

**CORONARY
ARTERY
BYPASS
SURGERY**

**in
New York State**

1996-1998

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TABLE OF CONTENTS

- INTRODUCTION1
- CORONARY ARTERY BYPASS GRAFT SURGERY (CABG)3
- THE HEALTH DEPARTMENT PROGRAM4
- PATIENT POPULATION4
- RISK ADJUSTMENT FOR ASSESSING PROVIDER PERFORMANCE4
 - Data Collection, Data Validation and Identifying In-Hospital Deaths4
 - Assessing Patient Risk5
 - Predicting Patient Mortality Rates for Providers5
 - Computing the Risk-Adjusted Rate5
 - Interpreting the Risk-Adjusted Mortality Rate5
 - How This Contributes to Quality Improvement6
- RESULTS6
 - 1998 Risk Factors for CABG Surgery6
 - Table 1 Multivariable Risk Factor Equation for CABG Hospital Deaths in New York State in 19987
- 1998 HOSPITAL OUTCOMES FOR CABG SURGERY8
 - Table 2 Hospital Observed, Expected and Risk-Adjusted Mortality Rates (RAMR) for CABG Surgery in New York State, 1998 Discharges9
 - Figure 1 Risk-Adjusted Mortality Rates for CABG in New York State, 1998 Discharges10
- 1996-1998 HOSPITAL AND SURGEON DATA FOR CABG SURGERY11
 - Table 3 Observed, Expected and Risk-Adjusted Hospital and Surgeon In-Hospital Mortality Rates for CABG Surgery, 1996-199811
 - Table 4 Summary Information for Surgeons Practicing at More Than One Hospital, 1996-199819
- SURGEON AND HOSPITAL VOLUMES FOR ADULT CARDIAC SURGERY AND FOR ISOLATED CABG SURGERY (1996-1998)22
 - Table 5 Total Cardiac Surgery and Isolated CABG Surgery Volumes by Hospital and Surgeon, 1996-199822
- CRITERIA USED IN REPORTING SIGNIFICANT RISK FACTORS30
- MEDICAL TERMINOLOGY31
- NYS CARDIAC SURGERY CENTERS32

INTRODUCTION

The information contained in this booklet is intended for health care providers, patients and families of patients who are considering coronary artery bypass surgery. It provides data on risk factors associated with bypass surgery mortality 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 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 Department of Health and the Cardiac Advisory Committee to compile accurate and meaningful data which can and has 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 New York State.

We encourage doctors to discuss this information with their patients and colleagues as they develop treatment plans. 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 coronary artery bypass 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 1998. 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 a lack of exercise. Limiting these risk factors after bypass 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 the continued high quality of cardiac surgery available to New York 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 coronary artery bypass graft (CABG) surgery and percutaneous transluminal coronary angioplasty (PTCA).

Coronary artery bypass graft surgery is 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, 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 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 blockage, patients should continue to reduce their risk factors for heart disease.

THE HEALTH DEPARTMENT PROGRAM

The New York State 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 New York State Cardiac Advisory Committee (CAC), 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 individual patients' pre-operative conditions.

PATIENT POPULATION

All patients undergoing isolated coronary artery bypass graft surgery (CABG surgery with no other major heart surgery during the same admission) in New York State hospitals who were discharged in 1998 are included in the one-year results for coronary artery bypass surgery. Similarly, all patients undergoing isolated CABG surgery who were discharged between January 1, 1996 and

December 31, 1998 are included in the three-year results.

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

December 31, 1998 are included in the three-year results.

Isolated CABG surgery represented 71.85 percent of all adult cardiac surgery for the three-year period covered by this report. Total cardiac surgery volume and isolated CABG volume are tabulated in Table 5 by hospital and surgeon for the period 1996 through 1998.

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 New York State Department of Health adjusts for patient risk in assessing provider outcomes.

Data Collection, Data Validation and Identifying In-Hospital Deaths

As part of the risk-adjustment process, New York State hospitals where CABG 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.

Patients participating in the international multi-institutional SHOCK trial who undergo bypass surgery are excluded from hospital assessments based on a 1996 recommendation by the CAC. In 1998, two SHOCK trial cases (one live discharge and one death) were reported but excluded from the 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 analysis bases mortality on deaths occurring during the same hospital stay in which a patient underwent cardiac surgery. In the past, the data validation activities have focused on the acute

care stay at the surgery center. However, changes in the health care system have resulted in an increasing number of administrative discharges within the hospital. For example, a patient may be discharged from an acute care bed to a hospice or rehabilitation bed within the same hospital stay in order to differentiate reimbursement for differing levels of care.

In this report, an in-hospital death is defined as a patient who died subsequent to CABG surgery during the same admission, or was discharged to hospice care.

Assessing Patient Risk

Each person who develops coronary artery 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 facts 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.

An 80-year-old patient with a history of a previous stroke, for example, has a very different risk profile than a 40-year-old with no previous stroke.

The statistical analyses conducted by the Department of Health consist of determining which of the risk factors collected are significantly related to in-hospital death for CABG surgery, and determining how to weight the significant risk factors to predict the chance each patient will have of dying in the hospital, 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 coronary bypass surgery.

The mortality rate for each hospital and surgeon

is also predicted using the statistical model. 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.

Computing the Risk-Adjusted Rate

The risk-adjusted mortality rate 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 risk-adjusted mortality rate 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 risk-adjusted mortality rate, the observed mortality rate is first divided by the provider's expected mortality rate. 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. The ratio is then multiplied by the overall statewide mortality rate (2.15% in 1998) to obtain the provider's risk-adjusted rate.

Interpreting the Risk-Adjusted Mortality Rate

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

The risk-adjusted mortality rate 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 risk-adjusted mortality rate 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 risk-adjusted rate may not be reflective of quality of care. The Department of Health monitors the quality of coded data by reviewing patients' medical records to ascertain the presence of key risk factors. When significant coding problems have been discovered, hospitals have been required to recode these data and have been subjected to subsequent monitoring.

A final reason that risk-adjusted rates may be misleading is that overall preprocedural severity of illness may not be accurately estimated because important risk factors are missing. This is not considered to be an important factor, however, because the New York State data system contains virtually every risk factor that has ever been demonstrated to be related to patient mortality in national and international studies.

Although there are reasons that risk-adjusted mortality rates 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 CABG surgery.

How This Contributes to Quality Improvement

The goal of the Department of Health and the Cardiac Advisory Committee is to improve the

quality of care in relation to coronary artery bypass graft surgery in New York State. Providing the hospitals and cardiac surgeons in New York State with data about their own outcomes for these procedures allows them to examine the quality of their own care, and to identify areas that need improvement.

The data collected and analyzed in this program are given to the Cardiac Advisory Committee. Committee members assist with interpretation and advise the Department of Health regarding which hospitals and surgeons 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 in CABG surgery show that significant progress is being made. In response to the program's results for CABG surgery, facilities have refined patient criteria, evaluated patients more closely for preoperative 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

1998 Risk Factors for CABG Surgery

The significant preoperative risk factors for coronary artery bypass surgery in 1998 are presented in Table 1.

Roughly speaking, the odds ratio for a risk factor represents the number of times more likely a patient with that risk factor is of dying in the hospital during or after CABG surgery than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor stroke is 1.612. This means that a patient who had a stroke prior to surgery is approximately 1.612 times as likely to die in the hospital as a patient who did not have a stroke but who has the same other significant risk factors.

For most of the risk factors in the table, there are only two possibilities: having the risk factor or not having it (for example, a patient either has had a stroke or has not had a stroke). Exceptions are age, ejection fraction (which is a measure of the heart's ability to pump blood), and renal failure.

For age, the odds ratio roughly represents the number of times more likely a patient is to die in the hospital than a patient one year younger. Thus, a patient undergoing CABG Surgery who is 72 years old has a chance of dying that is approximately 1.069 times the chance that a patient 71 years old undergoing CABG has of dying in the hospital.

The odds ratios for the categories for ejection fraction are relative to the omitted range (40% and higher). Thus, patients with an ejection fraction of less than 20% have odds of dying in the hospital that are 4.151 times the odds of a person with an ejection fraction of 40% or higher, all other risk factors being the same. The odds ratios for renal failure with and without dialysis are relative to the omitted category which is “no renal failure.”

Table 1: Multivariable risk factor equation for CABG hospital deaths in New York State in 1998.

Patient Risk Factor	Prevalence (%)	Logistic Regression		
		Coefficient	P-Value	Odds Ratio
Demographic				
Age	0.0671	<0.0001	1.069
Female Gender	28.92	0.5105	<0.0001	1.666
Hemodynamic State				
Unstable	1.32	1.0423	<0.0001	2.836
Shock	0.45	1.8458	<0.0001	6.333
Comorbidities				
Diabetes	30.91	0.3607	0.0010	1.434
Malignant Ventricular Arrhythmia	2.28	0.9759	<0.0001	2.654
COPD	15.97	0.5012	<0.0001	1.651
Renal Failure (no dialysis), Creatinine > 2.5	1.89	0.9213	<0.0001	2.513
Renal Failure requiring Dialysis	1.27	1.7384	<0.0001	5.688
Hepatic Failure	0.10	3.0535	<0.0001	21.190
Severity of Atherosclerotic Process				
Aortoiliac Disease	5.42	0.5481	0.0006	1.730
Stroke	7.01	0.4775	0.0016	1.612
Ventricular Function				
Ejection Fraction < 20	1.77	1.4235	<0.0001	4.151
Ejection Fraction 20-29	7.40	0.8183	<0.0001	2.267
Ejection Fraction 30-39	14.49	0.6186	<0.0001	1.856
Previous Open Heart Operations	5.98	0.6800	<0.0001	1.974
Intercept = -9.4988				
C Statistic = 0.793				

1998 HOSPITAL OUTCOMES FOR CABG SURGERY

Table 2 and Figure 1 present the 1998 CABG surgery results for the 33 hospitals performing this operation in New York. The table contains, for each hospital, the number of isolated CABG operations (CABG operations with no other major heart surgery) resulting in 1998 discharges, the number of in-hospital deaths, the observed mortality rate, the expected mortality rate based on the statistical model presented in Table 1, the risk-adjusted mortality rate and a 95% confidence interval for the risk-adjusted rate.

Definitions of key terms follow:

The **observed mortality rate (OMR)** is the number of observed deaths divided by the total number of patients who underwent isolated CABG surgery.

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.

Confidence intervals for the risk-adjusted mortality rate indicate which hospitals had significantly more or fewer deaths than expected given the risk factors of their patients. Hospitals with significantly higher rates than expected after adjusting for risk are those with confidence intervals entirely above the statewide 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 rate.

As indicated in Table 2, the overall mortality rate for the 18,814 CABG operations performed at the 33 hospitals was 2.15%. Observed mortality rates ranged from 0.68% to 7.27%. The range in expected mortality rates, which measure patient severity of illness, was 1.23% to 3.12%.

The risk-adjusted mortality rates, which are used to measure performance, ranged from 0.82% to 12.76%. Two hospitals, St. Vincent's Medical Center and Bellevue Hospital, had risk-adjusted mortality rates that were significantly higher than the statewide rate. Two hospitals, St. Joseph's Hospital and Winthrop University Hospital, had significantly lower risk-adjusted rates than the statewide average.

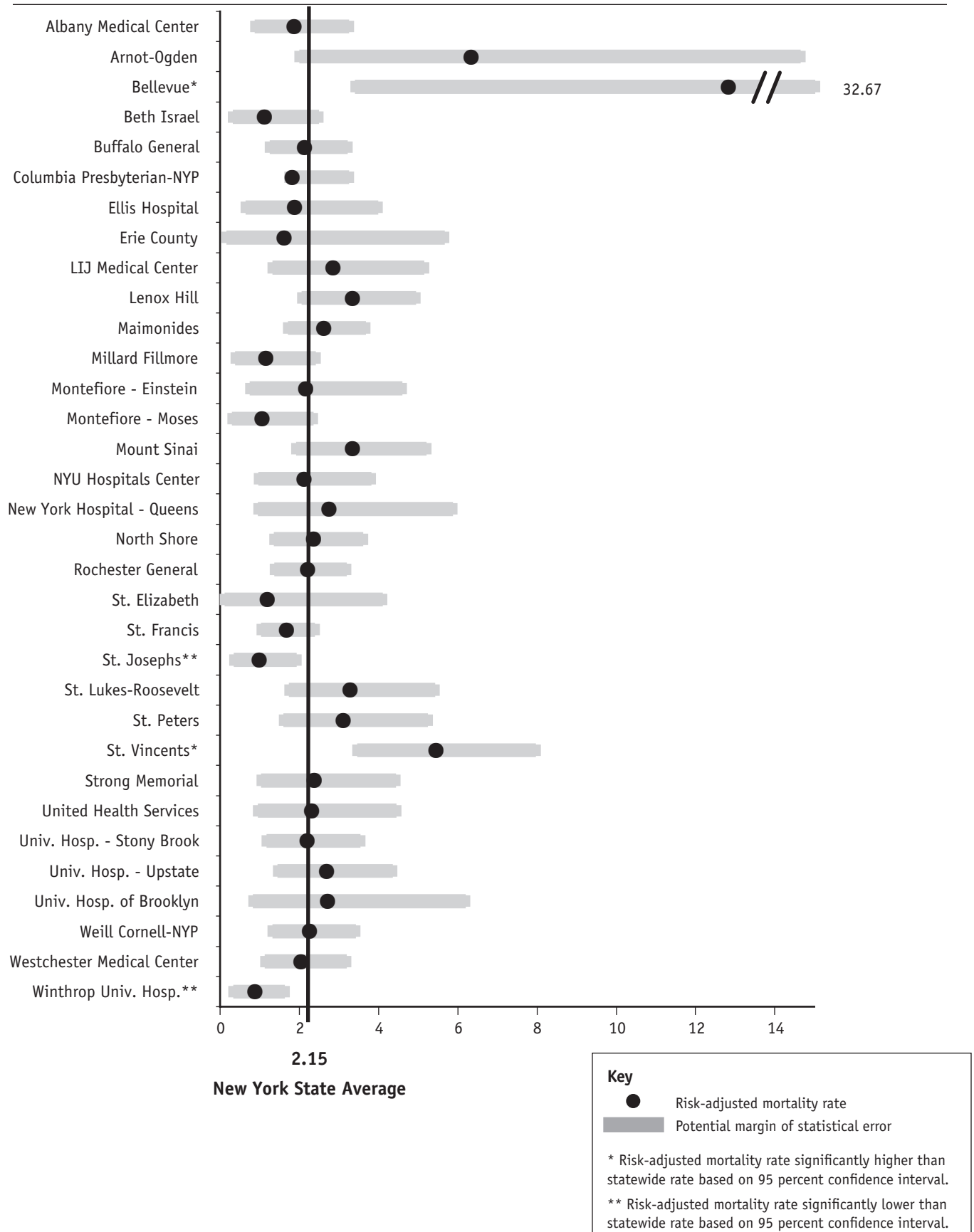
Table 2: Hospital Observed, Expected and Risk-Adjusted Mortality Rates (RAMR) for CABG Surgery in New York State, 1998 Discharges (Listed Alphabetically by Hospital)

Hospital	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Medical Center	834	11	1.32	1.57	1.81	(0.90, 3.23)
Arnot-Ogden	106	5	4.72	1.62	6.27	(2.02, 14.63)
Bellevue	55	4	7.27	1.23	12.76 *	(3.43, 32.67)
Beth Israel	446	5	1.12	2.28	1.06	(0.34, 2.47)
Buffalo General	1082	20	1.85	1.92	2.07	(1.27, 3.20)
Columbia Presbyterian-NYP	599	10	1.67	2.04	1.76	(0.84, 3.23)
Ellis Hospital	447	6	1.34	1.59	1.82	(0.66, 3.96)
Erie County	173	2	1.16	1.59	1.56	(0.18, 5.64)
LIJ Medical Center	423	10	2.36	1.82	2.79	(1.34, 5.13)
Lenox Hill	553	23	4.16	2.73	3.28	(2.08, 4.92)
Maimonides	979	30	3.06	2.58	2.56	(1.73, 3.65)
Millard Fillmore	642	6	0.93	1.83	1.10	(0.40, 2.39)
Montefiore - Einstein	305	6	1.97	2.02	2.10	(0.77, 4.57)
Montefiore - Moses	451	5	1.11	2.39	1.00	(0.32, 2.33)
Mount Sinai	433	18	4.16	2.73	3.28	(1.94, 5.19)
NYU Hospitals Center	463	10	2.16	2.26	2.06	(0.99, 3.79)
New York Hospital - Queens	303	6	1.98	1.59	2.69	(0.98, 5.85)
North Shore	784	19	2.42	2.27	2.30	(1.38, 3.59)
Rochester General	920	25	2.72	2.72	2.15	(1.39, 3.17)
St. Elizabeth	294	2	0.68	1.30	1.13	(0.13, 4.08)
St. Francis	1646	26	1.58	2.10	1.62	(1.06, 2.37)
St. Josephs	824	7	0.85	1.98	0.93 **	(0.37, 1.91)
St. Lukes-Roosevelt	300	14	4.67	3.12	3.22	(1.76, 5.40)
St. Peters	584	13	2.23	1.57	3.05	(1.62, 5.22)
St. Vincents	551	25	4.54	1.81	5.39 *	(3.48, 7.95)
Strong Memorial	347	9	2.59	2.41	2.32	(1.06, 4.41)
United Health Services	331	8	2.42	2.32	2.25	(0.97, 4.43)
Univ. Hosp. - Stony Brook	762	15	1.97	1.98	2.14	(1.19, 3.52)
Univ. Hosp. - Upstate	523	15	2.87	2.35	2.63	(1.47, 4.33)
Univ. Hosp. of Brooklyn	183	5	2.73	2.22	2.65	(0.85, 6.17)
Weill Cornell-NYP	861	20	2.32	2.27	2.20	(1.34, 3.40)
Westchester Medical Center	866	17	1.96	2.13	1.98	(1.15, 3.17)
Winthrop Univ. Hosp.	744	8	1.08	2.83	0.82 **	(0.35, 1.61)
Total	18814	405	2.15			

* Risk-adjusted mortality rate significantly higher than statewide rate based on 95 percent confidence interval.

** Risk-adjusted mortality rate significantly lower than statewide rate based on 95 percent confidence interval.

Figure 1: Risk-Adjusted Mortality Rates for CABG in New York State, 1998 Discharges (Listed Alphabetically by Hospital)



1996-1998 HOSPITAL AND SURGEON DATA FOR CABG SURGERY

Table 3 provides the number of isolated CABG operations, number of CABG patients who died in the hospital, observed mortality rate, expected mortality rate, risk-adjusted mortality rate and the 95% confidence interval for the risk-adjusted mortality rate for 1996-98 for each of the 33 hospitals performing CABG surgery during the time period.

This hospital information is presented for each surgeon (a) who performed 200 or more isolated CABG operations during 1996-1998, and/or (b) who performed at least one isolated CABG operation in each of the years 1996-1998.

The results for surgeons not meeting the above criteria are grouped together and reported as "All Others" in the hospital in which the operations were performed. Surgeons who performed operations in more than one hospital are noted in the table and are listed in

all hospitals in which they performed 200 or more operations and/or performed at least one operation in each of the years 1996-1998.

Also, surgeons who met criterion (a) and/or criterion (b) above and have performed CABG surgery in two or more New York State hospitals are listed separately in Table 4. For these surgeons, the table presents the number of isolated CABG operations, the number of deaths, observed mortality rate, expected mortality rate and risk-adjusted mortality rate with its 95 percent confidence interval for each hospital in which the surgeon performed surgery, as well as the aggregate numbers (across all hospitals in which the surgeon performed operations). In addition, surgeons and hospitals with risk-adjusted mortality rates that are significantly lower or higher than the statewide mortality rate (as judged by a 95% confidence interval) are noted in Tables 3 and 4.

Table 3: Surgeon Observed, Expected, and Risk-Adjusted Mortality Rates (RAMR) for Coronary Artery Bypass Grafts in New York State, 1996-1998 Discharges

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Medical Center Hospital						
##Banker M	7	1	14.29	2.07	15.69	(0.21, 87.29)
Britton L	413	4	0.97	1.52	1.45	(0.39, 3.72)
Canavan T	519	2	0.39	1.50	0.58 **	(0.07, 2.11)
Foster E	239	3	1.26	1.86	1.53	(0.31, 4.48)
#Joyce F	122	2	1.64	1.24	2.99	(0.34, 10.81)
Kelley J	593	18	3.04	1.71	4.04 *	(2.39, 6.38)
Luber J	329	8	2.43	1.91	2.89	(1.24, 5.69)
Miller S	460	3	0.65	2.03	0.73 **	(0.15, 2.14)
#Sardella G	158	0	0.00	1.25	0.00	(0.00, 4.21)
All Others	105	2	1.90	1.72	2.52	(0.28, 9.08)
TOTAL	2945	43	1.46	1.69	1.97	(1.42, 2.65)
Arnot Ogden Memorial Hospital						
Quintos E	266	13	4.89	1.98	5.61 *	(2.98, 9.59)
Vaughan J	89	2	2.25	2.05	2.49	(0.28, 9.01)
All Others	14	0	0.00	1.36	0.00	(0.00, 43.66)
TOTAL	369	15	4.07	1.97	4.68 *	(2.62, 7.72)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Bellevue Hospital Center						
#Colvin S	28	4	14.29	3.16	10.29 *	(2.77, 26.35)
#Galloway A	38	2	5.26	1.62	7.36	(0.83, 26.59)
#Glassman L	108	4	3.70	2.37	3.56	(0.96, 9.11)
#Ribakove G	60	1	1.67	1.10	3.44	(0.04, 19.12)
All Others	7	0	0.00	2.08	0.00	(0.00, 57.18)
TOTAL	241	11	4.56	2.02	5.14 *	(2.56, 9.20)
Beth Israel Medical Center						
Harris L	129	1	0.78	1.88	0.94	(0.01, 5.22)
Hoffman D	237	4	1.69	1.80	2.13	(0.57, 5.45)
#Stelzer P	281	5	1.78	2.57	1.58	(0.51, 3.68)
Tranbaugh R	671	11	1.64	2.54	1.47	(0.73, 2.63)
TOTAL	1318	21	1.59	2.35	1.54	(0.95, 2.36)
Buffalo General Hospital						
Bergsland J	527	17	3.23	2.55	2.87	(1.67, 4.60)
Bhayana J	245	6	2.45	2.41	2.31	(0.84, 5.03)
Grosner G	705	15	2.13	1.93	2.50	(1.40, 4.13)
Lajos T	396	15	3.79	2.36	3.65	(2.04, 6.02)
Levinsky L	379	6	1.58	1.85	1.95	(0.71, 4.23)
Lewin A	569	13	2.28	1.69	3.07	(1.64, 5.26)
Raza S	432	21	4.86	1.97	5.60 *	(3.46, 8.56)
Salerno T	269	7	2.60	2.94	2.01	(0.81, 4.15)
All Others	4	0	0.00	2.59	0.00	(0.00, 80.44)
TOTAL	3526	100	2.84	2.14	3.01 *	(2.45, 3.66)
Columbia Presbyterian - NY Presbyterian Hospital						
#Edwards N	164	5	3.05	2.57	2.70	(0.87, 6.30)
Michler R	206	6	2.91	2.76	2.40	(0.88, 5.23)
Oz M	646	15	2.32	2.26	2.34	(1.31, 3.86)
Rose E	311	4	1.29	1.60	1.83	(0.49, 4.68)
Smith C	617	4	0.65	1.93	0.77 **	(0.21, 1.96)
All Others	46	3	6.52	2.19	6.77	(1.36, 19.78)
TOTAL	1990	37	1.86	2.13	1.99	(1.40, 2.74)
Ellis Hospital						
##Banker M	1	0	0.00	1.10	0.00	(0.00, 100.00)
Depan H	415	8	1.93	1.65	2.65	(1.14, 5.23)
McIlduff J	344	5	1.45	1.48	2.23	(0.72, 5.21)
Reich H	292	1	0.34	1.30	0.60	(0.01, 3.32)
Saifi J	480	6	1.25	1.72	1.66	(0.60, 3.61)
All Others	1	0	0.00	0.74	0.00	(0.00, 100.00)
TOTAL	1533	20	1.30	1.57	1.89	(1.16, 2.93)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Erie County Medical Center						
#Bell-Thomson J	500	6	1.20	1.60	1.71	(0.62, 3.72)
All Others	157	2	1.27	1.44	2.01	(0.23, 7.26)
TOTAL	657	8	1.22	1.56	1.77	(0.76, 3.50)
Lenox Hill Hospital						
Geller C	127	8	6.30	1.73	8.26 *	(3.56, 16.27)
#Jacobowitz I	615	15	2.44	2.67	2.07	(1.16, 3.42)
McCabe J	117	4	3.42	1.95	3.98	(1.07, 10.19)
#Sabado M	165	8	4.85	3.33	3.31	(1.43, 6.53)
#Stelzer P	17	1	5.88	1.73	7.74	(0.10, 43.06)
Subramanian V	1177	46	3.91	2.57	3.46 *	(2.53, 4.61)
TOTAL	2218	82	3.70	2.57	3.27 *	(2.60, 4.06)
Long Island Jewish Medical Center						
Graver L	600	17	2.83	2.30	2.80	(1.63, 4.49)
Kline G	175	6	3.43	1.59	4.91	(1.79, 10.69)
Palazzo R	453	7	1.55	1.78	1.98	(0.79, 4.08)
TOTAL	1228	30	2.44	2.00	2.77	(1.87, 3.96)
Maimonides Medical Center						
#Acinapura A	377	10	2.65	2.17	2.78	(1.33, 5.11)
#Burack J	2	0	0.00	4.01	0.00	(0.00, 100.00)
Cane J	20	2	10.00	4.84	4.69	(0.53, 16.95)
Connolly M	649	10	1.54	2.57	1.36	(0.65, 2.50)
#Cunningham J N	353	16	4.53	2.78	3.70	(2.11, 6.01)
#Jacobowitz I	502	16	3.19	3.16	2.29	(1.31, 3.72)
#Ketosugbo A	62	1	1.61	2.35	1.56	(0.02, 8.68)
#Sabado M	52	5	9.62	2.79	7.84 *	(2.53, 18.30)
#Zisbrod Z	500	10	2.00	2.30	1.97	(0.95, 3.63)
All Others	157	10	6.37	3.24	4.47	(2.14, 8.23)
TOTAL	2674	80	2.99	2.66	2.56	(2.03, 3.18)
Millard Fillmore Hospital						
Aldridge J	393	9	2.29	1.89	2.76	(1.26, 5.23)
Ashraf M	471	9	1.91	1.83	2.37	(1.08, 4.50)
#Bell-Thomson J	13	0	0.00	4.02	0.00	(0.00, 15.95)
Guarino R	438	9	2.05	1.67	2.79	(1.28, 5.30)
Guiraudon G	71	4	5.63	1.34	9.54 *	(2.57, 24.43)
Jennings L	483	5	1.04	1.76	1.34	(0.43, 3.12)
Kerr P	322	15	4.66	2.33	4.54 *	(2.54, 7.49)
Major W	154	3	1.95	2.10	2.11	(0.42, 6.16)
TOTAL	2345	54	2.30	1.88	2.78	(2.09, 3.63)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Montefiore Medical Center - Einstein Division						
#Camacho M	2	0	0.00	0.88	0.00	(0.00, 100.00)
Frater R	98	0	0.00	2.01	0.00	(0.00, 4.24)
#Frymus M	436	7	1.61	2.11	1.73	(0.69, 3.56)
##Gold J	20	0	0.00	1.30	0.00	(0.00, 32.07)
Sisto D	253	8	3.16	2.57	2.80	(1.21, 5.52)
All Others	127	3	2.36	2.23	2.40	(0.48, 7.02)
TOTAL	936	18	1.92	2.22	1.97	(1.17, 3.11)
Montefiore Medical Center - Moses Division						
Attai L	306	7	2.29	2.41	2.16	(0.87, 4.45)
Brodman R	312	5	1.60	1.99	1.83	(0.59, 4.27)
#Camacho M	220	7	3.18	2.82	2.56	(1.03, 5.28)
#Frymus M	1	1	100.00	0.37	100.00 *	(8.12, 100.00)
##Gold J	134	0	0.00	1.62	0.00	(0.00, 3.84)
Merav A	245	8	3.27	2.60	2.85	(1.23, 5.62)
All Others	26	0	0.00	2.26	0.00	(0.00, 14.17)
TOTAL	1244	28	2.25	2.33	2.20	(1.46, 3.18)
Mount Sinai Hospital						
Ergin M	422	8	1.90	2.30	1.88	(0.81, 3.70)
Galla J	280	11	3.93	2.93	3.05	(1.52, 5.46)
Griep R	45	0	0.00	2.25	0.00	(0.00, 8.25)
Lansman S	373	22	5.90	3.16	4.24 *	(2.66, 6.43)
Nguyen K	79	2	2.53	2.83	2.03	(0.23, 7.34)
All Others	181	8	4.42	2.95	3.41	(1.47, 6.71)
TOTAL	1380	51	3.70	2.77	3.03	(2.26, 3.98)
New York Hospital - Queens						
#Altorki N	6	0	0.00	1.59	0.00	(0.00, 87.39)
#Isom O	1	0	0.00	1.86	0.00	(0.00, 100.00)
#Ko W	210	7	3.33	1.57	4.84	(1.94, 9.97)
#Lang S	469	7	1.49	1.72	1.98	(0.79, 4.07)
#Rosengart T	9	0	0.00	1.20	0.00	(0.00, 77.08)
TOTAL	695	14	2.01	1.66	2.75	(1.50, 4.62)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
NYU Hospitals Center						
#Colvin S	135	4	2.96	2.30	2.93	(0.79, 7.50)
Culliford A	374	8	2.14	2.62	1.86	(0.80, 3.66)
Esposito R	329	7	2.13	2.46	1.97	(0.79, 4.05)
#Galloway A	248	7	2.82	2.76	2.33	(0.93, 4.80)
#Glassman L	23	0	0.00	2.09	0.00	(0.00, 17.34)
Grossi E	143	7	4.90	3.37	3.30	(1.32, 6.80)
#Ribakove G	227	4	1.76	2.57	1.56	(0.42, 3.99)
Spencer F	89	4	4.49	4.51	2.27	(0.61, 5.80)
All Others	15	1	6.67	3.35	4.52	(0.06, 25.14)
TOTAL	1583	42	2.65	2.75	2.20	(1.58, 2.97)
North Shore University Hospital						
Hall M	838	12	1.43	2.56	1.27 **	(0.66, 2.22)
#Levy M	253	10	3.95	2.32	3.88	(1.86, 7.14)
Pogo G	622	15	2.41	2.63	2.08	(1.16, 3.43)
#Tortolani A	464	7	1.51	2.83	1.21	(0.49, 2.50)
Vatsia S	248	5	2.02	2.28	2.01	(0.65, 4.70)
All Others	9	0	0.00	6.62	0.00	(0.00, 14.01)
TOTAL	2434	49	2.01	2.59	1.77	(1.31, 2.34)
Rochester General Hospital						
Cheeran D	799	13	1.63	2.10	1.76	(0.94, 3.01)
Fong J	211	6	2.84	2.57	2.51	(0.92, 5.47)
Kirshner R	680	22	3.24	3.08	2.39	(1.50, 3.62)
Knight P	815	21	2.58	3.00	1.95	(1.21, 2.99)
Kwan S	495	12	2.42	2.86	1.93	(1.00, 3.37)
TOTAL	3000	74	2.47	2.72	2.06	(1.62, 2.58)
St. Elizabeth Medical Center						
#Joyce F	136	1	0.74	1.18	1.42	(0.02, 7.91)
All Others	187	1	0.53	1.15	1.06	(0.01, 5.88)
TOTAL	323	2	0.62	1.16	1.21	(0.14, 4.38)
St. Francis Hospital						
Bercow N	903	13	1.44	2.07	1.58	(0.84, 2.70)
Colangelo R	207	4	1.93	2.24	1.96	(0.53, 5.03)
Damus P	573	6	1.05	1.59	1.50	(0.55, 3.27)
Durban L	231	4	1.73	3.06	1.29	(0.35, 3.29)
Lamendola C	759	18	2.37	2.58	2.09	(1.24, 3.30)
Robinson N	805	16	1.99	1.91	2.37	(1.35, 3.85)
Taylor J	1107	15	1.36	2.34	1.32 **	(0.74, 2.18)
Weisz D	668	10	1.50	2.24	1.52	(0.73, 2.80)
TOTAL	5253	86	1.64	2.19	1.70 **	(1.36, 2.10)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
St. Josephs Hospital Health Center						
Marvasti M	583	0	0.00	1.87	0.00 **	(0.00, 0.76)
Nast E	618	8	1.29	2.10	1.40	(0.60, 2.76)
Nazem A	688	4	0.58	2.43	0.54 **	(0.15, 1.39)
Rosenberg J	642	6	0.93	2.17	0.98 **	(0.36, 2.13)
TOTAL	2531	18	0.71	2.16	0.75 **	(0.44, 1.18)
St. Lukes Roosevelt Hospital						
Anagnostopoulos C	167	10	5.99	2.43	5.61 *	(2.68, 10.31)
Aronis M	291	6	2.06	2.03	2.31	(0.84, 5.03)
Connery C	102	3	2.94	2.39	2.80	(0.56, 8.18)
Mindich B	75	3	4.00	2.31	3.94	(0.79, 11.51)
Swistel D	428	15	3.50	3.29	2.42	(1.36, 4.00)
All Others	40	3	7.50	2.97	5.74	(1.15, 16.77)
TOTAL	1103	40	3.63	2.66	3.10	(2.21, 4.21)
St. Peters Hospital						
##Banker M	513	13	2.53	2.14	2.70	(1.43, 4.61)
Bennett E	398	6	1.51	1.76	1.95	(0.71, 4.24)
Dal Col R	505	10	1.98	1.36	3.32	(1.59, 6.10)
#Edwards N	286	3	1.05	1.50	1.60	(0.32, 4.66)
#Sardella G	226	3	1.33	1.41	2.14	(0.43, 6.25)
All Others	69	2	2.90	2.42	2.73	(0.31, 9.85)
TOTAL	1997	37	1.85	1.70	2.48	(1.74, 3.42)
St. Vincents Hospital and Medical Center						
#Acinapura A	19	1	5.26	1.42	8.44	(0.11, 46.97)
Galdieri R	477	26	5.45	2.08	5.95 *	(3.89, 8.72)
McGinn J	540	11	2.04	2.21	2.10	(1.05, 3.76)
Tyras D	538	24	4.46	1.97	5.14 *	(3.30, 7.66)
All Others	26	3	11.54	1.34	19.57 *	(3.93, 57.18)
TOTAL	1600	65	4.06	2.07	4.47 *	(3.45, 5.70)
State University Hospital Upstate Medical Center						
Alfieri G	266	5	1.88	2.76	1.55	(0.50, 3.62)
Brandt B	336	7	2.08	2.21	2.14	(0.86, 4.41)
Parker F	263	7	2.66	2.42	2.50	(1.00, 5.16)
Picone A	384	11	2.86	2.38	2.73	(1.36, 4.89)
Ryan P	239	2	0.84	1.84	1.04	(0.12, 3.74)
All Others	40	3	7.50	2.05	8.33	(1.67, 24.33)
TOTAL	1528	35	2.29	2.32	2.24	(1.56, 3.12)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Strong Memorial Hospital						
Hicks G	555	13	2.34	2.70	1.97	(1.05, 3.37)
Risher W	538	19	3.53	1.99	4.03 *	(2.42, 6.29)
All Others	106	4	3.77	2.78	3.08	(0.83, 7.90)
TOTAL	1199	36	3.00	2.39	2.85	(2.00, 3.95)
United Health Services - Wilson Division						
Cunningham J R	241	2	0.83	2.21	0.85	(0.10, 3.08)
Wong K	375	9	2.40	2.41	2.27	(1.03, 4.30)
Yousuf M	372	15	4.03	3.16	2.90	(1.62, 4.79)
All Others	148	5	3.38	2.29	3.35	(1.08, 7.82)
TOTAL	1136	31	2.73	2.60	2.39	(1.62, 3.39)
University Hospital at Stony Brook						
Bilfinger T	498	14	2.81	2.70	2.36	(1.29, 3.97)
#Hartman A	17	0	0.00	1.48	0.00	(0.00, 33.10)
Krukenkamp I	322	8	2.48	1.65	3.43	(1.48, 6.75)
#Levy M	273	4	1.47	1.79	1.86	(0.50, 4.76)
Seifert F	618	12	1.94	2.12	2.08	(1.07, 3.64)
All Others	190	3	1.58	1.36	2.64	(0.53, 7.72)
TOTAL	1918	41	2.14	2.06	2.35	(1.69, 3.19)
University Hospital of Brooklyn						
Anderson J	200	10	5.00	2.40	4.75	(2.27, 8.73)
#Burack J	215	6	2.79	2.75	2.31	(0.84, 5.02)
Chiavarelli M	8	2	25.00	4.46	12.74	(1.43, 46.01)
#Cunningham J N	1	0	0.00	0.21	0.00	(0.00, 100.00)
#Ketosugbo A	60	1	1.67	1.94	1.95	(0.03, 10.84)
Piccone V	20	0	0.00	1.19	0.00	(0.00, 35.17)
#Zisbrod Z	77	1	1.30	2.16	1.36	(0.02, 7.59)
TOTAL	581	20	3.44	2.43	3.22	(1.96, 4.97)
Weill Cornell - NY Presbyterian Hospital						
#Altorki N	114	3	2.63	2.21	2.70	(0.54, 7.90)
##Gold J	30	0	0.00	1.57	0.00	(0.00, 17.74)
#Isom O	240	5	2.08	1.87	2.53	(0.82, 5.91)
#Ko W	102	3	2.94	4.48	1.49	(0.30, 4.36)
Krieger K	753	10	1.33	2.34	1.29	(0.62, 2.37)
#Lang S	244	10	4.10	3.18	2.93	(1.40, 5.39)
#Rosengart T	696	19	2.73	2.93	2.12	(1.27, 3.31)
#Tortolani A	176	4	2.27	3.27	1.58	(0.43, 4.05)
All Others	136	2	1.47	3.89	0.86	(0.10, 3.11)
TOTAL	2491	56	2.25	2.77	1.85	(1.40, 2.40)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Westchester Medical Center						
Axelrod H	407	9	2.21	2.72	1.85	(0.84, 3.51)
Fleisher A	519	10	1.93	1.86	2.35	(1.13, 4.32)
Lafaro R	376	12	3.19	2.18	3.34	(1.72, 5.83)
Moggio R	407	6	1.47	2.63	1.28	(0.47, 2.78)
Pooley R	403	20	4.96	2.32	4.86 *	(2.96, 7.50)
Sarabu M	481	5	1.04	2.70	0.87 **	(0.28, 2.04)
All Others	154	3	1.95	1.97	2.25	(0.45, 6.57)
TOTAL	2747	65	2.37	2.37	2.27	(1.75, 2.90)
Winthrop - University Hospital						
#Hartman A	445	4	0.90	3.02	0.68 **	(0.18, 1.73)
Kofsky E	621	9	1.45	2.57	1.28	(0.58, 2.43)
Mohtashemi M	208	3	1.44	2.43	1.35	(0.27, 3.94)
Schubach S	581	9	1.55	2.21	1.59	(0.73, 3.03)
Scott W	263	3	1.14	2.06	1.26	(0.25, 3.67)
Sutaria M	90	3	3.33	4.48	1.69	(0.34, 4.95)
Williams L	111	3	2.70	3.32	1.85	(0.37, 5.41)
All Others	70	1	1.43	3.85	0.84	(0.01, 4.69)
TOTAL	2389	35	1.47	2.64	1.26 **	(0.88, 1.75)
Statewide Total	59112	1344	2.27			

* Risk-adjusted mortality rate is significantly higher than statewide rate.

** Risk-adjusted mortality rate is significantly lower than statewide rate.

Performed operations in another New York State hospital

Performed operations in two or more other New York State hospitals

OMR - the observed mortality rate is the number of observed deaths divided by the number of patients.

EMR - the expected mortality rate is the sum of the predicted probabilities of death for each patient divided by the total number of patients.

RAMR - the risk-adjusted mortality rate 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 computed as the quotient of the OMR and the EMR (OMR/EMR) multiplied by the statewide mortality rate for the time period.

Table 4: Summary Information for Surgeons Practicing at More than One Hospital, 1996-1998

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Acinapura A	396	11	2.78	2.13	2.96	(1.48, 5.30)
Maimonides	377	10	2.65	2.17	2.78	(1.33, 5.11)
St. Vincents	19	1	5.26	1.42	8.44	(0.11, 46.97)
Altorki N	120	3	2.50	2.18	2.61	(0.52, 7.62)
New York Hosp-Queens	6	0	0.00	1.59	0.00	(0.00, 87.39)
Weill Cornell	114	3	2.63	2.21	2.70	(0.54, 7.90)
Banker M	521	14	2.69	2.13	2.86	(1.56, 4.80)
Albany Med Ctr	7	1	14.29	2.07	15.69	(0.21, 87.29)
Ellis Hospital	1	0	0.00	1.10	0.00	(0.00, 100.00)
St. Peters Hospital	513	13	2.53	2.14	2.70	(1.43, 4.61)
Bell-Thomson J	513	6	1.17	1.66	1.60	(0.59, 3.49)
Erie County	500	6	1.20	1.60	1.71	(0.62, 3.72)
Millard Fillmore	13	0	0.00	4.02	0.00	(0.00, 15.95)
Burack J	217	6	2.76	2.76	2.27	(0.83, 4.95)
Maimonides	2	0	0.00	4.01	0.00	(0.00, 100.00)
Univ Hosp-Brooklyn	215	6	2.79	2.75	2.31	(0.84, 5.02)
Camacho M	222	7	3.15	2.81	2.55	(1.02, 5.26)
Montefiore Einstein	2	0	0.00	0.88	0.00	(0.00, 100.00)
Montefiore Moses	220	7	3.18	2.82	2.56	(1.03, 5.28)
Colvin S	163	8	4.91	2.45	4.56	(1.96, 8.98)
Bellevue	28	4	14.29	3.16	10.29 *	(2.77, 26.35)
New York Hosp Ctr	135	4	2.96	2.30	2.93	(0.79, 7.50)
Cunningham J N	354	16	4.52	2.78	3.70	(2.11, 6.01)
Maimonides	353	16	4.53	2.78	3.70	(2.11, 6.01)
Univ Hosp-Brooklyn	1	0	0.00	0.21	0.00	(0.00, 100.00)
Edwards N	450	8	1.78	1.89	2.14	(0.92, 4.22)
Columbia Presbyterian	164	5	3.05	2.57	2.70	(0.87, 6.30)
St. Peters	286	3	1.05	1.50	1.60	(0.32, 4.66)
Frymus M	437	8	1.83	2.11	1.98	(0.85, 3.89)
Montefiore Einstein	436	7	1.61	2.11	1.73	(0.69, 3.56)
Montefiore Moses	1	1	100.00	0.37	100.00 *	(8.12, 100.00)
Galloway A	286	9	3.15	2.60	2.75	(1.25, 5.21)
Bellevue	38	2	5.26	1.62	7.36	(0.83, 26.59)
NYU Hosp Ctr	248	7	2.82	2.76	2.33	(0.93, 4.80)
Glassman L	131	4	3.05	2.32	2.99	(0.81, 7.66)
Bellevue	108	4	3.70	2.37	3.56	(0.96, 9.11)
NYU Hosp Ctr	23	0	0.00	2.09	0.00	(0.00, 17.34)

Table 4 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Gold J	184	0	0.00	1.58	0.00	(0.00, 2.88)
Montefiore Einstein	20	0	0.00	1.30	0.00	(0.00, 32.07)
Montefiore Moses	134	0	0.00	1.62	0.00	(0.00, 3.84)
Weill Cornell	30	0	0.00	1.57	0.00	(0.00, 17.74)
Hartman A	462	4	0.87	2.97	0.66 **	(0.18, 1.70)
Univ Hosp Stony Brook	17	0	0.00	1.48	0.00	(0.00, 33.10)
Winthrop Univ Hosp	445	4	0.90	3.02	0.68 **	(0.18, 1.73)
Isom O	241	5	2.07	1.87	2.52	(0.81, 5.88)
New York Hosp-Queens	1	0	0.00	1.86	0.00	(0.00, 100.00)
Weill Cornell	240	5	2.08	1.87	2.53	(0.82, 5.91)
Jacobowitz I	1117	31	2.78	2.89	2.18	(1.48, 3.10)
Lenox Hill	615	15	2.44	2.67	2.07	(1.16, 3.42)
Maimonides	502	16	3.19	3.16	2.29	(1.31, 3.72)
Joyce F	258	3	1.16	1.21	2.19	(0.44, 6.39)
Albany Med Ctr	122	2	1.64	1.24	2.99	(0.34, 10.81)
St. Elizabeth	136	1	0.74	1.18	1.42	(0.02, 7.91)
Ketosugbo A	122	2	1.64	2.15	1.73	(0.19, 6.26)
Maimonides	62	1	1.61	2.35	1.56	(0.02, 8.68)
Univ Hosp-Brooklyn	60	1	1.67	1.94	1.95	(0.03, 10.84)
Ko W	312	10	3.21	2.52	2.89	(1.39, 5.32)
New York Hosp-Queens	210	7	3.33	1.57	4.84	(1.94, 9.97)
Weill Cornell	102	3	2.94	4.48	1.49	(0.30, 4.36)
Lang S	713	17	2.38	2.22	2.45	(1.42, 3.92)
New York Hosp-Queens	469	7	1.49	1.72	1.98	(0.79, 4.07)
Weill Cornell	244	10	4.10	3.18	2.93	(1.40, 5.39)
Levy M	526	14	2.66	2.04	2.96	(1.62, 4.97)
North Shore	253	10	3.95	2.32	3.88	(1.86, 7.14)
Univ Hosp Stony Brook	273	4	1.47	1.79	1.86	(0.50, 4.76)
Ribakove G	287	5	1.74	2.26	1.75	(0.56, 4.09)
Bellevue	60	1	1.67	1.10	3.44	(0.04, 19.12)
NYU Hosp Ctr	227	4	1.76	2.57	1.56	(0.42, 3.99)
Rosengart T	705	19	2.70	2.91	2.11	(1.27, 3.29)
New York Hosp-Queens	9	0	0.00	1.20	0.00	(0.00, 77.08)
Weill Cornell	696	19	2.73	2.93	2.12	(1.27, 3.31)
Sabado M	217	13	5.99	3.20	4.26	(2.27, 7.28)
Lenox Hill	165	8	4.85	3.33	3.31	(1.43, 6.53)
Maimonides	52	5	9.62	2.79	7.84 *	(2.53, 18.30)

Table 4 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Sardella G	384	3	0.78	1.35	1.32	(0.27, 3.86)
Albany Med Ctr	158	0	0.00	1.25	0.00	(0.00, 4.21)
St. Peters	226	3	1.33	1.41	2.14	(0.43, 6.25)
Stelzer P	298	6	2.01	2.52	1.82	(0.66, 3.96)
Beth Israel	281	5	1.78	2.57	1.58	(0.51, 3.68)
Lenox Hill	17	1	5.88	1.73	7.74	(0.10, 43.06)
Tortolani A	640	11	1.72	2.95	1.33	(0.66, 2.37)
North Shore	464	7	1.51	2.83	1.21	(0.49, 2.50)
Weill Cornell	176	4	2.27	3.27	1.58	(0.43, 4.05)
Zisbrod Z	577	11	1.91	2.28	1.90	(0.95, 3.40)
Maimonides	500	10	2.00	2.30	1.97	(0.95, 3.63)
Univ Hosp-Brooklyn	77	1	1.30	2.16	1.36	(0.02, 7.59)

* Risk-adjusted rate is significantly higher than statewide rate.

** Risk-adjusted rate is significantly lower than statewide rate.

OMR - the observed mortality rate is the number of observed deaths divided by the number of patients.

EMR - the expected mortality rate is the sum of the predicted probability of death for each patient divided by the total number of patients.

RAMR - the risk-adjusted mortality rate 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.

SURGEON AND HOSPITAL VOLUMES FOR ADULT CARDIAC SURGERY AND FOR ISOLATED CABG SURGERY (1996-1998)

Table 5 presents, for each hospital and for each surgeon performing at least 200 isolated CABG operations at that hospital in 1996-1998 and/or performing one or more isolated CABG operations in each of the years 1996- 1998, the total number of adult cardiac surgeries performed, the total number of isolated CABG operations performed and the percentage of all adult cardiac surgeries that were isolated CABG operations. As in Table 3, results for surgeons not meeting the above criteria are grouped together in an “All Others” category.

Isolated CABG volumes include patients who undergo bypass of one or more of the coronary

arteries with no other major heart surgery during the same admission. Total adult cardiac surgery cases include isolated CABG, CABG combined with another cardiac procedure such as valve repair or replacement, single or multiple valve replacements and any other surgery on the heart or great vessels.

As indicated, the statewide percentage of adult cardiac surgeries that were isolated CABG operations in 1996-1998 was 71.85 percent (59,112 CABG operations out of a total of 82,264 total adult cardiac surgeries).

Table 5: Total Cardiac Surgery and Isolated CABG Surgery Volumes by Hospital and Surgeon, 1996-1998

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Albany Medical Center Hospital			
Banker M	8	7	87.50
Britton L	596	413	69.30
Canavan T	617	519	84.12
Foster E	376	239	63.56
Joyce F	149	122	81.88
Kelley J	798	593	74.31
Luber J	467	329	70.45
Miller S	574	460	80.14
Sardella G	166	158	95.18
All Others	138	105	76.09
TOTAL	3889	2945	75.73
Arnot-Ogden Memorial Hospital			
Quintos E	313	266	84.98
Vaughan J	108	89	82.41
All Others	18	14	77.78
TOTAL	439	369	84.05
Bellevue Hospital Center			
Colvin S	92	28	30.43
Galloway A	82	38	46.34
Glassman L	134	108	80.60
Ribakove G	141	60	42.55
All Others	20	7	35.00
TOTAL	469	241	51.39

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Beth Israel Medical Center			
Harris L	165	129	78.18
Hoffman D	271	237	87.45
Stelzer P	628	281	44.75
Tranbaugh R	919	671	73.01
TOTAL	1983	1318	66.46
Buffalo General Hospital			
Bergsland J	620	527	85.00
Bhayana J	553	245	44.30
Grosner G	786	705	89.69
Lajos T	445	396	88.99
Levinsky L	393	379	96.44
Lewin A	596	569	95.47
Raza S	562	432	76.87
Salerno T	345	269	77.97
All Others	54	4	7.41
TOTAL	4354	3526	80.98
Columbia Presbyterian - NY Presbyterian Hospital			
Edwards N	264	164	62.12
Michler R	363	206	56.75
Oz M	1104	646	58.51
Rose E	546	311	56.96
Smith C	1056	617	58.43
All Others	363	46	12.67
TOTAL	3696	1990	53.84
Ellis Hospital			
Banker M	1	1	100.00
Depan H	626	415	66.29
McIlduff J	431	344	79.81
Reich H	329	292	88.75
Saifi J	626	480	76.68
All Others	3	1	33.33
TOTAL	2016	1533	76.04
Erie County Medical Center			
Bell-Thomson J	602	500	83.06
All Others	179	157	87.71
TOTAL	781	657	84.12

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Lenox Hill Hospital			
Geller C	151	127	84.11
Jacobowitz I	771	615	79.77
McCabe J	165	117	70.91
Sabado M	271	165	60.89
Stelzer P	46	17	36.96
Subramanian V	1434	1177	82.08
TOTAL	2838	2218	78.15
Long Island Jewish Medical Center			
Graver L	836	600	71.77
Kline G	208	175	84.13
Palazzo R	559	453	81.04
All Others	8	0	0.00
TOTAL	1611	1228	76.23
Maimonides Medical Center			
Acinapura A	481	377	78.38
Burack J	3	2	66.67
Cane J	25	20	80.00
Connolly M	796	649	81.53
Cunningham J N	507	353	69.63
Jacobowitz I	626	502	80.19
Ketosugbo A	73	62	84.93
Sabado M	64	52	81.25
Zisbrod Z	559	500	89.45
All Others	175	157	89.71
TOTAL	3309	2674	80.81
Millard Fillmore Hospital			
Aldridge J	478	393	82.22
Ashraf M	541	471	87.06
Bell-Thomson J	16	13	81.25
Guarino R	494	438	88.66
Guiraudon G	94	71	75.53
Jennings L	524	483	92.18
Kerr P	393	322	81.93
Major W	166	154	92.77
TOTAL	2706	2345	86.66

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Montefiore Medical Center - Einstein Division			
Camacho M	2	2	100.00
Frater R	214	98	45.79
Frymus M	523	436	83.37
Gold J	32	20	62.50
Sisto D	366	253	69.13
All Others	176	127	72.16
TOTAL	1313	936	71.29
Montefiore Medical Center - Moses Division			
Attai L	419	306	73.03
Brodman R	446	312	69.96
Camacho M	286	220	76.92
Frymus M	1	1	100.00
Gold J	197	134	68.02
Merav A	336	245	72.92
All Others	39	26	66.67
TOTAL	1724	1244	72.16
Mount Sinai Hospital			
Ergin M	733	422	57.57
Galla J	504	280	55.56
Griep R	380	45	11.84
Lansman S	622	373	59.97
Nguyen K	145	79	54.48
All Others	302	181	59.93
TOTAL	2686	1380	51.38
New York Hospital - Queens			
Altorki N	7	6	85.71
Isom O	1	1	100.00
Ko W	265	210	79.25
Lang S	587	469	79.90
Rosengart T	11	9	81.82
TOTAL	871	695	79.79

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
NYU Hospitals Center			
Colvin S	619	135	21.81
Culliford A	664	374	56.33
Esposito R	468	329	70.30
Galloway A	495	248	50.10
Glassman L	39	23	58.97
Grossi E	271	143	52.77
Ribakove G	349	227	65.04
Spencer F	210	89	42.38
All Others	16	15	93.75
TOTAL	3131	1583	50.56
North Shore University Hospital			
Hall M	1217	838	68.86
Levy M	338	253	74.85
Pogo G	830	622	74.94
Tortolani A	548	464	84.67
Vatsia S	372	248	66.67
All Others	35	9	25.71
TOTAL	3340	2434	72.87
Rochester General Hospital			
Cheeran D	1053	799	75.88
Fong J	224	211	94.20
Kirshner R	864	680	78.70
Knight P	1179	815	69.13
Kwan S	583	495	84.91
TOTAL	3903	3000	76.86
St. Elizabeth Medical Center			
Joyce F	172	136	79.07
All Others	250	187	74.80
TOTAL	422	323	76.54
St. Francis Hospital			
Bercow N	1216	903	74.26
Colangelo R	263	207	78.71
Damus P	1155	573	49.61
Durban L	308	231	75.00
Lamendola C	1013	759	74.93
Robinson N	1145	805	70.31
Taylor J	1466	1107	75.51
Weisz D	852	668	78.40
TOTAL	7418	5253	70.81

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
St. Josephs Hospital Health Center			
Marvasti M	808	583	72.15
Nast E	751	618	82.29
Nazem A	820	688	83.90
Rosenberg J	976	642	65.78
TOTAL	3355	2531	75.44
St. Lukes Roosevelt Hospital-St. Lukes Div.			
Anagnostopoulos C	300	167	55.67
Aronis M	399	291	72.93
Connery C	145	102	70.34
Mindich B	124	75	60.48
Swistel D	534	428	80.15
All Others	63	40	63.49
TOTAL	1565	1103	70.48
St. Peters Hospital			
Banker M	597	513	85.93
Bennett E	656	398	60.67
Dal Col R	683	505	73.94
Edwards N	337	286	84.87
Sardella G	271	226	83.39
All Others	99	69	69.70
TOTAL	2643	1997	75.56
St. Vincents Hospital and Medical Center			
Acinapura A	21	19	90.48
Galdieri R	608	477	78.45
McGinn J	705	540	76.60
Tyras D	667	538	80.66
All Others	36	26	72.22
TOTAL	2037	1600	78.55
State University Hospital Upstate Medical Center			
Alfieris G	465	266	57.20
Brandt B	442	336	76.02
Parker F	400	263	65.75
Picone A	512	384	75.00
Ryan P	325	239	73.54
All Others	45	40	88.89
TOTAL	2189	1528	69.80

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Strong Memorial Hospital			
Hicks G	835	555	66.47
Risher W	915	538	58.80
All Others	156	106	67.95
TOTAL	1906	1199	62.91
United Health Services - Wilson Division			
Cunningham J R	310	241	77.74
Wong K	484	375	77.48
Yousuf M	479	372	77.66
All Others	175	148	84.57
TOTAL	1448	1136	78.45
University Hospital at Stony Brook			
Bilfinger T	592	498	84.12
Hartman A	26	17	65.38
Krukenkamp I	391	322	82.35
Levy M	321	273	85.05
Seifert F	805	618	76.77
All Others	213	190	89.20
TOTAL	2348	1918	81.69
University Hospital of Brooklyn			
Anderson J	348	200	57.47
Burack J	261	215	82.38
Chiavarelli M	17	8	47.06
Cunningham J N	5	1	20.00
Ketosugbo A	68	60	88.24
Piccone V	29	20	68.97
Zisbrod Z	98	77	78.57
TOTAL	826	581	70.34
Weill Cornell - NY Presbyterian Hospital			
Altorki N	135	114	84.44
Gold J	58	30	51.72
Isom O	586	240	40.96
Ko W	209	102	48.80
Krieger K	1113	753	67.65
Lang S	382	244	63.87
Rosengart T	1019	696	68.30
Tortolani A	221	176	79.64
All Others	349	136	38.97
TOTAL	4072	2491	61.17

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Westchester Medical Center			
Axelrod H	500	407	81.40
Fleisher A	677	519	76.66
Lafaro R	547	376	68.74
Moggio R	565	407	72.04
Pooley R	511	403	78.86
Sarabu M	703	481	68.42
All Others	185	154	83.24
TOTAL	3688	2747	74.48
Winthrop - University Hospital			
Hartman A	755	445	58.94
Kofsky E	749	621	82.91
Mohtashemi M	263	208	79.09
Schubach S	816	581	71.20
Scott W	358	263	73.46
Sutaria M	128	90	70.31
Williams L	142	111	78.17
All Others	77	70	90.91
TOTAL	3288	2389	72.66
Statewide Total	82264	59112	71.85

Criteria Used in Reporting Significant Risk Factors (1998)

Based on Documentation in Medical Record

Patient Risk Factor	Definitions
Hemodynamic State	Determined just prior to surgery
<ul style="list-style-type: none"> • Unstable • Shock 	<p>Patient requires pharmacologic or mechanical support to maintain blood pressure or output</p> <p>Acute hypotension (<i>systolic blood pressure <80 mmHg</i>) or low cardiac index (<i><2.0 liters/min/m²</i>), despite pharmacologic or mechanical support</p>
Comorbidities	
<ul style="list-style-type: none"> • Diabetes Requiring Medication • Malignant Ventricular Arrhythmia 	<p>The patient is receiving either oral hypoglycemics or insulin</p> <p>Recent (within the past 7 days) recurrent ventricular tachycardia or ventricular fibrillation requiring electrical defibrillation or the use of intravenous antiarrhythmic agents. Excludes a single episode of VT or VF occurring in the early phase of acute myocardial infarction and responding well to treatment</p>
• Hepatic Failure	<p>The patient has cirrhosis or other liver disease and has a bilirubin greater than 2 mg/dl and a serum albumin less than 3.5 grams/dl.</p>
• Chronic Obstructive Pulmonary Disease	<p>Patient requires chronic (longer than three months), bronchodilator therapy to avoid disability from obstructive airway disease; or has a forced expiratory volume in one second of less than 75% of the predicted value or less than 1.25 liters; or has a room air pO₂ < 60 or a pCO₂ >50</p>
• Renal Failure, Dialysis	The patient is on chronic peritoneal or hemodialysis
• Renal Failure, Creatinine >2.5	Pre-operative creatinine greater than 2.5 mg/dl.
Severity of Atherosclerotic Process	
• Aortoiliac Disease	<p>Angiographic demonstration of at least 50% narrowing in a major aortoiliac vessel, previous surgery for such disease, absent femoral pulses, or inability to insert a catheter or intra-aortic balloon due to iliac aneurysm or obstruction of the aortoiliac arteries</p>
• Stroke	A history of stroke, with or without residual deficit
Ventricular Function	
• Ejection Fraction	<p>Value of the ejection fraction taken closest to the procedure. When a calculated measure is unavailable, the EF 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</p>
Previous Open Heart Operations	<p>Open heart surgery previous to the hospitalization. For the purpose of this reporting system, minimally invasive procedures are considered open heart surgery</p>

MEDICAL TERMINOLOGY

angina pectoris - the pain or discomfort felt when blood and oxygen flow to the heart are impeded by blockage 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.

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

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) is 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, 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.

double, triple, quadruple bypass - the average number of bypass grafts created during coronary artery bypass graft surgery 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 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, blood and oxygen cannot flow freely to the heart muscle or myocardium.

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

myocardial infarction - partial destruction of the heart muscle due to interrupted blood supply, also called a heart attack or coronary thrombosis.

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 these 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.

NEW YORK STATE CARDIAC SURGERY CENTERS

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

Annot 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

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

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

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

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

Rochester General Hospital
1425 Portland Avenue
Rochester, New York 14621-3079

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

St. Vincent's Hospital & Medical
Center of NY
153 West 11th Street
New York, New York 10011

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 Upstate
Medical Center
750 East Adams Street
Syracuse, New York 13210

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

Westchester Medical Center
Grasslands Reservation
Valhalla, New York 10595

Winthrop – University Hospital
259 First Street
Mineola, New York 11501

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New York State Department of Health
Albany, New York 12220



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George E. Pataki, Governor

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