

**CORONARY
ARTERY
BYPASS
SURGERY**

**in
New York State**

1995-1997

New York State Department of Health

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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 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 1997. 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.

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

- 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.

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 1997 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, 1995, and

December 31, 1997, are included in the three-year results.

Isolated CABG surgery represented 73.15 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 1995 through 1997.

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 1995 recommendation by the CAC. In 1997, one SHOCK trial case (a live discharge) was 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 acute care admission; was discharged to another unit of the same hospital (e.g., hospice care, rehabilitation) and died; or was transferred to a formally affiliated cardiac surgery program and died.

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 two heart attacks, for example, has a very different risk profile than a 40-year-old with no previous heart problems.

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 (2.22% in 1997) 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

1997 Risk Factors for CABG Surgery

The significant preoperative risk factors for coronary artery bypass surgery in 1997 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 1.892. This means that a patient who had a stroke prior to surgery is approximately 1.892 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), previous myocardial infarction (MI, or heart attack), and renal failure.

In this model, age is treated as a continuous variable with two components, one for patients older than 75 and another for all patients, including those older than 75. Thus, the risk of mortality increases with age in general, and increases at a faster rate for patients over 75.

The odds ratios for the categories for ejection fraction are relative to the omitted range (30% and higher). Thus, patients with an ejection fraction of less than 20% have odds of dying in the hospital that are 3.750 times the odds of a person with an ejection fraction of 30% or higher, all other risk factors being the same. Similarly, the odds ratios for the categories of previous MI are relative to the odds for patients with no MI or

an MI more than six hours prior to surgery. The odds ratios for renal failure with and without dialysis are relative to the omitted category which is “no renal failure.”

1997 was the first year that cardiopulmonary resuscitation (CPR) was collected as a risk factor. CPR is based on status just prior to surgery.

Table 1: Multivariable risk factor equation for CABG hospital deaths in New York State in 1997.

Patient Risk Factor	Prevalence (%)	Logistic Regression		
		Coefficient	P-Value	Odds Ratio
Demographic				
Age	0.0407	<0.0001
# of Years in Age >75	0.0625	.0023
Female Gender	28.73	0.4125	<.0001	1.515
Hemodynamic State				
Unstable	1.53	0.9519	<0.0001	2.591
Shock	0.61	1.4432	<0.0001	4.234
Cardiopulmonary Resuscitation	0.28	2.0636	<0.0001	7.874
Comorbidities				
Chronic Obstructive Pulmonary Disease	15.64	0.6084	<0.0001	1.837
Renal Failure with Dialysis	1.11	1.3984	<0.0001	4.049
Renal Failure, Creatinine > 2.5 (no dialysis)	1.67	1.3048	<0.0001	3.687
Severity of Atherosclerotic Process				
Aortoiliac Disease	4.76	1.0926	<0.0001	2.591
Stroke	6.39	0.6375	<0.0001	1.892
Ventricular Function				
Previous MI, less than 6 hours	0.96	1.2905	<0.0001	3.634
Ejection Fraction Less Than 20%	1.77	1.3217	<0.0001	3.750
Ejection Fraction 20%-29%	7.10	0.8422	<0.0001	2.321
Previous Open Heart Operations	6.55	1.0421	<0.0001	2.835
Intercept = -7.5736				
C Statistic = 0.797				

1997 HOSPITAL OUTCOMES FOR CABG SURGERY

Table 2 and Figure 1 present the 1997 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 1997 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 20,220 CABG operations performed at the 33 hospitals was 2.22%. Observed mortality rates ranged from 0% (at a facility that began performing cardiac surgery in 1997) to 4.19%. The range in expected mortality rates, which measure patient severity of illness, was 1.08% to 2.81%.

The risk-adjusted mortality rates, which are used to measure performance, ranged from 0% to 4.55%. One hospital, Buffalo General, had a risk-adjusted mortality rate that was significantly higher than the statewide rate. Three hospitals, Rochester General, St. Joseph's Hospital and Winthrop University Hospital, had significantly lower risk-adjusted rates than the statewide average.

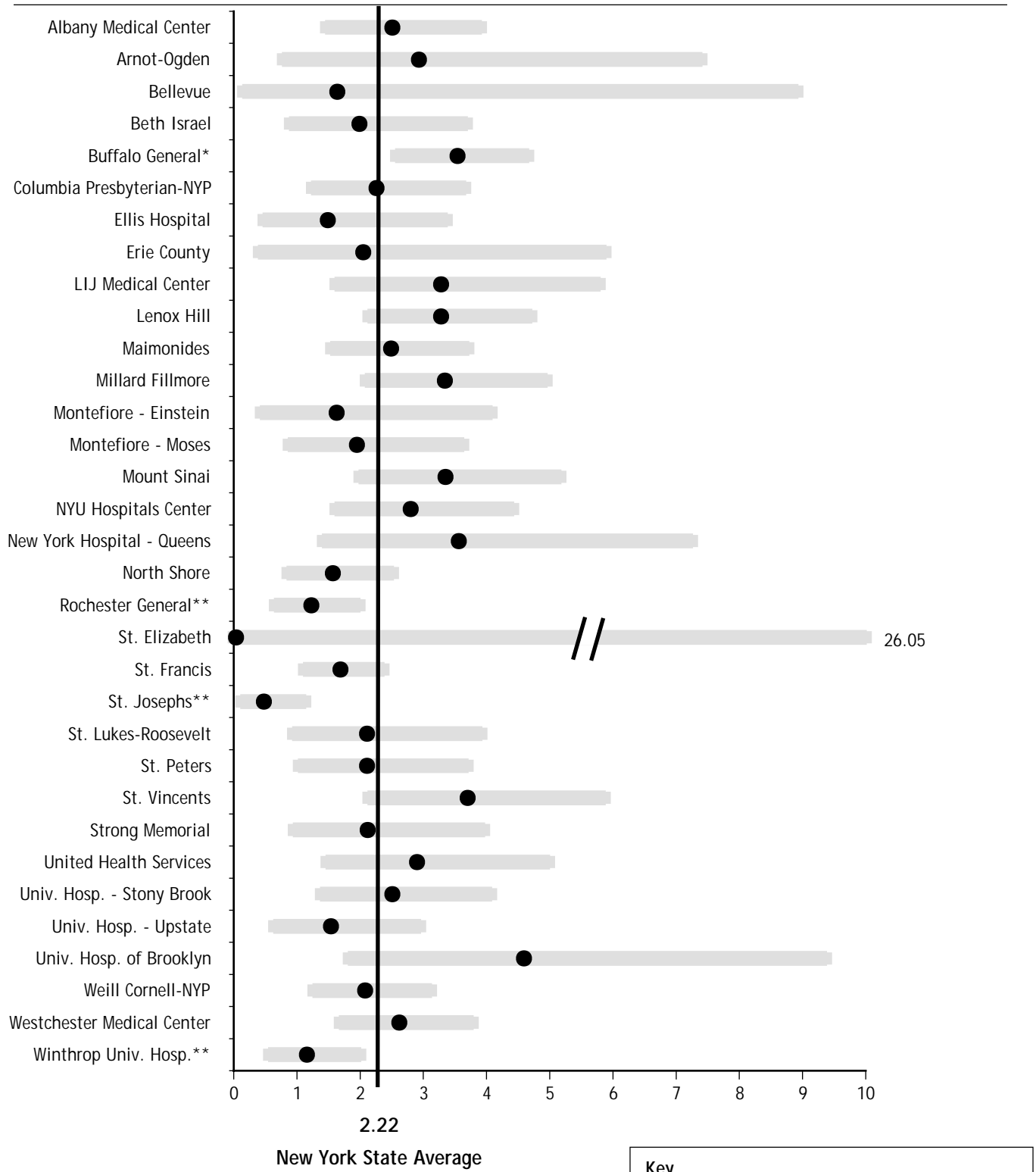
Table 2: Hospital Observed, Expected and Risk-Adjusted Mortality Rates (RAMR) for CABG Surgery in New York State, 1997 Discharges (Listed Alphabetically by Hospital)

Hospital	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Medical Center	975	18	1.85	1.66	2.47	(1.46, 3.91)
Arnot-Ogden	128	4	3.13	2.40	2.89	(0.78, 7.40)
Bellevue	92	1	1.09	1.51	1.60	(0.02, 8.92)
Beth Israel	444	9	2.03	2.31	1.95	(0.89, 3.69)
Buffalo General	1217	47	3.86	2.45	3.50*	(2.57, 4.66)
Columbia Presbyterian-NYP	702	15	2.14	2.14	2.22	(1.24, 3.66)
Ellis Hospital	538	5	0.93	1.43	1.45	(0.47, 3.37)
Erie County	225	3	1.33	1.47	2.01	(0.40, 5.88)
LIJ Medical Center	398	11	2.76	1.90	3.24	(1.61, 5.79)
Lenox Hill	805	27	3.35	2.30	3.24	(2.13, 4.71)
Maimonides	874	22	2.52	2.28	2.45	(1.54, 3.71)
Millard Fillmore	830	23	2.77	1.86	3.30	(2.09, 4.95)
Montefiore - Einstein	310	4	1.29	1.80	1.59	(0.43, 4.08)
Montefiore - Moses	415	9	2.17	2.52	1.91	(0.87, 3.63)
Mount Sinai	453	19	4.19	2.81	3.31	(1.99, 5.17)
NYU Hospitals Center	535	17	3.18	2.56	2.76	(1.61, 4.42)
New York Hospital - Queens	298	7	2.35	1.48	3.52	(1.41, 7.25)
North Shore	819	15	1.83	2.66	1.53	(0.85, 2.52)
Rochester General	1073	14	1.30	2.44	1.19**	(0.65, 1.99)
St. Elizabeth	29	0	0.00	1.08	0.00	(0.00, 26.05)
St. Francis	1793	29	1.62	2.17	1.65	(1.11, 2.37)
St. Josephs	895	4	0.45	2.24	0.44**	(0.12, 1.13)
St. Lukes-Roosevelt	373	9	2.41	2.59	2.07	(0.94, 3.92)
St. Peters	672	11	1.64	1.76	2.07	(1.03, 3.70)
St. Vincents	527	17	3.23	1.96	3.66	(2.13, 5.87)
Strong Memorial	404	9	2.23	2.37	2.08	(0.95, 3.96)
United Health Services	396	12	3.03	2.36	2.86	(1.47, 4.99)
Univ. Hosp. - Stony Brook	658	15	2.28	2.05	2.47	(1.38, 4.07)
Univ. Hosp. - Upstate	511	8	1.57	2.32	1.50	(0.64, 2.95)
Univ. Hosp. of Brooklyn	181	7	3.87	1.89	4.55	(1.82, 9.37)
Weill Cornell-NYP	832	21	2.52	2.75	2.04	(1.26, 3.12)
Westchester Medical Center	957	26	2.72	2.34	2.58	(1.68, 3.78)
Winthrop Univ. Hosp.	861	11	1.28	2.54	1.12**	(0.56, 2.00)
Total	20220	449	2.22			

* 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, 1997 Discharges (Listed Alphabetically by Hospital)



1995-1997 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 1995-97 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 1995-1997, and/or (b) who performed at least one isolated CABG operation in each of the years 1995-1997.

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 1995-1997.

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, 1995-1997 Discharges

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Medical Center Hospital						
##Banker M	91	2	2.20	1.49	3.52	(0.40, 12.72)
#Britton L	464	5	1.08	1.50	1.71	(0.55, 4.00)
Canavan T	572	5	0.87	1.59	1.31	(0.42, 3.06)
#Dal Col R	1	0	0.00	0.63	0.00	(0.00, 100.00)
Foster E	263	4	1.52	2.27	1.60	(0.43, 4.09)
Kelley J	552	15	2.72	1.86	3.49	(1.95, 5.76)
Luber J	448	12	2.68	2.40	2.66	(1.37, 4.65)
#Miller S	490	4	0.82	2.10	0.93**	(0.25, 2.38)
#Sardella G	156	0	0.00	1.24	0.00	(0.00, 4.54)
All Others	237	6	2.53	1.86	3.26	(1.19, 7.10)
TOTAL	3274	53	1.62	1.87	2.07	(1.55, 2.71)
Arnot Ogden Memorial Hospital						
Quintos E	264	10	3.79	2.25	4.02	(1.92, 7.39)
Vaughan J	122	2	1.64	2.68	1.46	(0.16, 5.28)
All Others	76	1	1.32	1.97	1.60	(0.02, 8.90)
TOTAL	462	13	2.81	2.32	2.90	(1.54, 4.96)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Bellevue Hospital Center						
#Colvin S	34	4	11.76	3.24	8.69	(2.34, 22.24)
#Galloway A	47	2	4.26	2.03	5.00	(0.56, 18.06)
#Glassman L	122	3	2.46	2.31	2.54	(0.51, 7.43)
#Grossi E	2	1	50.00	4.10	29.12	(0.38, 100.00)
#Ribakove G	84	2	2.38	1.91	2.97	(0.33, 10.73)
TOTAL	289	12	4.15	2.27	4.37	(2.25, 7.63)
Beth Israel Medical Center						
Hoffman D	199	1	0.50	1.63	0.74	(0.01, 4.09)
#Stelzer P	210	4	1.90	2.81	1.62	(0.44, 4.14)
Tranbaugh R	774	19	2.45	2.67	2.20	(1.32, 3.44)
All Others	44	0	0.00	1.84	0.00	(0.00, 10.80)
TOTAL	1227	24	1.96	2.49	1.87	(1.20, 2.79)
Buffalo General Hospital						
Bergsland J	526	17	3.23	2.94	2.63	(1.53, 4.21)
Bhayana J	237	8	3.38	3.05	2.65	(1.14, 5.22)
Grosner G	748	17	2.27	2.26	2.40	(1.40, 3.85)
Lajos T	445	20	4.49	2.33	4.60*	(2.81, 7.11)
Levinsky L	332	4	1.20	2.15	1.34	(0.36, 3.43)
Lewin A	624	14	2.24	1.77	3.03	(1.66, 5.09)
Raza S	444	23	5.18	2.16	5.73*	(3.63, 8.60)
Salerno T	315	12	3.81	2.90	3.14	(1.62, 5.49)
All Others	4	0	0.00	2.99	0.00	(0.00, 73.25)
TOTAL	3675	115	3.13	2.37	3.16*	(2.61, 3.79)
Columbia Presbyterian - NY Presbyterian Hospital						
#Edwards N	49	2	4.08	2.21	4.42	(0.50, 15.95)
Michler R	302	8	2.65	2.89	2.19	(0.94, 4.32)
Oz M	575	16	2.78	2.39	2.78	(1.59, 4.51)
Rose E	367	3	0.82	1.75	1.12	(0.22, 3.26)
Smith C	658	7	1.06	2.28	1.12**	(0.45, 2.30)
Spotnitz H	8	1	12.50	2.22	13.44	(0.18, 74.76)
All Others	67	2	2.99	2.15	3.31	(0.37, 11.95)
TOTAL	2026	39	1.92	2.30	2.00	(1.42, 2.73)
Ellis Hospital						
##Banker M	1	0	0.00	0.81	0.00	(0.00, 100.00)
#Britton L	1	0	0.00	0.86	0.00	(0.00, 100.00)
Depan H	434	5	1.15	1.96	1.40	(0.45, 3.28)
McIliduff J	454	5	1.10	1.67	1.58	(0.51, 3.69)
#Older T	1	0	0.00	0.92	0.00	(0.00, 100.00)
#Saifi J	525	8	1.52	1.79	2.03	(0.88, 4.01)
All Others	157	1	0.64	1.15	1.32	(0.02, 7.36)
TOTAL	1573	19	1.21	1.74	1.66	(1.00, 2.60)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Erie County Medical Center						
#Bell-Thomson J	623	8	1.28	1.64	1.87	(0.81, 3.68)
#Jennings L	2	0	0.00	3.66	0.00	(0.00, 100.00)
All Others	55	1	1.82	1.09	4.00	(0.05, 22.27)
TOTAL	680	9	1.32	1.60	1.97	(0.90, 3.75)
Lenox Hill Hospital						
##Geller C	137	8	5.84	1.47	9.47*	(4.08, 18.66)
#Jacobowitz I	590	14	2.37	2.84	1.99	(1.09, 3.35)
McCabe J	189	5	2.65	1.99	3.18	(1.03, 7.43)
#Sabado M	69	4	5.80	2.16	6.41	(1.72, 16.40)
#Stelzer P	189	5	2.65	2.37	2.66	(0.86, 6.22)
Subramanian V	1205	50	4.15	2.61	3.79*	(2.82, 5.00)
TOTAL	2379	86	3.61	2.52	3.42*	(2.74, 4.23)
Long Island Jewish Medical Center						
Graver L	560	14	2.50	2.21	2.71	(1.48, 4.55)
#Kerr P	1	0	0.00	8.93	0.00	(0.00, 98.13)
Kline G	162	4	2.47	1.85	3.18	(0.86, 8.15)
Palazzo R	442	7	1.58	1.91	1.98	(0.79, 4.09)
All Others	28	1	3.57	2.13	4.01	(0.05, 22.30)
TOTAL	1193	26	2.18	2.05	2.54	(1.66, 3.72)
Maimonides Medical Center						
#Acinapura A	364	13	3.57	2.25	3.79	(2.02, 6.48)
#Burack J	2	0	0.00	4.81	0.00	(0.00, 91.15)
Cane J	22	2	9.09	3.83	5.67	(0.64, 20.48)
Connolly M	449	7	1.56	2.87	1.30	(0.52, 2.68)
#Cunningham J N	365	17	4.66	2.55	4.37*	(2.54, 6.99)
#Jacobowitz I	700	16	2.29	2.91	1.88	(1.07, 3.05)
#Ketosugbo A	91	4	4.40	2.45	4.29	(1.15, 10.99)
#Sabado M	201	11	5.47	3.14	4.17	(2.08, 7.46)
#Zisbrod Z	317	8	2.52	2.33	2.59	(1.11, 5.10)
All Others	34	1	2.94	2.06	3.41	(0.04, 18.99)
TOTAL	2545	79	3.10	2.68	2.76	(2.19, 3.44)
Millard Fillmore Hospital						
Aldridge J	477	12	2.52	2.10	2.87	(1.48, 5.01)
Ashraf M	276	9	3.26	2.08	3.74	(1.71, 7.10)
#Bell-Thomson J	49	1	2.04	2.75	1.77	(0.02, 9.86)
Guarino R	478	13	2.72	1.68	3.86	(2.05, 6.60)
#Jennings L	550	17	3.09	1.86	3.98	(2.31, 6.37)
#Kerr P	355	21	5.92	2.28	6.19*	(3.83, 9.47)
Major W	171	2	1.17	1.92	1.46	(0.16, 5.26)
All Others	55	3	5.45	1.13	11.52	(2.32, 33.66)
TOTAL	2411	78	3.24	1.97	3.93*	(3.11, 4.91)

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	0.80	0.00	(0.00, 100.00)
Frater R	88	2	2.27	2.03	2.68	(0.30, 9.67)
#Frymus M	438	6	1.37	2.22	1.47	(0.54, 3.21)
##Geller C	22	0	0.00	2.03	0.00	(0.00, 19.65)
##Gold J	11	0	0.00	0.76	0.00	(0.00, 100.00)
Sisto D	379	14	3.69	2.83	3.12	(1.70, 5.23)
TOTAL	940	22	2.34	2.43	2.31	(1.44, 3.49)
Montefiore Medical Center - Moses Division						
Attai L	328	9	2.74	2.07	3.17	(1.45, 6.03)
Brodman R	311	6	1.93	1.97	2.34	(0.85, 5.09)
#Camacho M	190	9	4.74	2.33	4.86	(2.22, 9.23)
#Frymus M	3	1	33.33	0.85	93.85	(1.23, 100.00)
##Geller C	5	0	0.00	1.23	0.00	(0.00, 100.00)
##Gold J	78	0	0.00	1.15	0.00	(0.00, 9.81)
Merav A	258	8	3.10	2.62	2.83	(1.22, 5.58)
All Others	7	0	0.00	0.83	0.00	(0.00, 100.00)
TOTAL	1180	33	2.80	2.13	3.14	(2.16, 4.41)
Mount Sinai Hospital						
Ergin M	484	7	1.45	2.72	1.27	(0.51, 2.62)
Galla J	329	13	3.95	3.45	2.74	(1.46, 4.69)
Griep R	66	1	1.52	2.00	1.81	(0.02, 10.09)
Lansman S	408	24	5.88	2.97	4.74*	(3.03, 7.05)
All Others	197	6	3.05	3.33	2.19	(0.80, 4.76)
TOTAL	1484	51	3.44	3.00	2.74	(2.04, 3.60)
New York Hospital - Queens						
#Altorki N	6	0	0.00	1.72	0.00	(0.00, 85.04)
#Isom O	1	0	0.00	2.43	0.00	(0.00, 100.00)
#Ko W	98	5	5.10	1.56	7.82*	(2.52, 18.26)
#Lang S	278	3	1.08	1.72	1.50	(0.30, 4.39)
#Rosengart T	9	0	0.00	1.05	0.00	(0.00, 93.17)
TOTAL	392	8	2.04	1.66	2.93	(1.26, 5.77)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
NYU Hospitals Center						
#Colvin S	197	11	5.58	2.85	4.69	(2.34, 8.39)
Culliford A	400	7	1.75	2.92	1.43	(0.57, 2.95)
Esposito R	321	7	2.18	2.98	1.75	(0.70, 3.60)
#Galloway A	221	9	4.07	3.26	2.98	(1.36, 5.66)
#Glassman L	47	1	2.13	2.42	2.10	(0.03, 11.70)
#Grossi E	176	6	3.41	2.93	2.78	(1.01, 6.05)
#Ribakove G	223	8	3.59	3.50	2.45	(1.06, 4.83)
Spencer F	130	6	4.62	3.61	3.06	(1.12, 6.65)
All Others	50	2	4.00	3.31	2.89	(0.32, 10.42)
TOTAL	1765	57	3.23	3.09	2.50	(1.89, 3.24)
North Shore University Hospital						
Hall M	841	9	1.07	2.84	0.90**	(0.41, 1.71)
#Levy M	81	4	4.94	2.46	4.81	(1.29, 12.30)
Pogo G	591	16	2.71	2.56	2.53	(1.45, 4.11)
#Tortolani A	616	10	1.62	2.80	1.39	(0.66, 2.55)
All Others	172	3	1.74	2.80	1.49	(0.30, 4.35)
TOTAL	2301	42	1.83	2.74	1.59**	(1.15, 2.15)
Rochester General Hospital						
Cheeran D	860	18	2.09	2.09	2.40	(1.42, 3.79)
Kirshner R	787	22	2.80	2.96	2.26	(1.41, 3.42)
Knight P	910	17	1.87	2.88	1.55	(0.90, 2.48)
Kwan S	431	14	3.25	3.21	2.42	(1.32, 4.06)
All Others	145	3	2.07	2.46	2.01	(0.40, 5.87)
TOTAL	3133	74	2.36	2.71	2.08	(1.64, 2.62)
St. Elizabeth Medical Center						
All Others	29	0	0.00	0.89	0.00	(0.00, 34.13)
TOTAL	29	0	0.00	0.89	0.00	(0.00, 34.13)
St. Francis Hospital						
Bercow N	949	19	2.00	2.17	2.21	(1.33, 3.45)
Damus P	637	9	1.41	1.63	2.07	(0.94, 3.93)
Durban L	295	6	2.03	3.15	1.54	(0.56, 3.36)
Lamendola C	791	12	1.52	2.55	1.42	(0.73, 2.49)
Robinson N	835	16	1.92	2.06	2.22	(1.27, 3.61)
Taylor J	1121	17	1.52	2.51	1.44**	(0.84, 2.31)
Weisz D	691	12	1.74	2.48	1.67	(0.86, 2.92)
All Others	49	1	2.04	1.92	2.55	(0.03, 14.16)
TOTAL	5368	92	1.71	2.31	1.77**	(1.43, 2.18)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
St. Josephs Hospital Health Center						
Marvasti M	557	1	0.18	1.88	0.23**	(0.00, 1.27)
Nast E	662	9	1.36	2.28	1.43	(0.65, 2.71)
Nazem A	665	6	0.90	2.43	0.89**	(0.32, 1.93)
Rosenberg J	622	4	0.64	2.13	0.72**	(0.19, 1.85)
TOTAL	2506	20	0.80	2.19	0.87**	(0.53, 1.34)
St. Lukes Roosevelt Hospital						
Anagnostopoulos C	229	12	5.24	2.29	5.46*	(2.82, 9.54)
Aronis M	412	10	2.43	1.84	3.16	(1.51, 5.80)
Connery C	87	1	1.15	2.12	1.29	(0.02, 7.20)
Mindich B	85	4	4.71	1.82	6.18	(1.66, 15.82)
Swistel D	449	14	3.12	2.71	2.75	(1.50, 4.62)
All Others	10	0	0.00	5.21	0.00	(0.00, 16.84)
TOTAL	1272	41	3.22	2.27	3.39*	(2.43, 4.60)
St. Peters Hospital						
##Banker M	456	9	1.97	2.43	1.94	(0.89, 3.68)
Bennett E	518	9	1.74	1.93	2.15	(0.98, 4.09)
#Dal Col R	592	9	1.52	1.82	2.00	(0.91, 3.79)
#Edwards N	286	3	1.05	1.68	1.50	(0.30, 4.37)
#Miller S	5	0	0.00	1.95	0.00	(0.00, 90.15)
#Older T	174	8	4.60	2.96	3.71	(1.60, 7.31)
#Saifi J	1	0	0.00	14.39	0.00	(0.00, 60.92)
#Sardella G	63	0	0.00	1.35	0.00	(0.00, 10.34)
TOTAL	2095	38	1.81	2.05	2.12	(1.50, 2.91)
St. Vincents Hospital and Medical Center						
#Acinapura A	36	1	2.78	1.14	5.82	(0.08, 32.40)
Galdieri R	485	21	4.33	2.20	4.71*	(2.92, 7.20)
McGinn J	545	11	2.02	2.72	1.77	(0.88, 3.17)
Tyras D	536	19	3.54	2.08	4.07*	(2.45, 6.36)
All Others	1	1	100.00	0.62	100.00*	(5.01, 100.00)
TOTAL	1603	53	3.31	2.31	3.42*	(2.56, 4.47)
State University Hospital Upstate Medical Center						
Alfieris G	213	5	2.35	2.08	2.70	(0.87, 6.30)
Brandt B	239	8	3.35	2.18	3.67	(1.58, 7.22)
Parker F	271	5	1.85	2.33	1.89	(0.61, 4.42)
Picone A	347	9	2.59	2.25	2.75	(1.25, 5.22)
Ryan P	385	8	2.08	1.79	2.78	(1.20, 5.47)
TOTAL	1455	35	2.41	2.11	2.73	(1.90, 3.79)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Strong Memorial Hospital						
Hicks G	659	15	2.28	2.93	1.86	(1.04, 3.06)
Risher W	614	19	3.09	2.17	3.41	(2.05, 5.32)
All Others	32	2	6.25	3.50	4.27	(0.48, 15.42)
TOTAL	1305	36	2.76	2.59	2.55	(1.79, 3.53)
United Health Services - Wilson Division						
Cunningham J R	361	4	1.11	2.31	1.15	(0.31, 2.94)
Wong K	386	9	2.33	2.38	2.34	(1.07, 4.45)
Yousuf M	392	14	3.57	3.18	2.68	(1.46, 4.50)
All Others	39	1	2.56	2.39	2.57	(0.03, 14.27)
TOTAL	1178	28	2.38	2.62	2.16	(1.44, 3.13)
University Hospital at Stony Brook						
Bilfinger T	442	14	3.17	3.13	2.42	(1.32, 4.06)
#Hartman A	222	2	0.90	2.32	0.93	(0.10, 3.35)
#Levy M	412	8	1.94	2.24	2.07	(0.89, 4.09)
Seifert F	408	9	2.21	2.03	2.59	(1.18, 4.92)
All Others	188	4	2.13	1.72	2.96	(0.80, 7.58)
TOTAL	1672	37	2.21	2.38	2.23	(1.57, 3.07)
University Hospital of Brooklyn						
Anderson J	185	9	4.86	2.52	4.61	(2.10, 8.75)
#Burack J	191	6	3.14	2.61	2.87	(1.05, 6.25)
#Cunningham J N	3	0	0.00	1.28	0.00	(0.00, 100.00)
#Ketosugbo A	26	0	0.00	2.50	0.00	(0.00, 13.49)
Piccione V	39	1	2.56	2.56	2.39	(0.03, 13.30)
#Zisbrod Z	209	6	2.87	2.34	2.93	(1.07, 6.37)
All Others	14	2	14.29	3.23	10.58	(1.19, 38.19)
TOTAL	667	24	3.60	2.50	3.43	(2.20, 5.11)
Weill Cornell - NY Presbyterian Hospital						
#Altorki N	124	4	3.23	2.41	3.20	(0.86, 8.20)
##Gold J	102	1	0.98	2.27	1.03	(0.01, 5.74)
#Isom O	279	6	2.15	2.07	2.48	(0.91, 5.41)
#Ko W	77	4	5.19	6.18	2.01	(0.54, 5.14)
Krieger K	760	13	1.71	2.50	1.63	(0.87, 2.79)
#Lang S	492	15	3.05	3.03	2.41	(1.35, 3.97)
#Rosengart T	668	13	1.95	3.08	1.51	(0.80, 2.58)
#Tortolani A	21	2	9.52	6.89	3.30	(0.37, 11.93)
All Others	37	0	0.00	5.22	0.00	(0.00, 4.54)
TOTAL	2560	58	2.27	2.88	1.88	(1.43, 2.43)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Westchester Medical Center						
Axelrod H	384	14	3.65	3.02	2.89	(1.58, 4.85)
Fleisher A	539	9	1.67	1.98	2.02	(0.92, 3.84)
Lafaro R	403	15	3.72	2.28	3.90	(2.18, 6.43)
Moggio R	437	6	1.37	2.53	1.30	(0.47, 2.82)
Pooley R	418	23	5.50	2.58	5.10*	(3.23, 7.65)
Sarabu M	478	5	1.05	2.77	0.90**	(0.29, 2.11)
All Others	40	0	0.00	2.75	0.00	(0.00, 7.96)
TOTAL	2699	72	2.67	2.50	2.55	(1.99, 3.21)
Winthrop - University Hospital						
#Hartman A	316	3	0.95	3.17	0.72**	(0.14, 2.09)
Kofsky E	602	10	1.66	2.41	1.65	(0.79, 3.03)
Mohtashemi M	230	7	3.04	2.85	2.55	(1.02, 5.25)
Schubach S	557	12	2.15	2.42	2.13	(1.10, 3.72)
Scott W	292	4	1.37	2.18	1.50	(0.40, 3.85)
Sutaria M	116	8	6.90	5.13	3.22	(1.38, 6.34)
Williams L	128	6	4.69	3.03	3.70	(1.35, 8.05)
All Others	2	0	0.00	1.72	0.00	(0.00, 100.00)
TOTAL	2243	50	2.23	2.71	1.97	(1.46, 2.59)
Statewide Total	59581	1424	2.39			

* 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, 1995-1997

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Acinapura A	400	14	3.50	2.15	3.89	(2.12, 6.52)
Maimonides	364	13	3.57	2.25	3.79	(2.02, 6.48)
St. Vincent's	36	1	2.78	1.14	5.82	(0.08, 32.40)
Altorki N	130	4	3.08	2.38	3.10	(0.83, 7.93)
New York Hosp-Queens	6	0	0.00	1.72	0.00	(0.00, 85.04)
Weill Cornell	124	4	3.23	2.41	3.20	(0.86, 8.20)
Banker M	548	11	2.01	2.27	2.11	(1.05, 3.78)
Albany Medl Ctr	91	2	2.20	1.49	3.52	(0.40, 12.72)
Ellis Hospital	1	0	0.00	0.81	0.00	(0.00, 100.00)
St. Peters Hospital	456	9	1.97	2.43	1.94	(0.89, 3.68)
Bell-Thomson J	672	9	1.34	1.72	1.86	(0.85, 3.53)
Erie County	623	8	1.28	1.64	1.87	(0.81, 3.68)
Millard Fillmore	49	1	2.04	2.75	1.77	(0.02, 9.86)
Britton L	465	5	1.08	1.50	1.71	(0.55, 3.99)
Albany Med Ctr	464	5	1.08	1.50	1.71	(0.55, 4.00)
Ellis Hospital	1	0	0.00	0.86	0.00	(0.00, 100.00)
Burack J	193	6	3.11	2.64	2.82	(1.03, 6.13)
Maimonides	2	0	0.00	4.81	0.00	(0.00, 91.15)
Univ Hosp - Brooklyn	191	6	3.14	2.61	2.87	(1.05, 6.25)
Camacho M	192	9	4.69	2.31	4.84	(2.21, 9.19)
Montefiore Einstein	2	0	0.00	0.80	0.00	(0.00, 100.00)
Montefiore Moses	190	9	4.74	2.33	4.86	(2.22, 9.23)
Colvin S	231	15	6.49	2.90	5.34*	(2.99, 8.82)
Bellevue	34	4	11.76	3.24	8.69	(2.34, 22.24)
NYU Hosp Ctr	197	11	5.58	2.85	4.69	(2.34, 8.39)
Cunningham J N	368	17	4.62	2.54	4.35*	(2.53, 6.97)
Maimonides	365	17	4.66	2.55	4.37*	(2.54, 6.99)
Univ Hosp Brooklyn	3	0	0.00	1.28	0.00	(0.00, 100.00)
Dal Col R	593	9	1.52	1.82	1.99	(0.91, 3.79)
Albany Med Ctr	1	0	0.00	0.63	0.00	(0.00, 100.00)
St. Peters	592	9	1.52	1.82	2.00	(0.91, 3.79)
Edwards N	335	5	1.49	1.75	2.03	(0.66, 4.75)
Columbia Presbyterian	49	2	4.08	2.21	4.42	(0.50, 15.95)
St. Peters	286	3	1.05	1.68	1.50	(0.30, 4.37)

Table 4 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Frymus M	441	7	1.59	2.21	1.71	(0.69, 3.53)
Montefiore Einstein	438	6	1.37	2.22	1.47	(0.54, 3.21)
Montefiore Moses	3	1	33.33	0.85	93.85	(1.23, 100.00)
Galloway A	268	11	4.10	3.05	3.22	(1.60, 5.76)
Bellevue	47	2	4.26	2.03	5.00	(0.56, 18.06)
NYU Hosp Ctr	221	9	4.07	3.26	2.98	(1.36, 5.66)
Geller C	164	8	4.88	1.54	7.57*	(3.26, 14.91)
Lenox Hill	137	8	5.84	1.47	9.47*	(4.08, 18.66)
Montefiore Einstein	22	0	0.00	2.03	0.00	(0.00, 19.65)
Montefiore Moses	5	0	0.00	1.23	0.00	(0.00, 100.00)
Glassman L	169	4	2.37	2.34	2.42	(0.65, 6.19)
Bellevue	122	3	2.46	2.31	2.54	(0.51, 7.43)
NYU Hosp Ctr	47	1	2.13	2.42	2.10	(0.03, 11.70)
Gold J	191	1	0.52	1.72	0.73	(0.01, 4.04)
Montefiore Einstein	11	0	0.00	0.76	0.00	(0.00, 100.00)
Montefiore Moses	78	0	0.00	1.15	0.00	(0.00, 9.81)
Weill Cornell	102	1	0.98	2.27	1.03	(0.01, 5.74)
Grossi E	178	7	3.93	2.94	3.19	(1.28, 6.58)
Bellevue	2	1	50.00	4.10	29.12	(0.38, 100.00)
NYU Hosp Ctr	176	6	3.41	2.93	2.78	(1.01, 6.05)
Hartman A	538	5	0.93	2.82	0.79**	(0.25, 1.84)
Univ Hosp Stony Brook	222	2	0.90	2.32	0.93	(0.10, 3.35)
Winthrop Univ Hosp	316	3	0.95	3.17	0.72**	(0.14, 2.09)
Isom O	280	6	2.14	2.07	2.47	(0.90, 5.38)
New York Hosp-Queens	1	0	0.00	2.43	0.00	(0.00, 100.00)
Weill Cornell	279	6	2.15	2.07	2.48	(0.91, 5.41)
Jacobowitz I	1290	30	2.33	2.88	1.93	(1.30, 2.75)
Lenox Hill	590	14	2.37	2.84	1.99	(1.09, 3.35)
Maimonides	700	16	2.29	2.91	1.88	(1.07, 3.05)
Jennings L	552	17	3.08	1.86	3.95	(2.30, 6.32)
Erie County	2	0	0.00	3.66	0.00	(0.00, 100.00)
Millard Fillmore	550	17	3.09	1.86	3.98	(2.31, 6.37)
Kerr P	356	21	5.90	2.30	6.12*	(3.79, 9.36)
Long Island Jewish	1	0	0.00	8.93	0.00	(0.00, 98.13)
Millard Fillmore	355	21	5.92	2.28	6.19*	(3.83, 9.47)

Table 4 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Ketosugbo A	117	4	3.42	2.46	3.32	(0.89, 8.51)
Maimonides	91	4	4.40	2.45	4.29	(1.15, 10.99)
Univ Hosp Brooklyn	26	0	0.00	2.50	0.00	(0.00, 13.49)
Ko W	175	9	5.14	3.59	3.42	(1.56, 6.49)
New York Hosp-Queens	98	5	5.10	1.56	7.82*	(2.52, 18.26)
Weill Cornell	77	4	5.19	6.18	2.01	(0.54, 5.14)
Lang S	770	18	2.34	2.55	2.19	(1.30, 3.46)
New York Hosp-Queens	278	3	1.08	1.72	1.50	(0.30, 4.39)
Weill Cornell	492	15	3.05	3.03	2.41	(1.35, 3.97)
Levy M	493	12	2.43	2.27	2.56	(1.32, 4.47)
North Shore	81	4	4.94	2.46	4.81	(1.29, 12.30)
Univ Hosp Stony Brook	412	8	1.94	2.24	2.07	(0.89, 4.09)
Miller S	495	4	0.81	2.10	0.92**	(0.25, 2.36)
Albany Med Ctr	490	4	0.82	2.10	0.93**	(0.25, 2.38)
St. Peters	5	0	0.00	1.95	0.00	(0.00, 90.15)
Older T	175	8	4.57	2.95	3.70	(1.59, 7.30)
Ellis Hospital	1	0	0.00	0.92	0.00	(0.00, 100.00)
St. Peters	174	8	4.60	2.96	3.71	(1.60, 7.31)
Ribakove G	307	10	3.26	3.06	2.54	(1.22, 4.67)
Bellevue	84	2	2.38	1.91	2.97	(0.33, 10.73)
NYU Hosp Ctr	223	8	3.59	3.50	2.45	(1.06, 4.83)
Rosengart T	677	13	1.92	3.06	1.50	(0.80, 2.57)
New York Hosp-Queens	9	0	0.00	1.05	0.00	(0.00, 93.17)
Weill Cornell	668	13	1.95	3.08	1.51	(0.80, 2.58)
Sabado M	270	15	5.56	2.89	4.60*	(2.57, 7.58)
Lenox Hill	69	4	5.80	2.16	6.41	(1.72, 16.40)
Maimonides	201	11	5.47	3.14	4.17	(2.08, 7.46)
Saifi J	526	8	1.52	1.82	2.00	(0.86, 3.95)
Ellis Hospital	525	8	1.52	1.79	2.03	(0.88, 4.01)
St. Peters	1	0	0.00	14.39	0.00	(0.00, 60.92)
Sardella G	219	0	0.00	1.27	0.00	(0.00, 3.15)
Albany Med Ctr	156	0	0.00	1.24	0.00	(0.00, 4.54)
St. Peters	63	0	0.00	1.35	0.00	(0.00, 10.34)
Stelzer P	399	9	2.26	2.60	2.07	(0.94, 3.93)
Beth Israel	210	4	1.90	2.81	1.62	(0.44, 4.14)
Lenox Hill	189	5	2.65	2.37	2.66	(0.86, 6.22)

Table 4 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Tortolani A	637	12	1.88	2.93	1.54	(0.79, 2.68)
North Shore	616	10	1.62	2.80	1.39	(0.66, 2.55)
Weill Cornell	21	2	9.52	6.89	3.30	(0.37, 11.93)
Zisbrod Z	526	14	2.66	2.34	2.72	(1.49, 4.57)
Maimonides	317	8	2.52	2.33	2.59	(1.11, 5.10)
Univ Hosp Brooklyn	209	6	2.87	2.34	2.93	(1.07, 6.37)

* 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 (1995-1997)

Table 5 presents, for each hospital and for each surgeon performing at least 200 isolated CABG operations at that hospital in 1995-1997 and/or performing one or more isolated CABG operations in each of the years 1995- 1997, 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 1995-1997 was 73.15 percent (59,581 CABG operations out of a total of 81,456 total adult cardiac surgeries).

Table 5: Total Cardiac Surgery and Isolated CABG Surgery Volumes by Hospital and Surgeon, 1995-1997

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Albany Medical Center Hospital			
Banker M	99	91	91.92
Britton L	659	464	70.41
Canavan T	663	572	86.27
Dal Col R	1	1	100.00
Foster E	418	263	62.92
Kelley J	722	552	76.45
Luber J	637	448	70.33
Miller S	594	490	82.49
Sardella G	164	156	95.12
All Others	317	237	74.76
TOTAL	4274	3274	76.60
Arnot-Ogden Memorial Hospital			
Quintos E	307	264	85.99
Vaughan J	142	122	85.92
All Others	93	76	81.72
TOTAL	542	462	85.24
Bellevue Hospital Center			
Colvin S	113	34	30.09
Galloway A	95	47	49.47
Glassman L	149	122	81.88
Grossi E	2	2	100.00
Ribakove G	158	84	53.16
TOTAL	517	289	55.90

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Beth Israel Medical Center			
Hoffman D	226	199	88.05
Stelzer P	421	210	49.88
Tranbaugh R	1084	774	71.40
All Others	52	44	84.62
TOTAL	1783	1227	68.82
Buffalo General Hospital			
Bergsland J	667	526	78.86
Bhayana J	554	237	42.78
Grosner G	827	748	90.45
Lajos T	515	445	86.41
Levinsky L	346	332	95.95
Lewin A	668	624	93.41
Raza S	592	444	75.00
Salerno T	378	315	83.33
All Others	37	4	10.81
TOTAL	4584	3675	80.17
Columbia Presbyterian - NY Presbyterian Hospital			
Edwards N	68	49	72.06
Michler R	545	302	55.41
Oz M	983	575	58.49
Rose E	616	367	59.58
Smith C	1063	658	61.90
Spotnitz H	12	8	66.67
All Others	329	67	20.36
TOTAL	3616	2026	56.03
Ellis Hospital			
Banker M	1	1	100.00
Britton L	1	1	100.00
Depan H	628	434	69.11
McIliduff J	562	454	80.78
Older T	2	1	50.00
Saifi J	644	525	81.52
All Others	174	157	90.23
TOTAL	2012	1573	78.18
Erie County Medical Center			
Bell-Thomson J	747	623	83.40
Jennings L	2	2	100.00
All Others	57	55	96.49
TOTAL	806	680	84.37

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Lenox Hill Hospital			
Geller C	158	137	86.71
Jacobowitz I	740	590	79.73
McCabe J	248	189	76.21
Sabado M	106	69	65.09
Stelzer P	351	189	53.85
Subramanian V	1427	1205	84.44
TOTAL	3030	2379	78.51
Long Island Jewish Medical Center			
Graver L	798	560	70.18
Kerr P	1	1	100.00
Kline G	186	162	87.10
Palazzo R	543	442	81.40
All Others	42	28	66.67
TOTAL	1570	1193	75.99
Maimonides Medical Center			
Acinapura A	462	364	78.79
Burack J	3	2	66.67
Cane J	27	22	81.48
Connolly M	541	449	82.99
Cunningham J N	514	365	71.01
Jacobowitz I	860	700	81.40
Ketosugbo A	107	91	85.05
Sabado M	246	201	81.71
Zisbrod Z	360	317	88.06
All Others	36	34	94.44
TOTAL	3156	2545	80.64
Millard Fillmore Hospital			
Aldridge J	565	477	84.42
Ashraf M	308	276	89.61
Bell-Thomson J	69	49	71.01
Guarino R	530	478	90.19
Jennings L	603	550	91.21
Kerr P	420	355	84.52
Major W	187	171	91.44
All Others	73	55	75.34
TOTAL	2755	2411	87.51

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Montefiore Medical Center - Einstein Division			
Camacho M	2	2	100.00
Frater R	204	88	43.14
Frymus M	514	438	85.21
Geller C	24	22	91.67
Gold J	19	11	57.89
Sisto D	543	379	69.80
TOTAL	1306	940	71.98
Montefiore Medical Center - Moses Division			
Attai L	464	328	70.69
Brodman R	449	311	69.27
Camacho M	258	190	73.64
Frymus M	4	3	75.00
Geller C	7	5	71.43
Gold J	108	78	72.22
Merav A	349	258	73.93
All Others	13	7	53.85
TOTAL	1652	1180	71.43
Mount Sinai Hospital			
Ergin M	791	484	61.19
Galla J	559	329	58.86
Griep R	391	66	16.88
Lansman S	658	408	62.01
All Others	328	197	60.06
TOTAL	2727	1484	54.42
New York Hospital - Queens			
Altorki N	7	6	85.71
Isom O	1	1	100.00
Ko W	124	98	79.03
Lang S	331	278	83.99
Rosengart T	11	9	81.82
TOTAL	474	392	82.70

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
NYU Hospitals Center			
Colvin S	602	197	32.72
Culliford A	726	400	55.10
Esposito R	462	321	69.48
Galloway A	433	221	51.04
Glassman L	60	47	78.33
Grossi E	302	176	58.28
Ribakove G	326	223	68.40
Spencer F	272	130	47.79
All Others	60	50	83.33
TOTAL	3243	1765	54.42
North Shore University Hospital			
Hall M	1149	841	73.19
Levy M	103	81	78.64
Pogo G	754	591	78.38
Tortolani A	734	616	83.92
All Others	269	172	63.94
TOTAL	3009	2301	76.47
Rochester General Hospital			
Cheeran D	1116	860	77.06
Kirshner R	1003	787	78.46
Knight P	1255	910	72.51
Kwan S	502	431	85.86
All Others	151	145	96.03
TOTAL	4027	3133	77.80
St. Elizabeth Medical Center			
All Others	37	29	78.38
TOTAL	37	29	78.38
St. Francis Hospital			
Bercow N	1229	949	77.22
Damus P	1225	637	52.00
Durban L	404	295	73.02
Lamendola C	1017	791	77.78
Robinson N	1173	835	71.18
Taylor J	1469	1121	76.31
Weisz D	894	691	77.29
All Others	60	49	81.67
TOTAL	7471	5368	71.85

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
St. Josephs Hospital Health Center			
Marvasti M	778	557	71.59
Nast E	783	662	84.55
Nazem A	770	665	86.36
Rosenberg J	919	622	67.68
TOTAL	3250	2506	77.11
St. Lukes Roosevelt Hospital-St. Lukes Div.			
Anagnostopoulos C	395	229	57.97
Aronis M	553	412	74.50
Connery C	134	87	64.93
Mindich B	160	85	53.13
Swistel D	539	449	83.30
All Others	17	10	58.82
TOTAL	1798	1272	70.75
St. Peters Hospital			
Banker M	514	456	88.72
Bennett E	776	518	66.75
Dal Col R	745	592	79.46
Edwards N	337	286	84.87
Miller S	7	5	71.43
Older T	229	174	75.98
Saifi J	1	1	100.00
Sardella G	73	63	86.30
All Others	1	0	0.00
TOTAL	2683	2095	78.08
St. Vincents Hospital and Medical Center			
Acinapura A	43	36	83.72
Galdieri R	625	485	77.60
McGinn J	706	545	77.20
Tyras D	640	536	83.75
All Others	1	1	100.00
TOTAL	2015	1603	79.55
State University Hospital Upstate Medical Center			
Alfieris G	340	213	62.65
Brandt B	326	239	73.31
Parker F	423	271	64.07
Picone A	449	347	77.28
Ryan P	494	385	77.94
All Others	2	0	0.00
TOTAL	2034	1455	71.53

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Strong Memorial Hospital			
Hicks G	953	659	69.15
Risher W	952	614	64.50
All Others	57	32	56.14
TOTAL	1962	1305	66.51
United Health Services - Wilson Division			
Cunningham J R	463	361	77.97
Wong K	473	386	81.61
Yousuf M	486	392	80.66
All Others	47	39	82.98
TOTAL	1469	1178	80.19
University Hospital at Stony Brook			
Bilfinger T	530	442	83.40
Hartman A	307	222	72.31
Levy M	492	412	83.74
Seifert F	592	408	68.92
All Others	225	188	83.56
TOTAL	2146	1672	77.91
University Hospital of Brooklyn			
Anderson J	300	185	61.67
Burack J	230	191	83.04
Cunningham J N	10	3	30.00
Ketosugbo A	30	26	86.67
Piccone V	48	39	81.25
Zisbrod Z	255	209	81.96
All Others	27	14	51.85
TOTAL	900	667	74.11
Weill Cornell - NY Presbyterian Hospital			
Altorki N	155	124	80.00
Gold J	186	102	54.84
Isom O	622	279	44.86
Ko W	155	77	49.68
Krieger K	1113	760	68.28
Lang S	728	492	67.58
Rosengart T	970	668	68.87
Tortolani A	30	21	70.00
All Others	88	37	42.05
TOTAL	4047	2560	63.26

Table 5 continued

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
Westchester Medical Center			
Axelrod H	467	384	82.23
Fleisher A	686	539	78.57
Lafaro R	580	403	69.48
Moggio R	587	437	74.45
Pooley R	516	418	81.01
Sarabu M	691	478	69.18
All Others	52	40	76.92
TOTAL	3579	2699	75.41
Winthrop - University Hospital			
Hartman A	512	316	61.72
Kofsky E	709	602	84.91
Mohtashemi M	276	230	83.33
Schubach S	778	557	71.59
Scott W	393	292	74.30
Sutaria M	148	116	78.38
Williams L	162	128	79.01
All Others	4	2	50.00
TOTAL	2982	2243	75.22
Statewide Total	81456	59581	73.15

Criteria Used in Reporting Significant Risk Factors (1997)

Based on Documentation in Medical Record

Patient Risk Factor	Definitions
Hemodynamic State	
• Unstable	Determined just prior to surgery
• Shock	Patient requires pharmacologic or mechanical support to maintain blood pressure or output
• Cardiopulmonary Resuscitation	Acute hypotension (<i>systolic blood pressure <80 mmHg</i>) or low cardiac index (<i><2.0 liters/min/m</i>), despite pharmacologic or mechanical support
	Patient requires cardiopulmonary resuscitation
Comorbidities	
• Chronic Obstructive Pulmonary Disease	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 pO ₂ < 60 or a pCO ₂ >50
• 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	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
• Stroke	A history of stroke, with or without residual deficit
Ventricular Function	
• Previous MI, less than 6 hours	One or more myocardial infarctions less than 6 hours before surgery
• Ejection Fraction	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
Previous Open Heart Operations	
	Open heart surgery previous to the hospitalization. For the purpose of this reporting system, minimally invasive procedures are considered open heart surgery

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

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

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

Ellis Hospital
1101 Nott Street
Schenectady, New York

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
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11-11 Amsterdam Avenue at
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315 South Manning Boulevard
Albany, New York 12208

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Center of NY
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Strong Memorial Hospital
601 Elmwood Avenue
Rochester, New York 14642

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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

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750 East Adams Street
Syracuse, New York 13210

Weill-Cornell Medical Center –
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New York, New York 10021

Westchester Medical Center
Grasslands Reservation
Valhalla, New York 10595

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259 First Street
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