

**PERCUTANEOUS
CORONARY
INTERVENTIONS
(PCI)
in
New York State
*1998-2000***

**New York State Department of Health
January 2003**

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MESSAGE FROM COMMISSIONER

I am pleased to provide the information contained in this booklet for use by health care providers, patients and families of patients who are considering treatment options for cardiovascular disease. The report provides data on risk factors associated with in-hospital mortality following percutaneous coronary intervention (also known as angioplasty) and lists hospital and physician-specific mortality rates that have been risk-adjusted to account for differences in patient severity of illness.

The Percutaneous Coronary Interventions (PCI) Reporting System (the data set upon which these analyses are based) represents the largest collection of data available in which all patients undergoing PCI have been reported. Hospitals and doctors involved in cardiac care have worked cooperatively with the Department of Health and the Cardiac Advisory Committee to compile accurate and meaningful data that can and have been used to enhance quality of care. As part of that process, we have included comprehensive information on non-emergency and emergency cases in our PCI analyses. In addition, we provide physician specific analysis of outcomes.

I encourage doctors to discuss this information with their patients and colleagues as they develop treatment plans. While these statistics are an important tool in making informed health care choices, doctors and patients must make individual treatment plans together after careful consideration of all pertinent factors. It is also important to keep in mind that the information in this booklet does not include data after 2000. Important changes may have taken place in some hospitals since that time.

I would also ask that patients and physicians alike give careful consideration to the importance of healthy lifestyles for all those affected by heart disease. Controllable risk factors that contribute to a higher likelihood of developing coronary artery disease are high cholesterol levels, cigarette smoking, high blood pressure, obesity and lack of exercise. Limiting these risk factors will continue to be important in minimizing the occurrence of new blockages.

I extend my appreciation to the providers in this state and to the Cardiac Advisory Committee for their efforts in developing and refining this remarkable system. The Department of Health will continue to work in partnership with hospitals and physicians to ensure high quality of care for patients with heart disease. We look forward to providing reports such as this and the Coronary Artery Bypass Report on an annual basis and to the continuing high quality of care available from our New York State health care providers.

INTRODUCTION

Heart disease is, by far, the leading cause of death in New York State, and the most common form of heart disease is atherosclerotic coronary artery disease. Various 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 most common procedures performed on patients with coronary artery disease are percutaneous coronary intervention (PCI), also known as percutaneous transluminal coronary angioplasty (PTCA), and coronary artery bypass graft surgery (CABG).

During a PCI procedure, a catheter is threaded up to the site of the blockage in a coronary artery. In conjunction with the catheter, devices are used to reopen the blockage. In some cases, PCI is used as an emergency treatment for patients who are experiencing a heart attack or who may be in shock. Most cases, however, are not done on an emergency basis.

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

The analyses contained in this report are based on the information collected on each of the 108,282 patients who underwent PCI and were discharged between January 1, 1998 and December 31, 2000. The number of PCI cases per year has increased during that period from 33,310 in 1998 to 39,234 in 2000. Analyses of risk-adjusted mortality rates and associated risk factors are provided for 2000 and for the three-year period from 1998 through 2000. Analysis of all cases, non-emergency cases (which represent the majority of procedures) and emergency cases are included.

HEALTH DEPARTMENT PROGRAM

The New York State Department of Health has been studying the effects of patient and treatment characteristics on outcomes for patients with heart disease for several years. Detailed statistical analyses of the information received from the study have been conducted under the guidance of the New York State 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 that assesses the performance of hospitals and doctors over time, taking into account the severity of individual patient's pre-operative conditions. Coronary artery bypass surgery results have been assessed since 1989; PCI results were released in 1996 for the first time.

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 during and after PCI;
- 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

All adult patients undergoing PCI in New York State hospitals who were discharged during 2000 are included in the one-year results presented in this report. Additionally, all adult patients undergoing PCI in New York State hospitals who were discharged during 1998 and 1999 are included in one-year analyses presented in Appendices 6 and 7, respectively. Similarly, all patients undergoing PCI who were discharged between January 1, 1998 and December 31, 2000 are included in the three-year results. Observed and risk-adjusted mortality rates are reported for patients undergoing PCI in each of the 36 New York State hospitals with approval to perform the procedure.

In New York State, PCI is limited to centers with cardiac surgery on-site. However, beginning in the year 2000, a process was put in place to allow time-limited waivers to this policy for centers participating in a special study for heart attack patients. After extensive training and review, hospitals meeting specific conditions may now be allowed to perform PCI on acute myocardial infarction (heart attack) patients. One hospital began performing PCI under these conditions in September, 2000. We will continue to study the impact of the new programs over the next two years.

RISK ADJUSTMENT FOR ASSESSING PROVIDER PERFORMANCE

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

Data Collection, Data Validation and Identifying In-Hospital Deaths

As part of the risk-adjustment process, hospitals in New York State at which PCI is performed provide information to the Department of Health for each patient undergoing those procedures. Data concerning patients' demographic and clinical characteristics are collected by hospitals' cardiac catheterization laboratories. Approximately 40 of these characteristics (or risk factors) are collected for each patient. Along with information about the hospital, 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 PCI data with other Department of Health databases and a review of medical records for a selected sample of cases. These activities are extremely helpful in ensuring consistent interpretation of data elements across hospitals.

The analysis bases mortality on deaths occurring during the same hospital stay in which a patient underwent PCI. In this report, an in-hospital death is defined as a patient who died subsequent to PCI during the same acute care admission or was discharged to hospice care.

Assessing Patient Risk

Each person who develops coronary artery disease has a unique health history. A cardiac profile system has been developed to evaluate the risk of treatment for each individual patient based on his or her history, weighing the important health facts for that person based on the experiences of thousands of patients who have undergone the same procedures in recent years. All important risk factors for each patient are combined to create his or her risk profile.

An 80-year-old patient with a heart attack in the past six hours, for example, has a very different risk profile than a 40-year-old who has never suffered a heart attack.

The statistical analyses conducted by the New York State Department of Health consist of determining which of the risk factors collected are significantly related to in-hospital death, and determining how to weight the significant risk factors to predict the chance each patient will have of dying in the hospital given his or her specific characteristics.

Predicting Patient Mortality Rates for Providers

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

The mortality rate for each hospital and cardiologist is also predicted using the statistical model. This is accomplished by adding 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 hospital's performance was identical to the state performance. The percentage is called the predicted or expected mortality rate (EMR). A hospital's expected mortality rate is contrasted with its observed mortality rate (OMR), which is the number of PCI inpatients who died divided by the total number of PCI inpatients.

Computing the Risk-Adjusted 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 risk-adjusted mortality rate has, to the extent possible, ironed out differences among providers in patient severity of illness, since it arrives at a mortality rate for each provider based on an identical group of patients.

To get the risk-adjusted mortality rate, the observed mortality rate is first divided by the provider's expected mortality rate. If the resulting ratio is larger than one, the provider has a higher mortality rate than expected on the basis of its patient mix; if it is smaller than one, the provider has a lower mortality rate than expected from its patient mix. The ratio is then multiplied by the overall statewide rate (0.72% for all cases in 2000) to obtain the provider's risk-adjusted rate.

Interpreting the Risk-Adjusted Mortality Rate

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

The risk-adjusted mortality rate is used in this report as a measure of quality of care provided by hospitals and cardiologists. However, there are reasons that a provider's risk-adjusted rate may not be indicative of its true quality.

For example, extreme outcome rates may occur due to chance alone. This is particularly true for low-volume providers, for whom very high or very low rates are more likely to occur than for high-volume providers. Another attempt to prevent misinterpretation of differences caused by chance variation is the use of expected ranges (confidence intervals) in the reported results.

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

Some commentators have suggested that patient severity of illness may not be accurately estimated because some risk factors are not included in the data system, and this could lead to misleading risk-adjusted rates. This is not likely because the New York State data system has been reviewed by practicing physicians in the field and updated continually. It now contains virtually every risk factor that has ever been demonstrated to be related to patient mortality in national and international studies.

How This Contributes to Quality Improvement

The goal of the Department of Health and the Cardiac Advisory Committee is to improve the quality of care in relation to coronary artery bypass graft surgery and angioplasty in New York State. Providing the hospitals, cardiac surgeons (who perform CABG surgery), and cardiologists (who perform PCI) in New York State with data about their own outcomes for these procedures allows them to examine the quality of their own care, and to identify opportunities to improve that care.

The data collected and analyzed in this program are reviewed by the Cardiac Advisory Committee, who assist with interpretation and advise the Department of Health regarding which hospitals and physicians 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.

2000 HOSPITAL RISK-ADJUSTED MORTALITY FOR PCI

Table 1 presents the 2000 PCI mortality results for the 36 hospitals performing PCI in New York in 2000. The table contains, for each hospital, the number of PCIs resulting in 2000 discharges, the number of in-hospital deaths, the observed mortality rate, the expected mortality rate based on the statistical model presented in Appendix 1, the risk-adjusted mortality rate, and a 95% confidence interval for the risk-adjusted rate. Also, it contains each hospital's volume of cases and risk-adjusted mortality rate for non-emergency patients. Emergency patients are defined to be patients in shock, a state of hemodynamic instability (very low blood pressure), requiring cardiopulmonary resuscitation immediately prior to the procedure, or patients who experienced a heart attack within 24 hours prior to undergoing PCI. The hospital risk-adjusted rates for non-emergency PCI patients are provided because many studies are confined to this group of patients, and because these patients comprise the majority of all PCI patients (90.0% in 2000).

The overall mortality rate for the 39,234 PCIs performed at the 36 hospitals was 0.72%. Observed mortality rates ranged from 0.00% to 2.00%. The range in expected mortality rates, which measure patient severity of illness, was between 0.32% and 1.56%. The risk-adjusted rates, which measure hospital performance, range from 0.00% to 2.18%. Based on confidence intervals for risk-adjusted rates, one hospital (Ellis Hospital) had a significantly higher risk-adjusted mortality rate than the statewide rate. One hospital (North Shore University Hospital) had a significantly lower risk-adjusted mortality rate than the statewide rate.

The last column of Table 1 presents the hospital risk-adjusted mortality rates for non-emergency cases only (based on the statistical model presented in Appendix 2.) As presented in the last row, the statewide mortality rate for non-emergency cases is 0.34%. The range of risk-adjusted rates was from 0.00% to 0.85%. Two hospitals (Albany Medical Center and Strong Memorial) had a significantly higher risk-adjusted mortality rate than the statewide rate. No hospital had a significantly lower risk-adjusted mortality rate than the statewide rate.

1998-2000 HOSPITAL DATA FOR PCI

Table 2 provides the number of PCIs, the observed mortality rate, and the risk-adjusted mortality rate for 1998-2000 for each of three types of PCI patients in the 36 hospitals performing PCI during the time period. The three types of patients are all patients, non-emergency patients, and emergency patients (patients in shock, a state of hemodynamic instability (very low blood pressure), cardiopulmonary resuscitation (CPR) administered immediately prior to the procedure, or patients who experienced a heart attack within 24 hours prior to undergoing PCI). The statistical models that are the basis for all patients, non-emergency patients, and emergency patients in 1998-2000 are presented in Appendices 3-5, respectively.

As indicated in Table 2, the three-year observed mortality rates for all PCI patients ranged from 0.00% to 1.99%, and the risk-adjusted mortality rates ranged from 0.00% to 1.58%. One hospital (University Hospital at Stony Brook) had a risk-adjusted mortality rate that was significantly higher than the statewide rate, and three hospitals (Mount Sinai, North Shore, and St. Francis) had risk-adjusted mortality rates that were significantly lower than the statewide rate. It should be noted that hospitals are more likely to have results that show a statistically significant difference from the statewide rate when three years of data are used than when one year of data is used because the three-year volumes are higher.

Table 2 also presents the 3-year risk adjusted mortality rates for non-emergency cases based on the model in Appendix 4. Non-emergency cases comprise 90.6% of cases for the period 1998-2000. The statewide mortality rate for the 98,090 non-emergency cases during the 3-year period was 0.40%. Observed mortality rates for this group of patients ranged from 0.00% - 1.03% and the risk-adjusted mortality rates ranged from 0.00-1.30%. Two hospitals (Albany Medical Center and University Hospital of Brooklyn) had risk-adjusted mortality rates that were significantly higher than the statewide average. Three hospitals (Mount Sinai, North Shore, Winthrop University Hospital) had risk-adjusted mortality rates significantly below the statewide rate for non-emergency cases.

The last three columns in Table 2 presents data on emergency cases based on the model in Appendix 5. Emergency cases represented 9.4% of cases for the period 1998-2000. The statewide mortality rate for the 10,192 emergency PCI cases during the 3-year period was 4.50%. Observed mortality rates for this group ranged from 0.00% to 11.11% and the risk-adjusted mortality rates ranged from 0.00% - 7.94%. One hospital (Mount Sinai), had a risk-adjusted mortality rate that was significantly below the statewide average and no hospital had a risk-adjusted mortality rate that was significantly above the statewide average for emergency cases.

Definitions of key terms are as follows:

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

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 similar to the statewide mix. It is obtained by first dividing the observed mortality rate by the expected mortality rate, and then multiplying that quotient by the statewide mortality rate (0.72% for all PCI patients in 2000).

Confidence intervals indicate which hospitals had significantly more or fewer deaths than expected given the risk factors of their patients. Hospitals with significantly higher rates than expected after adjusting for risk are those with confidence intervals entirely above the statewide rate. Hospitals with significantly lower rates than expected given the severity of illness of their patients before the PCI have confidence intervals entirely below the statewide rate.

Table 1 Hospital Observed, Expected, and Risk-Adjusted Mortality Rates (RAMR) for PCI in New York State, 2000 Discharges (Listed Alphabetically by Hospital)

Hospital	All Cases						Non-Emergency	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Albany Medical Center	1074	15	1.40	0.80	1.27	(0.71, 2.09)	920	0.85 *
Arnot-Ogden	219	0	0.00	0.47	0.00	(0.00, 2.56)	182	0.00
Bellevue	100	2	2.00	0.66	2.18	(0.24, 7.87)	88	0.00
Beth Israel	1307	8	0.61	0.64	0.69	(0.30, 1.36)	1259	0.25
Buffalo General	1233	5	0.41	0.32	0.92	(0.30, 2.14)	1209	0.39
Columbia Presbyterian-NYP	582	7	1.20	0.76	1.15	(0.46, 2.37)	472	0.00
Crouse Hospital	870	9	1.03	0.77	0.97	(0.44, 1.84)	744	0.32
Ellis Hospital	652	9	1.38	0.62	1.61 *	(0.73, 3.05)	548	0.81
Erie County	148	0	0.00	0.67	0.00	(0.00, 2.67)	145	0.00
LIJ Medical Center	978	7	0.72	1.07	0.48	(0.19, 1.00)	802	0.41
Lenox Hill	2783	13	0.47	0.58	0.58	(0.31, 0.99)	2647	0.33
Maimonides	1247	7	0.56	0.81	0.50	(0.20, 1.03)	1180	0.12
Millard Fillmore	1040	9	0.87	0.70	0.90	(0.41, 1.71)	981	0.60
Montefiore - Einstein	533	4	0.75	0.45	1.21	(0.32, 3.09)	488	0.80
Montefiore - Moses	490	4	0.82	0.71	0.84	(0.23, 2.15)	455	0.31
Mount Sinai	1961	11	0.56	0.72	0.56	(0.28, 1.01)	1830	0.31
NYU Hospitals Center	663	7	1.06	0.98	0.78	(0.31, 1.60)	578	0.37
New York Hospital - Queens	795	9	1.13	0.93	0.88	(0.40, 1.67)	705	0.49
North Shore	2725	8	0.29	0.58	0.36 **	(0.16, 0.72)	2391	0.10
Rochester General	2550	22	0.86	0.84	0.74	(0.47, 1.13)	2248	0.37
South Nassau Community Hosp	12	0	0.00	1.41	0.00	(0.00,15.67)	.	.
St. Elizabeth	1123	7	0.62	0.53	0.85	(0.34, 1.74)	1079	0.25
St. Francis	2933	14	0.48	0.71	0.48	(0.26, 0.81)	2698	0.31
St. Josephs	1519	8	0.53	0.57	0.66	(0.29, 1.31)	1347	0.27
St. Lukes-Roosevelt	486	7	1.44	0.64	1.62	(0.65, 3.33)	460	0.72
St. Peters	1055	7	0.66	0.71	0.67	(0.27, 1.39)	884	0.51
St. Vincents	1570	8	0.51	0.63	0.58	(0.25, 1.15)	1440	0.19
Strong Memorial	1056	21	1.99	1.30	1.11	(0.69, 1.69)	867	0.80 *
United Health Services	938	7	0.75	1.19	0.46	(0.18, 0.94)	805	0.12
Univ. Hosp. - Stony Brook	1179	13	1.10	0.64	1.24	(0.66, 2.12)	1041	0.70
Univ. Hosp. - Upstate	153	3	1.96	1.56	0.91	(0.18, 2.66)	125	0.00
Univ. Hosp. of Brooklyn	400	2	0.50	0.38	0.95	(0.11, 3.44)	376	0.27
Vassar Brothers	420	2	0.48	0.76	0.45	(0.05, 1.63)	323	0.00
Weill Cornell-NYP	1621	11	0.68	0.75	0.66	(0.33, 1.17)	1498	0.32
Westchester Medical Center	1401	11	0.79	0.89	0.64	(0.32, 1.15)	1223	0.16
Winthrop Univ. Hosp.	1418	7	0.49	0.66	0.54	(0.22, 1.12)	1273	0.17
Statewide Total	39234	284	0.72				35311	0.34

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

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

Table 2 Hospital Observed and Risk-Adjusted Mortality Rates (RAMR) for PCI in New York State, 1998-2000 Discharges.

Hospital	All Cases			Non-Emergency Cases			Emergency Cases		
	Cases	OMR	RAMR	Cases	OMR	RAMR	Cases	OMR	RAMR
Albany Medical Center	3509	1.25	1.08	3077	0.71	0.66 *	432	5.09	5.42
Arnot-Ogden	731	0.82	1.42	617	0.49	0.88	114	2.63	6.90
Bellevue	453	1.99	1.58	387	1.03	1.30	66	7.58	7.09
Beth Israel	3478	0.69	0.78	3315	0.39	0.39	163	6.75	6.14
Buffalo General	3118	0.42	0.93	3055	0.33	0.46	63	4.76	7.53
Columbia Presbyterian-NYP	1660	1.14	1.15	1427	0.49	0.62	233	5.15	6.07
Crouse Hospital	2395	0.79	0.86	2048	0.24	0.37	347	4.03	4.84
Ellis Hospital	1726	0.93	1.00	1511	0.46	0.60	215	4.19	4.31
Erie County	406	0.00	0.00	397	0.00	0.00	9	0.00	0.00
LIJ Medical Center	2458	0.81	0.57	1992	0.40	0.34	466	2.58	2.83
Lenox Hill	6929	0.69	0.83	6578	0.50	0.51	351	4.27	3.79
Maimonides	3823	0.71	0.57	3654	0.44	0.29	169	6.51	3.69
Millard Fillmore	2781	0.93	1.11	2613	0.38	0.48	168	9.52	6.52
Montefiore - Einstein	1691	0.83	0.97	1549	0.39	0.47	142	5.63	5.12
Montefiore - Moses	1376	0.87	1.15	1246	0.40	0.65	130	5.38	5.73
Mount Sinai	5482	0.46	0.43 **	5147	0.33	0.25 **	335	2.39	1.87 **
NYU Hospitals Center	2109	0.95	0.61	1835	0.38	0.28	274	4.74	3.62
New York Hospital - Queens	2199	1.23	1.02	1941	0.72	0.62	258	5.04	5.59
North Shore	7795	0.42	0.49 **	6777	0.19	0.22 **	1018	1.96	3.12
Rochester General	7015	0.94	0.87	6310	0.48	0.43	705	5.11	5.41
South Nassau Comm. Hosp.	12	0.00	0.00	.	.	.	12	0.00	0.00
St. Elizabeth	2002	0.75	1.11	1951	0.56	0.55	51	7.84	6.63
St. Francis	8445	0.59	0.59 **	7864	0.38	0.35	581	3.44	2.95
St. Josephs	4566	0.81	0.93	4057	0.30	0.38	509	4.91	6.18
St. Lukes-Roosevelt	1459	0.89	1.05	1367	0.44	0.47	92	7.61	7.94
St. Peters	3192	0.72	0.72	2769	0.29	0.34	423	3.55	4.15
St. Vincents	4315	0.70	0.79	4049	0.32	0.31	266	6.39	6.03
Strong Memorial	2544	1.77	0.92	2024	0.74	0.68	520	5.77	4.47
United Health Services	2879	1.01	0.65	2490	0.40	0.34	389	4.88	3.77
Univ. Hosp. - Stony Brook	3151	1.02	1.28 *	2814	0.57	0.70	337	4.75	6.79
Univ. Hosp. - Upstate	454	1.76	1.22	409	0.73	0.95	45	11.11	4.62
Univ. Hosp. of Brooklyn	1206	0.83	1.24	1119	0.71	0.95 *	87	2.30	2.96
Vassar Brothers	420	0.48	0.42	323	0.00	0.00	97	2.06	3.46
Weill Cornell-NYP	4284	0.75	0.79	3968	0.45	0.48	316	4.43	3.66
Westchester Medical Center	4490	0.87	0.80	4026	0.27	0.27	464	6.03	5.61
Winthrop Univ. Hosp.	3729	0.62	0.67	3384	0.18	0.18 **	345	4.93	4.73
Statewide Total	108282	0.79		98090	0.40		10192	4.50	

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

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

1998-2000 HOSPITAL AND CARDIOLOGIST DATA FOR PCI

Table 3 provides the number of PCIs, number of PCI patients who died in the hospital, observed mortality rate, expected mortality rate, risk-adjusted mortality rate, and the 95% confidence interval for the risk-adjusted mortality rate for 1998-2000 for cardiologists in each of the 36 hospitals performing PCI during the time period, and for each of the hospitals. Table 3 also contains the volume and risk-adjusted mortality rate for cardiologists and hospitals for non-emergency cases.

This information is presented for each cardiologist who (a) performed 200 or more PCIs during 1998-2000, and/or (b) performed at least one PCI in each of the years 1998-2000. The results for cardiologists not meeting the above criteria are grouped together and reported as “All Others” in the hospital in which the procedures were performed. Cardiologists who met criterion (a) or (b) above and performed procedures in more than one hospital are noted in the table and are listed in all hospitals in which they performed procedures during 1998-2000.

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

It should be noted that MI less than 24 hours before the procedure, CPR, shock and hemodynamic instability are significant risk factors in the All Cases model. However, patients with these conditions are excluded from the non-emergency analysis. The outcomes models for the two groups can, therefore, yield substantially different risk-adjusted mortality rates. It is important to compare providers’ RAMR to the statewide average mortality rate for the specific group of patients analyzed.

Table 3 Cardiologist Observed, Expected, and Risk-Adjusted Mortality Rates (RAMR) for PCI in New York State, 1998 - 2000 Discharges.

	ALL CASES						NON-EMERGENCY	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	CASES	RAMR
Albany Medical Center Hospital								
#Delago A	2115	27	1.28	0.97	1.04	(0.68, 1.51)	1930	0.60
#Desantis J	1	0	0.00	0.82	0.00	(0.00,100.0)	0	0.00
#Esper D	472	8	1.69	1.24	1.08	(0.47, 2.14)	378	0.71
#Herman B	2	0	0.00	0.22	0.00	(0.00,100.0)	2	0.00
Houghton J	440	3	0.68	0.40	1.36	(0.27, 3.96)	397	0.70
#Jafar M	13	0	0.00	0.31	0.00	(0.00,72.15)	13	0.00
#Kantaros L	41	0	0.00	0.18	0.00	(0.00,40.24)	41	0.00
##Kufs W	20	0	0.00	0.34	0.00	(0.00,42.08)	18	0.00
Macina A	196	2	1.02	0.85	0.95	(0.11, 3.42)	140	2.05
#Marmulstein M	31	0	0.00	0.35	0.00	(0.00,26.72)	27	0.00
#Martinelli M	14	0	0.00	0.25	0.00	(0.00,82.48)	13	0.00
Papandrea L	130	4	3.08	1.50	1.62	(0.44, 4.15)	85	1.03
#Roccario E	12	0	0.00	0.15	0.00	(0.00,100.0)	11	0.00
All Others	22	0	0.00	0.30	0.00	(0.00,43.72)	22	0.00
TOTAL	3509	44	1.25	0.92	1.08	(0.78, 1.45)	3077	0.66 *

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Arnot-Ogden Memorial Hospital								
Laifer L	667	3	0.45	0.44	0.80	(0.16, 2.34)	566	0.33
##Wasserman H	4	0	0.00	0.42	0.00	(0.00,100.0)	3	0.00
All Others	60	3	5.00	0.61	6.43 *	(1.29,18.79)	48	4.97 *
TOTAL	731	6	0.82	0.46	1.42	(0.52, 3.08)	617	0.88
Bellevue Hospital Center								
#Attubato M	107	2	1.87	1.05	1.40	(0.16, 5.06)	97	1.69
#Chinitz L	3	0	0.00	1.34	0.00	(0.00,72.02)	1	0.00
#Feit F	123	1	0.81	0.62	1.04	(0.01, 5.76)	117	1.26
#Keller N	47	2	4.26	2.04	1.65	(0.19, 5.96)	33	0.00
#Levite H	70	3	4.29	1.52	2.22	(0.45, 6.50)	49	1.55
#Winer H	103	1	0.97	0.54	1.42	(0.02, 7.91)	90	1.55
TOTAL	453	9	1.99	1.00	1.58	(0.72, 2.99)	387	1.30
Beth Israel Medical Center								
##Duvvuri S	183	1	0.55	0.49	0.87	(0.01, 4.86)	179	0.00
Fox J	591	9	1.52	0.99	1.21	(0.55, 2.30)	529	0.96
#Kantrowitz N	54	0	0.00	0.41	0.00	(0.00,12.95)	54	0.00
Mittal B	188	0	0.00	0.39	0.00	(0.00, 3.98)	188	0.00
#Patel R	91	1	1.10	0.69	1.26	(0.02, 7.00)	89	0.79
Reimers C	785	7	0.89	0.89	0.79	(0.32, 1.62)	734	0.35
##Rubino R	17	0	0.00	0.20	0.00	(0.00,84.66)	16	0.00
#Sacchi T	176	0	0.00	0.34	0.00	(0.00, 4.81)	176	0.00
##Shaknovich A	165	0	0.00	0.52	0.00	(0.00, 3.38)	163	0.00
Sherman W	737	4	0.54	0.59	0.73	(0.20, 1.86)	711	0.27
#Wilentz J	370	1	0.27	0.42	0.51	(0.01, 2.85)	359	0.32
All Others	121	1	0.83	1.19	0.55	(0.01, 3.06)	117	0.00
TOTAL	3478	24	0.69	0.70	0.78	(0.50, 1.17)	3315	0.39
Buffalo General Hospital								
Conley J	1116	1	0.09	0.26	0.28	(0.00, 1.54)	1101	0.16
#Emerson R	18	0	0.00	2.41	0.00	(0.00, 6.68)	17	0.00
#Farhi E	459	3	0.65	0.45	1.15	(0.23, 3.35)	438	0.27
#Morris W	349	3	0.86	0.39	1.73	(0.35, 5.05)	345	0.75
Paris J	165	0	0.00	0.26	0.00	(0.00, 6.64)	163	0.00
Sullivan P	87	0	0.00	0.21	0.00	(0.00,16.13)	84	0.00
Visco J	794	6	0.76	0.42	1.43	(0.52, 3.11)	780	0.91
All Others	130	0	0.00	0.28	0.00	(0.00, 8.02)	127	0.00
TOTAL	3118	13	0.42	0.35	0.93	(0.50, 1.59)	3055	0.46

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Columbia Presbyterian - NY Presbyterian Hospital								
Apfelbaum M	165	3	1.82	1.11	1.30	(0.26, 3.80)	118	1.29
Arora R	139	3	2.16	0.73	2.35	(0.47, 6.87)	125	1.29
#Berke A	4	0	0.00	0.11	0.00	(0.00,100.0)	4	0.00
Brogno D	238	2	0.84	0.59	1.13	(0.13, 4.09)	226	0.00
Flyer J	41	0	0.00	0.63	0.00	(0.00,11.29)	40	0.00
##Giedd K	3	0	0.00	0.14	0.00	(0.00,100.0)	3	0.00
#Grose R	144	0	0.00	0.59	0.00	(0.00, 3.40)	134	0.00
##Johnson M	32	0	0.00	0.36	0.00	(0.00,24.83)	31	0.00
Rabbani L	181	2	1.10	1.34	0.65	(0.07, 2.35)	132	0.00
Reison D	81	0	0.00	0.22	0.00	(0.00,16.07)	80	0.00
#Rentrop K	1	0	0.00	0.31	0.00	(0.00,100.0)	1	0.00
Schwartz A	58	0	0.00	0.15	0.00	(0.00,32.72)	57	0.00
Warshofsky M	109	0	0.00	0.72	0.00	(0.00, 3.68)	100	0.00
##Wasserman H	214	8	3.74	0.72	4.11 *	(1.77, 8.10)	176	3.92 *
Weinberger J	133	0	0.00	1.46	0.00	(0.00, 1.50)	96	0.00
Wiedermann J	15	0	0.00	0.16	0.00	(0.00,100.0)	15	0.00
All Others	102	1	0.98	0.58	1.33	(0.02, 7.38)	89	0.00
TOTAL	1660	19	1.14	0.79	1.15	(0.69, 1.80)	1427	0.62
Crouse Hospital								
#Amin N	148	1	0.68	0.67	0.80	(0.01, 4.45)	130	0.00
#Battaglia J	760	8	1.05	0.53	1.58	(0.68, 3.12)	639	0.58
#Berkery W	283	2	0.71	1.45	0.39	(0.04, 1.40)	193	0.00
#Bhan R	15	1	6.67	0.46	11.34	(0.15,63.08)	12	19.89
#Caputo R	140	1	0.71	0.79	0.72	(0.01, 3.98)	132	0.00
#Esente P	150	0	0.00	0.46	0.00	(0.00, 4.18)	144	0.00
#Ford T	139	2	1.44	0.49	2.34	(0.26, 8.45)	117	0.00
#Giambartolomei A	97	2	2.06	1.51	1.08	(0.12, 3.89)	81	1.64
#Lozner E	144	1	0.69	1.19	0.46	(0.01, 2.58)	121	0.00
#Picone M	154	0	0.00	0.62	0.00	(0.00, 3.03)	137	0.00
#Reger M	73	0	0.00	0.64	0.00	(0.00, 6.25)	69	0.00
#Simons A	109	0	0.00	0.63	0.00	(0.00, 4.20)	97	0.00
#Walford G	48	0	0.00	0.67	0.00	(0.00, 9.04)	45	0.00
All Others	135	1	0.74	0.23	2.58	(0.03,14.36)	131	1.72
TOTAL	2395	19	0.79	0.73	0.86	(0.52, 1.34)	2048	0.37
Ellis Hospital								
#Card H	69	1	1.45	0.99	1.16	(0.02, 6.45)	63	0.00
Cospito P	428	4	0.93	0.80	0.93	(0.25, 2.38)	384	0.28
Jordan M	427	6	1.41	0.80	1.38	(0.51, 3.01)	362	1.45

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Ellis Hospital <i>continued</i>								
##Kufs W	234	1	0.43	0.87	0.39	(0.01, 2.16)	218	0.50
Parkes R	295	1	0.34	0.38	0.71	(0.01, 3.97)	254	0.00
All Others	273	3	1.10	0.72	1.20	(0.24, 3.51)	230	1.04
TOTAL	1726	16	0.93	0.73	1.00	(0.57, 1.63)	1511	0.60
Erie County Medical Center								
#Calandra S	1	0	0.00	0.11	0.00	(0.00,100.0)	1	0.00
#Dashkoff N	371	0	0.00	0.61	0.00	(0.00, 1.29)	363	0.00
#Farhi E	34	0	0.00	0.39	0.00	(0.00,21.80)	33	0.00
TOTAL	406	0	0.00	0.59	0.00	(0.00, 1.22)	397	0.00
Lenox Hill Hospital								
Collins M	1493	15	1.00	0.72	1.11	(0.62, 1.83)	1422	0.79 *
Columbo A	136	2	1.47	0.61	1.92	(0.22, 6.93)	131	1.52
##Geizhals M	63	2	3.17	1.06	2.37	(0.27, 8.56)	62	1.05
Iyer S	466	2	0.43	0.74	0.46	(0.05, 1.66)	406	0.22
Kreps E	867	6	0.69	0.75	0.73	(0.27, 1.59)	790	0.48
Leon M	298	3	1.01	0.64	1.25	(0.25, 3.65)	286	0.31
Moses J	1768	4	0.23	0.43	0.41	(0.11, 1.06)	1752	0.30
Moussa I	718	5	0.70	0.94	0.58	(0.19, 1.36)	667	0.53
Roubin G	418	4	0.96	0.81	0.93	(0.25, 2.38)	389	0.45
##Shaknovich A	272	1	0.37	0.40	0.72	(0.01, 4.00)	267	0.43
All Others	430	4	0.93	0.68	1.08	(0.29, 2.76)	406	0.26
TOTAL	6929	48	0.69	0.66	0.83	(0.61, 1.10)	6578	0.51
Long Island Jewish Medical Center								
##Friedman G	356	2	0.56	0.95	0.47	(0.05, 1.69)	283	0.00
#Green S	14	0	0.00	4.15	0.00	(0.00, 4.98)	2	0.00
##Grunwald A	577	9	1.56	1.07	1.15	(0.53, 2.19)	470	0.71
#Kaplan B	673	3	0.45	1.30	0.27 **	(0.05, 0.79)	556	0.26
#Katz S	54	2	3.70	1.87	1.57	(0.18, 5.67)	27	1.99
##Koss J	709	4	0.56	0.98	0.46	(0.12, 1.17)	593	0.18
#Marchant D	8	0	0.00	6.43	0.00	(0.00, 5.64)	1	0.00
#Ong L Y	5	0	0.00	0.59	0.00	(0.00,98.99)	3	0.00
##Padmanabhan V	15	0	0.00	0.36	0.00	(0.00,54.16)	11	0.00
#Patel R	13	0	0.00	0.51	0.00	(0.00,43.48)	13	0.00
##Rubino R	16	0	0.00	0.42	0.00	(0.00,43.06)	15	0.00
All Others	18	0	0.00	0.35	0.00	(0.00,45.45)	18	0.00
TOTAL	2458	20	0.81	1.12	0.57	(0.35, 0.88)	1992	0.34
Maimonides Medical Center								
Frankel R	1227	3	0.24	0.87	0.22 **	(0.04, 0.65)	1186	0.11 **
Friedman M	471	7	1.49	1.48	0.80	(0.32, 1.64)	425	0.17
#Sacchi T	475	2	0.42	0.46	0.72	(0.08, 2.61)	473	0.20

Table 3 *continued*

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Maimonides Medical Center <i>continued</i>								
Shani J	1558	14	0.90	1.03	0.69	(0.38, 1.16)	1494	0.51
All Others	92	1	1.09	1.70	0.50	(0.01, 2.80)	76	0.00
TOTAL	3823	27	0.71	0.98	0.57	(0.38, 0.83)	3654	0.29
Millard Fillmore Hospital								
#Calandra S	392	2	0.51	0.43	0.94	(0.11, 3.40)	380	0.93
Corbelli J	608	6	0.99	0.73	1.08	(0.39, 2.34)	564	0.19
#Dashkoff N	3	0	0.00	0.31	0.00	(0.00,100.0)	3	0.00
#Emerson R	124	2	1.61	0.38	3.33	(0.37,12.01)	111	1.30
Gelormini J	330	3	0.91	0.49	1.46	(0.29, 4.28)	318	0.94
Masud A	614	4	0.65	0.71	0.73	(0.20, 1.86)	570	0.41
#Morris W	709	9	1.27	0.85	1.18	(0.54, 2.24)	666	0.21
All Others	1	0	0.00	0.23	0.00	(0.00, 100.0)	1	0.00
TOTAL	2781	26	0.93	0.67	1.11	(0.72, 1.62)	2613	0.48
Montefiore Medical Center - Einstein Division								
Brown D	290	4	1.38	0.83	1.32	(0.36, 3.38)	252	0.99
Gotsis W	426	2	0.47	0.52	0.71	(0.08, 2.57)	402	0.00
Monrad E	467	6	1.28	0.67	1.51	(0.55, 3.28)	432	1.09
##Perry-Bottinger L	30	0	0.00	0.23	0.00	(0.00,42.16)	30	0.00
Silverman G	338	2	0.59	0.68	0.69	(0.08, 2.48)	303	0.32
All Others	140	0	0.00	0.88	0.00	(0.00, 2.35)	130	0.00
TOTAL	1691	14	0.83	0.67	0.97	(0.53, 1.63)	1549	0.47
Montefiore Medical Center - Moses Division								
Greenberg M	464	4	0.86	0.47	1.46	(0.39, 3.74)	422	0.00
#Grose R	153	1	0.65	0.87	0.59	(0.01, 3.30)	137	0.92
##Johnson M	250	2	0.80	0.54	1.17	(0.13, 4.21)	242	0.65
Menegus M	395	3	0.76	0.76	0.79	(0.16, 2.32)	336	0.49
##Perry-Bottinger L	114	2	1.75	0.37	3.76	(0.42,13.59)	109	2.92
TOTAL	1376	12	0.87	0.60	1.15	(0.59, 2.01)	1246	0.65
Mount Sinai Hospital								
#Ambrose J	79	0	0.00	0.59	0.00	(0.00, 6.26)	76	0.00
Cocke T	448	1	0.22	0.76	0.23	(0.00, 1.29)	410	0.20
##Duvvuri S	95	1	1.05	1.04	0.80	(0.01, 4.47)	81	0.79
Marmur J	933	3	0.32	0.72	0.35	(0.07, 1.03)	855	0.20
Reich D	570	9	1.58	0.87	1.44	(0.66, 2.73)	506	0.90
Sharma S	3003	8	0.27	0.83	0.25 **	(0.11, 0.50)	2895	0.13 **
All Others	354	3	0.85	1.09	0.61	(0.12, 1.79)	324	0.44
TOTAL	5482	25	0.46	0.83	0.43 **	(0.28, 0.64)	5147	0.25 **

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
New York Hospital - Queens								
#Chadi R	1	0	0.00	0.10	0.00	(0.00,100.0)	1	0.00
##Friedman G	10	3	30.00	0.86	27.61 *	(5.55,80.69)	9	10.93 *
##Geizhals M	300	3	1.00	0.49	1.62	(0.33, 4.73)	288	0.72
##Grunwald A	51	1	1.96	0.58	2.68	(0.04,14.93)	47	0.00
Gustafson G	671	9	1.34	1.27	0.83	(0.38, 1.58)	576	0.38
##Koss J	9	0	0.00	0.38	0.00	(0.00,85.91)	7	0.00
Papadakos S	721	7	0.97	1.11	0.69	(0.28, 1.43)	627	0.28
##Perry-Bottinger L	79	1	1.27	0.84	1.19	(0.02, 6.61)	71	1.58
#Wong S	356	3	0.84	0.55	1.22	(0.24, 3.56)	314	0.93
All Others	1	0	0.00	0.06	0.00	(0.00,100.0)	1	0.00
TOTAL	2199	27	1.23	0.95	1.02	(0.67, 1.48)	1941	0.62
New York University Hospitals Center								
#Attubato M	528	4	0.76	0.98	0.61	(0.16, 1.56)	489	0.14
#Bhalla N	154	1	0.65	1.55	0.33	(0.00, 1.85)	139	0.33
#Chinitz L	22	0	0.00	1.08	0.00	(0.00,12.19)	20	0.00
#Feit F	515	2	0.39	0.96	0.32	(0.04, 1.15)	459	0.24
#Keller N	167	5	2.99	2.08	1.14	(0.37, 2.65)	116	0.66
#Levite H	371	3	0.81	1.31	0.49	(0.10, 1.42)	315	0.23
#Winer H	351	5	1.42	1.34	0.84	(0.27, 1.96)	296	0.56
All Others	1	0	0.00	7.25	0.00	(0.00,40.01)	1	0.00
TOTAL	2109	20	0.95	1.23	0.61	(0.37, 0.94)	1835	0.28
North Shore University Hospital								
Albanese J	210	0	0.00	0.37	0.00	(0.00, 3.77)	203	0.00
##Deutsch E	262	0	0.00	0.39	0.00	(0.00, 2.82)	258	0.00
##Friedman G	344	3	0.87	0.60	1.16	(0.23, 3.38)	288	0.49
#Gambino A	112	1	0.89	0.36	1.97	(0.03,10.93)	101	1.54
#Green S	1139	9	0.79	0.81	0.77	(0.35, 1.47)	930	0.35
##Grunwald A	9	0	0.00	0.32	0.00	(0.00,100.0)	8	0.00
#Kaplan B	922	4	0.43	0.68	0.50	(0.14, 1.29)	769	0.31
#Katz S	1039	4	0.38	0.89	0.34	(0.09, 0.88)	900	0.12
##Koss J	6	0	0.00	0.56	0.00	(0.00,86.48)	5	0.00
#Marchant D	494	2	0.40	0.93	0.34	(0.04, 1.24)	387	0.00
#Ong L Y	1286	3	0.23	0.71	0.26 **	(0.05, 0.76)	1114	0.00 **
##Padmanabhan V	415	3	0.72	0.63	0.91	(0.18, 2.65)	338	0.88
##Rubino R	357	2	0.56	0.42	1.06	(0.12, 3.84)	333	0.50
#Sassower M	128	0	0.00	0.30	0.00	(0.00, 7.55)	124	0.00
#Schwartz R	528	2	0.38	0.71	0.42	(0.05, 1.51)	496	0.33

Table 3 *continued*

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
North Shore University Hospital <i>continued</i>								
#Witkes D	28	0	0.00	0.54	0.00	(0.00,19.21)	26	0.00
#Zisfein J	362	0	0.00	0.34	0.00	(0.00, 2.38)	352	0.00
All Others	154	0	0.00	0.35	0.00	(0.00, 5.37)	145	0.00
TOTAL	7795	33	0.42	0.68	0.49 **	(0.34, 0.69)	6777	0.22 **
Rochester General Hospital								
Doling M	1107	8	0.72	0.64	0.89	(0.38, 1.75)	1051	0.64
Fitzpatrick P	307	5	1.63	0.96	1.35	(0.43, 3.14)	257	0.76
Gacioch G	361	5	1.39	1.37	0.80	(0.26, 1.86)	287	0.33
#Mathew T C	240	2	0.83	0.75	0.88	(0.10, 3.19)	218	1.12
Mathew T M	633	7	1.11	0.87	1.01	(0.40, 2.08)	577	0.53
#Ong L S	2610	15	0.57	0.70	0.65	(0.36, 1.08)	2426	0.36
Scortichini D	338	0	0.00	0.62	0.00	(0.00, 1.39)	319	0.00
Stuver T	611	14	2.29	1.40	1.29	(0.71, 2.17)	481	0.18
Thompson M	397	6	1.51	1.08	1.11	(0.41, 2.42)	340	0.54
All Others	411	4	0.97	1.06	0.72	(0.19, 1.86)	354	0.37
TOTAL	7015	66	0.94	0.85	0.87	(0.68, 1.11)	6310	0.43
South Nassau Communities Hospital								
#Hamby R	1	0	0.00	0.94	0.00	(0.00,100.0)	.	.
#Lituchy A	2	0	0.00	0.79	0.00	(0.00,100.0)	.	.
#Minadeo J	2	0	0.00	1.90	0.00	(0.00,76.16)	.	.
#Petrossian G	2	0	0.00	2.45	0.00	(0.00,59.14)	.	.
#Zisfein J	4	0	0.00	2.78	0.00	(0.00,26.04)	.	.
All Others	1	0	0.00	0.71	0.00	(0.00,100.0)	.	.
TOTAL	12	0	0.00	1.92	0.00	(0.00,12.56)	.	.
St. Elizabeth Hospital								
Kelberman M	314	2	0.64	0.51	0.98	(0.11, 3.55)	308	0.55
Macisaac H	434	2	0.46	0.59	0.62	(0.07, 2.25)	421	0.22
#Mathew T C	289	5	1.73	0.65	2.12	(0.68, 4.95)	275	1.10
Nassif R	397	5	1.26	0.57	1.75	(0.56, 4.09)	387	0.93
Patel A	250	1	0.40	0.41	0.77	(0.01, 4.31)	246	0.45
Varma P	262	0	0.00	0.43	0.00	(0.00, 2.55)	259	0.00
All Others	56	0	0.00	0.37	0.00	(0.00,14.06)	55	0.00
TOTAL	2002	15	0.75	0.53	1.11	(0.62, 1.84)	1951	0.55
St. Francis Hospital								
Abittan M	778	2	0.26	0.69	0.29	(0.03, 1.06)	746	0.12
#Berke A	418	2	0.48	1.53	0.25	(0.03, 0.89)	376	0.00
Ezratty A	423	2	0.47	0.70	0.54	(0.06, 1.94)	401	0.54
Goldman A	335	2	0.60	1.19	0.40	(0.04, 1.43)	298	0.39
Gulotta R	414	3	0.72	0.69	0.82	(0.17, 2.41)	385	0.69
Gulotta S	248	1	0.40	0.53	0.60	(0.01, 3.34)	243	0.37

Table 3 *continued*

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
St. Francis Hospital <i>continued</i>								
#Hamby R	350	0	0.00	0.28	0.00	(0.00, 2.91)	347	0.00
Hershman R	245	0	0.00	0.44	0.00	(0.00, 2.68)	237	0.00
#Lituchy A	615	3	0.49	0.99	0.39	(0.08, 1.14)	546	0.14
#Minadeo J	717	8	1.12	1.13	0.78	(0.34, 1.54)	611	0.47
Monteleone B	50	1	2.00	1.56	1.01	(0.01, 5.64)	45	0.00
Oruci E	416	1	0.24	0.80	0.24	(0.00, 1.32)	396	0.21
Pappas T	705	1	0.14	0.66	0.17	(0.00, 0.94)	673	0.00
#Petrossian G	611	3	0.49	0.60	0.65	(0.13, 1.89)	576	0.22
Randall A	182	2	1.10	0.99	0.87	(0.10, 3.15)	176	0.68
Rehman A	240	5	2.08	1.49	1.11	(0.36, 2.58)	202	0.80
Shlofmitz R	1268	12	0.95	0.54	1.39	(0.72, 2.42)	1223	0.69
Venditto J	383	1	0.26	0.57	0.36	(0.00, 2.00)	347	0.26
All Others	47	1	2.13	0.89	1.89	(0.02,10.51)	36	2.50
TOTAL	8445	50	0.59	0.79	0.59**	(0.44, 0.78)	7864	0.35
St. Josephs Hospital Health Center								
#Amin N	129	2	1.55	0.55	2.24	(0.25, 8.09)	99	1.04
#Bhan R	269	1	0.37	0.58	0.50	(0.01, 2.80)	244	0.00
#Caputo R	827	6	0.73	0.65	0.89	(0.32, 1.93)	749	0.14
#Esente P	816	7	0.86	0.56	1.20	(0.48, 2.48)	740	0.52
#Ford T	115	2	1.74	1.13	1.21	(0.14, 4.38)	89	0.00
#Giambartolomei A	583	9	1.54	1.01	1.21	(0.55, 2.29)	524	1.01
#Lozner E	84	2	2.38	1.50	1.25	(0.14, 4.53)	58	0.00
#Picone M	120	2	1.67	0.87	1.52	(0.17, 5.49)	86	2.00
#Reger M	459	3	0.65	0.74	0.69	(0.14, 2.03)	415	0.00
#Simons A	665	1	0.15	0.44	0.27	(0.00, 1.49)	615	0.24
#Walford G	499	2	0.40	0.67	0.47	(0.05, 1.71)	438	0.00
TOTAL	4566	37	0.81	0.69	0.93	(0.66, 1.28)	4057	0.38
St. Lukes Roosevelt Hospital-St. Lukes Div.								
##Geizhals M	46	0	0.00	1.60	0.00	(0.00, 3.95)	45	0.00
##Giedd K	1	0	0.00	0.87	0.00	(0.00,100.0)	1	0.00
Leber R	185	2	1.08	0.50	1.69	(0.19, 6.11)	171	0.82
Palazzo A	132	1	0.76	1.21	0.50	(0.01, 2.76)	111	0.00
##Rubino R	10	0	0.00	0.28	0.00	(0.00,100.0)	10	0.00
Simon C	247	1	0.40	0.54	0.59	(0.01, 3.28)	243	0.37
Slater J	628	8	1.27	0.60	1.68	(0.72, 3.31)	591	0.59
Tamis J	106	1	0.94	0.56	1.33	(0.02, 7.42)	95	1.27
All Others	104	0	0.00	0.72	0.00	(0.00, 3.89)	100	0.00
TOTAL	1459	13	0.89	0.67	1.05	(0.56, 1.80)	1367	0.47
St. Peters Hospital								
#Card H	169	0	0.00	0.61	0.00	(0.00, 2.79)	161	0.00

Table 3 continued

	All Cases						Non-Emergency	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
#Delago A	14	0	0.00	2.06	0.00	(0.00, 10.07)	3	0.00
#Desantis J	252	1	0.40	0.47	0.67	(0.01, 3.72)	240	0.53
#Esper D	267	5	1.87	1.08	1.37	(0.44, 3.19)	223	0.70
#Herman B	167	0	0.00	0.33	0.00	(0.00, 5.19)	162	0.00
##Kufs W	12	0	0.00	0.20	0.00	(0.00, 100.0)	11	0.00
#Marmulstein M	375	5	1.33	0.78	1.35	(0.43, 3.15)	306	0.43
#Martinelli M	743	5	0.67	0.72	0.74	(0.24, 1.73)	641	0.19
#Papandrea L	379	2	0.53	1.16	0.36	(0.04, 1.30)	326	0.00
#Roccario E	718	4	0.56	0.75	0.58	(0.16, 1.50)	613	0.65
All Others	96	1	1.04	1.31	0.63	(0.01, 3.49)	83	0.00
TOTAL	3192	23	0.72	0.79	0.72	(0.46, 1.08)	2769	0.34
St. Vincents Hospital and Medical Center								
Acuna D	59	1	1.69	1.30	1.03	(0.01, 5.74)	47	0.00
#Ambrose J	80	0	0.00	0.57	0.00	(0.00, 6.34)	77	0.00
Braff R	142	3	2.11	0.69	2.41	(0.49, 7.05)	130	0.85
#Chen T	38	0	0.00	0.20	0.00	(0.00, 39.07)	38	0.00
Coppola J	603	7	1.16	0.85	1.08	(0.43, 2.23)	527	0.57
Dominguez A	345	2	0.58	1.43	0.32	(0.04, 1.16)	333	0.12
##Duvvuri S	436	0	0.00	0.73	0.00	(0.00, 0.91)	422	0.00
Elmquist T	127	0	0.00	1.10	0.00	(0.00, 2.08)	108	0.00
Farid A	191	2	1.05	0.76	1.08	(0.12, 3.91)	174	0.49
##Giedd K	153	3	1.96	0.40	3.86	(0.78, 11.27)	153	1.93
Homayuni A	346	1	0.29	0.47	0.49	(0.01, 2.70)	333	0.00
##Johnson M	1	0	0.00	0.07	0.00	(0.00, 100.0)	1	0.00
#Kantrowitz N	227	3	1.32	0.68	1.53	(0.31, 4.48)	217	0.00
##Kwan T	274	0	0.00	0.31	0.00	(0.00, 3.37)	269	0.00
Malpeso J	313	2	0.64	0.32	1.56	(0.17, 5.62)	303	0.49
McCord D	79	0	0.00	0.24	0.00	(0.00, 15.30)	77	0.00
Mulkay A	11	0	0.00	0.17	0.00	(0.00, 100.0)	10	0.00
#Rentrop K	284	1	0.35	0.52	0.54	(0.01, 2.98)	279	0.37
Seldon M	108	1	0.93	1.16	0.63	(0.01, 3.50)	87	0.00
Snyder S	204	1	0.49	0.32	1.22	(0.02, 6.80)	201	0.72
Warchol A	124	0	0.00	0.41	0.00	(0.00, 5.75)	118	0.00
#Wilentz J	102	2	1.96	0.38	4.09	(0.46, 14.76)	98	1.53
All Others	68	1	1.47	2.07	0.56	(0.01, 3.13)	47	0.00
TOTAL	4315	30	0.70	0.69	0.79	(0.54, 1.13)	4049	0.31

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
State University Hospital Upstate Medical Center								
#Battaglia J	16	0	0.00	0.67	0.00	(0.00, 27.14)	15	0.00
#Berkery W	44	1	2.27	0.86	2.09	(0.03, 11.63)	40	0.00
Phadke K	352	6	1.70	1.29	1.05	(0.38, 2.28)	315	0.88
All Others	42	1	2.38	0.44	4.27	(0.06, 23.78)	39	2.66
TOTAL	454	8	1.76	1.15	1.22	(0.52, 2.39)	409	0.95
Strong Memorial Hospital								
Cove C	643	16	2.49	1.20	1.63 *	(0.93, 2.65)	533	1.25 *
Cutlip D	588	9	1.53	1.55	0.78	(0.36, 1.48)	479	0.57
Ling F	836	11	1.32	1.64	0.63	(0.32, 1.13)	653	0.29
#Ong L S	30	1	3.33	0.79	3.34	(0.04,18.58)	30	2.06
Pomerantz R	343	5	1.46	1.66	0.70	(0.22, 1.62)	250	0.40
All Others	104	3	2.88	2.14	1.07	(0.21, 3.12)	79	0.00
TOTAL	2544	45	1.77	1.52	0.92	(0.67, 1.23)	2024	0.68
United Health Services - Wilson Division								
Jamal N	697	5	0.72	1.38	0.41	(0.13, 0.96)	588	0.27
Kashou H	522	8	1.53	1.36	0.89	(0.38, 1.75)	449	0.33
Phillips W	523	4	0.76	0.95	0.64	(0.17, 1.64)	481	0.18
Rehman A U	284	4	1.41	1.49	0.75	(0.20, 1.92)	232	0.88
Stamato N	246	3	1.22	1.42	0.68	(0.14, 1.98)	199	0.58
Traverse P	607	5	0.82	1.01	0.65	(0.21, 1.51)	541	0.18
TOTAL	2879	29	1.01	1.23	0.65	(0.43, 0.93)	2490	0.34
University Hospital at Stony Brook								
Chernilas J	203	3	1.48	0.65	1.80	(0.36, 5.25)	173	1.28
Dervan J	467	6	1.28	0.65	1.55	(0.57, 3.38)	437	1.32 *
#Grella R	477	7	1.47	0.65	1.79	(0.72, 3.69)	444	0.95
Korlipara G	286	0	0.00	0.35	0.00	(0.00, 2.90)	275	0.00
Lawson W	558	5	0.90	0.79	0.90	(0.29, 2.09)	478	0.53
Novotny H	467	2	0.43	0.48	0.71	(0.08, 2.56)	408	0.29
Rosenband M	487	8	1.64	0.78	1.67	(0.72, 3.30)	414	0.70
All Others	206	1	0.49	0.39	0.98	(0.01, 5.47)	185	0.00
TOTAL	3151	32	1.02	0.62	1.28 *	(0.88, 1.81)	2814	0.70
University Hospital of Brooklyn								
Afflu E	48	2	4.17	0.28	11.57 *	(1.30,41.79)	46	3.49
Alam M	247	2	0.81	0.77	0.83	(0.09, 2.98)	221	0.98
#Chadi R	126	1	0.79	0.41	1.52	(0.02, 8.48)	124	1.46
Chadow H	400	4	1.00	0.56	1.42	(0.38, 3.63)	374	1.06
Feit A	223	1	0.45	0.50	0.71	(0.01, 3.97)	195	0.70
##Kwan T	29	0	0.00	0.25	0.00	(0.00,40.22)	27	0.00
All Others	133	0	0.00	0.31	0.00	(0.00, 6.94)	132	0.00
TOTAL	1206	10	0.83	0.53	1.24	(0.59, 2.27)	1119	0.95 *

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Vassar Brothers Hospital								
#Jafar M	279	2	0.72	0.97	0.58	(0.07, 2.10)	203	0.00
#Kantaros L	129	0	0.00	0.79	0.00	(0.00, 2.86)	108	0.00
All Others	12	0	0.00	0.37	0.00	(0.00,65.20)	12	0.00
TOTAL	420	2	0.48	0.90	0.42	(0.05, 1.51)	323	0.00
Weill Cornell - NY Presbyterian Hospital								
Bergman G	719	13	1.81	0.86	1.67 *	(0.89, 2.85)	651	0.94
#Bhalla N	89	0	0.00	0.52	0.00	(0.00, 6.28)	86	0.00
#Charney R	165	1	0.61	0.47	1.02	(0.01, 5.66)	156	0.00
##Deutsch E	427	3	0.70	1.03	0.54	(0.11, 1.58)	385	0.38
Hong M	265	2	0.75	1.77	0.34	(0.04, 1.22)	225	0.33
##Kwan T	54	0	0.00	0.33	0.00	(0.00,16.42)	53	0.00
#Messinger D	124	0	0.00	0.98	0.00	(0.00, 2.39)	113	0.00
Parikh M	1028	6	0.58	0.84	0.55	(0.20, 1.20)	966	0.44
Reddy C	414	1	0.24	0.29	0.66	(0.01, 3.68)	412	0.41
Sanborn T	405	3	0.74	0.48	1.23	(0.25, 3.58)	375	0.65
##Shaknovich A	302	2	0.66	0.37	1.41	(0.16, 5.11)	275	0.75
##Wasserman H	1	0	0.00	0.04	0.00	(0.00,100.0)	1	0.00
#Wong S	291	1	0.34	0.49	0.56	(0.01, 3.11)	270	0.00
TOTAL	4284	32	0.75	0.75	0.79	(0.54, 1.11)	3968	0.48
Westchester Medical Center								
#Charney R	125	0	0.00	0.37	0.00	(0.00, 6.25)	123	0.00
Cohen M	903	8	0.88	0.85	0.83	(0.36, 1.63)	807	0.46
Hjemdahl-Monsen C	1329	14	1.05	1.00	0.83	(0.46, 1.40)	1183	0.33
Kalapatapu K	504	6	1.19	1.05	0.90	(0.33, 1.95)	426	0.00
#Messinger D	87	0	0.00	0.61	0.00	(0.00, 5.46)	87	0.00
Pucillo A	834	7	0.84	0.77	0.86	(0.34, 1.76)	755	0.32
Weiss M	708	4	0.56	0.72	0.62	(0.17, 1.58)	645	0.16
TOTAL	4490	39	0.87	0.86	0.80	(0.57, 1.09)	4026	0.27
Winthrop - University Hospital								
#Chen T	1	0	0.00	0.01	0.00	(0.00,100.0)	1	0.00
##Deutsch E	3	1	33.33	0.85	30.97	(0.40,100.0)	3	11.22
#Gambino A	600	1	0.17	0.48	0.27	(0.00, 1.52)	557	0.00
#Grella R	5	0	0.00	0.23	0.00	(0.00,100.0)	5	0.00
Guidera S	747	10	1.34	1.26	0.84	(0.40, 1.54)	655	0.14
Marzo K	895	4	0.45	0.49	0.71	(0.19, 1.83)	816	0.00
##Padmanabhan V	42	1	2.38	0.54	3.49	(0.05,19.42)	38	0.00
##Rubino R	19	0	0.00	0.34	0.00	(0.00,44.82)	18	0.00
#Sassower M	345	0	0.00	1.00	0.00	(0.00, 0.84)	297	0.00
#Schwartz R	598	4	0.67	0.68	0.78	(0.21, 1.99)	553	0.51
#Witkes D	229	0	0.00	0.46	0.00	(0.00, 2.78)	214	0.00

Table 3 *continued*

	Cases	Deaths	All Cases				Non-Emergency	
			OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Winthrop - University Hospital <i>continued</i>								
All Others	245	2	0.82	0.64	1.01	(0.11, 3.66)	227	0.00
TOTAL	3729	23	0.62	0.73	0.67	(0.42, 1.00)	3384	0.18 **
STATEWIDE TOTAL	108282	856	0.79				98090	0.40

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

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

Performed procedures in another New York State hospital.

Performed procedures in two or more other New York State hospitals.

Table 4 Summary Information for Cardiologists Practicing at More Than One Hospital, 1998-2000.

	All Cases						Non-Emergency	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Ambrose J	159	0	0.00	0.58	0.00	(0.00, 3.15)	153	0.00
Mount Sinai Hospital	79	0	0.00	0.59	0.00	(0.00, 6.26)	76	0.00
St. Vincents	80	0	0.00	0.57	0.00	(0.00, 6.34)	77	0.00
Amin N	277	3	1.08	0.61	1.40	(0.28, 4.09)	229	0.55
Crouse	148	1	0.68	0.67	0.80	(0.01, 4.45)	130	0.00
St. Josephs	129	2	1.55	0.55	2.24	(0.25, 8.09)	99	1.04
Attubato M	635	6	0.94	1.00	0.75	(0.27, 1.63)	586	0.27
Bellevue	107	2	1.87	1.05	1.40	(0.16, 5.06)	97	1.69
NYU Medical Center	528	4	0.76	0.98	0.61	(0.16, 1.56)	489	0.14
Battaglia J	776	8	1.03	0.53	1.54	(0.66, 3.04)	654	0.55
Crouse	760	8	1.05	0.53	1.58	(0.68, 3.12)	639	0.58
Upstate Medical Center	16	0	0.00	0.67	0.00	(0.00,27.14)	15	0.00
Berke A	422	2	0.47	1.51	0.25	(0.03, 0.89)	380	0.00
Columbia Presbyterian	4	0	0.00	0.11	0.00	(0.00,100.0)	4	0.00
St. Francis	418	2	0.48	1.53	0.25	(0.03, 0.89)	376	0.00
Berkery W	327	3	0.92	1.37	0.53	(0.11, 1.55)	233	0.00
Crouse	283	2	0.71	1.45	0.39	(0.04, 1.40)	193	0.00
Upstate Medical Center	44	1	2.27	0.86	2.09	(0.03,11.63)	40	0.00
Bhalla N	243	1	0.41	1.17	0.28	(0.00, 1.55)	225	0.27
NYU Medical Center	154	1	0.65	1.55	0.33	(0.00, 1.85)	139	0.33
Weill Cornell	89	0	0.00	0.52	0.00	(0.00, 6.28)	86	0.00
Bhan R	284	2	0.70	0.58	0.96	(0.11, 3.48)	256	0.55
Crouse	15	1	6.67	0.46	11.34	(0.15,63.08)	12	19.89
St. Josephs	269	1	0.37	0.58	0.50	(0.01, 2.80)	244	0.00
Calandra S	393	2	0.51	0.43	0.94	(0.11, 3.39)	381	0.93
Erie County	1	0	0.00	0.11	0.00	(0.00,100.0)	1	0.00
Millard Fillmore	392	2	0.51	0.43	0.94	(0.11, 3.40)	380	0.93
Caputo R	967	7	0.72	0.67	0.86	(0.34, 1.76)	881	0.12
Crouse	140	1	0.71	0.79	0.72	(0.01, 3.98)	132	0.00
St. Josephs	827	6	0.73	0.65	0.89	(0.32, 1.93)	749	0.14
Card H	238	1	0.42	0.72	0.46	(0.01, 2.56)	224	0.00
Ellis Hospital	69	1	1.45	0.99	1.16	(0.02, 6.45)	63	0.00
St. Peters	169	0	0.00	0.61	0.00	(0.00, 2.79)	161	0.00
Chadi R	127	1	0.79	0.41	1.52	(0.02, 8.46)	125	1.45
New York Hospital - Queens	1	0	0.00	0.10	0.00	(0.00,100.0)	1	0.00
Univ Hosp, Brooklyn	126	1	0.79	0.41	1.52	(0.02, 8.48)	124	1.46
Charney R	290	1	0.34	0.43	0.64	(0.01, 3.55)	279	0.00
Weill Cornell	165	1	0.61	0.47	1.02	(0.01, 5.66)	156	0.00
Westchester Medical Center	125	0	0.00	0.37	0.00	(0.00, 6.25)	123	0.00

Table 4 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Chen T	39	0	0.00	0.19	0.00	(0.00,39.00)	39	0.00
St. Vincents	38	0	0.00	0.20	0.00	(0.00,39.07)	38	0.00
Winthrop - University Hospital	1	0	0.00	0.01	0.00	(0.00,100.0)	1	0.00
Chinitz L	25	0	0.00	1.11	0.00	(0.00,10.42)	21	0.00
Bellevue	3	0	0.00	1.34	0.00	(0.00,72.02)	1	0.00
NYU Medical Center	22	0	0.00	1.08	0.00	(0.00,12.19)	20	0.00
Dashkoff N	374	0	0.00	0.60	0.00	(0.00, 1.28)	366	0.00
Erie County	371	0	0.00	0.61	0.00	(0.00, 1.29)	363	0.00
Millard Fillmore	3	0	0.00	0.31	0.00	(0.00,100.0)	3	0.00
Delago A	2129	27	1.27	0.98	1.02	(0.67, 1.49)	1933	0.59
Albany Med Center	2115	27	1.28	0.97	1.04	(0.68, 1.51)	1930	0.60
St. Peters	14	0	0.00	2.06	0.00	(0.00,10.07)	3	0.00
Desantis J	253	1	0.40	0.47	0.66	(0.01, 3.69)	240	0.53
Albany Med Center	1	0	0.00	0.82	0.00	(0.00,100.0)	0	0.00
St. Peters	252	1	0.40	0.47	0.67	(0.01, 3.72)	240	0.53
Deutsch E	692	4	0.58	0.79	0.58	(0.16, 1.49)	646	0.42
North Shore	262	0	0.00	0.39	0.00	(0.00, 2.82)	258	0.00
Weill Cornell	427	3	0.70	1.03	0.54	(0.11, 1.58)	385	0.38
Winthrop - University Hospital	3	1	33.33	0.85	30.97	(0.40,100.0)	3	11.22
Duvvuri S	714	2	0.28	0.71	0.31	(0.04, 1.13)	682	0.12
Beth Israel	183	1	0.55	0.49	0.87	(0.01, 4.86)	179	0.00
Mount Sinai Hospital	95	1	1.05	1.04	0.80	(0.01, 4.47)	81	0.79
St. Vincents	436	0	0.00	0.73	0.00	(0.00, 0.91)	422	0.00
Emerson R	142	2	1.41	0.64	1.74	(0.20, 6.28)	128	1.11
Buffalo General Hospital	18	0	0.00	2.41	0.00	(0.00, 6.68)	17	0.00
Millard Fillmore	124	2	1.61	0.38	3.33	(0.37,12.01)	111	1.30
Esente P	966	7	0.72	0.55	1.05	(0.42, 2.16)	884	0.42
Crouse	150	0	0.00	0.46	0.00	(0.00, 4.18)	144	0.00
St. Josephs	816	7	0.86	0.56	1.20	(0.48, 2.48)	740	0.52
Esper D	739	13	1.76	1.18	1.18	(0.63, 2.01)	601	0.71
Albany Med Center	472	8	1.69	1.24	1.08	(0.47, 2.14)	378	0.71
St. Peters	267	5	1.87	1.08	1.37	(0.44, 3.19)	223	0.70
Farhi E	493	3	0.61	0.45	1.08	(0.22, 3.15)	471	0.25
Buffalo General Hospital	459	3	0.65	0.45	1.15	(0.23, 3.35)	438	0.27
Erie County	34	0	0.00	0.39	0.00	(0.00,21.80)	33	0.00
Feit F	638	3	0.47	0.90	0.42	(0.08, 1.21)	576	0.40
Bellevue	123	1	0.81	0.62	1.04	(0.01, 5.76)	117	1.26
NYU Medical Center	515	2	0.39	0.96	0.32	(0.04, 1.15)	459	0.24

Table 4 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Ford T	254	4	1.57	0.78	1.60	(0.43, 4.09)	206	0.00
Crouse	139	2	1.44	0.49	2.34	(0.26, 8.45)	117	0.00
St. Josephs	115	2	1.74	1.13	1.21	(0.14, 4.38)	89	0.00
Friedman G	710	8	1.13	0.78	1.15	(0.49, 2.26)	580	0.72
Long Island Jewish	356	2	0.56	0.95	0.47	(0.05, 1.69)	283	0.00
New York Hospital - Queens	10	3	30.00	0.86	27.61 *	(5.55,80.69)	9	10.93 *
North Shore	344	3	0.87	0.60	1.16	(0.23, 3.38)	288	0.49
Gambino A	712	2	0.28	0.46	0.48	(0.05, 1.73)	658	0.21
North Shore	112	1	0.89	0.36	1.97	(0.03,10.93)	101	1.54
Winthrop - University Hospital	600	1	0.17	0.48	0.27	(0.00, 1.52)	557	0.00
Geizhals M	409	5	1.22	0.70	1.38	(0.44, 3.22)	395	0.71
Lenox Hill	63	2	3.17	1.06	2.37	(0.27, 8.56)	62	1.05
New York Hospital - Queens	300	3	1.00	0.49	1.62	(0.33, 4.73)	288	0.72
St. Lukes	46	0	0.00	1.60	0.00	(0.00, 3.95)	45	0.00
Giambartolomei A	680	11	1.62	1.08	1.18	(0.59, 2.11)	605	1.08
Crouse	97	2	2.06	1.51	1.08	(0.12, 3.89)	81	1.64
St. Josephs	583	9	1.54	1.01	1.21	(0.55, 2.29)	524	1.01
Giedd K	157	3	1.91	0.40	3.78	(0.76,11.04)	157	1.89
Columbia Presbyterian	3	0	0.00	0.14	0.00	(0.00,100.0)	3	0.00
St. Lukes	1	0	0.00	0.87	0.00	(0.00,100.0)	1	0.00
St. Vincents	153	3	1.96	0.40	3.86	(0.78,11.27)	153	1.93
Green S	1153	9	0.78	0.85	0.73	(0.33, 1.38)	932	0.35
Long Island Jewish	14	0	0.00	4.15	0.00	(0.00, 4.98)	2	0.00
North Shore	1139	9	0.79	0.81	0.77	(0.35, 1.47)	930	0.35
Grella R	482	7	1.45	0.64	1.79	(0.72, 3.68)	449	0.94
Univ Hosp, Stony Brook	477	7	1.47	0.65	1.79	(0.72, 3.69)	444	0.95
Winthrop - University Hospital	5	0	0.00	0.23	0.00	(0.00,100.0)	5	0.00
Grose R	297	1	0.34	0.74	0.36	(0.00, 2.01)	271	0.34
Columbia Presbyterian	144	0	0.00	0.59	0.00	(0.00, 3.40)	134	0.00
Montefiore - Moses Division	153	1	0.65	0.87	0.59	(0.01, 3.30)	137	0.92
Grunwald A	637	10	1.57	1.02	1.22	(0.58, 2.24)	525	0.63
Long Island Jewish	577	9	1.56	1.07	1.15	(0.53, 2.19)	470	0.71
New York Hospital - Queens	51	1	1.96	0.58	2.68	(0.04,14.93)	47	0.00
North Shore	9	0	0.00	0.32	0.00	(0.00,100.0)	8	0.00
Hamby R	351	0	0.00	0.29	0.00	(0.00, 2.88)	347	0.00
South Nassau Comm. Hosp.	1	0	0.00	0.94	0.00	(0.00,100.0)	.	.
St. Francis	350	0	0.00	0.28	0.00	(0.00, 2.91)	347	0.00

Table 4 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Herman B	169	0	0.00	0.33	0.00	(0.00, 5.15)	164	0.00
Albany Med Center	2	0	0.00	0.22	0.00	(0.00,100.0)	2	0.00
St. Peters	167	0	0.00	0.33	0.00	(0.00, 5.19)	162	0.00
Jafar M	292	2	0.68	0.94	0.57	(0.06, 2.07)	216	0.00
Albany Med Center	13	0	0.00	0.31	0.00	(0.00,72.15)	13	0.00
Vassar Brothers Hospital	279	2	0.72	0.97	0.58	(0.07, 2.10)	203	0.00
Johnson M	283	2	0.71	0.52	1.07	(0.12, 3.87)	274	0.54
Columbia Presbyterian	32	0	0.00	0.36	0.00	(0.00,24.83)	31	0.00
Montefiore - Moses Division	250	2	0.80	0.54	1.17	(0.13, 4.21)	242	0.65
St. Vincents	1	0	0.00	0.07	0.00	(0.00,100.0)	1	0.00
Kantaros L	170	0	0.00	0.64	0.00	(0.00, 2.67)	149	0.00
Albany Med Center	41	0	0.00	0.18	0.00	(0.00,40.24)	41	0.00
Vassar Brothers Hospital	129	0	0.00	0.79	0.00	(0.00, 2.86)	108	0.00
Kantrowitz N	281	3	1.07	0.63	1.34	(0.27, 3.91)	271	0.00
Beth Israel	54	0	0.00	0.41	0.00	(0.00,12.95)	54	0.00
St. Vincents	227	3	1.32	0.68	1.53	(0.31, 4.48)	217	0.00
Kaplan B	1595	7	0.44	0.94	0.37 **	(0.15, 0.76)	1325	0.28
Long Island Jewish	673	3	0.45	1.30	0.27 **	(0.05, 0.79)	556	0.26
North Shore	922	4	0.43	0.68	0.50	(0.14, 1.29)	769	0.31
Katz S	1093	6	0.55	0.94	0.46	(0.17, 1.01)	927	0.22
Long Island Jewish	54	2	3.70	1.87	1.57	(0.18, 5.67)	27	1.99
North Shore	1039	4	0.38	0.89	0.34	(0.09, 0.88)	900	0.12
Keller N	214	7	3.27	2.07	1.25	(0.50, 2.57)	149	0.52
Bellevue	47	2	4.26	2.04	1.65	(0.19, 5.96)	33	0.00
NYU Medical Center	167	5	2.99	2.08	1.14	(0.37, 2.65)	116	0.66
Koss J	724	4	0.55	0.97	0.45	(0.12, 1.16)	605	0.17
Long Island Jewish	709	4	0.56	0.98	0.46	(0.12, 1.17)	593	0.18
New York Hospital - Queens	9	0	0.00	0.38	0.00	(0.00,85.91)	7	0.00
North Shore	6	0	0.00	0.56	0.00	(0.00,86.48)	5	0.00
Kufs W	266	1	0.38	0.80	0.37	(0.00, 2.07)	247	0.46
Albany Med Center	20	0	0.00	0.34	0.00	(0.00,42.08)	18	0.00
Ellis Hospital	234	1	0.43	0.87	0.39	(0.01, 2.16)	218	0.50
St. Peters	12	0	0.00	0.20	0.00	(0.00,100.0)	11	0.00
Kwan T	357	0	0.00	0.31	0.00	(0.00, 2.61)	349	0.00
St. Vincents	274	0	0.00	0.31	0.00	(0.00, 3.37)	269	0.00
Univ Hosp, Brooklyn	29	0	0.00	0.25	0.00	(0.00,40.22)	27	0.00
Weill Cornell	54	0	0.00	0.33	0.00	(0.00,16.42)	53	0.00

Table 4 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Levite H	441	6	1.36	1.35	0.80	(0.29, 1.74)	364	0.39
Bellevue	70	3	4.29	1.52	2.22	(0.45, 6.50)	49	1.55
NYU Medical Center	371	3	0.81	1.31	0.49	(0.10, 1.42)	315	0.23
Lituchy A	617	3	0.49	0.99	0.39	(0.08, 1.14)	546	0.14
South Nassau Comm. Hosp.	2	0	0.00	0.79	0.00	(0.00,100.0)	.	.
St. Francis	615	3	0.49	0.99	0.39	(0.08, 1.14)	546	0.14
Lozner E	228	3	1.32	1.30	0.80	(0.16, 2.33)	179	0.00
Crouse	144	1	0.69	1.19	0.46	(0.01, 2.58)	121	0.00
St. Josephs	84	2	2.38	1.50	1.25	(0.14, 4.53)	58	0.00
Marchant D	502	2	0.40	1.02	0.31	(0.03, 1.12)	388	0.00
Long Island Jewish	8	0	0.00	6.43	0.00	(0.00, 5.64)	1	0.00
North Shore	494	2	0.40	0.93	0.34	(0.04, 1.24)	387	0.00
Marmulstein M	406	5	1.23	0.75	1.30	(0.42, 3.03)	333	0.41
Albany Med Center	31	0	0.00	0.35	0.00	(0.00,26.72)	27	0.00
St. Peters	375	5	1.33	0.78	1.35	(0.43, 3.15)	306	0.43
Martinelli M	757	5	0.66	0.71	0.74	(0.24, 1.72)	654	0.19
Albany Med Center	14	0	0.00	0.25	0.00	(0.00,82.48)	13	0.00
St. Peters	743	5	0.67	0.72	0.74	(0.24, 1.73)	641	0.19
Mathew T C	529	7	1.32	0.69	1.51	(0.61, 3.12)	493	1.11
Rochester General Hospital	240	2	0.83	0.75	0.88	(0.10, 3.19)	218	1.12
St. Elizabeth Hopital	289	5	1.73	0.65	2.12	(0.68, 4.95)	275	1.10
Messinger D	211	0	0.00	0.83	0.00	(0.00, 1.66)	200	0.00
Weill Cornell	124	0	0.00	0.98	0.00	(0.00, 2.39)	113	0.00
Westchester Medical Center	87	0	0.00	0.61	0.00	(0.00, 5.46)	87	0.00
Minadeo J	719	8	1.11	1.13	0.78	(0.33, 1.53)	611	0.47
South Nassau Comm. Hosp.	2	0	0.00	1.90	0.00	(0.00,76.16)	.	.
St. Francis	717	8	1.12	1.13	0.78	(0.34, 1.54)	611	0.47
Morris W	1058	12	1.13	0.70	1.28	(0.66, 2.24)	1011	0.40
Buffalo General Hospital	349	3	0.86	0.39	1.73	(0.35, 5.05)	345	0.75
Millard Fillmore	709	9	1.27	0.85	1.18	(0.54, 2.24)	666	0.21
Ong L S	2640	16	0.61	0.70	0.69	(0.39, 1.12)	2456	0.39
Rochester General Hospital	2610	15	0.57	0.70	0.65	(0.36, 1.08)	2426	0.36
Strong Memorial Hospital	30	1	3.33	0.79	3.34	(0.04,18.58)	30	2.06
Ong L Y	1291	3	0.23	0.71	0.26 **	(0.05, 0.76)	1117	0.00 **
Long Island Jewish	5	0	0.00	0.59	0.00	(0.00,98.99)	3	0.00
North Shore	1286	3	0.23	0.71	0.26 **	(0.05, 0.76)	1114	0.00 **

Table 4 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Padmanabhan V	472	4	0.85	0.61	1.09	(0.29, 2.79)	387	0.75
Long Island Jewish	15	0	0.00	0.36	0.00	(0.00,54.16)	11	0.00
North Shore	415	3	0.72	0.63	0.91	(0.18, 2.65)	338	0.88
Winthrop - University Hospital	42	1	2.38	0.54	3.49	(0.05,19.42)	38	0.00
Papandrea L	509	6	1.18	1.25	0.75	(0.27, 1.62)	411	0.22
Albany Med Center	130	4	3.08	1.50	1.62	(0.44, 4.15)	85	1.03
St. Peters	379	2	0.53	1.16	0.36	(0.04, 1.30)	326	0.00
Patel R	104	1	0.96	0.67	1.14	(0.01, 6.33)	102	0.71
Beth Israel	91	1	1.10	0.69	1.26	(0.02, 7.00)	89	0.79
Long Island Jewish	13	0	0.00	0.51	0.00	(0.00,43.48)	13	0.00
Perry-Bottinger L	223	3	1.35	0.52	2.06	(0.41, 6.01)	210	2.00
Montefiore - Einstein Division	30	0	0.00	0.23	0.00	(0.00,42.16)	30	0.00
Montefiore - Moses Division	114	2	1.75	0.37	3.76	(0.42,13.59)	109	2.92
New York Hospital - Queens	79	1	1.27	0.84	1.19	(0.02, 6.61)	71	1.58
Petrosian G	613	3	0.49	0.61	0.64	(0.13, 1.86)	576	0.22
South Nassau Comm. Hosp.	2	0	0.00	2.45	0.00	(0.00,59.14)	.	.
St. Francis	611	3	0.49	0.60	0.65	(0.13, 1.89)	576	0.22
Picone M	274	2	0.73	0.73	0.79	(0.09, 2.86)	223	0.79
Crouse	154	0	0.00	0.62	0.00	(0.00, 3.03)	137	0.00
St. Josephs	120	2	1.67	0.87	1.52	(0.17, 5.49)	86	2.00
Reger M	532	3	0.56	0.73	0.61	(0.12, 1.79)	484	0.00
Crouse	73	0	0.00	0.64	0.00	(0.00, 6.25)	69	0.00
St. Josephs	459	3	0.65	0.74	0.69	(0.14, 2.03)	415	0.00
Rentrop K	285	1	0.35	0.52	0.53	(0.01, 2.98)	280	0.37
Columbia Presbyterian	1	0	0.00	0.31	0.00	(0.00,100.0)	1	0.00
St. Vincents	284	1	0.35	0.52	0.54	(0.01, 2.98)	279	0.37
Roccario E	730	4	0.55	0.74	0.58	(0.16, 1.49)	624	0.64
Albany Med Center	12	0	0.00	0.15	0.00	(0.00,100.0)	11	0.00
St. Peters	718	4	0.56	0.75	0.58	(0.16, 1.50)	613	0.65
Rubino R	419	2	0.48	0.40	0.94	(0.11, 3.40)	392	0.42
Beth Israel	17	0	0.00	0.20	0.00	(0.00,84.66)	16	0.00
Long Island Jewish	16	0	0.00	0.42	0.00	(0.00,43.06)	15	0.00
North Shore	357	2	0.56	0.42	1.06	(0.12, 3.84)	333	0.50
St. Lukes	10	0	0.00	0.28	0.00	(0.00,100.0)	10	0.00
Winthrop - University Hospital	19	0	0.00	0.34	0.00	(0.00,44.82)	18	0.00
Sacchi T	651	2	0.31	0.43	0.57	(0.06, 2.05)	649	0.16
Beth Israel	176	0	0.00	0.34	0.00	(0.00, 4.81)	176	0.00
Maimonides Medical Center	475	2	0.42	0.46	0.72	(0.08, 2.61)	473	0.20

Table 4 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Sassower M	473	0	0.00	0.81	0.00**	(0.00, 0.76)	421	0.00
North Shore	128	0	0.00	0.30	0.00	(0.00, 7.55)	124	0.00
Winthrop - University Hospital	345	0	0.00	1.00	0.00	(0.00, 0.84)	297	0.00
Schwartz R	1126	6	0.53	0.70	0.61	(0.22, 1.32)	1049	0.43
North Shore	528	2	0.38	0.71	0.42	(0.05, 1.51)	496	0.33
Winthrop - University Hospital	598	4	0.67	0.68	0.78	(0.21, 1.99)	553	0.51
Shaknovich A	739	3	0.41	0.42	0.77	(0.16, 2.25)	705	0.42
Beth Israel	165	0	0.00	0.52	0.00	(0.00, 3.38)	163	0.00
Lenox Hill	272	1	0.37	0.40	0.72	(0.01, 4.00)	267	0.43
Weill Cornell	302	2	0.66	0.37	1.41	(0.16, 5.11)	275	0.75
Simons A	774	1	0.13	0.47	0.22	(0.00, 1.21)	712	0.21
Crouse	109	0	0.00	0.63	0.00	(0.00, 4.20)	97	0.00
St. Josephs	665	1	0.15	0.44	0.27	(0.00, 1.49)	615	0.24
Walford G	547	2	0.37	0.67	0.43	(0.05, 1.56)	483	0.00
Crouse	48	0	0.00	0.67	0.00	(0.00, 9.04)	45	0.00
St. Josephs	499	2	0.40	0.67	0.47	(0.05, 1.71)	438	0.00
Wasserman H	219	8	3.65	0.71	4.06*	(1.75, 8.01)	180	3.87*
Arnot-Ogden Memorial	4	0	0.00	0.42	0.00	(0.00,100.0)	3	0.00
Columbia Presbyterian	214	8	3.74	0.72	4.11*	(1.77, 8.10)	176	3.92*
Weill Cornell	1	0	0.00	0.04	0.00	(0.00,100.0)	1	0.00
Wilentz J	472	3	0.64	0.41	1.23	(0.25, 3.59)	457	0.53
Beth Israel	370	1	0.27	0.42	0.51	(0.01, 2.85)	359	0.32
St. Vincents	102	2	1.96	0.38	4.09	(0.46,14.76)	98	1.53
Winer H	454	6	1.32	1.16	0.90	(0.33, 1.96)	386	0.71
Bellevue	103	1	0.97	0.54	1.42	(0.02, 7.91)	90	1.55
NYU Medical Center	351	5	1.42	1.34	0.84	(0.27, 1.96)	296	0.56
Witkes D	257	0	0.00	0.46	0.00	(0.00, 2.43)	240	0.00
North Shore	28	0	0.00	0.54	0.00	(0.00,19.21)	26	0.00
Winthrop - University Hospital	229	0	0.00	0.46	0.00	(0.00, 2.78)	214	0.00
Wong S	647	4	0.62	0.52	0.94	(0.25, 2.41)	584	0.55
New York Hospital - Queens	356	3	0.84	0.55	1.22	(0.24, 3.56)	314	0.93
Weill Cornell	291	1	0.34	0.49	0.56	(0.01, 3.11)	270	0.00
Zisfein J	366	0	0.00	0.36	0.00	(0.00, 2.18)	352	0.00
North Shore	362	0	0.00	0.34	0.00	(0.00, 2.38)	352	0.00
South Nassau Comm. Hosp.	4	0	0.00	2.78	0.00	(0.00,26.04)	.	.

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

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

Criteria Used in Reporting Significant Risk Factors (2000)

Based on Documentation in Medical Record

Patient Risk Factor	Definitions
Hemodynamic State	
• Unstable	Determined just prior to the intervention
• Shock	Patient requires pharmacologic or mechanical support to maintain blood pressure or cardiac output Acute hypotension (systolic blood pressure < 80 mmHg) or low cardiac index (< 2.0 liters/min/m ²), despite pharmacologic or mechanical support
• Cardiopulmonary Resuscitation	Patient requires cardiopulmonary resuscitation within one hour of the procedure
Comorbidities	
• Chronic Obstructive Pulmonary Disease (COPD)	Patients who require chronic (longer than three months), bronchodilator therapy to avoid disability from obstructive airway disease; has a forced expiratory volume in one second of less than 75% of the predicted value or less than 1.25 liters; or has a room air pO ₂ <60 or a pCO ₂ >50
• Congestive Heart Failure (CHF), This Admission	Congestive heart failure at NYHA Level III or IV occurring during this admission
• Congestive Heart Failure (CHF), Before This Admission	The patient has been treated for congestive heart failure previous to this admission and may remain on medication, but has not had congestive heart failure at NYHA Level III or IV during this admission
• Diabetes	The patient is receiving either oral hypoglycemics or insulin.
• Malignant Ventricular Arrhythmia	Recent (within the past 7 days) recurrent ventricular tachycardia or ventricular fibrillation requiring electrical defibrillation or the use of intravenous antiarrhythmic agents. Excludes a single episode of Ventricular Tachycardia or Ventricular Fibrillation occurring in the early phase of an acute myocardial infarction and responding well to treatment
• Renal Failure, Creatinine > 2.5	Pre-intervention creatinine greater than 2.5 mg/dl
• Renal Failure, Dialysis	The patient is on chronic peritoneal or hemodialysis
Ventricular Function	
• Previous MI less than 6 hours	One or more myocardial infarctions (MI) less than 6 hours before the intervention
• Previous MI, less than 12 hours	One or more myocardial infarctions (MI) less than 12 hours before the intervention
• Previous MI, 12 to 23 hours	One or more myocardial infarctions (MI) occurring 12 to 23 hours before the intervention
• Previous MI less than 24 hours	One or more myocardial infarctions (MI) less than 24 hours before the intervention
• Previous MI, 1 to 7 days	One or more myocardial infarctions (MI) occurring 1 to 7 days before the intervention

Criteria Used in Reporting Significant risk Factors (2000) continued

Ventricular Function cont'd	
<ul style="list-style-type: none">Ejection Fraction	Value of the ejection fraction taken closest to the procedure. When a calculated measure is unavailable the ejection fraction should be estimated visually from the ventriculogram or by echocardiography. Intraoperative direct observation of the heart is not an adequate basis for a visual estimate of the ejection fraction
<hr/>	
Severity of Atherosclerotic Process	
<ul style="list-style-type: none">Carotid/Cerebrovascular Disease	Angiographic or ultrasound demonstration of at least 50% narrowing in a major cerebral or carotid artery (common or internal only), history of non-embolic stroke, or previous surgery for such disease. A history of bruits or transient ischemic attacks is not sufficient evidence of carotid/cerebrovascular disease.
<ul style="list-style-type: none">Aortoiliac Disease	Angiographic demonstration of at least 50% narrowing in a major aortoiliac vessel, previous surgery for such disease, absent femoral pulses, or inability to insert a catheter or intra-aortic balloon due to iliac aneurysm or obstruction of aortoiliac arteries.
<ul style="list-style-type: none">Femoral Popliteal Disease	Angiographic demonstration of at least 50% narrowing in a major femoral/popliteal vessel, previous surgery for such disease, absent pedal pulses, or an inability to insert a catheter or intra-aortic balloon due to obstructions in the femoral arteries.
<hr/>	
Vessels Diseased and Attempted	
<ul style="list-style-type: none">Left Main Attempted	There was an attempt to perform an intervention on the left main coronary artery
<ul style="list-style-type: none">Three Vessels Attempted	There was an attempt to perform an intervention on three coronary arteries, excluding the left main coronary artery
<ul style="list-style-type: none">Three Vessels Diseased	The patient has at least a 70% blockage in each of three native coronary arteries including the Left Anterior Descending (LAD), the Right Coronary Artery (RCA), and the Left Circumflex Artery (LCX) or their major branches.
<hr/>	
Worst Lesion Attempted	
<ul style="list-style-type: none">Type C	If any of the following are present: > 2 cm length; excessive tortuosity of proximal segment; extremely angulated segment, > 90 degrees; total occlusion > 3 months old; inability to protect major side branches; degenerated vein grafts with friable lesions
<ul style="list-style-type: none">Type B	If any of the following are present and no Type C are present: 10 to 20 mm length; eccentric; moderate tortuosity of proximal segment; moderately angulated segment, 45 to 90 degrees; irregular contour; moderate to heavy calcification; total occlusion < 3 months old; ostial in location; bi-furcation lesions requiring double guide wires; some thrombosis present

MEDICAL TERMINOLOGY

percutaneous coronary intervention (PCI) also known as **angioplasty** or **percutaneous transluminal coronary angioplasty** – typically 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 (such as atherectomies, stent or ultrasound) are sometimes used in conjunction with the catheter to remove plaque.

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

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

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

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

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

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

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, bypassing the arterial blockage. Typically, a section of one of the large saphenous veins in the leg, the radial artery in the arm or the mammary artery in the chest is used to construct the bypass. One or more bypasses may be performed during a single operation. When no other major heart surgery (such as valve replacement) is included, the operation is referred to as an isolated CABG.

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

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

lesion - an irregular growth of fiber and tissue. Lesions of Type C are more problematic than lesions of Type B, which in turn are more dangerous than lesions of Type A.

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

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, all of which cannot 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 PCI or surgery.

Appendix 1

2000 Risk Factors For PCI In-Hospital Mortality (ALL CASES)

The significant pre-procedural risk factors for in-hospital mortality following PCI in 2000 are presented in the table below.

Roughly speaking, the odds ratio for a risk factor represents the number of times more likely a patient with that risk factor is of dying in the hospital during or after PCI than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor “COPD” is 2.158. This means that a patient with COPD is approximately 2.158 times as likely to die in the hospital during or after undergoing PCI as a patient without COPD who has the same other significant risk factors.

For all risk factors in the table except age, ejection fraction, vessels attempted, worst lesion Type B or Type C, and previous MI, there are only two possibilities – having the risk factor or not having it. For example, a patient either has COPD or does not have it. In the case of the risk factor “Renal Failure requiring Dialysis”, the odds ratio given compares patients who have renal failure and are on dialysis with all other patients (patients without renal failure and patients with renal failure who are not on dialysis).

Previous MI is subdivided into four ranges (occurring less than 12 hours prior to the procedure, 12 through 23 hours prior to the procedure, 1-7 days prior to the procedure, and no MI within 7 days prior to the procedure). The last range, which does not appear in the table below, is referred to as the reference category. The odds ratios for the Previous MI ranges are relative to patients who have had an MI more than 7 days prior to PCI or who have not had a previous MI.

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 four ranges (0-19%, 20-29%, 30-39% and 40% or more). The last range, which does not appear in the Appendix 1 table, is referred to as the reference category. This means that the odds ratios that appear for the other ejection fraction categories in the table are relative to patients with an ejection fraction of 40% or more. Thus, a PCI patient with an ejection fraction of between 20% and 29% is about 2.081 times as likely to die in the hospital as a patient with an ejection fraction of 40% or higher, all other significant risk factors being the same.

Age is represented by a linear term in order to improve the fit of the statistical model. The odds ratio represents the number of times more likely a patient is to die in the hospital than a patient who is one year younger, all other significant risk factors being the same. Thus, the odds of dying for a patient who is 55 are 1.047 times the odds of dying for a patient who is 54, all other risk factors being the same.

“Left Main Attempted” includes all cases with a PCI attempted in the left main coronary artery. “Three Vessels Attempted w/out LM” includes cases with a PCI attempted in three coronary arteries excluding the left main coronary artery. The reference category represents cases with no left main attempted and no more than 2 other vessels attempted.

The odds ratio for patients who have a Worst Lesion Type B or Worst lesion Type C are relative to patients whose Worst Lesion is Type A.

Appendix 1 Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State, 2000 (*All Cases*).

Patient Risk Factor	Prevalence (%)	Regression Coefficient	P-Value	Odds Ratio
Demographic				
Age	—	0.0460	< .0001	1.047
Female Gender	31.63	0.5508	< .0001	1.735
Hemodynamic State				
Unstable	0.94	1.6339	< .0001	5.124
Shock	0.35	2.4883	< .0001	12.041
Cardiopulmonary Resuscitation	0.25	1.9565	< .0001	7.075
Ventricular Function				
Ejection Fraction < 20 %	0.71	0.9910	0.0022	2.694
Ejection Fraction 20-29 %	3.07	0.7327	0.0003	2.081
Ejection Fraction 30-39 %	7.84	0.3687	0.0406	1.446
Previous MI < 12 hours	6.82	2.0242	< .0001	7.570
Previous MI 12-23 hours	2.75	1.0614	0.0008	2.890
Previous MI 1-7 Days	14.61	0.8919	< .0001	2.440
Comorbidities				
CHF, This Admission	6.04	0.9404	< .0001	2.561
CHF, Before This Admission	5.25	0.5107	0.0348	1.666
COPD	5.36	0.7690	< .0001	2.158
Renal Failure, Creatinine > 2.5 mg/dl	1.15	1.2207	< .0001	3.390
Renal Failure requiring Dialysis	1.20	1.5753	< .0001	4.832
Vessels and Lesions				
Left Main (LM) Attempted	1.38	1.2563	< .0001	3.512
Three Vessels Attempted w/out LM	0.80	1.0987	0.0089	3.000
Worst Lesion Attempted is C	32.52	1.6724	0.0048	5.325
Worst Lesion Attempted is B	60.07	1.2207	0.0397	3.390
Intercept	=	-11.0020		
C Statistic	=	0.896		

Appendix 2

2000 Risk Factors For In-Hospital Mortality For Non-Emergency PCI

Appendix 2 contains the significant pre-procedural risk factors for 2000 New York PCI patients who were not emergency patients (were not in shock, or hemodynamically unstable, did not undergo CPR immediately prior to the procedure, and who did not suffer a heart attack within 24 hours prior to the PCI being performed). In this table, renal failure on dialysis is interpreted in the same manner as it was in Appendix 1. Ejection fraction is represented by only two groups (0% to 29% and 30% or higher) in Appendix 2, with the chance of a patient with an ejection fraction of 0% to 29% dying in the hospital being about 2.706 times as high as a patient with an ejection fraction of 30% or higher dying in the hospital, all other risk factors being the same.

In this table, patients who have Worst Lesion Type C are relative to patients whose Worst Lesion is of Type A or Type B.

Previous MI is represented by only two groups (MI 1 to 7 days prior to PCI, and the reference group, no MI within 7 days prior to the procedure.) The odds of dying in the hospital for a patient who had an MI 1-7 days prior to the procedure are 2.182 times the odds of dying for a patient who did not, all other risk factors being the same.

With regard to age, the odds ratio roughly represents the number of times more likely a patient who is over age 60 is to die in the hospital than another patient who is one year younger, all other significant risk factors being the same. Thus, a patient undergoing PCI who is 63 years old has approximately 1.047 times the chance of dying in the hospital that a 62 year-old patient has, all other risk factors being the same. All patients under age 60 have roughly the same odds of dying in the hospital if their other risk factors are identical.

Appendix 2 Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State, 2000 (Non-Emergency Cases).

Patient Risk Factor	Prevalence (%)	Regression Coefficient	P-Value	Odds Ratio
Demographic				
Age > 60 years	—	0.0463	< .0001	1.047
Female Gender	31.93	0.7061	0.0002	2.026
Ventricular Function				
Ejection Fraction < 29 %	3.33	0.9954	0.0003	2.706
Previous MI 1 to 7 days	16.04	0.7802	< .0001	2.182
Severity of Atherosclerotic Process				
Carotid/Cerebrovascular Disease	3.96	0.9956	0.0003	2.706
Comorbidities				
CHF, This Admission	5.38	1.1714	< .0001	3.227
Renal Failure, Creatinine > 2.5 mg/dl	1.18	1.0230	0.0125	2.781
Renal Failure requiring Dialysis	1.23	1.8554	< .0001	6.394
Vessels and Lesions				
Worst Lesion Attempted is C	31.31	0.6669	0.0003	1.948
Intercept	=	-7.3105		
C Statistic	=	0.813		

Appendix 3

1998-2000 Risk Factors For PCI In-Hospital Mortality (ALL CASES)

The significant pre-procedural risk factors for in-hospital mortality following PCI in the 1998-2000 time period are presented in the table below. The interpretation of this table is similar to the interpretation of Appendices 1 and 2 that is described previously. With the exception of age, ejection fraction, vessels attempted, previous myocardial infarction, worst lesion of Type B or Type C, and “risk squared”, the odds ratios for all risk factors are relative to patients without the risk factor (e.g., patients with diabetes have odds of dying in the hospital that are 2.491 times the odds of patients without diabetes dying in the hospital, all other risk factors being the same). The interpretation of the ejection fraction and vessels attempted categories is identical to that in Appendix 1.

Previous MI is represented by three groups: MI less than 6 hours, between 6 hours and one day before the PCI, and MI between one and seven days before the PCI. The odds ratios for the MI categories in the table are relative to the reference group (heart attack more than seven days before the PCI or no previous MI).

The odds of dying for patients who have a worst lesion of Type B or Type C, are relative to patients whose worst lesion is of Type A.

With regard to age, the odds ratio roughly represents the number of times more likely a patient who is over age 50 is to die in the hospital than another patient who is one year younger all other significant risk factors being the same. Thus, a patient undergoing PCI who is 53 years old has of dying is approximately 1.057 times the chance that a 52 year-old patient undergoing PCI has of dying in the hospital, all other risk factors being the same. All patients under age 50 have roughly the same odds of dying in the hospital if their risk factors are identical.

The “risk-squared” term is merely the square of the number of risk factors in Appendix 3 that a patient has (not counting age, since everybody has an age), and is used to improve the ability of the model to predict mortality.

Appendix 3 Multivariate Risk-Factor Equation for In-Hospital Deaths During of Following PCI in New York State, 1998-2000 (All Cases).

Patient Risk Factor	Prevalence (%)	Regression Coefficient	P-Value	Odds Ratio
Demographic				
Age > 50 years	—	0.0551	< .0001	1.057
Female Gender	31.97	0.9943	< .0001	2.703
Hemodynamic State				
Unstable	0.80	2.0100	< .0001	7.463
Shock	0.37	3.1492	< .0001	23.318
Cardiopulmonary Resuscitation	0.20	2.4814	< .0001	11.958
Ventricular Function				
Ejection Fraction < 20 %	0.68	1.6282	< .0001	5.095
Ejection Fraction 20-29 %	3.16	1.2646	< .0001	3.542
Ejection Fraction 30-39 %	7.77	0.8771	< .0001	2.404
Previous MI < 6 hours	5.13	2.3733	< .0001	10.733
Previous MI 6-23 hours	3.89	2.3035	< .0001	10.010
Previous MI 1-7 Days	15.33	1.2823	< .0001	3.605
Severity of Atherosclerotic Process				
Femoral/Popliteal Disease	3.67	1.1926	< .0001	3.296
Comorbidities				
Diabetes	24.55	0.9126	< .0001	2.491
CHF, This Admission	5.91	1.5716	< .0001	4.815
CHF, Before This Admission	5.05	0.9227	< .0001	2.516
Malignant Ventricular Arrhythmia	1.68	1.0413	< .0001	2.833
COPD	5.12	1.1602	< .0001	3.190
Renal Failure creatinine > 2.5 mg/dl	1.08	1.6461	< .0001	5.187
Renal Failure requiring Dialysis	1.06	1.9054	< .0001	6.722
Vessels and Lesions				
Left Main Attempted	1.34	1.5476	< .0001	4.700
Three Vessels Attempted	0.66	1.4025	< .0001	4.065
Worst Lesion Attempted is Type B	58.44	1.0657	< .0001	2.903
Worst Lesion Attempted is Type C	33.51	1.3831	< .0001	3.987
Number of Risk Factors Squared	—	-0.0699	< .0001	0.932
Intercept	=	-8.9217		
C Statistic	=	0.886		

Appendix 4

1998-2000 Risk Factors for In-Hospital Mortality for Non-Emergency PCI

The significant pre-procedural risk factors for in-hospital mortality following non-emergency PCI in the 1998-2000 time period are presented in the Appendix 4 table below. The interpretation of this table is similar to the interpretation of Appendices 2 and 3 that are described previously.

The odds ratios for the ejection fraction groups are relative to patients with ejection fraction of 50% and higher. Vessels attempted are interpreted as in Appendices 2 and 3, and the worst lesion of Type B and C is interpreted as in Appendix 3. For “previous MI within 7 days”, the odds ratio is relative to patients with a previous MI more than 7 days prior to their PCI or no previous MI. The odds ratio for age is relative to a person one year younger, but over the age of 55.

Appendix 4 Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State, 1998-2000 (Non-Emergency Cases).

Patient Risk Factor	Prevalence (%)	Regression Coefficient	P-Value	Odds Ratio
Demographic				
Age > 55 years	—	0.0568	< .0001	1.058
Female Gender	32.25	0.6793	< .0001	1.972
Ventricular Function				
Ejection Fraction < 20 %	0.62	1.3684	< .0001	3.929
Ejection Fraction 20-29 %	2.85	1.1922	< .0001	3.294
Ejection Fraction 30-39 %	7.09	0.6357	< .0001	1.888
Ejection Fraction 40-49 %	16.23	0.2763	0.0493	1.318
Previous MI 1-7 Days	16.74	0.6779	< .0001	1.970
Severity of Atherosclerotic Process				
Carotid/Cerebrovascular Disease	3.96	0.5058	0.0032	1.658
Aortoiliac Disease	2.84	0.7006	< .0001	2.015
Comorbidities				
CHF, This Admission	5.31	1.0536	< .0001	2.868
Diabetes	25.19	0.3492	0.0012	1.418
Renal Failure creatinine > 2.5 mg/dl	1.10	1.1633	< .0001	3.200
Renal Failure requiring Dialysis	1.11	1.5208	< .0001	4.576
Vessels and Lesions				
Worst Lesion Attempted is Type B	58.93	0.6564	0.0282	1.928
Worst Lesion Attempted is Type C	32.52	1.1653	< .0001	3.207
Intercept	=	-8.2331		
C Statistic	=	0.811		

Appendix 5

1998-2000 Risk Factors for In-Hospital Mortality for Emergency PCI

The significant pre-procedural risk factors for in-hospital mortality following non-emergency PCI in the 1998-2000 time period are presented in the Appendix 5 table below. The odds ratio for age is relative to a person one year younger but over age 50, the odds ratio for ejection fraction less than 30% is relative to people with ejection fractions of 30% and higher.

For all other risk factors there are only two possibilities – having the risk factor or not having it.

The “risk-squared” term is merely the square of the number of risk factors in Appendix 5 that a patient has (not counting age, since everybody has an age), and is used to improve the ability of the model to predict mortality.

Appendix 5 Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State, 1998-2000 (Emergency Cases).

Patient Risk Factor	Prevalence (%)	Regression Coefficient	P-Value	Odds Ratio
Demographic				
Age > 50 years	—	0.0565	< .0001	1.058
Female Gender	29.34	0.9612	< .0001	2.615
Hemodynamic State				
Unstable	8.51	1.6411	< .0001	5.161
Shock	3.92	3.0540	< .0001	21.201
Cardiopulmonary Resuscitation	2.16	2.3919	< .0001	10.935
Ventricular Function				
Ejection Fraction < 20 %	1.32	1.8038	< .0001	6.073
Ejection Fraction 20-29 %	6.09	1.2920	< .0001	3.640
Comorbidities				
Malignant Ventricular Arrhythmia	5.43	1.3727	< .0001	3.946
CHF, This Admission	11.71	1.7058	< .0001	5.506
CHF, Before This Admission	2.57	1.5062	< .0001	4.510
Vessels and Lesions				
Left Main Attempted	0.72	2.0139	< .0001	7.492
Number of Risk Factors Squared	—	-0.1952	< .0001	0.823
Intercept	=	-5.4260		
C Statistic	=	0.871		

Appendix 6

1998 Hospital Risk-Adjusted Mortality for PCI

The table below presents the 1998 PCI mortality results for the 34 hospitals performing PCI in New York in 1998. The table contains, for each hospital, the number of PCIs resulting in 1998 discharges, the number of in-hospital deaths, the observed mortality rate, the expected mortality rate based on the statistical model presented in Appendix 6A, the risk-adjusted mortality rate, and a 95% confidence interval for the risk-adjusted rate. Also, it contains each hospital's volume of cases and risk-adjusted mortality rate for non-emergency patients. Emergency patients are defined to be patients in shock, a state of hemodynamic instability (very low blood pressure), requiring cardiopulmonary resuscitation immediately prior to the procedure, or patients who experienced a heart attack within 24 hours prior to undergoing PCI. The hospital risk-adjusted rates for non-emergency PCI patients are provided because many studies are confined to this group of patients, and because these patients comprise the majority of all PCI patients (91.1% in 1998).

The overall mortality rate for the 33,310 PCIs performed at the 34 hospitals was 0.81%. Observed mortality rates ranged from 0.00% to 2.52%. The range in expected mortality rates, which measure patient severity of illness, was between 0.38% and 1.84%. The risk-adjusted rates, which measure hospital performance, range from 0.00% to 2.90%. Based on confidence intervals for risk-adjusted rates, one hospital (Arnot-Ogden) had a significantly higher risk-adjusted mortality rate than the statewide rate. One hospital (Mount Sinai) had a significantly lower risk-adjusted mortality rate than the statewide rate.

The last column of the table presents the hospital risk-adjusted mortality rates for non-emergency cases only (based on the statistical model presented in Appendix 6B). As presented in the last row, the statewide mortality rate for non-emergency cases is 0.42%. The range of risk-adjusted rates was from 0.00% to 1.56%. No hospital had a significantly higher or lower risk-adjusted mortality rate than the statewide rate.

During 1998, an international study known as the SHOCK trial (“SHould we emergently revascularize Occluded Coronaries for cardiogenic shock”) was undertaken to evaluate the efficacy of PCI and other treatments for patients in severe shock. The principal investigator of this trial requested that patients participating in the trial be excluded from the analyses of outcomes in the New York State System. This request was granted based on a 1995 Cardiac Advisory Committee recommendation, with the understanding that data on the number of cases and deaths excluded would be provided. The seven SHOCK trial cases (including 2 deaths) who underwent PCI in 1998 were excluded from all analyses in this report. 1998 was the last year that patients were enrolled in the SHOCK trial.

Appendix 6 Hospital Observed, Expected, and Risk-Adjusted Mortality Rates (RAMR) for PCI in New York State, 1998 Discharges. (Listed Alphabetically by Hospital)

Hospital	Cases	Deaths	All Cases				Non-Emergency	
			OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Albany Medical Center	1304	14	1.07	1.04	0.84	(0.46, 1.40)	1181	0.39
Arnot-Ogden	246	5	2.03	0.57	2.90 *	(0.93, 6.76)	210	1.19
Bellevue	159	4	2.52	1.51	1.36	(0.37, 3.48)	134	1.56
Beth Israel	1025	7	0.68	0.59	0.94	(0.38, 1.95)	970	0.50
Buffalo General	921	4	0.43	0.39	0.89	(0.24, 2.29)	903	0.52
Columbia Presbyterian-NYP	505	5	0.99	0.77	1.04	(0.34, 2.43)	450	1.19
Crouse Hospital	750	8	1.07	0.68	1.28	(0.55, 2.53)	634	0.64
Ellis Hospital	547	4	0.73	0.61	0.97	(0.26, 2.49)	501	0.65
Erie County	138	0	0.00	0.53	0.00	(0.00, 4.12)	136	0.00
LIJ Medical Center	686	7	1.02	1.12	0.74	(0.30, 1.52)	561	0.32
Lenox Hill	1936	18	0.93	0.75	1.01	(0.60, 1.60)	1831	0.68
Maimonides	1324	8	0.60	0.89	0.55	(0.24, 1.09)	1274	0.30
Millard Fillmore	840	7	0.83	0.71	0.96	(0.38, 1.97)	789	0.19
Montefiore - Einstein	566	2	0.35	0.72	0.40	(0.04, 1.44)	525	0.19
Montefiore - Moses	443	5	1.13	0.65	1.41	(0.46, 3.30)	386	0.29
Mount Sinai	1662	5	0.30	0.88	0.28 **	(0.09, 0.65)	1550	0.15
NYU Hospitals Center	743	7	0.94	1.39	0.55	(0.22, 1.13)	652	0.33
New York Hospital - Queens	670	8	1.19	0.83	1.16	(0.50, 2.29)	585	0.68
North Shore	2482	13	0.52	0.80	0.54	(0.28, 0.92)	2144	0.36
Rochester General	2141	25	1.17	0.77	1.24	(0.80, 1.83)	1972	0.62
St. Elizabeth	137	0	0.00	0.38	0.00	(0.00, 5.68)	136	0.00
St. Francis	2758	20	0.73	0.74	0.80	(0.49, 1.23)	2598	0.40
St. Josephs	1573	17	1.08	0.91	0.97	(0.57, 1.56)	1408	0.43
St. Lukes-Roosevelt	500	4	0.80	0.57	1.14	(0.31, 2.93)	463	0.55
St. Peters	1045	5	0.48	0.90	0.43	(0.14, 1.00)	930	0.15
St. Vincents	1249	8	0.64	0.66	0.79	(0.34, 1.56)	1191	0.30
Strong Memorial	613	8	1.31	1.84	0.58	(0.25, 1.13)	457	0.51
United Health Services	994	9	0.91	1.06	0.70	(0.32, 1.32)	866	0.47
Univ. Hosp. - Stony Brook	835	9	1.08	0.76	1.15	(0.53, 2.18)	744	0.51
Univ. Hosp. - Upstate	155	2	1.29	1.16	0.91	(0.10, 3.27)	143	0.82
Univ. Hosp. of Brooklyn	415	1	0.24	0.66	0.30	(0.00, 1.64)	373	0.41
Weill Cornell-NYP	1262	9	0.71	0.73	0.79	(0.36, 1.50)	1169	0.56
Westchester Medical Center	1547	14	0.90	0.70	1.05	(0.58, 1.77)	1444	0.22
Winthrop Univ. Hosp.	1139	9	0.79	0.76	0.84	(0.38, 1.60)	1045	0.25
Statewide Total	33310	271	0.81				30355	0.42

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

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

Appendix 6A

1998 Risk Factors For PCI In-Hospital Mortality (ALL CASES)

The significant pre-procedural risk factors for in-hospital mortality following PCI in 1998 are presented in the table below.

Roughly speaking, the odds ratio for a risk factor represents the number of times more likely a patient with that risk factor is of dying in the hospital during or after PCI than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor “diabetes” is 1.475. This means that a patient with diabetes is approximately 1.475 times as likely to die in the hospital during or after undergoing PCI as a patient without diabetes who has the same other significant risk factors.

For all risk factors in the table except age, ejection fraction and previous MI, there are only two possibilities – having the risk factor or not having it. For example, a patient either has diabetes or does not have it. In the case of the risk factor “Renal Failure requiring Dialysis”, the odds ratio given compares patients who have renal failure and are on dialysis with all other patients (patients without renal failure and patients with renal failure who are not on dialysis).

Previous MI is subdivided into three ranges (occurring less than 24 hours prior to the procedure, 1-7 days prior, and no MI within 7 days prior to the procedure). The last range, which does not appear in the table below, is referred to as the reference category. The odds ratios for the Previous MI ranges listed below are relative to patients who have had an MI more than 7 days prior to PCI or who have not had a previous MI.

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 (0-19%, 20-29%, and 30% or more). The last range, which does not appear in the Appendix 6A table, is referred to as the reference category. This means that the odds ratios that appear for the other ejection fraction categories in the table are relative to patients with an ejection fraction of 30% or more. Thus, a PCI patient with an ejection fraction of between 20% and 29% is about 1.863 times as likely to die in the hospital as a patient with an ejection fraction of 30% or higher, all other significant risk factors being the same.

With regard to age, the odds ratio roughly represents the number of times more likely a patient who is over age 50 is to die in the hospital than another patient who is one year younger, all other significant risk factors being the same. Thus, a patient undergoing PCI who is 63 years old has a chance of dying in the hospital that is approximately 1.069 times the chance that a patient 62 years old undergoing angioplasty has of dying in the hospital, all other risk factors being the same. All patients under age 50 have roughly the same odds of dying in the hospital if their other risk factors are identical.

Appendix 6A Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State, 1998 (All Cases).

Patient Risk Factor	Prevalence (%)	Regression Coefficient	P-Value	Odds Ratio
Demographic				
Age > 50 yrs	—	0.0663	< .0001	1.069
Female Gender	32.31	0.4775	0.0004	1.612
Hemodynamic State				
Unstable	0.71	1.6285	< .0001	5.096
Shock	0.41	2.4248	< .0001	11.300
Cardiopulmonary Resuscitation	0.15	2.5737	< .0001	13.114
Ventricular Function				
Ejection Fraction < 20 %	0.73	1.5263	< .0001	4.601
Ejection Fraction 20-29 %	3.17	0.6220	0.0031	1.863
Previous MI < 24 hours	8.49	2.0364	< .0001	7.663
Previous MI 1-7 Days	15.48	0.8844	< .0001	2.421
Comorbidities				
Diabetes	23.37	0.3884	0.0071	1.475
CHF, This Admission	5.49	1.1075	< .0001	3.027
CHF, Before This Admission	4.70	0.5682	0.0201	1.765
Renal Failure, Creatinine > 2.5 mg/dl	1.05	1.0856	0.0013	2.961
Renal Failure requiring Dialysis	0.87	1.3719	0.0006	3.943

Intercept = -7.4692

C Statistic = 0.883

Appendix 6B

1998 RISK FACTORS FOR IN-HOSPITAL MORTALITY FOR NON-EMERGENCY PCI

Appendix 6B contains the significant pre-procedural risk factors for 1998 New York PCI patients who were not emergency patients, (were not in shock or hemodynamically unstable, did not undergo CPR immediately prior to the procedure, and who did not suffer a heart attack within 24 hours prior to the PCI being performed). In this table, the odds ratio for age is relative to a person one year younger but over the age of 55.

Ejection fraction is represented by four groups (0-19%, 20-29%, 30-49%, and 50% or higher) in Appendix 6B, with the chance of a patient with an ejection fraction of 0% to 19% dying in the hospital being about 5.623 times as high as a patient with an ejection fraction of 50% or higher dying in the hospital, all other risk factors being the same.

Previous MI is represented by two groups, having an MI 1 to 7 days prior to the procedure or not having an MI within 7 days of the procedure.

“Three Vessels Diseased” refers to patients with at least a 70% blockage in each of three native coronary arteries (LAD, RCA, LCX), or their major branches. The odds ratio for this group is relative to all other patients. “Three Vessels Attempted w/out LM” refers to cases with a PCI attempted in each of the three coronaries, but no attempt in the left main. The reference group contains all other cases.

For the remaining risk factors, renal failure and CHF, there are only two possibilities – having the risk factor or not having it. In this model, Renal Failure refers to patients who are either on dialyses or have creatinine levels greater than 2.5 mg/dl prior to the procedure.

Appendix 6B Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State, 1998 (Non-Emergency Cases).

Patient Risk Factor	Prevalence (%)	Regression Coefficient	P-Value	Odds Ratio
Demographic				
Age > 55 years	-----	0.0658	< .0001	1.068
Female Gender	32.60	0.8422	< .0001	2.321
Ventricular Function				
Ejection Fraction < 20 %	0.68	1.7269	0.0002	5.623
Ejection Fraction 20-29 %	2.91	1.3176	< .0001	3.734
Ejection Fraction 30-49 %	23.60	0.5094	0.0142	1.664
Previous MI 1-7 Days	16.81	0.8478	< .0001	2.334
Comorbidities				
CHF, This Admission	4.99	1.0680	< .0001	2.910
Renal Failure	1.98	1.1699	0.0002	3.222
Vessels and Lesions				
Three Vessels Diseased	18.84	0.5623	0.0046	1.755
Three Vessels Attempted w/out LM	0.58	1.2335	0.0241	3.433
Intercept	=	-7.6448		
C Statistic	=	0.818		

Appendix 7

1999 Hospital Risk-Adjusted Mortality for PCI

The table below presents the 1999 PCI mortality results for the 34 hospitals performing PCI in New York in 1999. The table contains, for each hospital, the number of PCIs resulting in 1999 discharges, the number of in-hospital deaths, the observed mortality rate, the expected mortality rate based on the statistical model presented in Appendix 7A, the risk-adjusted mortality rate, and a 95% confidence interval for the risk-adjusted rate. Also, it contains each hospital's volume of cases and risk-adjusted mortality rate for non-emergency patients. Emergency patients are defined to be patients in shock, a state of hemodynamic instability (very low blood pressure), requiring cardiopulmonary resuscitation immediately prior to the procedure, or patients who experienced a heart attack within 24 hours prior to undergoing PCI. The hospital risk-adjusted rates for non-emergency PCI patients are provided because many studies are confined to this group of patients, and because these patients comprise the majority of all PCI patients (90.7% in 1999).

The overall mortality rate for the 35,738 PCIs performed at the 34 hospitals was 0.84%. Observed mortality rates ranged from 0.00% to 2.05%. The range in expected mortality rates, which measure patient severity of illness, was between 0.38% and 1.61%. The risk-adjusted rates, which measure hospital performance, range from 0.00% to 2.89%. Based on confidence intervals for risk-adjusted rates, one hospital (University Hospital of Brooklyn) had a significantly higher risk-adjusted mortality rate than the statewide rate. No hospital had a significantly lower risk-adjusted mortality rate than the statewide rate.

The last column of the Appendix 7 table presents the hospital risk-adjusted mortality rates for non-emergency cases only (based on the statistical model presented in Appendix 7B). As presented in the last row, the statewide mortality rate for non-emergency cases is 0.46%. The range of risk-adjusted rates was from 0.00% to 2.58%. Two hospitals (St. Elizabeth and University Hospital of Brooklyn), had a significantly higher risk-adjusted mortality rate than the statewide rate. No hospital had a significantly lower risk-adjusted mortality rate than the statewide rate.

Appendix 7 Hospital Observed, Expected, and Risk-Adjusted Mortality Rates (RAMR) for PCI in New York State, 1999 Discharges. (Listed Alphabetically by Hospital)

Hospital	Cases	Deaths	All Cases				Non-Emergency	
			OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Albany Medical Center	1131	15	1.33	1.01	1.11	(0.62, 1.83)	976	0.84
Arnot-Ogden	266	1	0.38	0.43	0.74	(0.01, 4.09)	225	0.94
Bellevue	194	3	1.55	0.84	1.55	(0.31, 4.53)	165	1.53
Beth Israel	1146	9	0.79	0.72	0.91	(0.42, 1.73)	1086	0.51
Buffalo General	964	4	0.41	0.38	0.92	(0.25, 2.35)	943	0.41
Columbia Presbyterian-NYP	573	7	1.22	0.82	1.26	(0.51, 2.60)	505	0.48
Crouse Hospital	775	2	0.26	0.76	0.29	(0.03, 1.03)	670	0.00
Ellis Hospital	527	3	0.57	0.96	0.50	(0.10, 1.46)	462	0.00
Erie County	120	0	0.00	0.38	0.00	(0.00, 6.71)	116	0.00
LIJ Medical Center	794	6	0.76	1.19	0.54	(0.20, 1.17)	629	0.26
Lenox Hill	2210	17	0.77	0.62	1.04	(0.61, 1.67)	2100	0.55
Maimonides	1252	12	0.96	1.05	0.77	(0.40, 1.34)	1200	0.48
Millard Fillmore	901	10	1.11	0.64	1.45	(0.70, 2.67)	843	0.61
Montefiore - Einstein	592	8	1.35	0.89	1.28	(0.55, 2.53)	536	0.52
Montefiore - Moses	443	3	0.68	0.40	1.41	(0.28, 4.13)	405	1.18
Mount Sinai	1859	9	0.48	0.89	0.46	(0.21, 0.87)	1767	0.27
NYU Hospitals Center	703	6	0.85	1.35	0.53	(0.19, 1.16)	605	0.22
New York Hospital - Queens	734	10	1.36	1.04	1.10	(0.53, 2.02)	651	0.83
North Shore	2588	12	0.46	0.78	0.50	(0.26, 0.88)	2242	0.20
Rochester General	2324	19	0.82	0.92	0.75	(0.45, 1.17)	2090	0.37
St. Elizabeth	742	8	1.08	0.48	1.90	(0.82, 3.74)	736	1.20 *
St. Francis	2754	16	0.58	0.84	0.58	(0.33, 0.95)	2568	0.33
St. Josephs	1474	12	0.81	0.72	0.95	(0.49, 1.66)	1302	0.37
St. Lukes-Roosevelt	473	2	0.42	0.70	0.51	(0.06, 1.83)	444	0.20
St. Peters	1092	11	1.01	0.84	1.01	(0.50, 1.81)	955	0.40
St. Vincents	1496	14	0.94	0.65	1.22	(0.66, 2.04)	1418	0.49
Strong Memorial	875	16	1.83	1.61	0.96	(0.55, 1.56)	700	0.53
United Health Services	947	13	1.37	1.53	0.76	(0.40, 1.29)	819	0.39
Univ. Hosp. - Stony Brook	1137	10	0.88	0.50	1.47	(0.70, 2.70)	1029	0.89
Univ. Hosp. - Upstate	146	3	2.05	0.72	2.40	(0.48, 7.00)	141	1.69
Univ. Hosp. of Brooklyn	391	7	1.79	0.52	2.89 *	(1.16, 5.96)	370	2.58 *
Weill Cornell-NYP	1401	12	0.86	0.90	0.80	(0.41, 1.40)	1301	0.46
Westchester Medical Center	1542	14	0.91	0.93	0.82	(0.45, 1.37)	1359	0.44
Winthrop Univ. Hosp.	1172	7	0.60	0.91	0.55	(0.22, 1.14)	1066	0.10
Statewide Total	35738	301	0.84				32424	0.46

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

Appendix 7A

1999 Risk Factors For PCI In-Hospital Mortality (ALL CASES)

The significant pre-procedural risk factors for in-hospital mortality following PCI in 1999 are presented in the table below.

Roughly speaking, the odds ratio for a risk factor represents the number of times more likely a patient with that risk factor is of dying in the hospital during or after PCI than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor “aortoiliac disease” is 3.147. This means that a patient with aortoiliac disease is approximately 3.147 times as likely to die in the hospital during or after undergoing PCI as a patient without aortoiliac disease who has the same other significant risk factors.

For all risk factors in the table except age, ejection fraction, worst lesion type B or type C, and previous MI, there are only two possibilities – having the risk factor or not having it. For example, a patient either has aortoiliac disease or does not have it. In the case of the risk factor “Renal Failure on Dialysis”, the odds ratio given compares patients who have renal failure and are on dialysis with all other patients (patients without renal failure and patients with renal failure who are not on dialysis).

Previous MI is subdivided into four ranges (occurring less than 6 hours prior to the procedure, 6 through 23 hours prior, 1-7 days prior, and no MI within 7 days prior to the procedure). The last range, which does not appear in the table below, is referred to as the reference category. The odds ratios for the Previous MI ranges listed below are relative to patients who have had an MI more than 7 days prior to PCI or who have not had a previous MI.

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 (0-29%, 30-39%, and 40% or more). The last range, which does not appear in the Appendix 1 table, is referred to as the reference category. This means that the odds ratios that appear for the other ejection fraction categories in the table are relative to patients with an ejection fraction of 40% or more. Thus, a PCI patient with an ejection fraction of between 30% and 39% is about 1.532 times as likely to die in the hospital as a patient with an ejection fraction of 40% or higher, all other significant risk factors being the same.

With regard to age, the odds ratio roughly represents the number of times more likely a patient who is over age 60 is to die in the hospital than another patient who is one year younger, all other significant risk factors being the same. Thus, a patient undergoing PCI who is 63 years old has a chance of dying in the hospital that is approximately 1.074 times the chance that a patient 62 years old undergoing angioplasty has of dying in the hospital, all other risk factors being the same. All patients under age 60 have roughly the same odds of dying in the hospital if their other risk factors are identical.

The odds for patients who have a worst lesion Type B or Type C are compared relative to patients whose worst lesion is of Type A.

Appendix 7A Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State, 1999 (All Cases).

Patient Risk Factor	Prevalence (%)	Regression Coefficient	P-Value	Odds Ratio
Demographic				
Age > 60 yrs	—	0.0716	< .0001	1.074
Female Gender	32.03	0.3724	0.0042	1.451
Hemodynamic State				
Unstable	0.73	0.7871	0.0042	2.197
Shock	0.36	2.6598	< .0001	14.294
Cardiopulmonary Resuscitation	0.20	1.4553	< .0001	4.286
Severity of Atherosclerotic Process				
Aortoiliac Disease	2.80	1.1463	< .0001	3.147
Ventricular Function				
Ejection Fraction < 29 %	3.86	0.8510	< .0001	2.342
Ejection Fraction 30-39 %	7.71	0.4267	0.0153	1.532
Previous MI < 6 hours	5.34	1.7712	< .0001	5.878
Previous MI 6-23 hours	3.56	1.5948	< .0001	4.927
Previous MI 1-7 Days	15.97	0.5491	0.0018	1.732
Comorbidities				
CHF, This Admission	6.16	1.2566	< .0001	3.513
Renal Failure, Creatinine > 2.5 mg/dl	1.02	1.1300	0.0002	3.096
Renal Failure requiring Dialysis	1.10	1.4941	< .0001	4.455
Vessels and Lesions				
Worst Lesion Attempted is B	57.94	1.4748	0.0116	4.370
Worst Lesion Attempted is C	34.47	1.7475	0.0028	5.740
Intercept	=	-8.3134		
C Statistic	=	0.873		

Appendix 7B

1999 RISK FACTORS FOR IN-HOSPITAL MORTALITY FOR NON-EMERGENCY PCI

Appendix 7B contains the significant pre-procedural risk factors for 1999 New York PCI patients who were not emergency patients, (were not in shock or hemodynamically unstable, did not undergo CPR immediately prior to the procedure, and who did not suffer a heart attack within 24 hours prior to the PCI being performed). In this table, the odds ratio for age is relative to a person one year younger but over the age of 50.

Ejection fraction is represented by four groups (0-19%, 20-29%, 30-39%, and 40% or higher) in Appendix 7B, with the chance of a patient with an ejection fraction of 0 % to 19% dying in the hospital being about 3.234 times as high as a patient with an ejection fraction of 40% or higher dying in the hospital, all other risk factors being the same.

The odds for patients who have worst lesion of Type C, which is the worst type of lesion, are considered relative to patients whose worst lesion is of Type A or Type B.

Appendix 7B Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State, 1999 (Non-Emergency Cases).

Patient Risk Factor	Prevalence (%)	Regression Coefficient	P-Value	Odds Ratio
Demographic				
Age > 50 years	—	0.0587	< .0001	1.060
Severity of Atherosclerotic Process				
Aortoiliac Disease	2.82	1.1575	< .0001	3.182
Ventricular Function				
Ejection Fraction < 20 %	0.58	1.1738	0.0266	3.234
Ejection Fraction 20-29 %	2.91	1.1139	< .0001	3.046
Ejection Fraction 30-39 %	7.10	0.9471	< .0001	2.578
Comorbidities				
CHF, This Admission	5.54	1.2515	< .0001	3.496
Renal Failure, Creatinine > 2.5 mg/dl	1.05	1.3526	< .0001	3.867
Renal Failure requiring Dialysis	1.15	1.6976	< .0001	5.461
Vessels and Lesions				
Worst Lesion Attempted is C	33.42	0.6014	0.0003	1.825
Intercept	=	-7.3358		
C Statistic	=	0.806		

NEW YORK STATE PERCUTANEOUS CORONARY INTERVENTION CENTERS

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

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

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

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

Buffalo General Hospital
100 High Street
Buffalo, New York 14203

Columbia Presbyterian
Medical Center – NY Presbyterian
161 Fort Washington Avenue
Syracuse, New York 13210

Crouse Hospital
736 Irving Avenue
New York, New York 10032

Ellis Hospital
1101 Nott Street
Schenectady, New York 12308

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

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

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

Maimonides Medical Center
4802 Tenth Avenue
Brooklyn, New York 11219

Millard Fillmore Hospital
3 Gates Circle
Buffalo, New York 14209

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

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

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

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

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

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

Rochester General Hospital
1425 Portland Avenue
Rochester, New York 14621

South Nassau Communities Hospital *
One Healthy Way
Oceanside, New York 11572

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

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

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

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

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

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

Strong Memorial Hospital
601 Elmwood Avenue
Rochester, New York 14642

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

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

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

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

Vassar Brothers Hospital
45 Reade Place
Poughkeepsie, New York 12601

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

Westchester Medical Center
Grasslands Road
Valhalla, New York 10595

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

* Approval limited to primary PCI, that is, only those patients with a heart attack occurring within 24 hours prior to the procedure.

*Additional copies of this report may be obtained through the
Department of Health web site at <http://www.health.state.ny.us>
or by writing to:*

*Cardiac
Box 2000
New York State Department of Health
Albany, New York 12220*



State of New York
George E. Pataki, Governor

Department of Health
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