

**PERCUTANEOUS
CORONARY
INTERVENTIONS
(Angioplasty)
in
New York State
*1995-1997***

**New York State Department of Health
July 2001**

Members of the New York State State Cardiac Advisory Committee

Chair

Kenneth I. Shine, M.D.
Institute of Medicine
National Academy of Sciences
Washington, DC

Vice Chair

O. Wayne Isom, M.D.
Professor and Chairman
Department of Cardiothoracic Surgery and
Surgeon-in-Chief
Weill-Cornell Medical Center
New York, NY

Members

Djavad T. Arani, M.D.
Clinical Associate Professor of Medicine
SUNY at Buffalo School of Medicine
The Buffalo General Hospital, Buffalo, NY

Edward V. Bennett, M.D.
Chief of Cardiac Surgery
St. Peter's Hospital, Albany, NY

Luther Clark, M.D.
Chief, Division of Cardiovascular Medicine
University Hospital of Brooklyn
Brooklyn, NY

Alfred T. Culliford, M.D.
Professor of Clinical Surgery
NYU Medical Center
New York, NY

Jeffrey P. Gold, M.D.
Chairman, Cardiac & Thoracic Surgery
Montefiore Medical Center
Bronx, NY

Alan Hartman, M.D.
Department of Cardiovascular Surgery
Winthrop University Hospital, Mineola, NY

Robert Jones, M.D.
Mary & Deryl Hart Professor of Surgery
Duke University Medical Center, Durham, NC

Stanley Katz, M.D.
Chief, Division of Cardiology
North Shore - LIJ Health System
Manhasset, NY

Ben D. McCallister, M.D.
Endowed Chair and Director
Cardiovascular Research
Mid America Heart Institute
Saint Luke's Hospital
Kansas City, MO

Barbara J. McNeil, M.D., Ph.D.
Head, Department of Health Care Policy
Harvard Medical School, Boston, MA

Alvin Mushlin, M.D., Sc.M.
Professor and Chair
Department of Public Health
Weill Medical College of Cornell University
New York, NY

Jan M. Quaegebeur, M.D., Ph.D.
Department of Surgery
Columbia-Presbyterian Medical Center
New York, NY

Eric A. Rose, M.D.
Professor, Chair and Surgeon-in-Chief,
Department of Surgery
Columbia-Presbyterian Medical Center
New York, NY

Thomas J. Ryan, M.D.
Professor of Medicine
Boston University Medical Center
Boston, MA

Rev. Robert S. Smith
Director, Sophia Center
Diocese of Rockville Centre
Huntington, NY

Valavanur A. Subramanian, M.D.
Director, Department of Surgery
Lenox Hill Hospital, New York, NY

Gary Walford, M.D.
Director, Cardiac Catheterization Laboratory
St. Joseph's Hospital, Syracuse, NY

Roberta Williams, M.D.
Vice President of Pediatrics and
Academic Affairs
USC - Children's Hospital
Los Angeles, CA

PCI Reporting System Analysis Workgroup

Members

Ben D. McCallister, M.D. (*Chair*)
Endowed Chair and Director
Cardiovascular Research
Mid America Heart Institute

Djavad T. Arani, M.D.
Clinical Associate Professor of Medicine
SUNY at Buffalo School of Medicine
The Buffalo General Hospital

Luther Clark, M.D.
Chief, Division of Cardiovascular Medicine
University Hospital of Brooklyn

Robert Jones, M.D.
Mary & Deryl Hart Professor of Surgery
Duke University Medical Center

Stanley Katz, M.D.
Chief, Division of Cardiology
North Shore – LIJ Health System

Barbara J. McNeil, M.D., Ph. D.
Head, Department of Health Care Policy
Harvard Medical School

Thomas J. Ryan, M.D.
Professor of Medicine
Boston University Medical Center

Gary Walford, M.D.
Director, Cardiac Catheterization Laboratory
St. Joseph's Hospital

Staff & Consultants to PCI Analysis Workgroup

Donna R. Doran
Administrator, Cardiac Services Program
New York State Department of Health

Rhonda J. O'Brien
Cardiac Database Manager
Cardiac Services Program
New York State Department of Health

Casey S. Roark
Cardiac Databases Coordinator
Research Foundation of SUNY

Edward Hannan, Ph.D.
Professor & Chair
Department of Health Policy,
Management & Behavior
SUNY School of Public Health

Michael Racz
Research Scientist
Department of Health Policy,
Management & Behavior
SUNY School of Public Health

TABLE OF CONTENTS

- MESSAGE FROM COMMISSIONER1
- INTRODUCTION3
- HEALTH DEPARTMENT PROGRAM3
- PATIENT POPULATION3
- RISK ADJUSTMENT FOR ASSESSING PROVIDER PERFORMANCE4
 - Data Collection, Data Validation and Identifying In-Hospital Deaths4
 - Assessing Patient Risk4
 - Predicting Patient Mortality Rates for Providers4
 - Computing the Risk-Adjusted Rate5
 - Interpreting the Risk-Adjusted Mortality Rate5
 - How this Contributes to Quality Improvement5
- 1997 HOSPITAL RISK-ADJUSTED MORTALITY FOR PCI6
- 1995 – 1997 HOSPITAL DATA FOR PCI6
 - Table 1 Hospital Observed, Expected and Risk-Adjusted Mortality Rates (RAMR) for PCI in New York State, 1997 Discharges8
 - Table 2 Hospital Observed, and Risk-Adjusted Mortality Rates (RAMR) for PCI in New York State, 1995 - 1997 Discharges9
- 1995 - 1997 HOSPITAL AND CARDIOLOGIST DATA FOR PCI10
 - Table 3 Cardiologist Observed, Expected and Risk-Adjusted Mortality Rates (RAMR) for PCI in New York State, 1995 - 1997 Discharges10
 - Table 4 Summary Information for Cardiologists Practicing at More Than One Hospital, 1995 - 199720
- CRITERIA USED IN REPORTING SIGNIFICANT RISK FACTORS (1997)24
- MEDICAL TERMINOLOGY26
- APPENDIX 1 1997 Risk Factors for PCI In-Hospital Mortality28
- APPENDIX 2 1997 Risk Factors For In-Hospital Mortality for Non-Emergency PCI30
- APPENDIX 3 1995 - 1997 Risk Factors for PCI In-Hospital Mortality32
- APPENDIX 4 1995 - 1997 Risk Factors for In-Hospital Mortality for Non-Emergency PCI34
- APPENDIX 5 1995 - 1997 Risk Factors for In-Hospital Mortality for Emergency PCI35

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 expanded our PCI analyses this year to include more comprehensive information on non-emergency and emergency cases. In addition, this is the first year we have provided 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 1997. 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 76,877 patients who underwent PCI and were discharged between January 1, 1995 and December 31, 1997. The number of PCI cases per year has increased during that period from 21,707 in 1995 to 29,516 in 1997. Analyses of risk adjusted mortality rates and associated risk factors are provided for 1997 and for the three-year period from 1995 through 1997. 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 patients' 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 1997 are included in the one-year results presented in this report. Similarly, all patients undergoing PCI who were discharged between January 1, 1995 and December 31, 1997 are included in the three-year results. Observed and risk-adjusted mortality rates are reported for patients undergoing PCI in each of the 33 New York State hospitals with approval to perform the procedure.

During the period covered by this report, 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.

In 1997, 8 SHOCK trial cases (including 2 deaths) were excluded from the analysis based on this exception. For the period 1995 – 1997, 17 cases (including 7 deaths) were excluded.

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 (0.90 for all cases in 1997) to obtain the provider's risk-adjusted rate.

Interpreting the Risk-Adjusted Mortality Rate

If the risk-adjusted mortality rate is lower than the statewide mortality rate, the 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 also given to 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.

1997 HOSPITAL RISK-ADJUSTED MORTALITY FOR PCI

Table 1 presents the 1997 PCI mortality results for the 33 hospitals performing PCI in New York in 1997. The table contains, for each hospital, the number of PCIs resulting in 1997 discharges, the number of in-hospital deaths, the observed mortality rate, the expected mortality rate based on the statistical model presented in 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 (91.8% in 1997).

The overall mortality rate for the 29,516 PCIs performed at the 33 hospitals was 0.90%. Observed mortality rates ranged from 0.00% to 2.06%. The range in expected mortality rates, which measure patient severity of illness, was between 0.53% and 1.66%. The risk-adjusted rates, which measure hospital performance, range from 0.00% to 2.15%. Based on confidence intervals for risk-adjusted rates, two hospitals (Weill Cornell-NYP and Montefiore-Einstein) had a significantly higher risk-adjusted mortality rate than the statewide rate. No hospitals 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 0.51%. The range of risk-adjusted rates was from 0.00% to 1.46%. One hospital, Montefiore-Einstein, had a significantly higher risk-adjusted mortality rate than the statewide rate. No hospitals had a significantly lower risk-adjusted mortality rate than the statewide rate.

1995-1997 HOSPITAL DATA FOR PCI

Table 2 provides the number of PCIs, the observed mortality rate, and the risk-adjusted mortality rate for 1995-97 for each of three types of PCI patients in the 33 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 1995-1997 are presented in Appendices 3-5, respectively.

As indicated in Table 2, the three-year observed mortality rates for all PCI patients ranged from 0.15% to 1.93%, and the risk-adjusted mortality rates ranged from 0.30% to 1.84%. Four hospitals (Arnot-Ogden Memorial, Montefiore-Einstein, St. Vincent's, and University Hospital at Stony Brook) had risk-adjusted mortality rates that were significantly higher than the statewide rate, and three hospitals (Buffalo General, Maimonides, 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 91.9% of cases for the period 1995-1997. The statewide mortality rate for the 70,664 non-emergency cases during the 3-year period was 0.49%. Observed mortality rates for this group of patients ranged from 0 - 0.98% and the risk-adjusted mortality rates ranged from 0-1.29%. Four hospitals (Arnot-Ogden, Montefiore-Einstein, University Hospital of Stony Brook and Weill-Cornell-NYP) had risk-adjusted mortality rates that were significantly higher than the statewide average. Three hospitals (Buffalo General, Montefiore-Moses and St. Francis) had risk-adjusted mortality rates significantly below the statewide rate for non-emergency cases.

The last three columns in Table 2 present data on emergency cases based on the model in Appendix 5. Emergency cases represented 8.1% of cases for the period 1995-1997. The statewide mortality rate for the 6,213 emergency PCI cases during the 3-year period was 5.87%. Observed mortality rates for this group ranged from 2.60% to 28.57% and the risk-adjusted mortality rates ranged from 3.31% - 18.05%. One hospital (St. Francis), had a risk adjusted mortality rate that was significantly below the statewide average and one hospital (St. Vincent's Medical Center) 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 (0.90% for all PCI patients in 1997).

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, 1997 Discharges (Listed Alphabetically by Hospital)

Hospital	All Cases						Non-Emergency	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Albany Medical Center	1061	8	0.75	0.89	0.77	(0.33, 1.52)	1002	0.42
Arnot-Ogden	325	4	1.23	0.79	1.41	(0.38, 3.62)	282	0.87
Bellevue	168	1	0.60	0.98	0.55	(0.01, 3.06)	143	0.00
Beth Israel	783	6	0.77	0.68	1.03	(0.37, 2.23)	739	0.56
Buffalo General	810	1	0.12	0.53	0.21	(0.00, 1.16)	788	0.00
Columbia Presbyterian-NYP	453	5	1.10	1.37	0.73	(0.24, 1.70)	399	0.61
Crouse Hospital	660	6	0.91	0.83	0.99	(0.36, 2.15)	577	0.40
Ellis Hospital	559	6	1.07	0.96	1.01	(0.37, 2.20)	496	1.07
Erie County	152	1	0.66	0.64	0.93	(0.01, 5.17)	149	0.00
LIJ Medical Center	587	5	0.85	1.05	0.74	(0.24, 1.72)	507	0.83
Lenox Hill	1742	19	1.09	0.97	1.02	(0.61, 1.59)	1657	0.62
Maimonides	1255	10	0.80	1.17	0.62	(0.29, 1.13)	1206	0.37
Millard Fillmore	725	8	1.10	0.75	1.33	(0.57, 2.62)	692	0.38
Montefiore - Einstein	535	11	2.06	0.87	2.15 *	(1.07, 3.84)	495	1.46 *
Montefiore - Moses	405	1	0.25	0.78	0.29	(0.00, 1.60)	362	0.00
Mount Sinai	1447	8	0.55	1.00	0.50	(0.22, 0.99)	1376	0.25
NYU Hospitals Center	690	8	1.16	1.10	0.96	(0.41, 1.89)	628	0.38
New York Hospital - Queens	751	9	1.20	0.90	1.21	(0.55, 2.29)	673	1.12
North Shore	2342	20	0.85	0.97	0.80	(0.49, 1.23)	2029	0.55
Rochester General	1839	14	0.76	0.80	0.86	(0.47, 1.44)	1714	0.68
St. Francis	2227	10	0.45	0.71	0.57	(0.27, 1.05)	2110	0.32
St. Josephs	1523	9	0.59	0.83	0.65	(0.29, 1.23)	1358	0.24
St. Lukes-Roosevelt	489	3	0.61	0.88	0.63	(0.13, 1.85)	457	0.35
St. Peters	932	9	0.97	1.25	0.70	(0.32, 1.32)	821	0.34
St. Vincents	1142	13	1.14	0.75	1.38	(0.73, 2.36)	1095	0.50
Strong Memorial	456	6	1.32	1.66	0.72	(0.26, 1.56)	340	0.00
United Health Services	802	12	1.50	1.13	1.19	(0.62, 2.09)	714	0.91
Univ. Hosp. - Stony Brook	797	13	1.63	0.92	1.61	(0.85, 2.74)	720	1.11
Univ. Hosp. - Upstate	160	1	0.63	1.07	0.53	(0.01, 2.94)	154	0.00
Univ. Hosp. of Brooklyn	300	0	0.00	0.60	0.00	(0.00, 1.83)	285	0.00
Weill Cornell-NYP	992	15	1.51	0.84	1.62 *	(0.91, 2.68)	900	0.98
Westchester Medical Center	1479	21	1.42	0.93	1.38	(0.85, 2.10)	1362	0.42
Winthrop Univ. Hosp.	928	4	0.43	0.65	0.60	(0.16, 1.54)	866	0.36
Total	29516	267	0.90				27096	0.51

* Risk-adjusted mortality rate significantly higher 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, 1995 - 1997 Discharges

Hospital	All Cases			Non-Emergency Cases			Emergency Cases		
	Cases	OMR	RAMR	Cases	OMR	RAMR	Cases	OMR	RAMR
Albany Medical Center	2534	0.83	0.99	2383	0.50	0.53	151	5.96	5.81
Arnot-Ogden	858	1.75	1.84 *	763	0.92	1.29 *	95	8.42	11.84
Bellevue	467	0.64	0.58	390	0.26	0.28	77	2.60	3.63
Beth Israel	1835	0.76	0.99	1726	0.58	0.49	109	3.67	6.90
Buffalo General	2016	0.15	0.30 **	1977	0.05	0.07 **	39	5.13	5.06
Columbia Presbyterian-NYP	1348	1.11	0.85	1197	0.42	0.55	151	6.62	4.48
Crouse Hospital	1703	0.88	1.19	1516	0.26	0.40	187	5.88	8.64
Ellis Hospital	1402	0.86	1.06	1274	0.55	0.70	128	3.91	5.13
Erie County	431	0.46	0.52	424	0.00	0.00	7	28.57	5.58
LIJ Medical Center	1497	1.14	1.13	1305	0.92	0.78	192	2.60	3.99
Lenox Hill	4792	1.29	1.11	4551	0.75	0.63	241	11.62	6.29
Maimonides	3258	0.77	0.63 **	3114	0.51	0.32	144	6.25	5.02
Millard Fillmore	2176	1.19	1.20	2066	0.48	0.64	110	14.55	8.53
Montefiore - Einstein	1488	1.75	1.80 *	1370	0.95	1.05 *	118	11.02	8.22
Montefiore - Moses	1084	0.46	0.45	980	0.00	0.00 **	104	4.81	4.66
Mount Sinai	3630	0.83	0.69	3424	0.41	0.31	206	7.77	4.96
NYU Hospitals Center	1826	1.26	0.94	1626	0.43	0.38	200	8.00	7.60
New York Hospital - Queens	1023	1.37	1.15	920	0.98	0.72	103	4.85	5.64
North Shore	5749	0.78	0.84	5050	0.51	0.50	699	2.72	4.11
Rochester General	5004	0.82	0.93	4691	0.47	0.52	313	6.07	5.92
St. Francis	6518	0.48	0.51 **	6198	0.29	0.28 **	320	4.06	3.37 **
St. Josephs	3946	0.71	0.74	3484	0.26	0.29	462	4.11	5.82
St. Lukes-Roosevelt	1400	0.79	0.82	1324	0.53	0.48	76	5.26	5.50
St. Peters	2483	0.68	0.61	2214	0.23	0.31	269	4.46	4.29
St. Vincents	2916	1.13	1.60 *	2802	0.57	0.58	114	14.91	18.05 *
Strong Memorial	1295	1.93	1.29	993	0.20	0.29	302	7.62	9.03
United Health Services	2098	1.10	0.83	1810	0.61	0.63	288	4.17	4.18
Univ. Hosp. - Stony Brook	2032	1.28	1.43 *	1846	0.81	0.99 *	186	5.91	6.85
Univ. Hosp. - Upstate	380	1.05	0.95	357	0.00	0.00	23	17.39	11.48
Univ. Hosp. of Brooklyn	829	0.84	1.32	799	0.50	0.57	30	10.00	13.95
Weill Cornell-NYP	2375	1.39	1.19	2158	0.97	0.92 *	217	5.53	4.52
Westchester Medical Center	3597	1.11	0.96	3278	0.52	0.51	319	7.21	6.13
Winthrop Univ. Hosp.	2887	0.62	0.77	2654	0.38	0.43	233	3.43	4.26
Statewide Totals	76877	0.92		70664	0.49		6213	5.87	

* 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.

1995-1997 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 1995-97 for cardiologists in each of the 33 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 (1) who performed 200 or more PCIs in that hospital during 1995-1997, and/or (2) who performed at least one PCI in each of the years 1995-1997. 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 performed procedures in more than one hospital are noted in the table and are listed in all hospitals in which they performed 200 or more procedures and/or performed procedures in each of the years 1995-1997.

Also, cardiologists who met criterion (1) and/or criterion (2) 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 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 provider's 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, 1995 - 1997 Discharges

	Cases	Deaths	All Cases				Non-Emergency	
			OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Albany Medical Center Hospital								
Breisblatt W	441	4	0.91	0.60	1.39	(0.38, 3.57)	425	0.77
#Delago A	980	6	0.61	0.92	0.61	(0.22, 1.33)	931	0.33
#Desantis J	2	0	0.00	3.27	0.00	(0.00,51.80)	0	-
#Esper D	175	3	1.71	0.77	2.04	(0.41, 5.97)	164	1.34
Houghton J	459	4	0.87	0.65	1.24	(0.33, 3.17)	428	0.57
Macina A	179	1	0.56	0.74	0.69	(0.01, 3.86)	159	0.00
#Marmulstein M	32	0	0.00	0.73	0.00	(0.00,14.45)	25	0.00
#Martinelli M	53	1	1.89	1.07	1.62	(0.02, 9.02)	50	2.83
#Papandrea L	31	0	0.00	0.82	0.00	(0.00,13.39)	27	0.00
#Roccario E	30	1	3.33	1.99	1.55	(0.02, 8.61)	26	0.00
All Others	152	1	0.66	0.39	1.54	(0.02, 8.57)	148	1.08
TOTAL	2534	21	0.83	0.78	0.99	(0.61, 1.51)	2383	0.53
Arnot-Ogden Memorial Hospital								
Laifer L	291	6	2.06	1.00	1.91	(0.70, 4.16)	254	1.04
Salimi A	567	9	1.59	0.81	1.80	(0.82, 3.42)	509	1.44
TOTAL	858	15	1.75	0.88	1.84 *	(1.03, 3.04)	763	1.29 *

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Bellevue Hospital Center								
#Attubato M	107	2	1.87	1.68	1.03	(0.12, 3.70)	92	1.17
#Chinitz L	25	0	0.00	1.29	0.00	(0.00,10.54)	17	0.00
#Feit F	135	0	0.00	1.06	0.00	(0.00, 2.37)	109	0.00
#Levite H	108	1	0.93	0.65	1.32	(0.02, 7.33)	94	0.00
#Winer H	74	0	0.00	0.65	0.00	(0.00, 7.09)	61	0.00
All Others	18	0	0.00	0.35	0.00	(0.00,53.79)	17	0.00
TOTAL	467	3	0.64	1.03	0.58	(0.12, 1.69)	390	0.28
Beth Israel Medical Center								
##Friedman M	98	1	1.02	0.32	2.96	(0.04,16.48)	95	1.82
#Hanley G	62	0	0.00	0.49	0.00	(0.00,11.05)	61	0.00
Reimers C	455	3	0.66	0.78	0.78	(0.16, 2.27)	430	0.38
Sherman W	530	4	0.75	0.60	1.17	(0.31, 3.00)	488	0.40
Wilentz J	670	6	0.90	0.84	0.98	(0.36, 2.14)	632	0.58
All Others	20	0	0.00	0.40	0.00	(0.00,42.11)	20	0.00
TOTAL	1835	14	0.76	0.71	0.99	(0.54, 1.66)	1726	0.49
Buffalo General Hospital								
Arani D	229	0	0.00	0.39	0.00	(0.00, 3.79)	226	0.00
Conley J	981	2	0.20	0.48	0.40	(0.04, 1.43)	964	0.15
#Morris W	118	0	0.00	0.36	0.00	(0.00, 8.00)	117	0.00
Paris J	167	1	0.60	0.58	0.96	(0.01, 5.33)	160	0.00
Sullivan P	94	0	0.00	0.59	0.00	(0.00, 6.14)	89	0.00
Visco J	427	0	0.00	0.43	0.00	(0.00, 1.83)	421	0.00
TOTAL	2016	3	0.15	0.46	0.30 **	(0.06, 0.87)	1977	0.07 **
Columbia Presbyterian - NY Presbyterian Hospital								
#Abittan M	1	0	0.00	0.10	0.00	(0.00,100.0)	1	0.00
Apfelbaum M	150	3	2.00	1.11	1.66	(0.33, 4.85)	128	1.16
Arora R	210	0	0.00	0.87	0.00	(0.00, 1.85)	188	0.00
Brogno D	259	3	1.16	1.56	0.68	(0.14, 2.00)	242	0.00
#Ezratty A	3	0	0.00	0.86	0.00	(0.00,100.0)	1	0.00
#Grose R	113	1	0.88	1.42	0.57	(0.01, 3.20)	104	0.00
#Johnson M	14	0	0.00	0.20	0.00	(0.00,100.0)	14	0.00
Lotvin A	28	1	3.57	0.71	4.65	(0.06,25.85)	28	2.74
Rabbani L	110	1	0.91	3.10	0.27	(0.00, 1.51)	84	0.00
#Reison D	89	0	0.00	0.25	0.00	(0.00,15.31)	88	0.00
Schwartz A	80	1	1.25	0.24	4.80	(0.06,26.73)	75	0.00
#Shani J	4	1	25.00	0.48	48.27	(0.63,100.0)	4	26.25
Wasserman H	178	3	1.69	0.76	2.05	(0.41, 5.99)	151	1.02
Weinberger J	83	0	0.00	1.86	0.00	(0.00, 2.20)	64	0.00

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Columbia Presbyterian - NY Presbyterian Hospital (continued)								
Wiedermann J	12	0	0.00	0.36	0.00	(0.00,79.34)	11	0.00
All Others	14	1	7.14	0.39	17.12	(0.22,95.26)	14	6.87
TOTAL	1348	15	1.11	1.20	0.85	(0.48, 1.41)	1197	0.55
Crouse Hospital								
#Amin N	148	0	0.00	0.62	0.00	(0.00, 3.72)	130	0.00
#Battaglia J	628	7	1.11	0.73	1.40	(0.56, 2.89)	550	0.58
#Berkery W	152	2	1.32	1.43	0.85	(0.10, 3.06)	107	0.00
#Bowser M	386	3	0.78	0.45	1.60	(0.32, 4.68)	375	0.80
#Caputo R	17	0	0.00	0.41	0.00	(0.00,48.83)	16	0.00
#Esente P	19	0	0.00	0.59	0.00	(0.00,30.28)	18	0.00
#Giambartolomei A	25	0	0.00	0.63	0.00	(0.00,21.67)	24	0.00
#Lozner E	121	2	1.65	0.46	3.34	(0.37,12.04)	110	0.00
#Picone M	82	0	0.00	0.84	0.00	(0.00, 4.91)	72	0.00
#Reger M	8	0	0.00	0.31	0.00	(0.00,100.0)	8	0.00
#Simons A	86	1	1.16	0.49	2.18	(0.03,12.12)	79	0.00
#Walford G	11	0	0.00	0.23	0.00	(0.00,100.0)	11	0.00
All Others	20	0	0.00	0.59	0.00	(0.00,28.81)	16	0.00
TOTAL	1703	15	0.88	0.68	1.19	(0.67, 1.97)	1516	0.40
Ellis Hospital								
#Card H	7	0	0.00	0.37	0.00	(0.00,100.0)	7	0.00
Cospito P	290	3	1.03	0.68	1.40	(0.28, 4.08)	273	1.07
Jordan M	385	2	0.52	0.82	0.58	(0.07, 2.11)	336	0.49
Parkes R	234	4	1.71	0.99	1.60	(0.43, 4.10)	211	0.00
Wright E	353	2	0.57	0.54	0.96	(0.11, 3.47)	323	0.82
All Others	133	1	0.75	0.75	0.92	(0.01, 5.12)	124	0.80
TOTAL	1402	12	0.86	0.74	1.06	(0.55, 1.86)	1274	0.70
Erie County Medical Center								
#Dashkoff N	350	2	0.57	0.78	0.67	(0.08, 2.43)	344	0.00
Farhi E	75	0	0.00	1.05	0.00	(0.00, 4.30)	74	0.00
#Masud Z	6	0	0.00	0.34	0.00	(0.00,100.0)	6	0.00
TOTAL	431	2	0.46	0.82	0.52	(0.06, 1.88)	424	0.00
Lenox Hill Hospital								
Collins M	362	5	1.38	1.10	1.16	(0.37, 2.70)	352	0.55
Columbo A	319	11	3.45	0.89	3.58 *	(1.78, 6.40)	306	2.15 *
##Friedman M	77	1	1.30	0.44	2.74	(0.04,15.26)	73	1.92
Kreps E	653	8	1.23	1.29	0.88	(0.38, 1.73)	584	0.28
Moses J	1928	11	0.57	0.66	0.79	(0.40, 1.42)	1914	0.36
#Shaknovich A	578	7	1.21	0.86	1.30	(0.52, 2.69)	550	0.71

Table 3 *continued*

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Lenox Hill Hospital (<i>continued</i>)								
Strain J	771	17	2.20	2.12	0.96	(0.56, 1.54)	677	0.68
All Others	104	2	1.92	2.00	0.89	(0.10, 3.21)	95	0.77
TOTAL	4792	62	1.29	1.08	1.11	(0.85, 1.42)	4551	0.63
Long Island Jewish Medical Center								
#Friedman G	514	4	0.78	1.16	0.62	(0.17, 1.59)	441	0.52
#Grunwald A	472	7	1.48	0.88	1.55	(0.62, 3.19)	406	0.80
Koss J	495	6	1.21	0.75	1.50	(0.55, 3.27)	444	1.13
All Others	16	0	0.00	0.62	0.00	(0.00,34.33)	14	0.00
TOTAL	1497	17	1.14	0.93	1.13	(0.66, 1.81)	1305	0.78
Maimonides Medical Center								
Frankel R	949	7	0.74	1.27	0.54	(0.21, 1.10)	887	0.14
Sacchi T	560	4	0.71	0.50	1.31	(0.35, 3.36)	557	0.59
#Shani J	1749	14	0.80	1.26	0.59	(0.32, 0.98)	1670	0.35
TOTAL	3258	25	0.77	1.13	0.63 **	(0.40, 0.92)	3114	0.32
Millard Fillmore Hospital								
Calandra S	192	0	0.00	0.66	0.00	(0.00, 2.66)	188	0.00
Corbelli J	626	10	1.60	1.07	1.37	(0.66, 2.53)	589	0.79
#Dashkoff N	3	0	0.00	0.58	0.00	(0.00,100.0)	3	0.00
Gelormini J	166	1	0.60	0.50	1.11	(0.01, 6.15)	156	0.74
#Masud Z	529	8	1.51	0.71	1.98	(0.85, 3.90)	508	1.13
#Morris W	647	7	1.08	1.13	0.89	(0.35, 1.82)	611	0.22
All Others	13	0	0.00	0.41	0.00	(0.00,62.89)	11	0.00
TOTAL	2176	26	1.19	0.92	1.20	(0.79, 1.77)	2066	0.64
Montefiore Medical Center - Einstein Division								
Jordan A	160	0	0.00	0.55	0.00	(0.00, 3.83)	151	0.00
Lerrick K	297	8	2.69	1.50	1.66	(0.72, 3.28)	265	0.60
Monrad E	436	10	2.29	0.76	2.78 *	(1.33, 5.11)	411	2.02 *
Silverman G	293	4	1.37	0.62	2.04	(0.55, 5.23)	269	0.92
Strom J	187	3	1.60	1.11	1.33	(0.27, 3.90)	173	0.70
All Others	115	1	0.87	0.68	1.17	(0.02, 6.53)	101	1.09
TOTAL	1488	26	1.75	0.90	1.80 *	(1.18, 2.64)	1370	1.05 *

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Montefiore Medical Center - Moses Division								
Greenberg M	407	1	0.25	0.74	0.31	(0.00, 1.72)	373	0.00
#Grose R	182	0	0.00	1.58	0.00	(0.00, 1.18)	168	0.00
#Johnson M	131	1	0.76	0.60	1.18	(0.02, 6.59)	126	0.00
Menegus M	349	2	0.57	0.97	0.55	(0.06, 1.98)	300	0.00
All Others	15	1	6.67	2.05	3.00	(0.04,16.70)	13	0.00
TOTAL	1084	5	0.46	0.95	0.45	(0.14, 1.04)	980	0.00 **
Mount Sinai Hospital								
Ambrose J	391	1	0.26	0.79	0.30	(0.00, 1.67)	381	0.00
Cocke T	440	7	1.59	1.40	1.05	(0.42, 2.17)	406	0.79
Duvvuri S	655	12	1.83	1.26	1.34	(0.69, 2.34)	588	0.57
Marmur J	467	6	1.28	1.18	1.01	(0.37, 2.20)	441	0.69
Sharma S	1677	4	0.24	1.01	0.22 **	(0.06, 0.56)	1608	0.09 **
TOTAL	3630	30	0.83	1.10	0.69	(0.47, 0.99)	3424	0.31
New York Hospital - Queens								
##Feld H	2	0	0.00	0.57	0.00	(0.00,100.0)	2	0.00
#Friedman G	13	0	0.00	0.47	0.00	(0.00,55.17)	12	0.00
#Geizhals M	107	2	1.87	0.51	3.39	(0.38,12.25)	106	1.80
#Grunwald A	9	0	0.00	0.78	0.00	(0.00,48.46)	7	0.00
##Gustafson G	290	4	1.38	1.33	0.96	(0.26, 2.46)	255	0.53
#Wong S	425	5	1.18	1.11	0.98	(0.32, 2.29)	385	0.55
All Others	177	3	1.69	1.14	1.37	(0.28, 4.01)	153	1.09
TOTAL	1023	14	1.37	1.10	1.15	(0.63, 1.93)	920	0.72
New York University Hospitals Center								
#Attubato M	420	3	0.71	0.80	0.82	(0.17, 2.41)	385	0.49
#Chinitz L	122	1	0.82	1.34	0.56	(0.01, 3.13)	109	0.00
#Feit F	458	6	1.31	1.29	0.94	(0.34, 2.04)	416	0.00
#Levite H	333	6	1.80	1.86	0.89	(0.33, 1.94)	274	0.57
#Winer H	293	6	2.05	1.25	1.52	(0.55, 3.30)	255	0.98
All Others	200	1	0.50	0.92	0.50	(0.01, 2.80)	187	0.00
TOTAL	1826	23	1.26	1.24	0.94	(0.60, 1.41)	1626	0.38
North Shore University Hospital								
##Feld H	3	0	0.00	0.26	0.00	(0.00,100.0)	3	0.00
Green S	985	13	1.32	0.88	1.38	(0.74, 2.37)	822	0.83
##Gustafson G	112	0	0.00	0.54	0.00	(0.00, 5.62)	112	0.00
Kaplan B	671	8	1.19	1.05	1.05	(0.45, 2.07)	560	0.94
Katz S	1111	12	1.08	0.99	1.01	(0.52, 1.77)	932	0.60
Ong L Y	983	4	0.41	1.04	0.36	(0.10, 0.93)	839	0.23
Padmanabhan V	715	2	0.28	0.58	0.45	(0.05, 1.61)	649	0.23

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
North Shore University Hospital (continued)								
#Sassower M	202	2	0.99	0.60	1.52	(0.17, 5.49)	200	0.73
#Schwartz R	387	2	0.52	0.76	0.63	(0.07, 2.27)	374	0.21
#Wong S	182	1	0.55	0.82	0.62	(0.01, 3.46)	179	0.32
Zisfein J	307	1	0.33	0.43	0.69	(0.01, 3.86)	299	0.42
All Others	91	0	0.00	1.16	0.00	(0.00, 3.21)	81	0.00
TOTAL	5749	45	0.78	0.86	0.84	(0.61, 1.12)	5050	0.50
Rochester General Hospital								
Doling M	833	3	0.36	0.72	0.46	(0.09, 1.35)	803	0.31
Fitzpatrick P	260	5	1.92	0.70	2.53	(0.82, 5.91)	240	1.08
Gagioch G	409	2	0.49	1.25	0.36	(0.04, 1.30)	347	0.00
Mathew T	523	3	0.57	0.48	1.10	(0.22, 3.21)	505	0.00
Ong L S	1792	13	0.73	0.58	1.16	(0.62, 1.99)	1743	0.74
Resnick R	120	1	0.83	0.55	1.39	(0.02, 7.75)	118	1.05
Scortichini D	207	3	1.45	1.16	1.15	(0.23, 3.36)	188	0.90
Stuver T	254	6	2.36	1.65	1.32	(0.48, 2.87)	202	0.52
Thompson M	547	5	0.91	1.25	0.67	(0.22, 1.57)	490	0.00
All Others	59	0	0.00	1.23	0.00	(0.00, 4.67)	55	0.00
TOTAL	5004	41	0.82	0.81	0.93	(0.67, 1.27)	4691	0.52
St. Francis Hospital								
#Abittan M	737	1	0.14	0.91	0.14 **	(0.00, 0.77)	703	0.11
Berke A	502	6	1.20	1.83	0.60	(0.22, 1.32)	461	0.63
#Ezratty A	503	1	0.20	0.70	0.26	(0.00, 1.45)	473	0.23
Gulotta R	283	1	0.35	1.13	0.29	(0.00, 1.61)	259	0.00
Gulotta S	300	2	0.67	0.62	0.99	(0.11, 3.57)	289	0.33
Hamby R	359	2	0.56	0.55	0.93	(0.10, 3.37)	348	0.38
Hershman R	235	1	0.43	0.39	1.00	(0.01, 5.55)	233	0.66
#Lituchy A	206	0	0.00	0.81	0.00	(0.00, 2.02)	186	0.00
Minadeo J	243	4	1.65	1.26	1.21	(0.33, 3.09)	222	0.51
Monteleone B	118	0	0.00	1.12	0.00	(0.00, 2.57)	107	0.00
Pappas T	627	2	0.32	0.66	0.44	(0.05, 1.60)	602	0.21
Petrossian G	578	5	0.87	0.85	0.94	(0.30, 2.20)	557	0.59
Randall A	136	0	0.00	0.68	0.00	(0.00, 3.67)	135	0.00
Reduto L	242	2	0.83	0.97	0.79	(0.09, 2.85)	237	0.00
Schlofmitz R	954	3	0.31	0.69	0.42	(0.08, 1.22)	918	0.26
Venditto J	225	0	0.00	0.51	0.00	(0.00, 2.94)	216	0.00
All Others	270	1	0.37	1.06	0.32	(0.00, 1.80)	252	0.00
TOTAL	6518	31	0.48	0.86	0.51 **	(0.34, 0.72)	6198	0.28 **

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
St. Josephs Hospital Health Center								
#Amin N	124	1	0.81	1.65	0.45	(0.01, 2.51)	85	0.00
#Bowser M	8	0	0.00	5.52	0.00	(0.00, 7.67)	0	0.00
#Caputo R	434	2	0.46	0.92	0.46	(0.05, 1.66)	382	0.00
#Esente P	881	6	0.68	0.79	0.79	(0.29, 1.72)	804	0.14
#Giambartolomei A	681	8	1.17	1.16	0.94	(0.40, 1.84)	609	0.77
#Lozner E	53	0	0.00	0.51	0.00	(0.00,12.62)	40	0.00
#Picone M	146	0	0.00	0.60	0.00	(0.00, 3.85)	117	0.00
#Reger M	603	2	0.33	0.79	0.39	(0.04, 1.39)	553	0.27
#Simons A	388	3	0.77	0.85	0.84	(0.17, 2.47)	337	0.33
#Walford G	566	6	1.06	0.74	1.32	(0.48, 2.87)	500	0.26
All Others	62	0	0.00	0.52	0.00	(0.00,10.41)	57	0.00
TOTAL	3946	28	0.71	0.89	0.74	(0.49, 1.06)	3484	0.29
St. Lukes Roosevelt Hospital-St. Lukes Div.								
#Geizhals M	258	1	0.39	0.75	0.48	(0.01, 2.67)	250	0.32
Goldman A	174	1	0.57	0.75	0.71	(0.01, 3.95)	166	0.00
Hirsch C	7	0	0.00	0.13	0.00	(0.00,100.0)	7	0.00
Leber R	121	0	0.00	0.87	0.00	(0.00, 3.23)	104	0.00
Palazzo A	34	1	2.94	2.18	1.25	(0.02, 6.95)	28	0.00
#Reison D	2	0	0.00	0.43	0.00	(0.00,100.0)	2	0.00
#Rentrop K	4	0	0.00	0.55	0.00	(0.00,100.0)	4	0.00
Slater J	755	7	0.93	0.89	0.96	(0.39, 1.99)	720	0.66
All Others	45	1	2.22	1.51	1.36	(0.02, 7.59)	43	2.40
TOTAL	1400	11	0.79	0.89	0.82	(0.41, 1.46)	1324	0.48
St. Peters Hospital								
#Card H	136	0	0.00	0.38	0.00	(0.00, 6.60)	133	0.00
#Delago A	14	1	7.14	9.37	0.70	(0.01, 3.92)	11	0.00
#Desantis J	387	3	0.78	0.87	0.82	(0.16, 2.39)	369	1.25
#Esper D	154	1	0.65	1.12	0.53	(0.01, 2.97)	128	0.00
Herman B	203	2	0.99	0.60	1.50	(0.17, 5.43)	198	0.63
#Marmulstein M	364	2	0.55	1.10	0.46	(0.05, 1.66)	317	0.40
#Martinelli M	435	1	0.23	1.01	0.21	(0.00, 1.17)	378	0.00
#Papandrea L	209	1	0.48	1.14	0.39	(0.01, 2.16)	191	0.00
#Roccario E	466	6	1.29	1.29	0.92	(0.34, 2.00)	388	0.00
All Others	115	0	0.00	0.73	0.00	(0.00, 4.02)	101	0.00
TOTAL	2483	17	0.68	1.04	0.61	(0.35, 0.97)	2214	0.31

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
St. Vincents Hospital and Medical Center								
Acuna D	150	3	2.00	0.52	3.54	(0.71,10.33)	134	3.19 *
Bloomfield D	31	0	0.00	0.29	0.00	(0.00,37.19)	31	0.00
Braff R	116	1	0.86	0.56	1.43	(0.02, 7.97)	113	0.93
Coppola J	354	4	1.13	0.64	1.62	(0.44, 4.15)	326	0.00
Dominguez A	211	3	1.42	0.71	1.84	(0.37, 5.38)	207	0.33
Elmquist T	87	5	5.75	1.34	3.95 *	(1.27, 9.22)	76	1.14
##Feld H	293	4	1.37	1.14	1.10	(0.30, 2.83)	284	0.39
##Friedman M	3	0	0.00	0.24	0.00	(0.00,100.0)	3	0.00
Homayuni A	324	2	0.62	0.66	0.86	(0.10, 3.11)	311	0.00
#Kwan T	84	0	0.00	0.38	0.00	(0.00,10.54)	83	0.00
Malpeso J	182	2	1.10	0.47	2.16	(0.24, 7.80)	178	1.65
#Rentrop K	573	3	0.52	0.55	0.89	(0.18, 2.59)	568	0.58
Seldon M	202	4	1.98	0.71	2.57	(0.69, 6.58)	189	0.58
Snyder S	135	1	0.74	0.37	1.83	(0.02,10.20)	134	1.01
Warchol A	72	0	0.00	0.38	0.00	(0.00,12.44)	70	0.00
All Others	99	1	1.01	0.57	1.63	(0.02, 9.05)	95	0.86
TOTAL	2916	33	1.13	0.65	1.60 *	(1.10, 2.25)	2802	0.58
State University Hospital Upstate Medical Center								
#Battaglia J	4	0	0.00	1.12	0.00	(0.00,75.70)	4	0.00
#Berkery W	96	0	0.00	1.23	0.00	(0.00, 2.87)	88	0.00
Patrone V	178	1	0.56	1.00	0.52	(0.01, 2.88)	172	0.00
Phadke K	102	3	2.94	0.86	3.16	(0.64, 9.24)	93	0.00
TOTAL	380	4	1.05	1.02	0.95	(0.26, 2.43)	357	0.00
Strong Memorial Hospital								
Cunningham M	436	5	1.15	1.64	0.65	(0.21, 1.51)	336	0.41
Ling F	590	11	1.86	1.14	1.51	(0.75, 2.70)	469	0.28
Pomerantz R	269	9	3.35	1.50	2.06 *	(0.94, 3.92)	188	0.00
TOTAL	1295	25	1.93	1.38	1.29	(0.83, 1.90)	993	0.29
United Health Services - Wilson Division								
Jamal N	632	5	0.79	1.42	0.52	(0.17, 1.20)	520	0.36
Kashou J	347	8	2.31	1.60	1.33	(0.57, 2.62)	291	0.97
Phillips W	444	3	0.68	0.78	0.80	(0.16, 2.34)	404	0.67
Stamato N	157	0	0.00	1.38	0.00	(0.00, 1.56)	120	0.00
Traverse P	491	6	1.22	1.01	1.12	(0.41, 2.43)	451	0.85
All Others	27	1	3.70	1.79	1.91	(0.02,10.61)	24	1.36
TOTAL	2098	23	1.10	1.22	0.83	(0.53, 1.24)	1810	0.63

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
University Hospital at Stony Brook								
Chernilas J	214	3	1.40	1.39	0.93	(0.19, 2.73)	180	0.76
Dervan J	359	9	2.51	0.83	2.79 *	(1.27, 5.29)	325	1.66 *
Grella R	532	2	0.38	0.40	0.87	(0.10, 3.16)	517	0.32
Lawson W	361	7	1.94	1.41	1.27	(0.51, 2.62)	307	0.94
Novotny H	339	4	1.18	0.63	1.74	(0.47, 4.46)	308	1.57
All Others	227	1	0.44	0.68	0.60	(0.01, 3.33)	209	0.00
TOTAL	2032	26	1.28	0.83	1.43 *	(0.93, 2.09)	1846	0.99 *
University Hospital of Brooklyn								
Chadow H	272	5	1.84	0.55	3.11 *	(1.00, 7.27)	261	1.40
Feit A	168	0	0.00	0.52	0.00	(0.00, 3.88)	162	0.00
#Hanley G	26	0	0.00	1.70	0.00	(0.00, 7.65)	25	0.00
#Kwan T	160	2	1.25	0.67	1.72	(0.19, 6.20)	150	0.70
#Reddy C	73	0	0.00	0.35	0.00	(0.00,13.44)	73	0.00
All Others	130	0	0.00	0.58	0.00	(0.00, 4.46)	128	0.00
TOTAL	829	7	0.84	0.59	1.32	(0.53, 2.73)	799	0.57
Weill Cornell - NY Presbyterian Hospital								
Altmann D	390	6	1.54	1.57	0.91	(0.33, 1.97)	341	0.52
Bergman G	505	8	1.58	1.31	1.12	(0.48, 2.20)	456	0.83
##Gustafson G	106	2	1.89	0.53	3.31	(0.37,11.94)	103	1.82
#Lituchy A	32	0	0.00	0.54	0.00	(0.00,19.58)	30	0.00
#Reddy C	70	0	0.00	0.48	0.00	(0.00,10.12)	69	0.00
Sanborn T	628	9	1.43	0.79	1.68	(0.77, 3.19)	574	1.03
#Shaknovich A	368	5	1.36	0.96	1.31	(0.42, 3.06)	348	1.21
All Others	276	3	1.09	1.22	0.82	(0.17, 2.41)	237	0.82
TOTAL	2375	33	1.39	1.08	1.19	(0.82, 1.67)	2158	0.92 *
Westchester Medical Center								
Charney R	303	0	0.00	0.56	0.00	(0.00, 1.98)	290	0.00
Cohen M	570	8	1.40	1.32	0.98	(0.42, 1.94)	509	0.47
Monsen C	947	13	1.37	1.30	0.98	(0.52, 1.67)	851	0.63
Pucillo A	916	8	0.87	1.12	0.72	(0.31, 1.42)	831	0.34
Weiss M	732	10	1.37	0.81	1.55	(0.74, 2.85)	673	0.97
All Others	129	1	0.78	0.56	1.28	(0.02, 7.10)	124	0.00
TOTAL	3597	40	1.11	1.07	0.96	(0.69, 1.31)	3278	0.51

Table 3 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Winthrop - University Hospital								
Gambino A	1854	11	0.59	0.66	0.83	(0.41, 1.49)	1750	0.47
Heller L	258	4	1.55	1.41	1.02	(0.27, 2.61)	207	1.15
Marzo K	751	3	0.40	0.73	0.51	(0.10, 1.48)	673	0.17
#Sassower M	8	0	0.00	1.73	0.00	(0.00,24.44)	8	0.00
#Schwartz R	12	0	0.00	0.68	0.00	(0.00,41.36)	12	0.00
All Others	4	0	0.00	0.28	0.00	(0.00,100.0)	4	0.00
TOTAL	2887	18	0.62	0.75	0.77	(0.46, 1.22)	2654	0.43
STATEWIDE TOTAL	76877	710	0.92				70664	0.49

* 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, 1995 - 1997

	All Cases						Non-Emergency	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Abittan M	738	1	0.14	0.91	0.14 **	(0.00, 0.77)	704	0.11
Columbia Presbyterian	1	0	0.00	0.10	0.00	(0.00,100.0)	1	0.00
St. Francis	737	1	0.14	0.91	0.14 **	(0.00, 0.77)	703	0.11
Amin N	272	1	0.37	1.09	0.31	(0.00, 1.74)	215	0.00
Crouse	148	0	0.00	0.62	0.00	(0.00, 3.72)	130	0.00
St. Josephs	124	1	0.81	1.65	0.45	(0.01, 2.51)	85	0.00
Attubato M	527	5	0.95	0.98	0.89	(0.29, 2.09)	477	0.60
Bellevue	107	2	1.87	1.68	1.03	(0.12, 3.70)	92	1.17
NYU Hospitals Center	420	3	0.71	0.80	0.82	(0.17, 2.41)	385	0.49
Battaglia J	632	7	1.11	0.74	1.39	(0.56, 2.86)	554	0.57
Crouse	628	7	1.11	0.73	1.40	(0.56, 2.89)	550	0.58
Upstate Med Ctr	4	0	0.00	1.12	0.00	(0.00,75.70)	4	0.00
Berkery W	248	2	0.81	1.36	0.55	(0.06, 1.98)	195	0.00
Crouse	152	2	1.32	1.43	0.85	(0.10, 3.06)	107	0.00
Upstate Med Ctr	96	0	0.00	1.23	0.00	(0.00, 2.87)	88	0.00
Bowser M	394	3	0.76	0.55	1.28	(0.26, 3.73)	375	0.80
Crouse	386	3	0.78	0.45	1.60	(0.32, 4.68)	375	0.80
St. Josephs	8	0	0.00	5.52	0.00	(0.00, 7.67)	0	0.00
Caputo R	451	2	0.44	0.90	0.45	(0.05, 1.64)	398	0.00
Crouse	17	0	0.00	0.41	0.00	(0.00,48.83)	16	0.00
St. Josephs	434	2	0.46	0.92	0.46	(0.05, 1.66)	382	0.00
Card H	143	0	0.00	0.38	0.00	(0.00, 6.29)	140	0.00
Ellis Hospital	7	0	0.00	0.37	0.00	(0.00,100.0)	7	0.00
St. Peters	136	0	0.00	0.38	0.00	(0.00, 6.60)	133	0.00
Chinitz L	147	1	0.68	1.33	0.47	(0.01, 2.62)	126	0.00
Bellevue	25	0	0.00	1.29	0.00	(0.00,10.54)	17	0.00
NYU Hospitals Center	122	1	0.82	1.34	0.56	(0.01, 3.13)	109	0.00
Dashkoff N	353	2	0.57	0.78	0.67	(0.08, 2.42)	347	0.00
Erie County	350	2	0.57	0.78	0.67	(0.08, 2.43)	344	0.00
Millard Fillmore	3	0	0.00	0.58	0.00	(0.00,100.0)	3	0.00
Delago A	994	7	0.70	1.04	0.62	(0.25, 1.29)	942	0.33
Albany Med Ctr	980	6	0.61	0.92	0.61	(0.22, 1.33)	931	0.33
St. Peters	14	1	7.14	9.37	0.70	(0.01, 3.92)	11	0.00
Desantis J	389	3	0.77	0.89	0.80	(0.16, 2.35)	369	1.25
Albany Med Ctr	2	0	0.00	3.27	0.00	(0.00,51.80)	0	0.00
St. Peters	387	3	0.78	0.87	0.82	(0.16, 2.39)	369	1.25
Esente P	900	6	0.67	0.79	0.78	(0.28, 1.70)	822	0.14
Crouse	19	0	0.00	0.59	0.00	(0.00,30.28)	18	0.00
St. Josephs	881	6	0.68	0.79	0.79	(0.29, 1.72)	804	0.14

Table 4 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Esper D	329	4	1.22	0.94	1.20	(0.32, 3.07)	292	0.79
Albany Med Ctr	175	3	1.71	0.77	2.04	(0.41, 5.97)	164	1.34
St. Peters	154	1	0.65	1.12	0.53	(0.01, 2.97)	128	0.00
Ezratty A	506	1	0.20	0.70	0.26	(0.00, 1.44)	474	0.23
Columbia Presbyterian	3	0	0.00	0.86	0.00	(0.00,100.0)	1	0.00
St. Francis	503	1	0.20	0.70	0.26	(0.00, 1.45)	473	0.23
Feit F	593	6	1.01	1.24	0.76	(0.28, 1.64)	525	0.00
Bellevue	135	0	0.00	1.06	0.00	(0.00, 2.37)	109	0.00
NYU Hospitals Center	458	6	1.31	1.29	0.94	(0.34, 2.04)	416	0.00
Feld H	298	4	1.34	1.13	1.10	(0.30, 2.81)	289	0.39
New York Hosp-Queens	2	0	0.00	0.57	0.00	(0.00,100.0)	2	0.00
North Shore	3	0	0.00	0.26	0.00	(0.00,100.0)	3	0.00
St. Vincents	293	4	1.37	1.14	1.10	(0.30, 2.83)	284	0.39
Friedman G	527	4	0.76	1.14	0.62	(0.17, 1.58)	453	0.51
Long Island Jewish	514	4	0.78	1.16	0.62	(0.17, 1.59)	441	0.52
New York Hosp-Queens	13	0	0.00	0.47	0.00	(0.00,55.17)	12	0.00
Friedman M	178	2	1.12	0.37	2.82	(0.32,10.17)	171	1.85
Beth Israel	98	1	1.02	0.32	2.96	(0.04,16.48)	95	1.82
Lenox Hill	77	1	1.30	0.44	2.74	(0.04,15.26)	73	1.92
St. Vincents	3	0	0.00	0.24	0.00	(0.00,100.0)	3	0.00
Geizhals M	365	3	0.82	0.68	1.12	(0.23, 3.28)	356	0.71
New York Hosp-Queens	107	2	1.87	0.51	3.39	(0.38,12.25)	106	1.80
St. Lukes	258	1	0.39	0.75	0.48	(0.01, 2.67)	250	0.32
Giambartolomei A	706	8	1.13	1.14	0.92	(0.40, 1.81)	633	0.74
Crouse	25	0	0.00	0.63	0.00	(0.00,21.67)	24	0.00
St. Josephs	681	8	1.17	1.16	0.94	(0.40, 1.84)	609	0.77
Grose R	295	1	0.34	1.52	0.21	(0.00, 1.15)	272	0.00
Columbia Presbyterian	113	1	0.88	1.42	0.57	(0.01, 3.20)	104	0.00
Montefiore-Moses Div	182	0	0.00	1.58	0.00	(0.00, 1.18)	168	0.00
Grunwald A	481	7	1.46	0.88	1.52	(0.61, 3.14)	413	0.79
Long Island Jewish	472	7	1.48	0.88	1.55	(0.62, 3.19)	406	0.80
New York Hosp-Queens	9	0	0.00	0.78	0.00	(0.00,48.46)	7	0.00
Gustafson G	508	6	1.18	0.99	1.11	(0.40, 2.41)	470	0.66
New York Hosp-Queens	290	4	1.38	1.33	0.96	(0.26, 2.46)	255	0.53
North Shore	112	0	0.00	0.54	0.00	(0.00, 5.62)	112	0.00
Weill Cornell	106	2	1.89	0.53	3.31	(0.37,11.94)	103	1.82
Hanley G	88	0	0.00	0.85	0.00	(0.00, 4.52)	86	0.00
Beth Israel	62	0	0.00	0.49	0.00	(0.00,11.05)	61	0.00
Univ Hosp Brooklyn	26	0	0.00	1.70	0.00	(0.00, 7.65)	25	0.00

Table 4 continued

	Cases	Deaths	OMR	All Cases			Non-Emergency	
				EMR	RAMR	95% CI for RAMR	Cases	RAMR
Johnson M	145	1	0.69	0.56	1.14	(0.01, 6.36)	140	0.00
Columbia Presbyterian	14	0	0.00	0.20	0.00	(0.00,100.0)	14	0.00
Montefiore-Moses Div	131	1	0.76	0.60	1.18	(0.02, 6.59)	126	0.00
Kwan T	244	2	0.82	0.57	1.32	(0.15, 4.77)	233	0.44
St. Vincents	84	0	0.00	0.38	0.00	(0.00,10.54)	83	0.00
Univ Hosp Brooklyn	160	2	1.25	0.67	1.72	(0.19, 6.20)	150	0.70
Levite H	441	7	1.59	1.57	0.94	(0.37, 1.93)	368	0.47
Bellevue	108	1	0.93	0.65	1.32	(0.02, 7.33)	94	0.00
NYU Hospitals Center	333	6	1.80	1.86	0.89	(0.33, 1.94)	274	0.57
Lituchy A	238	0	0.00	0.78	0.00	(0.00, 1.83)	216	0.00
St. Francis	206	0	0.00	0.81	0.00	(0.00, 2.02)	186	0.00
Weill Cornell	32	0	0.00	0.54	0.00	(0.00,19.58)	30	0.00
Lozner E	174	2	1.15	0.47	2.25	(0.25, 8.11)	150	0.00
Crouse	121	2	1.65	0.46	3.34	(0.37,12.04)	110	0.00
St. Josephs	53	0	0.00	0.51	0.00	(0.00,12.62)	40	0.00
Marmulstein M	396	2	0.51	1.07	0.43	(0.05, 1.57)	342	0.38
Albany Med Ctr	32	0	0.00	0.73	0.00	(0.00,14.45)	25	0.00
St. Peters	364	2	0.55	1.10	0.46	(0.05, 1.66)	317	0.40
Martinelli M	488	2	0.41	1.01	0.37	(0.04, 1.35)	428	0.33
Albany Med Ctr	53	1	1.89	1.07	1.62	(0.02, 9.02)	50	2.83
St. Peters	435	1	0.23	1.01	0.21	(0.00, 1.17)	378	0.00
Masud Z	535	8	1.50	0.70	1.97	(0.85, 3.88)	514	1.11
Erie County	6	0	0.00	0.34	0.00	(0.00,100.0)	6	0.00
Millard Fillmore	529	8	1.51	0.71	1.98	(0.85, 3.90)	508	1.13
Morris W	765	7	0.92	1.01	0.84	(0.34, 1.72)	728	0.19
Buffalo General	118	0	0.00	0.36	0.00	(0.00, 8.00)	117	0.00
Millard Fillmore	647	7	1.08	1.13	0.89	(0.35, 1.82)	611	0.22
Papandrea L	240	1	0.42	1.10	0.35	(0.00, 1.95)	218	0.00
Albany Med Ctr	31	0	0.00	0.82	0.00	(0.00,13.39)	27	0.00
St. Peters	209	1	0.48	1.14	0.39	(0.01, 2.16)	191	0.00
Picone M	228	0	0.00	0.69	0.00	(0.00, 2.16)	189	0.00
Crouse	82	0	0.00	0.84	0.00	(0.00, 4.91)	72	0.00
St. Josephs	146	0	0.00	0.60	0.00	(0.00, 3.85)	117	0.00
Reddy C	143	0	0.00	0.41	0.00	(0.00, 5.77)	142	0.00
Univ Hosp Brooklyn	73	0	0.00	0.35	0.00	(0.00,13.44)	73	0.00
Weill Cornell	70	0	0.00	0.48	0.00	(0.00,10.12)	69	0.00
Reger M	611	2	0.33	0.79	0.38	(0.04, 1.39)	561	0.27
Crouse	8	0	0.00	0.31	0.00	(0.00,100.0)	8	0.00
St. Josephs	603	2	0.33	0.79	0.39	(0.04, 1.39)	553	0.27

Table 4 continued

	All Cases						Non-Emergency	
	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR	Cases	RAMR
Reison D	91	0	0.00	0.25	0.00	(0.00,14.73)	90	0.00
Columbia Presbyterian	89	0	0.00	0.25	0.00	(0.00,15.31)	88	0.00
St. Lukes	2	0	0.00	0.43	0.00	(0.00,100.0)	2	0.00
Rentrop K	577	3	0.52	0.55	0.88	(0.18, 2.57)	572	0.57
St. Lukes	4	0	0.00	0.55	0.00	(0.00,100.0)	4	0.00
St. Vincents	573	3	0.52	0.55	0.89	(0.18, 2.59)	568	0.58
Roccario E	496	7	1.41	1.33	0.98	(0.39, 2.01)	414	0.00
Albany Med Ctr	30	1	3.33	1.99	1.55	(0.02, 8.61)	26	0.00
St. Peters	466	6	1.29	1.29	0.92	(0.34, 2.00)	388	0.00
Sassower M	210	2	0.95	0.64	1.36	(0.15, 4.93)	208	0.65
North Shore	202	2	0.99	0.60	1.52	(0.17, 5.49)	200	0.73
Winthrop Univ Hosp	8	0	0.00	1.73	0.00	(0.00,24.44)	8	0.00
Schwartz R	399	2	0.50	0.76	0.61	(0.07, 2.21)	386	0.20
North Shore	387	2	0.52	0.76	0.63	(0.07, 2.27)	374	0.21
Winthrop Univ Hosp	12	0	0.00	0.68	0.00	(0.00,41.36)	12	0.00
Shaknovich A	946	12	1.27	0.90	1.31	(0.67, 2.28)	898	0.92
Lenox Hill	578	7	1.21	0.86	1.30	(0.52, 2.69)	550	0.71
Weill Cornell	368	5	1.36	0.96	1.31	(0.42, 3.06)	348	1.21
Shani J	1753	15	0.86	1.26	0.63	(0.35, 1.04)	1674	0.39
Columbia Presbyterian	4	1	25.00	0.48	48.27	(0.63,100.0)	4	26.25
Maimonides	1749	14	0.80	1.26	0.59	(0.32, 0.98)	1670	0.35
Simons A	474	4	0.84	0.78	1.00	(0.27, 2.55)	416	0.27
Crouse	86	1	1.16	0.49	2.18	(0.03,12.12)	79	0.00
St. Josephs	388	3	0.77	0.85	0.84	(0.17, 2.47)	337	0.33
Walford G	577	6	1.04	0.73	1.31	(0.48, 2.86)	511	0.26
Crouse	11	0	0.00	0.23	0.00	(0.00,100.0)	11	0.00
St. Josephs	566	6	1.06	0.74	1.32	(0.48, 2.87)	500	0.26
Winer H	367	6	1.63	1.12	1.34	(0.49, 2.92)	316	0.85
Bellevue	74	0	0.00	0.65	0.00	(0.00, 7.09)	61	0.00
NYU Hospitals Center	293	6	2.05	1.25	1.52	(0.55, 3.30)	255	0.98
Wong S	607	6	0.99	1.02	0.89	(0.33, 1.94)	564	0.47
New York Hosp-Queens	425	5	1.18	1.11	0.98	(0.32, 2.29)	385	0.55
North Shore	182	1	0.55	0.82	0.62	(0.01, 3.46)	179	0.32

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

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

Criteria Used in Reporting Significant Risk Factors (1997)

Based on Documentation in Medical Record

Patient Risk Factor	Definitions
Hemodynamic State	Determined just prior to surgery
• Unstable	Patient requires pharmacologic or mechanical support to maintain blood pressure or cardiac output
• Shock	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 immediately prior to the procedure
Comorbidities	
• Chronic Obstructive Pulmonary Disease	Patient requires chronic (longer than three months), bronchodilator therapy to avoid disability from obstructive airway disease; or has a forced expiratory volume in one second of less than 75% of the predicted value or less than 1.25 liters; or has a room air pO ₂ <60 or a pCO ₂ >50
• Diabetes Requiring Medication	The patient is receiving either oral hypoglycemics or insulin
• Renal Failure, Dialysis	The patient is on chronic peritoneal or hemodialysis
• Renal Failure, Creatinine >2.5	Pre-angioplasty creatinine greater than 2.5 mg/dl
Severity of Atherosclerotic Process	
• Aortoiliac Disease	Angiographic demonstration of at least 50% narrowing in a major aortoiliac vessel, previous surgery for such disease, absent femoral pulses, or inability to insert a catheter or intra-aortic balloon due to iliac aneurysm or obstruction of the aortoiliac arteries
• 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 inability to insert a catheter or intra-aortic balloon due to obstruction in the femoral arteries
• Carotid/Cerebrovascular Disease	Angiographic or ultrasound demonstration of at least 50% narrowing in a major cerebral or carotid artery, history of non-embolic stroke, or previous surgery for such disease
Ventricular Function	
• Previous MI, less than 6 hours	One or more myocardial infarctions less than 6 hours before intervention
• Previous MI, 6 to 23 hours	One or more myocardial infarctions occurring 6 to 23 hours before intervention
• Previous MI, 1 to 7 days	One or more myocardial infarctions occurring 1 to 7 days before intervention

Criteria Used in Reporting Significant Risk Factors (1997) *continued*

Ventricular Function *continued*

• 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
• 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 VT or VF occurring in the early phase of an acute myocardial infarction and responding well to treatment
Previous PCI	The patient had one or more previous percutaneous coronary interventions
Two or Three Vessel Disease	Percent diameter stenosis is >70% in two or more vessels or branches

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.

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

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

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

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

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

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* or caused by *coronary thrombosis*.

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

risk factors for heart disease - certain risk factors have been found to increase the likelihood of developing heart disease. Some are controllable or avoidable, and some cannot be controlled. The biggest heart disease risk factors are heredity, gender, and age, 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. The risk increases with age, so that half of all cases are in those who are over 75 years old.

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

1997 RISK FACTORS FOR PCI IN-HOSPITAL MORTALITY (ALL CASES)

The significant pre-procedural risk factors for in-hospital mortality following PCI in 1997 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 2.407. This means that a patient with diabetes is approximately 2.407 times as likely to die in the hospital during or after undergoing angioplasty 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 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 (0-19%, 20-29%, and 30% 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 30% or more. Thus, a PCI patient with an ejection fraction of between 20% and 29% is about 2.968 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 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 1.087 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.

Appendix 1 Multivariable Risk Factor Equation for Hospital Deaths During or Following PCI in New York State – 1997 (*All Cases*)

Patient Risk Factor	Prevalence (%)	Regression		Odds Ratio
		Coefficient	P-Value	
Demographic				
Age >60	58.47	0.0831	<0.0001	1.087
Ventricular Function				
Ejection Fraction 0-19%	0.68	1.8288	<0.0001	6.227
Ejection Fraction 20-29%	2.88	1.0878	<0.0001	2.968
Previous MI <6 hours	5.00	1.6769	<0.0001	5.349
Previous MI 6 – 23 hours	2.82	1.4589	<0.0001	4.301
Previous MI 1 – 7 days	15.72	0.7017	<0.0001	2.017
Comorbidities				
Hemodynamic Instability	0.77	1.7277	<0.0001	5.628
Shock	0.44	2.9359	<0.0001	18.838
CPR	0.18	1.9811	<0.0001	7.251
Aortoiliac Disease	2.49	0.9618	<0.0001	2.616
Diabetes	22.46	0.8784	<0.0001	2.407
Renal Failure – on Dialysis	0.86	1.9772	<0.0001	7.222
Intercept	=	- 6.5832		
C Statistic	=	0.850		

Appendix 2

1997 RISK FACTORS FOR IN-HOSPITAL MORTALITY FOR NON-EMERGENCY PCI

Appendix 2 contains the significant pre-procedural risk factors for 1997 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, age and renal failure on dialysis are to be interpreted in the same manner as they were in Appendix 1. Ejection fraction is represented by only two groups (0% to 19% and 20% or higher) in Appendix 2, with the chance of a patient with an ejection fraction of 0% to 19% dying in the hospital being about 6.154 times as high as a patient with an ejection fraction of 20% or higher dying in the hospital, all other risk factors being the same.

The odds ratios for "Two Vessels Diseased" and "Three Vessels Diseased" are relative to patients with a single coronary artery diseased ("diseased" refers to blockage of 70% or more). Thus, patients with all three of their coronary arteries diseased are about 3.308 times as likely to die in the hospital as patients with a single diseased artery, all other risk factors being the same.

Appendix 2 Multivariable Risk Factor Equation for Hospital Deaths During or Following PCI in New York State –1997 (*Non-Emergency Patients Only*)

Patient Risk Factor	Prevalence	Regression		
		Coefficient	P-Value	Odds Ratio
Demographic				
Age >60	59.22	0.0667	<0.0001	1.069
Female Gender	32.48	0.5685	0.0013	1.766
Ventricular Function				
Ejection Fraction 0 – 19%	0.58	1.8171	<0.0001	6.154
Vessels Diseased				
Two	28.21	1.0137	<0.0001	2.756
Three	15.39	1.1963	<0.0001	3.308
Renal Failure –On Dialysis	0.88	2.0342	<0.0001	7.646
Intercept	=	- 6.8496		
C Statistic	=	0.758		

Appendix 3

1995-1997 RISK FACTORS FOR PCI IN-HOSPITAL MORTALITY (ALL CASES)

The significant pre-procedural risk factors for in-hospital mortality following PCI in the 1995-1997 time period are presented in the table below. The interpretation of this table is similar to the interpretation of Appendix 1 that is described previously. With the exception of age, ejection fraction, vessels diseased, previous myocardial infarction, worst lesion of 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 2.805 times the odds of patients without diabetes dying in the hospital, all other risk factors being the same). The interpretation of the ejection fraction categories is identical to that in Appendix 1, and the interpretation of vessels diseased is exactly the same as in Appendix 2.

In this model, previous myocardial infarction (MI) or heart attack has been divided into three categories (MI less than one day before the angioplasty, MI between one and seven days before the PCI and the reference group – no MI within 7 days prior to the procedure). The odds ratios for the MI category in the table below are relative to the reference group (heart attack more than seven days before the PCI or no previous heart attack). The odds for patients who have a worst lesion of Type C, which is the worst type of lesion, are relative to patients whose worst lesion is of Type A or Type B.

Age is represented by a linear and a quadratic (squared) term in order to improve the fit of the statistical model, and in this form the odds ratios for the two terms are not meaningful in terms of characterizing the relative risk of patients.

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 everyone has an age), and is used to improve the ability of the model to predict mortality.

Appendix 3 Multivariate Risk-Factor Equation for Hospital Deaths During or Following PCI in New York State in 1995-1997 (All Cases).

Patient Risk Factor	Prevalence (%)	Regression		
		Coefficient	P-Value	Odds Ratio
Demographic				
Age	-	-0.0486	0.1372	-
Age in years Squared	-	0.0759	0.0021	-
Female Gender	31.82	0.9808	<0.0001	2.667
Hemodynamic State				
Unstable	1.03	2.1701	<0.0001	8.759
Shock	0.52	3.6496	<0.0001	38.461
Ventricular Function				
Ejection Fraction 0-19%	0.60	1.9135	<0.0001	6.777
Ejection Fraction 20-29%	2.62	1.3295	<0.0001	3.779
Previous MI < 24 hours	7.56	1.9481	<0.0001	7.015
Previous MI 1-7 Days	15.16	1.0843	<0.0001	2.957
Severity of Atherosclerotic Process				
Carotid/Cerebrovascular Disease	3.20	1.0003	<0.0001	2.719
Femoral/Popliteal Disease	3.80	1.0403	<0.0001	2.830
Comorbidities				
Diabetes	20.91	1.0314	<0.0001	2.805
Malignant Ventricular Arrhythmia	1.83	1.5661	<0.0001	4.788
COPD	4.41	1.1719	<0.0001	3.228
Renal Failure, on Dialysis	0.80	2.4515	<0.0001	11.606
Vessels and Lesions				
Two Vessels Diseased	27.21	0.8105	<0.0001	2.249
Three Vessels Diseased	13.56	1.1058	<0.0001	3.022
Worst Lesion Attempted is Type C	30.15	0.7646	<0.0001	2.148
Sum of Binary Risk Factors Squared	-	-0.0716	<0.0001	-
Intercept	=	- 7.1555		
C Statistic	=	0.869		

Appendix 4

1995-1997 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 1995-1997 time period are presented in the Appendix 4 table below. As in Appendix 3, 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 40% and higher. Vessels diseased are interpreted as in Appendices 2 and 3, and the worst lesion of Type 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 heart attack. The odds ratio for age is relative to a person one year younger.

Two new risk factors that appear in this model are body surface area and previous PCI. The odds ratio for “previous PCI” is relative to patients who have not had an earlier PCI, and demonstrates that patients who have had a previous PCI have odds of dying in the hospital that are only 0.596 times the odds of patients who have not had a previous PCI, all other risk factors remaining the same. This finding is consistent with various studies in the literature.

Body surface area is a function of height and weight, and is a proxy for vessel size. Since larger vessels are easier to work with, the odds ratio for body surface area indicates that for each additional unit of body surface area, the odds of dying in the hospital is only 0.367 times the odds for someone with a body surface area one unit smaller, all other risk factors being the same.

Appendix 4 Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State in 1995-1997 (Non-Emergency Cases).

Patient Risk Factor	Prevalence (%)	Regression		
		Coefficient	P-Value	Odds Ratio
Demographic				
Age	-	0.0486	<0.0001	1.050
Female Gender	31.98	0.3726	0.0031	1.452
Body Surface Area	-	-1.0011	0.0004	0.367
Ventricular Function				
Ejection Fraction 0-19%	0.50	1.9703	<0.0001	7.173
Ejection Fraction 20-29%	2.37	1.1803	<0.0001	3.255
Ejection Fraction 30-39%	6.32	0.4540	0.0087	1.575
Previous MI 1-7 Days	16.27	0.6176	<0.0001	1.854
Comorbidities				
Diabetes	21.31	0.4797	<0.0001	1.616
Renal Failure, on Dialysis	0.81	1.9571	<0.0001	7.079
Vessels and Lesions				
Two Vessels Diseased	27.12	0.6187	<0.0001	1.856
Three Vessels Diseased	13.52	0.7074	<0.0001	2.029
Worst Lesion Attempted is Type C	29.54	0.5617	<0.0001	1.754
Previous PCI	28.04	-0.5176	0.0003	0.596
Intercept	=	-7.6752		
C Statistic	=	0.779		

Appendix 5

1995-1997 RISK FACTORS FOR IN-HOSPITAL MORTALITY FOR EMERGENCY PCI

The significant pre-procedural risk factors for in-hospital mortality following emergency PCI in the 1995-1997 time period are presented in the Appendix 5 table below. The odds ratio for age is relative to a person one year younger, the odds ratio for ejection fraction less than 20% is relative to people with ejection fractions of 20% and higher, and the odds ratio for three-vessel disease is relative to people with one or two-vessel disease.

Also, since renal failure is expressed in terms of renal failure with dialysis and renal failure without dialysis, the odds ratios are relative to people with no renal failure. Thus, PCI patients with renal failure who are not on dialysis have odds of dying in the hospital that are 2.904 times the odds of PCI patients without renal failure dying in the hospital, all other risk factors being the same.

Appendix 5 Multivariate Risk-Factor Equation for In-Hospital Deaths During or Following PCI in New York State, 1995-1997 (Emergency Cases).

Patient Risk Factor	Prevalence (%)	Regression		
		Coefficient	P-Value	Odds Ratio
Demographic				
Age	-	0.0522	<0.0001	1.054
Female Gender	29.95	0.4792	0.0002	1.615
Hemodynamic State				
Unstable	12.75	0.9316	<0.0001	2.539
Shock	6.42	2.6746	<0.0001	14.507
Cardiopulmonary Resuscitation	0.84	1.1988	0.0017	3.316
Ventricular Function				
Ejection Fraction 0-19%	1.72	0.9012	0.0010	2.463
Severity of Atherosclerotic Process				
Carotid/Cerebrovascular Disease	2.67	0.8322	0.0006	2.298
Comorbidities				
Diabetes	16.38	0.7385	<0.0001	2.093
Malignant Ventricular Arrhythmia	7.52	1.1662	<0.0001	3.210
Renal Failure, Creatinine > 2.5	1.48	1.0662	0.0008	2.904
Renal Failure, on Dialysis	0.72	1.1928	0.0061	3.296
Vessels and Lesions				
Three Vessels Diseased	14.04	0.5862	<0.0001	1.797
Intercept	=	-7.6597		
C Statistic	=	0.883		

*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
Antonia C. Novello, M.D., M.P.H., Dr. P.H., Commissioner