

**PERCUTANEOUS CORONARY
INTERVENTION IN THE
COMMONWEALTH OF MASSACHUSETTS**

April 1, 2003 – December 31, 2003

Mass-DAC

Department of Health Care Policy

Harvard Medical School

October 2005

FUNDED BY THE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

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**MASSACHUSETTS PERCUTANEOUS CORONARY INTERVENTION HOSPITALS:
2003**

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MASSACHUSETTS PRIMARY PERCUTANEOUS CORONARY INTERVENTION PILOT HOSPITALS: 2003

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1 - KEY FINDINGS

- Between April 1, 2003 and December 31, 2003,* there were **12657** hospital admissions in which at least one Percutaneous Coronary Intervention (PCI) was performed in Massachusetts hospitals.
- **15.5%** (1968) of these admissions were "SOS" admissions - admissions in which the patient had an ST-elevated myocardial infarction or was in shock.
- The remaining 10689 admissions (**84.5%**) were "non-SOS" admissions - those for which the patient did not have an ST-elevated myocardial infarction and was not in shock.
- **Eighteen** hospitals performed at least one PCI in 2003, **four** of which participated in the Massachusetts Primary PCI Pilot Program. Pilot programs are approved for SOS Admissions only.
- The majority of patients undergoing PCI are males (**68.6%**), white (**88.8%**), and one-third under 60 years of age.
- Of the 12657 PCI admissions, **216** patients died during the same hospitalization in which the PCI was performed. Eighty-one (**0.76% mortality**) of the deaths occurred in the Non-SOS population while 135 (**6.86% mortality**) occurred in the SOS population.
- **Based on in-hospital mortality, there were no statistically under-performing or over-performing PCI hospitals within Massachusetts.**

* Data collection for PCI began with procedures performed on April 1, 2003.

2 - INTRODUCTION

2.1 - What is in this Report?

This is the first report describing methods and results for calculating hospital-specific in-hospital mortality rates following Percutaneous Coronary Intervention (**PCI**) in Massachusetts. Interventions performed in United States Government Hospitals (e.g., VA Boston Healthcare System – Jamaica Plain Campus) are not included in this report. Information pertains to patients who were 18 years of age or older at the time of their intervention.

In Massachusetts, not all hospitals are permitted to perform PCIs and hospitals wishing to start performing PCIs must submit an application to the Determination of Need Program in the Massachusetts Department of Public Health. In 2003, there were eleven established PCI programs in Massachusetts, all with back-up cardiac surgery programs. Three community hospitals applied and were granted approval for both cardiac surgery and PCI programs (Cape Cod Hospital, Southcoast Hospital Group – Charlton Hospital, and North Shore Medical Center – Salem Hospital). Cape Cod Hospital and Charlton Hospital started performing PCIs in early 2003, while Salem Hospital did not perform their first PCI until November 3, 2003. Four community hospitals applied and received approval to perform primary PCI under a Primary PCI Pilot Program with the Massachusetts Department of Public Health: (Brockton Hospital [first PCI on April 2, 2003], Caritas Norwood Hospital [April 17, 2003], Metrowest Medical Center [December 5, 2003], and South Shore Hospital [April 9, 2003]). The four hospitals in the Primary PCI Pilot Program do not have cardiac surgery programs on site, but do have cardiac surgery available to their patients, if needed, from the hospitals with which they collaborate.

This document reports hospital-specific standardized mortality incidences rates following PCI procedures for the eighteen PCI hospitals in Massachusetts that performed at least one PCI between April 1, 2003 and December 31, 2003.* Because of the elevated risks associated with heart attack patients, results for two separate cohorts of patients are

* Data collection for PCI began with procedures performed on April 1, 2003. Subsequent reports will be based on a calendar year.

presented: 1) patients having an ST-elevated myocardial infarction (STEMI) within 24 hours of arrival to the hospital or having cardiogenic shock prior to the intervention (referred to as the **SOS** Cohort); and 2) patients having no STEMI within 24 hours of arrival to the hospital and no cardiogenic shock prior to the PCI (referred to as the **Non-SOS** Cohort).

In-hospital mortality is analyzed for the 18 hospitals that treated SOS patients. Because hospitals participating in the Massachusetts Primary PCI Pilot Program are permitted to treat only SOS cases, they are not included in the analysis for in-hospital mortality for Non-SOS patients. Thus, there are only 14 hospitals analyzed for Non-SOS patients.

2.2 - What is a Percutaneous Coronary Intervention?

For a heart to function properly, it needs an oxygen-rich blood supply. Coronary arteries send oxygen-rich blood to the heart. When the coronary arteries are healthy, blood flows easily so that the heart muscle gets the oxygen it needs. Coronary artery disease begins when blood flow to the heart is reduced due to a build-up of plaque. Plaque may build up because of high cholesterol, high blood pressure, smoking, diabetes, genetic predisposition, or other factors. If the plaque build-up increases, the coronary arteries narrow and blood flow to the heart is reduced, often leading to angina (chest pain, arm pain, or jaw tightness that occurs with exertion or, in more serious cases, at rest). If blood flow is completely blocked by the sudden development of a clot within a coronary artery, this usually results in a heart attack or myocardial infarction (MI), which may irreversibly damage the heart muscle.

Coronary artery disease is usually treated by one of three methods (medication, coronary intervention, or cardiac surgery). The treatment choice depends on the degree of the blockage, patient symptoms and the number of coronary arteries involved. Percutaneous Coronary Intervention is a procedure performed in the Catheterization Lab that unblocks a coronary artery without having to undergo surgery. Most Percutaneous Coronary Interventions involve either a balloon catheter and/or a stent (including drug eluting stents). The balloon is used to push the blockage against the walls of the artery reducing the narrowing of the artery. The balloon is then removed at the end of the procedure. The stent is a metal mesh tube that is inserted and left in the artery to maintain

the opening, preventing the closing of the artery after the procedure. Drug eluting stents are coated with a drug that interferes with the process of restenosis or collapse of the artery which can occur in a small percentage of patients after the intervention.

2.3 - Why Report on Percutaneous Coronary Interventions?

A PCI offers a non-surgical alternative to Coronary Artery Bypass Surgery (CABG). PCI is less invasive, and the hospital stay and recovery is much shorter than with CABG surgery. With the recent availability of drug eluting stents that are clinically very successful, CABG surgery has declined while PCI has increased considerably. Many more patients now have the option for less invasive, successful treatment of their coronary artery disease.

2.4 - Who Receives Percutaneous Coronary Interventions in Massachusetts?

Between April 1, 2003 and December 31, 2003, there were 12657 admissions in which at least one PCI was performed. The majority of patients undergoing a PCI were male, white, and over 60 years of age (**Table 2.1**). More than 90% of patients received only one PCI during their hospital admission.

Mass-DAC analyzed the first PCI for patients who received more than one PCI during their admission. Results do not change if the last PCI is used.

Table 2.1: Descriptive Summaries of Adult PCI Admissions in Massachusetts Hospitals, April 1 – December 31, 2003. If multiple PCIs occur during an admission, the **first** PCI is selected. [¶]Patients arriving with no STEMI within 24 hours and no cardiogenic shock; [§]Patients having STEMI within 24 hours of hospital arrival or cardiogenic shock.

RISK COHORT	[¶] Non-SOS		[§] SOS	
	Number	Percent	Number	Percent
Admitted via Emergency Department or Transfer	5445	50.9	1847	93.9
Number of PCIs Per Admission				
1 PCI	10355	96.9	1852	94.1
≥ 2 PCIs	334	3.1	116	5.9
More than 70% stenosis in Left Anterior Descending Artery	6009	56.2	1103	56.1
At least One Stent	9376	87.7	1782	90.6
Drug Eluting if Stented	5149	54.9	439	24.6
Total Length of Stay, days	Mean = 3.94 Median = 3.00		Mean = 6.49 Median = 5.00	
Post-Procedure Length of Stay, days	Mean = 3.16 Median = 2.00		Mean = 6.25 Median = 5.00	
Unadjusted Outcomes				
Any Vascular Complication	287	2.7	92	4.7
Unplanned CABG	23	0.21	13	0.66
In-Hospital Death	81	0.76	135	6.86
TOTAL NO. OF ADMISSIONS	10689	100	1968	100

Table 2.2 provides demographic summaries of the 10689 Non-SOS admissions and 1968 SOS admissions. The majority of Non-SOS admissions are male (68.2%), white (89.2%), and about one-third less than 60 years of age at the time of their PCI. Out of state patients comprised 7.5% of the Non-SOS admissions (data not shown). Like the Non-SOS admissions, the majority of SOS admissions are male (70.8%) and white (86.8%). Nearly

one-half (47.1%) of the SOS admissions were less than 60 years old at the time of their PCI. Finally, 6.8% of the SOS admissions were of patients residing out of state (data not shown).

Table 2.2: Age-Sex-Race Distribution for Adult PCI Admissions in Massachusetts Hospitals During April 1, 2003 – December 31, 2003: Stratified by Risk Cohort. Entries represent numbers of admissions.											
10689 Non-SOS PCI ADMISSIONS											
Age Group	Females					Males					
	White	African American	Hispanic	Other	Total	White	African American	Hispanic	Other	Total	
≤49	225	16	20	11	272	845	42	44	76	1007	
50-59	431	26	26	36	519	1606	40	49	119	1814	
60-69	726	26	30	45	827	1814	32	32	133	2011	
70-79	1023	21	22	69	1135	1602	15	25	95	1737	
≥80	591	6	6	48	651	670	8	9	29	716	
Total	2996	95	104	209	3404	6537	137	159	452	7285	
1968 SOS PCI ADMISSIONS											
Age Group	Females					Males					
	White	African American	Hispanic	Other	Total	White	African American	Hispanic	Other	Total	
≤49	50	3	5	3	61	272	16	17	37	342	
50-59	89	8	10	7	114	362	5	15	28	410	
60-69	110	0	1	7	118	268	4	10	25	307	
70-79	130	9	5	4	148	209	5	6	12	232	
≥80	122	3	4	5	134	96	1	2	3	102	
Total	501	23	25	26	575	1207	31	50	105	1393	

2.5 - Why Report Hospital-Specific In-Hospital Standardized Mortality Rates?

Quality data can be used to provide useful information to both patients and health care providers, stimulate additional research on cardiovascular disease and existing treatments, and foster improvements in quality of care. This report uses in-hospital mortality, defined as death occurring in the hospital during the same admission as for the procedure, regardless of cause, as a measure of hospital quality. While mortality is not the only important endpoint, it was selected as the primary measure of hospital quality because it is serious and unambiguous.

2.6 - What is Mass-DAC?

Mass-DAC is a data-coordinating center responsible to the Massachusetts Department of Public Health for the collection, storage, and analysis of the cardiac data submitted by Massachusetts hospitals. Mass-DAC is located in the Department of Health Care Policy, Harvard Medical School in Boston (www.massdac.org). Mass-DAC is advised by several committees on an ongoing basis: the Massachusetts Cardiac Care Quality Advisory Commission, the Cardiac Advisory Board, and the PCI Data Adjudication Committee. In addition, both the American College of Cardiology National Cardiovascular Data Registry (ACC-NCDR) and the Massachusetts American College of Cardiology serve as resources.

2.7 - What Data Are Used in this Report?

Massachusetts hospitals are required by law to submit specific information to Mass-DAC. Data included in this report were submitted by Massachusetts hospitals that performed PCIs between April 1, 2003 and December 31, 2003.

Data was rigorously verified by Mass-DAC. This process involved: (1) continuous data quality reports to data managers located at each hospital; (2) discussions with the Chiefs of Cardiology and the Directors of the Cardiac Catheterization Labs in Massachusetts; (3) audits of selected chart information by an independent PCI Data Adjudication

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Committee member, and by experienced and independent nurses contracted for the record abstractions; (4) review by an external Cardiac Advisory Board; and (5) linkages and cross-checks with state administrative databases.

2.8 - Risk Adjustment for Quantifying In-Hospital Mortality

Specific risk factors are known to contribute to heart disease. These risk factors include high cholesterol, smoking, high blood pressure, family history of heart disease, diabetes, age, gender. General health status prior to a PCI is an important factor as well. Such factors also have an impact on the risk of mortality following a PCI. Sicker patients or patients with more health-related risks may be more likely to die following a PCI than healthier patients. Moreover, patients who are sicker may be more likely to be treated at particular hospitals while patients who are healthier may be more likely to be treated at other hospitals. To compare hospitals fairly, it is therefore important to consider differences in patient health prior to a PCI.

The statistical process of adjusting for differences in patient sickness prior to their encounter with the health care system is called *risk adjustment*. This statistical process aims to “level the playing field” by accounting for health risks that patients have prior to a PCI. The hospital mortality rates in this report have been adjusted in order to account for differences in patient health prior to a PCI.

2.9 - How are Hospital Differences in Patient Outcomes Measured?

If there are differences in hospital quality, due to staff, experience, or other factors, then the risks of in-hospital mortality for two patients having exactly the same risk factors prior to a PCI but who are treated in different PCI hospitals will not be the same. The statistical model used to calculate mortality rates in this report - a *hierarchical logistic regression* model - models the difference between the risks of mortality for patients with the same risk factors who are treated at different hospitals. This is accomplished through the inclusion of a hospital -specific (random) effect that represents quality factors for each hospital. If there are no differences in the hospital-specific effects across the hospitals, then there is no evidence of quality differences.

3 - IDENTIFYING OUTLYING PERCUTANEOUS CORONARY INTERVENTION HOSPITALS

One of the purposes of this report is to identify hospitals that have *unusually* high or **unusually** low mortality rates. Such hospitals are denoted as “outlying” - however, the designation of outlying depends on how “unusual” unusual is. Two methods were used to identify outlying hospitals. The first method calculates a 95% interval estimate for each hospital’s risk-standardized mortality rate. If the interval estimate does not contain the state unadjusted in-hospital mortality rate, the hospital is designated as outlying.

However, because any one hospital could influence the estimates of the risk-standardized mortality rate for other hospitals, Mass-DAC also calculates the expected number of mortalities at each hospital using the experience of all **other** hospitals in Massachusetts. If the probability that the actual number of mortalities is different from the expected number of mortalities is small, then the hospital is classified as “outlying.”

If the 95% interval estimate for a particular hospital excludes the state unadjusted in-hospital mortality rate **or** if the mortality probability predicted from all other hospitals for a particular hospital is small, then Mass-DAC classified the hospital as outlying. It is important to note that the classification in this report is relative to all hospitals in Massachusetts performing PCI.

3.1 - Standardized Mortality Incidence Rates (SMIR)

Mass-DAC calculated a standardized mortality incidence rate (SMIR) and a corresponding 95% “posterior” interval for each PCI hospital. The SMIR is interpreted as the projected mortality rate at the hospital **today** if hospital quality remained the same as in 2003. Each hospital’s SMIR should only be interpreted in the context of its posterior interval. If the 95% interval includes the unadjusted state rate, then the hospital’s SMIR is no different from what was expected. If the interval excludes the state unadjusted rate, then the hospital’s SMIR is “unusual” from what was expected. In this case, if the upper limit of the interval is lower than the unadjusted state rate, then fewer patients than expected died. Such a hospital would be categorized as an over-performing hospital. If the lower

limit of the interval is higher than the unadjusted rate, then more patients than expected died. Such a hospital would be categorized as an under-performing hospital.

3.2 - Cross-Validated P-Values

Because data from all hospitals is used to estimate the expected number of deaths in any hospital, there is a risk that outlying hospitals may influence the estimates used to risk-adjust. One method to identify hospitals as outlying is through “cross-validation” which systematically drops each hospital from the data set and re-estimates the risk-adjusted model. Using the new model, the expected number of deaths at the dropped hospital is calculated. This expected number may be interpreted as the number of mortalities expected at the dropped hospital if the dropped hospital had the same level of quality as the remaining hospitals.

Mass-DAC compared the expected number to the actual number of deaths at the dropped hospital and calculated a “p-value.” Because the p-value quantifies how **likely** the actual number of deaths would be had the dropped hospital had the same level of quality as all remaining PCI hospitals, small p-values (those ≤ 0.01) indicate that the dropped hospital is outlying. When the p-value is small and the actual number of deaths is larger than that predicted by the remaining hospitals, the dropped hospital is classified as under-performing; when the p-values is small and the actual number of deaths is smaller than predicted by its peers, the hospital is classified as over-performing. Mass-DAC repeated this procedure, eliminating each PCI hospital.

3.3 - Sensitivity Analyses

Several sensitivity analyses were undertaken to determine whether conclusions would change when making reasonable changes to some of the underlying assumptions. These assumptions related to the amount of between-hospital variation in underlying quality of care. Mass-DAC varied our assumptions regarding the amount and type of between-hospital variation in quality of care, and re-estimated the SMIRs as well as the cross-validated p-values.

4 - HOSPITAL QUALITY FOLLOWING PCI: 2003

Of the 12657 PCIs performed in Massachusetts, 216 patients died during the same admission as the PCI. **Table 4.1** lists the prevalence (%) of important risk factors and the relationship of each risk factor (controlling for all other risk factors) with in-hospital mortality for Non-SOS cases following a PCI. For example, 31.6% of all PCI admissions included patients who had a history of diabetes. Because age is measured in years, the table reports the average number years over age 65 for the cohort. Odds ratios greater than 1 correspond to increased risk of mortality while those less than 1 correspond to decreased risk of mortality. The odds ratio of 1.68 for patients with diabetes indicates that those patients are 1.68 times as likely as a patient without diabetes to die within the hospital admission of a PCI. In contrast, patients with renal failure prior to a PCI are 2.73 times more likely to die within the PCI hospital admission than patients without renal failure. **Table 4.2** lists the same information as in Table 4.1 but for the SOS cases.

Figure 4.1 displays the SMIRs and corresponding 95% posterior intervals. The solid black vertical line in the figure is the unadjusted state in-hospital mortality rate of 0.76% for Non-SOS cases. Listed on the left-hand side of the figure are the total number of PCI's admissions and the expected in-hospital mortality rates for each hospital. The expected mortality rate provides an overall assessment of case-mix severity at each program – higher expected rates represent more severe case-mix. Listed on the right-hand side are the estimated SMIRs. All 95% probability intervals contain the unadjusted state rate. **Figure 4.2** displays the SMIRs and corresponding 95% posterior intervals for SOS cases. The solid black vertical line in the figure is the unadjusted state in-hospital mortality rate of 6.86% for SOS cases. All 95% intervals cover the state unadjusted in-hospital mortality rate.

Figure 4.3 presents the cross-validated p-values of Non-SOS cohort, under a number of different distributional assumptions regarding the hierarchical regression model; **Figure 4.4** presents similar values for the SOS cohort. No hospital has a p-value smaller than or equal to 0.01, regardless of cohort examined.

Based on in-hospital mortality data, there is no evidence of any PCI hospital over-performing or under-performing in Massachusetts.

Table 4.1: Adjusted Odds Ratios of In-Hospital Mortality Following PCI in Adults: Non-SOS Cases., April 1, 2003 – December 31, 2003. Based on 10689 interventions with 81 deaths (0.76%). ROC area \approx 0.87. Intercept = -7.44 (95% PI: -8.18,-6.81); Between-hospital variation: 0.0686 (0.000772, 0.362).

Risk Factor	Prevalence (%)	Adjusted Odds Ratio	95% Posterior Interval (PI)
Mean Age (years over 65)	0.04	1.07	1.044, 1.095
Renal Failure	7.6	2.73	1.551, 4.352
Diabetes	31.6	1.68	1.043, 2.609
Chronic Lung Disease	10.6	2.50	1.418, 4.013
Ejection Fraction < 30%	2.8	2.54	1.151, 4.714
PCI Status (Elective)	54.8	1.00	--
Urgent	40.5	3.63	1.956, 6.407
Emergent or Salvage	4.7	11.63	5.301, 22.27
High Lesion Risk	26.3	2.06	1.260, 3.206
Left Main Disease	6.8	1.34	0.661, 2.367
LAD > 70% Stenosis	56.2	1.75	1.011, 2.921

Table 4.2: Adjusted Odds Ratios of In-Hospital Mortality Following PCI in Adults, April 1, 2003 – December 31, 2003: SOS Cases. Based on 1968 interventions with 135 deaths (6.86%). ROC area \approx 0.89. Intercept = -5.51 (95% PI: -6.27, -4.54); Between-hospital variation = 0.0393 (0.000749, 0.219).

Risk Factor	Prevalence (%)	Adjusted Odds Ratio	95% Posterior Interval (PI)
Age (Ref = < 60 years)			
60-69 yrs	21.6	2.45	1.209, 4.445
70-79 yrs	19.3	4.24	2.220, 7.467
\geq 80 yrs	12.0	6.52	3.290, 11.73
Renal Failure	4.5	2.30	1.133, 4.179
Ejection Fraction < 30%	4.2	2.18	1.030, 4.023
PCI Status (Urgent + Elective)	15.6	1.00	--
Emergent or Salvage	84.5	2.57	1.167, 4.906
Pre-Procedure Cardiogenic Shock	14.7	16.16	10.19, 24.79
Left Main Disease	4.6	1.13	0.5258, 2.075

Figure 4.1: Ninety-Five Percent Posterior Intervals for Standardized Mortality Incidence Rates (SMIRs) Following PCI During April 1, 2003 – December 31, 2003: Non-SOS

Admissions. # of cases refers to the number of PCI admissions; expected mortality rate is the percentage of cases expected to die given the case-mix of the patients in the hospital. The white vertical line in each box is the hospital's SMIR while the black vertical line denotes the unadjusted state in-hospital mortality rate of 0.76%.

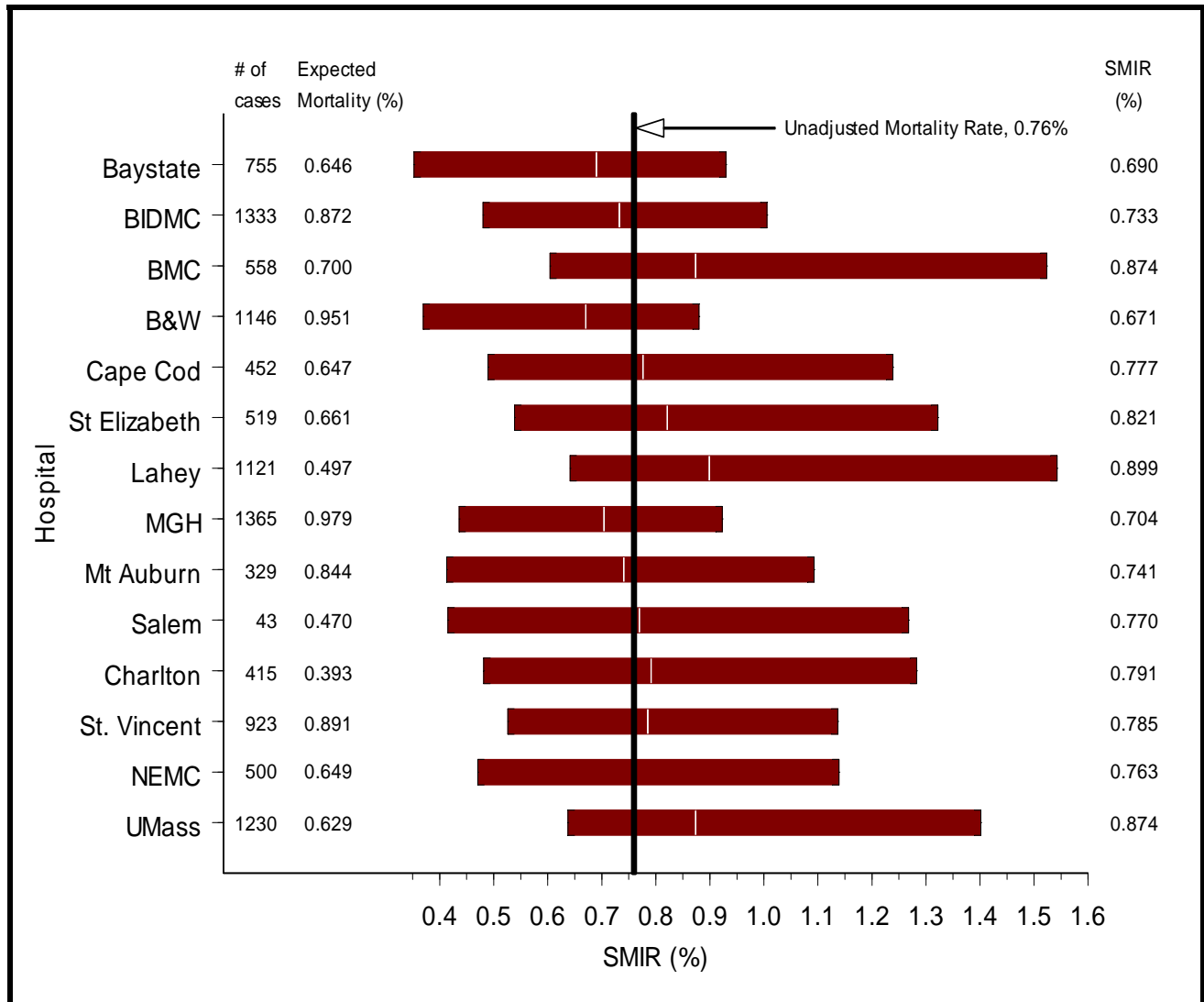


Figure 4.2: Ninety-Five Percent Probability Intervals for Standardized Mortality Incidence Rates (SMIRs) Following PCI During April 1, 2003 – December 31, 2003: SOS Admissions. # of cases refers to the number of SOS PCI admissions; expected mortality rate is the percentage of cases expected to die given the case-mix of the patients in the hospital. The white vertical line in each box is the hospital's SMIR while the black vertical line denotes the unadjusted state in-hospital mortality rate of 6.86%.

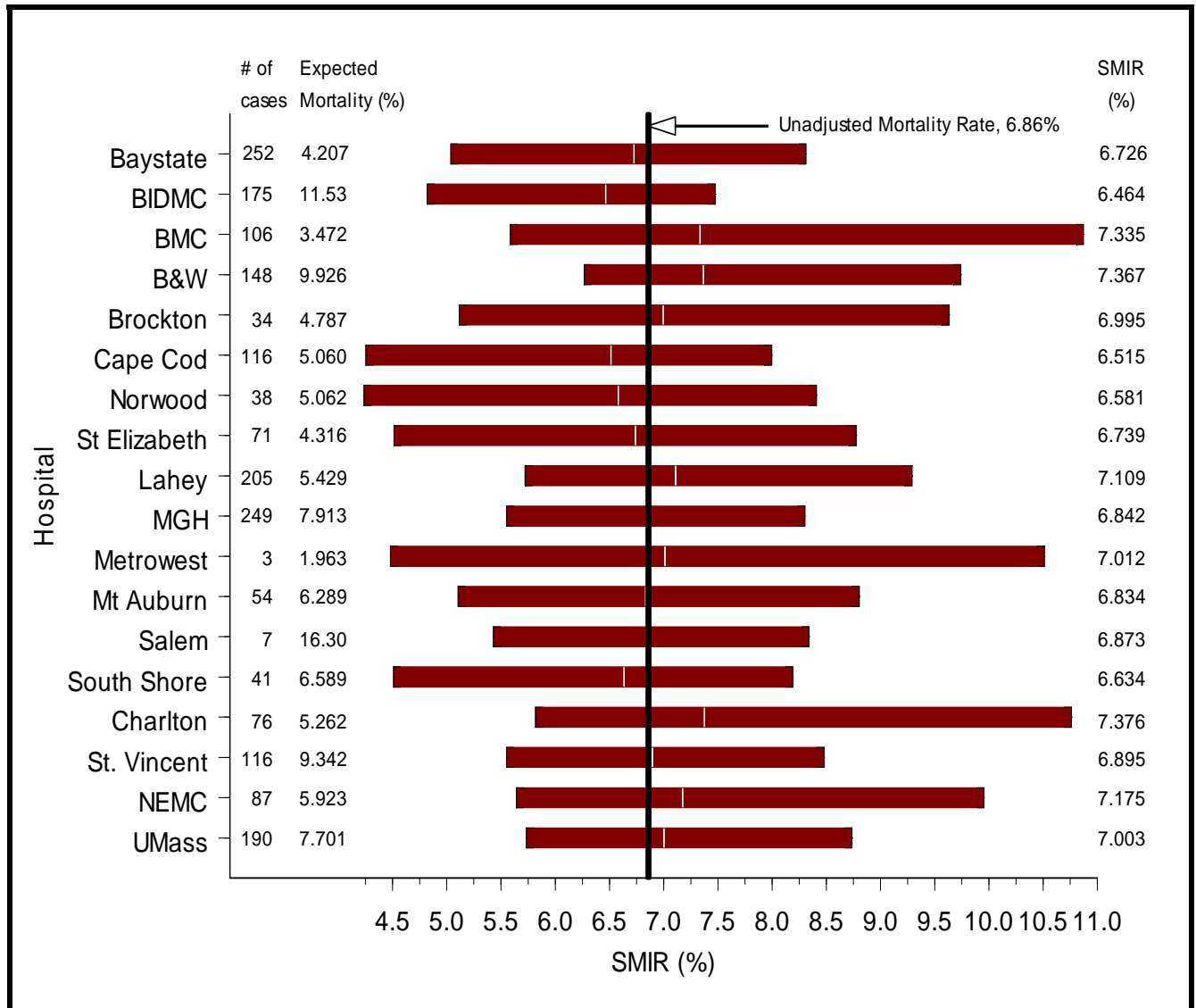


Figure 4.3: Cross-Validated P-Values: Non-SOS Cohort. P-Values are listed on the y-axis; the x-axis identifies the hospital. Results are presented under a variety of assumptions for fitting the hierarchical regression model.

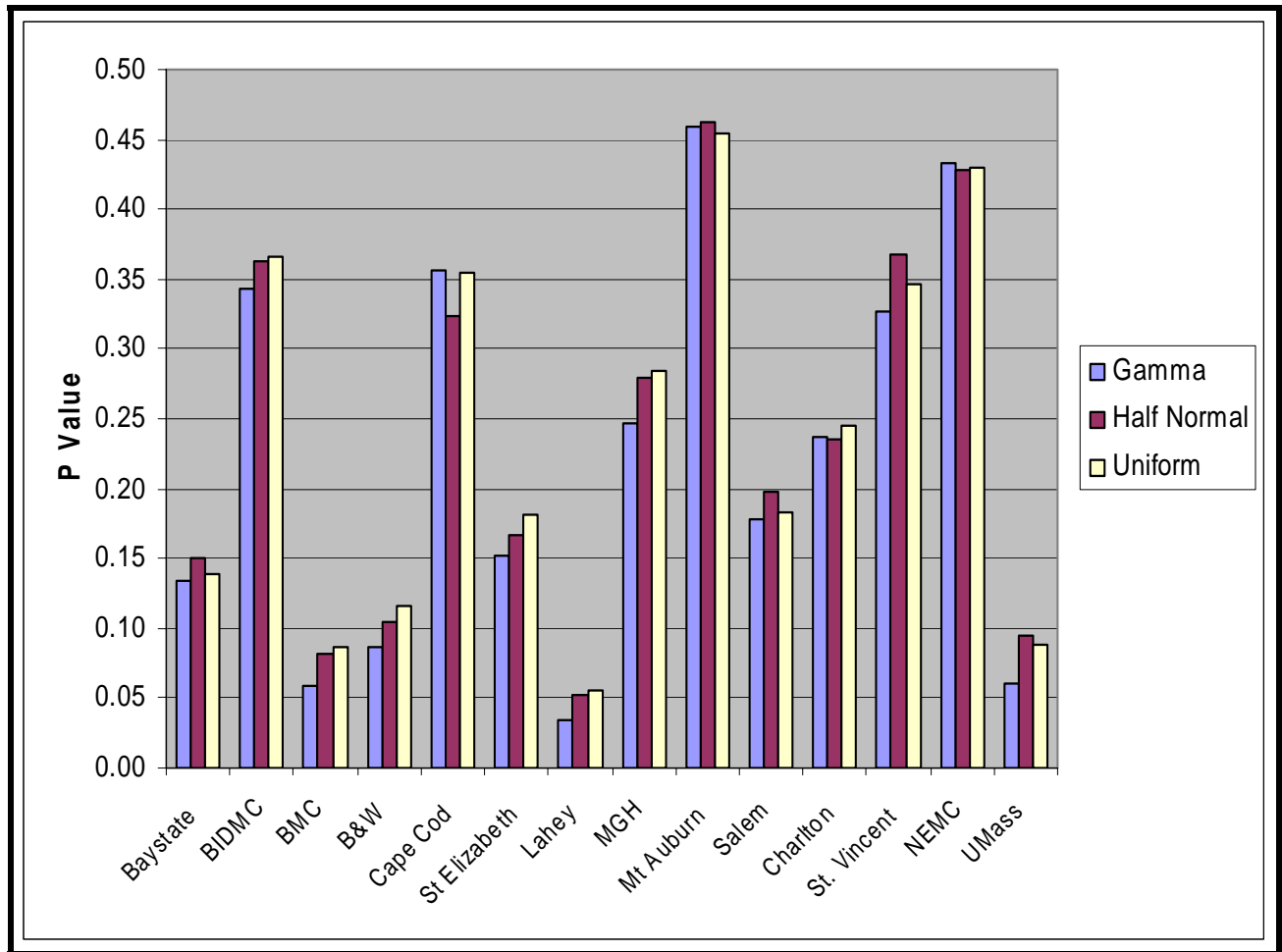
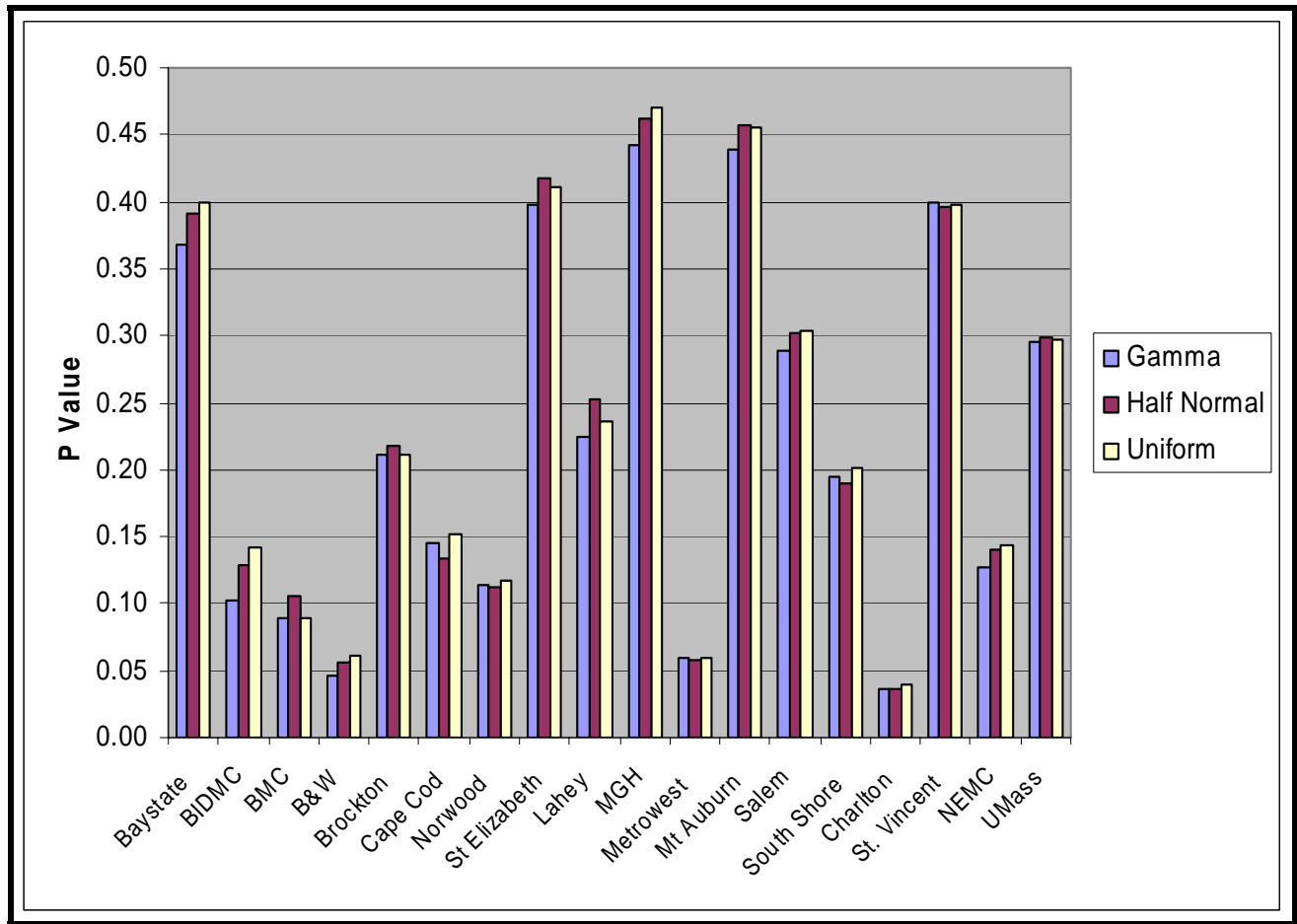


Figure 4.4: Cross-Validated P-Values: SOS Cohort. P-Values are listed on the y-axis; the x-axis identifies the hospital. Results are presented under a variety of assumptions for fitting the hierarchical regression model.



Technical details can be found in **Technical Details on Percutaneous Coronary Intervention in the Commonwealth of Massachusetts: April 1 – December 31, 2003.**

5 - IMPORTANT DEFINITIONS

Cardiac Catheterization: A procedure that determines the extent and the location of the coronary artery obstruction or blockage.

Cardiac Surgery (as defined by the Massachusetts legislature for the Massachusetts Cardiac Study): Surgery on the heart and the thoracic great vessels. Examples of cardiac surgery include coronary artery bypass grafts, heart valve repair or replacement, heart transplantation, surgery of the thoracic aorta, repair of congenital heart defects, and minimally invasive heart surgery.

Cardiovascular Disease: Includes diseases of the heart or vessels that supply the body and the heart muscle with blood and oxygen.

Coronary Artery Disease: A disease affecting the coronary arteries in which the flow of oxygen-containing blood to the heart muscle is partially or completely blocked, resulting in angina or a heart attack.

Coronary Artery Bypass Graft [CABG] Surgery: Operations in which the blocked coronary vessels are bypassed with the patients' own vessels to improve flow to the heart muscle. Coronary vessels are those vessels that supply the heart muscle with blood and oxygen.

Cross-Validation: Model validation is done to ascertain whether predicted values from a statistical model are likely to accurately predict responses on future subjects or on subjects not used to develop the analytical model. Cross-validation involves dropping a set of observations from the analytical process and the outcomes for the dropped set are predicted. This process is repeated many times in order to characterize the accuracy of the predictions.

Drug Eluting Stent: Stents that are either coated or imbedded with time released medication, interrupting the biological process that causes the artery to close up again.

Mitral Valve Repair: Surgical repair of the mitral valve of the heart. The mitral valve is responsible for facilitating the flow of blood from the left atrium into the left ventricle.

Percutaneous Coronary Intervention: A non-surgical procedure designed to open and maintain the patency of obstructed coronary vessels. This treatment is an invasive procedure performed in the cardiac catheterization lab (e.g., outside of an operating room) by an interventional cardiologist in which a balloon, stent, or other device is delivered to the affected vessel to open and maintain its patency.

Risk Factors: Factors that contribute to an individual's risk of coronary artery disease or of death. These factors are classified as those that can be modified or changed by an individual, and those that cannot be changed. Examples of risk factors that cannot be modified include age, gender, family history of coronary artery disease, and ethnicity. Risk factors that can be controlled include diet, cholesterol levels, obesity, smoking, hypertension, inactive lifestyle, stress, and diabetes.

Standardized Mortality Incidence Rate (SMIR): The ratio of projected deaths (the number of deaths adjusted for the number of cases treated at the hospital and the hospital case mix) to expected deaths (the expected number of deaths calculated on the basis of the mortality experience of all cardiac surgery programs) multiplied by the state unadjusted rate. SMIRs are interpreted in terms of their corresponding probability intervals. If the probability interval includes the state rate, then the SMIR is no different from what was expected. If the interval excludes the state rate, then the SMIR is "significantly different" from what was expected. In this case, if the upper limit of the interval is lower than the state rate, then fewer patients than expected died; if the lower limit of the 95% interval is higher than the state rate, then more patients than expected died.

Stent: a metal tube that is inserted after a balloon angioplasty to prevent abrupt artery closure.

6 - ADVISORY COMMITTEES

Mass-DAC gratefully acknowledges the support from members of several Advisory Committees who have donated their time to improve the quality of cardiac care in the Commonwealth of Massachusetts. Mass-DAC is also indebted to Marc Ciriello, B.A., and Patricia L. Miller, B.S., for editorial review and editing and to the Massachusetts PCI Data Managers for their data collection efforts – their attention to detail has contributed enormously to this initiative.

Massachusetts Cardiac Care Quality Advisory Commission develops standards and criteria to be used by the Department of Public Health and Mass-DAC for the purpose of collecting, monitoring, and validating patient specific outcome data from all hospitals in the Commonwealth of Massachusetts performing cardiac surgery or PCIs.

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Mass-DAC PCI Data Adjudication Committees review patient-specific data elements and corresponding data documentation submitted by hospitals to Mass-DAC in order to determine validity.

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APPENDIX:
ACC-NCDR DATA COLLECTION TOOL - VERSION 2.0

Data Collection Form

ADMINISTRATIVE			
Participant ID ⁵ _____ (mandatory)	Participant Name ⁶ _____		
DEMOGRAPHICS (complete this section on admission to the facility)			
Last Name ⁸ <input type="radio"/> Missing _____	First Name ⁹ <input type="radio"/> Missing _____	MI ¹⁰ <input type="radio"/> Missing <input type="radio"/> No MI	SSN + Country Code ¹¹ <input type="radio"/> Missing ____ - ____ - ____ + ____
Gender ¹² <input type="radio"/> Missing <input type="radio"/> Male <input type="radio"/> Female	Race ¹³ <input type="radio"/> Missing <input type="radio"/> Caucasian <input type="radio"/> Black <input type="radio"/> Hispanic <input type="radio"/> Asian <input type="radio"/> Native American <input type="radio"/> Other	Date of Birth ¹⁴ <input type="radio"/> Missing ____ / ____ / ____ mm dd yyyy	
ADMISSION / DISCHARGE (complete this section on admission/discharge to the facility)			
Admit Date ¹⁵ (mandatory) ____ / ____ / ____ mm dd yyyy Admit Status ¹⁷ <input type="radio"/> Missing <input type="radio"/> Referral <input type="radio"/> Emergency Department <input type="radio"/> Transfer – other Facility <input type="radio"/> Other	CAB Status ²¹ <input type="radio"/> Missing (During This Admission) <input type="radio"/> No CAB <input type="radio"/> Elective <input type="radio"/> Urgent <input type="radio"/> Emergency <input type="radio"/> Salvage CAB Date ²² <input type="radio"/> Missing (During This Admission) ____ / ____ / ____ mm dd yyyy	Insurance Payor ¹⁸ <input type="radio"/> Missing <input type="radio"/> Government <input type="radio"/> Commercial <input type="radio"/> HMO <input type="radio"/> None	# PCI Lab Visits ¹⁹ : <input type="button" value="Calc"/> Multiple PCIs–Same Lesion ²⁰ : <input type="button" value="Calc"/>
Discharge Date ¹⁶ (mandatory) ____ / ____ / ____ mm dd yyyy Discharge Status ²³ <input type="radio"/> Missing <input type="radio"/> Alive <input type="radio"/> Expired	(Complete if patient Expired) Date of Death ²⁴ <input type="radio"/> Missing ____ / ____ / ____ mm dd yyyy	(Complete if patient Expired) Prim Cause Death ²⁵ <input type="radio"/> Missing <input type="radio"/> Cardiac <input type="radio"/> Neurologic <input type="radio"/> Renal <input type="radio"/> Vascular <input type="radio"/> Infection <input type="radio"/> Pulmonary <input type="radio"/> Valvular <input type="radio"/> Other	(Complete if patient Expired) Location - Death ²⁶ <input type="radio"/> Missing <input type="radio"/> During CL Visit <input type="radio"/> After CL Visit
HISTORY AND RISK FACTORS (complete this section on admission to the facility)			
_____ cm Height ²⁷ <input type="radio"/> Missing _____ kg Weight ²⁸ <input type="radio"/> Missing Family Hx CAD ²⁹ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes CHF ³⁰ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes	Diabetes ³¹ <input type="radio"/> Missing <input type="radio"/> No Diabetes (Treatments) <input type="radio"/> No Treatment - OR - (select multiple below) <input type="radio"/> Diabetes – Insulin <input type="radio"/> Diabetes – Oral <input type="radio"/> Diabetes – Diet Renal Failure ³² <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes – Dialysis <input type="radio"/> Yes – No Dialysis	Chron. Lung Dise ³³ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Cerebrovas. Dise ³⁴ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Peripheral Vascular Disease ³⁵ <input type="radio"/> No <input type="radio"/> Missing <input type="radio"/> Yes Previous MI ³⁶ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes	Hypertension ³⁷ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Smoking History ³⁸ <input type="radio"/> Missing <input type="radio"/> Current <input type="radio"/> Former <input type="radio"/> Never Hypercholesterolemia ³⁹ <input type="radio"/> No <input type="radio"/> Missing <input type="radio"/> Yes – Treated with Lipid Lowering Therapy <input type="radio"/> Yes – Not treated with Lipid Lowering Therapy
PREVIOUS INTERVENTIONS (complete this section on admission to the facility)			
Previous PCI ⁴⁰ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Prev. PCI Date ⁴¹ <input type="radio"/> Missing ____ / ____ / ____ mm dd yyyy	Previous CAB ⁴² <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Prev. CAB Date ⁴³ <input type="radio"/> Missing ____ / ____ / ____ mm dd yyyy	Previous Valve Surgery ⁴⁴ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Prev. Valve Surgery Date ⁴⁵ <input type="radio"/> Missing ____ / ____ / ____ mm dd yyyy	

CARDIAC STATUS		(complete this section on admission to the facility)	
CHF – Prior Proc. ⁴⁶ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes NYHA ⁴⁷ (Yes only) <input type="radio"/> Missing <input type="radio"/> 01 <input type="radio"/> 02 <input type="radio"/> 03 <input type="radio"/> 04 Non-Invasive <input type="radio"/> Missing Test-Ischemia ⁴⁸ <input type="radio"/> None <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Equivocal <input type="radio"/> Arrhythmia	Canadian Clinical Classification ⁵⁰ <input type="radio"/> Missing <input type="radio"/> No Angina <input type="radio"/> Class 1 <input type="radio"/> Class 2 <input type="radio"/> Class 3 <input type="radio"/> Class 4	Angina Type (choose one) ⁴⁹ <input type="radio"/> Missing <input type="radio"/> No Angina <input type="radio"/> Atypical Chest Pain <input type="radio"/> Stable Angina <input type="radio"/> ACS: Unstable Angina <input type="radio"/> ACS: Non-ST Elev MI <input type="radio"/> ACS: ST Elev MI	ACS Time Period ⁵¹ No MI <6° 6°-24° 24°-7d 7d-2m Miss <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Instructions: < or = 6 hrs > 6 hrs and < or = 24 hrs > 24hrs and < or = 7 days > 7 days and < or = 2 months
CATH LAB VISIT		(complete this section for each Cath Lab visit)	
Procedure Date ⁵² (mandatory) ____ / ____ / ____ mm dd yyyy	Procedure Type ⁵⁴ <input type="radio"/> Right Heart Cath <input type="radio"/> Left Heart Cath <input type="radio"/> PCI	SUMMARY Fluro Time ⁵⁵ : <input type="radio"/> Missing _____ minutes Cath/PCI Same Lab Visit ⁵⁶ : <input type="button" value="Calc"/>	CORONARY ANATOMY Dominance ⁶⁸ <input type="radio"/> Missing <input type="radio"/> Not Assessed <input type="radio"/> Left <input type="radio"/> Right <input type="radio"/> Mixed Stenosis % (0 if None) Left Main ⁶⁹ : <input type="radio"/> Missing _____% <input type="radio"/> Not Assessed Prox LAD ⁷⁰ <input type="radio"/> Missing _____% <input type="radio"/> Not Assessed Mid/Dist LAD ⁷¹ : <input type="radio"/> Missing _____% <input type="radio"/> Not Assessed RCA/PDA if R or Mixed Dom. ⁷² : <input type="radio"/> Missing _____% <input type="radio"/> Not Assessed CIRC ⁷³ : <input type="radio"/> Missing _____% <input type="radio"/> Not Assessed
MEDICATIONS Aspirin ⁶⁰ <input type="radio"/> Missing <input type="radio"/> Not Administered <input type="radio"/> Contraindicated <input type="radio"/> Yes IIB/IIIA ⁵⁸ <input type="radio"/> Missing <input type="radio"/> Not Administered <input type="radio"/> Contraindicated <input type="radio"/> Yes – Before Lab Visit <input type="radio"/> Yes – During Lab Visit <input type="radio"/> Yes – After Lab Visit Percutaneous Entry Location ⁷⁴ (select mult below) Closure Device ⁷⁵ <input type="radio"/> No Art <input type="radio"/> No Sut <input type="radio"/> Seal <input type="radio"/> Oth <input type="radio"/> Ms <input type="radio"/> Femor <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Brachi <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Radial <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Other <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	HEMODYNAMIC SUPPORT IABP ⁶² <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes – Arrived with <input type="radio"/> Yes – Placed During CP Bypass ⁶³ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes LV STATUS LV Gram ⁶⁴ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes LV Wall Motion ⁶⁵ <input type="radio"/> Missing <input type="radio"/> Not Assessed <input type="radio"/> Yes – Normal <input type="radio"/> Yes – Abnormal	EF STATUS EF Testing ⁶⁶ <input type="radio"/> Missing <input type="radio"/> Not Assessed <input type="radio"/> Contrast: Calculated <input type="radio"/> Contrast: Estimated <input type="radio"/> Non-Invasive: Calculated <input type="radio"/> Non-Invasive: Estimated Ejection Fraction % ⁶⁷ <input type="radio"/> Missing _____% <input type="radio"/> Not Assessed	(Continued from previous section)
DIAGNOSTIC CATH		(skip this section if no Diagnostic Cath is performed)	
GENERAL Operator Name ⁷⁶ <input type="radio"/> Missing _____ Operator SSN ⁷⁷ <input type="radio"/> Missing _____ - _____ - _____ Card. Cat. Stat ⁷⁸ <input type="radio"/> Missing <input type="radio"/> Elective <input type="radio"/> Urgent <input type="radio"/> Emergency <input type="radio"/> Salvage	INDICATIONS Card. Shock ⁷⁹ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Val. Hrt. Dis. ⁸⁰ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Arrhythmia ⁸¹ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Isch. Hrt. Dis. ⁸² <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Positive Functional Tests ⁸³ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes Heart Disease of Other Etiology ⁸⁴ <input type="radio"/> Missing <input type="radio"/> No Heart Disease <input type="radio"/> Yes – Transplant <input type="radio"/> Yes – Congenital <input type="radio"/> Yes – Cardiomyopathy <input type="radio"/> Yes – Other	FINDINGS Pulmonary Hypertension ⁸⁵ <input type="radio"/> Missing <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> Not Assessed Valve Disease – Mitral ⁸⁶ <input type="radio"/> Missing <input type="radio"/> Not Assessed <input type="radio"/> No Valve Disease <input type="radio"/> Stenosis <input type="radio"/> Regurgitation <input type="radio"/> Stenosis/ Regurgitation Valve Disease – Tricuspid ⁸⁷ <input type="radio"/> Missing <input type="radio"/> Not Assessed <input type="radio"/> No Valve Disease <input type="radio"/> Stenosis <input type="radio"/> Regurgitation <input type="radio"/> Stenosis/ Regurgitation	Valve Disease – Aortic ⁸⁸ <input type="radio"/> Missing <input type="radio"/> Not Assessed <input type="radio"/> No Valve Disease <input type="radio"/> Stenosis <input type="radio"/> Regurgitation <input type="radio"/> Stenosis/ Regurgitation Valve Disease – Pulmonic ⁸⁹ <input type="radio"/> Missing <input type="radio"/> Not Assessed <input type="radio"/> No Valve Disease <input type="radio"/> Stenosis <input type="radio"/> Regurgitation <input type="radio"/> Stenosis/Regurgitation

P C I		(skip this section if no PCI is performed)	
<p>GENERAL</p> <p>Operator Name⁹⁰ <input type="radio"/> Missing</p> <hr/> <p>Operator SSN⁹¹ <input type="radio"/> Missing</p> <hr/> <p>PCI Status⁹² <input type="radio"/> Missing</p> <p><input type="radio"/> Elective</p> <p><input type="radio"/> Urgent</p> <p><input type="radio"/> Emergency</p> <p><input type="radio"/> Salvage</p>	<p>MEDICATIONS</p> <p>Thrombolytics⁵⁷ <input type="radio"/> Missing</p> <p><input type="radio"/> Not Administered</p> <p><input type="radio"/> Contraindicated</p> <p><input type="radio"/> Yes – < 3°</p> <p><input type="radio"/> Yes – 3° to 6°</p> <p><input type="radio"/> Yes – >6° to ≤ 7d</p> <p>Heparin⁵⁹ <input type="radio"/> Missing</p> <p><input type="radio"/> Not Administered</p> <p><input type="radio"/> Contraindicated</p> <p><input type="radio"/> Yes – Prior</p> <p><input type="radio"/> Yes – During</p> <p><input type="radio"/> Yes – After</p> <p><input type="radio"/> Yes – Prior/During</p> <p><input type="radio"/> Yes – Prior/After</p> <p><input type="radio"/> Yes – During/After</p> <p><input type="radio"/> Yes – Prior/During/After</p> <p>Clopidogrel⁶¹ <input type="radio"/> Missing</p> <p><input type="radio"/> Not Administered</p> <p><input type="radio"/> Contraindicated</p> <p><input type="radio"/> Yes – ≤= 72 hrs of PCI</p> <p><input type="radio"/> Yes – After PCI</p>	<p>INDICATIONS</p> <p>Lesion ≥=50%⁹³ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – De novo</p> <p><input type="radio"/> Yes – Restenosis</p> <p><input type="radio"/> Yes – De novo/Restenosis</p> <p>Acute MI⁹⁴ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – Non ST Elev MI</p> <p><input type="radio"/> Yes – ST Elevation MI</p> <p>ST Elevation Onset Date/Time⁹⁵ <input type="radio"/> Missing</p> <p>____/____/____</p> <p>mm dd yyyy</p> <p>____:____:____</p> <p>hh mm ss</p> <p>Ballon/Stent Deployment Date/Time⁹⁶ <input type="radio"/> Missing</p> <p>____/____/____</p> <p>mm dd yyyy</p> <p>____:____:____</p> <p>hh mm ss</p> <p>Cardiogenic Shock⁹⁷ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes</p>	<p>CALCULATIONS</p> <p># of Lesions Attempted⁹⁸:</p> <p style="text-align: right;"> Calc </p> <p># of Lesions Successfully Dilated⁹⁹:</p> <p style="text-align: right;"> Calc </p> <p>Result of Procedure¹⁰⁰:</p> <p style="text-align: right;"> Calc </p>

LESIONS						(skip this section if no PCI is performed)					
Lesion ID # ¹⁰¹	1		2		3		4		5		
Segment # ¹⁰²											
Guidewire Success ¹⁰³	No Yes		No Yes		No Yes		No Yes		No Yes		
% Pre-Stenosis ¹⁰⁴	____%		____%		____%		____%		____%		
% Post-Stenosis ¹⁰⁵	____% N/A		____% N/A		____% N/A		____% N/A		____% N/A		
PreProc TIMIFlow ¹⁰⁶	No Slow Part Comp		No Slow Part Comp		No Slow Part Comp		No Slow Part Comp		No Slow Part Comp		
PostProc TIMIFlow ¹⁰⁷	No Slow Part Comp N/A		No Slow Part Comp N/A		No Slow Part Comp N/A		No Slow Part Comp N/A		No Slow Part Comp N/A		
Prev Dilated Lesion ¹⁰⁸	No Unknown (select mult below) Balloon Stent Other		No Unknown (select mult below) Balloon Stent Other		No Unknown (select mult below) Balloon Stent Other		No Unknown (select mult below) Balloon Stent Other		No Unknown (select mult below) Balloon Stent Other		
Cited Segment in Graft ¹⁰⁹	No Yes-Artery Yes-Vein		No Yes-Artery Yes-Vein		No Yes-Artery Yes-Vein		No Yes-Artery Yes-Vein		No Yes-Artery Yes-Vein		
Location in Graft ¹¹⁰	No (select one below) Aortic Body Distal		No (select one below) Aortic Body Distal		No (select one below) Aortic Body Distal		No (select one below) Aortic Body Distal		No (select one below) Aortic Body Distal		
Lesion Risk ¹¹¹	Low Med High		Low Med High		Low Med High		Low Med High		Low Med High		
Intracoronary Device(s) ¹¹³ Primary Intracoronary Device ¹¹⁴ (circle primary device)	Ballo BareMetStent TEC_IVUS_PreWire Cut.Ballo_Rotational SiroliStent_Angiojet PaclitStent_Flowire HeparinStent_Laser CoveredStent_DCA GamBrach_BetBrach DistEmbProt_Other		Ballo BareMetStent TEC_IVUS_PreWire Cut.Ballo_Rotational SiroliStent_Angiojet PaclitStent_Flowire HeparinStent_Laser CoveredStent_DCA GamBrach_BetBrach DistEmbProt_Other		Ballo BareMetStent TEC_IVUS_PreWire Cut.Ballo_Rotational SiroliStent_Angiojet PaclitStent_Flowire HeparinStent_Laser CoveredStent_DCA GamBrach_BetBrach DistEmbProt_Other		Ballo BareMetStent TEC_IVUS_PreWire Cut.Ballo_Rotational SiroliStent_Angiojet PaclitStent_Flowire HeparinStent_Laser CoveredStent_DCA GamBrach_BetBrach DistEmbProt_Other		Ballo BareMetStent TEC_IVUS_PreWire Cut.Ballo_Rotational SiroliStent_Angiojet PaclitStent_Flowire HeparinStent_Laser CoveredStent_DCA GamBrach_BetBrach DistEmbProt_Other		
Dissection ¹¹⁵	No Yes		No Yes		No Yes		No Yes		No Yes		
Acute Closure ¹¹⁶	No Yes		No Yes		No Yes		No Yes		No Yes		
Succ. Reopening ¹¹⁷	N/A No Yes		N/A No Yes		N/A No Yes		N/A No Yes		N/A No Yes		
Perforation ¹¹⁸	No Yes		No Yes		No Yes		No Yes		No Yes		
<p>Notes: (1) When the Guidewire is unsuccessful, the % Post-Stenosis¹⁰⁵ and PostProc TIMIFlow¹⁰⁷ items should be marked N/A. Also, the Intracoronary Device(s)¹¹³, Primary Intracoronary Device¹¹⁴, Acute Closure¹¹⁶ and Successful Reopening¹¹⁷ items should be skipped/missing. (2) When Cited Segment in Graft¹⁰⁹ is No then Location in Graft¹¹⁰ must also be No. (3) When Acute Closure¹¹⁶ is No then Succ. Reopening¹¹⁷ must also be N/A.</p>											

A D V E R S E O U T C O M E S			(complete this section for each Cath Lab visit)
<p>Periprocedural MI¹¹⁹ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p> <p>CK-MB UNL¹²⁰ <input type="radio"/> Missing</p> <p>_____ (complete if Peri. MI is Yes)</p> <p><input type="radio"/> Unavailable</p> <p><input type="radio"/> No Periprocedural MI</p> <p>CK-MB Baseline¹²¹ <input type="radio"/> Missing</p> <p>_____ (complete if Peri. MI is Yes)</p> <p><input type="radio"/> Unavailable</p> <p><input type="radio"/> No Periprocedural MI</p> <p>CK-MB Peak¹²² <input type="radio"/> Missing</p> <p>_____ (complete if Peri. MI is Yes)</p> <p><input type="radio"/> Unavailable</p> <p><input type="radio"/> No Periprocedural MI</p> <p>Cardiogenic Shock¹²³ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p> <p>Arrhythmia¹²⁴ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p> <p>CVA/Stroke¹²⁵ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p>	<p>Tamponade¹²⁶ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p> <p><u>VASCULAR COMPLICATIONS</u></p> <p>Bleeding¹²⁷ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p> <p>Occlusion¹²⁸ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p> <p>Loss of Distal Pulse¹²⁹ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p> <p>Dissection¹³⁰ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p> <p>Pseudoaneurysm¹³¹ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p>AV Fistula¹³² <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p>	<p>Contrast Reaction¹³³ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p><input type="radio"/> Yes – During/After Cath Lab Visit</p> <p>CHF¹³⁴ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p>Renal Failure¹³⁵ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p> <p>Emergency PCI¹³⁶ (Cath only) <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p>Unplanned CAB¹³⁷ (PCI only) <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes – During Cath Lab Visit</p> <p><input type="radio"/> Yes – After Cath Lab Visit</p>	

OPTIONAL

PCI FOLLOW-UP AT 6 MONTHS

PCI FOLLOW-UP AT 6 MONTHS	
<p>Date of Follow Up¹³⁸</p> <p>____ / ____ / ____</p> <p style="margin-left: 20px;">mm dd yyyy</p> <p>Vital Status¹³⁹ <input type="radio"/> Missing</p> <p><input type="radio"/> Unable to contact</p> <p><input type="radio"/> Alive</p> <p><input type="radio"/> Dead</p> <p>(Complete if Vital Status¹³⁹ is Dead)</p> <p>Primary Cause of Death¹⁴⁰ <input type="radio"/> Missing</p> <p><input type="radio"/> Cardiac</p> <p><input type="radio"/> Noncardiac</p> <p><input type="radio"/> Unknown</p>	<p>Readmission¹⁴¹ <input type="radio"/> Missing</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Yes</p> <p>(Complete if Readmission¹⁴¹ is Yes. Select all that apply.)</p> <p>Readmission Reason¹⁴² <input type="radio"/> Missing</p> <p><input type="radio"/> Myocardial Infarction (documented)</p> <p><input type="radio"/> Coronary Artery Bypass Surgery</p> <p><input type="radio"/> Percutaneous Coronary Intervention</p> <p><input type="radio"/> Congestive Heart Failure (without MI)</p> <p><input type="radio"/> Arrhythmia or Conduction Disturbance (without MI)</p> <p><input type="radio"/> Recurrent Angina (without MI)</p> <p><input type="radio"/> Cardiac Catheterization</p> <p><input type="radio"/> Other Medical Problem</p>