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Disparities in the receipt of cardiac revascularization procedures

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ABSTRACT

Cardiovascular (CVD) disease is the number one cause of mortality in the United States. The mortality rate from CVD has decreased over the past 40 years due to a combination of lifestyle changes (smoking cessation, blood pressure and cholesterol screening, exercise) as well as advances in CVD therapies disparities in mortality rates continue to exist. This research sought to build on a body of research by examining the receipt of three invasive cardiac revascularization procedures, cardiac catheterization (CC), percutaneous transluminal cardiac angioplasty (PTCA) and coronary artery bypass graft (CABG) among Hispanics and Non-Hispanic Whites in Florida from 1992 to 2010 Who were diagnosed with Ischemic Heart Disease.

Inpatient discharge data from the Florida Agency for Health Care Administration was utilized for this study. These data exist in SPSS format and were imported into SAS for data management and analysis. A number of SAS PROCS were utilized and are illustrated subsequently in this paper.

Results of the analysis showed significant differences between Hispanics and Non-Hispanic Whites in the proportion of males, the distribution of insurance type, and the proportion of each group with diabetes, hypertension, depression, and obesity. More importantly Hispanics had significantly lower odds of receiving any of the three procedures (CC, PTCA, and CABG).

INTRODUCTION

Cardiovascular disease (CVD) is a growing concern in the United States. Each year more than 800,000 people die from cardiovascular disease. CVD is the leading cause of death both in the United States and globally. CVD has become the third leading cause of years of potential life lost before the age of 65. Ischemic heart disease (IHD) also referred to as coronary heart disease (CHD) is the cause of one-third of all deaths related to CVD (CDC, 1998).

CVD is the leading cause of preventable death in the United States. There are more than one million heart attacks and 700,000 strokes each year. Hypertension is considered to be a major risk factor for CVD and stroke. One out of every death is a result of hypertension in the United States. Majority of adult disabilities in the United States are caused by CVD making it one of the most expensive conditions to treat in the United States (CDC, 2012).

According to studies, the Hispanic population in the United States mainly consists of Mexicans, Puerto Ricans, and Cubans. Hispanics account for half of the United States growth and will constitute one-fourth of the population in years to come, making them the fastest growing minority in the United States. Since the year 2000, the Hispanic population in the United States has grown by 43 percent from 35.3 million to the estimated 52 million in 2011. The Hispanic population is expected to reach132.8 million by the year 2050, a projection that equals 24 percent of the entire United States population at that time, making them the fastest growing minority in the United States (CDC, Minority Health, 2014). In 2011, there was an estimated 4 million Hispanics living in the state of Florida.

In the United States, CVD is the cause of 22.5% of all mortality for Hispanic men and 25.4% of all mortality for Hispanic women. Despite the prevalence of DVD risk factors among the United States population, many people are not aware that they are at risk for developing the condition. In 2003, 27% of Hispanic women were aware that heart disease was a major health problem, compared with 55% of white women. Diabetes is a major risk factor for CVD and has a prevalence of 22% among Hispanics age 40 and older, which is nearly twice that of whites. The cumulative residual lifetime risk for diabetes is 45.5% for Hispanic men compared to 26.7% for white men. For Hispanic women, the lifetime risk for diabetes is 52.5% for Hispanic women compared to 31.2% white women (Li, Chen, & Mead, 2013).

Hispanic children have higher fasting insulin and glucose concentrations compared to whites. Childhood and adolescent obesity 10% higher among Hispanic males age 6 to 19 than whites (Li, Chen, & Mead, 2013).

Hispanics have a higher cardiovascular risk profiles than whites. Because there is an increase in the prevalence of CVD in Hispanics, the use and outcomes of revascularization procedures in Hispanics are vital. The care of the Hispanic population is an increasing concern for public health. However, treatment and outcomes of CVD are lacking for Hispanic patients (Parikh & Enriquez, 2009).

Hispanics are less likely than whites to receive coronary angiography and CARG but not PTCA. According to health organizations, Hispanics were less likely than whites to receive coronary angiography but not PTCA or CABG. One study found that Hispanics were less likely than whites to receive any revascularization procedure (Morrissey & Giacovaell, 2007).

The purpose of the research was to examine the rates of cardiovascular revascularization procedures (cardiac catheterization, balloon angioplasty, and bypass grafts) among Hispanics and Non-Hispanic Whites diagnosed with a primary discharge diagnosis of ischemic heart disease.

Ethics Statement

This research project was submitted to and approved by the Florida Agricultural and Mechanical University (FAMU) Institutional Review Board (IRB) on February 20, 2014.

METHODS

The Data were derived from the Florida Agency for Health Care Administration (AHCA). AHCA maintains public use discharge data from all licensed inpatient health care facilities in Florida. Hospitals report demographic, diagnosis, medical procedure, and cost data on discharges on a quarterly basis. The public use data file has no personal identifiers.

The data are housed in the GIS, Data, and Spatial Analysis Laboratory in the Institute of Public Health. Inpatient data for each year are kept in a separate SPSS datasets. Data used in the present study were extracted from inpatient datasets for the years 1992 to 2010. All records with a primary discharge diagnosis of ischemic heart disease (ICD-9-CM 410.0-414.9) were selected among Hispanic and non-Hispanic white residents of Florida greater than 40 years of age were included. Sex, age, year of discharge, other medical conditions (specifically diabetes, hypertension, obesity, depression), and payer type were selected as potential confounders. The procedure codes for cardiac catheterization (372.0-372.3), PTCA (36.01, 36.02, 36.05, 00.40-00.43, and 00.66), and CABG (36.10-36.20) indicated the outcomes of interest. The code for importing these data into SAS is shown below:

```
DM LOG 'CLEAR' CONTINUE;
LIBNAME IHD 'C:\IHD';
*THIS IS FOR 1992 TO 2004 IHD;
PROC IMPORT DATAFILE = 'C:\IHD\IHD92-04.SAV' DBMS = SAV OUT =
IHD.IHD9204;
RUN;
*THIS IS FOR 12005 IHD;
PROC IMPORT DATAFILE = 'C:\IHD\IHD2005.SAV' DBMS = SAV OUT =
IHD.IHD2005;
RUN;
*THIS IS FOR 2006 TO 2009 IHD;
PROC IMPORT DATAFILE = 'C:\IHD\IHD06-09.SAV' DBMS = SAV OUT =
IHD.IHD0609;
RUN;
*THIS IS FOR 2010 IHD;
PROC IMPORT DATAFILE = 'C:\IHD\IHD2010.SAV' DBMS = SAV OUT =
IHD.IHD2010;
RUN;
```

Figure 1: PROC IMPORT SYNTAX FOR SPSS DATAFILES

Because of the different formatting of the data elements in each file it was decided to import files with like formatting first before concatenating them. This is done using the DATA and SET commands. The syntax is shown below:

```
DATA IHD.IHDTOTAL;
SET IHD.IHD9204_STAT IHD.IHD2005_STAT IHD.IHD0609_STAT
IHD.IHD2010_STAT;
RUN;
```

Figure 2: Syntax for Combining FIles

A new datafile called IHD.IHDTOTAL is the result of combining the IHD9204 IHD2005 IHD0609 and IHD2010 files. The syntax for merging the data is DATA *new file name;* SET *existing file name(s);* This resulted in a file containing ischemic disease discharges in Florida between 1992 and 2010. Once this file was created variable labels, format libraries and formats were created. The creation of these extra attributes allows for data tables produced by SAS to have labeled output. (instead of tables with variable names like 'CC' or ;RACEETH' the output will be labeled 'CARDIAC CATH' or 'RACE/ETHNICITY'). The same holds true for the value formats. In this instance we used the PROC FORMAT command to define the value labels for our variables. Note that we first told SAS that the format library would be in the IHD library (**PROC FORMAT** LIBRARY = IHD.MYIHDFORMATS;). The MYIHDFORMATS component of the library names tells SAS the name of the format library. The second thing we inform SAS of is to look for the format file in the IHD library (OPTIONS FMTSEARCH = (IHD.MYIHDFORMATS);). In specifying this SAS will always search for the format file in the library called IHD.

Data was analyzed utilizing SAS 9.4 (Cary N.C.)

That code is shown here:

```
*THIS PROGRAM CREATES LABELS AND FORMATS;
DATA IHD.TOTAL;
SET IHD.IHDTOTAL;
LABEL PAYER = 'PAYER OR RECORD'
LABEL RACEETH = 'RACE/ETHNICITY'
LABEL REC_SEX = 'SEX'
LABEL CC = 'CARDIAC CATH'
LABEL PTCA = 'PERCUTANEOUS TRANSLUMINAL ANGIOPLASTY'
LABEL CABG = 'CORONARY ARTERY BYPASS GRAPH'
;
IF PAYER IN ('L' 'N') THEN NEWPAYER = '0';
IF PAYER IN ('A' 'B' 'C' 'D' 'I' 'J' 'K' 'O' 'H') THEN NEWPAYER =
'1';
IF PAYER IN ('E' 'F' 'G' 'Q') THEN NEWPAYER = '2';
IF PAYER IN ('M') THEN NEWPAYER = '3';
IF AGE >=40 AND AGE <=49 THEN NEWAGE = 0;
IF AGE >=50 AND AGE <65 THEN NEWAGE = 1;
IF AGE >=65 AND AGE <=74 THEN NEWAGE = 2;
IF AGE >=75 THEN NEWAGE = 3;
PROC FORMAT LIBRARY = IHD.MYIHDFORMATS;
OPTIONS FMTSEARCH = (IHD.MYIHDFORMATS);
VALUE NO_YES 0 = 'NO' 1 = 'YES';
VALUE RACEETH 0 = 'NON-HISPANIC WHITE' 1 = 'HISPANIC';
VALUE REC_SEX 0 = 'FEMALE' 1 = 'MALE';
VALUE $NEWPAYER '0' = 'NO INSURANCE' '1' = 'GOVERNMENT INSURANCE' '2'
= 'PRIVATE INSURANCE' '3' = 'OTHER';
VALUE NEWAGE 0 = '40-49 YEAR OLDS' 1 = '50 TO 64 YEAR OLDS' 2 = '65
TO 74 YEAR OLDS' 3 = '75 YEARS AND OLDER';
RUN;
```

Figure 3: SAS Code for Variable Labels and Value Formats

RESULTS

Initial univariate statistics were calculated to describe distributions of the predictor and outcome variables.

Note that we can use the format variables defined in Figure 2 to annotate our output. The code was a simple PROC FREQ using format variables:

```
DATA IHD.ANALYSIS;
SET IHD.TOTAL;
* INITIAL FREQUENCY DISTRIBUTIONS;
PROC FREQ DATA = IHD.ANALYSIS;
TABLE NEWPAYER REC_SEX CABG CC PTCA DEPRESSION DIABETES HYPERTENSION
OBESITY YEAR NEWAGE;
FORMAT CABG CC PTCA DEPRESSION DIABETES HYPERTENSION OBESITY
NO_YES.;
FORMAT RACEETH RACEETH. ;
FORMAT NEWPAYER $NEWPAYER.;
FORMAT NEWAGE NEWAGE.;
FORMAT REC_SEX REC_SEX.;
RUN;
```

Figure 4: Code for an initial Frequency Distributions

The following tables were produced from the code in Figure 4:

FREQUENCIES OF PREDICTOR AND OUTCOME VARIABLES

The FREQ Procedure

NEWPAYER	Frequency	Percent	Cumulative Frequency	Cumulative Percent
NO INSURANCE	96783	4.36	96783	4.36
GOVERNMENT INSURANCE	1542985	69.45	1639768	73.80
PRIVATE INSURANCE	574605	25.86	2214373	99.66
OTHER	7492	0.34	2221865	100.00

SEX LABEL

rec_sex	Frequency	Percent	Cumulative Frequency	Cumulative Percent
FEMALE	861339	38.77	861339	38.77
MALE	1360526	61.23	2221865	100.00

CORONARY ARTERY BYPASS GRAPH

CABG	Frequency	Percent	Cumulative Frequency	Cumulative Percent
NO	1910838	86.00	1910838	86.00
YES	311027	14.00	2221865	100.00

CARDIAC CATH LABEL

CC	Frequency	Percent	Cumulative Frequency	Cumulative Percent
NO	1803301	81.16	1803301	81.16
YES	418564	18.84	2221865	100.00

PERCUTANEOUS TRANSLUMINAL ANGIOPLASTY LABEL

PTCA	Frequency	Percent	Cumulative Frequency	Cumulative Percent
NO	1583945	71.29	1583945	71.29
YES	637920	28.71	2221865	100.00

Figure 5: Univariate Frequencies

depression	Frequency	Percent	Cumulative Frequency	Cumulative Percent
NO	2137860	96.22	2137860	96.22
YES	84005	3.78	2221865	100.00

diabetes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
NO	1606592	72.31	1606592	72.31
YES	615273	27.69	2221865	100.00

hypertension	Frequency	Percent	Cumulative Frequency	Cumulative Percent
NO	930592	41.88	930592	41.88
YES	1291273	58.12	2221865	100.00

obesity	Frequency	Percent	Cumulative Frequency	Cumulative Percent
NO	2131217	95.92	2131217	95.92
YES	90648	4.08	2221865	100.00

NEWAGE	Frequency	Percent	Cumulative Frequency	Cumulative Percent
40-49 YEAR OLDS	163682	7.37	163682	7.37
50 TO 64 YEAR OLDS	598618	26.94	762300	34.31
65 TO 74 YEAR OLDS	666221	29.98	1428521	64.29
75 YEARS AND OLDER	793344	35.71	2221865	100.00

Figure 5 continued: Univariate Frequencies

The remaining table, Year of Diagnosis is found on the next page.

year				
year	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1992	110873	4.99	110873	4.99
1993	113529	5.11	224402	10.10
1994	116519	5.24	340921	15.34
1995	122403	5.51	463324	20.85
1996	127672	5.75	590996	26.60
1997	129475	5.83	720471	32.43
1998	130961	5.89	851432	38.32
1999	132322	5.96	983754	44.28
2000	136542	6.15	1120296	50.42
2001	136012	6.12	1256308	56.54
2002	131800	5.93	1388108	62.47
2003	128774	5.80	1516882	68.27
2004	124892	5.62	1641774	73.89
2005	119533	5.38	1761307	79.27
2006	111385	5.01	1872692	84.28
2007	98407	4.43	1971099	88.71
2008	89675	4.04	2060774	92.75
2009	81970	3.69	2142744	96.44
2010	79121	3.56	2221865	100.00

Figure 5 continued

Bivariate tables were produced to examine the association of the predictor variables to outcome variables and covariates. The organization of the PROC FREQ is PROC FREQ *rowvariable * columnvariable.* The /CHISQ and CMH options provide Chi-Square and Odds Ratio measures for the resulting tables. Odds ratios were calculated for 2x2 analyses and Chi-Square statistics generated for tables larger than 2x2. The code for the other two outcomes, PTCA and CC are exactly the same by substituting in the MODEL statement and the TITLE statement.The syntax for this is shown in Figure 6:

```
* INITIAL BIVARIATE COMPARISONS;
PROC FREQ DATA = IHD.ANALYSIS;
TABLE (NEWPAYER REC_SEX CABG CC PTCA DEPRESSION DIABETES
HYPERTENSION OBESITY NEWAGE) * RACEETH /CHISQ CMH;
FORMAT CABG CC PTCA DEPRESSION DIABETES HYPERTENSION OBESITY
NO_YES.;
FORMAT RACEETH RACEETH. ;
FORMAT NEWPAYER $NEWPAYER.;
FORMAT REC_SEX REC_SEX.;
FORMAT NEWAGE NEWAGE.;
TITLE 'INITIAL BIVARIATE COMPARISONS';
RUN;
```

Figure 6: Bivariate code

The results from the bivariate analysis are shown in Figure 7.

	Non-Hispanic White	Hispanic	Significance
Insurance Status			P<0.001
No Insurance	3.92	8.26	
Government	69.87	65.68	
Private	26.90	25.52	
Other	0.31	0.54	
Sex			
Male	61.48	59.01	P<0.001
Diabetes			
Yes	26.64	37.04	
Hypertension			P<0.001
Yes	57.40	64.47	
Obesity			
Yes	4.07	4.01	N.S.
Depression			
Yes	3.81	3.51	P<0.001
Cardiac Catheterization			
Yes	18.95	17.82	P<0.001
Percutaneous Transluminal Coronary Angioplasty			P<0.001
Yes	29.14	24.87	
Coronary Artery Bypass Graft			P<0.001
Yes	14.32	11.16	

Figure 7: Bivariate Analysis

Multivariate (Logistic regression) analysis was performed to measure the odds of receiving CC, PTCA, and CABG for Hispanics compared to non-Hispanic Whites controlling for covariates.

```
*LOGISTIC REGRESSION OF CARDIAC CATHETERIZATION BY RACE/ETHNICITY;
PROC LOGISTIC DATA=IHD.ANALYSIS DESCENDING;
CLASS NEWPAYER ;
MODEL CC (EVENT = '1') = RACEETH REC_SEX DIABETES HYPERTENSION NEWPAYER
OBESITY DEPRESSION AGE YEAR;
FORMAT DEPRESSION DIABETES HYPERTENSION OBESITY NO_YES.;
FORMAT RACEETH RACEETH. ;
FORMAT NEWPAYER $NEWPAYER.;
FORMAT REC_SEX REC_SEX.;
TITLE  'LOGISTIC FOR CC';
RUN;
```

Figure 8: Logistic Regression Code

Multivariate Results

The table below shows the results of the logistic regression. Hispanics were only 90% as likely to receive cardiac catheterization (CC) compared to Non-Hispanic Whites. Males were 15% more likely to receive CC than females, Diabetic are less likely to receive CC. Hypertensives were significantly more likely to receive CC than normotensives. Those with government insurance (Medicaid and Medicare) were more likely to receive CC. Obesity was not significantly associated with the odds of receiving CC. Depression increased the odds of CC. Overall as age increased the odds of receiving cardiac catheterization decreased. The odds of receiving CC decreased with time.

Effect	Point Estimate	Lower Limit	Upper Limit
Raceeth (White is ref)	0.901	0.891	0.912
rec_sex (Female is ref)	0.853	0.847	0.859
Diabetes (No is ref)	0.970	0.963	0.978
Hypertension (No is ref)	1.110	1.102	1.118
Govt Ins vs Private (Private is ref)	1.220	1.209	1.231
No Ins vs Private (Private is ref)	1.047	1.029	1.065
Other vs Private (Private is ref)	0.928	0.873	0.987
Obesity (No is ref)	1.007	0.990	1.024
Depression (No is ref)	1.148	1.129	1.168
age	0.980	0.980	0.981
year	0.991	0.990	0.992

Figure 9: Multivariate Results for Cardiac Catheterization

The results from the logistic regression analysis for Percutaneous Transluminal Coronary Angioplasty (PTCA) are shown in Figure 10 below. The odds of a Hispanic receiving PTCA were 26% lower than for Non-Hispanic Whites. Males were significantly more likely to receive PTCA than females. Diabetics, the obese, and depressed were less likely to receive PTCA. Patients with Medicaid or Medicare were significantly less likely to receive PTCA.

Effect	Point Estimate	Lower Limit	Upper Limit
Raceeth (White is ref)	0.741	0.733	0.749
rec_sex (Female is ref)	1.193	1.186	1.201
Diabetes (No is ref)	0.846	0.840	0.852
Hypertension (No is ref)	0.995	0.988	1.001
Govt Ins vs Private (Private is ref)	0.902	0.895	0.909
No Ins vs Private (Private is ref)	0.710	0.699	0.721
Other vs Private (Private is ref)	0.514	0.484	0.547
Obesity (No is ref)	0.810	0.798	0.822
Depression (No is ref)	0.617	0.607	0.627
age	0.977	0.977	0.977
year	1.088	1.087	1.089

Figure 10: Multivariate Analysis for Receiving PTCA

From Table 10 it can be seen that Hispanics are less likely to receive bypass grafts than their Non-Hispanic White counterparts. Males, diabetics, hypertensives, and the obese, are all significantly more likely to receive bypass grafts. Those with Medicaid or Medicare were less likely than those with private insurance to receive bypass grafts. As age increased by one year the odds of receiving a bypass graph decreased by about 3%. However, with each year between 1992 and 2010 the odds of receiving a bypass graft increased by 8%.

Effect	Point Estimate	Lower Limit	Upper Limit
Raceeth (White is ref)	0.750	0.740	0.761
rec_sex (Female is ref)	1.790	1.775	1.805
Diabetes (No is ref)	1.128	1.119	1.138
Hypertension (No is ref)	1.233	1.223	1.243
Govt Ins vs Private (Private is ref)	0.943	0.933	0.952
No Ins vs Private (Private is ref)	0.826	0.810	0.8
Other vs Private (Private is ref)	0.748	0.697	0.802
Obesity (No is ref)	1.362	1.337	1.387
Depression (No is ref)	0.682	0.666	0.698
age	0.991	0.990	0.991
year	0.970	0.969	0.971

Figure 11: Multivariate Analysis for Receiving Bypass Grafts

CONCLUSION

From the foregoing we may draw several conclusions related to the data base functionality of SAS. First, using the SAS PROC IMPORT is an easy and efficient means to read data from other formats such as SPSS, Excel, dBase, Access, and others. The second is that using libraries for data and format files facilitates organization and locating critical files. Last is that utilizing variable labels and formats makes the resulting analytical tables much more readable.

In terms of the analysis, it can be seen that all of the covariates (potential confounders) were significantly associated with Hispanics with the exception of the prevalence of obesity. The multivariate analysis (controlled for the other variables in the logistic regression model) showed consistent patterns of lower odds of Hispanics to receive any of the invasive cardiac revascularization procedures compared to Non-Hispanic Whites.

A strength of this study is that it is population-based and as such is less affected by sampling error. There are several weaknesses in this study. One drawback of the study is that Hispanics were grouped into a single category which could not account for any possible cultural differences in this diverse group. The data obtained was based on discharges and not individual patients. That has the potential to increase the sample size and consequently increase the chances of an alpha error. Also, we were not able to access the severity of illness. This point could have major implications when examining the receipt of an invasive procedure like catheterization, angioplasty, and bypass grafts.

We would recommend that future studies, perhaps on smaller clinical populations investigate the role of severity in the receipt of these procedures. Additionally, examining differences within subgroups of who are termed Hispanic would assist Public Health in developing targeted, culturally competent health

REFERENCES

Carlisle, D., Leake, B., & Shapiro, M. (1997). Racial and ethnic disparities in the use of cardiovascular procedures: Associations with type of health insurance. American Journal of Public Health, 87:263-267.

CDC. (1998). Progress in chronic disease prevention state and sex specific premature mortality due to ischemic heart disease. Morbidity and Mortality Weekly Report, 313-314, 321-323.

CDC. (2012). Use of selected clinical preventive services among adults in the united states. morbidity and Mortality Weekly Report, 1-79.

CDC. (2014, February 1). Minority Health. Retrieved from CDC: http://www.cdc.gov/minorityhealth/populations/REMP/hispanic.html

Ford, E., Newman, J., & Deosaransingh, K. (2000). Racial and ethnic differences in the use of cardiovascular procedures: Findings from the Califonia cooperatice cardiovascular project. American journal of public health, 90:1128-1134.

Kressin, N., & Peterson, L. (2001). Racial differences in the use of invasive cardiovascular procedures: review of the literature and prescription for future research. Annals of Internal Medicine, 135:352-366.

Li, S., Chen, A., & Mead, K. (2013). Racial Disparities in the use of cardiac revascularization: Does local hospital capacity matter? Journal Prone 8(7), 1371.

Morrissey, N., & Giacovaell. (2007). Disparities in the treatment and outcomes of vascular disease in hispanic patients. Journal of vascular surgery, 971-978.

Mukamel, D., Weimer, A., & L, D. (2000). Racial diffferences in access to high-quality cardiac surgeons. American Journal of Public Health, 90:1774-7.

Parikh, S., & Enriquez, J. (2009). Association of a unique cardiovascular risk profile with outcomes in hispanic patients referred for percutaneous coronary intervention. American Journal of Cardiovascular, 775-779.

Philbin, E., McCullough, P., & DiSalvo, T. (2001). Underuse of invasive procedures among medicaid patients with acute myocadial infarction. American Journal of Public Health, 91:1082-1088.

Schneider, E., & Leape, L. (2001). Racial differences in cardiac revascularization rates: does "overuse" explain highr rates among white patients. Annals internal medicine, 328-337.

Taylor, A., Meyer, G., Morse, R., & Pearson, C. (1997). Can characteristics of a health care system mitigate ethnic hias in access to cardiovascular procedures? Experience from military health services system. American College of Cardiology, 901-7.

RECOMMENDED READING

- *Base SAS® Procedures Guide*
- *SAS® For Dummies®*
- *The Little SAS Book*
- *Data Manipulation and Analysis Using SAS Enterprise Guide*
- *SAS Statistics by Example*

CONTACT INFORMATION

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