procedures (12.6%) compared to 1,182 (31.5%) in the matched Medicare cohort.

  - Matched VA patients received 1,379 (36.7%) cardiac catheterization procedures compared to 2,438 (64.9%) in the matched Medicare cohort.

- Because procedure use is a significant component of total cost per heart attack patient, the team conducted a simple sensitivity analysis by controlling for the number of procedures performed in both systems. The analysis suggests that up to 100% of the difference in costs observed between these two systems could be directly related to differences in procedure utilization.

- There is some variation among the VISNs for IHD-related costs when comparing the Matched VA to the Matched Medicare cohort during the index admission episode

increment. For most VISNs, Matched VA costs are lower than the corresponding Matched Medicare cohort; however, there are a few VISNs in which the Matched VA costs are higher than their Matched Medicare counterparts.

RECOMMENDATIONS

- Even though differences in utilization may explain most of the difference in cost between the VA and private sector, VA might benefit from a more detailed cost analysis for several components of care incurred during hospitalization for a heart attack. Apart from procedure use, for example, VA may be more efficient than the private sector in bed-day costs (tests and procedures excluded).

- The project team also found that there is not complete congruence between DSS and the PTF, considering that both originate (in theory) from the same source. Further, we found that approximately 4.6% of persons known to have received care for a heart attack as recorded in PTF were miscoded with respect to primary diagnosis in DSS. Additional research is needed to understand the causes of the mismatch between DSS and PTF.

- We found the DSS data difficult to obtain although potentially useful. Therefore, we believe greater accessibility of the data to health services researchers is essential to timely completion of similar program evaluations of population-based health care services for specific conditions or disease management studies. VA should consider investing in DSS to develop standardized research data sets, including methodologies to track procedures specific costs, in addition to current DSS resources supporting the internal VA budgeting process.

- The VA should consider attempting to replicate the results using the same methodology on another (perhaps smaller) disease management group or population, to ascertain whether the differences between the VA and Medicare are directionally similar.