ADULT CARDIAC SURGERY

in New York State

2005 – 2007

New York State Department of Health
April 2010

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INTRODUCTION

The information contained in this booklet is intended for health care providers, patients and families of patients who are considering cardiac surgery. It provides data on risk factors associated with death following coronary artery bypass graft surgery (CABG) and heart valve surgery, and lists hospital and physician-specific mortality rates which have been risk-adjusted to account for differences in patient severity of illness.

New York State (NYS) has taken a leadership role in setting standards for cardiac services, monitoring outcomes and sharing performance data with patients, hospitals and physicians. Hospitals and doctors involved in cardiac care have worked in cooperation with the NYS Department of Health (Department of Health) and the NYS Cardiac Advisory Committee (Cardiac Advisory Committee) to compile accurate and meaningful data that can and have been used to enhance quality of care. We believe that this process has been instrumental in achieving the excellent outcomes that are evidenced in this report for centers across NYS.

We are pleased to be able to continue to provide expanded information in this year's report that encompasses outcomes for isolated CABG, valve surgery and the two procedures done in combination. Isolated CABG represents the majority of adult cardiac surgeries performed, and we have reported risk-adjusted outcomes for that procedure for over 15 years. However, many additional patients undergo procedures each year to repair or replace heart valves or undergo valve surgery done in combination with CABG. This report provides important information on the risk factors and outcomes for both CABG and valve surgery. In addition, this report includes information on mortality outside the hospital but within 30 days following surgery. We believe this to be an important quality indicator that will provide useful information to patients and providers.

As they develop treatment plans, we encourage doctors to discuss this information with their patients and colleagues. While these statistics are an important tool in making informed health care choices, individual treatment plans must be made by doctors and patients together after careful consideration of all pertinent factors. It is important to recognize that many factors can influence the outcome of cardiac surgery. These include the patient's health before the procedure, the skill of the operating team and general after-care. In addition, keep in mind that the information in this booklet does not include data after 2007. Important changes may have taken place in some hospitals during that time period.

In developing treatment plans, it is important that patients and physicians alike give careful consideration to the importance of healthy lifestyles for all those affected by heart disease. While some risk factors, such as heredity, gender and age cannot be controlled, others certainly can. Controllable risk factors that contribute to a higher likelihood of developing coronary artery disease are high cholesterol levels, cigarette smoking, high blood pressure, obesity and lack of exercise. Limiting these risk factors after surgery will continue to be important in minimizing the occurrence of new blockages.

Providers of this State and the Cardiac Advisory Committee are to be commended for the excellent results that have been achieved through this cooperative quality improvement system. The Department of Health will continue to work in partnership with hospitals and physicians to ensure continued high-quality cardiac surgery is available to NYS residents.

CORONARY ARTERY BYPASS GRAFT SURGERY (CABG)

Heart disease is, by far, the leading cause of death in New York State, and the most common form of heart disease is atherosclerotic coronary artery disease. Different treatments are recommended for patients with coronary artery disease. For some people, changes in lifestyle, such as dietary changes, not smoking and regular exercise, can result in great improvements in health. In other cases, medication prescribed for high blood pressure or other conditions can make a significant difference.

Sometimes, however, an interventional procedure is recommended. The two common procedures performed on patients with coronary artery disease are CABG surgery and percutaneous coronary intervention (PCI).

CABG surgery is an operation in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart muscle, bypassing the arterial blockage. Typically, a section of one of the large (saphenous) veins in the leg, the radial artery in the arm or the mammary artery in the chest is used to construct the bypass. One or more bypasses may be performed during a single operation, since providing several routes for the blood supply to travel is believed to improve long-term success for the procedure. Triple and quadruple bypasses are often done for this reason, not necessarily because the patient's condition is more severe. CABG surgery is one of the most common, successful major operations currently performed in the United States.

As is true of all major surgery, risks must be considered. The patient is totally anesthetized and there is generally a substantial recovery period in the hospital followed by several weeks of recuperation at home. Even in successful cases, there is a risk of relapse causing the need for another operation.

Those who have CABG surgery are not cured of coronary artery disease; the disease can still occur in the grafted blood vessels or other coronary arteries. In order to minimize new blockages, patients should continue to reduce their risk factors for heart disease.

CARDIAC VALVE PROCEDURES

Heart valves control the flow of blood as it enters the heart and is pumped from the chambers of the heart to the lungs for oxygenation and back to the body. There are four valves: the tricuspid, mitral, pulmonic and aortic valves. Heart valve disease occurs when a valve cannot open all the way because of disease or injury, thus causing a decrease in blood flow to the next heart chamber. Another type of valve problem occurs when the valve does not close completely, which leads to blood leaking backwards into the previous chamber. Either of these problems causes the heart to work harder to pump blood or causes blood to back up in the lungs or lower body.

When a valve is stenotic (too narrow to allow enough blood to flow through the valve opening) or incompetent (cannot close tightly enough to prevent the backflow of blood), one of the treatment options is to repair the valve. Repair of a stenotic valve typically involves widening the valve opening, whereas repair of an incompetent valve is typically achieved by narrowing or tightening the supporting structures of the valve. The mitral valve is particularly amenable to valve repairs because its parts can frequently be repaired without having to be replaced.

In many cases, defective valves are replaced rather than repaired, using either a mechanical or biological valve. Mechanical valves are built using durable materials that generally last a lifetime. Biological valves are made from tissue taken from pigs, cows or humans. Mechanical and biological valves each have advantages and disadvantages that can be discussed with referring physicians.

The most common heart valve surgeries involve the aortic and mitral valves. Patients undergoing heart surgery are totally anesthetized and are usually placed on a heart-lung machine, whereby the heart is stopped for a short period of time using special drugs. As is the case for CABG surgery, there is a recovery period of several weeks at home after being discharged from the hospital. Some patients require replacement of more than one valve and some patients with both coronary artery disease and valve disease require valve replacement and CABG surgery. This report contains outcomes for the following valve procedures when done alone or in combination with CABG: Aortic Valve Replacement, Mitral Valve Repair, Mitral Valve Replacement and Multiple Valve Surgery.

THE DEPARTMENT OF HEALTH PROGRAM

For many years, the Department of Health has been studying the effects of patient and treatment characteristics (called risk factors) on outcomes for patients with heart disease. Detailed statistical analyses of the information received from the study have been conducted under the guidance of the Cardiac Advisory Committee, a group of independent practicing cardiac surgeons, cardiologists and other professionals in related fields.

The results have been used to create a cardiac profile system which assesses the performance of hospitals and surgeons over time, independent of the severity of each individual patient's pre-operative conditions.

Designed to improve health in people with heart disease, this program is aimed at:

- understanding the health risks of patients that adversely affect how they will fare in coronary artery bypass surgery and/or valve surgery;
- improving the results of different treatments of heart disease;
- improving cardiac care; and
- providing information to help patients make better decisions about their own care.

PATIENT POPULATION

This report is based on data for patients discharged between January 1, 2005, and December 31, 2007, provided by all non-federal hospitals in NYS where cardiac surgery is performed.

Beginning with patients discharged in 2006, the Department of Health, with the advice of the Cardiac Advisory Committee, began a trial period of excluding from publicly-released reports any patients meeting the Cardiac Data System definition of pre-operative cardiogenic shock. Cardiogenic shock is a condition associated with severe hypotension (very low blood pressure). [The technical definition used in this report can be found on page 43.] Patients in cardiogenic shock are extremely high-risk, but for some, cardiac surgery may be their best chance for survival. Furthermore, the magnitude of the risk is not always easily determined using registry data. These cases were excluded after careful deliberation and input from NYS providers and others in an effort to ensure that physicians could accept these cases where appropriate without concern over a detrimental impact on their reported outcomes.

Cases with shock were also excluded from the 2005 data in the three-year analyses. This was done to allow for accurate risk assessment across the entire time period. In total, 387 cases with cardiogenic shock were removed from 2005-2007 data. This accounts for 0.61 percent of all cardiac surgeries (CABG, valve surgery and other cardiac surgery reported in this data system) in the three years.

In addition, 54 records were excluded from the 2007 database because they belong to patients residing outside the United States and these patients could not be followed after hospital discharge. Five records belonging to patients enrolled in a clinical trial (PARTNER) comparing outcomes for two kinds of valve replacement procedures were excluded as well.

Isolated CABG surgery represented 55.98 percent of all adult cardiac surgery for the three-year period covered by this report. Valve or combined valve/CABG surgery represented 33.13 percent of all adult cardiac surgery for the same three-year period. Total cardiac surgery, isolated CABG, valve or valve/CABG surgery and other cardiac surgery volumes are tabulated in Table 7 by hospital and surgeon for the period 2005 through 2007.

RISK ADJUSTMENT FOR ASSESSING PROVIDER PERFORMANCE

Provider performance is directly related to patient outcomes. Whether patients recover quickly, experience complications or die following a procedure is, in part, a result of the kind of medical care they receive. It is difficult, however, to compare outcomes across hospitals when assessing provider performance because different hospitals treat different types of patients. Hospitals with sicker patients may have higher rates of complications and death than other hospitals in the state. The following describes how the Department of Health adjusts for patient risk in assessing provider outcomes.

Data Collection, Data Validation and Identifying In-Hospital/30-Day Deaths

As part of the risk-adjustment process, NYS hospitals where cardiac surgery is performed provide information to the Department of Health for each patient undergoing that procedure. Cardiac surgery departments collect data concerning patients' demographic and clinical characteristics. Approximately 40 of these characteristics (called risk factors) are collected for each patient. Along with information about the procedure, physician and the patient's status at discharge, these data are entered into a computer and sent to the Department of Health for analysis.

Data are verified through review of unusual reporting frequencies, cross-matching of cardiac surgery data with other Department of Health databases and a review of medical records for a selected sample of cases. These activities are extremely helpful in ensuring consistent interpretation of data elements across hospitals.

The analyses in this report base mortality on deaths occurring during the same hospital stay in which a patient underwent cardiac surgery and on deaths that occur after discharge but within 30 days of surgery.

An in-hospital death is defined as a patient who died subsequent to CABG or valve surgery during the same admission or was discharged to hospice care and expired within 30 days.

Deaths that occur after hospital discharge but within 30 days of surgery are also counted in the risk-adjusted mortality analyses. This is done because hospital length of stay has been decreasing and in the opinion of the Cardiac Advisory Committee most deaths that occur after hospital discharge but within 30 days of surgery are related to complications of surgery.

Data on deaths occurring after discharge from the hospital are obtained from the Social Security Administration Death Master File, the Department of Health and the New York City Department of Health and Mental Hygiene Bureau of Vital Statistics.

Assessing Patient Risk

Each person who develops heart disease has a unique health history. A cardiac profile system has been developed to evaluate the risk of treatment for each individual patient based on his or her history, weighing the important health factors for that person based on the experiences of thousands of patients who have undergone the same procedures in recent years. All important risk factors for each patient are combined to create a risk profile. For example, an 80-year-old patient with a history of a previous open heart surgery has a very different risk profile than a 40-year-old with no previous open heart surgery.

The statistical analyses conducted by the Department of Health consist of determining which of the risk factors collected are significantly related to death following CABG and/or valve surgery and determining how to weight the significant risk factors to predict the chance each patient will have of dying, given his or her specific characteristics.

Doctors and patients should review individual risk profiles together. Treatment decisions must be made by doctors and patients together after consideration of all the information.

Predicting Patient Mortality Rates for Providers

The statistical methods used to predict mortality on the basis of the significant risk factors are tested to determine if they are sufficiently accurate in predicting mortality for patients who are extremely ill prior to undergoing the procedure as well as for patients who are relatively healthy. These tests have confirmed that the models are reasonably accurate in predicting how patients of all different risk levels will fare when undergoing cardiac surgery.

The mortality rate for each hospital and surgeon is also predicted using the relevant statistical models. This is accomplished by summing the predicted probabilities of death for each of the provider's patients and dividing by the number of patients. The resulting rate is an estimate of what the provider's mortality rate would have been if the provider's performance were identical to the State performance. The percentage is called the predicted or expected mortality rate (EMR). A hospital's EMR is contrasted with its observed mortality rate (OMR), which is the number of patients who died divided by the total number of patients.

Computing the Risk-Adjusted Mortality Rate

The risk-adjusted mortality rate (RAMR) represents the best estimate, based on the associated statistical model, of what the provider's mortality rate would have been if the provider had a mix of patients identical to the statewide mix. Thus, the RAMR has, to the extent possible, ironed out differences among providers in patient severity of illness, since it arrives at a mortality rate for each provider for an identical group of patients.

To get the RAMR, the OMR is first divided by the provider's EMR. If the resulting ratio is larger than one, the provider has a higher mortality rate than expected on the basis of its patient mix; if it is smaller than one, the provider has a lower mortality rate than expected from its patient mix. For isolated CABG patients the ratio is then multiplied by the overall statewide mortality rate of 1.95 percent (in-hospital/30-day mortality in 2007) to obtain the provider's RAMR. For the three year period 2005-2007, the ratio is multiplied by 1.96 percent (in-hospital/30-day mortality rate) for isolated CABG patients or 5.45 percent (in-hospital/30-day mortality rate) for valve or valve/CABG patients.

Interpreting the Risk-Adjusted Mortality Rate

If the RAMR is significantly lower than the statewide mortality rate, the provider has a significantly better performance than the state as a whole; if the RAMR is significantly higher than the statewide mortality rate, the provider has a significantly worse performance than the state as a whole.

The RAMR is used in this report as a measure of quality of care provided by hospitals and surgeons. However, there are reasons that a provider's RAMR may not be indicative of its true quality. For example, extreme outcome rates may occur due to chance alone. This is particularly true for low-volume providers, for whom very high or very low mortality rates are more likely to occur than for high-volume providers. To prevent misinterpretation of differences caused by chance variation, confidence intervals are reported in the results. The interpretations of those terms are provided later when the data are presented.

Differences in hospital coding of risk factors could be an additional reason that a provider's RAMR may not be reflective of quality of care. The Department of Health monitors the quality of coded data by reviewing samples of patients' medical records to ascertain the presence of key risk factors. When significant coding problems have been discovered, hospitals have been required to correct these data and have been subjected to subsequent monitoring.

Although there are reasons that RAMRs presented here may not be a perfect reflection of quality of care, the Department of Health feels that this information is a valuable aid in choosing providers for cardiac surgery.

How This Initiative Contributes to Quality Improvement

The goal of the Department of Health and the Cardiac Advisory Committee is to improve the quality of care related to cardiac surgery in NYS. Providing the hospitals and cardiac surgeons in NYS with data about their own outcomes for these procedures allows them to examine the quality of the care they provide and to identify areas that need improvement.

The data collected and analyzed in this program are reviewed by the Cardiac Advisory Committee. Committee members assist with interpretation and advise the Department of Health regarding hospitals and surgeons that may need special attention. Committee members have also conducted site visits to particular hospitals and have recommended that some hospitals obtain the expertise of outside consultants to design improvements for their programs.

The overall results of this program of ongoing review show that significant progress is being made. In response to the program's results for surgery, facilities have refined patient criteria, evaluated patients more closely for pre–operative risks and directed them to the appropriate surgeon. More importantly, many hospitals have identified medical care process problems that have led to less than optimal outcomes, and have altered those processes to achieve improved results.

RESULTS

2007 Risk Factors for CABG Surgery

The significant pre–operative risk factors for death in the hospital during the same admission as the surgery or after hospital discharge but within 30 days of surgery (in-hospital/30-day mortality) for CABG in 2007 are presented in Table 1.

Roughly speaking, the odds ratio for a risk factor represents the number of times a patient with that risk factor is more likely to die in the hospital during or after CABG or after discharge but within 30 days of the surgery than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor COPD is 1.575. This means that a patient who has COPD prior to surgery is approximately 1.575 times as likely to die in the hospital or after discharge within 30 days of surgery as a patient who does not have COPD but who has the same other significant risk factors.

For some of the risk factors in the table, there are only two possibilities: having the risk factor and not having it. For example, a patient either has COPD or does not have COPD. Exceptions are: Age – Number of Years Greater than 60, Ejection Fraction (which is a measure of the heart's ability to pump blood), Previous MI, and Renal Failure.

For age, the odds ratio roughly represents the number of times a patient who is older than 60 is more likely to die in the hospital or after discharge but within 30 days than a patient who is one year younger. Thus, the chance of in-hospital / 30-day mortality for a patient undergoing CABG who is 61 years old is approximately 1.067 times that of a patient 60 years old undergoing CABG, if all other risk factors are the same. All patients age 60 and younger have roughly the same odds of dying in the hospital or after discharge but within 30 days if their other risk factors are identical.

The odds ratios for the categories for Ejection Fraction are relative to the reference category (50 percent and higher). Thus, patients with an ejection fraction of less than 30 percent have odds of in-hospital/30-day mortality that are 3.029 times the odds of a person with an ejection fraction of 50 percent or higher, all other risk factors being the same.

Previous MI is subdivided into three groups: occurring less than six hours prior to surgery, six to twenty-three hours prior and no MI within one day prior to surgery. The last group is referred to as the reference category. The odds ratios for the Previous MI categories are relative to patients who have not had an MI within one day prior to the procedure.

Since Renal Failure is expressed in terms of renal failure with dialysis and elevated creatinine without dialysis, the odds ratios for all Renal Failure categories are relative to patients with no dialysis and no creatinine greater than 1.3 mg/dL prior to surgery.

Table 1: Multivariable Risk Factor Equation for CABG In-Hospital/30-Day Deaths in New York State in 2007.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age: Number of years greater than 60	---	0.0651	<.0001	1.067
Female Gender	26.57	0.6137	<.0001	1.847
Hemodynamic State				
Unstable	1.34	1.4022	<.0001	4.064
Ventricular Function				
Ejection Fraction				
Ejection Fraction ≥ 50%	59.36	----Reference----		1.000
Ejection Fraction < 30%	8.20	1.1081	<.0001	3.029
Ejection Fraction 30-39%	11.57	0.5764	0.0051	1.780
Ejection Fraction 40-49%	20.87	0.4131	0.0255	1.511
Previous MI				
No Previous MI within 1 day	97.61	----Reference----		1.000
Previous MI less than 6 hours	0.93	1.0847	0.0223	2.959
Previous MI 6 – 23 hours	1.46	0.8573	0.0339	2.357
Comorbidities				
COPD	21.09	0.4544	0.0026	1.575
Extensive Aortic Atherosclerosis	5.07	0.6161	0.0030	1.852
Renal Failure				
No Renal Failure	73.24	----Reference----		1.000
Renal Failure, Creatinine 1.3 -1.5 mg/dl	14.73	0.8204	<.0001	2.271
Renal Failure, Creatinine 1.6 -2.0 mg/dl	6.51	1.0329	<.0001	2.809
Renal Failure, Creatinine > 2.0 mg/dl	3.26	1.5822	<.0001	4.865
Renal Failure, Dialysis	2.26	2.3836	<.0001	10.844
Previous Open Heart Operations	3.29	0.8499	0.0016	2.339

Intercept = -5.9675

C Statistic = 0.811

2007 HOSPITAL OUTCOMES FOR CABG SURGERY

Table 2 and Figure 1 present the CABG surgery results for the 40 hospitals performing this operation in NYS in 2007. The table contains, for each hospital, the number of isolated CABG operations (CABG operations with no other major heart surgery earlier in the hospital stay) for patients discharged in 2007, the number of in-hospital/30-day deaths, the OMR, the EMR based on the statistical model presented in Table 1, the RAMR, and a 95 percent confidence interval for the RAMR.

As indicated in Table 2, the overall in-hospital/30-day mortality rate for the 11,445 CABG procedures performed at the 40 hospitals was 1.95 percent. In-hospital/30-day OMRs ranged from 0.00 percent to 5.61 percent. The range of EMRs, which measure patient severity of illness, was 1.16 percent to 2.86 percent.

The RAMRs, which are used to measure performance, ranged from 0.00 percent to 7.43 percent. Two hospitals (Montefiore Medical Center - Jack D. Weiler Hospital of Albert Einstein College Division in the Bronx and New York Hospital Medical Center of Queens in Flushing) had RAMRs that were significantly higher than the statewide rate. One hospital (St. Peter's Hospital in Albany) had a RAMR that was significantly lower than the statewide rate.

The 2007 in-hospital/30-day mortality rate of 1.95 percent for Isolated CABG is slightly higher than the 1.92 percent observed in 2006.

The in-hospital OMR for 2007 Isolated CABG discharges (not shown in Table 2) was 1.54 percent for all 11,445 patients included in the analysis.

Figures 1 and 2 provide a visual representation of the data displayed in Tables 2 and 3. For each hospital, the black dot represents the RAMR and the gray bar represents the confidence interval, or potential statistical error, for the RAMR. The black vertical line is the NYS in-hospital/30-day mortality rate. For any hospital where the gray bar crosses the state average line, the RAMR is not statistically different from the state as a whole. Hospitals that are statistical outliers will have gray bars (confidence intervals) that are either entirely above or entirely below the line for the statewide rate.

2005 - 2007 HOSPITAL OUTCOMES FOR VALVE SURGERY

Table 3 and Figure 2 present the combined Valve Only and Valve/CABG surgery results for the 40 hospitals performing these operations in NYS during the years 2005-2007. The table contains, for each hospital, the combined number of Valve Only and Valve/CABG operations resulting in 2005-2007 discharges, the number of in-hospital/30-day deaths, the OMR, the EMR based on the statistical models presented in Appendices 2-3, the RAMR and a 95 percent confidence interval for the RAMR.

As indicated in Table 3, the overall in-hospital/30-day mortality rate for the 21,039 combined Valve Only and Valve/CABG procedures performed at the 40 hospitals was 5.45 percent. The OMRs ranged from 0.00 percent to 11.28 percent. The range of EMRs, which measure patient severity of illness, was 2.99 percent to 7.16 percent.

The RAMRs, which are used to measure performance, ranged from 0.00 percent to 9.98 percent. Three hospitals (Long Island Jewish Medical Center in New Hyde Park, Maimonides Medical Center in Brooklyn, and NYU Hospitals Center in New York) had RAMRs that were significantly higher than the statewide rate. Three hospitals (North Shore University Hospital in Manhasset, Vassar Brothers Medical Center in Poughkeepsie, and Westchester Medical Center in Valhalla) had RAMRs that were significantly lower than the statewide rate.

Table 4 presents valve procedures performed at the 40 cardiac surgery hospitals in NYS during 2005-2007. The table contains, for each hospital, the number of valve operations (as defined by eight separate groups: Aortic Valve Replacements, Aortic Valve Repair or Replacements plus CABG, Mitral Valve Replacement, Mitral Valve Replacement plus CABG, Mitral Valve Repair, Mitral Valve Repair plus CABG, Multiple Valve Surgery and Multiple Valve Surgery plus CABG) resulting in 2005-2007 discharges. In addition to the hospital volumes, the rate of in-hospital/30-day death for the state (Statewide Mortality Rate) is given for each group. Unless otherwise specified, when the report refers to Valve or Valve/CABG procedures it is referring to the last column of Table 4.

The 2005-2007 in-hospital/30-day OMR of 5.45 percent for valve surgeries is lower than the 5.83 percent observed for 2004-2006. The in-hospital OMR for 2005-2007 valve surgeries (not shown in Table 3) is 4.75 percent for the 21,039 patients included in this analysis.

Note on Hospitals Not Performing Cardiac Surgery During Entire 2005-2007 Period

One hospital began performing cardiac surgery during the 2005 - 2007 time period on which this report is based: Good Samaritan Hospital of Suffern began performing cardiac surgery in January 2007.

DEFINITIONS OF KEY TERMS

The **observed mortality rate (OMR)** is the observed number of deaths divided by the total number of cases.

The **expected mortality rate (EMR)** is the sum of the predicted probabilities of death for all patients divided by the total number of patients.

The **risk-adjusted mortality rate (RAMR)** is the best estimate, based on the statistical model, of what the provider's mortality rate would have been if the provider had a mix of patients identical to the statewide mix. It is obtained by first dividing the OMR by the EMR, and then multiplying by the relevant statewide mortality rate (for example 1.95 percent for Isolated CABG patients in 2007 or 5.45 percent for Valve or Valve/CABG patients in 2005-2007).

Confidence Intervals are used to identify which hospitals had significantly more or fewer deaths than expected given the risk factors of their patients. The confidence interval identifies the range in which the RAMR may fall. Hospitals with significantly higher rates than expected after adjusting for risk are those where the confidence interval range falls entirely above the statewide mortality rate. Hospitals with significantly lower rates than expected, given the severity of illness of their patients before surgery, have confidence intervals entirely below the statewide mortality rate.

The more cases a provider performs, the narrower their confidence interval will be. This is because as a provider performs more cases, the likelihood of chance variation in the RAMR decreases.

Table 2: In-Hospital/30-Day Observed, Expected and Risk-Adjusted Mortality Rates for Isolated CABG Surgery in New York State, 2007 Discharges (Listed Alphabetically by Hospital)

Hospital	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Medical Center	331	4	1.21	1.71	1.38	(0.37, 3.53)
Arnot Ogden Med Ctr	125	3	2.40	1.46	3.21	(0.64, 9.38)
Bellevue Hospital Ctr	136	1	0.74	1.16	1.24	(0.02, 6.88)
Beth Israel Med Ctr	245	4	1.63	1.52	2.10	(0.56, 5.37)
Buffalo General Hosp	354	9	2.54	1.47	3.36	(1.53, 6.38)
Champ.Valley Phys Hosp	103	1	0.97	1.21	1.57	(0.02, 8.72)
Ellis Hospital	267	1	0.37	1.67	0.44	(0.01, 2.43)
Erie County Med Ctr	158	3	1.90	1.90	1.95	(0.39, 5.68)
Good Sam - Suffern	178	2	1.12	1.73	1.27	(0.14, 4.58)
Lenox Hill Hospital	472	11	2.33	1.90	2.39	(1.19, 4.28)
Long Island Jewish	290	4	1.38	2.28	1.18	(0.32, 3.02)
M I Bassett Hospital	68	0	0.00	1.21	0.00	(0.00, 8.71)
Maimonides Medical Ctr	354	8	2.26	2.01	2.19	(0.94, 4.31)
Mercy Hospital	289	7	2.42	1.94	2.44	(0.98, 5.02)
Millard Fillmore Hosp	334	8	2.40	1.78	2.63	(1.13, 5.18)
Montefiore - Moses	280	7	2.50	1.81	2.68	(1.08, 5.53)
Montefiore – Weiler	148	7	4.73	1.78	5.19 *	(2.08,10.69)
Mount Sinai Hospital	228	8	3.51	1.89	3.61	(1.55, 7.12)
NY Hospital - Queens	107	6	5.61	1.47	7.43 *	(2.71,16.18)
NY Methodist Hospital	124	3	2.42	1.93	2.44	(0.49, 7.14)
NYP- Columbia Presby.	370	10	2.70	1.91	2.76	(1.32, 5.08)
NYP- Weill Cornell	356	7	1.97	2.30	1.67	(0.67, 3.43)
NYU Hospitals Center	107	2	1.87	1.44	2.53	(0.28, 9.14)
North Shore Univ Hosp	596	8	1.34	2.33	1.12	(0.48, 2.21)
Rochester General Hosp	476	11	2.31	2.34	1.93	(0.96, 3.45)
SVCMC- St. Vincents	142	5	3.52	1.52	4.50	(1.45,10.51)
St. Elizabeth Med Ctr	239	8	3.35	2.23	2.92	(1.26, 5.75)
St. Francis Hospital	886	17	1.92	1.95	1.92	(1.12, 3.07)
St. Josephs Hospital	570	15	2.63	2.26	2.27	(1.27, 3.75)
St. Lukes at St. Lukes	164	3	1.83	2.64	1.35	(0.27, 3.95)
St. Peters Hospital	402	1	0.25	1.65	0.29 **	(0.00, 1.64)
Staten Island Univ Hosp	387	8	2.07	2.18	1.85	(0.79, 3.64)
Strong Memorial Hosp	334	11	3.29	1.96	3.27	(1.63, 5.84)
United Hlth Svcs-Wilson	217	4	1.84	1.99	1.81	(0.49, 4.63)
Univ.Hosp-Brooklyn	73	2	2.74	2.86	1.86	(0.21, 6.73)
Univ.Hosp-SUNY Upstate	187	1	0.53	2.08	0.50	(0.01, 2.78)
Univ.Hosp-Stony Brook	306	4	1.31	1.80	1.42	(0.38, 3.63)
Vassar Bros. Med Ctr	238	2	0.84	2.20	0.74	(0.08, 2.69)
Westchester Med Ctr	493	4	0.81	2.00	0.79	(0.21, 2.02)
Winthrop Univ. Hosp	311	3	0.96	1.91	0.98	(0.20, 2.87)
Statewide Total	**11445**	**223**	**1.95**	**1.95**	**1.95**	

* RAMR significantly higher than statewide rate based on 95 percent confidence interval.
** RAMR significantly lower than statewide rate based on 95 percent confidence interval.

Figure 1: In-Hospital/30-Day Risk-Adjusted Mortality Rates for Isolated CABG in New York State, 2007 Discharges

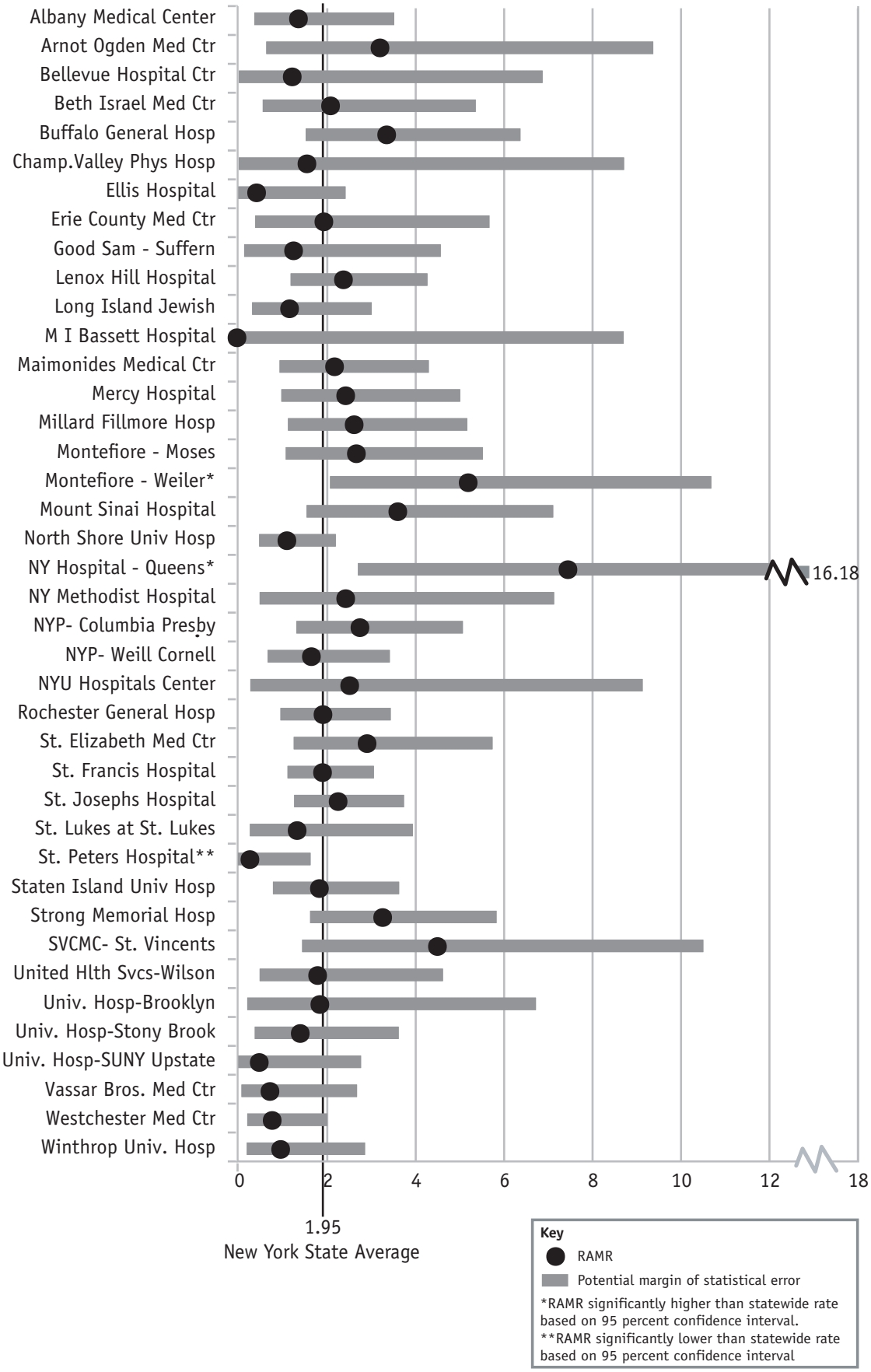

Table 3: In-Hospital/30-Day Observed, Expected and Risk-Adjusted Mortality Rates for Valve or Valve/CABG Surgery in New York State, 2005-2007 Discharges.

Hospital	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Medical Center	445	20	4.49	4.66	5.26	(3.21, 8.13)
Arnot Ogden Med Ctr	77	2	2.60	2.99	4.73	(0.53,17.07)
Bellevue Hospital Ctr	206	9	4.37	3.74	6.37	(2.91,12.09)
Beth Israel Med Ctr	418	35	8.37	6.45	7.08	(4.93, 9.84)
Buffalo General Hosp	454	22	4.85	4.36	6.06	(3.79, 9.17)
Champ.Valley Phys Hosp	46	2	4.35	3.09	7.68	(0.86,27.73)
Ellis Hospital	344	19	5.52	5.01	6.01	(3.62, 9.39)
Erie County Med Ctr	171	10	5.85	4.26	7.49	(3.58,13.77)
Good Sam - Suffern	53	0	0.00	4.05	0.00	(0.00, 9.31)
Lenox Hill Hospital	795	43	5.41	5.92	4.98	(3.60, 6.70)
Long Island Jewish	600	48	8.00	5.88	7.42 *	(5.47, 9.84)
M I Bassett Hospital	72	4	5.56	3.08	9.82	(2.64,25.14)
Maimonides Medical Ctr	470	53	11.28	6.50	9.46 *	(7.09,12.37)
Mercy Hospital	125	5	4.00	4.43	4.92	(1.58,11.48)
Millard Fillmore Hosp	248	7	2.82	4.26	3.62	(1.45, 7.45)
Montefiore - Moses	479	34	7.10	6.98	5.54	(3.84, 7.74)
Montefiore - Weiler	254	14	5.51	5.06	5.94	(3.25, 9.97)
Mount Sinai Hospital	1158	70	6.04	5.51	5.98	(4.66, 7.56)
NY Hospital - Queens	141	10	7.09	3.87	9.98	(4.78,18.36)
NY Methodist Hospital	129	7	5.43	5.08	5.82	(2.33,11.99)
NYP- Columbia Presby.	1749	93	5.32	4.66	6.22	(5.02, 7.62)
NYP- Weill Cornell	1091	44	4.03	4.92	4.47	(3.25, 6.01)
NYU Hospitals Center	1450	83	5.72	4.33	7.20 *	(5.74, 8.93)
North Shore Univ Hosp	1334	50	3.75	6.23	3.28 **	(2.43, 4.32)
Rochester General Hosp	859	51	5.94	6.08	5.32	(3.96, 7.00)
SVCMC- St. Vincents	272	14	5.15	4.23	6.64	(3.63,11.14)
St. Elizabeth Med Ctr	422	36	8.53	6.24	7.45	(5.22,10.31)
St. Francis Hospital	1753	90	5.13	6.24	4.49	(3.61, 5.52)
St. Josephs Hospital	865	45	5.20	6.85	4.14	(3.02, 5.54)
St. Lukes at St. Lukes	359	17	4.74	7.16	3.60	(2.10, 5.77)
St. Peters Hospital	786	31	3.94	5.28	4.08	(2.77, 5.79)
Staten Island Univ Hosp	250	9	3.60	4.76	4.12	(1.88, 7.83)
Strong Memorial Hosp	596	33	5.54	4.49	6.72	(4.63, 9.44)
United Hlth Svcs-Wilson	264	18	6.82	5.23	7.11	(4.21,11.23)
Univ.Hosp-Brooklyn	174	10	5.75	3.74	8.38	(4.01,15.41)
Univ.Hosp-SUNY Upstate	331	10	3.02	4.04	4.07	(1.95, 7.49)
Univ.Hosp-Stony Brook	448	40	8.93	6.71	7.26	(5.18, 9.88)
Vassar Bros. Med Ctr	405	9	2.22	5.13	2.36 **	(1.08, 4.48)
Westchester Med Ctr	475	17	3.58	5.75	3.39 **	(1.97, 5.43)
Winthrop Univ. Hosp	471	33	7.01	6.51	5.86	(4.04, 8.24)
Total	**21039**	**1147**	**5.45**	**5.45**	**5.45**	

* RAMR significantly higher than statewide rate based on 95 percent confidence interval.
** RAMR significantly lower than statewide rate based on 95 percent confidence interval.

Figure 2: In-Hospital/30-Day Risk-Adjusted Mortality Rates for Valve or Valve/CABG Surgery in New York State, 2005-2007 Discharges

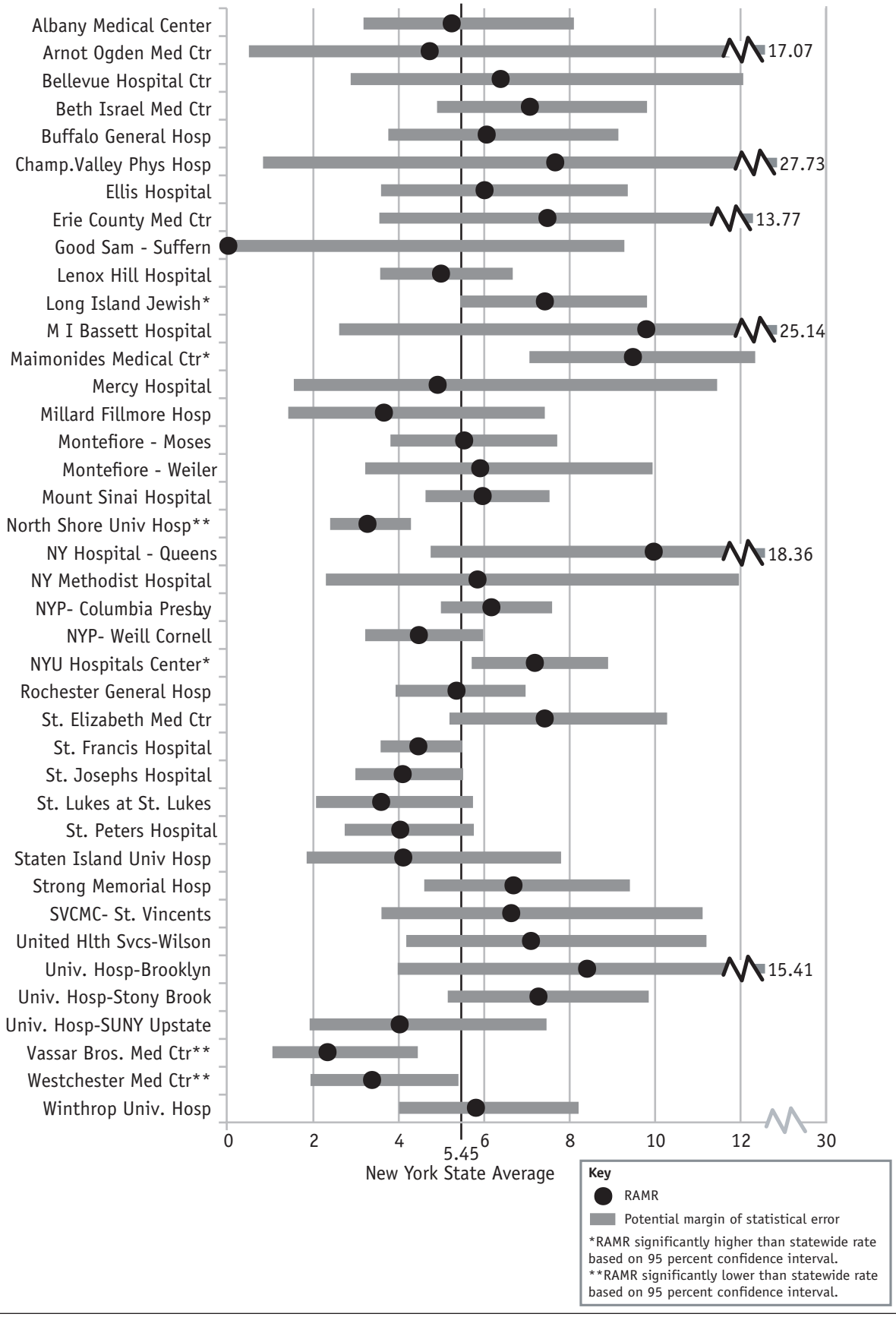

Table 4: Hospital Volume for Valve Procedures in New York State, 2005-2007 Discharges

Hospital	Aortic Valve Replace Surgery	Aortic Valve and CABG	Mitral Valve Replace Surgery	Mitral Replace and CABG	Mitral Valve Repair Surgery	Mitral Repair and CABG	Multiple Valve Surgery	Multiple Valve and CABG	Total Valve or Valve/ CABG
Albany Medical Center	126	159	46	18	27	30	26	13	445
Arnot Ogden Med Ctr	35	22	6	4	4	5	0	1	77
Bellevue Hospital Ctr	63	11	36	14	18	15	45	4	206
Beth Israel Med Ctr	68	81	40	29	35	52	81	32	418
Buffalo General Hosp	129	144	28	17	34	73	16	13	454
Champ.Valley Phys Hosp	19	12	4	1	2	3	1	4	46
Ellis Hospital	118	113	20	12	26	22	22	11	344
Erie County Med Ctr	68	36	17	15	7	2	18	8	171
Good Sam - Suffern	10	28	7	1	2	3	1	1	53
Lenox Hill Hospital	133	133	63	33	160	107	115	51	795
Long Island Jewish	119	133	86	68	48	52	65	29	600
M I Bassett Hospital	28	23	10	2	4	3	1	1	72
Maimonides Medical Ctr	128	97	76	29	24	41	57	18	470
Mercy Hospital	37	47	9	6	4	7	13	2	125
Millard Fillmore Hosp	69	69	21	6	33	22	14	14	248
Montefiore - Moses	89	82	51	46	39	69	76	27	479
Montefiore - Weiler	48	42	48	19	19	39	30	9	254
Mount Sinai Hospital	194	153	54	17	134	73	423	110	1158
NY Hospital - Queens	50	33	28	6	10	4	5	5	141
NY Methodist Hospital	34	26	17	6	13	9	17	7	129
NYP- Columbia Presby.	493	326	210	80	283	124	174	59	1749
NYP- Weill Cornell	386	232	112	49	86	44	136	46	1091
NYU Hospitals Center	508	101	132	25	466	54	137	27	1450
North Shore Univ Hosp	417	345	173	67	92	76	122	42	1334
Rochester General Hosp	280	249	75	55	91	43	36	30	859
SVCMC- St. Vincents	88	56	26	9	37	26	18	12	272
St. Elizabeth Med Ctr	92	92	31	43	29	72	29	34	422
St. Francis Hospital	586	437	101	59	151	148	169	102	1753
St. Josephs Hospital	218	229	81	65	65	78	81	48	865
St. Lukes at St. Lukes	54	59	57	29	50	39	42	29	359
St. Peters Hospital	232	233	49	25	54	81	76	36	786
Staten Island Univ Hosp	64	67	49	27	20	11	10	2	250
Strong Memorial Hosp	183	130	64	25	83	22	68	21	596
United Hlth Svcs-Wilson	74	102	31	25	11	2	11	8	264
Univ.Hosp-Brooklyn	41	18	30	4	28	18	24	11	174
Univ.Hosp-SUNY Upstate	104	68	29	7	53	34	29	7	331
Univ.Hosp-Stony Brook	112	107	51	26	17	40	60	35	448
Vassar Bros. Med Ctr	111	110	30	38	22	56	20	18	405
Westchester Med Ctr	154	142	31	18	37	51	31	11	475
Winthrop Univ. Hosp	115	153	33	32	27	62	26	23	471
Total	**5877**	**4700**	**2062**	**1057**	**2345**	**1712**	**2325**	**961**	**21039**
Statewide Mortality Rate (%)	**3.39**	**4.96**	**5.67**	**10.03**	**1.88**	**6.95**	**8.22**	**14.36**	**5.45**

2005 – 2007 HOSPITAL AND SURGEON OUTCOMES

Table 5 provides the number of Isolated CABG operations, number of CABG patients who died in the hospital or after discharge but within 30 days of surgery, OMR, EMR, RAMR and the 95 percent confidence interval for the RAMR for isolated CABG patients in 2005-2007. In addition, the final two columns provide the number of Isolated CABG, Valve and Valve/CABG procedures and the RAMR for these patients in 2005-2007 for each of the 40 hospitals performing these operations during the time period. Surgeons and hospitals with RAMRs that are significantly lower or higher than the statewide mortality rate (as judged by the 95 percent confidence interval) are also noted.

The hospital information is presented for each surgeon who met at least one of the following criteria: (a) performed 200 or more cardiac operations during 2005-2007, (b) performed at least one cardiac operation in each of the years, 2005-2007. A cardiac operation is defined as any reportable adult cardiac operation and may include cases not listed in Tables 5 or 6.

The results for surgeons not meeting either of the above criteria are grouped together and reported as "All Others" in the hospital in which the operations were performed. Surgeons who met the above criteria and who performed operations in more than one hospital during 2005-2007 are noted in Table 5 and listed under all hospitals in which they performed these operations.

Also, surgeons who met either criterion (a) or (b) above and have performed Isolated CABG, Valve or Valve/CABG operations in two or more NYS hospitals are listed separately in Table 6. This table contains the same information as Table 5 across all hospitals in which the surgeon performed operations.

Table 5: In-Hospital/30-Day Observed, Expected and Risk-Adjusted Mortality Rates by Surgeon for Isolated CABG and Valve Surgery (done in combination with or without CABG) in New York State, 2005 - 2007 Discharges

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
STATEWIDE TOTAL	**35546**	**697**	**1.96**	**1.96**	**1.96**		**56585**	**3.26**
Albany Medical Center								
Britton L	321	6	1.87	1.51	2.42	(0.88, 5.27)	472	2.26
Devejian N	.	.	.	.	.	(. , .)	1	0.00
Fuzesi L	357	3	0.84	1.98	0.83	(0.17, 2.44)	410	2.33
Miller S	296	7	2.36	1.84	2.53	(1.01, 5.21)	425	3.79
Sardella G	243	1	0.41	1.42	0.57	(0.01, 3.17)	354	3.20
Total	**1217**	**17**	**1.40**	**1.71**	**1.60**	**(0.93, 2.57)**	**1662**	**2.90**
Arnot Ogden Med Ctr								
Nast E	185	4	2.16	1.77	2.39	(0.64, 6.12)	227	3.53
All Others	135	3	2.22	2.10	2.07	(0.42, 6.06)	170	3.43
Total	**320**	**7**	**2.19**	**1.91**	**2.24**	**(0.90, 4.62)**	**397**	**3.48**
Bellevue Hospital Ctr								
#Crooke G	41	0	0.00	1.05	0.00	(0.00,16.67)	56	2.91
#Grau J B	150	2	1.33	0.95	2.74	(0.31, 9.89)	219	2.68
#Meyer D B	.	.	.	.	.	(. , .)	1	0.00
#Ribakove G	76	0	0.00	1.23	0.00	(0.00, 7.69)	153	3.21
#Schwartz C F	72	1	1.39	1.48	1.85	(0.02,10.27)	116	4.92
All Others	1	0	0.00	1.31	0.00	(0.00,100.0)	1	0.00
Total	**340**	**3**	**0.88**	**1.14**	**1.52**	**(0.31, 4.44)**	**546**	**3.38**

Table 5 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Beth Israel Med Ctr								
Geller C M	76	2	2.63	1.55	3.32	(0.37,11.99)	104	5.52
Hoffman D	186	3	1.61	1.31	2.41	(0.48, 7.05)	225	5.50
#Stelzer P	41	4	9.76	2.97	6.44	(1.73,16.49)	230	4.98
Tranbaugh R	457	7	1.53	1.56	1.92	(0.77, 3.96)	611	3.22
All Others	34	0	0.00	1.88	0.00	(0.00,11.24)	42	0.00
Total	**794**	**16**	**2.02**	**1.59**	**2.49**	**(1.42, 4.04)**	**1212**	**4.20**
Buffalo General Hosp								
##Ashraf M	32	0	0.00	1.92	0.00	(0.00,11.71)	35	0.00
Grosner G	767	17	2.22	1.67	2.60	(1.51, 4.16)	1171	3.92
Lewin A	296	5	1.69	1.33	2.49	(0.80, 5.81)	307	3.85
##Malekan R	2	0	0.00	0.48	0.00	(0.00,100.0)	3	0.00
##Picone A	38	0	0.00	1.55	0.00	(0.00,12.20)	69	3.30
All Others	48	3	6.25	1.25	9.81 *	(1.97,28.65)	52	15.03
Total	**1183**	**25**	**2.11**	**1.57**	**2.64**	**(1.71, 3.90)**	**1637**	**3.99**
Champ.Valley Phys Hosp								
#Bennett E	16	1	6.25	1.16	10.60	(0.14,59.00)	19	15.59
#Canavan T	35	0	0.00	1.01	0.00	(0.00,20.37)	41	0.00
#Dal Col R	1	0	0.00	0.29	0.00	(0.00,100.0)	1	0.00
#Depan H	5	0	0.00	1.03	0.00	(0.00,100.0)	5	0.00
#Reich H	9	0	0.00	0.90	0.00	(0.00,88.89)	10	0.00
#Saifi J	4	0	0.00	0.63	0.00	(0.00,100.0)	4	0.00
#Singh C	5	0	0.00	0.81	0.00	(0.00,100.0)	5	0.00
All Others	190	1	0.53	1.17	0.89	(0.01, 4.93)	226	2.82
Total	**265**	**2**	**0.75**	**1.11**	**1.33**	**(0.15, 4.79)**	**311**	**2.98**
Ellis Hospital								
#Depan H	254	1	0.39	1.82	0.43	(0.01, 2.37)	453	3.37
#Reich H	243	3	1.23	1.42	1.70	(0.34, 4.96)	321	2.08
#Singh C	341	6	1.76	1.56	2.21	(0.81, 4.81)	408	3.54
Total	**838**	**10**	**1.19**	**1.60**	**1.46**	**(0.70, 2.69)**	**1182**	**3.09**
Erie County Med Ctr								
##Aldridge J	1	0	0.00	0.25	0.00	(0.00,100.0)	1	0.00
##Ashraf M	15	1	6.67	1.51	8.66	(0.11,48.16)	16	13.02
#Bell-Thomson J	331	6	1.81	1.62	2.19	(0.80, 4.76)	482	4.28
#Datta S	102	4	3.92	1.76	4.37	(1.18,11.19)	108	6.87
#Downing S W	99	3	3.03	1.86	3.19	(0.64, 9.33)	111	4.56
All Others	4	1	25.00	1.16	42.42	(0.55,100.0)	5	21.26
Total	**552**	**15**	**2.72**	**1.68**	**3.17**	**(1.77, 5.22)**	**723**	**4.92**

Table 5 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Good Samaritan Hosp - Suffern								
All Others	178	2	1.12	1.75	1.26	(0.14, 4.53)	231	1.24
Total	**178**	**2**	**1.12**	**1.75**	**1.26**	**(0.14, 4.53)**	**231**	**1.24**
Lenox Hill Hospital								
##Ciuffo G B	92	3	3.26	2.41	2.65	(0.53, 7.75)	130	2.60
Loulmet D F	45	0	0.00	1.23	0.00	(0.00,12.97)	300	2.83
Patel N C	513	6	1.17	1.93	1.19	(0.43, 2.59)	718	2.74
#Reddy R C	116	4	3.45	1.76	3.83	(1.03, 9.81)	183	2.49
Subramanian V	495	11	2.22	2.34	1.87	(0.93, 3.34)	690	3.47
All Others	149	2	1.34	1.49	1.77	(0.20, 6.38)	184	2.50
Total	**1410**	**26**	**1.84**	**2.02**	**1.79**	**(1.17, 2.62)**	**2205**	**2.97**
Long Island Jewish Med Ctr								
Graver L	251	2	0.80	2.34	0.67	(0.07, 2.41)	573	3.71
Manetta F	154	6	3.90	2.41	3.16	(1.16, 6.89)	240	6.26 *
Palazzo R	258	0	0.00	1.88	0.00 **	(0.00, 1.48)	380	2.30
Parnell V	.	.	.	.	.	(. , .)	2	0.00
#Vatsia S	.	.	.	.	.	(. , .)	1	0.00
All Others	70	1	1.43	2.37	1.18	(0.02, 6.58)	137	1.85
Total	**733**	**9**	**1.23**	**2.20**	**1.10**	**(0.50, 2.08)**	**1333**	**3.62**
M I Bassett Hospital								
Lancey R A	93	0	0.00	1.52	0.00	(0.00, 5.08)	131	0.00
Shortt K G	109	0	0.00	1.02	0.00	(0.00, 6.49)	143	5.85
Total	**202**	**0**	**0.00**	**1.25**	**0.00**	**(0.00, 2.85)**	**274**	**2.75**
Maimonides Medical Ctr								
Abrol S	165	6	3.64	2.61	2.73	(1.00, 5.95)	235	3.77
#Brevetti G R	5	0	0.00	2.10	0.00	(0.00,68.46)	12	5.49
Cunningham J N	80	0	0.00	1.91	0.00	(0.00, 4.72)	111	4.93
#Genovesi M H	45	0	0.00	1.53	0.00	(0.00,10.46)	61	5.50
Jacobowitz I	438	7	1.60	2.09	1.50	(0.60, 3.09)	624	4.50
Lahey S J	42	1	2.38	1.54	3.04	(0.04,16.91)	62	4.88
Stephens G A	41	2	4.88	1.28	7.46	(0.84,26.92)	69	8.73
Vaynblat M	230	7	3.04	2.65	2.25	(0.90, 4.65)	320	3.85
All Others	64	4	6.25	1.84	6.66	(1.79,17.06)	86	10.81 *
Total	**1110**	**27**	**2.43**	**2.18**	**2.19**	**(1.44, 3.18)**	**1580**	**4.76 ***

Table 5 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Mercy Hospital								
##Aldridge J	54	0	0.00	1.33	0.00	(0.00,10.00)	61	0.00
##Ashraf M	1	0	0.00	1.25	0.00	(0.00,100.0)	1	0.00
#Bell-Thomson J	246	6	2.44	1.55	3.09	(1.13, 6.73)	306	3.76
Carlson R E	190	8	4.21	2.17	3.80	(1.64, 7.49)	212	6.96 *
#Downing S W	250	5	2.00	2.34	1.68	(0.54, 3.91)	286	2.51
Total	**741**	**19**	**2.56**	**1.96**	**2.57**	**(1.54, 4.01)**	**866**	**3.90**
Millard Fillmore Hosp								
##Aldridge J	190	8	4.21	1.55	5.34 *	(2.30,10.52)	228	6.46
##Ashraf M	697	11	1.58	1.90	1.63	(0.81, 2.92)	890	2.19
#Datta S	14	0	0.00	0.77	0.00	(0.00,66.95)	18	0.00
Jennings L	47	0	0.00	0.96	0.00	(0.00,15.99)	48	0.00
##Malekan R	8	0	0.00	0.96	0.00	(0.00,93.58)	9	30.46
##Picone A	17	0	0.00	1.06	0.00	(0.00,39.86)	27	4.74
All Others	6	0	0.00	1.66	0.00	(0.00,72.32)	7	0.00
Total	**979**	**19**	**1.94**	**1.74**	**2.18**	**(1.31, 3.41)**	**1227**	**3.07**
Montefiore - Moses								
##D Alessandro D A	197	7	3.55	1.91	3.64	(1.46, 7.50)	301	4.45
#Deanda A	6	0	0.00	1.02	0.00	(0.00,100.0)	12	0.00
##Derose J J	43	0	0.00	1.81	0.00	(0.00, 9.22)	50	5.47
#Goldstein D J	218	3	1.38	1.55	1.75	(0.35, 5.10)	329	2.55
#Merav A	106	5	4.72	1.94	4.78	(1.54,11.15)	155	4.89
#Michler R E	145	3	2.07	1.91	2.12	(0.43, 6.20)	295	3.32
##Plestis K A	14	1	7.14	1.90	7.38	(0.10,41.04)	19	10.55
Weinstein S	.	.	.	.	.	(. , .)	2	0.00
All Others	95	2	2.11	1.29	3.20	(0.36,11.54)	140	4.18
Total	**824**	**21**	**2.55**	**1.74**	**2.88**	**(1.78, 4.40)**	**1303**	**3.75**
Montefiore - Weiler								
##D Alessandro D A	13	1	7.69	0.58	25.81	(0.34,100.0)	17	14.36
#Deanda A	131	8	6.11	1.29	9.29 *	(4.00,18.31)	185	10.05 *
##Derose J J	102	4	3.92	1.98	3.87	(1.04, 9.92)	168	6.62
#Goldstein D J	43	2	4.65	2.22	4.11	(0.46,14.83)	57	6.09
#Merav A	12	2	16.67	2.06	15.83	(1.78,57.16)	15	15.70
#Michler R E	39	0	0.00	2.19	0.00	(0.00, 8.41)	94	1.99
##Plestis K A	48	0	0.00	1.50	0.00	(0.00, 9.98)	103	0.00
All Others	10	0	0.00	2.43	0.00	(0.00,29.59)	13	0.00
Total	**398**	**17**	**4.27**	**1.71**	**4.90 ***	**(2.85, 7.84)**	**652**	**5.14 ***

Table 5 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Mount Sinai Hospital								
Adams D H	18	0	0.00	1.45	0.00	(0.00,27.55)	565	3.72
Filsoufi F	179	4	2.23	1.87	2.34	(0.63, 6.00)	301	2.45
Griepp R	1	0	0.00	2.60	0.00	(0.00,100.0)	46	4.49
#Lansman S	.	.	.	.	.	(. , .)	1	11.66
Nguyen K	.	.	.	.	.	(. , .)	1	0.00
##Plestis K A	60	1	1.67	1.17	2.80	(0.04,15.59)	190	3.49
#Reddy R C	8	2	25.00	1.09	45.17 *	(5.07,100.0)	13	20.10
##Sarabu M	113	1	0.88	1.54	1.13	(0.01, 6.28)	149	1.01
#Spielvogel D	6	1	16.67	5.32	6.14	(0.08,34.16)	8	16.00
#Stelzer P	7	0	0.00	1.30	0.00	(0.00,78.93)	18	0.00
#Zias E	398	8	2.01	2.09	1.88	(0.81, 3.71)	592	2.66
All Others	47	1	2.13	2.92	1.43	(0.02, 7.96)	111	6.56 *
Total	**837**	**18**	**2.15**	**1.94**	**2.17**	**(1.29, 3.43)**	**1995**	**3.58**
NY Hospital - Queens								
#Adkins M	260	13	5.00	1.69	5.79 *	(3.08, 9.91)	342	8.54 *
##Ko W	168	3	1.79	2.22	1.58	(0.32, 4.61)	220	2.85
#Mack CA	55	0	0.00	1.40	0.00	(0.00, 9.31)	62	3.21
Total	**483**	**16**	**3.31**	**1.84**	**3.52 ***	**(2.01, 5.72)**	**624**	**5.90 ***
NY Methodist Hospital								
#Lee L Y	150	3	2.00	2.22	1.77	(0.36, 5.16)	205	2.54
#Tortolani A	217	1	0.46	2.00	0.45	(0.01, 2.51)	291	2.50
All Others	10	0	0.00	1.14	0.00	(0.00,62.82)	10	0.00
Total	**377**	**4**	**1.06**	**2.07**	**1.01**	**(0.27, 2.58)**	**506**	**2.50**
NYP- Columbia Presby.								
Argenziano M	105	4	3.81	1.62	4.61	(1.24,11.81)	312	3.95
#Chen J M	.	.	.	.	.	(. , .)	1	0.00
##D Alessandro D A	2	0	0.00	1.72	0.00	(0.00,100.0)	3	0.00
Mosca R S	1	0	0.00	0.38	0.00	(0.00,100.0)	5	30.48
Naka Y	232	8	3.45	1.75	3.87	(1.67, 7.63)	446	4.66
Oz M	252	2	0.79	1.23	1.26	(0.14, 4.55)	715	3.83
#Quaegebeur J	.	.	.	.	.	(. , .)	10	0.00
Smith C	255	5	1.96	1.05	3.65	(1.18, 8.51)	777	3.15
Stewart A S	263	7	2.66	2.23	2.34	(0.94, 4.81)	528	3.74
All Others	36	2	5.56	2.12	5.13	(0.58,18.51)	98	6.59
Total	**1146**	**28**	**2.44**	**1.59**	**3.01 ***	**(2.00, 4.35)**	**2895**	**3.95 ***

Table 5 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
NYP- Weill Cornell								
#Adkins M	3	0	0.00	1.48	0.00	(0.00,100.0)	7	0.00
#Chen J M	.	.	.	.	.	(. , .)	2	0.00
Girardi L	437	5	1.14	2.39	0.94	(0.30, 2.19)	881	1.81 **
Isom O	38	1	2.63	1.10	4.69	(0.06,26.09)	131	5.15
##Ko W	59	2	3.39	1.73	3.85	(0.43,13.90)	90	6.32
Krieger K	307	7	2.28	1.66	2.70	(1.08, 5.56)	669	2.64
#Lee L Y	122	2	1.64	2.41	1.33	(0.15, 4.82)	176	3.68
#Mack C A	6	0	0.00	3.24	0.00	(0.00,37.01)	12	0.00
#Tortolani A	136	3	2.21	2.54	1.71	(0.34, 4.98)	183	3.26
All Others	96	1	1.04	2.15	0.95	(0.01, 5.30)	144	2.62
Total	**1204**	**21**	**1.74**	**2.13**	**1.60**	**(0.99, 2.45)**	**2295**	**2.67**
NYU Hospitals Center								
##Ciuffo G B	13	1	7.69	2.31	6.53	(0.09,36.31)	31	5.36
Colvin S	42	0	0.00	1.36	0.00	(0.00,12.62)	736	5.40 *
#Crooke G	11	0	0.00	1.60	0.00	(0.00,40.99)	22	4.07
Culliford A	118	1	0.85	1.58	1.05	(0.01, 5.84)	295	2.81
Galloway A	86	6	6.98	2.01	6.81 *	(2.49,14.83)	487	3.96
#Grau J B	1	0	0.00	3.93	0.00	(0.00,100.0)	8	6.02
Grossi E	9	0	0.00	1.25	0.00	(0.00,63.72)	33	6.86
#Meyer D B	.	.	.	.	.	(. , .)	3	0.00
#Ribakove G	46	2	4.35	2.17	3.93	(0.44,14.19)	146	3.86
#Schwartz C F	24	0	0.00	2.00	0.00	(0.00,15.01)	39	5.53
Total	**350**	**10**	**2.86**	**1.79**	**3.13**	**(1.50, 5.75)**	**1800**	**4.39 ***
North Shore Univ Hosp								
Arnofsky A	130	1	0.77	2.07	0.73	(0.01, 4.04)	172	1.91
Esposito R	469	7	1.49	2.10	1.39	(0.56, 2.86)	670	1.92 **
Hall M	336	10	2.98	2.60	2.25	(1.08, 4.13)	543	3.12
Hartman A	211	2	0.95	2.02	0.92	(0.10, 3.33)	679	1.39 **
Kalimi R	332	9	2.71	2.46	2.16	(0.99, 4.11)	491	2.54
Pogo G	271	4	1.48	2.63	1.10	(0.30, 2.82)	425	2.70
#Vatsia S	167	3	1.80	2.61	1.35	(0.27, 3.94)	262	1.62
All Others	19	0	0.00	2.14	0.00	(0.00,17.65)	27	4.41
Total	**1935**	**36**	**1.86**	**2.36**	**1.55**	**(1.08, 2.14)**	**3269**	**2.18 ** **
Rochester General Hosp								
Becker E J	148	5	3.38	2.87	2.31	(0.74, 5.39)	175	4.07
Cheeran D	617	11	1.78	2.53	1.38	(0.69, 2.47)	952	2.74
#Green G R	95	2	2.11	2.83	1.46	(0.16, 5.26)	130	2.58
Kirshner R	615	12	1.95	2.52	1.52	(0.78, 2.65)	1077	2.96
Total	**1475**	**30**	**2.03**	**2.58**	**1.55**	**(1.04, 2.21)**	**2334**	**2.93**

Table 5 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
SVCMC- St. Vincents								
##Ciuffo G B	60	2	3.33	2.43	2.69	(0.30, 9.71)	119	7.80 *
Lang S	316	6	1.90	1.56	2.39	(0.87, 5.20)	415	4.03
Shin Y T	233	4	1.72	1.76	1.91	(0.51, 4.88)	346	1.84
All Others	2	0	0.00	1.32	0.00	(0.00,100.0)	3	0.00
Total	**611**	**12**	**1.96**	**1.72**	**2.24**	**(1.15, 3.91)**	**883**	**3.85**
St. Elizabeth Med Ctr								
El Amir N	173	2	1.16	1.69	1.34	(0.15, 4.83)	268	3.59
Joyce F	296	10	3.38	2.25	2.94	(1.41, 5.41)	465	4.60
Kelley J	316	11	3.48	1.97	3.47	(1.73, 6.21)	474	4.97 *
Total	**785**	**23**	**2.93**	**2.01**	**2.85**	**(1.81, 4.28)**	**1207**	**4.56 ***
St. Francis Hospital								
Bercow N	310	5	1.61	2.11	1.50	(0.48, 3.50)	523	3.00
Colangelo R	615	11	1.79	2.18	1.61	(0.80, 2.88)	859	2.10 **
Damus P	217	1	0.46	1.62	0.56	(0.01, 3.10)	415	2.40
Fernandez H A	368	4	1.09	1.96	1.09	(0.29, 2.79)	478	2.43
Lamendola C	351	6	1.71	2.10	1.60	(0.58, 3.48)	581	2.53
Robinson N	517	11	2.13	1.61	2.59	(1.29, 4.64)	859	3.99
Taylor J	494	8	1.62	2.05	1.55	(0.67, 3.05)	906	2.27
All Others	13	1	7.69	1.08	13.92	(0.18,77.46)	17	12.77
Total	**2885**	**47**	**1.63**	**1.96**	**1.63**	**(1.20, 2.17)**	**4638**	**2.69 ****
St. Josephs Hospital								
#Green G R	275	8	2.91	1.72	3.32	(1.43, 6.55)	386	3.57
Marvasti M	320	4	1.25	1.73	1.42	(0.38, 3.63)	586	1.97
Nazem A	459	7	1.53	2.25	1.33	(0.53, 2.74)	619	2.45
Rosenberg J	266	4	1.50	2.06	1.43	(0.38, 3.66)	463	3.47
Zhou Z	393	7	1.78	2.16	1.62	(0.65, 3.33)	524	2.02
Total	**1713**	**30**	**1.75**	**2.02**	**1.70**	**(1.15, 2.43)**	**2578**	**2.61**
St. Lukes at St. Lukes								
Balaram S K	87	4	4.60	3.06	2.95	(0.79, 7.54)	145	2.53
##Derose J J	95	1	1.05	2.28	0.91	(0.01, 5.05)	185	2.65
Swistel D	302	6	1.99	2.64	1.47	(0.54, 3.21)	513	2.20
Total	**484**	**11**	**2.27**	**2.65**	**1.68**	**(0.84, 3.01)**	**843**	**2.37**
St. Peters Hospital								
#Bennett E	228	2	0.88	1.68	1.03	(0.12, 3.70)	475	1.86
#Canavan T	308	3	0.97	1.85	1.03	(0.21, 3.01)	359	2.08
#Dal Col R	344	7	2.03	1.29	3.10	(1.24, 6.38)	613	3.23
#Saifi J	364	10	2.75	2.19	2.46	(1.18, 4.52)	583	3.17
Total	**1244**	**22**	**1.77**	**1.76**	**1.97**	**(1.23, 2.98)**	**2030**	**2.72**

Table 5 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Staten Island Univ Hosp								
McGinn J	900	22	2.44	2.40	2.00	(1.25, 3.03)	1080	3.11
Molinaro P J	110	1	0.91	1.86	0.96	(0.01, 5.32)	150	1.70
Nabagiez J P	19	0	0.00	1.19	0.00	(0.00,31.93)	26	0.00
Rosell F M	241	3	1.24	1.90	1.29	(0.26, 3.76)	264	2.32
Total	**1270**	**26**	**2.05**	**2.24**	**1.79**	**(1.17, 2.63)**	**1520**	**2.83**
Strong Memorial Hosp								
Alfieris G	.	.	.	.	.	(. , .)	5	0.00
Hicks G	285	3	1.05	1.76	1.17	(0.24, 3.42)	403	3.60
Knight P	547	10	1.83	2.09	1.71	(0.82, 3.15)	963	3.26
Massey H	217	7	3.23	2.51	2.52	(1.01, 5.20)	274	4.32
Total	**1049**	**20**	**1.91**	**2.09**	**1.79**	**(1.09, 2.76)**	**1645**	**3.55**
United Hlth Svcs-Wilson								
Quintos E	171	7	4.09	2.40	3.34	(1.34, 6.89)	219	4.85
Wong K	268	2	0.75	1.85	0.79	(0.09, 2.85)	385	1.87
Yousuf M	251	11	4.38	2.79	3.09	(1.54, 5.52)	350	5.64 *
Total	**690**	**20**	**2.90**	**2.33**	**2.44**	**(1.49, 3.77)**	**954**	**4.15**
Univ. Hosp-Brooklyn								
#Brevetti G R	17	0	0.00	1.88	0.00	(0.00,22.48)	34	0.00
Burack J H	34	0	0.00	1.45	0.00	(0.00,14.63)	55	0.00
#Genovesi M H	77	1	1.30	1.89	1.35	(0.02, 7.51)	94	3.73
##Ko W	53	3	5.66	2.33	4.77	(0.96,13.93)	114	6.45
Lowery R C	43	2	4.65	1.64	5.55	(0.62,20.03)	93	8.26
All Others	13	0	0.00	2.05	0.00	(0.00,27.04)	21	0.00
Total	**237**	**6**	**2.53**	**1.89**	**2.63**	**(0.96, 5.73)**	**411**	**4.75**
Univ. Hosp-SUNY Upstate								
Fink G W	277	3	1.08	1.40	1.51	(0.30, 4.43)	442	2.65
Lutz C J	341	7	2.05	1.93	2.08	(0.83, 4.29)	468	3.22
##Picone A	62	3	4.84	1.79	5.32	(1.07,15.53)	101	3.56
Total	**680**	**13**	**1.91**	**1.70**	**2.20**	**(1.17, 3.76)**	**1011**	**3.00**
Univ. Hosp-Stony Brook								
Bilfinger T	120	3	2.50	2.46	1.99	(0.40, 5.83)	174	3.86
McLarty A	95	1	1.05	1.66	1.25	(0.02, 6.94)	135	2.57
#Quaegebeur J	.	.	.	.	.	(. , .)	1	0.00
Rosengart T	226	4	1.77	1.67	2.08	(0.56, 5.33)	358	5.18
Seifert F	429	5	1.17	1.69	1.35	(0.44, 3.16)	601	2.87
All Others	85	4	4.71	1.80	5.12	(1.38,13.12)	134	6.29
Total	**955**	**17**	**1.78**	**1.79**	**1.95**	**(1.14, 3.13)**	**1403**	**3.94**

Table 5 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Vassar Bros. Med Ctr								
##Sarabu M	145	1	0.69	1.76	0.77	(0.01, 4.27)	310	0.88 **
Zakow P	284	4	1.41	2.00	1.38	(0.37, 3.53)	412	1.97
All Others	247	3	1.21	1.73	1.38	(0.28, 4.03)	359	2.18
Total	**676**	**8**	**1.18**	**1.85**	**1.25**	**(0.54, 2.47)**	**1081**	**1.66 ****
Westchester Med Ctr								
Fleisher A	297	9	3.03	2.45	2.42	(1.11, 4.60)	364	4.00
Lafaro R	228	7	3.07	2.06	2.92	(1.17, 6.03)	307	3.62
#Lansman S	457	6	1.31	2.10	1.22	(0.45, 2.67)	596	1.36 **
##Malekan R	16	0	0.00	1.90	0.00	(0.00,23.61)	21	0.00
##Sarabu M	8	0	0.00	2.22	0.00	(0.00,40.48)	11	0.00
Sett S	.	.	.	.	.	(. , .)	2	0.00
#Spielvogel D	429	3	0.70	2.17	0.63 **	(0.13, 1.85)	606	1.85 **
#Zias E	7	0	0.00	1.92	0.00	(0.00,53.60)	10	0.00
Total	**1442**	**25**	**1.73**	**2.18**	**1.56**	**(1.01, 2.30)**	**1917**	**2.33 ****
Winthrop Univ. Hosp								
Goncalves J A	289	5	1.73	2.47	1.37	(0.44, 3.20)	420	3.30
Kokotos W J	235	9	3.83	1.97	3.81	(1.74, 7.24)	369	4.76
Schubach S	292	1	0.34	1.68	0.40	(0.01, 2.23)	467	1.63
All Others	118	4	3.39	2.60	2.56	(0.69, 6.55)	149	4.12
Total	**934**	**19**	**2.03**	**2.11**	**1.89**	**(1.14, 2.95)**	**1405**	**3.36**
STATEWIDE TOTAL	**35546**	**697**	**1.96**	**1.96**	**1.96**		**56585**	**3.26**

* RAMR significantly higher than statewide rate based on 95 percent confidence interval.

** RAMR significantly lower than statewide rate based on 95 percent confidence interval.

\# Performed operations in another NYS hospital.

Performed operations in two or more other NYS hospitals.

Table 6: Summary Information for Surgeons Practicing at More than One Hospital, 2005-2007

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Adkins M	**263**	**13**	**4.94**	**1.69**	**5.74 ***	**(3.05, 9.81)**	**349**	**8.21 ***
NY Hospital - Queens	260	13	5.00	1.69	5.79 *	(3.08, 9.91)	342	8.54 *
NYP- Weill Cornell	3	0	0.00	1.48	0.00	(0.00,100.0)	7	0.00
Aldridge J	**245**	**8**	**3.27**	**1.49**	**4.29**	**(1.85, 8.44)**	**290**	**5.37**
Erie County Med Ctr	1	0	0.00	0.25	0.00	(0.00,100.0)	1	0.00
Mercy Hospital	54	0	0.00	1.33	0.00	(0.00,10.00)	61	0.00
Millard Fillmore Hosp	190	8	4.21	1.55	5.34 *	(2.30,10.52)	228	6.46
Ashraf M	**745**	**12**	**1.61**	**1.89**	**1.67**	**(0.86, 2.92)**	**942**	**2.24**
Buffalo General Hosp	32	0	0.00	1.92	0.00	(0.00,11.71)	35	0.00
Erie County Med Ctr	15	1	6.67	1.51	8.66	(0.11,48.16)	16	13.02
Mercy Hospital	1	0	0.00	1.25	0.00	(0.00,100.0)	1	0.00
Millard Fillmore Hosp	697	11	1.58	1.90	1.63	(0.81, 2.92)	890	2.19
Bell-Thomson J	**577**	**12**	**2.08**	**1.59**	**2.56**	**(1.32, 4.48)**	**788**	**4.10**
Erie County Med Ctr	331	6	1.81	1.62	2.19	(0.80, 4.76)	482	4.28
Mercy Hospital	246	6	2.44	1.55	3.09	(1.13, 6.73)	306	3.76
Bennett E	**244**	**3**	**1.23**	**1.64**	**1.47**	**(0.29, 4.29)**	**494**	**2.04**
Champ.Valley Phys Hosp	16	1	6.25	1.16	10.60	(0.14,59.00)	19	15.59
St. Peters Hospital	228	2	0.88	1.68	1.03	(0.12, 3.70)	475	1.86
Brevetti G R	**22**	**0**	**0.00**	**1.93**	**0.00**	**(0.00,16.93)**	**46**	**2.20**
Maimonides Medical Ctr	5	0	0.00	2.10	0.00	(0.00,68.46)	12	5.49
Univ.Hosp-Brooklyn	17	0	0.00	1.88	0.00	(0.00,22.48)	34	0.00
Canavan T	**343**	**3**	**0.87**	**1.77**	**0.97**	**(0.20, 2.84)**	**400**	**1.97**
Champ.Valley Phys Hosp	35	0	0.00	1.01	0.00	(0.00,20.37)	41	0.00
St. Peters Hospital	308	3	0.97	1.85	1.03	(0.21, 3.01)	359	2.08
Chen J M	**.**	**.**	**.**	**.**	**.**	**(. , .)**	**3**	**0.00**
NYP- Columbia Presby.	.	.	.	.	.	(. , .)	1	0.00
NYP- Weill Cornell	.	.	.	.	.	(. , .)	2	0.00
Ciuffo G B	**165**	**6**	**3.64**	**2.41**	**2.96**	**(1.08, 6.44)**	**280**	**5.34**
Lenox Hill Hospital	92	3	3.26	2.41	2.65	(0.53, 7.75)	130	2.60
NYU Hospitals Center	13	1	7.69	2.31	6.53	(0.09,36.31)	31	5.36
SVCMC- St. Vincents	60	2	3.33	2.43	2.69	(0.30, 9.71)	119	7.80 *
Crooke G	**52**	**0**	**0.00**	**1.17**	**0.00**	**(0.00,11.85)**	**78**	**3.39**
Bellevue Hospital Ctr	41	0	0.00	1.05	0.00	(0.00,16.67)	56	2.91
NYU Hospitals Center	11	0	0.00	1.60	0.00	(0.00,40.99)	22	4.07
D Alessandro D A	**212**	**8**	**3.77**	**1.83**	**4.04**	**(1.74, 7.97)**	**321**	**4.62**
Montefiore - Moses	197	7	3.55	1.91	3.64	(1.46, 7.50)	301	4.45
Montefiore - Weiler	13	1	7.69	0.58	25.81	(0.34,100.0)	17	14.36
NYP- Columbia Presby.	2	0	0.00	1.72	0.00	(0.00,100.0)	3	0.00

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Dal Col R	**345**	**7**	**2.03**	**1.29**	**3.10**	**(1.24, 6.38)**	**614**	**3.23**
Champ.Valley Phys Hosp	1	0	0.00	0.29	0.00	(0.00,100.0)	1	0.00
St. Peters Hospital	344	7	2.03	1.29	3.10	(1.24, 6.38)	613	3.23
Datta S	**116**	**4**	**3.45**	**1.64**	**4.12**	**(1.11,10.56)**	**126**	**6.19**
Erie County Med Ctr	102	4	3.92	1.76	4.37	(1.18,11.19)	108	6.87
Millard Fillmore Hosp	14	0	0.00	0.77	0.00	(0.00,66.95)	18	0.00
Deanda A	**137**	**8**	**5.84**	**1.28**	**8.97 ***	**(3.86,17.67)**	**197**	**9.17 ***
Montefiore - Moses	6	0	0.00	1.02	0.00	(0.00,100.0)	12	0.00
Montefiore - Weiler	131	8	6.11	1.29	9.29 *	(4.00,18.31)	185	10.05 *
Depan H	**259**	**1**	**0.39**	**1.80**	**0.42**	**(0.01, 2.34)**	**458**	**3.36**
Champ.Valley Phys Hosp	5	0	0.00	1.03	0.00	(0.00,100.0)	5	0.00
Ellis Hospital	254	1	0.39	1.82	0.43	(0.01, 2.37)	453	3.37
Derose J J	**240**	**5**	**2.08**	**2.07**	**1.97**	**(0.64, 4.61)**	**403**	**4.21**
Montefiore - Moses	43	0	0.00	1.81	0.00	(0.00, 9.22)	50	5.47
Montefiore - Weiler	102	4	3.92	1.98	3.87	(1.04, 9.92)	168	6.62
St. Lukes at St. Lukes	95	1	1.05	2.28	0.91	(0.01, 5.05)	185	2.65
Downing S W	**349**	**8**	**2.29**	**2.20**	**2.04**	**(0.88, 4.02)**	**397**	**3.06**
Erie County Med Ctr	99	3	3.03	1.86	3.19	(0.64, 9.33)	111	4.56
Mercy Hospital	250	5	2.00	2.34	1.68	(0.54, 3.91)	286	2.51
Genovesi M H	**122**	**1**	**0.82**	**1.75**	**0.92**	**(0.01, 5.10)**	**155**	**4.28**
Maimonides Medical Ctr	45	0	0.00	1.53	0.00	(0.00,10.46)	61	5.50
Univ.Hosp-Brooklyn	77	1	1.30	1.89	1.35	(0.02, 7.51)	94	3.73
Goldstein D J	**261**	**5**	**1.92**	**1.66**	**2.27**	**(0.73, 5.29)**	**386**	**2.98**
Montefiore - Moses	218	3	1.38	1.55	1.75	(0.35, 5.10)	329	2.55
Montefiore - Weiler	43	2	4.65	2.22	4.11	(0.46,14.83)	57	6.09
Grau J B	**151**	**2**	**1.32**	**0.97**	**2.66**	**(0.30, 9.62)**	**227**	**3.11**
Bellevue Hospital Ctr	150	2	1.33	0.95	2.74	(0.31, 9.89)	219	2.68
NYU Hospitals Center	1	0	0.00	3.93	0.00	(0.00,100.0)	8	6.02
Green G R	**370**	**10**	**2.70**	**2.00**	**2.65**	**(1.27, 4.87)**	**516**	**3.24**
Rochester General Hosp	95	2	2.11	2.83	1.46	(0.16, 5.26)	130	2.58
St. Josephs Hospital	275	8	2.91	1.72	3.32	(1.43, 6.55)	386	3.57
Ko W	**280**	**8**	**2.86**	**2.14**	**2.62**	**(1.13, 5.17)**	**424**	**4.75**
NY Hospital - Queens	168	3	1.79	2.22	1.58	(0.32, 4.61)	220	2.85
NYP- Weill Cornell	59	2	3.39	1.73	3.85	(0.43,13.90)	90	6.32
Univ.Hosp-Brooklyn	53	3	5.66	2.33	4.77	(0.96,13.93)	114	6.45
Lansman S	**457**	**6**	**1.31**	**2.10**	**1.22**	**(0.45, 2.67)**	**597**	**1.52 ****
Mount Sinai Hospital	.	.	.	.	.	(. , .)	1	11.66
Westchester Med Ctr	457	6	1.31	2.10	1.22	(0.45, 2.67)	596	1.36 **

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Lee L Y	**272**	**5**	**1.84**	**2.30**	**1.56**	**(0.50, 3.65)**	**381**	**3.10**
NY Methodist Hospital	150	3	2.00	2.22	1.77	(0.36, 5.16)	205	2.54
NYP- Weill Cornell	122	2	1.64	2.41	1.33	(0.15, 4.82)	176	3.68
Mack C A	**61**	**0**	**0.00**	**1.59**	**0.00**	**(0.00, 7.44)**	**74**	**2.51**
NY Hospital - Queens	55	0	0.00	1.40	0.00	(0.00, 9.31)	62	3.21
NYP- Weill Cornell	6	0	0.00	3.24	0.00	(0.00,37.01)	12	0.00
Malekan R	**26**	**0**	**0.00**	**1.50**	**0.00**	**(0.00,18.39)**	**33**	**4.67**
Buffalo General Hosp	2	0	0.00	0.48	0.00	(0.00,100.0)	3	0.00
Millard Fillmore Hosp	8	0	0.00	0.96	0.00	(0.00,93.58)	9	30.46
Westchester Med Ctr	16	0	0.00	1.90	0.00	(0.00,23.61)	21	0.00
Merav A	**118**	**7**	**5.93**	**1.95**	**5.97 ***	**(2.39,12.30)**	**170**	**5.77**
Montefiore - Moses	106	5	4.72	1.94	4.78	(1.54,11.15)	155	4.89
Montefiore - Weiler	12	2	16.67	2.06	15.83	(1.78,57.16)	15	15.70
Meyer D B	**.**	**.**	**.**	**.**	**.**	**(. , .)**	**4**	**0.00**
Bellevue Hospital Ctr	.	.	.	.	.	(. , .)	1	0.00
NYU Hospitals Center	.	.	.	.	.	(. , .)	3	0.00
Michler R E	**184**	**3**	**1.63**	**1.97**	**1.62**	**(0.33, 4.74)**	**389**	**2.97**
Montefiore - Moses	145	3	2.07	1.91	2.12	(0.43, 6.20)	295	3.32
Montefiore - Weiler	39	0	0.00	2.19	0.00	(0.00, 8.41)	94	1.99
Picone A	**117**	**3**	**2.56**	**1.60**	**3.13**	**(0.63, 9.16)**	**197**	**3.61**
Buffalo General Hosp	38	0	0.00	1.55	0.00	(0.00,12.20)	69	3.30
Millard Fillmore Hosp	17	0	0.00	1.06	0.00	(0.00,39.86)	27	4.74
Univ.Hosp-SUNY Upstate	62	3	4.84	1.79	5.32	(1.07,15.53)	101	3.56
Plestis K A	**122**	**2**	**1.64**	**1.38**	**2.33**	**(0.26, 8.40)**	**312**	**2.89**
Montefiore - Moses	14	1	7.14	1.90	7.38	(0.10,41.04)	19	10.55
Montefiore - Weiler	48	0	0.00	1.50	0.00	(0.00, 9.98)	103	0.00
Mount Sinai Hospital	60	1	1.67	1.17	2.80	(0.04,15.59)	190	3.49
Quaegebeur J	**.**	**.**	**.**	**.**	**.**	**(. , .)**	**11**	**0.00**
NYP- Columbia Presby.	.	.	.	.	.	(. , .)	10	0.00
Univ.Hosp-Stony Brook	.	.	.	.	.	(. , .)	1	0.00
Reddy R C	**124**	**6**	**4.84**	**1.72**	**5.51 ***	**(2.01,12.00)**	**196**	**3.19**
Lenox Hill Hospital	116	4	3.45	1.76	3.83	(1.03, 9.81)	183	2.49
Mount Sinai Hospital	8	2	25.00	1.09	45.17 *	(5.07,100.0)	13	20.10
Reich H	**252**	**3**	**1.19**	**1.41**	**1.66**	**(0.33, 4.85)**	**331**	**2.05**
Champ.Valley Phys Hosp	9	0	0.00	0.90	0.00	(0.00,88.89)	10	0.00
Ellis Hospital	243	3	1.23	1.42	1.70	(0.34, 4.96)	321	2.08
Ribakove G	**122**	**2**	**1.64**	**1.59**	**2.03**	**(0.23, 7.32)**	**299**	**3.60**
Bellevue Hospital Ctr	76	0	0.00	1.23	0.00	(0.00, 7.69)	153	3.21
NYU Hospitals Center	46	2	4.35	2.17	3.93	(0.44,14.19)	146	3.86

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Saifi J	**368**	**10**	**2.72**	**2.18**	**2.45**	**(1.17, 4.50)**	**587**	**3.17**
Champ.Valley Phys Hosp	4	0	0.00	0.63	0.00	(0.00,100.0)	4	0.00
St. Peters Hospital	364	10	2.75	2.19	2.46	(1.18, 4.52)	583	3.17
Sarabu M	**266**	**2**	**0.75**	**1.68**	**0.88**	**(0.10, 3.17)**	**470**	**0.89 ****
Mount Sinai Hospital	113	1	0.88	1.54	1.13	(0.01, 6.28)	149	1.01
Vassar Bros. Med Ctr	145	1	0.69	1.76	0.77	(0.01, 4.27)	310	0.88 **
Westchester Med Ctr	8	0	0.00	2.22	0.00	(0.00,40.48)	11	0.00
Schwartz C F	**96**	**1**	**1.04**	**1.61**	**1.27**	**(0.02, 7.08)**	**155**	**5.11**
Bellevue Hospital Ctr	72	1	1.39	1.48	1.85	(0.02,10.27)	116	4.92
NYU Hospitals Center	24	0	0.00	2.00	0.00	(0.00,15.01)	39	5.53
Singh C	**346**	**6**	**1.73**	**1.55**	**2.19**	**(0.80, 4.77)**	**413**	**3.52**
Champ.Valley Phys Hosp	5	0	0.00	0.81	0.00	(0.00,100.0)	5	0.00
Ellis Hospital	341	6	1.76	1.56	2.21	(0.81, 4.81)	408	3.54
Spielvogel D	**435**	**4**	**0.92**	**2.21**	**0.82**	**(0.22, 2.09)**	**614**	**2.11**
Mount Sinai Hospital	6	1	16.67	5.32	6.14	(0.08,34.16)	8	16.00
Westchester Med Ctr	429	3	0.70	2.17	0.63 **	(0.13, 1.85)	606	1.85 **
Stelzer P	**48**	**4**	**8.33**	**2.73**	**5.99**	**(1.61,15.34)**	**248**	**4.79**
Beth Israel Med Ctr	41	4	9.76	2.97	6.44	(1.73,16.49)	230	4.98
Mount Sinai Hospital	7	0	0.00	1.30	0.00	(0.00,78.93)	18	0.00
Tortolani A	**353**	**4**	**1.13**	**2.21**	**1.01**	**(0.27, 2.58)**	**474**	**2.83**
NY Methodist Hospital	217	1	0.46	2.00	0.45	(0.01, 2.51)	291	2.50
NYP- Weill Cornell	136	3	2.21	2.54	1.71	(0.34, 4.98)	183	3.26
Vatsia S	**167**	**3**	**1.80**	**2.61**	**1.35**	**(0.27, 3.94)**	**263**	**1.62**
Long Island Jewish	.	.	.	.	.	(. , .)	1	0.00
North Shore Univ Hosp	167	3	1.80	2.61	1.35	(0.27, 3.94)	262	1.62
Zias E	**405**	**8**	**1.98**	**2.09**	**1.85**	**(0.80, 3.65)**	**602**	**2.62**
Mount Sinai Hospital	398	8	2.01	2.09	1.88	(0.81, 3.71)	592	2.66
Westchester Med Ctr	7	0	0.00	1.92	0.00	(0.00,53.60)	10	0.00

* RAMR significantly higher than statewide rate based on 95 percent confidence interval.

** RAMR significantly lower than statewide rate based on 95 percent confidence interval.

SURGEON AND HOSPITAL VOLUMES FOR TOTAL ADULT CARDIAC SURGERY, 2005-2007

Table 7 presents, for each hospital and for each surgeon performing at least 200 cardiac operations in any hospital in 2005 – 2007 and/or performing one or more cardiac operations in each of the years 2005 – 2007, the total number of Isolated CABG operations, the total number of Valve or Valve/CABG operations, the total number of Other Cardiac operations and Total Cardiac operations. As in Table 5, results for surgeons not meeting the above criteria are grouped together in an "All Others" category.

The Isolated CABG column includes patients who undergo bypass of one or more of the coronary arteries with no other major heart surgery earlier in the same admission. Valve or Valve/CABG volumes include the total number of cases for the eight Valve or Valve/CABG groups that were identified in Table 4. Other Cardiac Surgery refers to cardiac procedures not represented by Isolated CABG, and Valve or Valve/CABG operations and includes, but is not limited to: repairs of congenital conditions, heart transplants, aneurysm repairs, ventricular reconstruction and ventricular assist device insertions. Total Cardiac Surgery is the sum of the previous three columns and includes any procedure to the heart or great vessels.

Table 7: Surgeon and Hospital Volume for Isolated CABG, Valve or Valve/CABG, Other Cardiac Surgery and Total Adult Cardiac Surgery, 2005-2007

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Albany Medical Center				
Britton L	321	151	48	520
Devejian N	0	1	23	24
Fuzesi L	357	53	30	440
Miller S	296	129	25	450
Sardella G	243	111	21	375
All Others	0	0	3	3
Total	**1217**	**445**	**150**	**1812**
Arnot Ogden Med Ctr				
Nast E	185	42	17	244
All Others	135	35	3	173
Total	**320**	**77**	**20**	**417**
Bellevue Hospital Ctr				
Crooke G	41	15	21	77
Grau J B	150	69	21	240
Meyer D B	0	1	6	7
Ribakove G	76	77	16	169
Schwartz C F	72	44	18	134
All Others	1	0	4	5
Total	**340**	**206**	**86**	**632**

Table 7 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Beth Israel Med Ctr				
Geller C M	76	28	5	109
Hoffman D	186	39	7	232
Stelzer P	41	189	112	342
Tranbaugh R	457	154	31	642
All Others	34	8	1	43
Total	**794**	**418**	**156**	**1368**
Buffalo General Hosp				
Ashraf M	32	3	1	36
Grosner G	767	404	53	1224
Lewin A	296	11	5	312
Malekan R	2	1	2	5
Picone A	38	31	10	79
All Others	48	4	15	67
Total	**1183**	**454**	**86**	**1723**
Champlain Valley Phys Hosp				
Bennett E	16	3	0	19
Canavan T	35	6	0	41
Dal Col R	1	0	0	1
Depan H	5	0	0	5
Reich H	9	1	0	10
Saifi J	4	0	0	4
Singh C	5	0	0	5
All Others	190	36	8	234
Total	**265**	**46**	**8**	**319**
Ellis Hospital				
Depan H	254	199	46	499
Reich H	243	78	10	331
Singh C	341	67	10	418
Total	**838**	**344**	**66**	**1248**
Erie County Med Ctr				
Aldridge J	1	0	0	1
Ashraf M	15	1	0	16
Bell-Thomson J	331	151	37	519
Datta S	102	6	35	143
Downing S W	99	12	12	123
All Others	4	1	1	6
Total	**552**	**171**	**85**	**808**

Table 7 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Good Samaritan Hosp - Suffern				
All Others	178	53	4	235
Total	**178**	**53**	**4**	**235**
Lenox Hill Hospital				
Ciuffo G B	92	38	12	142
Loulmet D F	45	255	26	326
Patel N C	513	205	30	748
Reddy R C	116	67	31	214
Subramanian V	495	195	46	736
All Others	149	35	51	235
Total	**1410**	**795**	**196**	**2401**
Long Island Jewish Med Ctr				
Graver L	251	322	81	654
Manetta F	154	86	20	260
Palazzo R	258	122	12	392
Parnell V	0	2	10	12
Vatsia S	0	1	6	7
All Others	70	67	6	143
Total	**733**	**600**	**135**	**1468**
M I Bassett Hospital				
Lancey R A	93	38	10	141
Shortt K G	109	34	13	156
Total	**202**	**72**	**23**	**297**
Maimonides Medical Ctr				
Abrol S	165	70	75	310
Brevetti G R	5	7	2	14
Cunningham J N	80	31	14	125
Genovesi M H	45	16	6	67
Jacobowitz I	438	186	28	652
Lahey S J	42	20	4	66
Stephens G A	41	28	4	73
Vaynblat M	230	90	48	368
All Others	64	22	17	103
Total	**1110**	**470**	**198**	**1778**
Mercy Hospital				
Aldridge J	54	7	2	63
Ashraf M	1	0	0	1
Bell-Thomson J	246	60	15	321
Carlson R E	190	22	15	227
Downing S W	250	36	30	316
Total	**741**	**125**	**62**	**928**

Table 7 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Millard Fillmore Hosp				
Aldridge J	190	38	33	261
Ashraf M	697	193	31	921
Datta S	14	4	0	18
Jennings L	47	1	0	48
Malekan R	8	1	1	10
Picone A	17	10	1	28
All Others	6	1	0	7
Total	**979**	**248**	**66**	**1293**
Montefiore - Moses				
D Alessandro D A	197	104	41	342
Deanda A	6	6	17	29
Derose J J	43	7	10	60
Goldstein D J	218	111	43	372
Merav A	106	49	10	165
Michler R E	145	150	30	325
Plestis K A	14	5	4	23
Weinstein S	0	2	15	17
All Others	95	45	11	151
Total	**824**	**479**	**181**	**1484**
Montefiore - Weiler				
D Alessandro D A	13	4	4	21
Deanda A	131	54	39	224
Derose J J	102	66	6	174
Goldstein D J	43	14	4	61
Merav A	12	3	0	15
Michler R E	39	55	5	99
Plestis K A	48	55	30	133
All Others	10	3	5	18
Total	**398**	**254**	**93**	**745**
Mount Sinai Hospital				
Adams D H	18	547	100	665
Filsoufi F	179	122	33	334
Griepp R	1	45	203	249
Lansman S	0	1	1	2
Nguyen K	0	1	36	37
Plestis K A	60	130	182	372
Reddy R C	8	5	1	14
Sarabu M	113	36	6	155
Spielvogel D	6	2	4	12

Table 7 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Mount Sinai Hospital, *continued*				
Stelzer P	7	11	28	46
Zias E	398	194	44	636
All Others	47	64	89	200
Total	**837**	**1158**	**727**	**2722**
NY Hospital - Queens				
Adkins M	260	82	16	358
Ko W	168	52	21	241
Mack CA	55	7	5	67
Total	**483**	**141**	**42**	**666**
NY Methodist Hospital				
Lee L Y	150	55	49	254
Tortolani A	217	74	4	295
All Others	10	0	2	12
Total	**377**	**129**	**55**	**561**
NYP- Columbia Presby.				
Argenziano M	105	207	117	429
Chen J M	0	1	20	21
D Alessandro D A	2	1	4	7
Mosca R S	1	4	35	40
Naka Y	232	214	199	645
Oz M	252	463	68	783
Quaegebeur J	0	10	97	107
Smith C	255	522	93	870
Stewart A S	263	265	338	866
All Others	36	62	182	280
Total	**1146**	**1749**	**1153**	**4048**
NYP- Weill Cornell				
Adkins M	3	4	1	8
Chen J M	0	2	7	9
Girardi L	437	444	565	1446
Isom O	38	93	5	136
Ko W	59	31	7	97
Krieger K	307	362	24	693
Lee L Y	122	54	14	190
Mack CA	6	6	1	13
Tortolani A	136	47	6	189
All Others	96	48	13	157
Total	**1204**	**1091**	**643**	**2938**

Table 7 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
NYU Hospitals Center				
Ciuffo G B	13	18	5	36
Colvin S	42	694	88	824
Crooke G	11	11	6	28
Culliford A	118	177	34	329
Galloway A	86	401	59	546
Grau J B	1	7	6	14
Grossi E	9	24	14	47
Meyer D B	0	3	7	10
Ribakove G	46	100	26	172
Schwartz C F	24	15	15	54
Total	**350**	**1450**	**260**	**2060**
North Shore Univ Hosp				
Arnofsky A	130	42	23	195
Esposito R	469	201	39	709
Hall M	336	207	20	563
Hartman A	211	468	107	786
Kalimi R	332	159	28	519
Pogo G	271	154	48	473
Vatsia S	167	95	20	282
All Others	19	8	6	33
Total	**1935**	**1334**	**291**	**3560**
Rochester General Hosp				
Becker E J	148	27	7	182
Cheeran D	617	335	92	1044
Green G R	95	35	7	137
Kirshner R	615	462	70	1147
Total	**1475**	**859**	**176**	**2510**
SVCMC- St. Vincents				
Ciuffo G B	60	59	9	128
Lang S	316	99	29	444
Shin Y T	233	113	36	382
All Others	2	1	5	8
Total	**611**	**272**	**79**	**962**
St. Elizabeth Med Ctr				
El Amir N	173	95	35	303
Joyce F	296	169	24	489
Kelley J	316	158	32	506
Total	**785**	**422**	**91**	**1298**

Table 7 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
St. Francis Hospital				
Bercow N	310	213	32	555
Colangelo R	615	244	16	875
Damus P	217	198	22	437
Fernandez H A	368	110	17	495
Lamendola C	351	230	30	611
Robinson N	517	342	31	890
Taylor J	494	412	45	951
All Others	13	4	1	18
Total	**2885**	**1753**	**194**	**4832**
St. Josephs Hospital				
Green G R	275	111	26	412
Marvasti M	320	266	60	646
Nazem A	459	160	47	666
Rosenberg J	266	197	61	524
Zhou Z	393	131	26	550
Total	**1713**	**865**	**220**	**2798**
St. Lukes at St. Lukes				
Balaram S K	87	58	23	168
Derose J J	95	90	47	232
Swistel D	302	211	38	551
Total	**484**	**359**	**108**	**951**
St. Peters Hospital				
Bennett E	228	247	55	530
Canavan T	308	51	2	361
Dal Col R	344	269	50	663
Saifi J	364	219	26	609
Total	**1244**	**786**	**133**	**2163**
Staten Island Univ Hosp				
McGinn J	900	180	24	1104
Molinaro P J	110	40	4	154
Nabagiez J P	19	7	2	28
Rosell F M	241	23	22	286
Total	**1270**	**250**	**52**	**1572**
Strong Memorial Hosp				
Alfieris G	0	5	34	39
Hicks G	285	118	63	466
Knight P	547	416	132	1095
Massey H	217	57	120	394
All Others	0	0	7	7
Total	**1049**	**596**	**356**	**2001**

Table 7 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
United Hlth Svcs-Wilson				
Quintos E	171	48	10	229
Wong K	268	117	5	390
Yousuf M	251	99	22	372
Total	**690**	**264**	**37**	**991**
Univ.Hosp-Brooklyn				
Brevetti G R	17	17	5	39
Burack J H	34	21	10	65
Genovesi M H	77	17	2	96
Ko W	53	61	6	120
Lowery R C	43	50	20	113
All Others	13	8	6	27
Total	**237**	**174**	**49**	**460**
Univ.Hosp-SUNY Upstate				
Fink G W	277	165	63	505
Lutz C J	341	127	29	497
Picone A	62	39	14	115
All Others	0	0	17	0
Total	**680**	**331**	**123**	**1134**
Univ.Hosp-Stony Brook				
Bilfinger T	120	54	27	201
McLarty A	95	40	38	173
Quaegebeur J	0	1	1	2
Rosengart T	226	132	18	376
Seifert F	429	172	29	630
All Others	85	49	15	149
Total	**955**	**448**	**128**	**1531**
Vassar Bros. Med Ctr				
Sarabu M	145	165	48	358
Zakow P	284	128	15	427
All Others	247	112	13	372
Total	**676**	**405**	**76**	**1157**
Westchester Med Ctr				
Fleisher A	297	67	26	390
Lafaro R	228	79	49	356
Lansman S	457	139	16	612
Malekan R	16	5	8	29
Sarabu M	8	3	0	11
Sett S	0	2	6	8

Table 7 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Westchester Med Ctr, *continued*				
Spielvogel D	429	177	118	724
Zias E	7	3	0	10
All Others	0	0	2	2
Total	**1442**	**475**	**225**	**2142**
Winthrop Univ. Hosp				
Goncalves J A	289	131	48	468
Kokotos W J	235	134	22	391
Schubach S	292	175	11	478
All Others	118	31	3	152
Total	**934**	**471**	**84**	**1489**
Statewide Total	**35546**	**21039**	**6917**	**63502**

Criteria Used in Reporting Significant Risk Factors (2007)

Based on Documentation in Medical Records

Patient Risk Factor	Definitions
Hemodynamic State	**Determined just prior to surgery.**
• Unstable	Patient requires pharmacologic or mechanical support to maintain blood pressure or cardiac index.
• Shock	Acute hypotension (systolic blood pressure < 80 mmHg) or low cardiac index (< 2.0 liters/min/m^2), despite pharmacologic or mechanical support. Records with this risk factor were excluded from all analyses in this report.
Comorbidities	
• COPD	Patients who require chronic (longer than three months) bronchodilator therapy to avoid disability from obstructive airway disease, or have forced expiratory volume in one second of less than 75 percent of the predicted value or less than 1.25 liters or have a room air PO_2 <60 or a PCO_2 >50.
• Extensive Aortic Atherosclerosis	Ascending, transverse and/or descending aortic atherosclerosis marked by either extensive calcification or luminal atheroma such that the intended surgical procedure is altered.
• Renal Failure, Creatinine	Highest pre-operative creatinine during the hospital admission was in the indicated range.
• Renal Failure Requiring Dialysis	The patient is on chronic peritoneal or hemodialysis.
Ventricular Function	
• Ejection Fraction	Value of the ejection fraction taken closest to the procedure. When a calculated measure is unavailable the ejection fraction should be estimated visually from the ventriculogram or by echocardiography. Intraoperative direct observation of the heart is not an adequate basis for a visual estimate of the ejection fraction. If no ejection fraction is reported, the ejection fraction is considered "normal" for purposes of analysis and is classified with the reference category.
• Previous MI	One or more myocardial infarctions (MI) in the specified time period prior to surgery.
Previous Open Heart Operations	Open heart surgery performed prior to the current operating room visit. Minimally invasive procedures are included.

angina pectoris - The pain or discomfort felt when blood and oxygen flow to the heart are impeded by blockages in the coronary arteries. Can also be caused by an arterial spasm.

angioplasty - Also known as *percutaneous transluminal coronary angioplasty* (PTCA) or *percutaneous coronary intervention* (PCI). In this procedure, a balloon catheter is threaded up to the site of blockage in an artery in the heart, and is then inflated to push arterial plaque against the wall of the artery to create a wider channel in the artery. Other procedures or devices are frequently used in conjunction with, or in place of, the balloon catheter. In particular, stents are used for most patients and devices such as rotoblaters and ultrasound are sometimes used.

arteriosclerosis - Also called *atherosclerotic coronary artery disease* or *coronary artery disease,* the group of diseases characterized by thickening and loss of elasticity of the arterial walls, popularly called "hardening of the arteries."

atherosclerosis - One form of arteriosclerosis in which plaques or fatty deposits form in the inner layer of the arteries.

coronary artery bypass graft surgery (CABG) - A procedure in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart muscle, bypassing the arterial blockage. Typically, a section of one of the large saphenous veins in the leg, the radial artery in the arm or the mammary artery in the chest is used to construct the bypass. One or more bypasses may be performed during a single operation. When no other major heart surgery (such as valve replacement) is included, the operation is referred to as an isolated CABG.

The average number of bypass grafts created during CABG is three or four. Generally, all significantly blocked arteries are bypassed unless they enter areas of the heart that are permanently damaged by previous heart attacks. Five or more bypasses are occasionally created. Multiple bypasses are often performed to provide several alternate routes for the blood flow and to improve the long-term success of the procedure, not necessarily because the patient's condition is more severe.

cardiac catheterization - Also known as *coronary angiography*, a procedure for diagnosing the condition of the heart and the arteries connecting to it. A thin tube threaded through an artery to the heart releases a dye, which allows doctors to observe blockages with an X-ray camera. This procedure is generally required before coronary bypass surgery.

cardiovascular disease - Disease of the heart and blood vessels, the most common form is coronary artery disease.

coronary arteries - The arteries that supply the heart muscle with blood. When they are narrowed or blocked, oxygen-rich blood cannot flow freely to the heart muscle or myocardium.

heart valve- Gates that connect the different chambers of the heart so that there is a one-way flow of blood between the chambers. The heart has four valves: the tricuspid, mitral, pulmonic, and aortic valves.

incompetent valves - A valve that does not close tightly.

ischemic heart disease (ischemia) - Heart disease that occurs as a result of inadequate blood supply to the heart muscle or myocardium.

myocardial infarction (MI) - Also called a *heart attack,* partial destruction of the heart muscle due to interrupted blood supply.

plaque - Also called *atheroma,* this is the fatty deposit in the coronary artery that can block blood flow.

risk factors for heart disease - Certain risk factors have been found to increase the likelihood of developing heart disease. Some are controllable or avoidable and some cannot be controlled. The biggest heart disease risk factors are heredity, gender and age, none of which can be controlled. Men are much more likely to develop heart disease than women before the age of 55, although it is the number one killer of both men and women.

Some controllable risk factors that contribute to a higher likelihood of developing coronary artery disease are high cholesterol levels, cigarette smoking, high blood pressure (hypertension), obesity, a sedentary lifestyle or lack of exercise, diabetes and poor stress management.

stenosis - The narrowing of an artery due to blockage. Restenosis is when the narrowing recurs after surgery.

stenotic valve- A valve that does not open fully.

valve disease- Occurs when a valve cannot open all of the way (reducing flow to the next heart chamber) or cannot close all of the way (causing blood to leak backwards into the previous heart chamber).

valve repair- Widening valve openings for stenotic valves or narrowing or tightening valve openings for incompetent valves without having to replace the valves.

valve replacement- Replacement of a diseased valve. New valves are either mechanical (durable materials such as Dacron or titanium) or biological (tissues taken from pigs, cows or human donors).

Appendix 1. 2005-2007 Risk Factors For Isolated CABG In-Hospital/30-Day Mortality

The significant pre-procedural risk factors for in-hospital/30-day mortality following isolated CABG in the 2005-2007 time period are presented in the table that follows.

Roughly speaking, the odds ratio for a risk factor represents the number of times a patient with that risk factor is more likely to die in the hospital during or after CABG or after discharge but within 30 days of the operation than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor COPD is 1.709. This means that a patient with COPD is approximately 1.709 times as likely to die in the hospital during or after undergoing CABG or after discharge but within 30 days as a patient without COPD who has the same other significant risk factors.

For all risk factors in the table except Age, Ejection Fraction, Previous MI and Renal Failure, there are only two possibilities – having the risk factor and not having it. For example, a patient either has COPD or does not have it. Since Renal Failure is expressed in terms of Renal Failure with dialysis and without dialysis, the odds ratios are relative to patients with no dialysis prior to surgery and no pre-operative creatinine greater than 1.3 mg/dL.

Previous MI is subdivided into four groups: occurring less than six hours prior to surgery; occurring six to twenty-three hours prior to surgery; occurring one to seven days prior to surgery; and no MI within seven days prior to the procedure. The last range is referred to as the reference category. The odds ratios for the Previous MI ranges listed above are relative to patients who have not had a previous MI within seven days prior to the procedure.

Ejection Fraction, which is the percentage of blood in the heart's left ventricle that is expelled when it contracts (with more denoting a healthier heart), is subdivided into five ranges (less than 20 percent, 20-29 percent, 30-39 percent, 40-49 percent and 50 percent or more). The last range is referred to as the reference category. This means that the odds ratios that appear for the other Ejection Fraction categories in the table are relative to patients with an ejection fraction of 50 percent or more. Thus, a patient with an ejection fraction less than 20 percent is about 4.609 times as likely to die in the hospital or after discharge but within 30 days as a patient with an ejection fraction of 50 percent or higher, all other significant risk factors being the same.

With regard to age, the odds ratio roughly represents the number of times a patient who is over age 55 is more likely to die in the hospital than another patient who is one year younger, all other significant risk factors being the same. Thus, the chance of in-hospital / 30-day mortality for a patient undergoing CABG surgery who is 63 years old is approximately 1.061 times that of a 62 year-old patient undergoing CABG, all other risk factors being the same. All patients age 55 or under have roughly the same odds of dying in the hospital or after discharge but within 30 days if their risk factors are identical.

Appendix 1: Multivariable Risk Factor Equation for Isolated CABG In-Hospital / 30-Day Deaths in New York State in 2005-2007.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age: Number of years greater than 55	---	0.0596	<.0001	1.061
Female Gender	26.73	0.6159	<.0001	1.851
Hemodynamic State				
Unstable	1.31	1.0382	<.0001	2.824
Ventricular Function				
Ejection Fraction				
Ejection Fraction ≥ 50%	59.25	--Reference--		1.000
Ejection Fraction < 20%	1.82	1.5279	<.0001	4.609
Ejection Fraction 20-29%	6.41	0.9903	<.0001	2.692
Ejection Fraction 30-39%	11.69	0.6981	<.0001	2.010
Ejection Fraction 40-49%	20.83	0.4110	<.0001	1.508
Previous MI				
No Previous MI within 7 days	81.87	--Reference--		1.000
Previous MI less than 6 hours	0.92	1.3099	<.0001	3.706
Previous MI 6 – 23 hours	1.39	0.9684	<.0001	2.634
Previous MI 1 – 7 days	15.82	0.3975	<.0001	1.488
Comorbidities				
COPD	19.67	0.5361	<.0001	1.709
Diabetes	35.93	0.2495	0.0025	1.283
Extensive Aortic Atherosclerosis	6.50	0.6246	<.0001	1.868
Peripheral Vascular Disease	12.63	0.2148	0.0260	1.240
Renal Failure				
No Renal Failure	73.19	--Reference--		1.000
Renal Failure, Creatinine 1.3 -1.5 mg/dl	14.65	0.5057	<.0001	1.658
Renal Failure, Creatinine 1.6 -2.0 mg/dl	6.72	0.7044	<.0001	2.023
Renal Failure, Creatinine > 2.0 mg/dl	3.26	1.1257	<.0001	3.082
Renal Failure, Dialysis	2.18	2.0673	<.0001	7.903
Previous Open Heart Operations	3.49	0.9291	<.0001	2.532

Intercept = -6.2772

C Statistic = 0.812

Appendix 2. 2005-2007 Risk Factors For Valve Surgery In-Hospital/30-Day Mortality

The significant pre-procedural risk factors for in-hospital/30-day mortality following valve surgery in the 2005-2007 time period are presented in the table that follows.

Roughly speaking, the odds ratio for a risk factor represents the number of times a patient with that risk factor is more likely to die in the hospital during or after valve surgery or after discharge but within 30 days than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor COPD is 1.446. This means that a patient with COPD is approximately 1.446 times as likely to die in the hospital during or after undergoing valve surgery or after discharge but within 30 days as a patient without COPD who has the same other significant risk factors.

The odds ratio for type of valve surgery represents the number of times a patient with a specific valve surgery is more likely to die in the hospital during or after that particular surgery or after discharge but within 30 days than a patient who has had aortic valve replacement surgery, all other risk factors being the same. For example, a patient who has a mitral valve replacement surgery is 1.535 times as likely to die in the hospital during or after surgery or after discharge but within 30 days as a patient with aortic valve replacement surgery, all other significant risk factors being the same.

Left Main Disease refers to patients with a blockage of at least 50 percent in their Left Main Coronary Artery. This group is compared to patients who do not have a blockage of at least 50 percent in their Left Main Coronary Artery.

Three Vessels Diseased refers to patients with at least a 70 percent blockage in each of three native coronary arteries (LAD, RCA, LCX) or their major branches. The reference category for this group includes patients who have fewer than three vessels diseased.

For all other risk factors in the table except Age and Renal Failure there are only two possibilities – having the risk factor and not having it. For example, a patient either has COPD or does not have it. Age and Renal Failure are interpreted in the same way as previously described.

Appendix 2: Multivariable Risk Factor Equation for Valve Surgery In-Hospital / 30-Day Deaths In NYS, 2005-2007.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age: number of years greater than 50	—	0.0447	<.0001	1.046
Female Gender	48.75	0.6014	<.0001	1.825
Type of Valve Surgery				
Aortic Valve Replacement	46.61	--Reference--		1.000
Mitral Valve Replacement	16.35	0.4284	0.0009	1.535
Mitral Valve Repair	18.60	-0.0869	0.6186	0.917
Multiple Valve Repair/Replacement	18.44	0.8004	<.0001	2.226
Hemodynamic State				
Unstable	1.09	0.9487	<.0001	2.582
Ventricular Function				
Ejection Fraction < 30%	6.61	0.4269	0.0049	1.532
Comorbidities				
COPD	19.91	0.3691	0.0003	1.446
Endocarditis	5.36	0.9417	<.0001	2.564
Hepatic Failure	0.33	1.6013	<.0001	4.960
Renal Failure				
No Renal Failure	74.62	--Reference--		1.000
Renal Failure, Creatinine 1.3 -1.5 mg/dl	12.60	0.5777	<.0001	1.782
Renal Failure, Creatinine 1.6 -2.0 mg/dl	6.45	0.9799	<.0001	2.664
Renal Failure, Creatinine > 2.0 mg/dl	3.70	1.1717	<.0001	3.228
Renal Failure, requiring dialysis	2.63	1.4761	<.0001	4.376
Vessels Diseased				
Left Main Disease	0.84	0.6916	0.0219	1.997
Three Vessels Diseased	1.34	0.5575	0.0339	1.746
Previous Open Heart Operations	18.21	0.5383	<.0001	1.713
Previous Organ Transplant	0.62	1.4120	<.0001	4.104

Intercept = -5.3413

C Statistic = 0.780

Appendix 3. 2005-2007 Risk Factors For Valve and CABG Surgery In-Hospital/30-Day Mortality

The significant pre-procedural risk factors for in-hospital/30-day mortality following valve and CABG surgery in the 2005-2007 time period are presented in the table that follows.

Roughly speaking, the odds ratio for a risk factor represents the number of times a patient with that risk factor is more likely to die in the hospital during or after valve and CABG surgery or after discharge but within 30 days than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor COPD is 1.350. This means that a patient with COPD is approximately 1.350 times as likely to die in the hospital during or after undergoing valve and CABG surgery or after discharge but within 30 days as a patient without COPD who has the same other significant risk factors. Female Gender, Previous MI within 24 hours, Endocarditis, Extensive Aortic Atherosclerosis, Peripheral Vascular Disease and Previous Open Heart Operations are also interpreted in this way. The interpretaion for Ejection Fraction and Renal Failure is similar to that described in Appendix 1.

The odds ratio for Type of Valve with CABG surgery represents the number of times a patient with a specific Valve with CABG surgery is more likely to die in the hospital during or after that particular surgery or after discharge but within 30 days than a patient who has had aortic valve repair or replacement and CABG surgery, all other risk factors being the same. For example, a patient who has a mitral valve replacement and CABG surgery is 1.936 times as likely to die in the hospital during or after surgery as a patient with aortic valve repair or replacement and CABG surgery, all other significant risk factors being the same.

The interpretation for Age is similar to that described in Appendix 1. In this case, the odds ratio for age roughly represents the number of times a patient who is over age 65 is more likely to die in the hospital or after discharge but within 30 days than another patient who is one year younger with all the other significant risk factors the same.

Appendix 3: Multivariable Risk Factor Equation for Valve and CABG Surgery In-Hospital/ 30-Day Deaths in NYS, 2005-2007.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age: Number of years greater than 65	--	0.0616	<.0001	1.064
Female Gender	38.34	0.4516	<.0001	1.571
Type of Valve (with CABG)				
Aortic Valve Repair/Replacement	55.75	--Reference--		1.000
Mitral Valve Replacement	12.54	0.6608	<.0001	1.936
Mitral Valve Repair	20.31	0.4279	0.0007	1.534
Multiple Valve Repair/Replacement	11.40	1.0653	<.0001	2.902
Ventricular Function				
Ejection Fraction				
Ejection Fraction ≥ 30%	86.13	--Reference--		1.000
Ejection Fraction < 20 %	3.32	0.8060	<.0001	2.239
Ejection Fraction 20-29 %	10.55	0.6851	<.0001	1.984
Previous MI				
Previous MI < 24 hours	0.78	1.7071	<.0001	5.513
Comorbidities				
COPD	25.41	0.3002	0.0017	1.350
Endocarditis	1.47	0.6614	0.0141	1.937
Extensive Aortic Atherosclerosis	11.44	0.3837	0.0013	1.468
Peripheral Vascular Disease	13.76	0.5611	<.0001	1.753
Renal Failure				
No Renal Failure	63.20	--Reference--		1.000
Renal Failure, Creatinine 1.3 - 1.5 mg/dl	17.78	0.2671	0.0281	1.306
Renal Failure, Creatinine 1.6 - 2.0 mg/dl	10.52	0.3732	0.0061	1.452
Renal Failure, Creatinine > 2.0 mg/dl	5.12	0.6712	<.0001	1.957
Renal Failure Requiring Dialysis	3.37	1.8660	<.0001	6.463
Previous Open Heart Operations	8.93	0.6323	<.0001	1.882

Intercept = -4.5117

C Statistic = 0.751

NEW YORK STATE CARDIAC SURGERY CENTERS

Albany Medical Center Hospital
New Scotland Avenue
Albany, New York 12208

Arnot Ogden Medical Center
600 Roe Avenue
Elmira, New York 14905

Bellevue Hospital Center
First Avenue and 27th Street
New York, New York 10016

Beth Israel Medical Center
10 Nathan D. Perlman Place
New York, New York 10003

Buffalo General Hospital
100 High Street
Buffalo, New York 14203

Champlain Valley Physicians Hospital
Medical Center
75 Beekman Street
Plattsburgh, New York 12901

Columbia Presbyterian Medical Center
– NY Presbyterian
161 Fort Washington Avenue
New York, New York 10032

Ellis Hospital
1101 Nott Street
Schenectady, New York 12308

Erie County Medical Center
462 Grider Street
Buffalo, New York 14215

Good Samaritan Hospital of Suffern
255 Lafayette Avenue
Suffern, New York 10901

Lenox Hill Hospital
100 East 77th Street
New York, New York 10021

Long Island Jewish
Medical Center
270-05 76th Avenue
New Hyde Park, New York 11040

Maimonides Medical Center
4802 Tenth Avenue
Brooklyn, New York 11219

Mary Imogene Bassett Healthcare
Atwell Road
Cooperstown, New York 13326

Mercy Hospital
565 Abbott Road
Buffalo, New York 14220

Millard Fillmore Hospital
3 Gates Circle
Buffalo, New York 14209

Montefiore Medical Center
Henry & Lucy Moses Division
111 East 210th Street
Bronx, New York 11219

Montefiore Medical Center-
Weiler Hospital of
A. Einstein College
1825 Eastchester Road
Bronx, New York 10461

Mount Sinai Medical Center
One Gustave L. Levy Place
New York, New York 10019

NYU Hospitals Center
550 First Avenue
New York, New York 10016

New York Hospital Medical
Center-Queens
56-45 Main Street
Flushing, New York 11355

New York Methodist Hospital
506 Sixth Street
Brooklyn, New York 11215

North Shore University Hospital
300 Community Drive
Manhasset, New York 11030

Rochester General Hospital
1425 Portland Avenue
Rochester, New York 14621

St. Elizabeth Medical Center
2209 Genesee Street
Utica, New York 13413

St. Francis Hospital
Port Washington Boulevard
Roslyn, New York 11576

St. Joseph's Hospital
Health Center
301 Prospect Avenue
Syracuse, New York 13203

St. Luke's Roosevelt
Hospital Center
11-11 Amsterdam Avenue at
114th Street
New York, New York 10025

St. Peter's Hospital
315 South Manning Boulevard
Albany, New York 12208

SVCMC - St. Vincent's Manhattan
Center of NY
153 West 11th Street
New York, New York 10011

Staten Island
University Hospital – North
475 Seaview Avenue
Staten Island, New York 10305

Strong Memorial Hospital
601 Elmwood Avenue
Rochester, New York 14642

United Health Services
Wilson Hospital Division
33-57 Harrison Street
Johnson City, New York 13790

University Hospital at Stony Brook
SUNY Health Science Center at
Stony Brook
Stony Brook, New York 11794-8410

University Hospital of Brooklyn
450 Lenox Road
Brooklyn, New York 11203

University Hospital SUNY Health
Sciences Center
750 East Adams Street
Syracuse, New York 13210

Vassar Brother's Medical Center
45 Reade Place
Poughkeepsie, New York 12601

Weill-Cornell Medical Center –
NY Presbyterian
525 East 68th Street
New York, New York 10021

Westchester Medical Center
Grasslands Road
Valhalla, New York 10595

Winthrop University Hospital
259 First Street
Mineola, New York 11501

Additional copies of this report may be obtained through the Department of Health web site at http://www.nyhealth.gov or by writing to:

Cardiac
Box 2005
New York State Department of Health
Albany, New York 12220

State of New York
David A. Paterson, Governor

Department of Health
Richard F. Daines, M.D., Commissioner

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