ADULT CARDIAC SURGERY

in New York State

2012-2014

Department of Health

May 2017

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INTRODUCTION

For over twenty years, the NYS Cardiac Data Reporting System has been a powerful resource for quality improvement in the areas of cardiac surgery and percutaneous coronary interventions (PCI). Building on this strong foundation, we are pleased to include in one report information on mortality after coronary artery bypass graft (CABG) surgery and valve repair or replacement surgery, readmissions after CABG, and, for the first time, information on mortality after transcatheter aortic valve replacement (TAVR) in NYS.

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

The information contained in this report is intended for health care providers, patients and families of patients who are considering cardiac surgery. It includes:

- Mortality rates, adjusted for patient severity of illness, for CABG surgery, valve repair or replacement surgery, and TAVR at NYS hospitals.
- Readmission rates, adjusted for patient severity of illness, following CABG at NYS hospitals.
- Mortality rates, adjusted for patient severity of illness, following CABG and/or valve surgery for surgeons performing the procedure.
- Volume (number of cases) of all cardiac surgery for NYS hospitals and surgeons.
- Description of the patient risk factors associated with mortality for CABG and valve surgery and TAVR, and those associated with readmissions after CABG surgery.

The data that serve as the basis for this report are collected by the NYS Department of Health cooperatively with hospitals throughout the state. Careful auditing and rigorous analysis assure that these reports represent meaningful outcome assessments. The report was developed with clinical guidance from the NYS Cardiac Advisory Committee, an advisory body to the Commissioner of Health consisting of nationally recognized cardiac surgeons, cardiologists and others from related disciplines working both in New York State and elsewhere. The Cardiac Advisory Committee is to be commended for sustained leadership in these efforts.

As they develop treatment plans, we encourage doctors to discuss this information with their patients and colleagues. While these statistics are an important tool in making informed health care choices, individual treatment plans must be made by doctors and patients together after careful consideration of all pertinent factors. It is important to recognize that many factors can influence the outcome of cardiac surgery. These include the patient's health before the procedure, the skill of the operating team and general after-care. In addition, keep in mind that the information in this booklet does not include data after 2014. Important changes may have taken place in hospitals during that time period.

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 sedentary lifestyle. Careful attention to these risk factors after surgery will continue to be important in promoting good health and preventing recurrence of disease.

Hospitals and physicians in NYS can take pride in the excellent patient care provided and in their role in contributing to this unique collaborative quality improvement system. The Department of Health will continue to work in partnership with hospitals and physicians to ensure that continued high-quality cardiac surgery is available to NYS residents.

CORONARY ARTERY BYPASS GRAFT SURGERY (CABG)

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

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

CABG surgery is an operation in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart muscle, bypassing the arterial blockage. Typically, a section of one of the large (saphenous) veins in the leg, the radial artery in the arm or the mammary artery in the chest is used to construct the bypass. One or more bypasses may be performed during a single operation, since providing several routes for the blood supply to travel is believed to improve long-term success for the procedure. CABG surgery is one of the most common, successful major operations currently performed in the United States.

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

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

CARDIAC VALVE PROCEDURES

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

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

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

The most common heart valve surgeries involve the aortic and mitral valves. Patients undergoing heart surgery are totally anesthetized and are usually placed on a heart-lung machine, whereby the heart is stopped for a short period of time using special drugs. As is the case for CABG surgery, there is a recovery period of

several weeks at home after being discharged from the hospital. Some patients require replacement of more than one valve and some patients with both coronary artery disease and valve disease require valve replacement and CABG surgery. This report contains outcomes for the following valve surgeries when done alone or in combination with CABG: Aortic Valve Replacement, Mitral Valve Repair, Mitral Valve Replacement and Multiple Valve Surgery.

In recent years, a new technique for replacement of the aortic valve has been tested and approved for use in the United States under certain circumstances. This procedure, known as Transcatheter Aortic Valve Replacement (TAVR, also sometimes called Transcatheter Aortic Valve Implantation or TAVI), differs from traditional surgical valve replacement in that the replacement valve is delivered to the heart through a catheter rather than through a standard surgical incision. The procedure is performed collaboratively by cardiologists and cardiac surgeons.

THE DEPARTMENT OF HEALTH PROGRAM

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

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

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

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

PATIENT POPULATION

This report is based on data for patients discharged between December 1, 2011, and November 30, 2014, provided by all non-federal hospitals in NYS where cardiac surgery is performed. The analysis period for this report includes patients discharged in December 2011 but not those discharged in December 2014. This strategy allows for more timely report publication by eliminating the need to track patients for 30-day mortality into the following calendar year. Inclusion of cases from the previous December allows for meaningful comparison of 12-month volume as found in previous reports. The single year analysis for 2014 cases includes patients discharged from December 1, 2013 through November 30, 2014. In total there were 58,765 cardiac surgical procedures performed during this time period.

For various reasons, some of these cases are excluded from analysis in this report. The reasons for exclusion and number of cases affected are described below.

Records for 129 patients residing outside the United States were excluded because these patients could not be followed after hospital discharge. There were 8 cases excluded from analysis because each 30-day mortality can only be associated with a single cardiac surgery.

Beginning with patients discharged in 2006, the Department of Health, with the advice of the Cardiac Advisory Committee, began a trial period of excluding from publicly released reports any patients meeting the Cardiac Data System definition of pre-operative cardiogenic shock. Cardiogenic shock is a condition

associated with severe hypotension (very low blood pressure). [The technical definition used in this report can be found on page 43.] Patients in cardiogenic shock are extremely high-risk, but for some, cardiac surgery may be their best chance for survival. Furthermore, the magnitude of the risk is not always easily determined using registry data. These cases were excluded after careful deliberation and input from NYS providers and others in an effort to ensure that physicians could accept these cases where appropriate without concern over a detrimental impact on their reported outcomes. In total, 618 cases with cardiogenic shock were removed from the data. This accounts for 1.05 percent of all cardiac surgeries (CABG, valve surgery and other cardiac surgery reported in this data system) in the three years.

After all of the above exclusions, there were 58,010 cardiac surgeries analyzed in this report. Isolated CABG surgery represented 41.81 percent of all adult cardiac surgery included in this report. Valve or combined valve/CABG surgery represented 38.47 percent of all adult cardiac surgery for the same period. TAVR represented 6.52 percent of all cardiac surgeries reported. Total cardiac surgery, isolated CABG, valve surgery and other cardiac surgery volumes are tabulated in Table 8 by hospital and surgeon for the period 2012 through 2014.

While there were 7,942 CABG cases included in the mortality analysis for 2014 discharges, some additional exclusions were required for the readmission analysis. Records belonging to patients residing outside NYS were excluded because there is no reliable way to track out-of-state readmissions. This accounted for 300 cases. Another 73 patients were excluded because they died in the same admission as their index CABG, so readmission was impossible. Twenty-seven cases were transfered to another acute care facility after CABG and so were excluded from readmission analysis.

In total, the number of exclusions was 400, leaving 7,542 cases to be examined for 30-day readmission rates.

Note on Hospitals Not Performing Cardiac Surgery During Entire 2012 – 2014 Period

Good Samaritan in West Islip began performing cardiac surgery in January 2014. Millard Fillmore Hospital closed in 2013 and performed the last cardiac surgery in March of that year. The cardiac surgery programs at Erie County Medical Center and Champlain Valley Physician's Hospital closed in March and December of 2013, respectively.

RISK ADJUSTMENT FOR ASSESSING PROVIDER PERFORMANCE

Provider performance is directly related to patient outcomes. Whether patients recover quickly, experience complications, require another hospitalization, 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 death and readmission than other hospitals in the state. The following describes how the Department of Health adjusts for patient risk in assessing provider outcomes.

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

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

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

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

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

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

Data on deaths occurring after discharge from the hospital are obtained from the Department of Health, the New York City Department of Health and Mental Hygiene Bureau of Vital Statistics, and the National Death Index.

Data on readmissions are obtained from the Department of Health's acute care hospital dataset, the Statewide Planning and Research Cooperative System (SPARCS), which contains data pertaining to all acute care hospital discharges in the state.

Thirty-day readmission is defined as admission to a NYS non-Federal hospital within 30 days of discharge from the index hospitalization.

Assessing Patient Risk

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

The statistical analyses conducted by the Department of Health consist of determining which of the risk factors collected are significantly related to death or readmission following CABG and/or valve surgery and determining how to weigh the significant risk factors to predict the chance each patient will have of dying or being readmitted, 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 whether they are sufficiently accurate in predicting mortality for patients who are extremely ill prior to undergoing the procedure as well as for patients who are relatively healthy. These tests have confirmed that the models are reasonably accurate in predicting how patients of all different risk levels will fare when undergoing cardiac surgery.

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

Computing the Risk-Adjusted Mortality Rate

The risk-adjusted mortality rate (RAMR) represents the best estimate, based on the associated statistical model, of what the provider's mortality rate would have been if the provider had a mix of patients identical to the statewide mix. Thus, the RAMR has, to the extent possible, ironed out differences among providers in patient severity of illness, since it arrives at a mortality rate for each provider for an identical group of patients. To calculate the RAMR, the OMR is first divided by the provider's EMR. If the resulting ratio is larger than one, the provider has a higher mortality rate than expected on the basis of its patient mix; if it is smaller than one, the provider has a lower mortality rate than expected from its patient mix. For isolated CABG patients the ratio is then multiplied by the overall statewide mortality rate of 1.22 percent (in-hospital/30-day mortality in 2014) to obtain the provider's RAMR. For the three-year period 2012-2014, the ratio is multiplied by 1.51 percent (in-hospital/30-day mortality rate) for isolated CABG patients or 3.18 percent (in-hospital/30-day mortality rate) for valve or valve/CABG patients.

There is no Statewide EMR or RAMR, because the statewide data is not risk-adjusted. The Statewide OMR (number of total cases divided by number of total deaths) serves as the basis for comparison for each hospital's EMR and RAMR.

Interpreting the Risk-Adjusted Mortality Rate

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

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

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

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

Predicting Patient Readmission and Computing and Interpreting Risk-Adjusted Readmission Rates

Patient risk of 30-day readmission is assessed using the same methods used for assessing mortality risk as described above. All potential risk factors are considered and those that are independently related to readmission are identified and given weights so as to best predict the risk of 30-day readmission for each patient. Observed readmission rates (ORR), expected readmission rates (ERR) and risk-adjusted readmission rates (RARR) are calculated in the same way that OMR, EMR and RAMR are calculated. ERR and RARR are compared to the statewide observed readmission rate (13.48 percent in 2014).

This analysis is based on all-cause readmission, not just readmission directly related to the CABG procedure. Not all readmissions represent a poor patient outcome or reflect poor patient care. However, by risk-adjusting and comparing the results across the many hospitals that perform this procedure we are able to look for meaningful differences from the overall statewide experience. If the RARR is significantly lower than the statewide readmission rate, the hospital has a better performance than the state as a whole; if the RARR is significantly higher than the statewide readmission rate, the hospital has a worse performance than the state as a whole.

As described above for mortality, there are reasons that a provider's RARR may not be indicative of its true quality. Confidence intervals and careful attention to data quality are used in the same way for readmission as they are for mortality.

How This Initiative Contributes to Quality Improvement

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

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

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

DEFINITIONS OF KEY TERMS

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

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

The **risk-adjusted mortality rate (RAMR)** is the best estimate, based on the statistical model, of what the provider's mortality rate would have been if the provider had a mix of patients identical to the statewide mix. It is obtained by first dividing the OMR by the EMR, and then multiplying by the relevant statewide mortality rate (for example, 1.22 percent for Isolated CABG patients in 2014 or 3.18 percent for Valve or Valve/CABG patients in 2012-2014).

The **observed readmission rate (ORR)** is the observed number of 30-day readmissions divided by the total number of analyzed cases.

The **expected readmission rate (ERR)** is the sum of the predicted probabilities of readmission for all patients divided by the total number of analyzed cases.

The **risk-adjusted readmission rate (RARR)** is the best estimate, based on the statistical model, of what the provider's readmission rate would have been if the provider had a mix of patients similar to the statewide mix. It is obtained by first dividing the ORR by the ERR, and then multiplying that quotient by the statewide readmission rate (13.48 percent 30-day readmission rate for all CABG patients discharged in 2014).

Confidence Intervals are used to identify which hospitals had significantly more or fewer deaths or readmissions than expected given the risk factors of their patients. The confidence interval identifies the range in which the risk-adjusted rate may fall. Hospitals with significantly higher rates than expected after adjusting for risk are those where the confidence interval range falls entirely above the statewide mortality rate. Hospitals with significantly lower rates than expected, given the severity of illness of their patients before surgery, have confidence intervals entirely below the statewide mortality rate. The more cases a provider performs, the narrower their confidence interval will be. This is because as a provider performs more cases, the likelihood of chance variation in the risk-adjusted rate decreases.

2014 HOSPITAL OUTCOMES FOR CABG SURGERY

Table 1 and Figure 1 present the CABG surgery results for the 38 hospitals performing this operation in NYS in 2014. The table contains, for each hospital, the number of isolated CABG operations (CABG operations with no other major heart surgery earlier in the hospital stay) for patients discharged in 2014, the number of in-hospital/30-day deaths, the OMR, the EMR based on the statistical model presented in Appendix 1, the RAMR and a 95 percent confidence interval for the RAMR.

As indicated in Table 1, the overall in-hospital/30-day mortality rate for the 7,942 CABG surgeries was 1.22 percent. In-hospital/30-day OMRs ranged from 0.00 percent to 3.45 percent. The range of EMRs, which measure patient severity of illness, was 0.74 percent to 1.88 percent.

The RAMRs, which are used to measure performance, ranged from 0.00 percent to 5.09 percent. No hospitals had RAMRs that were significantly lower than the statewide rate. Two hospitals (St. Francis Hospital in Roslyn and UHS-Wilson Medical Center in Johnson City) had mortality rates that were significantly higher than the statewide rate.

The 2014 in-hospital/30-day mortality rate of 1.22 percent for Isolated CABG is lower than the 1.84 percent observed in 2013.

The in-hospital OMR for 2014 Isolated CABG discharges (not shown in Table 1) was 0.92 percent for all 7,942 patients included in the analysis.

Figure 1 provides a visual representation of the data displayed in Tables 1. For each hospital, the black dot represents the RAMR and the gray bar represents the confidence interval, or potential statistical error, for the RAMR. The black vertical line is the NYS in-hospital/30-day mortality rate. A gray bar that extends far above and/or below the statewide average indicates that a hospital has a wide confidence interval. This is common when the hospital has a very small number of cases. It does not necessarily mean that the risk-adjusted mortality rate is very high or very low. For any hospital where the gray bar crosses the state average line, the RAMR is not statistically different from the state as a whole. Hospitals that are statistical outliers will have gray bars (confidence intervals) that are either entirely above or entirely below the line for the statewide rate.

Table 2 presents the 30-day readmission results for the 38 hospitals performing CABG in NYS in 2014 for which data could be analyzed. The table contains, for each hospital, the number of CABGs resulting in 2014 discharges in the readmission analysis, the number of 30-Day readmissions, the ORR, the ERR based on the statistical model presented in Appendix 2, the RARR and a 95 percent confidence interval for the RARR.

The overall ORR for the 7,542 CABGs included in this 2014 analysis was 13.48 percent. Observed readmission rates ranged from 7.33 percent to 39.29 percent. The range in ERRs, which measure patient severity of illness, was between 10.80 percent and 18.87 percent. The RARRs, which measure hospital performance, range from 7.48 percent to 28.08 percent.

Based on confidence intervals for RARRs, three hospitals (Bellevue Hospital in Manhattan, Lenox Hill Hospital in Manhattan, and University Hospital - Brooklyn) had RARRs that were significantly higher than the statewide average. Two hospitals (Ellis Hospital in Schenectady and St. Joseph's Hospital in Syracuse) had RARRs that were significantly lower than the statewide average.

Figure 2 provides a visual representation of the data displayed in Table 2. It is interpreted in the same way as Figure 1 described above.

Table 1

In-hospital/30-Day Observed, Expected and Risk-Adjusted Mortality Rates for Isolated CABG Surgery in New York State, 2014 Discharges

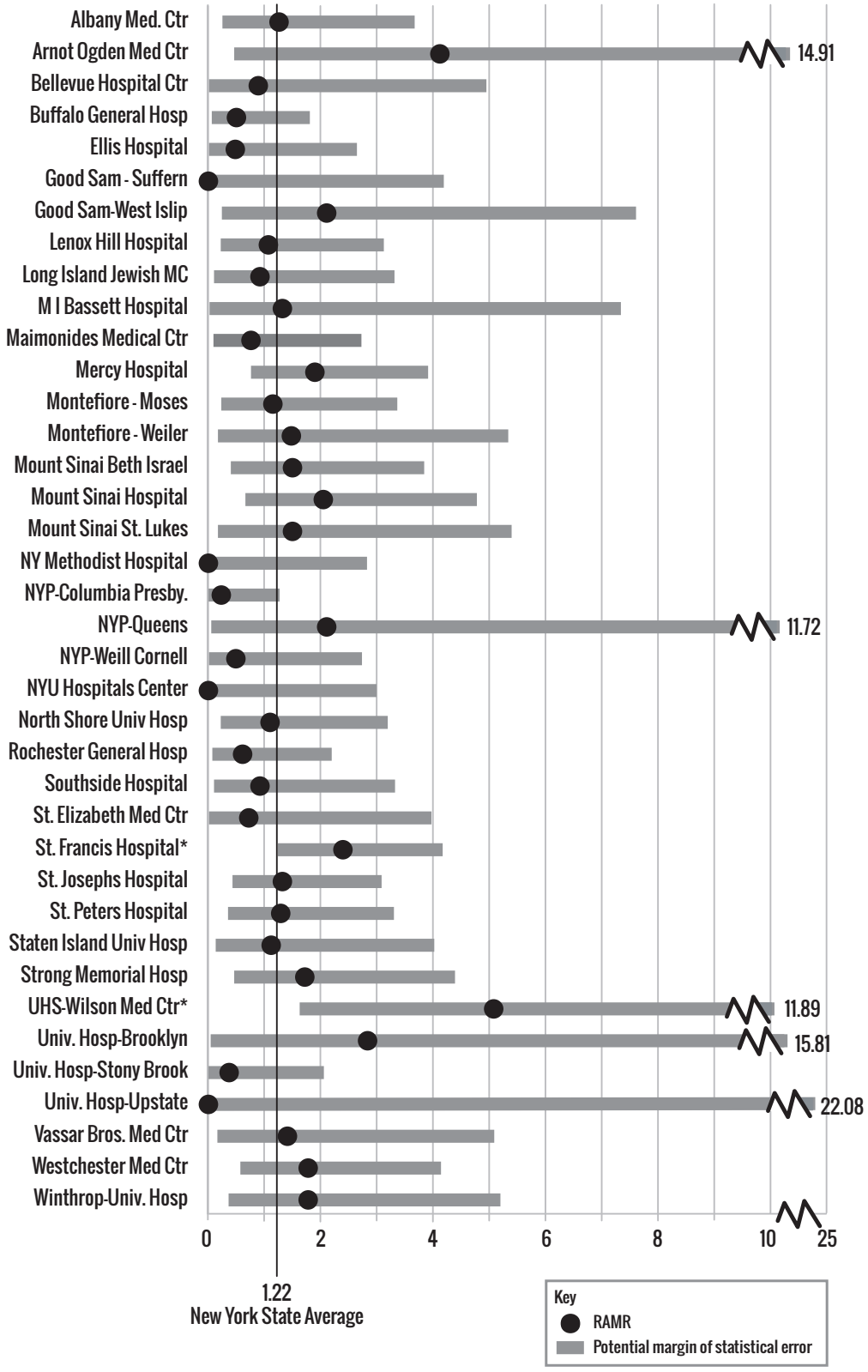
(Listed Alphabetically by Hospital)

Hospital	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Med. Ctr	251	3	1.20	1.16	1.26	(0.25, 3.68)
Arnot Ogden Med Ctr	80	2	2.50	0.74	4.13	(0.46,14.91)
Bellevue Hospital Ctr	111	1	0.90	1.23	0.89	(0.01, 4.96)
Buffalo General Hosp	449	2	0.45	1.09	0.50	(0.06, 1.81)
Ellis Hospital	206	1	0.49	1.24	0.48	(0.01, 2.65)
Good Sam - Suffern	97	0	0.00	1.10	0.00	(0.00, 4.20)
Good Sam-West Islip	151	2	1.32	0.77	2.11	(0.24, 7.63)
Lenox Hill Hospital	243	3	1.23	1.41	1.07	(0.22, 3.13)
Long Island Jewish MC	202	2	0.99	1.32	0.92	(0.10, 3.32)
M I Bassett Hospital	108	1	0.93	0.86	1.32	(0.02, 7.36)
Maimonides Medical Ctr	224	2	0.89	1.44	0.76	(0.09, 2.73)
Mercy Hospital	332	7	2.11	1.35	1.90	(0.76, 3.92)
Montefiore - Moses	205	3	1.46	1.55	1.15	(0.23, 3.37)
Montefiore - Weiler	201	2	1.00	0.82	1.48	(0.17, 5.35)
Mount Sinai Beth Israel	173	4	2.31	1.88	1.50	(0.40, 3.85)
Mount Sinai Hospital	337	5	1.48	0.88	2.05	(0.66, 4.79)
Mount Sinai St. Lukes	91	2	2.20	1.79	1.50	(0.17, 5.41)
NY Methodist Hospital	100	0	0.00	1.58	0.00	(0.00, 2.83)
NYP-Columbia Presby.	395	1	0.25	1.35	0.23	(0.00, 1.27)
NYP-Queens	61	1	1.64	0.95	2.11	(0.03,11.72)
NYP-Weill Cornell	192	1	0.52	1.29	0.49	(0.01, 2.74)
NYU Hospitals Center	169	0	0.00	0.88	0.00	(0.00, 3.00)
North Shore Univ Hosp	251	3	1.20	1.33	1.10	(0.22, 3.20)
Rochester General Hosp	316	2	0.63	1.27	0.61	(0.07, 2.20)
Southside Hospital	160	2	1.25	1.66	0.92	(0.10, 3.33)
St. Elizabeth Med Ctr	180	1	0.56	0.95	0.72	(0.01, 3.98)
St. Francis Hospital	483	12	2.48	1.27	2.40 *	(1.24, 4.18)
St. Josephs Hospital	396	5	1.26	1.17	1.32	(0.43, 3.09)
St. Peters Hospital	341	4	1.17	1.11	1.29	(0.35, 3.31)
Staten Island Univ Hosp	196	2	1.02	1.12	1.12	(0.13, 4.03)
Strong Memorial Hosp	229	4	1.75	1.24	1.72	(0.46, 4.40)
UHS-Wilson Med Ctr	145	5	3.45	0.83	5.09 *	(1.64,11.89)
Univ. Hosp-Brooklyn	29	1	3.45	1.48	2.84	(0.04,15.81)
Univ. Hosp-Stony Brook	280	1	0.36	1.18	0.37	(0.00, 2.06)
Univ. Hosp-Upstate	24	0	0.00	0.85	0.00	(0.00,22.08)
Vassar Bros. Med Ctr	157	2	1.27	1.10	1.41	(0.16, 5.10)
Westchester Med Ctr	191	5	2.62	1.80	1.78	(0.57, 4.15)
Winthrop-Univ. Hosp	186	3	1.61	1.11	1.78	(0.36, 5.21))
STATEWIDE TOTAL	**7942**	**97**	**1.22**			

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

Figure 1

In-Hospital/30-Day Risk-Adjusted Mortality Rates for Isolated CABG in New York State, 2014 Discharges



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

Table 2

30-Day Observed, Expected and Risk-Adjusted Readmission Rates for Isolated CABG Surgery in New York State, 2014 Discharges

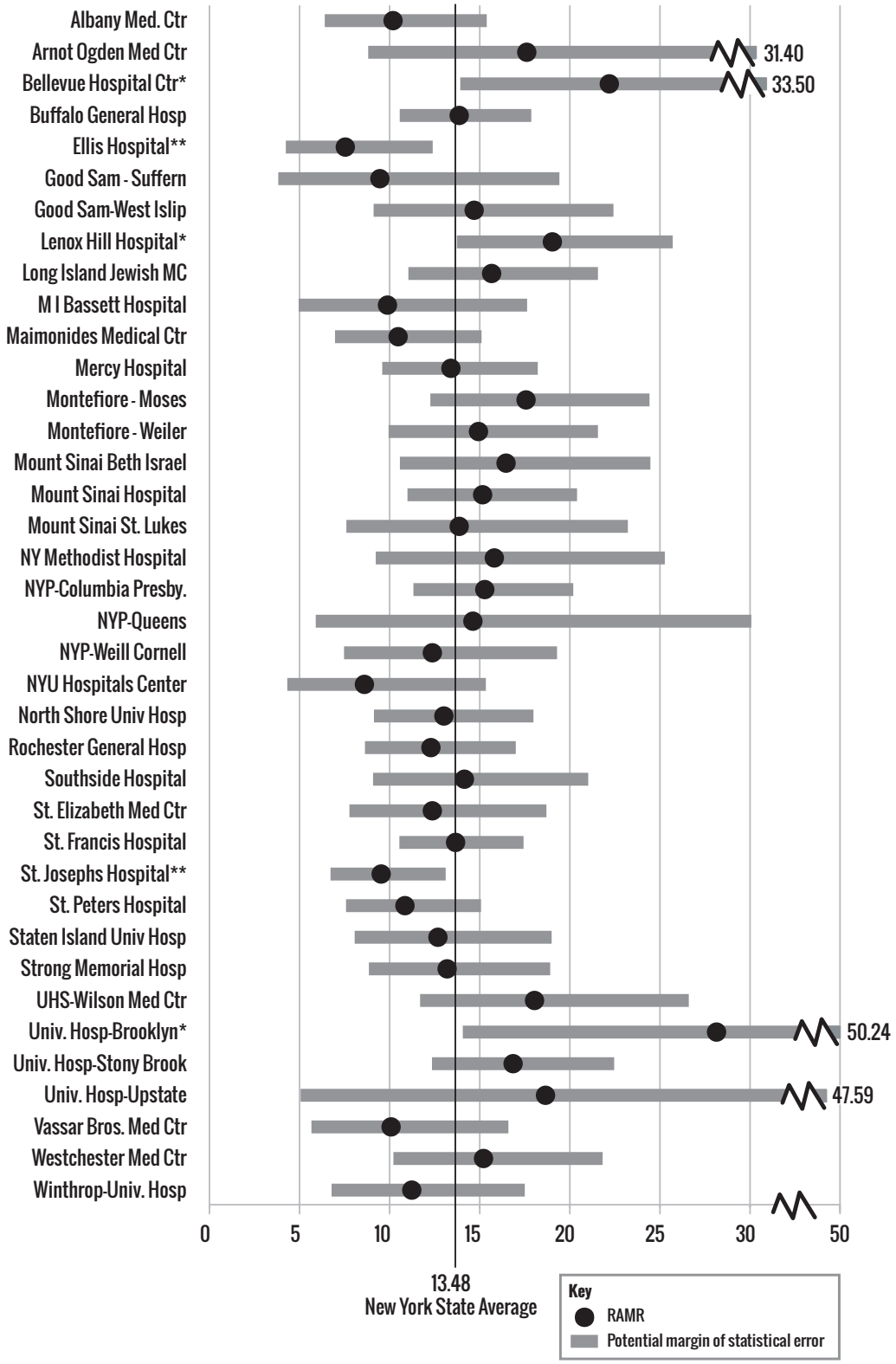
(Listed Alphabetically by Hospital)

Hospital	Cases	Readmits	ORR	ERR	RARR	95% CI for RARR
Albany Med. Ctr	230	22	9.57	12.74	10.13	(6.34,15.33)
Arnot Ogden Med Ctr	69	11	15.94	12.25	17.55	(8.75,31.40)
Bellevue Hospital Ctr	109	22	20.18	12.30	22.13*	(13.86,33.50)
Buffalo General Hosp	432	59	13.66	13.35	13.80	(10.50,17.80)
Ellis Hospital	204	15	7.35	13.26	7.48**	(4.18,12.33)
Good Sam - Suffern	83	7	8.43	12.10	9.40	(3.76,19.36)
Good Sam-West Islip	148	21	14.19	13.08	14.63	(9.05,22.36)
Lenox Hill Hospital	227	42	18.50	13.15	18.97*	(13.67,25.65)
Long Island Jewish MC	198	37	18.69	16.15	15.60	(10.98,21.50)
M I Bassett Hospital	106	11	10.38	14.26	9.82	(4.89,17.57)
Maimonides Medical Ctr	222	28	12.61	16.34	10.41	(6.91,15.04)
Mercy Hospital	322	40	12.42	12.56	13.34	(9.53,18.16)
Montefiore - Moses	201	35	17.41	13.41	17.51	(12.20,24.36)
Montefiore - Weiler	194	28	14.43	13.09	14.87	(9.88,21.50)
Mount Sinai Beth Israel	164	24	14.63	12.03	16.40	(10.51,24.41)
Mount Sinai Hospital	311	43	13.83	12.35	15.10	(10.93,20.34)
Mount Sinai St. Lukes	89	14	15.73	15.37	13.80	(7.54,23.16)
NY Methodist Hospital	97	17	17.53	15.01	15.75	(9.17,25.21)
NYP-Columbia Presby.	330	49	14.85	13.15	15.22	(11.26,20.13)
NYP-Queens	60	7	11.67	10.80	14.56	(5.84,30.01)
NYP-Weill Cornell	156	19	12.18	13.34	12.31	(7.41,19.23)
NYU Hospitals Center	150	11	7.33	11.58	8.54	(4.26,15.28)
North Shore Univ Hosp	244	36	14.75	15.37	12.95	(9.07,17.92)
Rochester General Hosp	306	36	11.76	12.97	12.23	(8.57,16.94)
Southside Hospital	153	24	15.69	15.01	14.09	(9.02,20.96)
St. Elizabeth Med Ctr	176	22	12.50	13.69	12.31	(7.71,18.64)
St. Francis Hospital	465	64	13.76	13.64	13.60	(10.48,17.37)
St. Josephs Hospital	386	37	9.59	13.65	9.47**	(6.66,13.05)
St. Peters Hospital	325	35	10.77	13.46	10.79	(7.52,15.01)
Staten Island Univ Hosp	183	23	12.57	13.43	12.62	(8.00,18.93)
Strong Memorial Hosp	225	29	12.89	13.24	13.13	(8.79,18.85)
UHS-Wilson Med Ctr	134	25	18.66	13.99	17.98	(11.63,26.54)
Univ. Hosp-Brooklyn	28	11	39.29	18.87	28.08*	(14.00,50.24)
Univ. Hosp-Stony Brook	274	46	16.79	13.48	16.79	(12.29,22.40)
Univ. Hosp-Upstate	22	4	18.18	13.19	18.59	(5.00,47.59)
Vassar Bros. Med Ctr	154	15	9.74	13.11	10.02	(5.60,16.53)
Westchester Med Ctr	182	29	15.93	14.18	15.15	(10.15,21.76)
Winthrop-Univ. Hosp	183	19	10.38	12.54	11.17	(6.72,17.44)
STATEWIDE TOTAL	**7542**	**1071**	**13.48**			

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

Figure 2

30-Day Risk-Adjusted Readmission Rates for Isolated CABG in New York State, 2014 Discharges



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

2012-2014 HOSPITAL OUTCOMES FOR VALVE SURGERY

Table 3 and Figure 3 present the combined Valve Only and Valve/CABG surgery results for the 41 hospitals performing these operations in NYS during the years 2012-2014. The table contains, for each hospital, the combined number of Valve Only and Valve/CABG operations resulting in 2012-2014 discharges, the number of in-hospital/30-day deaths, the OMR, the EMR based on the statistical models presented in Appendices 3-4, the RAMR and a 95 percent confidence interval for the RAMR.

As indicated in Table 3, the overall in-hospital/30-day mortality rate for the 22,313 combined Valve Only and Valve/CABG procedures performed at the 41 hospitals was 3.18 percent. The OMRs ranged from 0.00 percent to 11.11 percent. The range of EMRs, which measure patient severity of illness, was 1.54 percent to 4.44 percent.

The RAMRs, which are used to measure performance, ranged from 0.00 percent to 11.14 percent. Six hospitals (Mt. Sinai-Beth Israel in Manhattan, St. Elizabeth Medical Center in Utica, St. Peter's Hospital in Albany, Strong Memorial Hospital in Rochester, United Health Services - Wilson in Johnson City and University Hospital - Brooklyn) had RAMRs that were significantly higher than the statewide rate. Three hospital (Long Island Jewish in New Hyde Park, New York Presbyterian - Columbia in Manhattan, and Vassar Brothers Medical Center in Poughkeepsie) had RAMRs that were significantly lower than the statewide rate.

Figure 3 provides a visual representation of the data displayed in Table 3. It is interpreted in the same way as Figure 1 described above.

Table 4 presents valve procedures performed at the 41 cardiac surgery hospitals in NYS during 2012-2014. The table contains, for each hospital, the number of valve operations (as defined by eight separate groups: Aortic Valve Replacements, Aortic Valve Repair or Replacements plus CABG, Mitral Valve Replacement, Mitral Valve Replacement plus CABG, Mitral Valve Repair, Mitral Valve Repair plus CABG, Multiple Valve Surgery and Multiple Valve Surgery plus CABG) resulting in 2012-2014 discharges. In addition to the hospital volumes, the rate of in-hospital/30-day death for the state (Statewide Mortality Rate) is given for each group. Unless otherwise specified, when the report refers to Valve or Valve/CABG procedures it is referring to the last column of Table 4.

The 2012-2014 in-hospital/30-day OMR of 3.18 percent for Valve and Valve/CABG surgeries is lower than the 3.45 percent observed for 2011-2013. The in-hospital OMR for 2012-2014 valve surgeries (not shown in Table 3) is 2.68 percent for the 22,313 patients included in this analysis.

Table 5 presents the results for transcatheter aortic valve replacement (TAVR) procedures performed at the 20 hospitals performing TAVR during the 2012-2014 discharge period. The table contains, for each hospital, the number of TAVR procedures resulting in 2012-2014 discharges, the number of in-hospital/30-day deaths, the OMR, the EMR based on the statistical model presented in Appendix 5, the RAMR and a 95 percent confidence interval for the RAMR. Please note, some hospitals listed in Table 5 began performing the procedure during the 2012-2014 reporting period and the number of cases listed does not represent a full three year's program activity. Other hospitals have begun performing the procedure more recently. As indicated in Table 5, the overall in-hospital/30-day mortality rate for the 3836 TAVR procedures performed at the 20 hospitals was 5.71 percent. The OMRs ranged from 2.70 percent to 10.00 percent. The range of EMRs, which measure patient severity of illness, was 4.36 percent to 6.70 percent.

The RAMRs, which are used to measure performance, ranged from 2.89 percent to 9.38 percent. No hospitals had RAMRs that were statistically higher or lower than the statewide rate.

Table 3

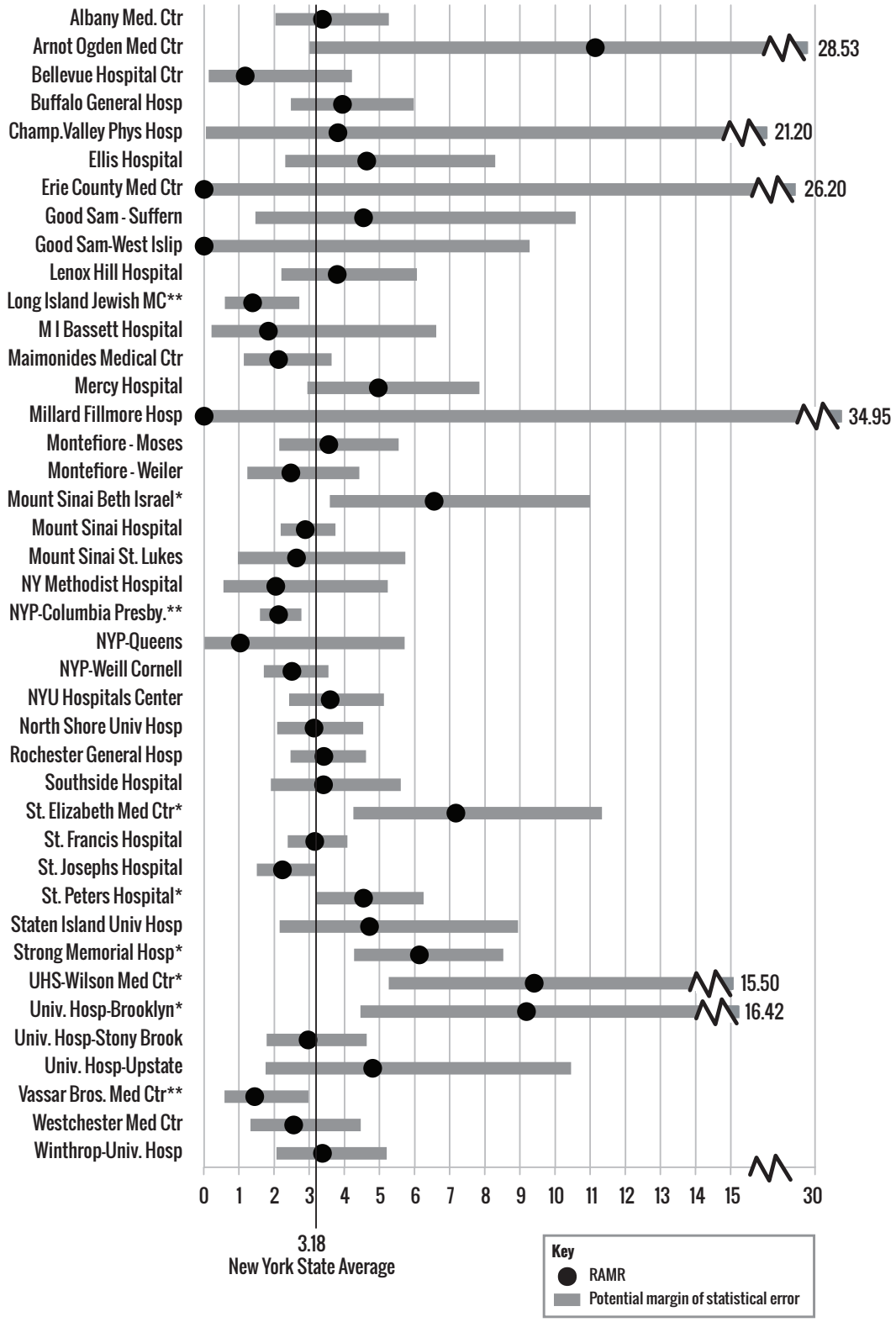
In-hospital/30-Day Observed, Expected, and Risk-Adjusted Mortality Rates for Valve or Valve/CABG Surgery in New York State, 2012 - 2014 Discharges

Hospital	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Med. Ctr	643	19	2.95	2.79	3.37	(2.03, 5.26)
Arnot Ogden Med Ctr	72	4	5.56	1.58	11.14	(3.00,28.53)
Bellevue Hospital Ctr	249	2	0.80	2.19	1.17	(0.13, 4.21)
Buffalo General Hosp	739	22	2.98	2.40	3.94	(2.47, 5.97)
Champ.Valley Phys Hosp	54	1	1.85	1.54	3.81	(0.05,21.20)
Ellis Hospital	295	11	3.73	2.56	4.63	(2.31, 8.29)
Erie County Med Ctr	14	0	0.00	3.18	0.00	(0.00,26.20)
Good Sam - Suffern	127	5	3.94	2.76	4.54	(1.46,10.58)
Good Sam-West Islip	60	0	0.00	2.10	0.00	(0.00, 9.27)
Lenox Hill Hospital	463	17	3.67	3.08	3.79	(2.20, 6.06)
Long Island Jewish MC	511	8	1.57	3.62	1.38 **	(0.59, 2.71)
M I Bassett Hospital	129	2	1.55	2.69	1.83	(0.21, 6.61)
Maimonides Medical Ctr	491	13	2.65	3.97	2.12	(1.13, 3.63)
Mercy Hospital	487	18	3.70	2.37	4.96	(2.94, 7.84)
Millard Fillmore Hosp	19	0	0.00	1.76	0.00	(0.00,34.95)
Montefiore - Moses	440	19	4.32	3.86	3.55	(2.14, 5.54)
Montefiore - Weiler	319	11	3.45	4.44	2.47	(1.23, 4.42)
Mount Sinai Beth Israel	224	14	6.25	3.03	6.55 *	(3.58,10.99)
Mount Sinai Hospital	2008	56	2.79	3.08	2.88	(2.18, 3.74)
Mount Sinai St. Lukes	261	6	2.30	2.77	2.63	(0.96, 5.73)
NY Methodist Hospital	187	4	2.14	3.33	2.04	(0.55, 5.23)
NYP-Columbia Presby.	2274	54	2.37	3.56	2.12 **	(1.59, 2.77)
NYP-Queens	117	1	0.85	2.64	1.03	(0.01, 5.71)
NYP-Weill Cornell	1248	31	2.48	3.16	2.50	(1.70, 3.54)
NYU Hospitals Center	1308	30	2.29	2.03	3.59	(2.42, 5.12)
North Shore Univ Hosp	810	28	3.46	3.50	3.13	(2.08, 4.53)
Rochester General Hosp	1065	42	3.94	3.67	3.41	(2.46, 4.61)
Southside Hospital	360	15	4.17	3.90	3.40	(1.90, 5.60)
St. Elizabeth Med Ctr	305	18	5.90	2.62	7.17 *	(4.25,11.33)
St. Francis Hospital	1667	57	3.42	3.45	3.15	(2.38, 4.08)
St. Josephs Hospital	1243	30	2.41	3.44	2.23	(1.50, 3.18)
St. Peters Hospital	815	37	4.54	3.18	4.54 *	(3.19, 6.25)
Staten Island Univ Hosp	210	9	4.29	2.89	4.71	(2.15, 8.94)
Strong Memorial Hosp	646	35	5.42	2.81	6.13 *	(4.27, 8.52)
UHS-Wilson Med Ctr	248	15	6.05	2.04	9.40 *	(5.26,15.50)
Univ. Hosp-Brooklyn	99	11	11.11	3.85	9.18 *	(4.57,16.42)
Univ. Hosp-Stony Brook	566	19	3.36	3.60	2.96	(1.78, 4.63)
Univ. Hosp-Upstate	141	6	4.26	2.82	4.80	(1.75,10.45)
Vassar Bros. Med Ctr	476	7	1.47	3.24	1.44 **	(0.58, 2.97)
Westchester Med Ctr	357	12	3.36	4.18	2.55	(1.32, 4.46)
Winthrop-Univ. Hosp	566	20	3.53	3.33	3.37	(2.06, 5.20)
STATEWIDE TOTAL	**22313**	**709**	**3.18**			

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

Figure 3

In-Hospital/30-Day Risk-Adjusted Mortality Rates for Valve or Valve/ CABG Surgery in New York State, 2012-2014 Discharges



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

Table 4

Hospital Volume for Valve Surgery in New York State, 2012-2014 Discharges

Hospital	Aortic Valve Replace Surgery	Aortic Valve and CABG	Mitral Valve Replace Surgery	Mitral Replace and CABG	Mitral Valve Repair Surgery	Mitral Repair and CABG	Multiple Valve Surgery	Multiple Valve and CABG	Total Valve or Valve/ CABG
Albany Med. Ctr	244	147	40	12	79	39	58	24	643
Arnot Ogden Med Ctr	31	26	4	0	7	2	2	0	72
Bellevue Hospital Ctr	96	11	63	7	21	2	44	5	249
Buffalo General Hosp	284	240	61	20	66	33	17	18	739
Champ.Valley Phys Hosp	35	18	1	0	0	0	0	0	54
Ellis Hospital	111	99	24	14	19	9	12	7	295
Erie County Med Ctr	4	4	2	1	1	0	1	1	14
Good Sam - Suffern	41	38	6	5	24	5	4	4	127
Good Sam-West Islip	24	19	0	1	2	8	4	2	60
Lenox Hill Hospital	160	52	59	6	89	19	69	9	463
Long Island Jewish MC	132	96	63	29	66	44	61	20	511
M I Bassett Hospital	52	53	5	2	3	4	4	6	129
Maimonides Medical Ctr	153	94	110	32	22	12	61	7	491
Mercy Hospital	183	134	34	13	74	13	27	9	487
Millard Fillmore Hosp	7	8	0	0	2	0	2	0	19
Montefiore - Moses	128	59	81	26	41	32	62	11	440
Montefiore - Weiler	80	54	58	18	19	32	46	12	319
Mount Sinai Beth Israel	65	46	27	16	26	12	26	6	224
Mount Sinai Hospital	388	159	33	10	184	79	989	166	2008
Mount Sinai St. Lukes	45	42	23	11	76	33	27	4	261
NY Methodist Hospital	69	28	34	9	7	2	35	3	187
NYP-Columbia Presby.	930	402	213	62	284	73	254	56	2274
NYP-Queens	47	25	22	4	5	7	6	1	117
NYP-Weill Cornell	522	215	120	35	128	21	168	39	1248
NYU Hospitals Center	508	111	87	11	377	30	163	21	1308
North Shore Univ Hosp	276	196	115	50	48	18	84	23	810
Rochester General Hosp	415	222	73	25	135	68	86	41	1065
Southside Hospital	119	67	38	11	34	26	46	19	360
St. Elizabeth Med Ctr	102	70	22	14	27	30	27	13	305
St. Francis Hospital	623	345	98	30	177	104	208	82	1667
St. Josephs Hospital	374	277	89	48	172	80	135	68	1243
St. Peters Hospital	254	243	28	24	44	63	93	66	815
Staten Island Univ Hosp	88	39	30	18	16	2	13	4	210
Strong Memorial Hosp	299	154	51	6	68	11	44	13	646
UHS-Wilson Med Ctr	120	90	9	8	4	4	8	5	248
Univ. Hosp-Brooklyn	25	13	21	2	8	11	16	3	99
Univ. Hosp-Stony Brook	194	150	37	23	40	34	52	36	566
Univ. Hosp-Upstate	49	28	17	4	23	4	13	3	141
Vassar Bros. Med Ctr	155	142	58	19	34	17	31	20	476
Westchester Med Ctr	122	80	31	15	38	25	34	12	357
Winthrop-Univ. Hosp	187	129	82	43	42	37	27	19	566
Total	**7741**	**4425**	**1969**	**684**	**2532**	**1045**	**3059**	**858**	**22313**
STATEWIDE MORTALITY RATE (%)	**1.99**	**3.05**	**4.06**	**8.04**	**0.95**	**3.64**	**5.07**	**7.93**	**3.18**

Table 5

In-hospital/30-Day Observed, Expected and Risk-Adjusted Mortality Rates for TAVR in New York State, 2012-2014 Discharges (Listed Alphabetically by Hospital)

Hospital	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Med. Ctr	230	10	4.35	5.05	4.92	(2.35, 9.04)
Buffalo General Hosp	142	9	6.34	6.39	5.66	(2.58,10.75)
Lenox Hill Hospital	99	9	9.09	5.53	9.38	(4.28,17.81)
Long Island Jewish MC	161	5	3.11	6.13	2.89	(0.93, 6.74)
Maimonides Medical Ctr	100	5	5.00	5.24	5.44	(1.75,12.70)
Montefiore - Moses	71	5	7.04	5.43	7.41	(2.39,17.28)
Mount Sinai Hospital	343	26	7.58	5.36	8.08	(5.28,11.84)
NY Methodist Hospital	23	1	4.35	6.70	3.71	(0.05,20.62)
NYP-Columbia Presby.	919	51	5.55	6.43	4.92	(3.67, 6.47)
NYP-Weill Cornell	277	17	6.14	5.22	6.71	(3.90,10.74)
NYU Hospitals Center	121	8	6.61	4.36	8.65	(3.73,17.05)
North Shore Univ Hosp	193	9	4.66	5.77	4.61	(2.10, 8.75)
Southside Hospital	74	2	2.70	4.72	3.27	(0.37,11.81)
St. Francis Hospital	313	19	6.07	5.78	5.99	(3.61, 9.36)
St. Josephs Hospital	143	9	6.29	5.77	6.23	(2.84,11.82)
St. Peters Hospital	30	3	10.00	6.31	9.05	(1.82,26.45)
Strong Memorial Hosp	104	7	6.73	6.35	6.05	(2.42,12.47)
Univ. Hosp-Stony Brook	60	3	5.00	4.98	5.73	(1.15,16.73)
Westchester Med Ctr	64	3	4.69	6.18	4.33	(0.87,12.64)
Winthrop-Univ. Hosp	369	18	4.88	5.05	5.51	(3.27, 8.71)
STATEWIDE TOTAL	**3836**	**219**	**5.71**			

2012-2014 HOSPITAL AND SURGEON OUTCOMES

Table 6 provides the number of Isolated CABG operations, number of CABG patients who died in the hospital or after discharge but within 30 days of surgery, OMR, EMR, RAMR and the 95 percent confidence interval for the RAMR for Isolated CABG patients in 2012-2014. In addition, the final two columns provide the number of Isolated CABG, Valve and Valve/CABG procedures and the RAMR for these patients in 2012-2014 for each of the 41 hospitals performing these operations during the time period. Surgeons and hospitals with RAMRs that are significantly lower or higher than the statewide mortality rate (as judged by the 95 percent confidence interval) are also noted.

The hospital information is presented for each surgeon who met at least one of the following criteria: (a) performed 200 or more cardiac operations during 2012-2014, (b) performed at least one cardiac operation in each of the years, 2012-2014. A cardiac operation is defined as any reportable adult cardiac operation and may include cases not listed in Tables 6 or 7.

The results for surgeons not meeting either of the above criteria are grouped together and reported as "All Others" in the hospital in which the operations were performed. Surgeons who met the above criteria and who performed operations in more than one hospital during 2012-2014 are noted in Table 6 and listed under all hospitals in which they performed these operations. Also, surgeons who met either criterion (a) or (b) above and have performed Isolated CABG, Valve or operations in two or more NYS hospitals are listed separately in Table 7. This table contains the same information as Table 6 across all hospitals in which the surgeon performed operations.

Table 6

In-Hospital / 30-Day Observed, Expected and Risk-Adjusted Mortality Rates by Surgeon for Isolated CABG and Valve Surgery (done in combination with or without CABG) in New York State, 2012-2014 Discharges

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	No of Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
STATEWIDE TOTAL	**24252**	**366**	**1.51**				**46565**	**2.31**
Albany Med. Ctr								
#Akujuo A C	112	1	0.89	1.60	0.84	(0.01, 4.70)	167	2.21
Bennett E	57	1	1.75	1.35	1.96	(0.03,10.89)	235	3.21
Britton L	129	1	0.78	1.54	0.76	(0.01, 4.22)	270	1.77
Depan H	215	3	1.40	2.04	1.03	(0.21, 3.01)	377	2.31
Devejian N	.	.	.	.	.	(. , .)	1	0.00
Miller S	184	4	2.17	1.79	1.83	(0.49, 4.69)	289	1.70
All Others	4	0	0.00	1.67	0.00	(0.00,82.63)	5	0.00
Total	**701**	**10**	**1.43**	**1.76**	**1.23**	**(0.59, 2.26)**	**1344**	**2.21**
Arnot Ogden Med Ctr								
Nast E	102	1	0.98	1.21	1.22	(0.02, 6.81)	140	3.96
All Others	132	5	3.79	1.27	4.50	(1.45,10.51)	166	7.02 *
Total	**234**	**6**	**2.56**	**1.24**	**3.11**	**(1.14, 6.78)**	**306**	**5.70 ***

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	No of Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Bellevue Hospital Ctr								
#Balsam L B	135	1	0.74	1.13	0.99	(0.01, 5.52)	267	1.03
##Culliford A	19	1	5.26	1.54	5.17	(0.07,28.74)	28	3.65
##Deanda A	105	3	2.86	0.99	4.37	(0.88,12.77)	176	2.51
#Grossi E	1	0	0.00	0.54	0.00	(0.00,100.0)	1	0.00
##Loulmet D F	12	0	0.00	0.76	0.00	(0.00,60.80)	31	8.61
##Zias E	2	0	0.00	2.78	0.00	(0.00,99.39)	2	0.00
All Others	13	0	0.00	0.84	0.00	(0.00,50.68)	31	0.00
Total	**287**	**5**	**1.74**	**1.08**	**2.43**	**(0.78, 5.66)**	**536**	**1.89**
Buffalo General Hosp								
#Aldridge J	151	7	4.64	1.33	5.24 *	(2.10,10.80)	165	8.07 *
##Ashraf M	520	7	1.35	1.28	1.59	(0.64, 3.28)	655	2.63
##Downing S W	8	1	12.50	0.95	19.96	(0.26,100.0)	11	11.93
Grosner G	605	7	1.16	1.21	1.44	(0.58, 2.97)	1192	2.47
Total	**1284**	**22**	**1.71**	**1.25**	**2.07**	**(1.29, 3.13)**	**2023**	**3.00**
Champ.Valley Phys Hosp								
Cahill A T	108	1	0.93	1.11	1.26	(0.02, 7.02)	159	2.33
#El Amir N	6	0	0.00	0.72	0.00	(0.00,100.0)	8	0.00
All Others	35	1	2.86	1.16	3.72	(0.05,20.70)	36	5.63
Total	**149**	**2**	**1.34**	**1.10**	**1.83**	**(0.21, 6.62)**	**203**	**2.79**
Ellis Hospital								
#Choumarov K	225	3	1.33	1.44	1.40	(0.28, 4.09)	290	2.66
Reich H	113	1	0.88	1.36	0.98	(0.01, 5.47)	257	1.87
Singh C	215	1	0.47	1.42	0.50	(0.01, 2.76)	301	2.66
Total	**553**	**5**	**0.90**	**1.41**	**0.97**	**(0.31, 2.25)**	**848**	**2.41**
Erie County Med Ctr								
##Downing S W	86	0	0.00	1.38	0.00	(0.00, 4.67)	99	0.00
All Others	6	0	0.00	1.17	0.00	(0.00,79.19)	7	0.00
Total	92	0	0.00	1.37	0.00	(0.00, 4.41)	106	0.00
Good Sam - Suffern								
#Lundy E F	89	1	1.12	1.95	0.87	(0.01, 4.84)	117	0.92
Salenger R	97	2	2.06	1.25	2.48	(0.28, 8.97)	132	3.97
All Others	145	1	0.69	1.44	0.72	(0.01, 4.02)	209	2.69
Total	**331**	**4**	**1.21**	**1.52**	**1.20**	**(0.32, 3.07)**	**458**	**2.43**
Good Sam-West Islip								
#Lamendola C	69	2	2.90	1.04	4.20	(0.47,15.18)	112	2.85
All Others	82	0	0.00	0.98	0.00	(0.00, 6.87)	99	0.00
Total	**151**	**2**	**1.32**	**1.01**	**1.98**	**(0.22, 7.15)**	**211**	**1.66**

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	No of Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Lenox Hill Hospital								
Fontana G P	43	1	2.33	1.27	2.76	(0.04,15.35)	148	3.31
##Galloway A	4	0	0.00	1.38	0.00	(0.00,99.97)	15	0.00
Hemli J M	23	1	4.35	1.26	5.19	(0.07,28.87)	24	6.72
##Loulmet D F	4	0	0.00	1.04	0.00	(0.00,100.0)	9	0.00
Patel N C	596	5	0.84	1.31	0.97	(0.31, 2.26)	830	2.02
Plestis K A	46	3	6.52	1.30	7.56 *	(1.52,22.10)	131	3.23
##Zias E	1	0	0.00	0.60	0.00	(0.00,100.0)	4	0.00
All Others	24	2	8.33	1.86	6.77	(0.76,24.45)	43	9.07 *
Total	**741**	**12**	**1.62**	**1.32**	**1.85**	**(0.96, 3.24)**	**1204**	**2.78**
Long Island Jewish MC								
Graver L	219	3	1.37	2.00	1.03	(0.21, 3.01)	486	0.93 **
#Manetta F	2	0	0.00	0.52	0.00	(0.00,100.0)	3	0.00
Meyer D B	.	.	.	.	.	(. , .)	2	0.00
Palazzo R	195	0	0.00	1.54	0.00	(0.00, 1.84)	279	1.17
Scheinerman S J	146	2	1.37	1.98	1.04	(0.12, 3.76)	302	1.17
##Singh V A	2	0	0.00	2.49	0.00	(0.00,100.0)	3	0.00
Total	**564**	**5**	**0.89**	**1.83**	**0.73**	**(0.24, 1.70)**	**1075**	**1.04 ** **
M I Bassett Hospital								
#Choumarov K	1	0	0.00	0.50	0.00	(0.00,100.0)	1	0.00
Kelley J	161	2	1.24	1.46	1.29	(0.14, 4.65)	248	1.45
All Others	106	0	0.00	1.45	0.00	(0.00, 3.61)	148	0.90
Total	**268**	**2**	**0.75**	**1.45**	**0.78**	**(0.09, 2.81)**	**397**	**1.26**
Maimonides Medical Ctr								
Abrol S	116	1	0.86	2.22	0.59	(0.01, 3.26)	196	1.10
Crooke G	90	2	2.22	2.03	1.65	(0.19, 5.97)	147	1.62
Jacobowitz I	238	2	0.84	2.06	0.62	(0.07, 2.23)	362	1.10
Ribakove G	77	1	1.30	1.83	1.07	(0.01, 5.97)	185	2.49
Saunders P	62	1	1.61	2.15	1.13	(0.01, 6.31)	73	1.42
Stephens G A	25	0	0.00	2.23	0.00	(0.00, 9.94)	63	3.10
Vaynblat M	138	2	1.45	1.77	1.24	(0.14, 4.46)	211	1.21
Total	**746**	**9**	**1.21**	**2.02**	**0.90**	**(0.41, 1.72)**	**1237**	**1.47 ** **
Mercy Hospital								
##Ashraf M	1	0	0.00	0.50	0.00	(0.00,100.0)	1	0.00
Bell-Thomson J	360	9	2.50	1.39	2.71	(1.24, 5.15)	680	4.50 *
##Downing S W	353	7	1.98	1.48	2.02	(0.81, 4.16)	468	2.73
Lico S	195	3	1.54	1.33	1.75	(0.35, 5.11)	243	2.30
All Others	55	1	1.82	1.19	2.31	(0.03,12.86)	59	3.22
Total	**964**	**20**	**2.07**	**1.40**	**2.24**	**(1.37, 3.46)**	**1451**	**3.51 ***
Millard Fillmore Hosp								
#Aldridge J	2	0	0.00	0.76	0.00	(0.00,100.0)	6	0.00
##Ashraf M	57	0	0.00	1.07	0.00	(0.00, 9.06)	72	0.00
Total	**59**	**0**	**0.00**	**1.06**	**0.00**	**(0.00, 8.84)**	**78**	**0.00**

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	No of Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Montefiore - Moses								
#Bello R A	11	1	9.09	3.02	4.54	(0.06,25.24)	13	5.79
#D Alessandro D A	221	2	0.90	1.49	0.92	(0.10, 3.31)	350	2.45
#Derose J J	20	0	0.00	2.06	0.00	(0.00,13.44)	23	4.29
#Goldstein D J	131	2	1.53	1.26	1.83	(0.21, 6.62)	246	1.48
#Jakobleff W A	121	2	1.65	1.59	1.57	(0.18, 5.66)	152	2.90
#Michler R E	87	1	1.15	1.62	1.07	(0.01, 5.96)	246	2.57
Weinstein S	.	.	.	.	.	(. , .)	1	0.00
Total	**591**	**8**	**1.35**	**1.53**	**1.34**	**(0.58, 2.64)**	**1031**	**2.40**
Montefiore - Weiler								
#Bello R A	172	0	0.00	1.66	0.00	(0.00, 1.94)	260	1.27
#D Alessandro D A	1	0	0.00	19.14	0.00	(0.00,28.92)	3	0.00
#Derose J J	291	3	1.03	1.26	1.24	(0.25, 3.62)	463	1.79
#Goldstein D J	58	2	3.45	1.25	4.15	(0.47,14.99)	92	3.29
#Jakobleff W A	1	0	0.00	1.17	0.00	(0.00,100.0)	2	0.00
#Michler R E	1	0	0.00	0.72	0.00	(0.00,100.0)	23	0.00
All Others	2	0	0.00	0.69	0.00	(0.00,100.0)	2	0.00
Total	**526**	**5**	**0.95**	**1.42**	**1.01**	**(0.33, 2.36)**	**845**	**1.71**
Mount Sinai Beth Israel								
##Culliford A	.	.	.	.	.	(. , .)	3	45.67
##Deanda A	.	.	.	.	.	(. , .)	1	0.00
##Galloway A	.	.	.	.	.	(. , .)	1	0.00
Geller C M	50	1	2.00	2.10	1.43	(0.02, 7.98)	76	3.30
Hoffman D	120	1	0.83	1.39	0.91	(0.01, 5.04)	153	2.52
##Loulmet D F	.	.	.	.	.	(. , .)	1	0.00
Tranbaugh R	262	2	0.76	1.34	0.86	(0.10, 3.12)	377	2.91
##Zias E	2	0	0.00	0.82	0.00	(0.00,100.0)	6	0.00
All Others	56	4	7.14	1.82	5.93 *	(1.60,15.19)	96	7.48 *
Total	**490**	**8**	**1.63**	**1.48**	**1.67**	**(0.72, 3.28)**	**714**	**3.62**
Mount Sinai Hospital								
Adams D H	12	0	0.00	0.70	0.00	(0.00,65.74)	996	1.28 **
Anyanwu A C	51	2	3.92	1.25	4.75	(0.53,17.14)	156	4.58
Chikwe J Y	165	4	2.42	0.94	3.90	(1.05, 9.98)	274	3.24
Filsoufi F	273	1	0.37	0.96	0.57	(0.01, 3.19)	422	2.82
Reddy R C	243	3	1.23	1.63	1.14	(0.23, 3.34)	354	1.81
Stelzer P	41	1	2.44	0.92	3.99	(0.05,22.17)	323	2.17
#Stewart A S	32	2	6.25	1.42	6.63	(0.74,23.94)	133	3.92
Tannous H J	62	0	0.00	0.91	0.00	(0.00, 9.81)	103	0.00
Varghese R	65	1	1.54	0.61	3.83	(0.05,21.31)	103	1.53
All Others	97	0	0.00	1.08	0.00	(0.00, 5.28)	185	2.83
Total	**1041**	**14**	**1.34**	**1.12**	**1.81**	**(0.99, 3.03)**	**3049**	**2.20**
Mount Sinai St. Lukes								
Balaram S K	82	0	0.00	2.18	0.00	(0.00, 3.10)	129	1.32
Swistel D	245	5	2.04	1.93	1.60	(0.51, 3.72)	459	2.03
Total	**327**	**5**	**1.53**	**1.99**	**1.16**	**(0.37, 2.70)**	**588**	**1.85**

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	No of Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
NY Methodist Hospital								
#Gulkarov I M	109	0	0.00	1.41	0.00	(0.00, 3.61)	198	0.00 **
Tortolani A	132	2	1.52	1.25	1.84	(0.21, 6.63)	212	3.61
Worku B M	36	0	0.00	2.40	0.00	(0.00, 6.40)	48	0.00
All Others	7	0	0.00	2.62	0.00	(0.00,30.22)	13	0.00
Total	**284**	**2**	**0.70**	**1.49**	**0.71**	**(0.08, 2.58)**	**471**	**1.33**
NYP-Columbia Presby.								
Argenziano M	202	0	0.00	1.03	0.00	(0.00, 2.67)	521	1.05
Bacchetta M D	.	.	.	.	.	(. , .)	1	0.00
#Bacha E	.	.	.	.	.	(. , .)	10	0.00
George I	103	1	0.97	1.88	0.78	(0.01, 4.33)	191	1.42
Naka Y	233	2	0.86	1.35	0.96	(0.11, 3.48)	464	2.02
Quaegebeur J	.	.	.	.	.	(. , .)	2	0.00
Smith C	143	0	0.00	1.06	0.00	(0.00, 3.64)	765	1.44
#Stewart A S	132	4	3.03	2.18	2.10	(0.56, 5.37)	394	2.04
Takayama H	364	6	1.65	1.92	1.30	(0.47, 2.82)	626	1.85
#Williams M R	46	1	2.17	1.40	2.34	(0.03,13.03)	499	1.11 **
All Others	7	0	0.00	4.60	0.00	(0.00,17.20)	31	3.69
Total	**1230**	**14**	**1.14**	**1.58**	**1.08**	**(0.59, 1.82)**	**3504**	**1.56** **
NYP-Queens								
#Lang S	249	3	1.20	1.03	1.77	(0.36, 5.17)	366	1.63
Total	**249**	**3**	**1.20**	**1.03**	**1.77**	**(0.36, 5.17)**	**366**	**1.63**
NYP-Weill Cornell								
#Bacha E	.	.	.	.	.	(. , .)	5	0.00
Girardi L	251	1	0.40	1.39	0.43	(0.01, 2.41)	951	1.64
#Gulkarov I M	4	0	0.00	1.28	0.00	(0.00,100.0)	7	0.00
Isom O	7	0	0.00	0.67	0.00	(0.00,100.0)	32	0.00
Krieger K	177	2	1.13	1.34	1.27	(0.14, 4.59)	575	2.04
#Lang S	7	0	0.00	0.90	0.00	(0.00,87.56)	16	0.00
Salemi A	84	2	2.38	1.21	2.96	(0.33,10.69)	187	2.15
All Others	1	0	0.00	0.41	0.00	(0.00,100.0)	6	0.00
Total	**531**	**5**	**0.94**	**1.33**	**1.07**	**(0.35, 2.50)**	**1779**	**1.79**
NYU Hospitals Center								
#Balsam L B	1	0	0.00	0.46	0.00	(0.00,100.0)	7	4.69
##Culliford A	61	0	0.00	0.71	0.00	(0.00,12.87)	131	0.00
##Deanda A	6	0	0.00	0.39	0.00	(0.00,100.0)	22	0.00
##Galloway A	62	1	1.61	1.05	2.31	(0.03,12.84)	589	2.57
#Grossi E	4	0	0.00	0.92	0.00	(0.00,100.0)	13	0.00
##Loulmet D F	66	0	0.00	0.72	0.00	(0.00,11.66)	401	2.10
Malhotra S P	.	.	.	.	.	(. , .)	2	0.00
Mosca R S	.	.	.	.	.	(. , .)	4	0.00
#Williams M R	3	0	0.00	1.76	0.00	(0.00,100.0)	19	17.19
##Zias E	212	2	0.94	0.81	1.77	(0.20, 6.37)	499	2.31
All Others	22	0	0.00	1.13	0.00	(0.00,22.24)	58	8.92 *
Total	**437**	**3**	**0.69**	**0.83**	**1.25**	**(0.25, 3.64)**	**1745**	**2.52**

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	No of Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
North Shore Univ Hosp								
Esposito R	241	2	0.83	1.45	0.87	(0.10, 3.13)	447	2.25
Hall M	137	1	0.73	2.31	0.48	(0.01, 2.66)	243	1.66
#Hartman A	37	0	0.00	1.11	0.00	(0.00,13.51)	189	1.22
#Kalimi R	78	2	2.56	1.58	2.44	(0.27, 8.82)	178	2.46
Pogo G	145	5	3.45	1.89	2.76	(0.89, 6.44)	236	4.12
Vatsia S	155	5	3.23	1.65	2.95	(0.95, 6.88)	289	2.43
Yu P J	26	0	0.00	1.38	0.00	(0.00,15.46)	47	3.23
Total	**819**	**15**	**1.83**	**1.70**	**1.62**	**(0.91, 2.68)**	**1629**	**2.35**
Rochester General Hosp								
Cheeran D	493	9	1.83	1.66	1.66	(0.76, 3.15)	934	2.33
Kirshner R	438	11	2.51	1.52	2.49	(1.24, 4.45)	1057	3.00
All Others	33	1	3.03	1.46	3.12	(0.04,17.37)	38	3.25
Total	**964**	**21**	**2.18**	**1.59**	**2.07**	**(1.28, 3.16)**	**2029**	**2.67**
Southside Hospital								
#Hartman A	53	2	3.77	1.86	3.06	(0.34,11.05)	218	2.81
#Kalimi R	211	4	1.90	1.99	1.44	(0.39, 3.68)	340	2.03
#Manetta F	166	2	1.20	2.06	0.88	(0.10, 3.19)	227	1.80
##Singh V A	17	1	5.88	1.84	4.83	(0.06,26.86)	22	8.93
Total	**447**	**9**	**2.01**	**1.99**	**1.52**	**(0.70, 2.89)**	**807**	**2.42**
St. Elizabeth Med Ctr								
#Akujuo A C	76	1	1.32	1.21	1.64	(0.02, 9.13)	120	4.35
#El Amir N	207	2	0.97	1.34	1.08	(0.12, 3.91)	319	3.57
Joyce F	298	8	2.68	1.59	2.55	(1.10, 5.03)	447	4.36 *
Total	**581**	**11**	**1.89**	**1.45**	**1.97**	**(0.98, 3.52)**	**886**	**4.08** *
St. Francis Hospital								
Bercow N	447	15	3.36	1.70	2.98 *	(1.67, 4.92)	732	3.41
Colangelo R	626	6	0.96	1.45	1.00	(0.37, 2.18)	1166	1.62
#Fernandez H A	87	0	0.00	2.90	0.00	(0.00, 2.20)	122	1.06
#Lamendola C	207	3	1.45	1.64	1.33	(0.27, 3.90)	377	2.30
#Lundy E F	118	3	2.54	2.07	1.85	(0.37, 5.42)	164	2.86
Robinson N	205	2	0.98	1.48	1.00	(0.11, 3.60)	662	2.76
#Taylor J	74	0	0.00	1.64	0.00	(0.00, 4.57)	198	0.89
All Others	44	0	0.00	1.91	0.00	(0.00, 6.59)	54	0.00
Total	**1808**	**29**	**1.60**	**1.66**	**1.46**	**(0.97, 2.09)**	**3475**	**2.27**
St. Josephs Hospital								
Green G R	225	2	0.89	1.55	0.86	(0.10, 3.12)	518	0.88 **
#Lutz C J	193	2	1.04	1.69	0.92	(0.10, 3.33)	417	1.81
Marvasti M	163	2	1.23	2.08	0.89	(0.10, 3.21)	366	1.24
Nazem A	286	5	1.75	1.64	1.61	(0.52, 3.75)	516	1.94
Zhou Z	303	4	1.32	1.49	1.34	(0.36, 3.43)	596	2.23
Total	**1170**	**15**	**1.28**	**1.65**	**1.17**	**(0.65, 1.93)**	**2413**	**1.67** **

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	No of Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
St. Peters Hospital								
Edwards N	176	2	1.14	1.07	1.60	(0.18, 5.77)	417	2.26
Karavas A N	225	3	1.33	1.47	1.36	(0.27, 3.99)	254	2.95
Saifi J	176	2	1.14	1.71	1.01	(0.11, 3.63)	542	3.87 *
Terrien C M	348	5	1.44	1.37	1.58	(0.51, 3.69)	520	1.96
All Others	37	1	2.70	2.49	1.64	(0.02, 9.13)	44	2.23
Total	**962**	**13**	**1.35**	**1.44**	**1.41**	**(0.75, 2.41)**	**1777**	**2.90**
Staten Island Univ Hosp								
McGinn J	313	6	1.92	1.36	2.13	(0.78, 4.64)	456	3.65
Rosell F M	270	2	0.74	1.59	0.70	(0.08, 2.53)	325	1.51
##Singh V A	2	1	50.00	0.89	84.60	(1.11,100.0)	2	100.00
All Others	35	2	5.71	1.30	6.66	(0.75,24.04)	47	6.08
Total	**620**	**11**	**1.77**	**1.46**	**1.84**	**(0.92, 3.29)**	**830**	**3.06**
Strong Memorial Hosp								
Alfieris G	.	.	.	.	.	(. , .)	2	0.00
Gensini P F	.	.	.	.	.	(. , .)	5	0.00
Hicks G	161	4	2.48	1.41	2.66	(0.72, 6.81)	248	5.28 *
Knight P	494	12	2.43	1.48	2.48	(1.28, 4.32)	979	3.77 *
Massey H	89	3	3.37	1.85	2.75	(0.55, 8.04)	156	5.33
Total	**744**	**19**	**2.55**	**1.51**	**2.55** *	**(1.54, 3.99)**	**1390**	**4.24** *
UHS-Wilson Med Ctr								
Wong K	200	10	5.00	1.62	4.66 *	(2.23, 8.57)	328	6.20 *
Yousuf M	240	8	3.33	1.56	3.22	(1.39, 6.35)	360	6.42 *
Total	**440**	**18**	**4.09**	**1.59**	**3.89** *	**(2.30, 6.15)**	**688**	**6.32** *
Univ. Hosp-Brooklyn								
Burack J H	5	0	0.00	0.43	0.00	(0.00,100.0)	8	0.00
Lee D C	21	1	4.76	2.66	2.70	(0.04,15.03)	35	2.11
Tak V M	104	3	2.88	2.09	2.08	(0.42, 6.09)	186	6.00 *
Total	**130**	**4**	**3.08**	**2.12**	**2.19**	**(0.59, 5.61)**	**229**	**5.28** *
Univ. Hosp-Stony Brook								
Bilfinger T	22	1	4.55	2.11	3.26	(0.04,18.11)	35	2.49
#Fernandez H A	188	2	1.06	1.56	1.03	(0.12, 3.71)	317	1.14
Gupta S	132	0	0.00	1.48	0.00	(0.00, 2.83)	271	0.71
McLarty A	.	.	.	.	.	(. , .)	1	12.55
Seifert F	147	3	2.04	1.48	2.08	(0.42, 6.07)	188	4.62
#Taylor J	208	0	0.00	1.48	0.00	(0.00, 1.80)	427	1.78
All Others	29	1	3.45	1.33	3.91	(0.05,21.78)	53	3.61
Total	**726**	**7**	**0.96**	**1.51**	**0.96**	**(0.38, 1.98)**	**1292**	**1.91**
Univ. Hosp-Upstate								
Dunton R F	37	2	5.41	1.86	4.38	(0.49,15.83)	50	4.97
Fink G W	142	2	1.41	1.28	1.66	(0.19, 5.99)	227	2.61
#Lutz C J	59	0	0.00	1.60	0.00	(0.00, 5.88)	101	2.29
All Others	4	0	0.00	0.66	0.00	(0.00,100.0)	5	28.18
Total	**242**	**4**	**1.65**	**1.44**	**1.74**	**(0.47, 4.45)**	**383**	**3.10**

Table 6 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	No of Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Vassar Bros. Med Ctr								
Bhutani A K	46	1	2.17	1.08	3.04	(0.04,16.92)	49	3.92
Sarabu M	128	1	0.78	1.43	0.83	(0.01, 4.59)	370	0.90 **
Shahani R B	152	1	0.66	1.70	0.58	(0.01, 3.24)	242	0.86
Zakow P	187	1	0.53	1.60	0.51	(0.01, 2.81)	328	1.30
Total	**513**	**4**	**0.78**	**1.54**	**0.76**	**(0.21, 1.96)**	**989**	**1.09 ** **
Westchester Med Ctr								
Kai M	108	2	1.85	1.97	1.42	(0.16, 5.12)	158	1.79
Lafaro R	73	0	0.00	1.03	0.00	(0.00, 7.37)	118	1.76
Lansman S	31	0	0.00	1.22	0.00	(0.00,14.67)	56	0.00
Malekan R	223	3	1.35	1.65	1.23	(0.25, 3.59)	297	2.26
Sett S S	.	.	.	.	.	(. , .)	1	0.00
Spielvogel D	178	5	2.81	1.89	2.24	(0.72, 5.23)	319	2.46
Tang G H L	2	0	0.00	1.19	0.00	(0.00,100.0)	23	0.00
Total	**615**	**10**	**1.63**	**1.68**	**1.46**	**(0.70, 2.69)**	**972**	**2.01**
Winthrop-Univ. Hosp								
Goncalves J A	151	2	1.32	1.25	1.60	(0.18, 5.77)	382	1.88
Kokotos W J	181	2	1.10	1.71	0.97	(0.11, 3.51)	347	1.96
Schubach S	159	0	0.00	1.31	0.00	(0.00, 2.65)	293	2.49
All Others	150	1	0.67	1.69	0.60	(0.01, 3.32)	185	1.75
Total	**641**	**5**	**0.78**	**1.50**	**0.79**	**(0.25, 1.83)**	**1207**	**2.03**
STATEWIDE TOTAL	**24252**	**366**	**1.51**				**46565**	**2.31**

* RAMR significantly higher than statewide rate based on 95 percent confidence interval.
** RAMR significantly lower than statewide rate based on 95 percent confidence interval.
\# Performed operations in another NYS hospital.
Performed operations in two or more other NYS hospitals.

Table 7

Summary Information for Surgeons Practicing at More Than One Hospital, 2012-2014.

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Akujuo A C	**188**	**2**	**1.06**	**1.44**	**1.12**	**(0.13, 4.03)**	**287**	**3.08**
Albany Med. Ctr	112	1	0.89	1.60	0.84	(0.01, 4.70)	167	2.21
St. Elizabeth Med Ctr	76	1	1.32	1.21	1.64	(0.02, 9.13)	120	4.35
Aldridge J	**153**	**7**	**4.58**	**1.33**	**5.20** *	**(2.08,10.72)**	**171**	**7.84** *
Buffalo General Hosp	151	7	4.64	1.33	5.24 *	(2.10,10.80)	165	8.07 *
Millard Fillmore Hosp	2	0	0.00	0.76	0.00	(0.00,100.0)	6	0.00
Ashraf M	**578**	**7**	**1.21**	**1.26**	**1.46**	**(0.58, 3.00)**	**728**	**2.40**
Buffalo General Hosp	520	7	1.35	1.28	1.59	(0.64, 3.28)	655	2.63
Mercy Hospital	1	0	0.00	0.50	0.00	(0.00,100.0)	1	0.00
Millard Fillmore Hosp	57	0	0.00	1.07	0.00	(0.00, 9.06)	72	0.00
Bacha E	**.**	**.**	**.**	**.**	**.**	**(. , .)**	**15**	**0.00**
NYP-Columbia Presby.	.	.	.	.	.	(. , .)	10	0.00
NYP-Weill Cornell	.	.	.	.	.	(. , .)	5	0.00
Balsam L B	**136**	**1**	**0.74**	**1.12**	**0.99**	**(0.01, 5.50)**	**274**	**1.40**
Bellevue Hospital Ctr	135	1	0.74	1.13	0.99	(0.01, 5.52)	267	1.03
NYU Hospitals Center	1	0	0.00	0.46	0.00	(0.00,100.0)	7	4.69
Bello R A	**183**	**1**	**0.55**	**1.74**	**0.47**	**(0.01, 2.63)**	**273**	**1.50**
Montefiore - Moses	11	1	9.09	3.02	4.54	(0.06,25.24)	13	5.79
Montefiore - Weiler	172	0	0.00	1.66	0.00	(0.00, 1.94)	260	1.27
Choumarov K	**226**	**3**	**1.33**	**1.43**	**1.40**	**(0.28, 4.08)**	**291**	**2.66**
Ellis Hospital	225	3	1.33	1.44	1.40	(0.28, 4.09)	290	2.66
M I Bassett Hospital	1	0	0.00	0.50	0.00	(0.00,100.0)	1	0.00
Culliford A	**80**	**1**	**1.25**	**0.90**	**2.09**	**(0.03,11.62)**	**162**	**1.43**
Bellevue Hospital Ctr	19	1	5.26	1.54	5.17	(0.07,28.74)	28	3.65
Mount Sinai Beth Israel	.	.	.	.	.	(. , .)	3	45.67
NYU Hospitals Center	61	0	0.00	0.71	0.00	(0.00,12.87)	131	0.00
D Alessandro D A	**222**	**2**	**0.90**	**1.57**	**0.87**	**(0.10, 3.13)**	**353**	**2.38**
Montefiore - Moses	221	2	0.90	1.49	0.92	(0.10, 3.31)	350	2.45
Montefiore - Weiler	1	0	0.00	19.14	0.00	(0.00,28.92)	3	0.00
Deanda A	**111**	**3**	**2.70**	**0.95**	**4.27**	**(0.86,12.48)**	**199**	**2.28**
Bellevue Hospital Ctr	105	3	2.86	0.99	4.37	(0.88,12.77)	176	2.51
Mount Sinai Beth Israel	.	.	.	.	.	(. , .)	1	0.00
NYU Hospitals Center	6	0	0.00	0.39	0.00	(0.00,100.0)	22	0.00
Derose J J	**311**	**3**	**0.96**	**1.31**	**1.11**	**(0.22, 3.25)**	**486**	**1.92**
Montefiore - Moses	20	0	0.00	2.06	0.00	(0.00,13.44)	23	4.29
Montefiore - Weiler	291	3	1.03	1.26	1.24	(0.25, 3.62)	463	1.79

Table 7 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Downing S W	**447**	**8**	**1.79**	**1.45**	**1.86**	**(0.80, 3.66)**	**578**	**2.64**
Buffalo General Hosp	8	1	12.50	0.95	19.96	(0.26,100.0)	11	11.93
Erie County Med Ctr	86	0	0.00	1.38	0.00	(0.00, 4.67)	99	0.00
Mercy Hospital	353	7	1.98	1.48	2.02	(0.81, 4.16)	468	2.73
El Amir N	**213**	**2**	**0.94**	**1.33**	**1.07**	**(0.12, 3.85)**	**327**	**3.52**
Champ.Valley Phys Hosp	6	0	0.00	0.72	0.00	(0.00,100.0)	8	0.00
St. Elizabeth Med Ctr	207	2	0.97	1.34	1.08	(0.12, 3.91)	319	3.57
Fernandez H A	**275**	**2**	**0.73**	**1.98**	**0.55**	**(0.06, 2.00)**	**439**	**1.11**
St. Francis Hospital	87	0	0.00	2.90	0.00	(0.00, 2.20)	122	1.06
Univ. Hosp-Stony Brook	188	2	1.06	1.56	1.03	(0.12, 3.71)	317	1.14
Galloway A	**66**	**1**	**1.52**	**1.07**	**2.13**	**(0.03,11.84)**	**605**	**2.49**
Lenox Hill Hospital	4	0	0.00	1.38	0.00	(0.00,99.97)	15	0.00
Mount Sinai Beth Israel	.	.	.	.	.	(. , .)	1	0.00
NYU Hospitals Center	62	1	1.61	1.05	2.31	(0.03,12.84)	589	2.57
Goldstein D J	**189**	**4**	**2.12**	**1.26**	**2.54**	**(0.68, 6.51)**	**338**	**2.04**
Montefiore - Moses	131	2	1.53	1.26	1.83	(0.21, 6.62)	246	1.48
Montefiore - Weiler	58	2	3.45	1.25	4.15	(0.47,14.99)	92	3.29
Grossi E	**5**	**0**	**0.00**	**0.84**	**0.00**	**(0.00,100.0)**	**14**	**0.00**
Bellevue Hospital Ctr	1	0	0.00	0.54	0.00	(0.00,100.0)	1	0.00
NYU Hospitals Center	4	0	0.00	0.92	0.00	(0.00,100.0)	13	0.00
Gulkarov I M	**113**	**0**	**0.00**	**1.40**	**0.00**	**(0.00, 3.50)**	**205**	**0.00** **
NY Methodist Hospital	109	0	0.00	1.41	0.00	(0.00, 3.61)	198	0.00 **
NYP-Weill Cornell	4	0	0.00	1.28	0.00	(0.00,100.0)	7	0.00
Hartman A	**90**	**2**	**2.22**	**1.55**	**2.16**	**(0.24, 7.81)**	**407**	**2.16**
North Shore Univ Hosp	37	0	0.00	1.11	0.00	(0.00,13.51)	189	1.22
Southside Hospital	53	2	3.77	1.86	3.06	(0.34,11.05)	218	2.81
Jakobleff W A	**122**	**2**	**1.64**	**1.59**	**1.56**	**(0.18, 5.63)**	**154**	**2.85**
Montefiore - Moses	121	2	1.65	1.59	1.57	(0.18, 5.66)	152	2.90
Montefiore - Weiler	1	0	0.00	1.17	0.00	(0.00,100.0)	2	0.00
Kalimi R	**289**	**6**	**2.08**	**1.88**	**1.67**	**(0.61, 3.63)**	**518**	**2.16**
North Shore Univ Hosp	78	2	2.56	1.58	2.44	(0.27, 8.82)	178	2.46
Southside Hospital	211	4	1.90	1.99	1.44	(0.39, 3.68)	340	2.03
Lamendola C	**276**	**5**	**1.81**	**1.49**	**1.84**	**(0.59, 4.28)**	**489**	**2.39**
Good Sam-West Islip	69	2	2.90	1.04	4.20	(0.47,15.18)	112	2.85
St. Francis Hospital	207	3	1.45	1.64	1.33	(0.27, 3.90)	377	2.30
Lang S	**256**	**3**	**1.17**	**1.03**	**1.73**	**(0.35, 5.04)**	**382**	**1.56**
NYP-Queens	249	3	1.20	1.03	1.77	(0.36, 5.17)	366	1.63
NYP-Weill Cornell	7	0	0.00	0.90	0.00	(0.00,87.56)	16	0.00

Table 7 continued

	Isolated CABG						Isolated CABG, or Valve or Valve/CABG	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Loulmet D F	**82**	**0**	**0.00**	**0.74**	**0.00**	**(0.00, 9.11)**	**442**	**2.36**
Bellevue Hospital Ctr	12	0	0.00	0.76	0.00	(0.00,60.80)	31	8.61
Lenox Hill Hospital	4	0	0.00	1.04	0.00	(0.00,100.0)	9	0.00
Mount Sinai Beth Israel	.	.	.	.	.	(. , .)	1	0.00
NYU Hospitals Center	66	0	0.00	0.72	0.00	(0.00,11.66)	401	2.10
Lundy E F	**207**	**4**	**1.93**	**2.02**	**1.45**	**(0.39, 3.70)**	**281**	**2.12**
Good Sam - Suffern	89	1	1.12	1.95	0.87	(0.01, 4.84)	117	0.92
St. Francis Hospital	118	3	2.54	2.07	1.85	(0.37, 5.42)	164	2.86
Lutz C J	**252**	**2**	**0.79**	**1.67**	**0.72**	**(0.08, 2.59)**	**518**	**1.90**
St. Josephs Hospital	193	2	1.04	1.69	0.92	(0.10, 3.33)	417	1.81
Univ. Hosp-Upstate	59	0	0.00	1.60	0.00	(0.00, 5.88)	101	2.29
Manetta F	**168**	**2**	**1.19**	**2.04**	**0.88**	**(0.10, 3.18)**	**230**	**1.80**
Long Island Jewish MC	2	0	0.00	0.52	0.00	(0.00,100.0)	3	0.00
Southside Hospital	166	2	1.20	2.06	0.88	(0.10, 3.19)	227	1.80
Michler R E	**88**	**1**	**1.14**	**1.61**	**1.07**	**(0.01, 5.93)**	**269**	**2.28**
Montefiore - Moses	87	1	1.15	1.62	1.07	(0.01, 5.96)	246	2.57
Montefiore - Weiler	1	0	0.00	0.72	0.00	(0.00,100.0)	23	0.00
Singh V A	**21**	**2**	**9.52**	**1.81**	**7.94**	**(0.89,28.66)**	**27**	**11.10**
Long Island Jewish MC	2	0	0.00	2.49	0.00	(0.00,100.0)	3	0.00
Southside Hospital	17	1	5.88	1.84	4.83	(0.06,26.86)	22	8.93
Staten Island Univ Hosp	2	1	50.00	0.89	84.60	(1.11,100.0)	2	100.00
Stewart A S	**164**	**6**	**3.66**	**2.03**	**2.72**	**(0.99, 5.92)**	**527**	**2.43**
Mount Sinai Hospital	32	2	6.25	1.42	6.63	(0.74,23.94)	133	3.92
NYP-Columbia Presby.	132	4	3.03	2.18	2.10	(0.56, 5.37)	394	2.04
Taylor J	**282**	**0**	**0.00**	**1.52**	**0.00 ****	**(0.00, 1.29)**	**625**	**1.48**
St. Francis Hospital	74	0	0.00	1.64	0.00	(0.00, 4.57)	198	0.89
Univ. Hosp-Stony Brook	208	0	0.00	1.48	0.00	(0.00, 1.80)	427	1.78
Williams M R	**49**	**1**	**2.04**	**1.42**	**2.16**	**(0.03,12.04)**	**518**	**1.32 ****
NYP-Columbia Presby.	46	1	2.17	1.40	2.34	(0.03,13.03)	499	1.11 **
NYU Hospitals Center	3	0	0.00	1.76	0.00	(0.00,100.0)	19	17.19
Zias E	**217**	**2**	**0.92**	**0.82**	**1.69**	**(0.19, 6.10)**	**511**	**2.25**
Bellevue Hospital Ctr	2	0	0.00	2.78	0.00	(0.00,99.39)	2	0.00
Lenox Hill Hospital	1	0	0.00	0.60	0.00	(0.00,100.0)	4	0.00
Mount Sinai Beth Israel	2	0	0.00	0.82	0.00	(0.00,100.0)	6	0.00
NYU Hospitals Center	212	2	0.94	0.81	1.77	(0.20, 6.37)	499	2.31

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

SURGEON AND HOSPITAL VOLUMES FOR TOTAL ADULT CARDIAC SURGERY, 2012-2014

Table 8 presents, for each hospital and for each surgeon performing at least 200 cardiac operations in any hospital in 2012-2014 and/or performing one or more cardiac operations in each of the years 2012-2014, the total number of Isolated CABG operations, the total number of Valve or Valve/CABG operations, the total number of Other Cardiac operations and Total Cardiac operations. As in Table 6, results for surgeons not meeting the above criteria are grouped together in an "All Others" category.

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

Table 8

Surgeon and Hospital Volume for Isolated CABG, Valve or Valve/CABG, Other Cardiac Surgery, and Total Adult Cardiac Surgery, 2012-2014.

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Albany Med. Ctr				
Akujuo A C	112	55	20	187
Bennett E	57	178	207	442
Britton L	129	141	108	378
Depan H	215	162	40	417
Devejian N	0	1	7	8
Miller S	184	105	31	320
All Others	4	1	0	5
Total	**701**	**643**	**413**	**1757**
Arnot Ogden Med Ctr				
Nast E	102	38	6	146
All Others	132	34	6	172
Total	**234**	**72**	**12**	**318**
Bellevue Hospital Ctr				
Balsam L B	135	132	38	305
Culliford A	19	9	1	29
Deanda A	105	71	75	251
Grossi E	1	0	1	2
Loulmet D F	12	19	3	34
Zias E	2	0	1	3
All Others	13	18	8	39
Total	**287**	**249**	**127**	**663**

Table 8 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Buffalo General Hosp				
Aldridge J	151	14	67	232
Ashraf M	520	135	109	764
Downing S W	8	3	2	13
Grosner G	605	587	144	1336
Total	**1284**	**739**	**322**	**2345**
Champ.Valley Phys Hosp				
Cahill A T	108	51	10	169
El Amir N	6	2	0	8
All Others	35	1	0	36
Total	**149**	**54**	**10**	**213**
Ellis Hospital				
Choumarov K	225	65	12	302
Reich H	113	144	25	282
Singh C	215	86	13	314
Total	**553**	**295**	**50**	**898**
Erie County Med Ctr				
Downing S W	86	13	14	113
All Others	6	1	5	12
Total	**92**	**14**	**19**	**125**
Good Sam - Suffern				
Lundy E F	89	28	1	118
Salenger R	97	35	8	140
All Others	145	64	1	210
Total	**331**	**127**	**10**	**468**
Good Sam-West Islip				
Lamendola C	69	43	8	120
All Others	82	17	0	99
Total	**151**	**60**	**8**	**219**
Lenox Hill Hospital				
Fontana G P	43	105	126	274
Galloway A	4	11	0	15
Hemli J M	23	1	3	27
Loulmet D F	4	5	1	10
Patel N C	596	234	46	876
Plestis K A	46	85	120	251
Zias E	1	3	0	4
All Others	24	19	46	89
Total	**741**	**463**	**342**	**1546**
Long Island Jewish MC				
Graver L	219	267	47	533
Manetta F	2	1	1	4
Meyer D B	0	2	15	17
Palazzo R	195	84	88	367
Scheinerman S J	146	156	109	411
Singh V A	2	1	0	3
All Others	0	0	23	23
Total	**564**	**511**	**283**	**1358**

Table 8 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
M I Bassett Hospital				
Choumarov K	1	0	0	1
Kelley J	161	87	15	263
All Others	106	42	3	151
Total	**268**	**129**	**18**	**415**
Maimonides Medical Ctr				
Abrol S	116	80	66	262
Crooke G	90	57	81	228
Jacobowitz I	238	124	53	415
Ribakove G	77	108	57	242
Saunders P	62	11	29	102
Stephens G A	25	38	8	71
Vaynblat M	138	73	28	239
Total	**746**	**491**	**322**	**1559**
Mercy Hospital				
Ashraf M	1	0	0	1
Bell-Thomson J	360	320	84	764
Downing S W	353	115	39	507
Lico S	195	48	25	268
All Others	55	4	2	61
Total	**964**	**487**	**150**	**1601**
Millard Fillmore Hosp				
Aldridge J	2	4	2	8
Ashraf M	57	15	2	74
Total	**59**	**19**	**4**	**82**
Montefiore - Moses				
Bello R A	11	2	11	24
D Alessandro D A	221	129	86	436
Derose J J	20	3	78	101
Goldstein D J	131	115	74	320
Jakobleff W A	121	31	7	159
Michler R E	87	159	32	278
Weinstein S	0	1	28	29
All Others	0	0	4	4
Total	**591**	**440**	**320**	**1351**
Montefiore - Weiler				
Bello R A	172	88	29	289
D Alessandro D A	1	2	2	5
Derose J J	291	172	56	519
Goldstein D J	58	34	8	100
Jakobleff W A	1	1	2	4
Michler R E	1	22	1	24
All Others	2	0	0	2
Total	**526**	**319**	**98**	**943**

Table 8 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Mount Sinai Beth Israel				
Culliford A	0	3	0	3
Deanda A	0	1	1	2
Galloway A	0	1	0	1
Geller C M	50	26	7	83
Hoffman D	120	33	13	166
Loulmet D F	0	1	0	1
Tranbaugh R	262	115	26	403
Zias E	2	4	0	6
All Others	56	40	9	105
Total	**490**	**224**	**56**	**770**
Mount Sinai Hospital				
Adams D H	12	984	135	1131
Anyanwu A C	51	105	268	424
Chikwe J Y	165	109	53	327
Filsoufi F	273	149	18	440
Reddy R C	243	111	73	427
Stelzer P	41	282	279	602
Stewart A S	32	101	154	287
Tannous H J	62	41	8	111
Varghese R	65	38	12	115
All Others	97	88	155	340
Total	**1041**	**2008**	**1155**	**4204**
Mount Sinai St. Lukes				
Balaram S K	82	47	38	167
Swistel D	245	214	36	495
Total	**327**	**261**	**74**	**662**
NY Methodist Hospital				
Gulkarov I M	109	89	42	240
Tortolani A	132	80	5	217
Worku B M	36	12	8	56
All Others	7	6	22	35
Total	**284**	**187**	**77**	**548**
NYP-Columbia Presby.				
Argenziano M	202	319	39	560
Bacchetta M D	0	1	143	144
Bacha E	0	10	133	143
George I	103	88	172	363
Naka Y	233	231	187	651
Quaegebeur J	0	2	61	63
Smith C	143	622	71	836
Stewart A S	132	262	229	623
Takayama H	364	262	176	802
Williams M R	46	453	802	1301
All Others	7	24	170	201
Total	**1230**	**2274**	**2183**	**5687**

Table 8 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
NYP-Queens				
Lang S	249	117	21	387
All Others	0	0	1	1
Total	**249**	**117**	**22**	**388**
NYP-Weill Cornell				
Bacha E	0	5	13	18
Girardi L	251	700	717	1668
Gulkarov I M	4	3	1	8
Isom O	7	25	3	35
Krieger K	177	398	24	599
Lang S	7	9	1	17
Salemi A	84	103	315	502
All Others	1	5	18	24
Total	**531**	**1248**	**1092**	**2871**
NYU Hospitals Center				
Balsam L B	1	6	25	32
Culliford A	61	70	19	150
Deanda A	6	16	41	63
Galloway A	62	527	49	638
Grossi E	4	9	35	48
Loulmet D F	66	335	97	498
Malhotra S P	0	2	8	10
Mosca R S	0	4	29	33
Williams M R	3	16	43	62
Zias E	212	287	51	550
All Others	22	36	5	63
Total	**437**	**1308**	**402**	**2147**
North Shore Univ Hosp				
Esposito R	241	206	162	609
Hall M	137	106	20	263
Hartman A	37	152	78	267
Kalimi R	78	100	16	194
Pogo G	145	91	37	273
Vatsia S	155	134	38	327
Yu P J	26	21	25	72
All Others	0	0	1	1
Total	**819**	**810**	**377**	**2006**
Rochester General Hosp				
Cheeran D	493	441	118	1052
Kirshner R	438	619	89	1146
All Others	33	5	0	38
Total	**964**	**1065**	**207**	**2236**
Southside Hospital				
Hartman A	53	165	72	290
Kalimi R	211	129	45	385
Manetta F	166	61	39	266
Singh V A	17	5	3	25
Total	**447**	**360**	**159**	**966**

Table 8 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
St. Elizabeth Med Ctr				
Akujuo A C	76	44	3	123
El Amir N	207	112	39	358
Joyce F	298	149	13	460
Total	**581**	**305**	**55**	**941**
St. Francis Hospital				
Bercow N	447	285	80	812
Colangelo R	626	540	54	1220
Fernandez H A	87	35	7	129
Lamendola C	207	170	32	409
Lundy E F	118	46	6	170
Robinson N	205	457	304	966
Taylor J	74	124	17	215
All Others	44	10	5	59
Total	**1808**	**1667**	**505**	**3980**
St. Josephs Hospital				
Green G R	225	293	135	653
Lutz C J	193	224	75	492
Marvasti M	163	203	49	415
Nazem A	286	230	61	577
Zhou Z	303	293	121	717
Total	**1170**	**1243**	**441**	**2854**
St. Peters Hospital				
Edwards N	176	241	88	505
Karavas A N	225	29	6	260
Saifi J	176	366	73	615
Terrien C M	348	172	36	556
All Others	37	7	0	44
Total	**962**	**815**	**203**	**1980**
Staten Island Univ Hosp				
McGinn J	313	143	14	470
Rosell F M	270	55	25	350
Singh V A	2	0	1	3
All Others	35	12	10	57
Total	**620**	**210**	**50**	**880**
Strong Memorial Hosp				
Alfieris G	0	2	28	30
Gensini P F	0	5	46	51
Hicks G	161	87	62	310
Knight P	494	485	222	1201
Massey H	89	67	146	302
All Others	0	0	2	2
Total	**744**	**646**	**506**	**1896**
UHS-Wilson Med Ctr				
Wong K	200	128	12	340
Yousuf M	240	120	19	379
Total	**440**	**248**	**31**	**719**

Table 8 continued

	Isolated CABG	Valve or Valve/CABG	Other Cardiac Surgery	Total Cardiac Surgery
Univ. Hosp-Brooklyn				
Burack J H	5	3	2	10
Lee D C	21	14	4	39
Tak V M	104	82	17	203
Total	**130**	**99**	**23**	**252**
Univ. Hosp-Stony Brook				
Bilfinger T	22	13	15	50
Fernandez H A	188	129	62	379
Gupta S	132	139	70	341
McLarty A	0	1	45	46
Seifert F	147	41	7	195
Taylor J	208	219	72	499
All Others	29	24	4	57
Total	**726**	**566**	**275**	**1567**
Univ. Hosp-Upstate				
Dunton R F	37	13	3	53
Fink G W	142	85	49	276
Lutz C J	59	42	12	113
All Others	4	1	5	10
Total	**242**	**141**	**69**	**452**
Vassar Bros. Med Ctr				
Bhutani A K	46	3	1	50
Sarabu M	128	242	51	421
Shahani R B	152	90	19	261
Zakow P	187	141	25	353
Total	**513**	**476**	**96**	**1085**
Westchester Med Ctr				
Kai M	108	50	47	205
Lafaro R	73	45	20	138
Lansman S	31	25	27	83
Malekan R	223	74	91	388
Sett S S	0	1	7	8
Spielvogel D	178	141	98	417
Tang G H	2	21	54	77
All Others	0	0	1	1
Total	**615**	**357**	**345**	**1317**
Winthrop-Univ. Hosp				
Goncalves J A	151	231	475	857
Kokotos W J	181	166	50	397
Schubach S	159	134	5	298
All Others	150	35	4	189
Total	641	566	534	1741
TOTAL	**24252**	**22313**	**11445**	**58010**

Criteria Used in Reporting Significant Risk Factors (2014)

Based on Documentation in Medical Records

Patient Risk Factor	Definitions
Demographic	
Body Surface Area	Body surface area (BSA) is a function of height and weight and increases for larger heights and weights. The statistical formula used to calculate BSA in this report is: BSA (m^2) =0.0003207 x $H^{0.3}$ x $W^{(0.7285 - (0.0188 \times LOG))}$ Where H is Height in centimeters and W is Weight in grams.
Body Mass Index	Body Mass Index (BMI) is a measure of body fat that is the ratio of the weight of the body in kilograms to the square of its height in meters and is considered an indication of nutritional status of the body. The formula for BMI is: BMI=Weight/$Height^2$ where Height is height in meters (m) and Weight is weight in kilograms (kg).
Hemodynamic State	**Determined in the immediate pre-operative period, defined as the period prior to anesthesia taking responsibility for the patient.**
Unstable	Patient requires pharmacologic or mechanical support to maintain blood pressure or cardiac index.
Shock	Acute hypotension (systolic blood pressure < 80 mmHg) or low cardiac index (< 2.0 liters/min/m2), despite pharmacologic or mechanical support. Records with this risk factor were excluded from all analyses in this report.
Comorbidities	
Cerebrovascular Disease	Cerebrovascular disease prior to surgery documented by any one of the following: • CVA (symptoms > 24 hrs after onset, presumed to be from vascular etiology); • TIA (recovery within 24 hrs); • Non-invasive carotid test with > 79% diameter occlusion.; or • Prior carotid surgery or stenting or prior cerebral aneurysm clipping or coil. Does not include neurological disease processes such as metabolic and/or anoxic ischemic encephalopathy.
Chronic Lung Disease	The patient has chronic lung disease with pre-operative findings of one of the following: • Mild - FEV_1 60% to 75% of predicted, and/or on chronic inhaled or oral bronchodilator therapy. • Moderate - FEV_1 50% to 59% of predicted, and/or on chronic steroid therapy aimed at lung disease. • Severe - FEV_1 <50% predicted, and/or Room Air pO_2 < 60 or Room Air pCO_2 > 50.

Patient Risk Factor	Definitions
Comorbidities, *continued*	
Congestive Heart Failure (CHF), Current	Within 2 weeks prior to the procedure, the patient has a clinical diagnosis of CHF and symptoms requiring treatment for CHF. Note: Physician diagnosis of CHF may be based on one of the following: • Paroxysmal nocturnal dyspnea (PND) • Dyspnea on exertion (DOE) due to heart failure • Chest X-Ray showing pulmonary congestion Documentation must include the presence of a diagnosis of CHF, evidence of symptoms, and treatment for CHF.
Congestive Heart Failure (CHF), Past	Between 2 weeks and 6 months prior to the procedure, the patient has a clinical diagnosis / past medical history of CHF and ongoing treatment for CHF. Note: Physician diagnosis of CHF may be based on one of the following: • Paroxysmal nocturnal dyspnea (PND) • Dyspnea on exertion (DOE) due to heart failure • Chest X-Ray showing pulmonary congestion Documentation must include a diagnosis of CHF and evidence of treatment for CHF. Patient's clinical status may be compensated.
Diabetes with Insulin Therapy	The patient has a history of diabetes diagnosed and/or treated by a physician and was treated with insulin prior to admission.
Endocarditis	Patients with two or more positive blood cultures without other obvious source with demonstrated valvular vegetations or acute valvular dysfunction caused by infection. Includes patients who are on antibiotics at the time of surgery. Excludes patients who have completed antibiotic therapy and have no evidence of residual infection.
Extensive Aortic Atherosclerosis	Ascending, transverse, and/or descending aortic atherosclerosis marked by either extensive calcification or luminal atheroma such that the intended surgical procedure is altered.
Peripheral Vascular Disease	Angiographic demonstration of at least 50% narrowing in a major aortoiliac or femoral/popliteal vessel, previous surgery for such disease, absent femoral or pedal pulses, or the inability to insert a catheter or intra-aortic balloon due to iliac aneurysm or obstruction of the aortoiliac or femoral arteries Ankle-Brachial Index < 0.9 is also acceptable documentation.
Renal Failure, Creatinine	Last pre-operative creatinine was in the indicated range.
Renal Failure Requiring Dialysis	The patient is undergoing peritoneal or hemodialysis at the time of admission.

Patient Risk Factor	Definitions
Comorbidities, *continued*	
Ventricular Function	
Ejection Fraction	Value of the ejection fraction taken closest to but before the start of the procedure. Intraoperative direct observation of the heart is not an adequate basis for a visual estimate of the ejection fraction. Intra-operative TEE is acceptable, if no pre-operative Ejection Fraction is available. If no ejection fraction is reported, the ejection fraction is considered "normal" for purposes of analysis and is classified with the reference category.
Previous MI	One or more myocardial infarctions (MI) in the specified time period prior to surgery.
Previous Procedures	
Previous Organ Transplant	The patient has had any organ transplant prior to the current cardiac surgery. This includes, but is not limited to, heart, lung, kidney, and liver transplants.
Previous PCI, This Episode of Care	The patient has had a Percutaneous Coronary Intervention during this episode of care.
Previous Valve Surgery or Intervention	Prior to this cardiac surgery, the patient has previously undergone surgery or catheter based intervention for valve repair or replacement.
Previous CABG Surgery with Patent Grafts	Prior to this cardiac surgery, the patient has previously undergone CABG surgery and the grafts remain patent (open for blood flow).
Any Previous Cardiac Surgery	Prior to this cardiac surgery, the patient has previously undergone any previous Cardiac Surgery. This would include a previous catheter-based valve repair or replacement but not other catheter-based interventions.
Vessels Diseased	
Left Main Disease	The patient has at least a 50 percent blockage in the Left Main Coronary Artery.
Three Vessels Diseased	The patient has at least a 70 percent blockage in each of the three native coronary arteries including the Left Anterior Descending (LAD), the Right Coronary Artery (RCA) and the Left Circumflex (LCX) or their major branches.

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

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

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

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

coronary artery bypass graft surgery (CABG) – A procedure in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart muscle, bypassing the arterial blockage. Typically, a section of one of the large saphenous veins in the leg, the radial artery in the arm or the mammary artery in the chest is used to construct the bypass. One or more bypasses may be performed during a single operation. When no other major heart surgery (such as valve replacement) is included, the operation is referred to as an isolated CABG. The average number of bypass grafts created during CABG is three or four. Generally, all significantly blocked arteries are bypassed unless they enter areas of the heart that are permanently damaged by previous heart attacks. Five or more bypasses are occasionally created. Multiple bypasses are often performed to provide several alternate routes for the blood flow and to improve the long-term success of the procedure, not necessarily because the patient’s condition is more severe.

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

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

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

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

incompetent valves – A valve that does not close tightly.

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

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

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

risk factors for heart disease – Certain risk factors have been found to increase the likelihood of developing heart disease. Some are controllable or avoidable and some cannot be controlled. The biggest heart disease risk factors are heredity, gender and age, none of which can be controlled. Men are much more likely to develop heart disease than women before the age of 55, although it is the number one killer of both men and women. Some controllable risk factors that contribute to a higher likelihood of developing coronary artery disease are high cholesterol levels, cigarette smoking, high blood pressure (hypertension), obesity, a sedentary lifestyle or lack of exercise, diabetes and poor stress management.

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

stenotic valve – A valve that does not open fully.

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

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

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

Appendix 1
Risk Factors for CABG In-Hospital / 30-Day Deaths in New York State in 2014

The significant pre-operative risk factors for death in the hospital during the same admission as the surgery or after hospital discharge but within 30 days of surgery (in-hospital/30-day mortality) for CABG in 2014 are presented in Appendix Table 1.

Roughly speaking, the odds ratio for a risk factor represents the number of times more likely to die in the hospital during or after CABG or after discharge but within 30 days of the surgery a patient with that risk factor is than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor Peripheral Vascular Disease is 1.977. This means that a patient who has Peripheral Vascular Disease prior to surgery is approximately 1.977 times as likely to die in the hospital or after discharge within 30 days of surgery as a patient who does not have Peripheral Vascular Disease but who has the same other significant risk factors.

For all of the risk factors in the table except Age: Number of years greater than 60, Ejection Fraction and Renal Failure, there are only two possibilities: having the risk factor and not having it.

For age, the odds ratio roughly represents the number of times more likely to die a patient who is older than 60 is compared to a patient who is one year younger but otherwise has the same significant risk factors. Thus, the chance of in-hospital / 30-day death for a patient undergoing CABG who is 66 years old is approximately 1.037 times that of a patient 65 years old undergoing CABG, if all other risk factors are the same. All patients age 60 and younger have roughly the same odds of in-hospital / 30-day mortality if their other risk factors are identical.

Ejection Fraction, which is the percentage of blood in the heart's left ventricle that is expelled when it contracts (with more denoting a healthier heart), is subdivided into three ranges (less than 30 percent, 30 percent to 39 percent, and 40 percent or more). The last range is referred to as the reference category. This means that the odds ratio that appears for the other Ejection Fraction categories in the table is relative to patients with an ejection fraction of 40 percent or more. Thus, a CABG patient with an ejection fraction of less than 30 percent is about 2.324 times as likely to die in the hospital or within 30 days as a patient with an ejection fraction of 40 percent or higher, all other significant risk factors being the same.

Renal Failure is subdivided into four groups. Two categories represent patients with various levels of elevated creatinine, but no dialysis. A third category includes patients with renal failure on dialysis. These groups are relative to patients who are not on dialysis and whose last pre-operative creatinine values were not greater than 1.5 mg/dL.

Appendix Table 1

Multivariable Risk Factor Equation for CABG In-Hospital / 30-Day Deaths in New York State in 2014.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age: Number of years greater than 60	—-	0.0367	0.0038	1.037
Ventricular Function				
Ejection Fraction				
Ejection Fraction 40% or greater	81.93	— Reference —		1.000
Ejection Fraction < 30%	7.76	0.8433	0.0048	2.324
Ejection Fraction 30-39%	10.31	0.6860	0.0156	1.986
Previous MI < 6 hours	0.64	1.8506	0.0011	6.363
Hemodynamic State				
Unstable	0.81	1.3303	0.0059	3.782
Comorbidities				
Peripheral Vascular Disease	11.84	0.6818	0.0049	1.977
Congestive Heart Failure, within 2 weeks	15.24	0.6961	0.0061	2.006
Renal Failure				
No Renal Failure	88.62	— Reference —		1.000
Renal Failure, Creatinine 1.6-2.0 mg/dl	5.46	0.7128	0.0392	2.040
Renal Failure, Creatinine > 2.0 mg/dl	2.53	1.2869	0.0004	3.621
Renal Failure, Requiring Dialysis	3.39	1.5299	<.0001	4.618
Previous Procedures				
Previous Valve Surgery or Intervention	0.30	1.8006	0.0101	6.053
Previous PCI, This Episode of Care	2.62	1.0129	0.0191	2.753
Previous CABG with Patent Grafts	1.39	1.3314	0.0085	3.786

Intercept = -5.6992
C Statistic = 0.822

Appendix 2
Risk Factors for CABG 30-Day Readmissions in New York State in 2014

The significant pre-procedural risk factors for 30-day readmissions following CABG in 2014 are presented in the table that follows. Female Gender, Cerebrovascular Disease, Congestive Heart Failure, Chronic Lung Disease, and Diabetes on Insulin Therapy are interpreted in the same way as Peripheral Vascular Disease in Appendix 1. The patient either has the risk factor or does not.

The interpretation for Age is the same as that presented in Appendix 1.

Body Mass Index (BMI) is a relationship of weight to height. It is a measure of body fat that is the ratio of the weight of the body in kilograms to the square of its height in meters and is considered an indication of nutritional status of the body. This model includes terms for both BMI and BMI-squared, reflecting the complex relationship between BMI and 30-day readmission. The quadratic function of BMI (BMI-squared) used in the statistical model reflects the fact that patients with very high and very low BMIs tend to have higher risks of readmission than patients with intermediate levels of BMI. This functional form is used to improve the model's ability to predict mortality, but it means that the odds ratios for these terms do not have a straightforward interpretation.

Renal Failure is expressed in terms of renal failure with dialysis and elevated creatinine without dialysis. The odds ratios for all three Renal Failure categories are relative to patients with no dialysis and whose last creatinine measured prior to surgery was not greater than 1.5 mg/dL.

Appendix Table 2

Multivariable Risk Factor Equation for CABG / 30-Day Readmission in New York State in 2014.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age: Number of years greater than 60	—	0.0164	0.0003	1.017
Female	24.12	0.2670	0.0005	1.306
Body Mass Index	—	-0.1543	<0.0001	—
Body Mass Index - squared	—	0.0025	<0.0001	—
Comorbidities				
Cerebrovascular Disease	14.39	0.3429	0.0001	1.409
Congestive Heart Failure, within 6 months	18.85	0.2760	0.0009	1.318
Chronic Lung Disease	18.02	0.4067	<0.0001	1.502
Diabetes on Insulin Therapy	18.07	0.2542	0.0035	1.289
Renal Failure				
No Renal Failure	88.80	— Reference —		1.000
Renal Failure, Creatinine 1.6-2.5 mg/dl	6.74	0.2925	0.0191	1.340
Renal Failure, Creatinine > 2.5 mg/dl	1.22	0.7740	0.0015	2.168
Renal Failure, Requiring Dialysis	3.24	0.9513	<0.0001	2.589

Intercept = -0.1464
C Statistic = 0.641

Appendix 3
Risk Factors For Valve Surgery In-Hospital / 30-Day Mortality in 2012-2014

The significant pre-procedural risk factors for in-hospital/30-day mortality following valve surgery in the 2012-2014 time period are presented in the table that follows.

Age: number of years greater than 55 is interpreted in a similar fashion to Appendix 1 and 2 except in this case each year over age 55 is associated with an increased risk of mortality.

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

For example, a patient who has a mitral valve replacement surgery is roughly 1.697 times as likely to die in the hospital during or after surgery or after discharge but within 30 days of surgery as a patient with aortic valve replacement surgery, all other significant risk factors being the same.

The interpretation of renal failure in this model is similar to that provided in Appendix 1 except in this case there is only one level of elevated creatinine.

All other variables can be interpreted in the same way as described in Appendix 1 for risk factors with only two possibilities.

Appendix 3

Multivariable Risk Factor Equation for Valve Surgery In-Hospital / 30-Day Deaths In NYS, 2012-2014.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age: Number of years greater than 55	—	0.0477	<.0001	1.049
Female Gender	46.78	0.5647	<.0001	1.759
Type of Valve Surgery				
Aortic Valve Replacement	50.59	— Reference —		1.000
Mitral Valve Replacement	12.87	0.5291	0.0005	1.697
Mitral Valve Repair	16.55	-0.3042	0.1769	0.738
Multiple Valve Repair/Replacement	19.99	0.8314	<.0001	2.297
Ventricular Function				
Previous MI, Any	10.08	0.4089	0.0029	1.505
Hemodynamic State				
Unstable	0.56	1.1661	0.0009	3.210
Comorbidities				
Cerebrovascular Disease	12.68	0.3513	0.0056	1.421
Chronic Lung Disease	19.25	0.2575	0.0245	1.294
Congestive Heart Failure, within 2 weeks	32.59	0.4420	<.0001	1.556
Endocarditis	5.26	0.4873	0.0091	1.628
Renal Failure				
No Renal Failure	89.58	— Reference —		1.000
Renal Failure, Creatinine > 1.5 mg/dl	7.61	0.6398	<.0001	1.896
Renal Failure, Requiring Dialysis	2.81	1.5850	<.0001	4.879
Previous Procedres				
Any Previous Valve Surgery or Intervention	11.47	0.3258	0.0159	1.385
Vessels Diseased				
Left Main Disease or Three Vessels Diseased	1.46	0.7057	0.0111	2.025

Intercept = -5.5986

C Statistic = 0.765

Appendix 4
Risk Factors for Valve and CABG Surgery In-Hospital/30-Day Mortality in New York State in 2012-2014

The significant pre-procedural risk factors for in-hospital/30-day mortality following valve and CABG surgery in the 2012-2014 time period are presented in the table that follows.

Body surface area (BSA) is a function of height and weight and increases for larger heights and weights. This model includes terms for both BSA and BSA-squared, reflecting the complex relationship between BSA and in-hospital/ 30-day mortality. The quadratic function of BSA (BSA-squared) used in this statistical model reflects the fact that patients with very high or very low BSAs tend to have higher risks of in-hospital/30-day mortality than patients with intermediate levels of BSA. This functional form is used to improve the model's ability to predict mortality, but it means that the odds ratios for these terms do not have a straightforward interpretation.

The odds ratio for Type of Valve with CABG surgery roughly represents the number of times more likely to die in the hospital during or after that particular surgery or after discharge but within 30 days a patient with a specific Valve with CABG surgery is than a patient who had aortic valve repair or replacement and CABG surgery, all other risk factors being the same. For example, a patient who has a mitral valve replacement and CABG surgery is 2.037 times as likely to die in the hospital or within 30 days after discharge as a patient with aortic valve repair or replacement and CABG surgery, all other significant risk factors being the same.

Renal Failure is interpreted in a similar fashion to that described in Appendix 3. All other risk factors are interpreted as described in Appendix 1 for risk factors with only two possibilities.

Appendix Table 4

Multivariable Risk Factor Equation for Valve and CABG Surgery In-Hospital/ 30-Day Deaths in NYS, 2012-2014.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age: Number of years greater than 65	—	0.0554	<.0001	1.057
Female Gender	34.50	0.3303	0.0225	1.391
Body Surface Area (10 m^2)	—	-0.9023	<.0001	—
Body Surface Area – squared (100 m^4)	—	0.0220	<.0001	—
Type of Valve (with CABG)				
Aortic Valve Replacement	63.11	— Reference —		1.000
Mitral Valve Replacement	9.75	0.7113	<.0001	2.037
Mitral Valve Repair	14.90	-0.0208	0.9182	0.979
Multiple Valve Repair/Replacement	12.24	0.7579	<.0001	2.134
Ventricular Function				
Ejection Fraction < 30%	8.84	0.5960	0.0008	1.815
Previous MI < 21 Days	14.86	0.5707	0.0001	1.769
Comorbidities				
Congestive Heart Failure, within 2 weeks	36.64	0.5326	<.0001	1.703
Peripheral Vascular Disease	13.49	0.5173	0.0005	1.677
Renal Failure				
No Renal Failure	92.88	— Reference —		1.000
Renal Failure, Creatinine > 2.0 mg/dl	3.28	0.5703	0.0260	1.769
Renal Failure Requiring Dialysis	3.84	1.1895	<.0001	3.285
Previous Procedures				
Any Previous Cardiac Surgery	6.86	0.9026	<.0001	2.466
Previous Organ Transplant	0.73	1.4615	0.0005	4.312

Intercept = 4.2459

C Statistic = 0.753

Appendix 5
Multivariable Risk Factor Equation for TAVR In-Hospital / 30-Day Deaths in New York State in 2012-2014.

The significant pre-procedural risk factors for in-hospital/30-day mortality following TAVR in the 2012-2014 time period are presented in the table that follows. The risk factors in this model are interpreted as described in Appendices 1 – 4.

Appendix Table 5

Multivariable Risk Factor Equation for TAVR In-Hospital / 30-Day Deaths in New York State in 2012-2014.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age: Number of years greater than 85	—	0.0490	0.0336	1.050
Body Surface Area (10 m^2)	—	-0.6510	0.0017	—
Body Surface Area – squared (100 m^4)	—	0.0157	0.0033	—
Comorbidities				
Congestive Heart Failure, within 2 weeks	57.40	0.4430	0.0037	1.557
Chronic Lung Disease	36.13	0.4607	0.0014	1.585
Renal Failure				
No Renal Failure	79.11	— Reference —		1.000
Renal Failure, Creatinine >1.5 mg/dl	16.48	0.6165	0.0003	1.852
Renal Failure Requiring Dialysis	4.41	1.0467	<.0001	2.848

Intercept = 2.9838

C Statistic = 0.634

Appendix 6
Risk Factors for Isolated CABG In-Hospital/30-Day Mortality in New York State 2012-2014

The significant pre-procedural risk factors for in-hospital/30-day mortality following isolated CABG in the 2012-2014 time period are presented in the table that follows. The risk factors in this model are interpreted as described in Appendices 1 – 5

Appendix Table 6

Multivariable Risk Factor Equation for CABG In-Hospital / 30-Day Deaths in New York State in 2012-2014.

		Logistic Regression		
Patient Risk Factor	**Prevalence (%)**	**Coefficient**	**P-Value**	**Odds Ratio**
Demographic				
Age	—	0.0419	<.0001	1.043
Female Gender	24.63	0.4496	<.0001	1.568
Hemodynamic State				
Unstable	0.77	1.1267	<.0001	3.085
Ventricular Function				
Ejection Fraction				
Ejection Fraction 40% or greater	81.70	— Reference —		1.000
Ejection Fraction < 30%	7.80	0.9232	<0.0001	2.517
Ejection Fraction 30-39%	10.50	0.4526	0.0031	1.572
Previous MI				
No Previous MI within 14 days	70.83	— Reference —		1.000
Previous MI less than 1 day	2.84	1.2608	<.0001	3.528
Previous MI 1 - 14 days	26.33	0.5037	<.0001	1.655
Comorbidities				
Cerebrovascular Disease	14.78	0.4624	0.0002	1.588
Chronic Lung Disease	20.26	0.4328	0.0002	1.542
Congestive Heart Failure, within 2 weeks	14.38	0.3022	0.0226	1.353
Extensive Aortic Atherosclerosis	3.67	0.4653	0.0125	1.592
Peripheral Vascular Disease	11.78	0.3120	0.0213	1.366
Renal Failure				
No Renal Failure	94.23	— Reference —		1.000
Renal Failure, Creatinine > 2.0 mg/dl	2.51	0.7860	0.0003	2.195
Renal Failure Requiring Dialysis	3.27	1.1477	<.0001	3.151
Previous Procedures				
Previous Valve Surgery or Intervention	0.36	1.7679	<.0001	5.859
Previous CABG with Patent Grafts	1.48	0.7345	0.0197	2.084

Intercept = -8.1363
C Statistic = 0.794

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

Bassett Medical Center
Atwell Road
Cooperstown, New York 13326

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

Buffalo General Medical Center
100 High Street
Buffalo, New York 14203

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

Ellis Hospital
1101 Nott Street
Schenectady, New York 12308

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

Good Samaritan Hospital Medical Center
1000 Montauk Highway
West Islip, New York 11795

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

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

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

Maimonides Medical Center
4802 Tenth Avenue
Brooklyn, New York 11219

Mercy Hospital of Buffalo
565 Abbott Road
Buffalo, New York 14220

Millard Fillmore Hospital ***
3 Gates Circle
Buffalo, New York 14209

Montefiore Medical Center @ Henry & Lucy Moses Division
111 East 210th Street
Bronx, New York 10467

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

Mount Sinai Beth Israel
10 Nathan D. Perlman Place
New York, New York 10003

Mount Sinai Hospital
One Gustave L. Levy Place
New York, New York 10029

Mount Sinai St. Luke's
1111 Amsterdam Avenue
New York, New York 10025

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Flushing, New York 11355

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

NY Presbyterian Hospital @ Columbia Presbyterian Center
630 West 168th Street
New York, New York 10032

NY Presbyterian Hospital @ New York Weill – Cornell College
525 East 68th Street
New York, New York 10021

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

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

Rochester General Hospital
1425 Portland Avenue
Rochester, New York 14621

St. Elizabeth Medical Center
2209 Genesee Street
Utica, New York 13501

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

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

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

Southside Hospital
301 East Main Street
Bayshore, New York 11706

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475 Seaview Avenue
Staten Island, New York 10305

Strong Memorial Hospital
601 Elmwood Avenue
Rochester, New York 14642

UHS Wilson Medical Center
33-57 Harrison Street
Johnson City, New York 13790

University Hospital at Stony Brook
Stony Brook, New York 11794-8410

University Hospital of Brooklyn
450 Clarkson Avenue
Brooklyn, New York 11203

Upstate University Hospital – State University of New York
750 East Adams Street
Syracuse, New York 13210

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45 Reade Place
Poughkeepsie, New York 12601

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100 Woods Road
Valhalla, New York 10595

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Mineola, New York 11501

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