Evaluation of Canadian, American and International Cardiovascular Registries

Tony Zhang BHSc, Kelly Lau OSSD, and Dennis Ko, MD, MSc

December 2010

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Measuring and improving quality of care and patient outcomes is the ultimate goal for quality improvement efforts. In the past decade, cardiovascular registries have played a vital role in collecting, managing, and dispersing clinical information to patients, physicians, and health policy makers. The health care system in Canada is structured provincially as are the clinical registries. Because of the regional variations in the collection of data, data definitions, and quality of care indicators that exist, the ability to compare and examine national trends in cardiovascular disease in Canada has been limited. The Canadian Cardiovascular Society (CCS) has identified the standardization of data collection and data definitions as a key initiative in improving cardiovascular care. Through the support of the Public Health Agency of Canada (PHAC), the goal of this report is to examine data elements and data definitions of Canadian registries as well as those in American and international databases. This initial effort will strongly facilitate the development of pan-Canadian data definitions and quality indicators.

The main findings of our current report were:

- Several Canadian provinces have large provincial cardiovascular registries that have collected data on a large number of patients records;
- Canadian cardiovascular databases have focused on hospitalized patients with acute coronary syndrome, cardiovascular invasive procedures such as cardiac catheterization/percutaneous coronary intervention, and cardiac surgery;
- Canadian cardiovascular registries identified in our report have been collecting detailed clinical information for a long term of time and continue to do so on an ongoing basis;
- Canadian cardiovascular registries have similar scope regarding the number of data variables that are being collected;
- Substantial variations exist among cardiovascular registries regarding how data variables are defined;
- Some Canadian cardiovascular registries do not have an operation manual to detail definition of data variables;
- The scope of the Canadian cardiovascular databases is in general less comprehensive than the American cardiovascular registries, as they collect fewer clinical variables and have less detailed data definitions for variables.

INTRODUCTION

Many policy experts believe in the dogma that "you can't manage what you can't measure." This concept of quality assessment and improvement is especially true for health care. One needs to quantify quality of patient care in order to evaluate quality, study causes and improve care and outcomes.[1] Clinical cardiovascular registry is vital for cataloguing, storing and circulating quality of care information. Driven by the technological advances, the capability to store and manage data has increased significantly through the development of purpose-based software and various inception cohort designs. [2] There are currently numerous provincial cardiac databases in Canada which collect, manage and analyze clinical information. With an extensive number of patient records, these registries have become the cornerstones of cardiac care information in Canada. They have made vital clinical information available to policy makers and legislators, enabling them to make informed choices about resource allocation. For instance, information on wait times has allowed provincial health authorities and administrators to set and improve benchmarks for timely access to care, and thus avoiding excessive delays and improved patient outcomes.[3]

Still, there is much that can be improved. Key stakeholders identified four focused areas in Canadian cardiac registries: 1. Enabling improvements in quality patient care; 2. Facilitating evidence-based decision making and resource allocation; 3. Disseminating information to decision-makers, and 4. Improving management of cardiac waiting lists.[2] By providing dynamic, up-to-date information on patient care, disease incidence and wait times, registries can become more effective for patients, physicians, and health policy decision-makers. Because Canada's healthcare is structured provincially and cardiovascular registries are managed independently, there are regional variations in cardiovascular databases across Canada. Discrepancies in the clinical registries between Canadian provinces make it very difficult to conduct meaningful comparisons across jurisdictions. As a result, many opportunities to explore regional discrepancies and to improve quality of care are lost.

In February 2009 the Canadian Heart Health Strategy and Action Plan (CHHS-AP) identified the need for national standardization in Canada's quality of care indicators and definitions. The Canadian Cardiovascular Society (CCS) sought input from major stakeholders and this initiative was subsequently funded by the Public Health Agency of Canada (PHAC). The objective of this current report was to examine data elements and definitions of Canadian clinical registries as well as examine common American and International databases for reference. This initial effort will strongly facilitate the development of pan-Canadian data definitions and quality indicators.

SPECIFIC OBJECTIVES

The main goal of this report was to assist the CCS-PHAC initiative to establish a "live", internet-based, pan-Canadian Data Dictionary. In this report we have three main objectives:

1) To identify common representative cardiovascular databases in Canada and internationally.

2) To identify and compare data variables from case collection forms used in Canadian and international registries.

3) To collect and compare definitions for cardiovascular data elements found in Canadian and international databases.

METHODS

Registry Identification

The main focus of our report was on clinical registries that are being used in Canada. We also included national cardiac databases in the United States and the European Data Standards in order to gain perspectives of international registries. We did not include administrative databases such as the Canadian Institute for Health Information (CIHI) in this initial report. This was because CIHI is a Canadian wide database that already applies the same data elements across the whole country. Through initial discussion with the Data Definitions Steering Committee, our initial report focused on clinical registries of Acute Coronary Syndrome (ACS), Cardiac Catheterization (cath)/Percutaneous Coronary Intervention (PCI) and Cardiac Surgery because these databases are better established in Canada than databases for other cardiac conditions or procedures. The panel recognized the need to standardize other important cardiac conditions such as heart failure, cardiac arrhythmias, as well as electrophysiological procedures. However, at this current time, there are relatively few provinces that are mandating collection of data in these conditions.

Major Canadian and international registries were identified by conducting electronic searches and contacting key content experts. We also sought input from the Data Definitions Steering Committee of the Canadian Cardiovascular Society (CCS) and the chairs of the three Chapter Working Groups.

A total of 13 registries were identified using this strategy, which was categorized into ACS, Cath/PCI, and cardiac surgery based on the focus of the database. Case report forms for each registry were obtained from online public resources or by contacting key persons of these databases. Our comparisons were based solely on these case report forms, so we did not evaluate information collected internally or through other means.

Data abstraction

The reviewers (KL and TZ) tabulated the variables and field options from each cardiac registry form along with their respective definitions. The data elements were reviewed and combined in some cases in order to keep only the most essential data elements. For instance, location, date and time of first ECG obtained was reduced to ECG date/time. We tried to retain as many of the variables as possible in our comprehensive report. The resulting data elements were the basis of comparison for the registries. Many registries used different terminology for their data elements, so only one term was chosen to represent each variable. All work was checked by the two reviewers and disagreements on specificity were resolved through discussion.

RESULTS

Our efforts yielded five clinical registries in ACS, five registries in Cardiac Catheterization/PCI, and three registries in Cardiac Surgery, as listed in the following table:

Table 1 of Cardiac Registries

Country	ACS Registries	Cath/PCI Registries	Cardiac Surgery Registries
Canada	APPROACH, CVHNS	APPROACH, BCCR, CCN	APPROACH, BCCR,
United States	NCDR ACTION	NCDR Cath PCI	STS
Europe	CARDS *	CARDS*	
International	GRACE 2		

Abbreviations:

APPROACH – Alberta Provincial Project for Outcome Assessment in Coronary Heart Disease

CVHNS - Cardiovascular Health Nova Scotia

CCN – Cardiac Care Network

CARDS – Cardiology Audit Registration Data Standards

*Note CARDS is not a cardiac registry, it is a report of data standards

BCCR- British Columbia Cardiac Registries

NCDR ACTION – National Cardiovascular Data Registries - American College of Cardiology Acute Coronary Syndrome Registry

NCDR Cath PCI - National Cardiovascular Data Registries Catheterization and Percutaneous Coronary Intervention

STS – Society of Thoracic Surgeons

GRACE 2- Expanded Global Registry of Acute Coronary Events

DESCRIPTION AND ANALYSIS OF CARDIAC REGISTRIES

CANADIAN REGISTRIES

Alberta Provincial Project for Outcome Assessment in Coronary Heart Disease (APPROACH) – Acute coronary syndrome, Cath/PCI, CABG registries [4]

The Alberta Provincial Project for Outcome Assessment in Coronary Heart disease (APPROACH) database is a patient-centred initiative with a focus on coronary artery disease. It collects and evaluates both short-term and long-term patient outcomes, such as mortality, revascularization, and quality of life. The APPROACH software began in Alberta in the mid 1990s with implementation in the cardiac catheterization laboratory and cardiovascular surgery database. It has since expanded in geographic distribution in many provinces across Canada. APPROACH has also grown in scope to include data collection in the area of waitlist management, ACS, nuclear medicine, and most recently CT angiogram. APPROACH has also introduced new innovations such as the Coronary Artery Reporting and Archiving Tool (CARAT), which is a graphic recording and communication application for capturing coronary anatomy and interventional and surgical details. The registry now contains clinical information on more than 140,000 Albertans with diagnostic catheterization and/or revascularization procedures and more than 40,000 ACS hospital admissions. Additionally, APPROACH follows up patients with a health status survey at one, three, and five years post-catheterization, which provides important longitudinal measure of the patients' clinical progression. A project is currently underway to create APPROACH Online, a web-based database to facilitate care.

British Columbia Cardiac Registry [5]

The British Columbia Cardiac Registry (BCCR), now termed the Cardiac Services British Columbia Registry, was developed more than a decade ago to collect information on demographics, wait times, and clinical data for patients undergoing cardiac surgery procedures in British Columbia. It has since expanded into a full clinical registry, including diagnostic catheterizations, percutaneous coronary interventions, pacemakers and implantable cardioverter-defibrillator implants. Recently, it has started collection of data on percutaneous heart valves and will soon introduce electrophysiology and ACS modules. At the moment, BCCR does not have publically available data definition manuals for data variables. However a plan to substantially change the structures of the databases to aid future health care delivery is being implemented. The BCCR is governed by Cardiac Services BC, an agency of the Provincial Health Services Authority. In addition to managing the registry, Cardiac Services BC is also responsible for planning, monitoring, evaluating, and funding certain tertiary cardiac services across British Columbia.

Cardiac Care Network of Ontario [6]

The Cardiac Care Network of Ontario (CCN) was established in the early 1990s to institute a provincial system of active cardiac access management for Ontario. Over the period of 20 years, CCN has widened its focus from cardiac surgery to encompass selected adult advanced cardiac procedures and other cardiac care. Composed of eighteen member hospitals, CCN serves as an advisor to the Ontario Ministry of Health and Long-term Care (MOHLTC). It is responsible for planning, implementing, and evaluating cardiovascular care in Ontario, including reporting on the provincial wait list registry for various cardiac procedures. Furthermore, CCN develops evidence-based strategies to improve a full-range of cardiac care, including means to minimize acute hospital readmissions and the need for initial and repeat procedures. Funded by the MOHLTC, CCN has more than one million patient records and collects data on over 100,000 patients annually.

Cardiovascular Health Nova Scotia [7, 8]

The Cardiovascular Health Nova Scotia (CVHNS) registry is a provincial program run by the Nova Scotia Department of Health. It is a continuation of the Improving Cardiovascular Outcome in Nova Scotia (ICONS) project. ICONS was a private-public research study launched in 1997 to test if periodic measurements and feedback would lead to enhanced care of hospitalized cardiac patients. The patient populations of interest were those with acute ischemic syndrome, congestive heart failure or atrial fibrillation. From 1997 to 2002, patients with any of those conditions admitted to a Nova Scotia acute care hospital were enrolled. More than 60,000 hospital admissions and 34,000 unique patients were abstracted during the span of five years. Furthermore, a total of 12,500 patients were followed longitudinally to monitor their quality of life and clinical end points. In 2004, ICONS officially became an operational program of the Nova Scotia Department of Health. Its focus was initially cardiac disease and has subsequently expanded to stroke care. ICONS was renamed to CVHNS in 2006. Currently, the program is aiming to improve its methods of surveillance for stroke and to widen cardiovascular data reporting capacities through linkages with other data sources. It has also been focusing on multi-strategy quality improvement initiatives and supporting implementation of guidelines throughout District Health Authorities.

AMERICAN REGISTRIES

National Cardiovascular Data Registries: ACTION and Cath/PCI [9, 10]

The ACS and Cath/PCI databases organized by the National Cardiovascular Data Registries (NCDR) were selected as the most representative cardiovascular registries in the United States as they are used most frequently by hospitals in the United States. The NCDR ACTION Registry-GWTG was the result of the merger between the ACTION registry from the American College of Cardiology Foundation

and the Get With The Guidelines[SM] Coronary Artery Disease (GWTG-CAD) registry from the American Heart Association. The ACTION Registry measures close to 300 clinical variables and its clinical data standards were created through a collaboration of pre-existing data registry information into consistent standards. This included the ranking of data elements/definitions in the ACTION registry, followed by consensus seeking and public review/comments. Originally designed to bridge the treatment gaps in cardiac care among American hospitals, ACTION Registry – GWTG has become the United States' largest quality improvement initiative, managing millions of patient records. It has established itself as the national standard for examining treatment patterns, clinical outcomes and overall quality of care given to high-risk ACS patients.

The National Cardiovascular Data Registries Cath/PCI registry captures the characteristics, treatments, and outcomes among patients who undergo diagnostic catheterization and/or percutaneous coronary intervention (PCI) procedures. The NCDR CathPCI registry is used in more than 60% of cardiac catheterization labs in the United States and has more than 10 million patient records.

Society of Thoracic Surgeons Registry [11]

The Society of Thoracic Surgeons (STS) is a not-for-profit organization with roughly 6,000 surgeons, researchers and allied health professionals from around the globe. Founded in 1964 and based in the United States, the society has dedicated itself to improving heart, lung, esophageal, and other surgical procedures for the chest. The STS National Database collects ongoing data for adult cardiac, general thoracic and congenital surgery.

EUROPEAN CARDIOVASCULAR DATA STANDARDS

Cardiology Audit Registration Data Standards [12]

The Cardiology Audit Registration Data Standards (CARDS) project was a collaborative work by the European Union Department of Health and Children, the European Society of Cardiology, the Irish Cardiac Society, and the European Commission. The goal of this project was to create standardized data variables and definitions for clinical cardiology in an effort to harmonize data collected for local, national, and international registries and audit. The three modules that were focused on were ACS, PCI, and clinical electrophysiology (pacemakers, implantable cardioverter defibrillators and ablation procedures). For each of these modules, all existing databases, registries, and surveys across Europe were acquired by the Coordination Committee and three multidisciplinary Expert committees through the help of the European Society of Cardiology. All the variables collected were examined, compiled into large matrices and subsequently limited to less than 100 variables by the Expert Committees. These variables had to be consistent with existing treatment guidelines and needed to be useful for future clinical audit, clinical care of patients, service planning and epidemiology. The data standards

were then pilot-tested in selective institutions for clarity and feasibility. In May 2004, the draft data standards were reviewed, discussed and adopted at an EU conference involving the Member States. The next step in the CARDS project is the dissemination of these data standards to stakeholders across Europe.

INTERNATIONAL CARDIOVASCULAR REGISTRY

Global Registry of Acute Coronary Events [13]

The Global Registry of Acute Coronary Events (GRACE) was an international research collaboration that collected data for patients hospitalized with ACS. It was included in this report to gain a global perspective of data variables. The objective of the second phase of GRACE, the Expanded Global Registry of Acute Coronary Events (GRACE2) was to gain a wider understanding of patient demographics, management, and consequent clinical outcomes while maintaining the original study design. In 2003, an expanded version (GRACE2) was started, allowing for more hospitals and countries to participate. The registry has now become the largest of its kind. As of 2010, clinical data on more than 102,341 patients is available in the database.[1] More than 10,000 patients continue to be enrolled every year by 247 hospitals in thirty countries.

Comparison of Data collection of ACS Registries

In general, all databases include a wide scope of data elements. The only section that we were not able to examine was follow-up because this was usually not available in the case report forms. This may be explained by the fact that many follow-up initiatives are done via linkages with administrative databases.

When comparing the two Canadian ACS databases – namely APPROACH and CVHNS, they are more similar than different. Both collect relevant demographic information, admission, cardiac status on first medical contact, risk and co-morbidity factors, and prior cardiac history and intervention. With regards to medications, the two registries are also alike in that both lack data elements related to home medications and medications at follow-up.

Almost all the registries have accompanying variable definitions. The most complete set of definitions is from the ACTION Registry-GWTG. ACTION has a 98-page document, detailing coding instructions, definitions, and supporting notes for all the variables in an organized and user-friend format. Similarly, CARDS also has a complete definition document, explaining all variables and field options. APPROACH has data definitions for select variables. Currently, CVHNS does not have a data dictionary or definitions book for its data variables.

Acute Coronary Syndrome (ACS) Registries					
	APPROACH	**CVHNS**	**ACTION**	**GRACE 2**	**CARDS***
DEMOGRAPHICS					
Name	✓	✓	✓	✓	
Address	✓			✓	
Birth Date	✓	✓	✓	✓	✓
Social Security Number/ Provincial Health Numbers	✓	✓	✓		
Patient Identification			✓	✓	✓
Medical Record Number	✓			✓	
Race	✓*		✓		
Sex	✓	✓	✓	✓	✓
Hospital Identification	✓	✓		✓	✓
Insurance Payers	✓		✓		
ADMISSION					
Admitting Physician	✓				
Means of Transport	✓	✓	✓		✓
Admit Location	✓	✓	✓		✓
Admission type (e.g. Independent ER, Convalescence)		✓			
Hospital Arrival Date/Time	✓	✓	✓	✓	✓
Date/Time of Patient Transfer between Facilities/Floors	✓				
CARDIAC STATUS ON FIRST MEDICAL CONTACT					

ACS Diagnosis	✓	✓		✓	✓
STEMI Types	✓				
Non-ACS Diagnosis	✓	✓		✓	
Symptom Onset Date/Time	✓	✓	✓	✓	✓
Location of First ECG		✓	✓		
First ECG Date/Time	✓	✓	✓	✓	
Killip Class	✓			✓	✓
Heart Failure		✓	✓		
Heart Rate	✓	✓	✓	✓	✓
Systolic or Diastolic Blood Pressure	✓	✓	✓	✓	✓
Cardiogenic Shock	✓	✓	✓		
Cocaine Use			✓		
Pre-Hospital Cardiac Arrest	✓	✓		✓	✓
EMS details	✓		✓		
RISK AND COMORBIDITY FACTORS					
Height	✓	✓	✓	✓	✓
Weight	✓	✓	✓	✓	✓
Smoking	✓	✓	✓	✓	✓
Hypertension	✓	✓	✓	✓	✓
Dyslipidemia	✓	✓	✓	✓	✓
Renal Insufficiency	✓	✓		✓	✓
Hemodialysis	✓	✓	✓		✓
Asthma		✓			
Cerebrovascular disease	✓		✓		
Prior Transient Ischemic Attack or Stroke	✓	✓	✓	✓	✓
Family History of Premature Coronary Artery Disease	✓	✓			
Peripheral Arterial Disease	✓	✓	✓	✓	✓
Diabetes Mellitus	✓	✓	✓	✓	✓
Major Bleeding		✓		✓	
Deep Vein Thrombosis	✓				
Thromboembolic History	✓				
Delirium	✓				
Infectious Endocarditis	✓				
Alcohol Use	✓	✓			
Chronic Lung disease	✓	✓	✓		✓
Liver Disease	✓				
Malignancy	✓	✓			
Gastrointestinal Disease	✓				
PRIOR CARDIAC HISTORY AND INTERVENTIONS					
Myocardial Infarction	✓	✓	✓	✓	✓
Heart Failure	✓	✓	✓	✓	✓
Cardiac Arrest	✓	✓			
Cardiac Catheterization	✓	✓			
PCI	✓	✓	✓	✓	✓
CABG	✓	✓	✓	✓	✓
Prosthetic Valve	✓			✓	

Prior Angina		✓		✓	✓
MEDICATIONS					
Home Meds	✓	✓	✓	✓	✓
Medications Administered in First 24 Hours (including start time and dose)	✓	✓	✓	✓	
In-Hospital Medications	✓	✓		✓	✓
Medications Prescribed at Hospital Discharge	✓	✓	✓	✓	✓
Medications Taken at Follow-Up	✓				✓
PROCEDURES AND TESTS					
Exercise ECG	✓	✓	✓	✓	✓
Stress Echo	✓	✓		✓	✓
LVEF Assessment	✓	✓	✓	✓	✓
Coronary Angiography details	✓		✓		✓
PCI details	✓	✓	✓	✓	✓
CABG Done	✓	✓	✓	✓	✓
LABORATORY RESULTS					
Lab Values/Status	✓	✓	✓	✓	✓
REPERFUSION STRATEGY					
Reperfusion Used	✓	✓	✓	✓	✓
IN-HOSPITAL CLINICAL EVENTS					
In-Hospital Events	✓	✓	✓	✓	✓
DISCHARGE					
Death	✓	✓	✓	✓	✓
Discharge Information	✓	✓	✓	✓	✓
FOLLOW UP					
Follow-up Information					✓
Post-Discharge Events					✓

Abbreviations

APPROACH - Alberta Provincial Project for Outcome Assessment in Coronary Heart Disease *This feature will be available in the WEB version but is not yet operational	CARDS - Cardiology Audit and Registration Data Standards *Note: this is not a cardiac registry
CVHNS - Cardiovascular Health Nova Scotia	ACTION – American College of Cardiology Acute Coronary Syndrome Registry
CABG - Coronary Artery Bypass Grafting	GRACE 2- The Expanded Global Registry of Acute Coronary Events
PCI- Percutaneous Coronary Intervention	ACS - Acute Coronary Syndrome
EMS - Emergency Medical Services	ER - Emergency Room
LVEF - Left Ventricular Ejection Fraction	ECG – Electrocardiogram

Comparisons of Catheterization/PCI Registries and CARDS

All of the cath/PCI databases collect information on a wide range of data elements and are fairly comprehensive. The collection of medication information is most discrepant among databases in which the APPROACH, BCCR, NCDR collect medication at different time frames, and the CCN database do not collect any medication information.

All the cath/PCI database collect a large amount of procedural related information except for the CCN database, which has less detailed information relating to coronary anatomy and procedure characteristics compared with other clinical databases.

In terms of data definitions, the CCN and APPROACH databases have very detailed definition manuals. The APPROACH definitions are not publically available at this time. The NCDR Cath/PCI and CARDS (PCI) have complete, comprehensive definitions for all their variables. The BCCR database does not have publically accessible definitions for its variables at the time.

Percutaneous Coronary Intervention (PCI) Registries and CARDS

	CCN	APPROACH	BCCR	NCDR CathPCI	CARDS*
DEMOGRAPHICS					
Name	✓	✓	✓	✓	
Birth Date	✓	✓	✓	✓	✓
Social Security Number/ Health Card Number	✓	✓	✓	✓	
Insurance Payers		✓		✓	
Patient Address	✓	✓	✓		
Patient ID		✓	✓	✓	✓
Race		✓*		✓	
Sex	✓	✓	✓	✓	✓
Hospital ID	✓	✓	✓		✓
Work Status		✓	✓		
EPISODE OF CARE					
Arrival Date/Time	✓	✓		✓	✓
Admit Source	✓	✓		✓	✓
Urgency of Procedure	✓	✓	✓		
Referral Date	✓	✓	✓		
RISK AND COMORBIDITY FACTORS					
Height		✓	✓	✓	✓
Weight	✓	✓	✓	✓	✓
Allergy History	✓				
Smoking History	✓	✓	✓	✓	✓
Hypertension	✓	✓	✓	✓	✓
Alcoholism		✓			
Dyslipidemia	✓	✓	✓	✓	✓

Family History of Premature CAD	✓	✓		✓	
Chronic Renal Failure	✓	✓	✓		✓
Peripheral Arterial Disease	✓	✓	✓	✓	✓
Diabetes Mellitus	✓	✓	✓	✓	✓
Cerebrovascular Disease	✓	✓	✓	✓	✓
Deep Vein Thrombosis	✓	✓			
Thromboembolism History		✓			
Pulmonary Embolism		✓			
Psychiatric History		✓			
Infectious Endocarditis	✓	✓	✓		
Pulmonary Diseases	✓	✓	✓	✓	
Malignancy		✓	✓		
Liver Diseases		✓	✓		
Gastrointestinal Diseases		✓	✓		
PRIOR CARDIAC HISTORY AND INTERVENTIONS					
Myocardial Infarction	✓	✓	✓	✓	✓
Heart Failure	✓	✓	✓	✓	✓
Valve Surgery/Procedure		✓		✓	✓
PCI	✓	✓	✓	✓	✓
CABG	✓	✓	✓	✓	✓
CATHETERIZATION LABORATORY VISIT					
CLINICAL EVALUATION LEADING TO THE PROCEDURE					
CAD Presentation	✓	✓	✓	✓	✓
Symptom Onset Date/Time	✓	✓	✓	✓	✓
Thrombolytics and Start Date/Time (if applicable)	✓	✓	✓	✓	
Thrombolytics Types	✓	✓	✓		
CCS Anginal Classification within 2 Weeks	✓	✓	✓	✓	✓
Anti-Anginal Med and Types within 2 Weeks	✓	✓		✓	✓
Heart Failure NYHA Class	✓	✓	✓	✓	✓
Cardiac Arrhythmia	✓	✓	✓		
Valvular Heart Disease	✓	✓	✓		✓
Pre-Operative Evaluation Before Non-Cardiac Surgery		✓		✓	
Cardiogenic Shock w/in 24 Hours		✓	✓	✓	✓
Cardiac Arrest within 24 Hours				✓	
ACS TIMI Risk Score	✓				
CARDIAC INVESTIGATIONS					
ECG Findings	✓	✓	✓		
Standard Exercise Stress Test and Results/Risk of Ischemia	✓	✓	✓	✓	
Cardiac CTA and Results/Risk of Ischemia		✓		✓	
Pre-PCI LVEF	✓	✓	✓	✓	✓
CORONARY ANATOMY					
Coronary Anatomy Details		✓	✓	✓	✓
PCI PROCEDURE					
PCI Status (e.g. elective)		✓	✓	✓	
Cardiogenic Shock at Start of PCI		✓	✓	✓	✓
PCI Indication		✓	✓	✓	✓
Fluoro Time/Dose		✓	✓	✓	
Contrast Volume		✓	✓	✓	

Arterial Access Site		✓	✓	✓	✓
Closure Methods		✓		✓	
Lesions and Devices		✓	✓	✓	✓
MECHANICAL VENTRICULAR SUPPORT					
IABP and Timing		✓	✓	✓	✓
Other Mechanical Ventricular Support and Timing		✓		✓	
Hemodynamic Support					✓
MEDICATIONS					
Pre-Procedure Medications (Administered within 24 Hours prior to PCI Procedure)			✓	✓	
Procedure Medications		✓		✓	✓
Discharge Medications		✓**	✓*	✓	✓
Medications Taken by Patient at Follow-up		✓			✓
LABS					
Lab Values	✓	✓	✓	✓	✓
INTRA AND POST-PROCEDURE EVENTS					
Intra-Procedure Events			✓	✓	✓
Post-Procedure Events		✓	✓	✓	✓
DISCHARGE					
Death		✓	✓	✓	✓
Discharge Information	✓	✓**	✓*	✓	✓
FOLLOW UP					
Follow-up Information		✓			✓
Post-Discharge Events		✓			✓

Abbreviations	
CCN - Canadian Cardiac Network of Ontario	APPROACH - Alberta Provincial Project for Outcome Assessment in Coronary Heart Disease *This feature will be available in the WEB version but is not yet operational ** Refers to inpatients
NCDR - National Cardiovascular Data Registries	CARDS - Cardiology Audit and Registration Data Standards
CAD - Coronary Artery Disease	PCI - Percutaneous Coronary Intervention
CABG - Coronary Artery Bypass Grafting	CCS - Canadian Cardiovascular Society
NYHA - New York Heart Association	ACS - Acute Coronary Syndrome
TIMI - Thrombolysis In Myocardial Infarction	ECG – Electrocardiogram
LVEF - Left Ventricular Ejection Fraction	BCCR - British Columbia Cardiac Registries

Comparison of Cardiac Surgery Databases

Overall, the STS National Database, BCCR and APPROACH are very comprehensive in terms of the collection of data variables that do not differ significantly. The STS National Database, BCCR, and APPROACH collect same variables in most categories, namely pre-operative risk factors, previous interventions, medications, operative details, post-operative details, complications, and discharge.

The STS and APPROACH databases have comprehensive data definition manuals, whereas BCCR has no publically accessible definitions at all. In comparing APPROACH and STS, STS has clearly defined definitions for each of its variables whereas APPROACH has detailed definitions for only selected data fields.

Cardiac Surgery Registries			
	STS	**BCCR**	**APPROACH**
DEMOGRAPHICS			
Participant ID	✓	✓	✓
Patient Name	✓	✓	✓
Date of Birth	✓	✓	✓
Gender	✓	✓	✓
Race	✓		✓*
ZIP or Postal Code	✓	✓	✓
HOSPITALIZATION			
Date of Admission	✓	✓	✓
Date of Surgery	✓	✓	✓
Date of Discharge	✓	✓	✓
Duration of ICU stay	✓		✓
Readmission to ICU	✓		✓
PRE-OPERATIVE RISK FACTORS			
Weight	✓	✓	✓
Height	✓	✓	✓
Smoker	✓	✓	✓
Family History of Coronary Artery Disease	✓	✓	✓
Diabetes and Therapies	✓	✓	✓
Hypercholesterolemia	✓	✓	✓
Last Creatinine Level Pre-operation	✓	✓	✓
Renal Failure	✓	✓	✓
Hypertension	✓	✓	✓
Infectious Endocarditis	✓	✓	✓
Chronic Lung Disease	✓	✓	✓
Immunosuppressive Treatment	✓	✓	✓
Peripheral Vascular Disease	✓	✓	✓
Cerebrovascular Disease	✓	✓	✓
PREVIOUS INTERVENTIONS			
Previous Cardiovascular Interventions	✓	✓	✓
PRE OPERATIVE CARDIAC STATUS			
Myocardial Infarction	✓	✓	✓
Congestive Heart Failure	✓	✓	✓

Angina	✓	✓	✓
Cardiogenic Shock	✓		✓
Resuscitation	✓		✓*
Arrhythmia	✓	✓	✓
CCS Classification	✓	✓	✓
NYHA Classification	✓	✓	✓
MEDICATIONS			
Pre-Operative Medications	✓	✓	✓
Discharge Medications	✓	✓	✓
PRE OPERATIVE HEMODYNAMICS AND CORONARY ANGIOGRAPHY RESULTS			
Valvular Stenosis and Insufficiency	✓	✓	✓
Pulmonary Artery Catheter Results	✓		✓
Coronary Anatomy		✓	✓
Left Ventricular Ejection Fraction (LVEF)	✓	✓	✓
OPERATIVE DETAILS			
Status of Procedure	✓	✓	✓
Valves Used	✓	✓	✓
Operative Techniques	✓	✓	✓
Other Cardiac Procedures	✓	✓	✓
Other Non-Cardiac Procedures	✓	✓	✓
Cardiopulmonary Bypass and Support	✓	✓	✓
POST OPERATIVE			
Post-Operative Blood Products	✓	✓	✓
Post-Operative Ventilation	✓	✓	✓
COMPLICATIONS			
In-Hospital Complications	✓	✓	✓
Mortality	✓	✓	✓
DISCHARGE			
Discharge Information	✓	✓	✓
READMISSION			
Readmission Details	✓		✓

Abbreviations	
STS - Society of Thoracic Surgeons	BCCR - British Columbia Cardiac Surgeries
ICU - Intensive Care Unit	CCS - Canadian Cardiovascular Society
NYHA - New York Heart Association	APPROACH - Alberta Provincial Project for Outcome Assessment in Coronary Heart Disease *This feature will be available in the WEB version but is not yet operational

Comparisons of Data Definitions across Cardiovascular Registries

Although we observed similar data variables that are being collected across different registries, the definitions of data variables differed substantially across clinical registries. To assist the examination of the data definitions, we have listed all the definitions of data variables of the NCDR, APPROACH, CCN, and STS in Appendix A to Appendix E.

To illustrate the point that data definitions varied substantially, we compared definition of diabetes, a common condition associated with cardiovascular disease for illustration in the databases that had a data definition manual.

Definition of diabetes in NCDR

Diabetes is defined as a history of diabetes mellitus, regardless of duration of disease or need for antidiabetic agents. In a footnote, diabetes mellitus is further defined as a diagnosed by a physician or can be defined as a fasting blood sugar > 7 mmol/l or 126 mg/dL. It does not include gestational diabetes. This includes diagnosis on admission or prior to the current period of care.

Definition of diabetes in CCN

Diabetes is defined when a patient has history of diabetes mellitus diagnosed and /or treated by a physician as documented in chart and/or referral/ triage form.

Definition of diabetes in APPROACH

In APPROACH, diabetes is classified into type I and type II diabetes. Type I diabetes is diagnosed and/or treated by a physician regardless of need for antidiabetic agents. Type I diabetes is insulin dependent diabetes. There should be a history of 2 of the following: diabetic ketoacidosis, juvenile onset, and insulin use within 2 years of diagnosis (if patient is not obese). Type II diabetes all other diabetes

Definition of diabetes in STS

In the STS database, diabetes is defined as a history of diabetes, regardless of duration of disease or need for anti-diabetic agents

Canadian vs. American Databases

In this report we examined three American databases - ACTION Registry-GWTG, NCDR CathPCI, and the Cardiac STS National Database. All three are widely used across the United States in their respective areas of ACS, Catheterization/PCI, and cardiac surgery. We compared these databases to Canadian registries: CCN, APPROACH (ACS, PCI, Cardiac Surgery), BCCR (PCI, Cardiac Surgery), and CVHNS, which are used provincially.

Overall, American registries cover a greater scope and depth of clinical information in their data collection form, capturing in detail all categories. By contrast, Canadian registries contain more variation in data elements in both the PCI and cardiac surgery categories due to regional differences in their collection of information.

The breadth of data definitions was another point of difference between American and Canadian registries. We observed that all American databases examined have very thorough definitions to explain the variables and field options used. These registries include coder's data dictionaries, instructions, scenarios, and additional notes. This supplementary information reinforces a level of standardization in data reporting, minimizing the margin of error and risk of misinterpretation. In comparison, data definitions in Canada are incomplete in many registries and the definitions themselves are less developed and precise.

Nevertheless, Canada has an abundance of administrative data that clinical databases can be linked in order to evaluate long term outcome, which most American databases could not due to privacy concerns.

LIMITATIONS

Several potential limitations of our report merit considerations. First, our report did not include examination of the quality of data that are being captured (i.e. accuracy). Variables themselves do not necessarily represent quality of information obtained since the variables would not matter if the process of collection creates systematic errors. The first step in acquiring quality data is having comprehensive, detailed data definitions to prevent misinterpretations, so we collected and compiled existing data definitions from each registry. We were unable to evaluate the process of each database in the validation of data and the efforts in each database made to minimize errors such as the training of staff to abstract data. Second, we did not evaluate the process of each database in obtaining long-term outcomes since we do not have to means to obtain this information. It is anticipated that many Canadian databases have the ability to link their data for long-term outcomes; however, this was not reported consistently. Third, our analysis is an attempt to evaluate the data elements and data definition used in each registry in order to assess and compare them. It is important to note that there is no "gold standard" to evaluate which databases is the best. Collecting a larger number of data variables do not necessary mean that it is the most ideal clinical database. Rather, the best database might actually be those that serve the needs of their respective goals.

CONCLUSION

Canada has many valuable cardiovascular disease registries across the country as detailed in this report. Each has gathered an impressive number of patient records. These databases have and will continue to direct regional care and improvement efforts. What is needed now is a collaborative approach to establish pan-Canadian consistency in all the registries. Our work represents a major step towards this goal. In our comparative analysis of Canadian, American and international registries, we have identified the strengths and weaknesses of each database in Canada. These results can assist with ongoing discussion of standardization efforts. More importantly, this knowledge is instrumental in identifying existing quality indicators, developing new indicators for unexplored clinical areas, and updating data definitions. All these components are essential for the future standardization of Canadian registries. The next crucial step is to build on the existing data infrastructure by identifying and adopting a set of common quality indicators and definitions. The implementation of a Canadian standard will allow for improved feedback assessment and ultimately enhancement of cardiac care.

ACKNOWLEDGEMENT

The authors would like to acknowledge the help and guidance of the Data Definitions Steering Committee Members Christopher Buller (Chair), Hamilton Health Sciences, ON, Karin Humphries, BC Cardiac Registry, Ross Davies, University of Ottawa Heart Institute, ON, Diane Galbraith, APPROACH, Calgary, AB, Jafna Cox, Cardiovascular Health Nova Scotia, Laurie Lambert, Agence d'évaluation des technologies et des modes d'intervention en santé, Kori Kingsbury, Cardiac Care Network of Ontario, Anne McFarlane and Tony Mottershead, Canadian Institutes for Health Information, Dennis Ko, Institute for Clinical Evaluative Studies, Charlie Kerr, Past President, and Blair O'Neill, President, Canadian Cardiovascular Society, ex-officios Canadian Cardiovascular Society Staff: Anne Ferguson, Chief Executive Officer and Louise Marcus, Director, Health Policy/Advocacy, Norvinda Rodger, Project Manager, First Avenue Events/MCI

The production of this report was made possible through a financial contribution by the Public Health Agency of Canada.

DISCLAIMER

The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

COPYRIGHT

REFERENCES

1. Spertus JA, Eagle KA. Krumholz HM, Mitchell KR, Normand ST et al. American College of Cardiology and American Heart Association Methodology for the Selection and Creation of Performance Measures for Quantifying the Quality of Cardiovascular Care. 2005; 111: 1703-1712

2. Canadian Cardiovascular Society. Data Definitions Steering Committee. Pan-Canadian Data Definitions Background Paper. February 2010.

3. Naylor CD, Sykora K, Jaglal SB, Jefferson S, The Steering Committee of the Adult Cardiac Care Network of Ontario. Waiting for coronary artery bypass surgery: Population-based Study of 8571 consecutive patients in Ontario, Canada. Lancet 1995; 346:1605-9.

4. The Alberta Provincial Project for Outcome Assessment in Coronary Heart disease (APPROACH). http://www.approach.org/

5. Cardiac Services BC Strategic Plan. Available from: http://www.phsa.ca/

6. Cardiac Care Network of Ontario. www.ccn.on.ca

7. Howlett JG, Mann OE, Baillie R, et. al. Heart failure clinics are associated with clinical benefit in both tertiary and community care settings: data from Improving Cardiovascular Outcomes in Nova Scotia (ICONS) registry. Can J Cardio. 2009; 25(9):e306-11

8. Cardiovascular Health Nova Scotia. Available from http://www.gov.ns.ca/health/cvhns/

9. ACTION Registry – GWTG. Available from: http://www.ncdr.com/webncdr/action/default.aspx

10. CathPCI Registry. Available from: https://www.ncdr.com/webncdr/DefaultCathPCI.aspx

11. STS National Database. Available from: http://www.sts.org/sections/stsnationaldatabase/

12. Flynn MR, Barrett C, Cosio, FG, and et. al. The Cardiology Audit and Registration Data Standards (CARDS), European data standards for clinical cardiology practise. Eur Heart J. 2005; 26(3):308-13.

13. Global Registry of Acute Coronary Events (GRACE). Available from: http://www.outcomes-umassmed.org/GRACE/

Appendix A: NCDR ACTION and CathPCI Registry Data Definitions

ACC ACTION Registry		
Variable	***Field Options***	***Coding instructions/Definitions of Variables***
DEMOGRAPHICS		
Name	Text	Indicate the patient's first, middle, and last name. Hyphenated names should be recorded with a hyphen. It is acceptable to specify the patient's middle initial. If the patient has multiple middle names, enter all of the middle names sequentially
Birth Date	Date	
SSN	Numeric	Indicate the patient's United States Social Security Number. Indicate if the patient does not have a SSN
Patient ID	Numeric	Indicate the number created and automatically inserted by the software that uniquely identifies this patient
Other ID	Numeric	An optional patient identifier, such as medical record number, that can be associated with the patient
Race		Racial profile. If patient has multiple race origins, specify them using the other race selections
	• White	Having origins in any of the original peoples of Europe, the Middle East, or North Africa
	• Black/African American	Having origins in any of the black racial groups of Africa.
	• Asian	Having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam
	• American Indian/Alaskan Native	Having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
	• Native Hawaiian/Pacific Islander	Having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands
Hispanic/Latino Ethnicity	Y/N	A person of Cuban, Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race. The term, "Spanish origin," can be used in addition to "Hispanic or Latino."
Sex	M/F	
ADMISSION		
Patient Zip Code	Numeric	Indicate the patient's United States Postal Service zip code of their primary residence. If the patient does not have a US residence, or is homeless, leave blank and check "No Zip Code".
Means of Transport to First Facility	• Self/Family • Ambulance	Means of transportation to the facility where the patient first received treatment

	• Mobile ICU • Air	
	• Pre-Arrival 1st Med contact Date/Time for Ambulance/Mobile ICU or Air	Indicate the date/time when the patient was first evaluated by either the EMS or another healthcare professional prior to arrival at your facility. Also indicate if the pre-arrival first medical contact time was estimated
Transfer from Outside Facility	N/Y	Indicate if the patient was transferred directly to your facility within 24 hours after initial presentation to an outside facility
	If yes, Means of transfer:	Indicate the means of transportation from outside facility to your facility
	o Ambulance o Mobile ICU	
	o Air	
	If yes, Date/time of arrival at outside facility	Also indicate if the time the patient arrived at outside facility was estimated.
	If yes, Transfer from Outside Facility date/time	Also indicate if the time the patient arrived at outside facility was estimated.
	If yes, Name of Transferring Facility/American Hospital Association number	
Your Facility	• Arrival Date/Time	Indicate the date/time the patient arrived at your facility
	• Admission Date	Indicate the date the patient was admitted as an inpatient to your facility for the current episode of care
	• Location of First Evaluation (i.e. ED, Cath Lab, Other)	Indicate the location the patient was first evaluated at your facility. ED includes traditional ED locations, such as ED-based chest pain units, clinics, and short-stay coronary-care units housed in the ED. Other locations include pre-op or post-op surgical units or general medicine floor/unit. Also includes intensive-care unit, coronary-care unit, general cardiac floor, step-down unit, or a monitored bed unit that is physically separate from the ED.
	If ED, Transfer out Date/Time	If placed in ED, indicate date/time when patient was moved.
Your Facility (cont'd)	• Insurance Payers (Private Health Insurance, Medicare, Medicaid, Military Health care, State-specific plan (non-Medicaid), Indian health service , Non-US insurance, None)	Check all that apply. Private health insurance is coverage by a health plan provided through an employer or union or purchased by an individual from a private health insurance company. Medicare is the Federal program which helps pay health care costs for people 65 and older and for certain people under 65 with long-term disabilities. Medicaid is a program administered at the state level, which provides medical assistance to the needy. Families with dependent children, the aged, blind, and disabled who are in financial need are eligible for Medicaid. It may be known by different names in different states. Military health care includes RICARE/CHAMPUS (Civilian Health and Medical Program of the Uniformed Services) and CHAMPVA (Civilian Health and Medical Program of the Department of Veterans Affairs), as well as care provided by the Department of Veterans Affairs (VA). Some states have their own health insurance programs for low-income uninsured individuals. These health plans may be known by different names in different states. Indian Health Service (IHS) is a health care program through which the Department of Health and Human Services provides medical

		assistance to eligible American Indians at IHS facilities. In addition, the IHS helps pay the cost of selected health care services provided at non-IHS facilities. Non-US insurance refers to individuals with a payer that does not originate in the United States. None' refers to individuals with no or limited health insurance thus, the individual is the payer regardless of ability to pay.
HIC#	Numeric	Indicate the patient's Health Insurance Claim number
CARDIAC STATUS ON FIRST MEDICAL CONTACT		
Symptom onset Date/Time	Date/Time	Indicate the date/time the patient first noted ischemic symptoms lasting greater than or equal to 10 minutes. If the patient had intermittent ischemic symptoms, record the date and time of the most recent ischemic symptoms prior to hospital presentations. In the event of stuttering symptoms, Acute Coronary Syndrome (ACS) symptoms onset is the time at which symptoms became constant in quality or intensity. If the symptom onset time is not specified in the medical record, it may be recorded as 0700 for morning; 1200 for lunchtime; 1500 for afternoon; 1800 for dinnertime; 2200 for evening and 0300 if awakened from sleep. Indicate if the symptom onset time was estimated or not available.
First ECG Obtained		Indicate when the first ECG was obtained
	• Pre-Hospital (e.g. Ambulance)	The first ECG was obtained prior to arrival at your hospital, either at a physician's office, during transport by EMS, air ambulance, or other method of critical care transport
	• After 1st Hosp. Arrival	The first ECG was obtained upon arrival to the first hospital at which the patient presented.
First ECG Date/Time	Date/Time	
STEMI/STEMI Equivalent	Y/N	Indicate if the ECG findings demonstrated a STEMI or STEMI equivalent. STEMI or STEMI equivalent must be noted prior to any procedures and not more than 24 hrs after arrival at first facility. Arrival at first facility refers to either the time of arrival at your facility or the time of arrival at transferring facility.
	If yes, ECG findings	
	• ST Elevation	For definition of ST elevation, see footnotes. If no exact ST-elevation measurement is recorded in the medical chart, physician's written documentation of ST-elevation or Q-waves is acceptable. If only one ECG is performed, then the assumption that the ST elevation persisted at least the required 20 minutes is acceptable.

	• New or presumed new LBBB	LBBB: left bundle branch block refers to LBBB that was not known to be old on the initial ECG.
STEMI/STEMI Equivalent (Cont'd)	• Isolated Posterior MI	Isolated posterior MI: Isolated Posterior MI refers to infarction of the posterobasal wall of the left ventricle. The use of posterior leads V7 to V9 will show ST segment elevation in patients with posterior infarction. If the posterior leads were not applied, ST segment depression that is maximal in leads V1-V3, without ST-Segment elevation in other leads, may be considered as indicative of posterior ischemia or infarction.
	If yes, STEMI or STEMI Equivalent First Noted:	Indicate if a STEMI or STEMI equivalent was noted on either the first ECG or a subsequent ECG. The subsequent ECG must be performed within 24 hours of arrival at first facility.
	o First ECG o Subsequent ECG	
	o If Subsequent ECG, Subsequent ECG with STEMI or STEMI Equivalent: Date/Time	Indicate the date/time of the subsequent ECG with ST segment elevation, LBBB, or isolated posterior MI.
	If no, Other ECG Findings	Indicate if other findings from ECG were demonstrated within 24 hours of arrival at first facility. Indicate if other findings from the ECG were demonstrated within 24 hrs of arrival at first facility. If more than one present, code the findings on which the treatment was based.
	o New or presumed new ST Depression	See footnote for definition of New or Presumed New ST depression. If no exact ST-depression measurement is recorded in the medical chart, physician's written documentation of ST-depression is acceptable.
	o New or presumed new T-wave Inversion	See footnote for definition of New or Presumed New T-wave inversion. If no exact T wave inversion measurement is recorded in medical chart, physician's written documentation of T wave inversion is acceptable.
	o Transient ST elevation lasting <20 minutes	
	• None	
Heart Failure	Y/N	Indicate if there is physician documentation or report of heart failure on first medical contact (at your facility or at the transferring facility). See footnote for definition of heart failure.
Heart Rate	Numeric	Indicate the first measurement or earliest record of heart rate (in beats per minute). measurement from transferring facility is acceptable
Systolic BP	Numeric	Indicate the first measurement or earliest record of systolic blood pressure (mm Hg). Measurement from transferring facility is acceptable
Cardiogenic Shock	Y/N	Indicate if the patient was in a state of cardiogenic shock on first medical contact. See footnote for definition of cardiogenic shock.
Cocaine Use	Y/N	If the patient reports cocaine use within last 48 hours or has a urine test that is positive for cocaine.
HISTORY AND RISK FACTORS		
Height, Weight	Numeric	

Current/Recent Smoker (<1 year)	Y/N	Indicate if the patient has smoked cigarettes anytime during the year prior to arrival at your facility
HTN	Y/N	Indicate if the patient has been diagnosed (previously or on admission) with hypertension. See footnote for definition of hypertension.
Dyslipidemia	Y/N	Indicate if the patient has a history of dyslipidemia diagnosed and/or treated by a physician. See footnote for definition of dyslipidemia.
Currently on dialysis	Y/N	Indicate if patient is currently undergoing either hemodialysis or peritoneal dialysis on an ongoing basis as a result of renal failure. Code "No" if patient was not on dialysis until after reperfusion during this admission.
Chronic Lung Disease	Y/N	Indicate if patient has a history of chronic lung disease. Code "No" if patient was not on dialysis until after reperfusion during this admission. Chronic lung disease is defined in the footnote.
Prior MI	Y/N	Indicate if the patient has had at least one documented previous MI. MI is defined in the footnote.
Prior Heart Failure	Y/N	
Atrial Fibrillation or Flutter (past 2 weeks)	Y/N	Code "No" if patient was first diagnosed with atrial fibrillation or flutter after reperfusion during this admission. If there is no prior documentation of atrial arrhythmias, it is acceptable to code "No"
Peripheral Arterial Disease	Y/N	Indicate if the patient has a history of peripheral arterial disease (includes upper and lower extremity, renal, mesenteric, and abdominal aortic systems). Peripheral arterial disease is defined in the footnote.
Diabetes Mellitus	Y/N	Indicate if patient has a history of diabetes mellitus, regardless of duration of disease or need for antidiabetic agents. Code "No" if patient was not on dialysis until after reperfusion during this admission. Diabetes is defined in footnote
	If yes, Diabetes Therapy	Indicate the therapy method the patient presented with. Choose the most aggressive therapy. Patients placed on a pre-procedure diabetic pathway of insulin drip at admission were controlled direct or oral methods are not coded as insulin treated. If a patient had a pancreatic transplant, code "other" since the insulin from new pancreas is not exogenous insulin.
	o None	No treatment for diabetes
	o None	Diet treatment only
	o Oral	Oral agent treatment (includes oral agent with/without diet treatment)
	o Insulin	Insulin treatment (includes any combination with insulin)
	o Other	Other adjunctive treatment, non-oral/insulin/diet
Prior PCI	Y/N	Indicate if the patient had a previous percutaneous coronary intervention (PCI) of any type (balloon, angioplasty, stent or other). If the patient had a previous PCI, indicate the date.
	If yes, Most Recent PCI Date	
Prior CABG	Y/N	Indicate If the patient had a previous CABG
	If yes, Most Recent CABG date	

Cerebrovascular Disease	Y/N	Code "No" if the patient was first diagnosed with cerebrovascular disease after reperfusion during this admission.
	If yes, Prior Stroke: Y/N	Defined as any confirmed neurological deficit of abrupt onset caused by a disturbance in cerebral blood supply that did not resolve w/in 24 hours.
ORAL MEDICATIONS		
Aspirin, Clopidogrel, Ticlopidine, Prasugrel, Warfarin, Beta Blocker, ACEI, ARB, Aldosterone-Blocking Agent, Statin, Non-Statin Lipid-Lowering Agent		
Home Meds	Text	Defined as routinely taking of meds at home prior to this hospitalization. "Routine" refers to daily use of medications as prescribed, even if the patient misses a dose; any occurrence between 2 weeks prior to first medical contact and firs medical contact.
Medications Administered in first 24 hours	Y/N/Contraindicated/Blinded	Indicate if meds were administered in the first 24 hours before or after first medical contact, regardless of location of care (e.g. transferring facility or EMS) No definitions of "contraindicated" or "blinded". This section is not necessary for warfarin
	If yes, Start Date/time	Specify the start date/time for Aspirin, clopidogrel, Ticlopidine, and beta blocker.
	If yes, Dose	Specify dose for Clopidogrel, Ticlopidine, Prasugrel, and beta blocker.
Medications prescribed at hospital discharge (do not code for patients who die or are AMA or are transferred to another hospital)	Y/N/Contraindicated/Blinded	Indicate if meds were continued or prescribed.
	If yes, Dose	Specify doses for Aspirin, Clopidogrel, Ticlopidine, and Prasugrel.
	If yes, Recommended Duration	Recommended duration is defined as physician-documented intended total duration of therapy. It is not equivalent to the prescription length. Specify recommended duration for Clopidogrel, Ticlopidine, and Prasugrel.
INTRAVENOUS AND SUBCUTANEOUS MEDICATIONS		
GP IIb/IIIa inhibitor (any time during this hospitalization)	Y/N/Contraindicated/Blinded	Indicate if a GP IIb/IIIa inhibitor was administered (any occurrence between first medical contact and discharge)
	If yes, Medication type:	Specify full, reduced or other dosage if eptifibatide or tirofiban used
	o Eptifibatide o Tirofiban	
	o Abciximab	

GP IIb/IIIa inhibitor (Cont'd)	If Eptifibatide or Tirofiban, (Dose, Full, Reduced, Other)	
	If yes, Start and Stop Date/Time	
Anticoagulants	Y/N/Contraindicated/Blinded	
	If yes, Medication types	
	o IV Unfractionated Heparin (Start Date/Time, Initial Bolus dose, Initial Infusion Dose)	Indicate if unfractionated heparin is administered. If so, indicate the date/time of administration. If an initial bolus/infusion is given, indicate the respective dosage
	o Enoxaparin (LMWH) (Start Date/Time, Initial SubQ Dose, Initial IV Bolus, Injection Frequency - q12hr, q24hr, None)	Indicate the start date/time of enoxaparin. Indicate the initial subcutaneous dose. Indicate the prescribed frequency of subcutaneous injections. Indicate if an IV bolus was administered.
	o Dalteparin (LMWH) (Start Date/Time, Initial SubQ dose)	Indicate if dalteparin was administered. Indicate the date/time of administration. Indicate the subcutaneous dose. Do not record the IV doses
	o Bivalirudin, Fondaparinux, Argatroban, Lepirudin (e.g. start date/time)	Indicate if Bivalirudin, Fondaparinux, Argatroban, Lepirudin was administered. Indicate the start date/time
PROCEDURES AND TESTS		
Non-invasive Stress Testing	Y/N	Indicate if the patient underwent exercise or pharmacologic stress testing with or without echocardiographic or nuclear imaging
	If yes, Date	
LVEF	Numeric	Code the best estimate of the current left ventricular ejection fraction closest to discharge. If no diagnostic report is in medical record, a value documented in medical record is acceptable. In cases of conflicting measurements, the clinician should specify the value that they think best represents the post-procedure or post PCI LVEF. If only a descriptive value is reported (i.e. normal), enter the corresponding percentage value from the list below: Normal = 60%, good function = 50%, mildly reduced = 45%, fair function = 40%, moderately reduced = 30%, poor function = 25%, severely reduced = 20%. indicate if LVEF was not assessed
Diagnostic Coronary Angiography	Y/N	Diagnostic coronary angiography is defined as the passage of a catheter into the aortic root or other great vessels for the purpose of angiography of the native coronary arteries or bypass grafts supplying native coronary arteries
	If yes, Angiography Date/Time	

	If yes, Best Estimate of Coronary Anatomy	Indicate the best estimate of most severe percent stenosis in the involved arteries. Also indicate if the best estimate of percent stenosis in a vessel is not available. Provide the most severe stenosis for each of the following vessels that are primarily providing perfusion to the myocardium in that territory. In instances where multiple lesions are present, enter the single highest percent stenosis noted. If no stenosis, then enter 0%
	o Left Main Stenosis percent	
	o Proximal LAD Stenosis percent	
	o Mid/Distal LAD, Diagonal Branches Stenosis percent	Indicate the best estimate of most severe percent stenosis in the mid/distal left anterior descending (LAD), and all diagonal coronary artery branches that are >= 2.0 mm in diameter as determined by angiography.
	o CIRC, OMs, LPDA and LPL Branches Stenosis percent	Indicate the best estimate of most severe percent stenosis in the in the Circumflex, obtuse marginals, LPDA and LPL coronary artery branches of >= 2.0 mm in diameter as determined by angiography.
Diagnostic Coronary Angiography (Cont'd)	o RCA, RPDA, RPL, AM Branches Stenosis percent	Indicate the best estimate of most severe percent stenosis in the right coronary artery, RPDA, RPL, and AM branches of >= 2.0 mm in diameter as determined by angiography.
	o Ramus Stenosis percent	Indicate the best estimate of most severe percent stenosis in the Ramus Artery (if present) of >= 2.0 mm in diameter as determined by angiography.
	If no, Diagnostic Cath Contraindication: Y/N	Indicate if a catherization was not performed because it was contraindicated. Contraindications may include patient refusal, advanced age, not a candidate for revascularization, do not resuscitate, active bleeding, and clinical contraindications/severe co-morbidities.
PCI	Y/N	
	If yes, Cath Lab Arrival Date/Time	Indicate the date/time the patient arrived to the cath lab where the PCI was being performed, as documented in the medical record
	If yes, First Device Activation Date/Time	Indicate the date/time the first device was activated regardless of type of device used. This is a process measure about the timeliness of treatment. What is being measured is the time of the first mechanical treatment of the culprit lesion.
	If yes, Stent(s) placed: Y/N	Indicate if a stent/stents were placed in the affected coronary artery and the stent type.
	If yes, Stent type(s): o Bare metal stent o Drug eluting stent o Other	

PCI (Cont'd)	If yes, PCI indication: (Immediate, Primary PCI for STEMI, Rescue PCI (after failed full-dose lytics for STEMI), PCI for NSTEMI, Stable, Successful reperfusion for STEMI, Completed infarction post-STEMI, Other)	Indicate the primary reason PCI was performed or attempted. The effect on timing/delay of PCI must be documented in order to be an acceptable reason for delay. If unable to determine whether a documented reason is system in nature, or if physician /APN/PA documentation does not establish a linkage between event(s)/condition(s) and the timing/delay in PCI/reperfusion/cath/transfer to cath lab, select "None"
	If immediate, PRIMARY PCI for STEMI, Non-System Reason for delay in PCI: Difficult vascular access, Cardiac arrest and/or need for intubation before PCI, Patient delays in providing consent for procedure, Difficulty crossing the culprit lesion during the PCI procedure, other, none.	Indicate if there is a documentation of a non-system reason for a delay in doing the first percutaneous coronary intervention after hospital arrival by a physician/advanced practice nurse/physician assistant.
CABG	Y/N	
	If yes, Date/Time	
Reperfusion Strategy (Immediate Reperfusion)		
Reperfusion Candidate	Y/N	Indicate if the patient received reperfusion therapy for the treatment of STEMI. Reperfusion therapy includes thrombolysis and primary PCI. Reperfusion therapy also includes pre-hospital thrombolytic.
	If no, Primary Reason	Indicate one primary reason, documented in the medical record, that reperfusion therapy (thrombolytic therapy or primary PCI) was not indicated.
Reperfusion Candidate (Cont'd)	If yes, Thrombolytics: Y/N	Indicate if the patient received thrombolytic therapy as an urgent treatment for STEMI.
	If yes, Strength of Dose: Full dose or Reduced dose	
	If yes, Type of Thrombolytics: Tenecteplase, Alteplase, Reteplase, Streptokinase, Other	
	If yes, Dose Start Date/Time	If your facility receives a patient transfer with infusion ongoing, record the date that infusion was started at transferring facility.
	If yes, Non-System Reason for Delay: Y/N	Indicate if there is a documentation of a non-system reason for delay in initiating thrombolytic therapy >30 minutes from the time of first facility arrival. (A patient being transferred into your facility is not considered a non-system reason for delay). A patient being transferring into your facility

		is not considered a non-system reason for delay.
IN-HOSPITAL CLINICAL EVENTS		
In-Hospital Clinical Events	Y/N	
	• Reinfarction/Cardiogenic shock/Heart Failure/CVA/Stroke	Indicate if there are clinical signs and symptoms of a new infarction or repeat infarction, cardiogenic shock, heart failure, or CVA/Stroke
	If yes, Hemorrhagic: Y/N	Indicate if the patient experienced a hemorrhagic stroke with documentation on imaging. A hemorrhagic stroke requires documentation on imaging. Evidence of hemorrhagic stroke obtained from lumbar puncture, neurosurgery, or autopsy can also confirm the diagnosis.
In-Hospital Clinical Events (Cont'd)	• Suspected Bleeding Events	Indicate if there was a suspected bleeding event observed and documented in the medical record that was associated with any of the following: 1. Hemoglobin drop of >=4 g/dL; 2. Transfusion of whole blood or packed red blood cells; 3. Procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding (such as surgical closures/exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear, endoscopy with cautery of a GI bleed).
	If yes, Suspected Bleeding Event Date	
	If yes, Bleeding Event Location: Access Site, retroperitoneal, GI, GU, Other	
	If yes, Surgical Procedure Intervention required: Y/N	Indicate if the suspected bleeding event observed required procedural intervention or surgery at the bleeding site to reverse, stop or correct the bleeding (e.g. surgical closures, exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear, or endoscopy with cautery of a GI bleed). Prolonged pressure does not qualify as an intervention, but ultrasonic guided compression after making a diagnosis of pseudoaneurysm does qualify.
RBC/Whole Blood Transfusion:	Y/N	
	If yes, First Transfusion Date	
	If yes, CABG-related Transfusion	Indicate if any red blood cell/whole blood transfusion was related to CABG. If any units were given for reasons not related to CABG, check "No." Check "Yes" only if all transfusions given were related to CABG.

LABORATORY RESULTS		
CARDIAC MARKERS		
Positive Cardiac Markers within First 24 hours	Y/N	Indicate if any positive cardiac markers were present during the first 24 hours after arrival at first facility.
Troponin (Initial and Peak), CK-MB (Initial and Peak), Creatinine (Initial and Peak), Hemoglobin (Initial and Lowest), Initial Hemoglobin A1c, Initial INR	Y/N	Indicate if these markers are collected
	If yes, Date/Time	Indicate Date/Time of collection (between arrival at first facility and discharge)
	If yes, Value	
	If yes, URL (for troponin and CK-MB)	Indicate Upper Reference Limit (defined as the 99th percentile of troponin levels for a normal reference population) for troponin and CK-MB.
Lipids (mg/dL)	Y/N	Indicate if a lipid panel was performed (between 6 months before arrival at first facility and discharge)
	If yes, Date/Time	Indicate the date/time sample was collected (not the date results reported). Lipids obtained with the first 24 hrs of this admission should take precedence. If greater than 24 hrs of admission, then enter the most recent values obtained (within 6 months) prior to this admission
	If yes, TC	Indicate the values for lipid panel elements in mg/dL. If an exact value could not be determined by the lab because it is too high or low (e.g. >300 mg/dL, <20 mg/dL, or no value was reported), do not indicate a value for this element and indicate "Yes" for Lipid Panel Value Out of Range
	If yes, HDL, LDL, Triglycerides	
Initial BNP, Initial NT-ProBNP	Y/N	Indicate if a BNP or an NT-pro BNP was obtained during this admission (between arrival at first facility and discharge)
	If yes, Values (pg/mL)	
DISCHARGE		
Discharge date	Date	Indicate the month, day, and year the patient was discharged from acute care, left against medical advice, or expired during this admission
Comfort measures only	Y/N	Indicate if there was physician/nurse practitioner/physician assistant documentation that the patient was receiving comfort measures. Comfort measures are commonly referred to as palliative care in the medical community and comfort care by the general public. Palliative care includes attention to the psychological and spiritual needs of the patient and support for the dying patient and the patient's family. Usual interventions are not received because a medical decision was made to limit care to comfort measures only. Comfort Measures are not equivalent to the following: Do Not Resuscitate (DNR), living will, no code, no heroic measures.

Enrolled in clinical trial during hospitalization	Y/N	Indicate if the patient signed an informed consent to participate in a clinical trial during his/her hospitalization, even if the investigational medication, device, or procedure was never initiated.
Discharge Status	Alive/Deceased	
	If Alive, Smoking Counselling: Y/N	Indicate if there was documentation in the medical record that smoking cessation advice or counselling was given during this admission.
	If Alive, Dietary Modification counselling: Y/N/not applicable	Indicate if there were written discharge instructions or other documentation of educational material given to the patient or caregiver addressing diet/fluid intake after discharge.
	If Alive, Exercise counselling: Y/N/ineligible	Indicate if there was written documentation encouraging the patient to engage in a physical activity program that commensurate with those recommended by the Centers for Disease Control and Prevention and the American College of Sports Medicine, that is, 30 minutes or more of moderate-intensity physical activity such as brisk walking on most, and preferably all, days of the week. "Ineligible" may be selected for patients considered ineligible based on patient-oriented barriers (patient refusal, for example), provider-oriented criteria (patient deemed to have a high-risk condition or contraindication to exercise such as dementia, homebound, long-term nursing home placement >60 days, for example), or health care system barriers (financial barriers or lack of exercise facilities near a patient's home, for example).
Discharge Status (Cont'd)	If Alive, Cardiac Rehabilitation Referral: Y/N/ineligible	Indicate if there was written documentation of a referral for the patient (by the physician, nurse, or other personnel) to an outpatient cardiac rehabilitation program, or a documented medical or patient-centered reason why such a referral was not made. The program may include a traditional cardiac rehabilitation program based on face-to-face interactions and training sessions or may include other options such as home-based approaches. "Ineligible" is defined as above.
	If Alive, Discharge Location: Home, Extended care/transitional care unit, Other hospital, Nursing home, Hospice, Other, Left against medical advice (AMA)	If patient was discharged to another hospital, indicate time of transfer, if the patient was transferred to another facility for PCI/CABG
	If Other Hospital, Transfer Time	Indicate the time the patient was transferred to another acute-care hospital for further management
	If Other Hospital, Transfer for PCI: Y/N	Indicate if the patient was transferred to another facility for PCI
	If Other Hospital, Transfer for CABG: Y/N	Indicate if the patient was transferred to another facility for CABG surgery
	If Deceased, Cause of death: Cardiac, Non-Cardiac	
	If Deceased, Time of death	

OPTIONAL ELEMENTS (FOR AMI CORE MEASURE REPORTING ONLY)		
Point of origin		Indicate the point of inpatient origin for this admission to your facility
	• Non-Health Care Facility	The patient was admitted to this facility upon order of a physician. Usage note: Includes patients coming from home, a physician's office, or workplace.
	• Clinic	The patient was admitted to this facility as a transfer from a freestanding or non-freestanding clinic.
Point of origin (Cont'd)	• Transfer From a Hospital (Different Facility)	The patient was admitted to this facility as a hospital transfer from an acute care facility where he or she was an inpatient or outpatient. Usage note: Excludes transfers from hospital inpatient in the same facility
	• Transfer from a Skilled Nursing Facility (SNF) or Intermediate Care Facility (ICF)	The patient was admitted to this facility as a transfer from a SNF or ICF where he or she was a resident.
	• Transfer from Another Health Care Facility	The patient was admitted to this facility as a transfer from another type of health care facility not defined elsewhere in this code list.
	• Emergency Room	The patient was admitted to this facility after receiving services in this facility's emergency room.
	• Court/Law Enforcement	The patient was admitted to this facility upon the direction of court of law, or upon the request of a law enforcement agency. Usage note: includes transfers from incarceration facilities.
	• Information Not Available	The means by which the patient was admitted to this hospital is unknown.
	• Transfer from One Distinct Unit of the Hospital to Another Distinct Unit of the Same Hospital Resulting in a Separate Claim to the Payer	The patient was admitted to this facility as a transfer from hospital inpatient within this hospital resulting in a separate claim to the payer. Usage Note: For purposes of this code, "Distinct Unit" is defined as a unique unit or level of care at the hospital requiring the issuance of a separate claim to the payer. Examples could include observation services, psychiatric units, rehabilitation units, a unit in a critical access hospital, or a swing bed located in an acute hospital.
	• Transfer from Ambulatory Surgery Center	The patient was admitted to this facility as a transfer from an ambulatory surgery center.
	• Transfer from Hospice and is Under a Hospice Plan of Care or Enrolled in a Hospice Program	The patient was admitted to this facility as a transfer from hospice.
Transfer from another ED	Y/N	Was the patient received as a transfer from an emergency department of another hospital? Use the following definitions for 'No' and 'Yes': N (No): Patient not received as a transfer from another hospital emergency department or unable to determine from medical record documentation. Y (Yes): Patient received as a transfer from another hospital emergency department.
CMS Comfort Measures Timing	Time	When is the earliest physician/APN/PA documentation of comfort measures only?

	o Day 0 or 1	The earliest day the physician/APN/PA documented comfort measures only was the day of arrival (Day 0) or day after arrival (Day 1).
	o Day 2 or after	The earliest day the physician/APN/PA documented comfort measures only was two or more days after arrival day (Day 2+).
	o Time Unclear	There is physician/APN/PA documentation of comfort measures only during this hospital stay, but whether the earliest documentation of comfort measures only was on day 0 or 1 OR after day 1 is unclear.
	o Not Documented/UTD	There is no physician/APN/PA documentation of comfort measures only, or unable to determine from medical record documentation if there is physician/APN/PA documentation of comfort measures only during this hospital stay.
Principal diagnosis code	Numeric	The International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code associated with the diagnosis established after study to be chiefly responsible for occasioning the admission of the patient for this hospitalization.
Date	Date	The month, day, and year when the principal procedure was performed.
Other diagnosis code(s)	Numeric	The International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes associated with the diagnosis for this hospitalization.
Physician 1 and 2		

CMS discharge status	Home or self care, Short term general hospital, To a skilled nursing facility (SNF) with Medicare certification in anticipation of covered skilled care, Intermediate care facility , Institution not defined elsewhere in this code list , Home under care of organized home health service organization in anticipation of covered skilled care, Left against medical advice or discontinued care, expired, expired in a medical facility (e.g. hospital, SNF, ICF, or freestanding hospice), Federal health care facility, Hospice - Home, Hospice - Medical facility, Hospital-based Medicare-approved swing bed, Inpatient rehabilitation facility (IRF) including rehab-distinct part units of a hospital, Medicare-certified long term care hospital (LTCH), Nursing facility certified under Medicaid but not certified under Medicare, To a psychiatric hospital or a psychiatric-distinct part unit of a hospital, Critical access hospital (CAH)	The place or setting to which the patient was discharged

NCDR CathPCI Registry		
Variable	***Field Options***	***Coding Instructions and Definitions of Variable/Field Options***
DEMOGRAPHICS		
Name	Text	Indicate the patient's first, middle, and last name. Hyphenated names should be recorded with a hyphen. It is acceptable to specify the patient's middle initial. If the patient has multiple middle names, enter all of the middle names sequentially
Birth Date	Date	
SSN	Numeric	Indicate the patient's United States Social Security Number (SSN). If the patient does not have a US Social Security Number (SSN), leave blank and check 'SSN NA'.
Patient ID	Numeric	Indicate the number created and automatically inserted by the software that uniquely identifies this patient.
Other ID	Numeric	An optional patient identifier, such as medical record number, that can be associated with the patient.
Race		Racial profile. If patient has multiple race origins, specify them using the other race selections
	• White	Having origins in any of the original peoples of Europe, the Middle East, or North Africa
	• Black/African American	Having origins in any of the black racial groups of Africa.
	• Asian	Having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam
	• American Indian/Alaskan Native	Having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
	• Native Hawaiian/Pacific Islander	Having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
Hispanic/Latino Ethnicity	Y/N	A person of Cuban, Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race. The term, "Spanish origin," can be used in addition to "Hispanic or Latino."
Sex	M/F	
EPISODE OF CARE		
Arrival Date/Time	Date/Time	Indicate the date/time the patient arrived at your facility. Indicate the time (hours:minutes) using the military 24-hour clock, beginning at midnight (0000 hours). If the patient came to your facility for an elective or outpatient procedure and the time was not documented, code the scheduled time of arrival.
Patient Zip Code	Numeric	Indicate the patient's United States Postal Service zip code of their primary residence. If the patient does not have a U.S residence, or is homeless, leave blank and check 'Zip

		Code NA'.
Admit Source		Indicate the source of admission for the patient to your facility
	• Emergency department	The patient came to the facility for this episode of care via the emergency department (excludes transfers from other facilities).
	• Transfer in from another acute care facility	The patient was transferred from another acute care facility (even if he/she was transferred to the emergency department) for this episode of care.
	• Other	The patient came to the facility for this episode of care by any other means. This includes elective admissions, and transfers from non-acute care facilities.
Insurance Payers	• Private health insurance	Private health insurance is coverage by a health plan provided through an employer or union or purchased by an individual from a private health insurance company.
	• Medicare	Medicare is the Federal program which helps pay health care costs for people 65 and older and for certain people under 65 with long-term disabilities.
	• Medicaid	Medicaid is a program administered at the state level, which provides medical assistance to the needy. Families with dependent children, the aged, blind, and disabled who are in financial need are eligible for Medicaid. It may be known by different names in different states.
	• Military health care	Military Health care - Military health care includes TRICARE/CHAMPUS (Civilian Health and Medical Program of the Uniformed Services) and CHAMPVA (Civilian Health and Medical Program of the Department of Veterans Affairs), as well as care provided by the Department of Veterans Affairs (VA).
Insurance Payers (Cont'd)	• State-specific plan (non-Medicaid)	State-specific plan - Some states have their own health insurance programs for low-income uninsured individuals. These health plans may be known by different names in different states. (Non-Medicaid)
	• Indian health services	Indian Health Service (IHS) is a health care program through which the Department of Health and Human Services provides medical assistance to eligible American Indians at IHS facilities. In addition, the IHS helps pay the cost of selected health care services provided at non-IHS facilities.
	• Non-US insurance	Non-U.S. Insurance refers to individuals with a payer that does not originate in the United States.
	• None	None refers to individuals with no or limited health insurance thus, the individual is the payer regardless of ability to pay.
HIC #	Numeric	The Health Insurance Claim (HIC) number is the unique identifier issued to all Medicare eligible beneficiaries by either the Social Security Administration (SSA) or the Centers for Medicare & Medicaid Services.
HISTORY AND RISK FACTORS		

Height, Weight	Numeric	
Current/Recent Smoker (<1 year)	Y/N	Indicate if the patient has smoked cigarettes anytime during the year prior to arrival at your facility.
HTN	Y/N	Indicate if the patient has a current diagnosis of hypertension. HTN is defined in the "Supporting Definitions" list.
Dyslipidemia	Y/N	Indicate if the patient has a history of dyslipidemia diagnosed and/or treated by a physician. If the patient is diagnosed within 24 hours of arrival, code "yes." Dyslipidemia is defined in the "Supporting Definitions" list.
Family History of Premature CAD	Y/N	See "Supporting Definitions" for definitions. If the patient is adopted, or the family history is unavailable, code No.
Currently on Dialysis	Y/N	Indicate if the patient is currently undergoing either hemodialysis or peritoneal dialysis on an ongoing basis as a result of renal failure. If a patient is on receiving continuous veno-venous hemofiltration (CVVH) as a result of renal failure (and not as treatment to remove fluid for heart failure), code "yes."
Chronic Lung Disease	Y/N	See "Supporting Definitions" for definitions.
Prior MI	Y/N	Indicate if the patient has had at least one documented previous MI. previous MI should be coded "yes" only for MIs that occurred prior to the first onset of symptoms that led to this episode of care. Code No if the patient's only MI occurred at the transferring facility. See "Supporting Definitions" detailed definition of MI.
Prior Heart Failure	Y/N	Indicate if there is a previous history of heart failure. A previous hospital admission with principal diagnosis of heart failure is considered evidence of heart failure history. See "Supporting Definitions" for detailed definition of heart failure.
Peripheral Arterial Disease	Y/N	Indicate if the patient has a history of peripheral arterial disease (PAD). See "Supporting Definitions" for detailed definition of peripheral arterial diseases.
Diabetes Mellitus	Y/N	Indicate if patient has a history of diabetes mellitus, regardless of duration of disease or need for antidiabetic agents. See "Supporting Definitions" for detailed definition of diabetes mellitus.
	If yes, Diabetes therapy:	Indicate the therapy method the patient presented with. Choose the most aggressive therapy. Patients placed on a pre-procedure diabetic pathway of insulin drip at admission were controlled direct or oral method are not coded as insulin treated. If a patient had a pancreatic transplant, code "other" since the insulin from new pancreas is not exogenous insulin.
	o None	No treatment for diabetes
	o Diet	Diet treatment only
	o Oral	Oral agent treatment (includes oral agent with/without diet treatment)
	o Insulin	Insulin treatment (includes any combination with insulin)
	o Other	Other adjunctive treatment, non-oral/insulin/diet

Prior Valve Surgery/Procedure	Y/N	Indicate if the patient had a previous surgical replacement and/or repair of a cardiac valve, by any approach prior to arrival.
Prior PCI	Y/N	Indicate if the patient had a previous percutaneous coronary intervention. See "Supporting Definitions" for definition of PCI.
	If yes, Most recent PCI date	If the patient had a previous PCI, indicate the date
Prior CABG	Y/N	
	If yes, most Recent CABG date	If the patient had a previous CABG, indicate the date.
Cerebrovascular Disease	Y/N	See "Supporting Definitions" for detailed definition of cerebrovascular disease.
CATH LAB VISIT (COMPLETE FOR EACH CATH LAB VISIT)		
CLINICAL EVALUATION LEADING TO THE PROCEDURE		
CAD Presentation		Indicate the patient's CAD presentation. Choose the worst status within the period of 2 weeks prior to arrival and current procedure. If the patient presents with atypical symptoms of myocardial ischemia (i.e. only shortness of breath, upper abdominal pain, left arm pain, etc.) that is known and documented to be myocardial ischemia, and is considered to be an anginal equivalent, code the selection that fits their presentation. If these symptoms are not thought to be or have not been proven to be the anginal equivalent, code "Symptom unlikely to be ischemic." If this is a subsequent episode of care (within 2 weeks), do not code the CAD Presentation from the previous episode of care.
	• No Sxs, no angina (14 days)	For STEMI and NSTEMI, code the highest value within 1 week of the current procedure. If this is a repeat visit to the cath lab during the same episode of care, code the CAD presentation based on the patient's clinical status prior to the subsequent procedure.
	• Sx unlikely to be ischemic (14 days)	Pain, pressure or discomfort in the chest, neck or arms NOT clearly exertional or NOT otherwise consistent with pain or discomfort of myocardial ischemic origin. This includes patients with non-cardiac pain (e.g. pulmonary embolism, musculoskeletal, or esophageal discomfort), or cardiac pain not caused by myocardial ischemia (e.g., acute pericarditis).
	• Stable angina (42 days)	Angina without a change in frequency or pattern for the 6 weeks prior to this cath lab visit. Angina is controlled by rest and/or oral or transcutaneous medications.
CAD Presentation (Cont'd)	• Unstable angina (60 days)	There are three principal presentations of unstable angina: 1. Rest angina (occurring at rest and prolonged, usually >20 minutes); 2. New onset angina (within the past 2 months, of at least Canadian Cardiovascular Society Class III severity); or 3. Increasing angina (previously diagnosed angina that has become distinctly more frequent, longer in duration, or increased by 1 or more Canadian Cardiovascular Society class to at least CCS III severity).
	• Non-STEMI (7 days)	The patient was hospitalized for a non-ST elevation myocardial infarction (STEMI) as

		documented in the medical record. See "Supporting Definitions" for detailed definition of Non-STEMI.
	• STEMI (7 days)	The patient presented with a ST elevation myocardial infarction (STEMI) or its equivalent as documented in the medical record. See "Supporting Definitions" for detailed definition of STEMI
	If STEMI or Non-STEMI,	If STEMI or non-STEMI, indicate the date (between 1 week prior to current procedure and current procedure) the patient first noted ischemic symptoms lasting greater than or equal to 10 minutes. Also indicate if time was estimated or not available. If the patient had intermittent ischemic symptoms, record the date and time of the most recent ischemic symptoms prior to hospital presentation. Symptoms may include jaw pain, arm pain, shortness of breath, nausea, vomiting, fatigue/malaise, or other equivalent discomfort suggestive of a myocardial infarction. In the event of stuttering symptoms, Acute Coronary Syndrome (ACS) symptom onset is the time at which symptoms became constant in quality or intensity. If the symptom onset time is not specified in the medical record, it may be recorded as 0700 for morning; 1200 for lunchtime; 1500 for afternoon; 1800 for dinnertime; 2200 for evening and 0300 if awakened from sleep.
	o Symptom onset date/time	
	If STEMI, thrombolytics: Y/N	Indicate if the patient received thrombolytic therapy as an urgent treatment. Code yes only if full dose (not partial dose) thrombolytics were administered.
	o If yes, start date/time	Indicate the date/time of either the first bolus/the beginning of the infusion. If your facility receives a patient transfer with infusion ongoing, record the date/time that infusion was started at the transferring facility.
Anginal Classification w/in 2 Weeks		Indicate the patient's anginal classification or symptom status within the past 2 weeks. If this is a subsequent episode of care (within 2 weeks), do not code the Anginal Classification w/in 2 weeks from the previous episode of care. The anginal classification or symptom status is classified as the highest grade of angina or chest pain by the Canadian Cardiovascular Society Classification System (CCS).
	• No symptoms	
	• CCS I	Ordinary physical activity does not cause angina; for example walking or climbing stairs, angina occurs with strenuous or rapid or prolonged exertion at work or recreation.
Anginal Classification w/in 2 Weeks (Cont'd)	• CCS II	Slight limitation of ordinary activity; for example, angina occurs walking or stair climbing after meals, in cold, in wind, under emotional stress or only during the few hours after awakening, walking more than two blocks on the level or climbing more than one flight of ordinary stairs at a normal pace and in normal conditions.
	• CCS III	Marked limitation of ordinary activity; for example, angina occurs walking one or two

		blocks on the level or climbing one flight of stairs in normal conditions and at a normal pace.
	• CCS IV	Inability to carry on any physical activity without discomfort - angina syndrome may be present at rest.
Anti-Anginal Med w/in 2 Weeks	Y/N	Indicate if the patient has taken or has been prescribed anti-anginal medication within the past 2 weeks. Code 'no' if a patient was given a sublingual, IV, or short acting formula of one of these medications. Code 'yes' if the patient was started on an oral form of an anti-anginal medication after admission but prior to this cath lab visit. If any anti-anginal medication was prescribed for this patient, but you are unsure if they were prescribed specifically to treat anginal symptoms, code 'yes'.
	If yes, type:	Check all that apply
	o Beta blockers o Ranolazine	
	o Calcium channel blockers	
	o Long acting nitrates o Other	
Heart Failure within 2 Weeks	Y/N	Indicate if there is physician documentation or report that the patient has been in a state of heart failure within the past 2 weeks. If this is a subsequent episode of care (within 2 weeks), do not code the Heart Failure w/in 2 Weeks from the previous episode of care.
	If yes, NYHA class within 2 weeks	Indicate the patient's worst dyspnea or functional class, coded as the New York Heart Association (NYHA) classification within the past 2 weeks.
	o Class I	Patient has cardiac disease but without resulting limitations of ordinary physical activity. Ordinary physical activity (e.g., walking several blocks or climbing stairs) does not cause undue fatigue, palpitation, dyspnea, or anginal pain. Limiting symptoms may occur with marked exertion.
Heart Failure within 2 Weeks (Cont'd)	o Class II	Patient has cardiac disease resulting in slight limitation of ordinary physical activity. Patient is comfortable at rest. Ordinary physical activity such as walking more than two blocks or climbing more than one flight of stairs results in limiting symptoms (e.g., fatigue, palpitation, dyspnea, or anginal pain).
	o Class III	Patient has cardiac disease resulting in marked limitation of physical activity. Patient is comfortable at rest. Less than ordinary physical activity (e.g., walking one to two level blocks or climbing one flight of stairs) causes fatigue, palpitation, dyspnea, or anginal pain.
	o Class IV	Patient has symptoms at rest that increase with any physical activity. Patient has cardiac disease resulting in inability to perform any physical activity without discomfort. Symptoms may be present even at rest. If any physical activity is undertaken, discomfort is increased.
Cardiomyopathy or LV Systolic Dysfunction	Y/N	Indicate if a reason for the cath lab visit is evaluation of cardiomyopathy and/or

		evaluation of left ventricular systolic dysfunction (i.e. depressed LV ejection fraction).
Pre-operative Evaluation Before Non-Cardiac Surgery	Y/N	Indicate if a reason for the cath lab visit is pre-operative evaluation before non-cardiac surgery.
Cardiogenic Shock w/in 24 Hours	Y/N	Indicate if the patient has been in a state of cardiogenic shock within 24 hrs of procedure. Cardiogenic shock is defined in the "Supporting Definitions" list.
Cardiac Arrest w/in 24 Hours	Y/N	Indicate if the patient has had an episode of cardiac arrest within 24 hours of procedure. Cardiac arrest includes pulseless clinical scenarios that can be brady arrests or tachy arrests requiring cardiopulmonary resuscitation (requiring two or more chest compressions, or open chest massage) and/or requiring emergency defibrillation.
Stress or Imaging Studies Performed	Y/N	Indicate if an exercise stress test, stress echocardiogram, stress testing with SPECT MPI, stress testing with CMR, cardiac CTA or coronary calcium scoring was performed. For any subsequent procedures during this episode of care, only code new imaging or stress test results that were performed after the previous procedure until the current procedure. It's for any occurrence between 6 months prior to current procedure and current procedure.
Stress or Imaging Studies Performed (Cont'd)	If yes, Standard exercise stress test: Y/N	Indicate if a standard exercise stress test (without imaging) was performed
	o Results (i.e. negative, positive, indeterminate, unavailable)	Indicate the results of the exercise stress test. Negative: A stress test is negative when the electrocardiogram (ECG) is normal or not suggestive of ischemia. ECGs are not suggestive of ischemia when < 1 mm of horizontal or downsloping ST-segment depression or elevation for >= 60-80 milliseconds after the end of the QRS complex, either during or after exercise. Positive: A stress test is positive when the electrocardiogram (ECG) suggests ischemia. ECGs suggestive of ischemia can be described as having >= 1 mm of horizontal or downsloping ST-segment depression or elevation for >= 60-80 milliseconds after the end of the QRS complex, either during or after exercise. It is also be suggestive of ischemia if the patient had symptoms of ischemia (i.e. chest pain), arrhythmias, and/or a fall in blood pressure during or immediately after the procedure. If more than one study was performed with conflicting results and one study suggested coronary artery disease, code yes. Indeterminate: The results of the stress test were indeterminate. They cannot be considered positive or negative. Unavailable: The results of the stress test are not available
	o If positive result, Risk/Extent of ischemia (i.e. low, intermediate, high, unavailable)	Indicate the risk score of the standard exercise stress test. The risk score is derived by the Duke Treadmill score which is an exercise treadmill score that predicts prognosis in coronary artery disease. It is calculated as follows: Treadmill score = exercise time - (5 x ST-segment deviation in millimeters*) - (4 x

		treadmill angina index**) * ST-segment deviation can be measured at 60 to 80 ms after the J point. If the amount of exercise-induced ST-segment deviation is less than 1 mm, the value entered into the score for ST deviation is 0. ** The treadmill anginal index has a value of 0 if there was no exercise angina, 1 if exercise angina occurred, and 2 if angina was the reason the patient stopped exercising. Exercise time is based on a standard Bruce protocol.
	If yes, Stress echocardiogram: Y/N	Indicate if a stress echocardiogram was performed.
Stress or Imaging Studies Performed (Cont'd)	o Results (i.e. negative, positive, indeterminate, unavailable)	Indicate the results of the stress echocardiogram. Negative: The imaging study was normal. There was no change in wall motion during the procedure. Positive: The imaging study was abnormal. There were changes that reflected wall motion abnormalities during the procedure. Indeterminate: The results of the study were un-interpretable. They cannot be considered positive or negative. Unavailable: The results of the imaging study was not available.
	o If positive result, Risk/Extent of ischemia (i.e. low, intermediate, high, unavailable)	Indicate the risk score of the stress echocardiogram. Low risk: 1. Low-risk treadmill score (score >=5). 2. Normal stress echocardiographic wall motion or no change of limiting resting wall motion abnormalities during stress*. *Although the published data are limited, patients with these findings will probably not be at low risk in the presence of either a high-risk treadmill score or severe resting left ventricular dysfunction (LVEF <35%). Low risk equates with a less than 1% annual mortality rate Intermediate risk: 1. Mild/moderate resting left ventricular dysfunction (LVEF=35% to 49%) 2. Intermediate-risk treadmill score (-11 < score < 5). 3. Limited stress echocardiographic ischemia with a wall motion abnormality only at higher doses of dobutamine involving less than or equal to two segments. Intermediate risk equates with a 1%-3% annual mortality rate. High risk: 1. Severe resting left ventricular dysfunction (exercise LVEF <35%). 2. High-risk treadmill score (score <= -11). 3. Severe exercise left ventricular dysfunction (exercise LVEF <35%). 4. Echocardiographic wall motion abnormality (involving greater than two segments) developing at low dose of dobutamine (<=10 mg/kg/min) or at a low heart rate (<120 beats/min). 5. Stress echocardiographic evidence of extensive ischemia. High risk equates with a greater than 3% annual mortality rate. Unavailable Results of test not available.
	If yes, Stress testing w/ SPECT	Indicate if stress testing with single photo emission computer tomography myocardial

	MPI or stress testing with CMR: Y/N	perfusion imaging or stress testing with cardiac magnetic resonance was performed.
Stress or Imaging Studies Performed (Cont'd)	o If yes, Results (i.e. negative, positive, indeterminate, unavailable)	Indicate the results. Negative: The results of the imaging study revealed no myocardial perfusion defects. Positive: The result of the imaging study revealed one or more stress-induced myocardial perfusion defects. Indeterminate: The results of the study were un-interpretable. They cannot be considered positive or negative. Unavailable: The results of the study were not available.
	o If positive, Risk/Extent of ischemia (i.e. low, intermediate, high, unavailable)	Indicate the risk or extent of ischemia. Low Risk: 1. Low-risk treadmill score (score >=5). 2. Normal or small myocardial perfusion defect at rest or with stress. Although the published data are limited, patients with these findings will probably not be at low risk in the presence of either a high-risk treadmill score or severe resting left ventricular dysfunction (LVEF <35%). Low risk equates with a less than 1% annual mortality rate. Intermediate Risk: 1. Mild/moderate resting left ventricular dysfunction (LVEF=35% to 49%). 2. Intermediate-risk treadmill score (-11 < score < 5) 3. Stress-induced moderate perfusion defect without LV dilation or increased lung intake (thallium-201) Intermediate risk equates with a 1%-3% annual mortality rate. High Risk: 1. Severe resting left ventricular dysfunction (exercise LVEF <35%) 2. High-risk treadmill score (score <= -11) 3. Severe exercise left ventricular dysfunction (exercise LVEF <35%) 4. Stress-induced large perfusion defect (particularly if anterior) 5. Stress-induced multiple perfusion defects of moderate size 6. Large, fixed perfusion defect with LV dilation or increased lung update (thallium-201) 7. Stress-induced moderate perfusion defect with LV dilation or increased lung uptake (thallium-201) High risk equates with a greater than 3% annual mortality rate. Unavailable: The results of the study were not available.
	If yes, Cardiac CTA: Y/N	Indicate if a cardiac computerized tomographic angiography was performed
Stress or Imaging Studies Performed (Cont'd)	o If yes, Results (i.e. no disease, 1VD, 2VD, 3VD, indeterminate, unavailable)	Indicate the results of the study. For purposes of coding the results of a cardiac CTA, a coronary artery is defined as one of the 3 major vessels of the heart. These vessels are the right coronary artery, the left anterior descending coronary artery and the circumflex coronary artery and their associated branches. A left main coronary artery with stenosis >=50% is considered two vessel disease because it feeds both the left anterior descending and circumflex arteries. No disease: There was <50% stenosis in all coronary artery branches. 1 Vessel disease: There was >=50% stenosis in one coronary artery.

		2 Vessel disease: There was >=50% stenosis in two coronary arteries (or >=50% stenosis in the left main coronary artery). 3 Vessel disease: There was >=50% stenosis in three coronary arteries (or >=50% stenosis in the left main coronary artery and >=50% stenosis in the right coronary artery). Indeterminate: The results of the study were un-interpretable due to technical or patient-related issues. Unavailable: The results of the study were unavailable.
	If yes, Coronary calcium score: Y/N	Indicate if coronary calcium score is available
	o If yes, calcium score	
PROCEDURE INFORMATION		
Procedure Date/Time	Date/Time	Indicate the date/time the procedure was initiated. Indicate the time (hours:minutes) using the military 24-hour clock, beginning at midnight (0000 hours). If an arterial sheath is already in place, use the time of the introduction of a catheter or the time the sheath was exchanged. The time the procedure started is defined as the time at which local anesthetic was first administered for vascular access, or the time of the first attempt at vascular access for the cardiac catheterization (use whichever is earlier).
PCI	Y/N	Indicate if the patient had PCI.
Diagnostic Cath	Y/N	Indicate if the patient had a left heart catherization or diagnostic coronary angiography procedure at this facility
Other Procedure (in conj w/Dx Cath or PCI)	Y/N	Indicate if an "other procedure" was performed in conjunction with a left heart cath, diagnostic coronary angiography, or PCI procedure. Other procedures include, but are not limited to right heart caths, EtOH ablations, septal closures, and other (renal, abdominal, peripheral or carotid) angiograms and/or endovascular interventions. The intent of "other procedure" is to capture those procedures that would add additional fluoro time and/or contrast volume to the diagnostic cath and/or PCI procedure. Do not code "other procedure" unless the procedure is performed in conjunction with a left heart cath, diagnostic coronary angiography, or PCI procedure.
Fluoro Time/Dose	Numeric	Indicate the total fluoroscopy time recorded to the nearest 0.1 -minute. The time recorded should include the total time for the lab visit. Or Indicate the total fluoroscopy dose to the nearest integer in milligrays (mGy). The value recorded should include the total dose for the lab visit. One gray is the absorption of one joule of radiation energy by one kg of matter.
Contrast Volume (ml)	Numeric	Indicate the volume of contrast (ionic and non-ionic) used in milliliters (ml). The

		volume recorded should be the total volume for the lab visit.
MECHANICAL VENTRICULAR SUPPORT		
IABP	Y/N	Indicate if the patient required the use of an Intra-Aortic Balloon Pump (during the procedure)
	If yes, timing:	
	o Inserted after PCI has begun	
	o In place at start of procedure	
	o Inserted during procedure and prior to PCI	
Other Mechanical Ventricular Support	Y/N	
	If yes, timing:	
	o Inserted after PCI has begun	
	o In place at start of procedure	
	o Inserted during procedure and prior to PCI	
ARTERIAL ACCESS		
Arterial Access Site		
	• Femoral	Either a cut down or percutaneous puncture of either femoral artery.
	• Brachial	Either a cut down or percutaneous puncture of either brachial artery
	• Radial	Percutaneous radial approach.
	• Other	Entry other than femoral, brachial, or radial approaches to the arterial system
Closure Methods	Text	Indicate the arterial closure methods used in chronological order regardless of whether or not they provided hemostasis. The same closure method may be repeated.
Method not Documented	Documented/not documented	Indicate if method to close arterial access site was not documented.
DIAGNOSTIC CATHERIZATION PROCEDURE (COMPLETE FOR EACH DIAGNOSTIC CATH)		
Operator's Name	Text	Indicate the diagnostic catherization operator's last, middle, and first name
Operator's NPI	Text	Indicate the primary diagnostic cath operator's National Provider Identifier. NPIs, assigned by the Center for Medicare and Medicaid Services (CMS), are used to uniquely identify physicians for Medicare billing purposes.
Diagnostic Coronary Angiography	Y/N	Indicate if the patient had a diagnostic coronary angiography. Diagnostic coronary angiography is defined as the passage of a catheter into the aortic root or other great vessels for the purpose of angiography of the native coronary arteries or bypass grafts supplying native coronary arteries.

Left Heart Cath	Y/N	Indicate if the patient had a left heart cath procedure, defined as the passage of a catheter into the left ventricle for the purposes of angiography or measurement of ventricular pressures and/or oxygen saturation.
Cardiac Transplant Evaluation	Y/N	Indicate if a reason for the cath lab visit is evaluation for, or routine follow-up after an organ transplant
	If yes, type	
	o Donor for cardiac transplant o Post cardiac transplant follow up	
	o Candidate to receive a cardiac transplant	
	o Post cardiac transplant follow up	
Diagnostic Cath Status		Indicate the status of the diagnostic catheterization. The status is determined when the decision is made to activate the cath lab.
Diagnostic Cath Status (Cont'd)	• Elective	The procedure can be performed on an outpatient basis or during a subsequent hospitalization without significant risk of infarction or death. For stable inpatients, the procedure is being performed during this hospitalization for convenience and ease of scheduling and NOT because the patient's clinical situation demands the procedure prior to discharge.
	• Urgent	The procedure is being performed on an inpatient basis and prior to discharge because of significant concerns that there is risk of ischemia, infarction and/or death. Patients who are outpatients or in the emergency department at the time that the cardiac catheterization is requested would warrant an admission based on their clinical presentation.
	• Emergency	The procedure is being performed as soon as possible because of substantial concerns that ongoing ischemia and/or infarction could lead to death. "As soon as possible" refers to a patient who is of sufficient acuity that you would cancel a scheduled case to perform this procedure immediately in the next available room during business hours, or you would activate the on call team were this to occur during off-hours.
	• Salvage	The procedure is a last resort. The patient is in cardiogenic shock at the start of the procedure. Within the last ten minutes prior to the start of the procedure the patient has also received chest compressions for a total of at least sixty seconds or has been on unanticipated extracorporeal circulatory support (e.g. extracorporeal membrane oxygenation, cardiopulmonary support)
Rx Recommendation (after diagnostic cath)		Indicate the primary treatment that was recommended as a result of the diagnostic cath

	• None	Due to the outcome of the cath, no treatment recommendations were required.
	• Medical therapy and/or counselling	Medical therapy and/or counselling refers to patients who only receive pharmacologic therapy and/or recommendations for cardiac risk factor reduction
	• PCI without planned CABG	
Rx Recommendation (after diagnostic cath) (Cont'd)	• CABG (including planned hybrid CABG/PCI procedures)	Includes both CABG and planned hybrid CABG/PCI procedures.
	• Other cardiac therapy without CABG or PCI	Other cardiac therapy includes any procedure or intervention (not including PCI, CABG, and not receiving only medical/pharmacological therapy).
BEST ESTIMATE OF CORONARY ANATOMY (COMPLETE FOR EACH LAB VISIT)		
Dominance		Indicate the dominance of the coronary anatomy (whether the posterior descending artery comes from the right or left vessel system)
	• Left	The posterior descending artery (PDA) and posterolateral artery (PLA) arises from the left circumflex artery.
	• Right	The posterior descending artery (PDA) and posterolateral artery (PLA) arises from the right coronary artery.
	• Co-dominant	The right coronary artery supplies the posterior descending artery (PDA) and the circumflex supplies the posterolateral artery (PLA). Thus, there is approximately equal contribution to the inferior surface of the left ventricle from both the left circumflex and right coronary arteries.
	• Native Artery Percent Stenosis in >=2 mm vessels	Indicate the best estimate of most severe percent stenosis in the left main coronary artery. Also indicate if best estimate of percent stenosis is not available. If no stenosis, enter 0%. If the patient has only a PCI (without a diagnostic cath in the same lab visit) it is acceptable to use prior cath lab visit information, when coding coronary stenosis, as long as there have been no changes in coronary anatomy. This includes stenosis determined via cardiac catheterization at another facility. This does not include collaterals. Target value: The highest value between 1 month prior to current procedure and current procedure. Stenosis: Stenosis represents the percentage diameter reduction, ranging from 0 to 100, associated with the identified vessels. Percent stenosis at its maximal point is estimated to be the amount of reduction in the diameter of the "normal" reference vessel proximal to the lesion. In instances where multiple lesions are present, enter the single highest percent stenosis noted.
	• Grafts supplying coronary territory percent stenosis	Indicate the best estimate of most severe percent stenosis in a graft supplying the involved vessel as determined by angioplasty. If no stenosis, enter 0%. Leave blank if CABG Date is greater than Procedure Date/Time or Prior CABG is "No".
PCI PROCEDURE (COMPLETE FOR EACH CATH LAB VISIT IN WHICH A PCI WAS ATTEMPTED OR PERFORMED)		

Operator's Name	Text	Indicate the PCI operator's first, middle, and last name
Operator's NPI	Text	Indicate the physician's National Provider Identifier (NPI). NPI's, assigned by the Center for Medicare and Medicaid Services (CMS), are used to uniquely identify physicians for Medicare billing purposes.
PCI Status		Indicate the status of the PCI. The status is determined at the time the operator decides to perform a PCI
	• Elective • Urgent	
	• Emergency • Salvage	
Pre-PCI LVEF (percentage)	Numeric	Code the best estimate of current LVEF. Also indicate if pre-PCI LVEF was not assessed. The left ventricular ejection fraction is the percentage of the blood emptied from the left ventricle at the end of the contraction. If only a range is reported, report the median of the range (i.e.50-55%, is reported as 53%). If only a descriptive value is reported (i.e. normal), enter the corresponding percentage value from the list below: Normal = 60% Good function = 50% Mildly reduced = 45% Fair function = 40% Moderately reduced = 30% Poor function = 25% Severely reduced = 20% The Left Ventricular Ejection Fraction can be assessed via invasive (i.e. LV gram) or non-invasive (i.e. Echo, MR, CT or Nuclear) testing. If an ejection fraction is not measured during this admission and prior to the PCI, and their clinical status has not changed, it is acceptable to code an ejection fraction that was obtained prior to arrival.
Cardiogenic Shock at Start of PCI	Y/N	Indicate if the patient is in cardiogenic shock at the start of PCI procedure. Transient episodes of hypotension reversed with IV fluid or atropine do not constitute cardiogenic shock. The hemodynamic compromise (with or without extraordinary supportive therapy) must persist for at least 30 minutes. Cardiogenic shock is defined in the "Supporting Definitions" list.
PCI Indication		Indicate the reason the PCI is being performed
	• Immediate PCI for STEMI	Immediate PCI for patient with STEMI (or STEMI equivalent).
	• PCI for STEMI (unstable, >12 hrs from sx onset)	PCI for STEMI (or STEMI equivalent) more than 12 hours from symptom onset with recurrent or persistent symptoms, symptoms of heart failure or ventricular arrhythmia.
	• PCI for STEMI (stable, >12 hrs from sx onset)	Patient with STEMI (or STEMI equivalent) who is stable, and is more than 12 hours from symptom onset. The patient does not have any symptoms of recurrent or persistent ischemia, symptoms of heart failure, or electrical instability.
	• PCI for STEMI (stable after successful full-dose thrombolytics)	PCI for STEMI (or STEMI equivalent) who is stable after receiving full dose thrombolysis.
	• Rescue PCI for STEMI (after failed full-dose lytics)	Rescue PCI for STEMI (or STEMI equivalent) after failed full-dose lytics.

	• PCI for high risk Non-STEMI or unstable angina	Includes patients with unstable angina or Non-STEMI who have high risk features for short-term risk of death or nonfatal MI. High risk features includes at least one of the following: 1. History - accelerating tempo of ischemic symptoms in preceding 48 hours. 2. Character of pain - prolonged ongoing (greater than 20 minutes) rest pain. 3. Clinical findings: A. Pulmonary edema, most likely due to ischemia B. New or worsening mitral regurgitation murmur C. S3 or new worsening rales D. Hypotension, bradycardia, tachycardia E. Age greater than 75 years 4. ECG A. Angina at rest with transient ST-segment changes greater than 0.5 mm B. Bundle-branch block, new or presumed new C. Sustained ventricular tachycardia 5. Cardiac markers - NSTEMI patients with elevated cardiac TnT, TnI, or CK-MB.
	• Staged PCI	The second PCI of a planned, staged procedure (the first PCI could have been during a prior admission, or during this admission).
	• Other	Includes patients that don't fit into any of the above categories. This can include patients with elective or urgent status, status/post cardiac arrest or cardiogenic shock but without ECG or biomarker evidence of acute infarction.
	If immediate PCI for STEMI, STEMI or STEMI Equivalent first noted	Indicate if a STEMI or STEMI equivalent was noted on either the first ECG or a subsequent ECG. Code subsequent ECG if the ECG on arrival does not indicate STEMI or STEMI equivalent. Target value: the first value between 1 day prior to current procedure and current procedure.
	o First ECG	
PCI Indication (Cont'd)	o Subsequent ECG	
	o If subsequent ECG, subsequent ECG with STEMI or STEMI equivalent date/time	
	If immediate PCI for STEMI, first device activation date/time	Indicate the time the first device was activated regardless of type of device used. Use the earliest time from the following: 1. Time of the first balloon inflation. 2. Time of the first stent deployment. 3. Time of the first treatment of lesion (AngjoJet or other thrombectomy/aspiration device, laser, rotational atherectomy). 4. If the lesion cannot be crossed with a guidewire or device (and thus none of the above apply), use the time of guidewire introduction. This is a process measure about the timeliness of treatment. It is NOT a clinical outcomes measure based on TIMI flow or clinical reperfusion. It does not matter whether the baseline angiogram showed TIMI 3 flow or if the final post-PCI angiogram showed TIMI 0 flow. What is being measured is the time of the first mechanical treatment of the culprit lesion, not the time when TIMI 3 flow was (or was

		not) restored. Indicate the time (hours:minutes) using the military 24-hour clock, beginning at midnight (0000 hours).
	If immediate PCI for STEMI, Transferred In for immediate PCI for STEMI:Y/N	Indicate if the patient was transferred from another facility to have immediate PCI for STEMI at this facility
	o If yes, Date/Time ED presentation at referring facility	Code the date of arrival to the original, transferring facility as documented in the medical record. If the initial onset of ST elevation MI symptoms or STEMI equivalent occurred after initial ECG and presentation to the transferring facility, it is acceptable to code the date/time of symptom onset or subsequent ECG to the original, transferring facility, as documented in the medical record.
PCI Indication (Cont'd)	If immediate PCI for STEMI, Non-system reason for delay in PCI	Indicate if there is documentation of a non-system reason for a delay in performing the percutaneous coronary intervention (PCI). Documentation must be from a physician/advanced practice nurse/physician assistant (physician/APN/PA). The effect on timing/delay of PCI must be documented in order to be an acceptable reason for delay. If unable to determine whether a documented reason is system in nature, or if physician/APN/PA documentation does not establish a linkage between event(s)/condition(s) and the timing/delay in PCI/reperfusion/cath/transfer to cath lab, select "None."
	o Difficult vascular access	
	o Cardiac arrest and/or need for intubation before PCI	
	o Patient delays in providing consent for procedure	
	o Difficulty crossing the culprit lesion during the PCI procedure	
	o Other o None	
PROCEDURE MEDICATIONS (ADMINSITERD WITHIN 24 HOURS PRIOR TO AND DURING THE PCI PROCEDURE)		
Anticoagulants (fondaparinux, low molecular weight heparin, unfractionated heparin), Aspirin (Aspirin), Direct Thrombin Inhibitors (Bivalirudin, Direct Thrombin Inhibitor), Glycoprotein IIb/IIIa Inhibitors, Thienopyridines (Clopidogrel, Ticlopidine, Prasugrel)	• No	Medication was not administered or prescribed
	• Yes	Medication was administered or prescribed
	• Contraindicated	Medication was not administered because of a contraindication. Contraindications

		must be documented explicitly by the physician, or clearly evidenced within the medical record.
	• Blinded	Patient was in a research study or clinical trial and the administration of this specific medication or class of medications is unknown.
LESIONS AND DEVICES (COMPLETE FOR EACH PCI ATTEMPTED OR PERFORMED)		
Lesion Counter	1,2	The lesion counter is used to distinguish between multiple lesions on which a PCI is attempted or performed. A target lesion is defined as a stenosis within a coronary artery or coronary artery bypass graft on which mechanical coronary revascularization is attempted during the current procedure. When specifying intracoronary devices, list all treated lesions in which the device was utilized. The software-assigned lesion counter should start at one and be incremented by one for each lesion. The lesion counter is reset back to one for each new PCI lab visit. At least one lesion must be specified for each PCI procedure.
Segment Number	Numeric	Indicate the segment(s) that the current lesion spans (a lesion can span one or more segments). Segment is defined in the "Supporting Definitions" list.
Culprit Lesion (If CAD presentation is "STEMI", "Non-STEMI" or "Unstable angina")	Y/N/Unknown	Indicate the lesion that is considered to be responsible for the acute coronary syndrome. "No" should be coded if there is no apparent lesion that could be responsible for evidence of ischemia. "Unknown" should be coded if the culprit segment was not known. The physician should use his/her judgment in choosing the primary lesion. In cases in which this is difficult to determine (despite correlation of ECG changes and angiographic data), the lesion supplying the largest territory of myocardium should be selected.
Stenosis Immediately Prior to Rx (%)	Numeric	Indicate the percent diameter stenosis immediately prior to the treatment of this lesion. Use the highest value on current procedure
	If 100%, Chronic total occlusion: Y/N	Indicate if the segment with 100% pre-procedure stenosis was presumed to be 100% occluded for at least 3 months previous to this procedure AND not related to a clinical event prompting (or leading to) this procedure.
Stenosis Immediately Prior to Rx (%) (Cont'd)	o if 40-70%, IVUS: Y/N	Indicate if intravascular ultrasound was performed to confirm the percent stenosis (any occurrence between beginning of procedure and prior to intervention).
	o if 40-70%, FFR: Y/N	Indicate if fractional flow reserve was performed to confirm the percent stenosis. Myocardial fractional flow reserve is a lesion-specific index of stenosis severity.
	o If yes, FFR Ratio	Indicate the fractional flow reserve ratio (the lowest value between beginning of the procedure end prior to intervention)
Pre-procedure TIMI Flow		Indicate the pre-procedure TIMI flow value
	• 0	No flow/no perfusion
	• 1	Slow penetration without perfusion

	• 2	Partial flow/partial perfusion (greater than TIMI-1 but less than TIMI-3)
	• 3	Complete and brisk flow/complete perfusion
Previous Treated Lesion	Y/N	Indicate if the lesion has been treated before in the current or a prior episode of care
	If yes, Timeframe:	If this lesion was previously treated during another PCI procedure, then indicate the timeframe in calendar months or years
	o <1 month o 1-5 months	
	o 6-12 months o 1-2 years	
	o >2 years	
	If yes, Treated with stent: Y/N	Indicate if the previously treated lesion was treated with any type of stent in the current or prior episode of care.
	o If yes, In-stent restenosis: Y/N	Indicate if the previously treated and stented lesion is being treated for in-stent restenosis. In-stent restenosis is defined as a previously stented lesion that has 50% or greater stenosis
	o If yes, In-stent thrombosis: Y/N	Indicate if the previously treated and stented lesion is being treated because of the presence of a thrombus in the stent.
	o If yes, Stent type:	Indicate the type of stent in the previously treated lesion.
	o DES	
	o non-DES	
	o Type unknown	
Lesion in Graft		If the treated lesion is in a coronary artery bypass graft, indicate the type of graft
	• Not in graft	Lesion is not in a coronary artery bypass graft
	• Vein	Lesion is in a vein graft
Lesion in Graft	• LIMA	Lesion is in a left internal mammary artery graft
	• Other artery	Lesion is in an "other" arterial graft (not including LIMA grafts). Radial artery grafts or other free arterial conduit grafts (e.g. free IMA) should be coded as another arterial graft.
	If lesion in vein, LIMA, other, location in graft	If lesion is in a graft, indicate the location of the most severe stenosis in the graft
	o Aortic	The most severe stenosis is at the aortic anastomosis of the graft (<= 3 mm from insertion point).
	o Body	The most severe stenosis is in the body of the graft.
	o Distal	The most severe stenosis is at the distal anastomosis of the graft (<= 3 mm from insertion point).
Lesion Complexity		Indicate the complexity of lesion as defined in selections described below. It's for any occurrence on the current procedure.
	• Non-high/non-C lesion	See "Supporting Definitions" for detailed definition of non-high/non-C lesion
	• High/C	See "Supporting Definitions" for detailed definition of high/C lesion

Lesion Length (mm)	Numeric	Indicate the length of the treated lesion in mm. information obtained after the baseline angiogram can be used to help determine lesion length (e.g. for total occlusions where the distal vessel can not be visualized).
Thrombus Present	Y/N	Indicate if there was a thrombus present. Thrombus is suggested by certain angiographic features: haziness, reduced contrast density or contrast persistence, irregular lesion contours, or globular filling defects.
Bifurcation Lesion	Y/N	Indicate if the lesion is at a significant bifurcation, trifurcation or more complex branch point. See "Supporting Definitions" for detailed definition of bifurcation lesion
Guidewire across Lesion	Y/N	Indicate if a guidewire successfully crossed the lesion
	If yes, stenosis post-procedure %	Indicate the post-procedure percent stenosis for the treated lesion
	If yes, post-procedure TIMI flow:	Indicate the post-procedure TIMI flow
	o 0 o 1 o 2 o 3	
	If yes, devices deployed: Y/N	Indicate if a device was deployed during the procedure
Intracoronary Device(s) Used	Text	Indicate all devices utilized during the current procedure. If a device was utilized on multiple lesions, specify it only once (e.g., if a balloon was used to dilate two separate lesions, list it only once). Every treatment and support device utilized during the procedure should be specified. Each intracoronary device must be associated with at least one lesion via the Lesion Counter if Device Deployed is 'Yes'. An intracoronary device may be associated with more than one lesion.
Associated Lesions	Text	
Diameter	Numeric	Indicate the diameter of the intracoronary device in mm
Length	Numeric	Indicate the length of the device in mm
Intraprocedure Events	Text	
Significant Dissection	Y/N	See "Supporting Definitions" list for detailed definition of dissection.
Perforation	Y/N	See "Supporting Definitions" list for detailed definition of perforation.
LABS (COMPLETE FOR EACH CATH LAB VISIT IN WHICH A PACI WAS ATTEMPTED OR PERFORMED)		
Pre-Procedure (performed at your facility)		
CK-MB	Numeric	Indicate the pre-procedure CK-MB baseline that was drawn at our facility. Exclude point-of-care (bedside) testing
CK Not Applicable	Checkbox	Check off the box if pre-procedure CK baseline was not drawn, or not drawn at your facility, or drawn at your facility using point-of-care (bedside) testing.
CK Drawn and Normal	Checkbox	Indicate if the pre-procedure CK level was drawn and was normal, thus the CK-MB was not measured at your facility
Troponin I, Troponin T, Creatinine, Hemoglobin	Numeric	Indicate the pre-procedure biomarkers baseline if drawn at your facility. Exclude point-

		of-care (bedside) testing. Exclude values drawn at other facilities (they have different upper reference limits).
	• Not drawn	Check off the box if pre-procedure biomarkers baseline was not drawn, or not drawn at your facility, or drawn at your facility using point-of-care (bedside) testing.
Post-Procedure (only)		
CK-MB (nag/mL) (peak value 6-24 hours)	Numeric	Indicate the pre-procedure CK-MB baseline that was drawn at our facility. Exclude point-of-care (bedside) testing
CK Not Applicable	Checkbox	Check off the box if pre-procedure CK baseline was not drawn, or not drawn at your facility, or drawn at your facility using point-of-care (bedside) testing.
CK Drawn and Normal	Checkbox	Indicate if the pre-procedure CK level was drawn and was normal, thus the CK-MB was not measured at your facility
Troponin I (peaks value 6-24 hours), Troponin T (peak value 6-24 hours), Creatinine (highest value), Hemoglobin (lowest within 72 hours)	Numeric	Indicate if the pre-procedure biomarkers baseline if drawn at your facility. Exclude point-of-care (bedside) testing. Exclude values drawn at other facilities (they have different upper reference limits).
	• Not drawn	Check off the box if pre-procedure biomarkers baseline was not drawn, or not drawn at your facility, or drawn at your facility using point-of-care (bedside) testing.
INTRA AND POST-PROCEDURE EVENTS (COMPLETE FOR EACH CATH LAB VISIT)		
		For patients with extended hospital stays, restrict coding of post-procedure events to 30 days after the last procedure.
Myocardial Infarction (positive biomarkers)	Y/N	Indicate the NEW occurrence of a biomarker positive myocardial infarction after PCI. At least one determination of biomarkers obtained no sooner than 6 hours after PCI, and preferably within the interval of 6-24 hours post-PCI, should be used to make this diagnosis. Q waves with absent, incomplete or inconclusive biomarkers should be considered evidence of MI and should be coded as yes. In rare situations, biomarkers may not be obtained in the setting of a post-PCI acute MI (e.g., sudden unexpected cardiac death without symptoms or ECG changes suggestive of ischemia, patient is transferred, or biomarkers were just not ordered). In these situations, the site may choose to report a clinically-diagnosed post-PCI myocardial infarction even in the absence of the usually required biomarker elevations. See "Supporting Definitions" for detailed definition of MI.
Cardiogenic Shock	Y/N	Indicate if the patient had a new onset or acute recurrence of cardiogenic shock.
Heart Failure	Y/N	Indicate if the patient had new onset or acute recurrent of heart failure which necessitated new or increased pharmacologic therapy. A previous hospital admission with a principal diagnosis of heart failure is considered evidence of heart failure history. See "Supporting Definitions" for detailed definition of heart failure.
CVA/Stroke	Y/N	A stroke or CVA is documented by a loss of neurological function caused by an ischemic

		or hemorrhagic event with residual symptoms lasting at least 24 hours after onset or leading to death.
	If yes, Hemorrhagic stroke: Y/N	A stroke with documentation on imaging (e.g., CT scan or MRI of hemorrhage in the cerebral parenchyma, or a subdural or subarachnoid hemorrhage). Evidence of hemorrhagic stroke obtained from lumbar puncture, neurosurgery, or autopsy can also conform the diagnosis.
Tamponade	Y/N	Indicate if the patient experienced fluid in the pericardial space compromising cardiac filling and requiring intervention. Tamponade should be documented by either: 1. Echocardiogram showing pericardial fluid and signs of tamponade such as right heart compromise, or 2. Systemic Hypotension due to pericardial fluid compromising cardiac function.
New Requirement for Dialysis	Y/N	Indicate if the patient experienced acute or worsening renal failure necessitating renal dialysis. If a patient is on receiving continuous veno-venous hemofiltration (CVVH) as a result of renal failure (not as treatment to remove fluid for heart failure), code yes.
Other Vascular Complications Req Rx	Y/N	Indicate if the patient experienced any other vascular complications (excluding external bleeding or hematomas) at the percutaneous entry site that required treatment or intervention. Code 'yes' for patients treated with IV therapy for loss of distal pulse. To quality, this adverse outcome should be attributable to this procedure and not related to a previous or subsequent procedure. See "Supporting Definitions" for detailed definition of "other vascular complications"
RBC/Whole Blood Transfusion	Y/N	Indicate if there was a transfusion(s) of either whole blood or packed red blood cells
	If yes, Hgb prior to transfusion (g/dL)	
Bleeding Event within 72 Hours	Y/N	See "Supporting Definitions" for detailed definition of "Bleeding Events"
	If yes, Bleeding at access site: Y/N	See "Supporting Definitions" for detailed definition of "Bleeding at access site"
	If yes, Hematoma at access site: Y/N	
	o If yes, Size:	Indicate the maximal dimension, in centimeters, of the hematoma (measured by palpation or imaging). It should be the highest value between start of procedure and 72 hours after current procedure.
	o < 3cm o 3-5 cm	
	o > 5-10 cm o > 10 cm	
	If yes, Retroperitoneal bleeding: Y/N	Indicate if the patient experienced retroperitoneal bleeding. For definition of bleeding, see above in "Hematoma at Access Site" It should be the highest value between start of procedure and 72 hours after current procedure.

	If yes, GI Bleed: Y/N	Indicate whether the patient experienced gastrointestinal bleeding. For definition of bleeding, see above in "Hematoma at Access Site" It should be the highest value between start of procedure and 72 hours after current procedure.
	If yes, GU Bleed: Y/N	Indicate whether genital or urinary bleeding occurred. For definition of bleeding, see above in "Hematoma at Access Site" It should be the highest value between start of procedure and 72 hours after current procedure.
	If yes, Other Bleed: Y/N	Indicate if other bleeding occurred. Other bleeding includes bleeding from a site not specified, such as pulmonary bleeding. For definition of bleeding, see above in "Hematoma at Access Site" It should be the highest value between start of procedure and 72 hours after current procedure.
DISCHARGE (COMPLETE THIS SECTION FOR EACH EPISODE OF CARE)		
CABG	Y/N	Indicate if the patient had coronary artery bypass graft surgery
	If yes, CABG status	
	o Elective	The patient's cardiac function has been stable in the days or weeks prior to the operation. The procedure could be deferred without increased risk of compromised cardiac outcome.
CABG (Cont'd)	o Urgent	Procedure required during same hospitalization in order to minimize chance of further clinical deterioration. Examples include but are not limited to: worsening sudden chest pain, CHF, acute myocardial infarction (AMI), anatomy, IABP, unstable angina (USA) with intravenous (IV) nitroglycerin (NTG) or rest angina
	o Emergency	Patients requiring emergency operation will have ongoing refractory (difficulty, complicated, and unmanageable) unrelenting cardiac compromise, with or without hemodynamic instability, and not responsive to any form of therapy except cardiac surgery. An emergency operation is one in which there should be no delay in providing operative intervention. The patient's clinical status includes any of the following: a. Ischemic dysfunction (any of the following): 1. Ongoing ischemia including rest angina despite maximal medical therapy (medical or IABP). 2. Acute Evolving Myocardial Infarction with 24hours before surgery. 3. Pulmonary edema requiring intubation. b. Mechanical dysfunction (either of the following): 1. Shock with circulatory support 2. Shock without circulatory support
	o Salvage	The patient is undergoing CPR in route to the operating room or prior to anesthesia induction.
	If yes, CABG indication	

	o PCI complication	
	o PCI failure without clinical deterioration	
	o Treatment of CAD without PCI immediately preceding CABG	
	o PCI/CABG hybrid procedure	Hybrid therapy occurs when both surgical and percutaneous coronary revascularization are planned, with different lesions treated with the different techniques. Examples include LIMA-LAD followed by PCI of the circumflex or RCA; or primary PCI of the infarct culprit RCA followed by CABG for the severe LMCA stenosis. Unplanned revascularization as a result of a complication (e.g., CABG for PCI-related dissection, PCI for acute graft closure) are NOT considered hybrid procedures because these sequential interventions were not part of a considered treatment strategy.
	If yes, Location:	
	o At your facility	
	o Transferred to other facility	
	o If at your facility, CABG date/time	Indicate the date/time of the procedure. The time of the procedure is the time to nearest minute that the skin incision, or its equivalent, was made in order to start the surgical procedure.
Other Major Surgery	Y/N	Indicate if the patient had other major surgery during this episode of care that may impact the patient's length of stay and/or clinical outcomes. Other major surgery may include other cardiac, vascular, thoracic, abdominal, peripheral or other surgical procedures.
LVEF (%)	Numeric	Code the best estimate of the current LVEF closest to discharge. The Left Ventricular Ejection Fraction is the percentage of the blood emptied from the left ventricle at the end of the contraction. If no diagnostic report is in the medical record, a value documented in the medical record is acceptable. In cases of conflicting measurements, the clinician should specify the value that they think best represents the post-procedure, or post-PCI LVEF. If only a range is reported, report the center of the range (i.e. 50-55%, is reported as 53%). If only a descriptive value is reported (i.e. normal), enter the corresponding percentage value from the list below: Normal = 60% Good function = 50% Mildly reduced = 45% Fair function = 40% Moderately reduced = 30% Poor function = 25% Severely reduced = 20% The Left Ventricular Ejection Fraction can be assessed via invasive (i.e. LV gram) or non-invasive (i.e. Echo, MR, CT or Nuclear) testing.
LVEF not Assessed	Checkbox	Indicate whether the LVEF was not assessed at this facility
Discharge Date	Date	

Discharge Status	• Deceased • Alive	
	If alive, Discharge Location	Indicate the location to which the patient was discharged
	o Home o Nursing Home	
	o Extended Care/TCU/Rehab	
	o Other Acute Care Hospital	
	o Hospice o Other	
	o Left against medical advice (AMA)	
Discharge Status	If alive, Cardiac rehabilitation referral: Y/N/Ineligible	Indicate if there was written documentation of a referral for the patient (by the physician, nurse, or other personnel) to an outpatient cardiac rehabilitation program, or a documented medical or patient-centered reason why such a referral was not made. The program may include a traditional cardiac rehab program based on face-to-face interactions and training sessions or may include other options such as home-based approaches. Ineligible may be selected for patients considered ineligible based on patient-oriented barriers (patient refusal, for example), provider-oriented criteria (patient deemed to have a high-risk condition or contraindication to exercise such as dementia, homebound, long-term nursing home placement >60 days, for example), or health care system barriers (financial barriers or lack of cardiac rehab programs near a patient's home, for example). A referral is defined in the "Supporting Definitions."
	If Deceased, Death in Lab: Y/N	If the patient expired during this hospitalization, indicate if the patient expired while in the cath lab
	If Deceased, Primary Cause of Death:	Select the PRIMARY cause of death, i.e. the first significant abnormal event which ultimately led to death
	o Cardiac o Neurologic o Renal	
	o Vascular o Infection o Valvular	
	o Pulmonary o Unknown o Other	
Hospital Status		Indicate if the patient was considered an outpatient for the entire stay at your facility. The Center for Medicare and Medicaid Services defines an outpatient as a patient who receives professional services in a medical facility for less than a 24-hour period regardless of the hour of admission, whether or not a bed is used, or whether or not the patient remains in the facility past midnight.
	• Outpatient	The patient was an outpatient for this entire episode of care.
	• Outpatient converted to inpatient	The patient was considered an outpatient on arrival to the facility, and was converted to an inpatient status during this episode of care.
	• Inpatient	The patient was admitted as an inpatient upon arrival to the facility, for this episode of

		care.
DISCHARGE MEDICATIONS (PRESCRIBED AT DISCHARGE - COMPLETE FOR EACH EPISODE OF CARE IN WHICH A PCI WAS ATTEMPTED OR PERFORMED)		
Discharge medications are not required for patients who expired or were discharged to "other acute care hospital", "hospice", or "AMA"		
ACEI (any), ARBs (any), Aspirin (any), Beta blockers (any), Lipid Lowering Agents (Statin, non-statin), Thienopyridines (Clopidogrel, Ticlopidine, Prasugrel)		
	• No	Medication was not administered or prescribed
	• Yes	Medication was administered or prescribed
	• Contraindicated	Medication was not administered because of a contraindication. Contraindications must be documented explicitly by the physician, or clearly evidenced within the medical record.
	• Blinded	Patient was in a research study or clinical trial and the administration of this specific medication or class of medications is unknown.

Supplementary Definitions of the NCDR ACTION/CATH-PCI Registry

Cardiac biomarkers

Qualifying cardiac biomarkers include the following: 1. Troponin I or T: Level is elevated if the lab value exceeds the upper limit of normal (ULN) according to the individual hospital's laboratory parameters. 2. Creatine kinase-myocardial band (CK-MB): Level is elevated if the lab value exceeds the ULN according to the individual hospital's laboratory parameters. 3. Positive bedside troponin assay: Level is elevated if the lab value exceeds the ULN according to the individual hospital's laboratory parameters. Referral: A referral is defined as an official communication between the health care provider and the patient to recommend and carry out a referral order to an early outpatient Cardiac Rehabilitation program. This includes the provision of all necessary information to the patient that will allow the patient to enroll in an early outpatient CR program. This also includes a communication between the health care provider or health care system and the CR program that includes the patient's referral information for the program. A hospital discharge summary or office note may potentially be formatted to include the necessary patient information to communicate to the CR program [the patient's cardiovascular history, testing, and treatments, for instance]. All communications must maintain appropriate confidentiality as outlined by the 1996 Health Insurance Portability and Accountability Act [HIPPA].)

Cardiogenic shock

A sustained (>30 minutes) episodes of systolic blood pressure <90 mm Hg, and/or cardiac index <2.2 L/min/m2 determined to be secondary to cardiac dysfunction, and/or the requirement for parenteral inotropic or vasopressor agents or mechanical support (e.g. IABP, extracorporeal circulation, ventricular assist devices) to maintain blood pressure and cardiac index above those specified levels. NOTE: Transient episodes of hypotension reversed with IV fluid or inotropine do not constitute cardiogenic shock. The hemodynamic compromise (with or without extraordinary supportive therapy) must persist for at least 30 minutes.

Cerebrovascular disease

Cerebrovascular disease is documented by any one of the following: 1. cerebrovascular accident (CVA): patient has a history of stroke, i.e., loss of neurological function with residual symptoms at least 24 hrs after onset, presumed to be from vascular etiology. 2. Transient Ischemic Attack (TIA): Patient has a history of loss of neurological function that was abrupt in onset but with complete return of function within 24 hrs, presumed to be due to vascular etiology. 3. Non-invasive/invasive carotid test with greater than 79% occlusion. 4. Previous carotid artery surgery/intervention for carotid artery stenosis. This does not include neurological disease processes such as metabolic and/or anoxic ischemic encephalopathy

Chronic lung disease

Chronic lung disease can include patients with chronic obstructive pulmonary disease, chronic bronchitis, or emphysema. It can also include a patient who is currently being chronically treated with inhaled or oral pharmacological therapy (e.g. beta-adrenergic agonist, anti-inflammatory agent, leukotriene receptor antagonist, or steroid). Patients with asthma or seasonal allergies are not considered to have chronic lung disease.

Diabetes mellitus

Diabetes mellitus is diagnosed by a physician or can be defined as a fasting blood sugar > 7 mmol/l or 126 mg/dL. It does not include gestational diabetes. This includes diagnosis on admission or prior to the current period of care

Dyslipidemia

Dyslipidemia is defined by the National Cholesterol Education Program criteria and includes documentation of the following: 1. Total cholesterol greater than 200 mg/dL (5.18 mmol/l); or 2. Low-density lipoprotein (LDL) greater than or equal to 130 mg/dL (3.37 mmol/l); or 3. High-density lipoprotein (HDL) < 40 mg/dL (1.04 mmol/l). For patients with known coronary artery disease, treatment is initiated if LDL is greater than 100 mg/dL (2.59 mmol/l), and this would qualify as hypercholesterolemia

Heart failure

Heart failure is defined as physician documentation or report of any of the following clinical symptoms of heart failure described as unusual dyspnoea on light exertion, recurrent dyspnoea occurring in the supine position, fluid retention; or description of rales, jugular venous distension, pulmonary edema on physical exam or pulmonary edema on chest x ray presumed to be cardiac dysfunction. A low ejection fraction without clinical evidence of heart failure does not qualify as heart failure. NOTE: Killip class 2 is defined as rate over 50% or less of the lung fields or the presence of an S3. Killip Class 3 is defined as rates over > 50% of lung fields. Either class would qualify as a yes.

Hypertension

Hyper tension (HTN) is defined by any one of the following: 1.history of HTN diagnosed and treated with medication, diet and/or exercise 2. prior documentation of blood pressure greater than 140 mmHg systolic and/or 90 mm Hg diastolic for patients without diabetes or chronic kidney disease, or prior documentation of blood pressure greater than 130 mm Hg systolic or 80 mm Hg diastolic on at least two occasions for patients with diabetes or chronic kidney disease. 3. Currently on pharmacological therapy for treatment of HTN

New or Presumed New T-wave inversion

Indicate if there was a new/presumed new T wave inversion of at least 0.1 mV in two contiguous leads with prominent R wave or R/S ratio >1 within the first 24 hours of presentation.

New or Presumed New ST depression

Indicate if there was new/presumed new horizontal or down-sloping ST depression >=0.5 mV in two contiguous leads below the isoelectric line on the ECG within the first 24 hours of presentation.

MI

A myocardial infarction is evidenced by any of the following: 1. A rise and fall of cardiac biomarkers (preferably troponin) with at least one of the values in the abnormal range for that laboratory [typically above the 99th percentile of the upper reference limit (URL) for normal subjects] together with at least one of the following manifestations of myocardial ischemia: a. Ischemic symptoms. b. ECG changes indicative of new ischemia (new ST-T changes, new left bundle branch block, or loss of R wave voltage).
c. Development of pathological Q- waves in 2 or more contiguous leads in the ECG (or equivalent findings for true posterior MI). d. Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality. e. Documentation in the medical record of the diagnosis of acute myocardial infarction based on the cardiac biomarker pattern in the absence of any items enumerated in a-d due to conditions that may mask their appearance (e.g., peri-operative infarct when the patient cannot report ischemic symptoms; baseline left bundle branch block or ventricular pacing). 2. ECG changes

associated with prior myocardial infarction can include the following (with or without prior symptoms): a. Any Q-wave in leads V2-V3 >=0.02 seconds or QS complex in leads V2 and V3. b. Q-wave >=0.03 seconds and >=0.1 mV deep or QS complex in leads I, II, aVL, aVF, or V4-V6 in any two leads of a contiguous lead grouping (I, aVL, V6; V4-V6; II, III, and aVF). c. R-wave >=0.04 seconds in V1-V2 and R/S >=1 with a concordant positive T-wave in the absence of a conduction defect. 3. Imaging evidence of a region with new loss of viable myocardium at rest in the absence of a non-ischemic cause. This can be manifest as:
a. Echocardiographic, CT, MR, ventriculographic or nuclear imaging evidence of left ventricular thinning or scarring and failure to contract appropriately (i.e., hypokinesis, akinesis, or dyskinesis). b. Fixed (non-reversible) perfusion defects on nuclear radioisotope imaging (e.g., MIBI, thallium). 4. Medical record documentation of prior myocardial infarction.

PCI

A PCI is the placement of an angioplasty guide wire, balloon, or other device (e.g. stent, atherectomy, brachytherapy, or thrombectomy catheter) into a native coronary artery or coronary artery bypass graft for the purpose of mechanical coronary revascularization.

Peripheral arterial diseases

Peripheral arterial diseases (includes upper and lower extremity, renal, mesenteric, and abdominal aortic systems) can include: claudication, either with exertion or at rest; amputation for arterial vascular insufficiency; vascular reconstruction, bypass surgery, or percutaneous intervention to the extremities (excluding dialysis fistulas and vein stripping); documented aortic aneurysm with or without repair; positive non-invasive test (e.g. ankle brachial index <=0.9), ultrasound, magnetic resonance, CT, or angiographic imaging of >50% diameter stenosis in any peripheral artery (e.g. renal, subclavian, femoral, iliac). For the purpose of the registry, peripheral arterial disease excludes diseases disease in carotid and cerebrovascular arteries.

Reinfarction

Reinfarction occurs when there are clinical signs and symptoms of ischemia that is distinct from the presenting ischemic event and meeting at least one of the following criteria: 1. Spontaneous (Prior to or without revascularization, >24 hours after PCI and/or >72 hours after CABG) a. New, significant Q waves in at least two contiguous leads of an ECG that were not present with the presenting ischemic event b. Patients whose most recent cardiac markers drawn prior to reinfarction which were normal require an increase in CK-MB or troponin above the ULN which is at least >=25% above the most recent value. c. Patients whose most recent cardiac markers prior to reinfarction were above the upper limit of normal require an increase in CK-MB or troponin by >= 50% above the most recent value. 2. Within 24 hours after PCI: a. Patients with normal CK-MB values (pre-procedure) who then develop an increase in CK-MB to a value at least 3 times the upper limit of normal for your laboratory (i.e., above 3 times the 99th percentile upper reference limit for a normal population) are indicative of peri-procedural myocardial necrosis. ECG changes or symptoms are not required to qualify. Note: Some patients presenting with acute coronary syndrome will not have biomarker elevations prior to the PCI. Elevated biomarker after PCI in these cases does not necessarily mean a reinfarction occurred. b. Patients with elevated baseline (pre-procedure) cardiac biomarkers (CK-MB): there are two possible scenarios. In these scenarios, ECG changes or symptoms are not required to qualify. i. Patients with cardiac markers above the upper limit of normal (pre-procedure) assumed to be in the midst of an acute myocardial infarction. In these patients, it is not possible to distinguish necrosis that resulted from the PCI vs. necrosis arising from the presenting acute MI, and these pts require an increase in CK-MB that must also be >= 50% above the most recent value. ii. Patients with elevated biomarkers with a characteristic rise and fall in biomarker levels pre-procedure most likely have completed their presenting infarct. Further rises in CK-MB must be >= 50% above the most recent value to be coded as reinfarction. c. Patients with new, significant Q waves in at

least two contiguous leads of an ECG that was not present with the presenting ischemic event. 3. Within the first 72 hours following CABG: A CABG-related myocardial infarction is defined by an increase of biomarkers greater than 5 times the upper limit of normal for your laboratory (i.e., above 5 times the 99th percentile upper reference limit for a normal population) compared with the pre-CABG biomarker value closest to the time of surgery plus one of the following:
a. new pathological Q waves or new LBBB; b. angiographically documented new occlusion or thrombosis of a graft or native coronary artery since the preoperative angiogram; c. imaging evidence of new loss of viable myocardium at rest in the absence of a non-ischemic cause. Note: Patients with cardiac biomarkers above the upper limit of normal pre-CABG require the increase in CKMB to be >=50% above the most recent value.

ST Elevation
ST-segment elevation is defined by new or presumed new sustained ST-segment elevation at the J-point in two contiguous ECG leads with the cut-off points: >=0.2 mV in men or >=0.15mV in women in leads V2-V3 and/or >-0.1 mV in other leads and lasting greater than or equal to 20 minutes.

CATHPCI

Bifurcation lesion
A significant bifurcation or branch point is a division of a vessel into at least two branches, each of which is >1.5 mm or greater in diameter. In a bifurcation or branch lesion, the plaque extends from at least one of the limbs to the branch point; it need not progress down all the proximal and distal branches. Bifurcations or branch point lesions should be considered one lesion, no matter how many limbs are treated.

Bleeding at access site
The patient experienced significant external bleeding that occurred at the access or percutaneous entry site. To qualify, it must be associated with any of the following: 1. Hematocrit drop >=10% and/or hemoglobin drop of >=3 g/dL; 2. Transfusion of whole blood or packed red blood cells; 3. Procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding (such as surgical closures/exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear, endoscopy with cautery of a GI bleed) Acute anemia with fall in Hgb >3 g/dL without other obvious source (e.g., GI, GU, operative, or hemolysis) that is attributable to intraprocedural blood loss (e.g., during equipment exchanges) should be considered bleeding at the access site, even if no hematoma is palpable or documented on imaging studies. Prolonged pressure does not qualify as an intervention.

Bleeding events
The patient experienced a suspected bleeding event observed and documented in the medical record that was associated with any of the following: 1. Hemoglobin drop of >=3 g/dL; 2. Transfusion of whole blood or packed red blood cells; 3. Procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding (such as surgical closures/exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear, endoscopy with cautery of a GI bleed). To qualify, this adverse outcome should be attributable to this procedure and not related to a previous or subsequent procedure. A patient who was actively bleeding with coffee ground emesis pre-procedure should not qualify as bleeding. However, a patient with peptic ulcer disease with no noted or active bleeding prior to procedure who starts bleeding after the procedure would qualify as a "yes".

Dissection

Dissection is defined as the appearance of contrast materials outside of the expected luminal dimensions of the target vessel and extending longitudinally beyond the length of the lesion. Typically, dissections described as type A or B are not considered significant dissections because there is no impairment of flow. Significant dissections are grade C dissections in the presence of ischemia, or grade D-F dissections, all of which are further described as: type C: persisting contrast medium extravasations; type D: spiral filling defect with delayed but complete distal flow; type E: persistent filling defect with delayed antegrade flow; type F: filling defect with impaired flow and total occlusion

Family history of premature CAD

Family history of premature CAD includes any direct blood relatives (parents, siblings, children) who have had any of the following diagnosed at age less than 55 years for male relatives or less than 65 years for female relatives: 1. Angina 2. Acute myocardial infarction 3. Sudden cardiac death without obvious cause 4. Coronary artery bypass graft surgery 5. Percutaneous coronary intervention

Non-high/non-C lesions

Non-high/non-C lesions are considered Type A or B lesions (low or medium risk). They can be characterized as to the right. Low Risk or Type A lesions: Discrete (<10 mm length), Concentric, Readily accessible, Non-angulated segment <45 degrees, Smooth contour, Little or no calcification, Less than totally occlusive, Not ostial in location, No major branch involvement, Absence of thrombus, Medium Risk (Type B1) lesions: Tubular (10-20 mm length); Eccentric; Moderate tortuosity of proximal segment; Moderately angulated segment, 45-90 degrees; Irregular contour; Moderate to heavy calcification; Ostial in location; Bifurcation lesions requiring double guide wires; Some thrombus present; Total occlusion <3 months old, High/C lesion: Medium or high risk: Medium Risk (Type B2 lesions): Two or more "B" characteristics. Descriptions of a High Lesion Risk (C Lesion): Diffuse (length > 2cm), Excessive tortuosity of proximal segment, Extremely angulated segments > 90 degrees, Total occlusions > 3 months old and/or bridging collaterals, Inability to protect major side branches, Degenerated vein grafts with friable lesions

Non-STEMI

Non-STEMIs are characterized by the presence of both criteria: a. Cardiac biomarkers (creatine kinase-myocardial band, Troponin T or I) exceed the upper limit of normal according to the individual hospital's laboratory parameters with a clinical presentation which is consistent or suggestive of ischemia. ECG changes and/or ischemic symptoms may or may not be present. b. Absence of ECG changes diagnostic of a STEMI (see STEMI).

Perforation

A coronary artery perforation occurs when there is angiographic or clinical evidence of a dissection or intimal tear that extends through the full thickness of the arterial wall. This does not include pre-existing AV fistula and other coronary anomalies.

Segment

A segment is a defined region of a coronary artery, as illustrated in the CathPCI Registry coronary anatomy segment diagram. If the target lesion is in a bypass graft, indicate the segment location of the first anastomosis distal to the lesion (and if it's above a Y graft, indicate the segment location of the most important distal vessel). Use the following numeric reference points to identify segments where procedures were attempted and its proximal reference number. 1 Proximal right coronary artery conduit segment – pRCA 2 Mid-right coronary artery conduit segment - mRCA

3 Distal right coronary artery conduit segment – dRCA 4 Right posterior descending artery segment – rPDA 5 Right posterior atrioventricular segment – rPAV 6 First right posterolateral segment - 1st RPL
7 Second right posterolateral segment - 2nd RPL 8 Third right posterolateral segment - 3rd RPL
9 Posterior descending septal perforators segment – pDSP 10 Acute marginal segment(s) - aMarg
11 Left main coronary artery segment – LM 12 Proximal LAD artery segment – pLAD 13 Mid-LAD artery segment – mLAD 14 Distal LAD artery segment – dLAD 15 First diagonal branch segment - 1st Diag
15a Lateral first diagonal branch segment - Lat 1st Diag 16 Second diagonal branch segment - 2nd Diag
16a Lateral second diagonal branch segment - Lat 2nd Diag 17 LAD septal perforator segments - LAD SP
18 Proximal circumflex artery segment – pCIRC 19 Mid-circumflex artery segment – mCIRC 19a Distal circumflex artery segment – dCIRC 20 First obtuse marginal branch segment - 1st OM 20a Lateral first obtuse marginal branch segment - Lat 1st OM 21 Second obtuse marginal branch segment - 2nd OM 21a Lateral second obtuse marginal branch segment - Lat 2nd OM 22 Third obtuse marginal branch segment - 3rd OM 22a Lateral third obtuse marginal branch segment - Lat 3rd OM 23 Circumflex artery AV groove continuation segment - CIRC AV 24 First left posterolateral branch segment - 1st LPL
25 Second left posterolateral branch segment - 2nd LPL 26 Third posterolateral descending artery segment - 3rd LPL 27 Left posterolateral descending artery segment – LPDA 28 Ramus intermedius segment – Ramus 28a Lateral ramus intermedius segment - Lat Ramus 29 Third diagonal branch segment - 3rd Diag 29a Lateral third diagonal branch segment - Lat 3rd Diag

STEMI
STEMIs are characterized by the presence of both criteria: a. ECG evidence of STEMI: New or presumed new ST-segment elevation or new left bundle branch block not documented to be resolved within 20 minutes. ST-segment elevation is defined by new or presumed new sustained ST-segment elevation at the J-point in two contiguous electrocardiogram (ECG) leads with the cut-off points: >=0.2 mV in men or >= 0.15mV in women in leads V2-V3 and/or >= 0.1 mV in other leads and lasting greater than or equal to 20 minutes. If no exact ST-elevation measurement is recorded in the medical chart, physician's written documentation of ST-elevation or Q-waves is acceptable. If only one ECG is performed, then the assumption that the ST elevation persisted at least the required 20 minutes is acceptable. Left bundle branch block (LBBB) refers to new or presumed new LBBB on the initial ECG. b. Cardiac biomarkers (creatine kinase-myocardial band, Troponin T or I) exceed the upper limit of normal according to the individual hospital's laboratory parameters a clinical presentation which is consistent or suggestive of ischemia which is consistent or suggestive of ischemia. Note: For purposes of the Registry, ST elevation in the posterior chest leads (V7 through V9), or ST depression that is maximal in V1-3, without ST-segment elevation in other leads, demonstrating posterobasal myocardial infarction, is considered a STEMI equivalent and qualifies the patient for reperfusion therapy.

Vascular Complications
Vascular complications can include, but are not limited to, access site occlusions, peripheral embolizations, dissections, pseudoaneurysms and/or AV fistulas. Any noted vascular complication must have had an intervention such as a fibrin injection, angioplasty, or surgical repair to qualify. Prolonged pressure does not qualify as an intervention, but ultrasonic guided compression after making a diagnosis of pseudoaneurysm does qualify. A retroperitoneal bleed or hematoma requiring transfusion is not a vascular complication under this data element.

Appendix B: APPROACH ACS and PCI Registry Data Definitions

APPROACH (ACS with and without acuity markers) Registries		Legend: black - shared between the two cardiac registries, red - available only on ACS without acuity markers, blue- available only on ACS with acuity markers
Variable	***Field Options***	***Coding Instructions and Definitions of Variables or Field Options***
Name	Text	
Address, City, Province, Postal Code	Text	
Phone (H)	Numeric	
PHN/ULI	Numeric	Provincial healthcare number
Hospital	Text	
Birth Date (mm/dd/yy)	Date	
Admitting DR:	Text	
Gender	M/F	
Is this Hospital the Initial Hospital?	Y/N	
	If no, Name of the initial hospital	
ER Arrival Time (First Hospital Contact)	Date/Time	
Inpatient Admission	• Date/Time	
	• Unit	
Date and Time of Patient Transfer between Facilities/Floors	• Date/Time	
	• To:	
PRIMARY CARDIAC ADMITTING DIAGNOSIS		
ACS Diagnosis (Complete All Pages)		
	• STEMI	Primary cardiac admitting diagnosis is documented in the medical record as STEMI.
	If STEMI, STEMI type	o Ant/Lat o Inf/Post o New LBBB
	• Non-STEMI	
	• ACS (including Unstable Angina)	
	• CHF	
	• Cardiac Arrest	
	• Cardiogenic Shock	
	• CP not yet diagnosed	

Non-ACS Diagnosis (Complete Patient Hx & D/C Pages)	• Aortic Dissection	Primary cardiac diagnosis that is documented in the patients chart
	• Arrhythmia	
	• Cardiomyopathy	
	• Congenital Heart	
	• ICD Change	
	• Pacemaker Change	
	• Pericardial Disease	
	• Stable Angina	
	•Syncope	
	• Valvular Heart Disease	
	• Other	
	If other, indicate the Dx	
Date and time of ER assessment by physician	Date/Time	Date/time patient assessed by physician in emergency
Initial Vital Signs (at Point of First Medical Contact)	• BP • HR	Enter the blood pressure and heart rate at time of 1st medical contact (EMS, ED)
Presence of Crackles	Y/N	Crackling noises heard on auscultation of lungs
ASA in Previous 7 Days (Pre-Admission)	Y/N	Indicate if ASA was self-administered in the past 7 days.
Chest pain not Applicable Proceed to EMS Page)	Checkbox	Select if patient did not present with chest pain symptoms
Onset of Chest Pain	•Pain Not Applicable	Patient did not present with chest pain syndromes
	• Unknown	Select if patient is unable to identify when the pain began.
	• Date/Time of onset	Enter the date and time as stated by the patient;
	• >20 mins: Y/N/U	Indicate if duration of the pain has been more than 20 minutes
	• Typical symptoms: Y/N/U	Mid-sternal/epigastric discomfort, radiating to left arm/jaw; diaphoresis
	• >=24 hrs of angina: Y/N/U	>2 episodes within 24 hours of admission
Pre-Hospital Cardiac Arrest	Y/N	As noted by EMS or if the patient arrested during transport to hospital
EMS	Y/N	Indicate Yes if patient arrived via EMS – includes ground and air ambulance/chopper
	If yes, Region	
	If yes, Call date/time and arrival date/time	Enter the date/time the call was received by EMS and when EMS arrived on the scene
EMS PRE-HOSPITAL MEDICATIONS		Select if administered by EMS
ASA	Y/N/Unknown	
Heparin	Y/N/Unknown	
Thrombolytic	Y/N/Unknown	If yes, document Date/time of administration and type (TNK, tPA etc)

TESTS (NOTE: ONLY TESTS DONE WITHIN 3 MONTHS OF CURRENT ADMISSION ARE APPLICABLE)		
Treadmill Exercise Test, Thallium/MIBI, Stress ECHO	• Date	This section records non-invasive testing prior to admission - Suggested timeline - within 3 months of admission. Enter the date for each test if available. If unsure of the date, enter the first day of the month.
	• Strong positive	As documented on the report or patient record – Thallium/MIBI: prognostically important observation of a large anterior or multiple defects. ETT – ST depression of 2mm in Stage I or fall in BP.
	• Positive	As documented on the report or patient record.
	• Negative	As documented on the report or patient record.
	• No test	
CT, cardiac MRI, Peripheral angio	Date	Document date of test
INITIAL ECG INFORMATION		
Initial ECG Date/Time	Date/Time	
ECG Not Available	Checkbox	
ECG Normal/Clinically Insignificant	Checkbox	Indicate if ECG is normal or has clinically insignificant ST changes.
IDENTIFIED ECG CHANGES		
Lead I, aVL, V6; Lead V1 - 3; Lead V4 - 5; Lead II, III, aVF		For the grouping of leads document significant Q-waves, ST elevation, ST depression and Twave inversion.
	• Q	Q-waves should meet Minnesota code criteria of width > 30 ms
	• ST elevation	ST elevation must be >2mm
	• ST depression	St depression must be >1mm
	• T wave inversion	
Dynamic ECG Changes	Y/N	Variation in ST changes or T wave vector
Afib/Flutter, Pacemaker, LBBB, RBBB, LVH	Y/N	Record Atrial fibrillation/flutter, presence of pacemaker, LBBB, RBBB or LVH if documented on the ECG.
PATIENT HISTORY – Risk Factors		
Hypertension	Y/N/Unknown	Indicate yes if patient has a history of Hypertension diagnosed and/or treated by a physician. Treatment may include medication, diet and/or exercise
Hyperlipidemia	Y/N/Unknown	Indicate yes if patient has a history of hyperlipidemia diagnosed and/or treated by a physician
Diabetes Mellitus Type I	Y/N/Unknown	Indicate yes if patient has a history of diabetes mellitus type I diagnosed and/or treated by a physician regardless of need for antidiabetic agents. Type I diabetes is insulin dependent

		diabetes. There should be a history of 2 of the following: diabetic ketoacidosis, juvenile onset, and insulin use within 2 years of diagnosis (if patient is not obese)
Diabetes Mellitus Type II	Y/N/Unknown	All other diabetes
Renal Insufficiency	Y/N/Unknown	Indicate yes if patient has any documented history of renal (kidney) disease diagnosed and treated with medication, diet or dialysis.
	If yes, Chronic renal failure: Y/N/U	Indicate Yes if patient has documented history of chronic renal failure – progressive/gradual decline of kidney function over time.
	If yes, ACF: Y/N/U	Indicate Yes if patient has documented history of acute renal failure – sudden onset
	If yes, Dialysis: Y/N/U	Indicate yes if patient is currently undergoing either hemodialysis or peritoneal dialysis.
Prior MI	Y/N/Unknown	Indicate yes only if the patient has clear cut history and enzyme documentation, or typical ECG changes prior to this hospital admission.
	If yes, Prior MI date	Indicate the date of most recent episode
Family History	Y/N/Unknown	Indicate if the patient has/had any direct blood relative (parents, siblings, and children) who have been diagnosed with angina, MI, PCI, CABG or sudden cardiac death before age 55 years.
Congestive Heart Failure	Y/N/Unknown	Indicate YES if patient has a history of congestive heart failure diagnosed and/or treated by a physician. There must be a history of one or more of the following: exertional dyspnea, orthopnea, paroxysmal nocturnal dyspnea (PND), and either cardiac rales, or pulmonary congestion on x-ray. Neither pedal edema nor dyspnea alone is diagnostic.
Peripheral Arterial Disease	Y/N/Unknown	Indicate YES if patient has typical symptoms of claudication, positive non-invasive/invasive test, documented aortic aneurysm, or has had prior corrective surgery, angioplasty or amputation to the extremities.
Deep Vein Thrombosis (DVT)	Y/N/Unknown	Indicate Yes if patient has a documented history of DVT (blood clot in the leg/pelvis). A condition marked by the formation of a thrombus within a deep vein (as of the leg or pelvis) that may be asymptomatic or be accompanied by symptoms (as swelling and pain) and that is potentially life threatening if dislodgment of the thrombus results in pulmonary embolism.
Thromboembolic History	Y/N/Unknown	Indicate Yes if patient has a history of recurrent venous or arterial thrombembolic events
Pulmonary Embolism	Y/N/Unknown	Indicate YES if patient has a documented history of pulmonary embolism (blood clots in the lung). Embolism of a pulmonary artery or one of its branches that is produced by foreign matter and most often a blood clot originating in a vein of the leg or pelvis and that is marked by laboured breathing, chest pain, fainting, rapid heart rate, cyanosis, shock, and sometimes death
Prior PCI	Y/N/Unknown	Indicate any previous PCI (percutaneous coronary intervention) regardless of centre where PCI was done.
Prior CABG	Y/N/Unknown	Indicate previous CABG (coronary artery bypass grafting) surgery regardless of centre where CABG was done

COMORBIDITY FACTORS		
Pulmonary	Y/N/Unknown	Chronic lung disease – the patient must have a documented history of COPD, asthma, bronchitis and be on pharmacological therapy (i.e. bronchodilators or inhaled steroids).
Liver Disease	Y/N/Unknown	Liver abscess, cirrhosis, hepatitis
Malignancy < 5 yrs	Y/N/Unknown	Patient must have a documented history of solid organ malignancy or leukemia/lymphoma requiring treatment within the past 5 years.
GI Disease	Y/N/Unknown	Gastrointestinal disease i.e. esophageal varices, gastric ulcer, duodenal ulcer, peptic ulcer
Other	Text	Enter diseases that limit life expectancy (i.e. MS or Guillian-Bare syndrome).
Cerebrovascular Disease	Y/N/Unknown	Indicate yes if patient has any of the following previously documented cerebrovascular diseases
	If yes, Type	
	o CVA</=2 weeks prior to admission	Cerebrovascular accident – history of stroke i.e. loss of neurological function caused by an ischemic event with residual symptoms at least 24 hours after onset. Note recent (within 2 weeks)
	o CVA>/=2 weeks prior to admission	Cerebrovascular accident – history of stroke i.e. loss of neurological function caused by an ischemic event with residual symptoms at least 24 hours after onset. Note remote (CVA occurred > 2 weeks prior).
	o COMA	Mental unresponsiveness
	o RIND	Reversible Ischemic Neurological Deficit – history of loss of neurological function caused by an ischemic event but with return of function within 72 hours.
	o TIA	Transient ischemic attack - loss of neurological function caused by an ischemic event that was abrupt in onset but with complete return of function within 24 hours.
	o Non-Invasive >75%	Non-invasive carotid testing with >75% occlusion
	o Previous Carotid Surgery	Prior carotid surgery ie endarterectomy or carotid intervention/stenting for carotid artery stenosis.
	o Unknown	
Delirium	Y/N/Unknown	Indicate YES if patient has history of delirium documented on the health record. A mental disturbance characterized by confusion, disordered speech, and hallucinations.
Psychiatric History	Y/N/Unknown	Indicate YES if patient has a history of one of the following that was diagnosed and treated by a physician – mood (depression, bipolar disease), anxiety (obsessive compulsive, panic attacks) or psychotic disorder (schizophrenia).
Infectious Endocarditis	Y/N/Unknown	Indicate YES if patient has a history of infectious endocarditis documented by history or one of the following: 1) positive blood cultures; 2) vegetation on ECHO and/or other diagnostic modality
	If yes, Treated: Y/N	If no antibiotic treatment is being given then the infection is considered treated.
	If yes, Active: Y/N	If the patient is currently being treated for endocarditis, the disease is considered active.
Smoking Status		Cigarettes only. Cigar/pipe smoking is not included

	• Unknown	
	• Never	
	• Current	Use of cigarettes within one month of admission date.
	• Former – if Yes document Date Quit and pack/years	Use of cigarettes > one month of admission date. Indicate Date Quit. If you only know the year that the patient quit enter 01-Jan- of the identified year. Indicate PK yrs (pack years) or use calculator by entering the number of years the patient has smoked and the number of packs per day smoked – use decimal i.e. 0.5=1/2 pack.
ALCOHOL USE		
History of Alcoholism	Y/N/Unknown	YES if patient has documented history of alcoholism
#Drinks/Weeks	Numeric	A drink = one 12 ounce beer or wine cooler, one 5 ounce glass wine, or 1.5 ounce Spirits
IN HOSPITAL MEDICATIONS		Document medications administered during hospitalization. Do not remove medications if the med has been discontinued after administration; once YES always yes
Thrombolytics, GPIIb/IIIa	Y/N	
	If yes, Date and time, type	Indicate date/time of either the first bolus or beginning of the infusion and choose type
	If yes, 2nd dose date and time, type	
Beta Blockers, Calcium Channel Blockers, Long Acting Nitrates, ARB, ACEI, Digitalis, Diuretics, Mucomyst, Antidepressants, Anxiolytic (Anti-Anxiety), ASA, Clopidogrel, Coumadin, Oral Hypoglycemics, Immunosuppressive Rx, Bronchodilators/Inhaled Steroids, Nitrates IV, Inotropes IV, Heparin IV, LMWH, Bivalirudin, Factor XA Inhibitors	Y/N/Unknown	Users receive a list of medications and medication category
Lipid Lowering Drugs	Y/N/Unknown	
	If yes, Type(Statin, Other, Statin+Other)	
Antiarrhythmics	Y/N/Unknown	
	If yes, Type (Amiodarone, Other, Both)	
Insulin	Y/N/Unknown	
	If yes, IV, Pump , Subuctaneous	
LAB RESULTS	Lab values that are not completed (i.e.HBA1C) should remain blank	

Initial Lab Results		
Hgb, Platelets, WBC, Glucose (Random vs fasting), HBA1C, BNP, Creatinine, CRP, Total Cholesterol, Triglycerides, HDL, LDL, CK, CK-MB, Trop I, Trop T	Numeric	Enter initial lab values. eGRF is automatically calculated
PEAK LAB RESULTS		
Platelets, Creatinine, CRP, CK, CK-MB, Trop I, Trop. T	Numeric	For platelets record lowest value. For Cr and Cardiac enzymes record highest/peak value.
DISCHARGE INFORMATION		
HOSPITAL ADVERSE EVENTS		
Hemorrhagic Stroke	Y/N/Unknown	Indicate Yes if patient experiences CVA (Cerebrovascular accident) or loss of neurological function and cerebral bleed is documented by MRI/CT/death certificate.
	If yes, Date & time	
Non-hemorrhagic Stroke	Y/N/Unknown	Indicate Yes if patient experiences CVA (Cerebrovascular accident) or loss of neurological function and MRI/CT/death certificate reveals thrombosis of one of the cerebral arteries or an embolic event.
	If yes, Date & time	
Major Bleed	Y/N/Unknown	Indicate Yes if Intracranial bleed or clinically significant overt signs of hemorrhage associated with a drop in hemoglobin of > 5 g/dL.
	If yes, Date & time	
Reinfarction	Y/N/Unknown	Indicate Yes if An extension of the initial admission infarct; secondary rise in cardiac markers; a MI resulting from a cath or PCI; new Q waves noted on ECG (.03 sec in width and or > 1/3 of the total QRS complex) in contiguous leads or new LBBB.
	If yes, Date & time	
Recurrent Angina	Y/N/Unknown	Indicate Yes if patient Required medical or procedural intervention (I.e. nitro drip/cath lab)
Vascular Complications	Y/N/Unknown	Indicate Yes if documentation of Pseudoaneurysm, Hematoma, retroperitoneal bleed, arterial occlusion, DVT or other venous or arterial clot.
Congestive Heart Failure	Y/N/Unknown	Indicate Yes if documentation of new CHF during hospitalization as complication of procedure or admitting diagnosis.
Transfusion,	Y/N/Unknown	Indicate Yes if documentation of blood transfusion
Dialysis (HD/CRRT)	Y/N/Unknown	Indicate Yes if documentation of NEW dialysis. HD=hemodialysis; CCRT – continuous renal replacement therapy
DISCHARGE MEDICATIONS		

ASA, Beta Blockers, ACEI, Coumadin, Ticlopidine/Clopidogrel, ARB Antagonists	Y/N/Unknown	
Lipid Lowering	Y/N/Unknown	
	If yes, Types:	
	o Statin o Other o Statin+Other	
DISCHARGE STATUS		
Status	• Deceased	
	• Alive	
If ALIVE – discharge location	• Home	
	• Rehab	
	• Hospice	
	• Acute Care Transfer	
	• Nursing Home	
	• Off cardiology	
Discharge/Transfer Date and Time	Date/Time	Indicate the date/time that the discharge/transfer or death occurred
Cardiac Rehabilitation Referral		
	• Yes	
	• No	
	• Prior referral	
	• Refused	Patient refuses referral
	• Ineligible	Indicate ineligible if patient is contraindicated for reasons of dementia, long-term nursing home placement, no rehab near home
Smoking Cessation Counselling	Yes/No/NA	
	If yes indicate: • Program • Pharma • Program + Pharma	
Indicate Primary Discharge Diagnosis with a 1; Indicate Secondary Discharge Diagnosis with a 2	STEMI (ant +/- Lat), STEMI (Inf +/- Post), STEMI (New LBBB), Non-STEMI, Unstable Angina, CHF, Aortic Dissection Arrhythmia, Cardiomyopathy, Congenital heart disease, ICD Change, Non-cardiac Chest Pain, Pacemaker change, Pericardial Disease, Stable Angina, Valvular Heart Disease, Other	Indicate the most responsible cardiac discharge diagnosis

APPROACH – CATH Registry		
Variable	***Field Options***	***Coding Instructions/Definitions of Variables and Field Options***
Name		
Address	Text	Patients address includes address, city, province, postal code
Phone #	Numeric	Indicate home or mobile
Priority		Refers to status at the time of referral
	• Emergency	To be done without delay
	• Emergency Salvage	To be done without delay in an effort to save the patient's life
	• Urgent-In	To be done prior to hospital discharge not emergent and not elective
	• Urgent-Out	To be done on an urgent basis but patient came from home - next available time
	o If urgent-out, transfer from hospital & unit	
	• Low Risk/Planned	To be done as an outpatient/day procedure - procedure can be deferred without cardiac compromises
PHN	Numeric	
Hospital ID	Numeric	
DOB - Age	Numeric	Enter patients date of birth – age is calculated from date of birth to date of cath
BMI	Numeric	
Gender	M/F	
Height, Weight, BMI	Numeric	BMI is calculated from Ht and wt
CLN	Numeric	Cathlab number -– enter if appropriate
CathDate	Date	
Referring Physician	Text	Indicate physician that has referred the patient for cath
Performing Cardiologist	Text	Cardiologist performing the diagnostic procedure
Resident	Y/N	
Technologist #1/#2	Text	
Protocol	Text	Indicate name of Research protocol/study.
Heartview/CARAT not done	Checkbox	Tick if coronary graphic not completed
Heartview?CARAT Comment	TEXT	Indicate the reason that the coronary graphic was not done – ie could not gain access
Admission CCS Class		Indicate the CCS class at time of hospital admission or at time of cath
	• None	No angina
	• I	Ordinary physical activity, such as walking and climbing stairs, does not cause angina. Angina with strenuous, rapid or prolonged exertion.
	• II	Slight limitation of ordinary activity. Angina with walking or climbing stairs rapidly, walking uphill, walking

		or stair climbing after meals, in cold, in wind, or when under emotional stress, or only during the few hours after awakening.
	• III	Marked limitation of activity. Angina with walking one or two blocks or climbing more than one flight of stairs in normal conditions.
	• IVa	Unstable angina, pain resolved with intensified medical therapy, now stable on oral medication. Inability to carry on any physical activity without discomfort - angina syndrome may be present at rest.
	• IVb	ACS on oral therapy, symptoms improved but angina with minimal provocation.
	• IVc	ACS - symptoms persisting, not manageable on oral therapy, may be hemodynamically unstable, requires coronary care monitoring and IV medication (i.e. nitrates, inotropes).
	• Atypical	Use this selection if the patient is experiencing more general atypical symptoms which may be related to angina – fatigue, nausea, vomiting, diaphoresis, faintness and back pain
Referral #	Numeric	Software calculated so referral and cath procedure are linked
Access Site		Enter ARTERIAL access site. User can add more than one access site – assumed that the last site is the successful site.
	• Left/Right radial	
	• Left/Right femoral	
	• Left/Right brachial	
French Size	Numeric	Enter the French size of the arterial catheter.
Heart Rate	Numeric	
Quality of Life	Text	Reported by patient - Patient is asked to rate their quality of life on a scale of 0-10. 0 = lowest quality (someone completely dependent physically on others, seriously impaired mentally, unaware of surroundings and in a hopeless situation) & 10 = highest (someone physically and mentally independent, communicating well with others, able to do most of the things enjoyed, pulling own weight, with a hopeful yet realistic attitude).
Work Status		Enter the patient's work status throughout the past 3 months
	• Full time	
	• Part time	
	• Student	
	• Unemployed	
	• Sick Leave	
	• Retired	
	• Homemaker	
CD #	Numeric	Indicate CD# of film if appropriate
Procedure Start	Time	Start date/time of procedure – defined as the time at which local anesthetic was first administered for

		vascular access or the time of the first attempt at vascular access – whichever is first.
Procedure End	Time	This is the procedure end time as defined by the Fluoro time or "Catheters out".
Indication	Text	This section refers to the diagnostic reason for the procedure
ECG		Common table – see previous definitions – ACS ECG. For Cath enter the most diagnostic ECG.
OUTCOME DETERMINANTS – RISK Factors) COMMON TABLE – See ACS definitions		
PRE-CATH Medications		Indicate meds administered in 24 hours pre-cath
Thrombolytics and GP IIb/IIIa Platelet Inhibitors	Y/N	
	If yes, Date/time and type.	Indicate Date/time of first bolus or beginning of infusion and name of medication administered.
Beta-blockers, Calcium Channel Blockers, Long Acting Nitrates, ARB Antagonists, ACEI, Digitalis, diuretics, Mucomyst, Anti-Depressants, Anxiolytics, ASA, Clopidogrel, Coumadin, Oral Hypoglycemics, Immunosuppressive Rx, Bronchodilators/Inhaled Steroid, Nitrates IV, Inotropes IV, Heparin IV, LMWH, Bivalirudin, Factor XA Inhibitors	Y/N	Common Table – users have a list of medications and categories
Lipid Lowering Drugs	If yes enter statin, other, both	Both = statin + other
Antiarrhythmics	If YES enter amiodarone, other, both	Both = amiodarone + other
Insulin	If YES note IV, sc, pump	
LAB Results		COMMON TABLE – For Cath enter pre procedural values. Enter Creatinine closest to time of cath. For cardiac enzymes enter peak pre-procedure.

Hgb, Platelets, WBC, Creatinine, GLUCOSE(Fasting vs random), HbA1c, K, Ca, Na, CK, CK-MB, Trop I, Trop T, CRP, INR, Cholesterol, Triglycerides, HDL, LDL	Numeric	
Postproc Results		Enter lab results post cath.
Hgb, Platelets, WBC, Creatinine, CK, CK-MB, Trop. I, Trop. T, CRP	Numeric	Enter lowest Hgb and platelets but for other values (Creatinine and cardiac enzymes) list peak values.
In Lab Medications		
GP IIb/IIIa, LMWH, Heparin IV, Bivalirudin	Y/N	
CATH Procedural DATA		
Diagnostic Catheters	Numeric	Count of catheters
IVUS, Flow Wire, Pressure Wire, Filter Wire	Numeric	Enter number of IVUS/Flow Wire/Pressure Wire- if yes enter ischemia YES or No/Filter Wire used
Fluoro Time	Numeric - Minute	Fluoro time in minutes
Dye	Numeric	Indicate the amount of dye used to the nearest cc – total used
Dye type	Text	Indicate ionic, non-ionic, low-ionic
Extent of CAD	TEXT	Software calculated from the coronary graphic. Duke Coronary Index from native coronaries. Menu includes: Normal, Disease <50%, SVD 50-70%, SVD >70%, SVD with pLAD>70%, 2VD, 2VD both >70%, 3VD, 3VD with pLAD, 3VD with pLAD>70%, LeftMain disease, Severe Leftmain disease.
Duke Jeopardy Score	Numeric	Software calculated from the coronary graphic.
APPROACH Jeopardy Score	Numeric	Software calculated from the coronary graphic.
Treatment Recommendation	Text	Medical therapy, PCI, CABG, Non-invasive testing, PCI vs CABG, Further consultation.
Blood Pressure Pre and Post	Numeric	
LVEDP	Numeric	Indicate LVEDP – left ventricular end diastolic pressure in mm
Mean PA Pressure	Numeric	Indicate Mean pulmonary artery pressure
Closure Device		If YES - Indicate the type of closure device used to close the arterial access site from the drop down.
	• Angioseal	
	• Perclose	
	• Starclose	
	• Superstich	

LVEF Angiography	• Calc%	Calculated EF
	• Estimate	Visual estimate
	o >50% o 35-50%	
	o 20-34%	
	o LV not done	
	• Reason	Reason LV not able to be calculated
LVEF Non-invasive	• Calc %	Calculated EF
	• Estimate	Visual estimate
	o >50% o 35-50%	
	o 20-34%	
	o LV not done	
	• Based on	Document type of non-invasive test - MUGA, ECHO, Nuclear, cMRI, CT
In Lab Events		ENTER events that occur while the patient is in the cathlab
	• None	Procedure was uneventful - i.e. no complications.
	• Death	Patient died while in the cath lab
	• Prolonged angina	Angina requiring NTG.
	• MI	Please note that this field is for MI that occurred as a result of the procedure – i.e. NEW complication - NOT patient presenting with AMI at time of cath.
	• CVA	Patient experiences CVA (Cerebrovascular accident) or loss of neurological function
	• Pulmonary edema	Patient goes into pulmonary edema during cath
	• Embolization	Distal embolization - clot
	• ECABG	Patient required CABG as a result of the procedure – patient moved directly to OR.
	• Access site complication	Bleeding, dissection, loss of distal pulse
	• VT/VF treated	Required cardioversion
	• Afib/Flutter	Atrial fibrillation or flutter that is symptomatic or requiring treatment
	• Anaphylactic reaction	Including broncho spasm and vascular collapse
	• Contrast allergy	Hives/rash noticed during procedure, after contrast has been used.
	• No reflow	Reduction of antegrade flow without a demonstrable residual stenosis
	• Bradycardia treated	I.e. with pacing
	• Acute closure during procedure	Coronary occlusion (TIMI 0/1) occurred during cathlab visit
	• Shock	New onset or acute recurrence of Cardiogenic shock – sustained episode of systolic BP <90mm Hg and/or CI <2.2 L/min/m2 determined to be secondary to cardiac dysfunction and/or the requirement for inotropes or vasopressor agents or mechanical support to maintain BP and CI.

	• IABP	Intra Aortic Balloon Pump required during catheterization or before leaving cathlab – do not enter if prophylactic
	• Important side branch occlusion	Enter if TIMI 0/1 and vessel size must be > 1.5mm
	• Dissection requiring vascularization	Arterial dissection and if yes Drop down menu includes choices of aortic or coronary
Predischarge Complications	• None	Enter complications within 48 hours of CATH procedure
Death		
Hemorrhagic stroke	Y/N	Patient experiences CVA (Cerebrovascular accident) or loss of neurological function and cerebral bleed is documented by MRI/CT/death certificate. Note Date/time.
Non-Hemorrhagic Stroke	Y/N	Patient experiences CVA (Cerebrovascular accident) or loss of neurological function and MRI/CT/death certificate reveals thrombosis of one of the cerebral arteries or an embolic event. Note date/time.
Thrombocytopenia	Y/N	
CABG	Y/N	
GI Bleed	Y/N	Requiring treatment with transfusion/surgery
Renal Failure	Y/N	New or increasing renal failure
Out of Lab Vascular Complications	• None	If yes – note below. These complications should be as a result of the CATH procedure.
	• Pseudoaneurysm	Occurrence of aneurysmal dilatation of artery at the access site – demonstrated by an imaging study - arteriography or ultrasound.
	• AV Fistula	Connection between the access artery (i.e. femoral) and access vein that is demonstrated buy an imaging study. Often characterized by a continuous bruit
	• Hematoma	Indicate size of hematoma using drop down: <5cm, 5-10 cm, and > 10 cm.
	• Retroperitoneal Bleed	Bleeding in the area outside or behind the peritoneum.
	• Access Site Bleeding	Patient experienced significant external bleeding that occurred at the access site
	• Occlusion	Total obstruction of the artery at the site of access requiring surgical repair. May be accompanied by absence of palpable pulse or Doppler signal and associated with signs and symptoms of an ischemic limb.
	• Dissection	Dissection of artery used in access

APPROACH – PCI Registry		
Variable	***Field Options***	***Coding Instructions/Definitions of Variables and Field Options***
Demographics		Common table to ACS and CATH
Name		
Address	Text	
Home Phone #	Numeric	Home and/or Mobile
Priority		Refers to status at the time of PCI – common definitions with CATH
PHN	Numeric	
Hospital ID	Numeric	
Age	Numeric	
BMI	Numeric	
Gender	M/F	
Height, Weight	Numeric	
CLN	Numeric	Cathlab number - Site specific – enter if appropriate
PCI Date	Date	
Scheduling	Cath to immediate PCI	Document scheduling/timing of PCI
	If yes,	
	• STEMI (primary PCI, facilitated, rescue)	Primary PCI – Patient admitted with STEMI and came directly to cath lab – no thrombolytic Facilitated – Patient admitted with STEMI received thrombolytic/antithrombotic and coming to the cathlab Rescue – Patient coming to the cathlab following failed full dose thrombolysis.
	• Cross-over sameday	Patient had cath followed by PCI on the same day. This situation arises when a diagnostic procedure is performed by an angiographer who does not do interventions, there is often a short wait until an interventionalist is available. Occasionally the intervention portion is deferred for a few hours if the operator feels that more time is needed for informed consent or for research purposes.
	•Cross over Same sitting	In practice this scenario is more common and arises when the PCI is done in the same sitting as the diagnostic catheterization i.e. same lab and often with the same operator involved.
	• Staged	Patient previously had PCI to culprit vessel and was then referred to come back for another vessel
	• Low Risk- Planned	PCI booked – may be an in or out patient.
Interventionist	Text	
Resident	Y/N	
Technologist #1/#2	Text	
Protocol	Text	Indicate Research protocol/study
Heartview/CARAT Not Done	Checkbox	See CATH definition
		See CATH definition

Admission CCS Class		Indicate the CCS class at time of hospital admission or PCI. Common definitions
Ref. Cardiologist	Text	Enter Referring Cardiologist
Access Site		Enter ARTERIAL access site. User can add more than one access site – assumed that the last site is the successful site.
	• Left/Right radial	
	• Left/Right femoral	
	• Left/Right brachial	
French Size	Numeric	Enter the French size of the arterial catheter.
Heart Rate	Numeric	
Quality of Life	Text	See CATH definition
Work Status		
	• Full time	Enter the patient's work status throughout the past 3 months. See CATH definition
	• Part time	
	• Student	
	• Unemployed	
	• Sick Leave	
	• Retired	
	• Homemaker	
CD #	Numeric	
Procedure Start	Time	Start date/time of procedure – defined as the time at which local anesthetic was first administered for vascular access or the time of the first attempt at vascular access – whichever is first. If adhoc procedure enter start of PCI case
Procedure End	Time	This is the procedure end time as defined by the Fluoro time or "Catheters out".
Indication	Text	This section refers to the reason for the PCI procedure. See CATH definition
ECG	Date	Common Table – See ACS Definitions
OUTCOME DETERMINANTS - Risk Factors Common Table – See ACS definitions		
Medications		COMMON TABLE – See Cathlab Definitions
Thrombolytics/GP IIb/IIIa	Y/N	
	If yes,	Date/time of first bolus or beginning of infusion and name of medication
Beta-blockers, Calcium Channel Blockers, Long Acting Nitrates,	Y/N	

ARB Inhibitors, ACEI, , Digitalis, diuretics, Mucomyst, Anti-Depressants, Anxiolytics, ASA, Clopidogrel, Coumadin, Oral Hypoglycemics, Immunosuppressive Rx, Bronchodilators/Inhaled Steroid, Nitrates IV, Inotropes IV, Heparin IV, LMWH, Bivalirudin, Factor XA		
Lipid lowering drugs		See Cath Definitions
Antiarrhythmics		See Cath Definitions
Insulin		See Cath Definitions
Pre PCI Results		
Hgb, Platelets, WBC, Creatinine, GLUCOSE(Fasting vs random), HbA1c, K, Ca, Na, CK, CK-MB, Trop I, Trop T, CRP, INR, Cholesterol, Triglkycerides, HDL, LDL	Numeric	
Post PCI Results		
Hgb, Platelets, WBC, Creatinine, CK, CK-MB, Trop. I, Trop. T, CRP	Numeric	
In Lab Medications		
GP IIb/IIIa, LMWH, Heparin IV, Bivalirudin	Y/N	Common table – See Cath Definitions
PCI DATA		
Guiding Catheters	Numeric	Enter count of guiding catheters
Rotational/Directional Atherectomy	Numeric	Enter count of atherectomy devices used
IVUS, Flow Wire, Pressure Wire, Filter Wire	Numeric	Enter count of IVUS/Flow Wire/Pressure Wire – if YES enter findings of ischemia/Filter Wire used
Other	Text	
Initial Wire Crossing	Date/Time	Enter date/time of initial wire crossing

Balloon 1st Inflation	Date/Time	Balloon 1st Inflation or stent deployment – whichever is first – could also refer to angiojet or thrombectomy/aspiration device. Enter the appropriate date/time
TIMI 3 Flow Observed	Time	Refers to the time that TIMI 3 flow was observed in the culprit artery.
Fluoro Time	Minute	Enter Fluor time during PCI procedure
Dye	Numeric	Indicate the amount of dye used to the nearest cc during PCI
Blood Pressure Pre and Post	Numeric	
Instent Restenosis < 1yr	yes/No	
Final Timi Flow	Numeric	Enter final TIMI flow in culprit PCI vessel (0,I,II, III)
Closure Device		Indicate the type of closure device used to close the arterial access site from the drop down.
	• Angioseal	
	• Perclose	
	• Starclose	
	• Superstich	
LVEF Angiography	• Calc%	This will have been entered during the CATH but if done during an elective PCI then Cath definitions apply. Calculated EF
	• Estimate	Visual estimate by using the pull down menu
	o >50% o 35-50%	
	o 20-34%	
	o LV not done	
	• Reason	
LVEDP	numeric	Indicate left ventricular end diastolic pressure in mmHg
LVEF Non-invasive	• Calc %	Calculated EF
	• Estimate	Visual estimate by using the pull down menu [>50%; 35-50: 20-34: <20 , LV not done].
	o >50% o 35-50%	
	o 20-34%	
	o LV not done	
	• Based on	
PCI Dissections	Numeric	
In Lab Events		Enter complications occurring in the cathlab and during the PCI procedure – See cath definitions
	• None	Procedure was uneventful - i.e. no complications.
	• Death	Patient died while in the cath lab
	• Prolonged angina	Angina requiring NTG.
	• MI	Please note that this field is for MI that occurred as a result of the procedure – i.e. NEW complication -

		NOT patient presenting with AMI at time of cath.
	• CVA	Patient experiences CVA (Cerebrovascular accident) or loss of neurological function
	• Pulmonary edema	Patient goes into pulmonary edema during cath
	• Embolization	Distal embolization - clot
	• ECABG	Patient required CABG as a result of the procedure – patient moved directly to OR.
	• Access site complication	Bleeding, dissection, loss of distal pulse
	• VT/VF treated	Required cardioversion
	• Afib/Flutter	Atrial fibrillation or flutter that is symptomatic or requiring treatment
	• Anaphylactic reaction	Including broncho spasm and vascular collapse
	• Contrast allergy	Hives/rash noticed during procedure, after contrast has been used.
	• No reflow	Reduction of antegrade flow without a demonstratable residual stenosis
	• Bradycardia treated	I.e. with pacing
	• Acute closure during procedure	Coronary occlusion (TIMI 0/1) occurred during cathlab visit – note if successfully redilated.
	• Shock	New onset or acute recurrence of Cardiogenic shock – sustained episode of systolic BP <90mm Hg and/or CI <2.2 L/min/m2 determined to be secondary to cardiac dysfunction and/or the requirement for inotropes or vasopressor agents or mechanical support to maintain BP and CI.
	• IABP	Intra Aortic Balloon Pump required during catheterization or before leaving cathlab – do not enter if prophylactic
	• Important side branch occlusion	Enter if TIMI 0/1 and vessel size must be > 1.5
	• Dissection requiring vascularization	Drop down menu includes choices of aortic or coronary
Predischarge Complications		Enter complications within 48 hours of PCI - See Cathlab definitions
		Patient experiences CVA (Cerebrovascular accident) or loss of neurological function and cerebral bleed is documented by MRI/CT/death certificate. Note Date/time.
		Patient experiences CVA (Cerebrovascular accident) or loss of neurological function and MRI/CT/death certificate reveals thrombosis of one of the cerebral arteries or an embolic event. Note date/time.
Out of Lab Vascular Complications	• None	See Cathlab definitions

Supporting Definitions in APPROACH

AV Fistula
Connection between the access artery (i.e. femoral) and access vein that is demonstrated buy an imaging study. Often characterized by a continuous bruit

Bleeding at access site
Patient experienced significant external bleeding that occurred at the access site

Hematoma
Indicate size of hematoma using drop down: <5cm, 5-10 cm, and > 10 cm.

Loss of Distal Pulse
Loss of pulse distal to access site requiring therapy.

Occlusion
Total obstruction of the artery at the site of access requiring surgical repair. May be accompanied by absence of palpable pulse or Doppler signal and associated with signs and symptoms of an ischemic limb.

Pseudoaneurysm
Occurrence of aneurysmal dilatation of artery at the access site – demonstrated by an imaging study - arteriography or ultrasound.

Retroperitoneal Bleed
Bleeding in the area outside or behind the peritoneum.

Appendix C: CCN Registry Data Definitions

CCN Registry		
Variable	***Field Options***	***Coding Instructions and Definitions of Variable/Field Options***
PATIENT INFORMATION		
Name	Text	Indicate the patient's first, middle, and surname.
Birth Date	Date	Patient's Date of Birth YYYY MM DD
Health Card Number	Numeric	The Patient's Health Care Number for THIS ENCOUNTER
MRN/Hospital Chart #	Numeric	
Address	Text	Home : The current residence, not necessarily the official permanent residence. Mailing: The address specified for mailing materials to the patient. Temporary: A temporary address where the patient or patient's family can be reached.
City/Town	Text	City of the Address Specified: Goes with the address where the patient or patient's family can be reached.
Province	Text	Province code of patient's residence. Use official Canada Post letter abbreviation. This province code goes with the address where the patient or patient's family can be reached.
Postal Code	Text	A postal code is a series of letters and/or digits appended to a postal address for the purpose of sorting mail. This code goes with the address where the patient or patient's family can be reached.
E-mail Contact	Text	
Home Phone/Other #	Numeric	Home: Phone number of current residence, not necessarily official permanent residence
PHYSICIAN DETAILS		
Name of Referring Physician		Physician who referred Patient for procedure selected from a look up list associated with the provincial CPSO index. Specify the type of referring physician. Do not include Dr. or other salutation; Use last name, first name only.
	• Specialist • Family/GP	
	• Referring MD is out-of-province	Check if the referral was received from a Out of Province Physician, then specify the name in the text box provided.
Name of GP/Family Physician	Text	The name of the patient's family physician, if available. Indicate only if GP is different from referring physician
Date of Request for Specialist Consult	Date	The date written on the form by the referring physician (cath referral form or other form requesting procedure) on which the request was made. The date is next to the physician signature line on the CCN standard referral form. Date Format YYYY-MM-DD
Name of Requested Procedural Physician(s)	Text	Referral specifies a request for a specific procedural physician.

	• First Available Procedural Physician	The referral requests the procedure can be done by the first available procedural physician.
REASON(S) FOR REFERRAL		
Primary and Secondary (if any) Reason for Referral		Check all that apply
	• Coronary disease	If Primary or Secondary Reason for Referral is coronary disease, describe type of Coronary Disease
	If yes,	
	o Elective stable CAD	
	o Unstable angina	
	o Non-ST elevation MI (NSTEMI)	
	o ST elevation MI (STEMI)	
	• Aortic stenosis	
	If yes,	
	o Echo valve area (cm2)	The Aortic valve area (echo) is a record of the area of the aortic valve (measured in squared centimetres) from the findings of a specific echocardiography investigation.
	o Echo gradient (mmHg)	The aortic gradient is used in the estimation in severity of Aortic Stenosis. Aortic Mean Gradient as derived by the echo or planimetry of cath gradient measured in mmHg. If both echo and cath available then order of priority is (1) echo (2) cath. First use peak if available, otherwise use mean.
	• Other valvular	
	• Congestive heart failure (including cardiomyopathy)	A history of one or more of the following: exertional dyspnea, orthopnea, paroxysmal, nocturnal dyspnea (PND), and either cardiac rales, or pulmonary congestion on x-ray. Neither pedal edema nor dyspnea alone are diagnostic.
	• Arrhythmia	Cardiac rhythm disturbances
	• Congenital	
	• Other	If Primary or Secondary Reason for Referral = OTHER specify type: protocol (research or employment); cardiac biopsy (cath for purpose of biopsy); donor cathed as donor for transplant; transplant recipient; heart disease of other aetiology
REQUEST TYPE		
Request Type		This field is for CATH only. If referring healthcare provider completing the referral does not complete this field, user should leave this field blank as it is not a required field
	• No consult required - CATH only	
	• Referral for CATH and consultation regarding subsequent management	

URGENCY		
Referring MDs Estimate of Urgency		
	• Emergent • Elective	
	• Urgent (while still in hospital)	
	• Urgent (within 2 wks)	
	• Unknown	
PATIENT WAIT LOCATION		
Patient Wait Location		Location of Patient at time of acceptance can include Home.
	• Hospital • Home • ICU/CCU	Specify name of Hospital
	• Ward	Specify name of Ward.
	• Other	Specify in the space provided.
Translator Required	Y/N	Whether a translator is needed. If yes, specify language for which a translator is needed
RECENT OR PREVIOUS MI		
History of MI	Y/N	History of MI is an MI > 30 days from the referral date. If 'Service Detail 2' = CABG, or CABG + Valve and if current referral date of most recent coronary angiogram procedure < 6 months then default History of MI value is from the Referral Form page of most recent coronary angiogram procedure. If 'Service Detail 2' = coronary Angiogram, and if current referral date of most recent CABG procedure < 6 months then default History of MI value from Referral Form page of most recent CABG procedure Otherwise Default is : No Value
Recent MI	Y/N	Patient has had an MI within 30 days of (Prior to) referral date. When recent MI = (Y) yes, date of recent MI becomes a required field. (If 'Service Detail 2' ='CABG', or 'CABG +Valve' and if current date – referral date of most recent coronary angiogram procedure <6 months) 'Recent MI' value from Referral Form page of most recent coronary angiogram procedure (If 'Service Detail 2' = 'Coronary Angiogram', and if current date – referral date of most recent CABG procedure < 6 months) 'Recent MI' value from Referral Form page of most recent CABG procedure Otherwise default is : No Value
Recent MI Date		Date if Recent MI < or = to 30 days before referral date. If MI date is uncertain then use Admission date as a default.
HEART FAILURE CLASS (NYHA)		
The New York Heart Association (NYHA)		Not applicable applies to patients without known HF.
	• I	No symptoms with ordinary physical activity.

	• II	Symptoms with ordinary activity. Slight limitations of activity.
	• III	Symptoms with less than ordinary activity. Marked limitation of activity.
	• IV	Symptoms with any physical activity or even at rest.
	• N/A	Not applicable
REST ECG		
Rest ECG	Done/Not Done	Indicate if the first electrocardiogram Coding Instructions: (ECG) was obtained.
Ischemic Changes at Rest	Y/N/Uninterpretable	Are there ischemic changes at rest? Uninterpretable: Significant resting ST segment depression, or Left Bundle Branch Block, or LVH, or Digoxin therapy, or paced ventricular rhythm or WPW
Ischemic Change Type		If there are ischemic changes at rest, what type?
	• Persistent (fixed)	
	• Transient without pain	
	• Transient with pain	
	• Not applicable	
Exercise ECG	Done/Not Done	Indicate whether exercise electrocardiogram was done
Exercise ECG Risk		Risk Assessment from Exercise ECG
	• Low	Low risk – Absence of high risk criteria Uninterpretable – Significant resting ST segment depression, or Left Bundle Branch Block, or LVH, or Digoxin therapy, or paced Ventricular rhythm or WPW.
	• High risk	High risk – patient demonstrates any of the following: a) >= 2.5mm ST depression or ST elevation > 1mm in leads without q waves at low workloads (heart rate < 120); or b) early onset ST segment changes or angina in 1st stage (3 min); or c) ST segment depression lasting longer than 8 minutes into recovery stage; or d) max HR < 120 on no cardio-inhibitory medication; or e) SBP lowered at least by 10mm Hg; or f) 3 or more beats of ventricular tachycardia; or g) Duke treadmill score <-10.
	• Uninterpretable • Not applicable	
FUNCTIONAL IMAGING		
Functional Imaging Done	Done/Not Done	Functional imaging includes exercise or pharmacological stress (either ipyridamole /Persantine or adensosine or dobutamin/Dobutrex) with either 1) nuclear/PET perfusion imaging (thallium, MIBI or rubidium) or 2) nuclear ventriculography (MUGA); or 3) echocardiography.
Functional Imaging Risk		
	• Low	Low risk tests are those that do not meet the high risk criteria.
	• High	High risk scans showed clear evidence of a) multi-vessel disease, or b) of single vessel disease involving a large segment of the anterior wall; or c) summed stress score > 12 segments or d) transient ischemia LV cavity dilation.
	• Not applicable	

LV FUNCTION		
LV Function	Done/Not Done	
LV Method		Hierarchical order (non-valve) in the event of results from multiple tests = MUGA, left ventriculogram, echo, other Hierarchical order (valve) in the event of results from multiple tests = MUGA, echo, left ventriculogram, other. Note: If no intervening MI and multiple tests, MUGA takes precedent. If there has been an intervening MI between the dates of any two assessments, the most recent assessment post-MI takes precedent.
	• MUGA	Nuclear ventriculography
	• Ventriculogram	
	• Echo	Echocardiographic or nuclear imaging evidence
	• Other	
LV Function Results		If LV assessment is completed but the results are not yet available, then user should enter LV function of "unknown"
	• 1: >=50% • 2: 35%-49%	
	• 3: 20%-34% • 4: <20%	
	• Not Applicable	
OTHER FACTORS AFFECTING PRIORITIZATION		
Other Factors Affecting Prioritization		Other Factors considered in setting prioritization other than those captured in the URS if any.
	• Other clinical factors (e.g. chemotherapy, other non-cardiac surgery required)	
	• Non-clinical factors.	
CCS/ACS ANGINA CLASS		
CCS		
	• 0	0: Class 0, Asymptomatic
	• I	Class I: Ordinary physical activity such as walking or climbing stairs does not cause angina. Angina with strenuous, rapid, or prolonged exertion at work or recreation.
	• II	Class II: Slight limitation of ordinary activity. Walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals, or in cold, or in wind. or under emotional stress, or during the few hours after awakening. Walking more than 2 blocks on the level and climbing more than one flight of stairs at a normal pace and in normal conditions

	• III	Class III: Marked limitation of ordinary physical activity. Walking one or two blocks on the level or climbing one flight of stairs in normal conditions and at a normal pace.
	• IV	Class IV: Inability to carry out any physical activity without discomfort – anginal syndrome may be present at rest.
Acute Coronary Syndrome (ACS)		ACS = unstable angina (UA), non-ST segment elevation MI (NSTEMI) and ST-segment elevation MI (STEMI)
	• Low Risk (IV-A)	See "Supporting Definitions"
	• Intermediate Risk (IV-B)	See "Supporting Definitions"
	• High Risk (IV-C)	See "Supporting Definitions"
	If yes,	
	o Hemodynamically unstable	Indicate whether patient is hemodynamically unstable and requires inotropic or vasopressor support or balloon pump
	• Emergent (IV-D)	
COMORBIDITY ASSESSMENT		
Creatinine		
	If known, value	The value of the most recent serum creatinine prior to procedure, entered at the time of offlisting. Numeric creatinine value in umol/L
	If no value:	Indicate the Status of the patient's most recent Serum Creatinine test before procedure
	o Pending o Not Done o Unknown	
Dialysis	N/Y	Patient has a history of dialysis or on any form of dialysis at time of referral (peritoneal, hemodialysis, CRT)
Diabetes	N/Y	Patient has history of diabetes mellitus diagnosed and /or treated by a physician as documented in chart and/or referral/ triage form.
	If yes to diabetes, therapies:	
	o Diet	Managed by diet only
	o Insulin	Insulin treatment includes any combination with insulin
	o Oral hypoglycemics	On oral Hypoglycemics includes oral agent with/ without diet treatment
	o No Treatment	No treatment
History of Smoking		
	• Never	No history of any form of tobacco.
	• Current	Use of any form of tobacco (cigarettes, cigar, pipe) within one month of referral date.
	• Former	Use of any form of tobacco > one month of referral date.
Hypertension	Y/N	Documented history of hypertension diagnosed and treated with medication, diet and/or exercise
Hyperlipidemia	Y/N	Documented history of dyslipidemia diagnosed and/or treated by a physician.

Cerebral Vascular Disease (CVD)	Y/N/Unknown	History of Cerebral Vascular disease as any history of stroke TIA previous carotid endarterectomy/stent or any known carotid stenosis > = 70%
Peripheral Vascular Disease (PVD)	Y/N	See "Supporting Definitions".
Varicose Veins	Y/N	History of varicose vein surgery or injection.
COPD	Y/N	Chronic lung disease: The patient must have a documented history of obstructive or restrictive lung disease (e.g. COPD, asthma, bronchitis, emphysema, pulmonary fibrosis) and be on pharmacological therapy.
Previous (CABG) Bypass Surgery	Y/N	Indicate whether the patient has had a previous CABG procedure. A bypass surgery is a cardiac surgical procedure in which one or more anastomoses are constructed between a conduit vessel and a coronary artery.
	If yes, documentation	Provide separate documentation of previous number and location of grafts
LIMA	Y/N	Left internal mammary artery previously used?
Previous PCI	Y/N	Whether there were any previous PCIs prior to this procedure
On Coumadin	Y/N	Whether Patient is currently on Coumadin
On IIb/IIIa Inhibitors	Y/N	Whether Patient is currently on IIb/IIIa Inhibitors
Dye Allergy	Y/N/Unknown	Whether Patient has previously had an allergic reaction to the dye
Possible LV Thrombus	Y/N/Unknown	Possible Left Ventricle Thrombus. Y: Yes - if echo, ventriculogram or other imaging modality reports a definite or possible left ventricular thrombus. N: No - if echo, ventriculogram or other imaging modality does not report a definite or possible left ventricular thrombus
Infective Endocarditis	Y/N	Indicate whether infective Endocarditis is active (i.e., under active treatment of antibiotics and has not had a negative blood count.)
	If yes to infection, Active Endocarditis: Y/N	Active is defined as patient is currently being treated for endocarditis, the disease is active. If no antibiotic medication (other than prophylactic medication) is being given, then the infection is considered treated.
History of CHF	Y/N	Enter YES if patient has history of congestive heart failure diagnosed and/or treated by a physician. There must be a history of one or more of the following: exertional dyspnea, orthopnea, paroxysmal nocturnal dyspnea (PND), and either cardiac rales, or pulmonary congestion on x-ray. Neither pedal edema nor dyspnea alone are diagnostic.
Height, Weight	Numeric	Patient Height, Weight; no decimals
Patient Options for Timely Access to Care	Y/N	Check box if you (physician) have discussed with this patient (and/or significant others) timely access to care options for this procedure.
FOR COORDINATOR USE ONLY		
Referral Date	Date	Date the coordinator or triage office (regular business hours) or the physician-on-call (evenings and weekends) becomes aware of the referral for CATH, PCI, SURGERY or EP services.

Acceptance Date	Date	Date the HCP accepts the patient for a procedure i.e. surgery PCI or angiography. If patient is triaged direct to angiography by the RCCC, the acceptance date is same as referral date.
Inpt Admit Date	Date	Date of admission to originating hospital. This is the date Patient admitted to the originating hospital i.e., either the hospital where the procedure is performed if Patient is coming from home, or the peripheral hospital if the Patient is a transfer. In the latter case, the Transfer Date is entered as the date the Patient is transferred to the hospital where the procedure is performed from the peripheral hospital.
Transfer Date	Date	Transfer Date is entered as the date the Patient is transferred from the peripheral hospital to the hospital where the procedure is performed. Left blank if the Patient came from home to the hospital where the procedure is performed.
Booking Date	Date	Date the patient was booked/scheduled for the procedure. Multiple booking dates can be entered if a cancellation exists.
Discharge Date	Date	Date the patient is discharged/transferred from the institution where the procedure was performed. Discharge section to be completed only for patients with removal reason of procedure started.
Brochure Sent	Date	Date when brochure was sent or given to patient. Defaults to today's date when checked.
Letter Sent	Date	Date the letter was sent/provided to the patient. By default it is today's date.
SCHEDULING DETAILS		
Dates Affecting Readiness to Treat From	Date	See "Supporting Definitions"
Dates Affecting Readiness to Treat To	Date	See "Supporting Definitions"
Date Procedure Cancelled/Delayed	Date	Date on which cancellation or delay occurred. (Not necessarily the date for which the cancelled procedure was scheduled).
Medical Delay	Time	Hour the cancellation or delay occurred. (Optional)
FAX CATH Report to:		
Person/Organization	Text	Contact Person or Organization information for Faxing the Cath Report.
Fax Number	Numeric	Contact Person or Organization FAX number for Faxing the Cath Report.
E-mail Contact	Text	Contact Person or Organization email information for sending the Cath Report via email.
SPECIAL INSTRUCTIONS and/or BRIEF HISTORY		
Brief History	Text	History documented on the cath referral form. Maximum length is 300 characters. Indicate whether previous CATH done outside of Ontario.

Supplementary Definitions in CCN Registry

ACS low risk

a: TIMI Risk Score for unstable angina and non-ST segment elevation myocardial infarction (see table 1) = 0-2 – OR any of the following b: Age < 65 years (note: age is not to be used alone to determine risk category) c: No or minimum troponin rise (<1.0 ng/ml) (note:Troponin T levels are universal due to a single system of standards.) d: No further Chest Pain e: Inducible ischemia <= 7 MET's workload 2. STEMI not treated by primary PCI low risk: a: TIMI risk score after STEMI (see table 2) = 0-3 – OR b: ACC/AHA guidelines after STEMI (Gibbons, 2002) : i) LVEF >= 40%; ii) low risk on non-invasive assessment such as: Duke treadmill score >=5. Intermediate risk (includes ACS and STEMI not treated by primary PCI intermediate risk)

ACS intermediate risk

a: TIMI Risk Score for unstable angina non-ST segment elevation
myocardial infarction = 3-4 – OR any of the following b: NSTEMI with small troponin rise (>= 1 < 5 ng/ml) c: Worst ECG T wave inversion or flattening: Significant LV dysfunction (EF < 40%) e: Previous documented CAD, MI or CABG, PCI 4. STEMI not treated by primary PC intermediate risk: a: TIMI risk score after STEMI = 4-5 OR b: ACC/AHA guidelines after STEMI: i) absence of high risk predictors; ii) LVEF < 40%; iii) high or intermediate risk on non-invasive assessment such as: Duke treadmill score < 5, stress-induced large anterior or multiple perfusion defects. High risk (includes ACS and STEMI not treated by primary PCI high risk)

ACS high risk

a: TIMI Risk Score for unstable angina and non-ST segment elevation myocardial infarction = 5-7 OR any of the following: b: Persistent or recurrent chest pain c: Dynamic ECG changes with chest pain (e.g. transient ischemic ST segment changes with chest pain.) d: CHF, hypotension, arrhythmias with C/P e: Moderate or high (>5 ng/ml) Troponin Rise f: Age > 75 years (note: age is not to be used alone to determine risk category) 4. STEMI not treated by primary PCI high risk (clinical predictors): a: TIMI risk score after STEMI > 5 OR- b: ACC/AHA guidelines after STEMI ((high risk predictors): i)failed reperfusion (recurrent chest pain, persistent ECG findings of infarction), ii) mechanical complications (sudden heart failure, new murmur), iii) change in clinical status (shock) Emergent (URS = 1)= shock, and primary PCI, salvage/rescue PCI, facilitated PCI for STEMI Note: if clinical parameters result in patient falling into two classifications (e.g. High Risk and Emergent for shock) the higher classification takes precedence.

Dates affecting readiness to treat (DART)

Dates affecting readiness to treat (DART) allow users to enter dates during which time a procedure is unable to take place for reasons solely related to a PATIENT's DECISION not to be available. A DART is subtracted from the total wait time DART FROM is the beginning date of the period for which the patient, by their own decision, is not available for procedure. This stops the wait time clock. Dates affecting readiness to treat allow users to enter dates during which time a procedure is unable to take place for reasons solely related to a PATIENT's DECISION not to be available. To ensure that the removal date has not fallen between the dates affecting readiness to treat, users should verify and edit dates affecting readiness to treat as required prior to entering the removal date. Once the removal date is entered the dates affecting readiness to treat (DART) cannot be edited.

DART TO

DART TO is the end date of the period for which the patient, by their own decision, is not available for procedure. This stops the wait time clock. If the user is not aware of the 'to' date at the time of the entry, they should enter December 31, 9999. To ensure that the removal date has not fallen between the dates affecting readiness to treat, users should verify and edit dates affecting readiness to treat as required prior to entering the removal date. Once the removal date is entered the Dates affecting readiness to treat (DART) cannot be edited.

History of peripheral vascular disease

The patient has a history of peripheral vascular disease. This can include: 1. Claudication either with exertion or at rest. 2. Amputation for arterial vascular insufficiency. 3. Prior vascular surgery or angioplasty (to extremities or intra-abdominal viscera). 4. Positive non-invasive/invasive vascular test. [Footnote – a)AAA > 4cm; b) ABI < 70%; and/or c) PVD (excluding CVD) with a luminal diameter > 50%]. This does not include procedures such as vein stripping or carotid disease. Examples may include a) aorto-iliac occlusive disease reconstruction, b) peripheral vascular (excluding carotids) bypass surgery, angioplasty or stent; c) percutaneous intervention to the extremities or intra- abdominal viscera, or d) AAA repair or stent.

Appendix D: STS Registry Data Definitions

STS - Adult Cardiac Surgery Database		
Variable	***Field Options***	***Coding Instructions and Definitions of Variables or Field Options***
ADMINISTRATIVE		
Participant ID	Numeric	Participant ID is a unique number assigned to each database Participant by the STS. A database Participant is defined as one entity that signs a Participation Agreement with the STS, submits one data file to the harvest, and gets back one report on their data. The Participant ID must be entered into each record. Each Participant's data if submitted to harvest must be in one data file. If one Participant keeps their data in more than one file (e.g. at two sites), then the Participant must combine them back into one file for harvest submission. If two or more Participants share a single purchased software, and enter cases into one database, then the data must be extracted into two different files, one for each Participant ID, with each record having the correct Participant ID number
Cost Link Field (optional)	Numeric	Participant specified Cost link id that does NOT include the patient's medical record number
STS Trial Link Number (optional)	Numeric	STS Trial Link Number is a unique number assigned to each STS supported clinical trial. This ID is controlled by assignment of the STS.
DEMOGRAPHICS		
Patient Medical Record Number (not harvested)	Numeric	
Last Name, First Name	Text	
MI (not harvested)	Text	Patient Middle Initial
Date of Birth (optional harvest)	Numeric	
Age (system calculation)	Numeric	
Sex	M/F	
Race	• Caucasian • Black	
	• Hispanic • Asian	
	• Native American	
Social Security (or National ID) Number (not harvested)	Numeric	
ZIP or Postal Code (optional harvest)	Text	
Referring Cardiologist's/Physician's Name	Text	

(not harvested)		
HOSPITALIZATION		
Hospital Name	Controlled List	
Primary Payor (not harvested)	Text	
Date of Admission, Surgery, Discharge	Date	
Same Day Elective Admission	Y/N	
Initial ICU Hours	Numeric	Indicate the number of hours the patient was initially in the ICU post operation. Leave blank if the patient expired in the OR.
Readmission to ICU	Y/N	Was the patient readmitted to the Intensive Care Unit after an initial stay. The patient must have been transferred to a step-down or intermediate care ward and then returned to Intensive Care Unit.
	If yes,	
	o Additional ICU hours	Indicate the number of additional hours spent in the Intensive Care Unit.
	o Total hours in ICU (calculated)	
PRE-OPERATIVE RISK FACTORS		
Weight, Height	Numeric	
Smoker	Y/N	A history confirming any form of tobacco use in the past (cigarettes, cigar, tobacco chew, etc.).
	If yes, Current smoker: Y/N	A history confirming any form of tobacco use in the past (cigarettes, cigar, tobacco chew, etc.).
Family History of CAD	Y/N	Whether any direct blood relatives (parents, siblings, children) have had any of the following at age <55: a. Angina b. myocardial infarction (MI) c. sudden cardiac death without obvious cause.
Diabetes	Y/N	A history of diabetes, regardless of duration of disease or need for anti-diabetic agents.
	If yes, Diabetes control:	Method of diabetic control, at time of intervention. Code the control method patient presented with on admission. Patients placed on a pre-operative diabetic pathway of Insulin drip but at admission were controlled with diet or oral method are not coded as insulin dependent.
	o None	No treatment for diabetes.
	o Diet	Diet treatment only
	o Oral	Oral agent treatment
	o Insulin	Insulin treatment (includes any combination with insulin)
Hypercholesterolemia	Y/N	Whether the patient has a history of hypercholesterolemia diagnosed and or treated by a physician. Criteria can include documentation of: a. TC > 200 b. LDL >= 130 c. HDL < 30 d. Admission cholesterol > 200 mg/dl.
Last Creatinine Preop	Numeric	Most recent prior to day of surgery. A creatinine level should be collected on all patients for consistency, even if they have not prior history. A creatinine value is a high predictor of a patient's outcome and used in the Predicted Risk Models.
Renal Failure	Y/N	Is there a documented history of renal failure? Does the patient have a history of a creatinine > 2.0? Prior renal transplant patients are not included as pre-op renal failure unless since transplantation their creatinine has been or currently is > 2.0

	If yes, Dialysis: Y/N	Is the patient on dialysis preoperatively?
Hypertension	Y/N	Does the patient have a diagnosis of hypertension, documented by one of the following: a. Documented history of hypertension diagnosed and treated with melipidication, diet and/or exercise. b. Blood pressure >140 systolic or >90 diastolic on at least 2 occasions. c. Currently on antihypertensive medication
Cerebrovascular Accident	Y/N	A central neurologic deficit persisting more than 72 hours. (i.e. extremity weakness or loss of motion, loss of consciousness, loss of speech, field cuts).
	If yes, When:	
	o Recent <= 2 weeks	
	o Remote > 2 weeks	
Infectious Endocarditis	Y/N	A patient presenting with valvular disease of infectious etiology with positive blood culture.
	If yes, Infectious endocarditis type:	If the patient is currently being treated for endocarditis, the disease is considered active. If no antibiotic medication (other than prophylactic medication) is being given at the time of surgery, then the infection is considered treated.
	o Treated o Active	
Chronic Lung Disease	• No	Specify if the patient has chronic lung disease, and the severity level according to the following classification: No; Mild: FEV1 60% to 75% of predicted, and/or on chronic inhaled or oral bronchodilator therapy. Moderate: FEV1 50% to 59% of predicted, and/or on chronic steroid therapy aimed at lung disease.
	• Mild • Moderate • Severe	
Immunosuppressive Treatment	Y/N	Use of any form of immunosuppressive therapy (i.e. systemic steroid therapy) within 30 days preceding the operative procedure. Does not include topical applications and inhalers
Peripheral Vascular Disease	Y/N	Whether the patient has Peripheral Vascular Disease, as indicated by claudication either with exertion or rest; amputation for arterial insufficiency; aorto-iliac occlusive disease reconstruction; peripheral vascular bypass surgery, angioplasty, or stent; documented AAA, AAA repair, or stent; positive non-invasive testing documented.
Cerebrovascular Disease	Y/N	Whether the patient has Cerebro-Vascular Disease, documented by any one of the following: Unresponsive coma > 24 hrs; CVA (symptoms > 72 hrs after onset); RIND (recovery within 72 hrs); TIA (recovery within 24 hrs); Non-invasive carotid test with > 75% occlusion.; or Prior carotid surgery.
	If yes, CVD type:	What type of Cerebro-Vascular Disease does the patient have? Choose one of the following: Unresponsive coma > 24 hrs. CVA (symptoms > 72 hrs after onset). RIND (recovery within 72 hrs). TIA (recovery within 24 hrs). Non-invasive carotid test with > 75% occlusion. Prior Carotid Surgery.
	o Coma	
	o CVA	
	o RIND	
	o TIA	

	o Non Invasive > 75%	
	o Previous Carotid Surgery	
PREVIOUS INTERVENTIONS		
Previous CV Interventions	Y/N	Has the patient undergone any previous cardiovascular intervention, either surgical or non-surgical, which may include those done during the current admission. This includes thrombolytic therapy for cardiac.
	If yes, Complete this Section	
# of Prior Cardiac Operations Requiring and Without Cardiopulmonary Bypass	Numeric	Prior to this operation, how many cardiac surgical operations were performed on this patient utilizing and without cardiopulmonary bypass.
Previous Coronary Artery Bypass Surgery	Y/N	
Previous Valve Surgery	Y/N	
Previous Other Cardiac Surgery	Y/N	Any other previous cardiac surgery which traversed the anterior mediastinum, including surgery on the ascending aorta and/or arch.
Prior PTCA including Balloon and/or Atherectomy	Y/N	Was Percutaneous Transluminal Coronary Angioplasty and/or Coronary Atherectomy done at any time prior to this surgical procedure (which may include during the current admission)?
	If yes, Interval:	
	o <=6 hours o >6 hours	
Previous non-surgical Stent Placement	Y/N	Did the patient previously have insertion of an intra-coronary stent at any time prior to this surgical procedure (which may include during the current admission)?
	If yes, Interval:	
	o <=6 hours	
	o >6 hours	
Thrombolysis	Y/N	Was Thrombolytic treatment given for cardiac indications at any time prior to this surgical procedure, which may include during the current admission?
	If yes, Interval:	The time between thrombolysis treatment and surgical repair of coronary occlusion
	o <=6 hours o >6 hours	
Previous non-surgical Balloon Valvuloplasty	Y/N	
PRE OPERATIVE CARDIAC STATUS		
Myocardial Infarction	Y/N	Patient hospitalized with an MI documented in the medical record. Two of the following four criteria are necessary: a. Prolonged (> 20 min) typical chest pain not relieved by rest and/or nitrates. b. Enzyme level elevation: either (1) CK-MB > 5% of total CPK; (2) CK greater than 2x normal; (3) LDH subtype 1 > LDH subtype 2; or (4) troponin > 0.2 micrograms / ml. c. Any wall motion abnormalities as documented by LV Gram, Echo, Muga Scan and or EF<45%. d. Serial ECG (at least two) showing changes from baseline or

		serially in ST-T and/or Q waves that are 0.03 seconds in width and/or > or + one third of the total QRS complex in two or more contiguous leads.
	If yes, When:	
	o <=6 hours	
	o >6 hours but <24 hours	
	o 1-7 days o 8-21 days	
	o >21 days	
Congestive Heart Failure	Y/N	If patient has symptoms, have they occurred within 2 weeks prior to surgery? This does not include patients with chronic or stable non-symptomatic compensated CHF. Does the patient have one or more of the following: * Paroxysmal nocturnal dyspnea (PND) * Dyspnea on exertion (DOE) due to heart failure * Chest X-Ray (CXR) showing pulmonary congestion.
Angina	Y/N	Whether the patient has angina pectoris present leading up to or during the hospitalization within 24 hours prior to surgical intervention.
	If yes, Type:	Indicate the type of angina present within 24 hours of the surgical procedure: Stable: Angina which is controlled by oral or transcutaneous medication. Unstable: The presence of on-going refractory (difficult, complicated, and/or unmanageable) ischemia which necessitates the increase or initiation of angina control therapies that may include: nitroglycerin drip, heparin drip, IABP placement.
	o Stable	
	o Unstable	
	If unstable, Unstable Type:	If the patient has Unstable Angina, which presentation?
	o Rest Angina	
	o New Class 3	New onset exertional angina of at least Canadian Cardiovascular Society Class (CCSC) III in severity.
	o Recent Accel	Recent acceleration in pattern and increase of one CCSC class to at least CCSC Class III.
	o Variant Angina	
	o Non-Q MI	
	o Post-Infarct Angina	
Cardiogenic Shock	Y/N	Is the patient, at the time of procedure, in a clinical state of hypoperfusion according to either of the following criteria: 1. Systolic BP < 80 and/or Cardiac Index < 1.8 despite maximal treatment; 2. IV inotropes and/or IABP necessary to maintain Systolic BP > 80 and/or CI > 1.8.
	If yes, Type:	
	o Refractory Shock	Systolic BP < 80 and/or Cardiac Index < 1.8 despite maximal treatment
	o Hemodynamic Instability	Hemodynamic Instability: IV inotropes and/or IABP necessary to maintain Systolic BP > 80 and CI > 1.8.
Resuscitation	Y/N	The patient required cardiopulmonary resuscitation within one hour before the start of the operative procedure.
Arrhythmia	Y/N	Is there a preoperative arrhythmia present within two weeks of the procedure, by clinical documentation of any one of the following
	If yes, Type:	

	o Sust VT/VF	Sustained Ventricular Tachycardia or Ventricular Fibrillation
	o Heart Block	
	o Afib/Flutter	Atrial fibrillation/flutter requiring Rx
CCS Classification		Canadian Cardiovascular Society Classification. This classification represents level of functional status related to frequency and intensity of angina. The CCS may not be the same as the NYHA classification for same evaluation time period. Code the highest class leading to episode of hospitalization and/or intervention
	• 0	No Angina
	• I	Ordinary physical activity, such as walking or climbing the stairs does not cause angina. Angina may occur with strenuous, rapid or prolonged exertion at work or recreation.
	• II	There is slight limitation of ordinary activity. Angina may occur with moderate activity such as walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals or in the cold, in the wind, or under emotional stress, or walking more than two blocks on the level, and climbing more than one flight of stairs at normal pace under normal conditions.
	• III	There is marked limitation of ordinary physical activity. Angina may occur after walking one or two blocks on the level or climbing one flight of stairs under normal conditions at a normal pace.
	• IV	There is inability to carry on any physical activity without discomfort; angina may be present at rest.
NYHA Classification		NYHA: New York Heart Association Class. NYHA classification represents the overall functional status of the patient in relationship to both congestive heart failure and angina. The NYHA may not be the same as the CCS classification for the same evaluation period. Code the highest level leading to episode of hospitalization and/or procedure.
	• I	Patients with cardiac disease but without resulting limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea, or anginal pain.
	• II	Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitations, dyspnea, or anginal pain.
	• III	Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary physical activity results in fatigue, palpitations, dyspnea, or anginal pain.
	• IV	Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.
PRE OPERATIVE MEDICATIONS		
Digitalis, Inotropic agents, Beta blockers, Steroids, Nitrates - IV, Aspirin, Coagulants, ACEI, diuretics, Other Anti-Platelets	Y/N	Has the patient received any of these medications within 24 hours preceding surgery?
PRE OPERATIVE HEMODYNAMICS AND CATH		

Number of Diseased Coronary Vessels		The number of major coronary vessel systems (LAD system, Circumflex system, and/or Right system) with > 50% narrowing in any angiographic view. NOTE: Left main disease (>50%) is counted as TWO vessels (LAD and Circumflex). For example, left main and RCA would count as three total.
	• None • One	
	• Two • Three	
Left Main Disease > 50%	Y/N	
Ejection Fraction Done?	Y/N	Was the Ejection Fraction measured pre-operatively?
	If yes, Ejection fraction	The percentage of the blood emptied from the ventricle at the end of the contraction. Use the most recent determination prior to intervention. Enter a percentage in the range of 5 - 90.
	If yes, Method	How was Ejection Fraction measurement info obtained?
	o LV gram o ECHO	
	o Radionucleotide	MUGA Scan
	o Estimate	From other calculations, based on available clinical data
Pulmonary Artery Mean Pressure Done?	Y/N	
	If yes, Pulmonary Artery Mean Pressure	Mean pulmonary artery pressure in mm Hg, recorded from catheterization data or Swan-Ganz catheter BEFORE the induction of anaesthesia.
Aortic/Mitral/Tricuspid/Pulmonic Stenosis	Y/N	
	If yes to aortic stenosis, Gradient	Indicate the mean gradient across the aortic valve obtained from an echocardiogram or angiogram.
Aortic/Mitral/Tricuspid/Pulmonic Insufficiency	• 0=None • 1=Trivial	
	• 2=Mild • 3=Moderate	
	• 4=Severe	
OPERATIVE		
Surgeon's Name, Group (Controlled List)		The name of the Surgeon and Surgeon's practice group. If the surgeon is not a member of a group (solo practice) and has no group name, then use the surgeon's name.
Status of Procedure	• Emergent Salvage	The patient is undergoing CPR en route to the OR or prior to anaesthesia induction.
	• Emergent	The patient's clinical status includes any of the following: a. Ischemic dysfunction (any of the following): (1) Ongoing ischemia including rest angina despite maximal medical therapy (medical and/or IABP)); (2) Acute Evolving Myocardial Infarction within 24 hours before surgery; or (3) pulmonary edema requiring intubation. b. Mechanical dysfunction (either of the following): (1) shock with circulatory support; or (2) shock without circulatory support.
	If yes, Reason	
	o Shock Circ Support	
	o Shock No Circ Support	
	o Pulm Edema o AEMI	

	o Ongoing Ischemia	
	o Valve Dysfunction	
	o Aortic Dissection	
	• Urgent	ALL of the following conditions are met: a. Not elective status. b. Not emergent status. c. Procedure required during same hospitalization in order to minimize chance of further clinical deterioration. d. Worsening, sudden chest pain, CHF, acute myocardial infarction (AMI), anatomy, IABP, unstable angina (USA) with intravenous (IV) nitroglycerin (TNG) or rest angina may be included.
	If yes, Reason	
	o AMI o IABP o CHF	
	o Worsening CP	
	o Anatomy o USA	
	o Rest Angina	
	o Valve Dysfunction	
	o Aortic Dissection	
	• Elective	The patient's cardiac function has been stable in the days or weeks prior to the operation. The procedure could be deferred without increased risk of compromised cardiac outcome.
Coronary Artery Bypass	Y/N	
	If yes, Complete Next Section	
Aortic		Was a surgical procedure done on the Aortic Valve, and if so what?
	• No • Replacement	
	• Repair/Reconstruction	
	• Root Reconstruction Valve Conduit	
	• Reconstruction with Valve Sparing	
	• Resuspension Aortic Valve	
	• Resection Sub-Aortic Stenosis	
Mitral/Tricuspid	• No • Annuloplasty only	
	• Replacement	
	• Reconstruction with Annuloplasty	
	• Reconstruction without Annuloplasty	
Pulmonic	• No	
	• Replacement	
	• Reconstruction	

Other Cardiac Procedure	Y/N	Was another type of cardiac procedure done (other than CABG and/or Valve procedures)?
	If yes, Complete "Other Cardiac Procedures" Section	
Other Non-Cardiac Procedure	Y/N	Was a non-cardiac procedure done?
	If yes, Complete "Other Non-Cardiac Procedures" Section	
CORONARY SURGERY		
Unplanned CABG	Y/N	The patient required unplanned CABG after catheterization or an interventional procedure such as PTCA, stent, or atherectomy. In the opinion of the operator or the responsible physician, the patient needed to be moved directly to surgery from the cath lab or hospital ward, typically due to indications such as ongoing ischemia, rest angina despite maximal treatment, pulmonary edema requiring intubation, or shock.
Number of Distal Anastomoses with Arterial Conduits	Numeric	The total number of distal anastomoses with arterial conduits, whether IMA, GEPA, radial artery, etc.
Number of Distal anastomoses with Vein Grafts	Numeric	The total number of distal anastomoses with venous conduits, e.g. saphenous veins.
IMAs Used as Grafts		Specify which, if any, Internal Mammary Artery(ies) were used for grafts.
	• Left IMA • Right IMA	
	• Both IMAs • No IMA	
Number of IMA Distal Anastomoses	Numeric	Total number of distal anastomoses done using internal mammary artery grafts.
Radial Artery (ies) Used as Grafts		Indicate which radial artery(ies) was/were used for grafts
	• No/Left/Right/Both Radial	
Number of Radial/Gastro-Epiploic Artery Distal Anastomoses	Numeric	Total number of distal anastomoses done using radial artery/Gastro-Epiploic grafts.
VALVE SURGERY		
Aortic Prosthesis, Mitral Prosthesis, Tricuspid Prosthesis, Pulmonic Prosthesis	• Implant/Explant Type	
	o None o Mechanical	
	o Bioprosthesis	
	o Homograft o Autograft	
	o Ring	

	• Implant/Explant	Select the name of the prosthesis implanted/explanted
	• Size (mm)	
OPERATIVE TECHNIQUES		
Cardiopulmonary Bypass Used	Y/N	Indicate if Cardiopulmonary Bypass was used at anytime during the procedure
	If yes, Conversion to CPB: Y/N	Indicate whether the patient needed to be placed on cardiopulmonary bypass after the off-pump procedure was attempted.
Primary Indication for Minimally Invasive Approach	• Not Minimally Invasive	
	• Surg/Pat Choice	
	• Contraindicated Std Approach	
	• Comb Cath Intervention	
Primary Incision		Select the primary incision used as the initial intention for treatment
	• Full, Partial, Transverse Sternotomy	
	• Right, Left Vertical Parasternal	
	• Right, Left Anterior Thoracotomy	
	• Posterolateral thoracotomy	
	• Xiphoid • Epigastric	
	• Subcostal	
Total # of Incisions	Numeric	Total number of incisions, including portholes in chest and other locations such as groin or neck, for cannulation or instrumentation access.
Conversion to Stnd Incision	Y/N	Indicate whether the minimally invasive incision was converted to a full median sternotomy.
	If yes, Indication	
	o Not Minimally Invasive	
	o Exposure	Inadequate exposure
	o Bleeding o Hypotension	
	o Rhythm	Rhythm problems
	o Conduit	Conduit trauma or quality
Cannulation Method		Indicate the method of cannulation used for cardiopulmonary bypass
	• Aorta and Fem/Jug Vein	
	• Fem Art and Fem/Jug Vein	
	• Aorta and Atrial/Caval	

	• Fem Art and Atrial/Caval	
	• None • Other	
Aortic Occlusion Method		Indicate if aortic occlusion was used and if so, by which method
	• None • Cross-clamp	
	• Balloon Occlusion	
Intracoronary Shunt Used during Distal Anastomoses	Y/N	
Suture Technique		Primary suture technique used for distal anastomoses.
	• Running • Interrupted	
	• Stapler • Combination	
Vessel Stabilization Technique		
	• None • Suture Snare	
	• Suction Device	
	• Compression • Other	
IMA Harvest Technique		
	• None • Direct vision	
	• Thoracoscopy	
	• Combination	
Acute Flow Patency Assess of Grafts (Periop)		Indicate if any flow/patency study was done in the acute perioperative period, and what type.
	• None • IntraOp Doppler	
	• IntraOp Angio	
	• Postop Angio	
	• Postop Doppler	
OTHER CARDIAC PROCEDURES		
Left Ventricular Aneurysm Repair	Y/N	
Batista	Y/N	(Left Ventricular Reduction Myoplasty) A Procedure whereby left ventricular myocardium is excised to reduce left ventricular volume in patients with a dilated cardiomyopathy, with or without mitral valve replacement or repair. If a concomitant valve procedure is performed, please check that category also.
Transmyocard Laser Revasc	Y/N	Creation of multiple channels in left ventricular myocardium with a laser fiber.
Permanent Pacemaker	Y/N	
Vent Septal Defect Repair	Y/N	
SVR	Y/N	Surgical Ventricular Restoration includes procedures that restore the geometry of the heart after an anterior MI. They include the Dor procedure or the SAVER procedure. This SVR procedure is distinct from an anterior left ventricular aneurysmectomy (LVA) and from a Batista procedure (left ventricular volume reduction procedure).

Cardiac Trauma	Y/N	
AICD	Y/N	Automatic Implanted Cardioverter Defibrillator
Atrial, Congenital Septal Defect Repair	Y/N	
Cardiac Transplant	Y/N	Cardiac Transplant: Heterotopic or Orthotopic heart transplantation
Other	Y/N	
OTHER NON-CARDIAC PROCEDURES		
Aortic Aneurysm	Y/N	
Carotid Endarterectomy	Y/N	Surgical removal of stenotic atheromatous plaque.
Other Vascular	Y/N	Procedures correcting peripheral vascular occlusion
Other Thoracic	Y/N	Procedures involving Thorax/Pleura.
CPB AND SUPPORT		
Skin Incision Start Time (24 hour clock)	Time	Document to the nearest minute (using 24 hour clock) the time the skin incision was made.
Skin Incision Stop Time (24 hour clock)	Time	Document to the nearest half hour (using 24 hour clock) the time the skin incision was closed, if the patient leaves the OR with an open chest, collect the time the dressings are applied to the incisions.
Cross Clamp Time (min)	Time	Total number of minutes the aorta is completely cross-clamped during bypass. Leave blank if no cross-clamp was used.
Perfusion Time (min)	Time	Total number of minutes on cardiopulmonary bypass. Leave Blank if no cardiopulmonary bypass was used.
Cardioplegia	Y/N	Was Cardioplegia used?
IABP	Y/N	
	If yes, When Inserted	What was the time of earliest IABP insertion?
	o Preop o Intraop o Postop	
	If yes, Indication	
	o Hemodynamic Instab	
	o PTCA Support	
	o Unst. Angina	
	o CPB Wean o Prophylatic	
Ventricular Assist Device	Y/N	Was a VAD used at the time the patient left the operating room?
POST OPERATIVE		
Blood Products Used	Y/N	Were Blood Products transfused postoperatively?
Initial # of Hours Ventilated Postop	Y/N	Indicate the number of initial hours post operation for which the patient was ventilated before any reintubation. Number of hours includes hours ventilated post-operatively till removal of the endotracheal

		tube or if patient has tracheostomy tube, till no longer ventilator dependent. Leave blank if the patient was extubated on the operating table. Any patient ventilated > 24 hours is coded as a Pulmonary Complication of "Prolonged Ventilation"
Re-intubated During Hospital Stay	Y/N	Was the patient re-intubated during the hospital stay after the initial/planned extubation?
	If yes, Addl Hours Ventilated Postop	
Total Hours Ventilated Postop	Numeric	Total number of hours including any re-intubation hours. Any patient ventilated > 24 hours is coded as a Pulmonary Complication of "Prolonged Ventilation
COMPLICATIONS		
In Hospital Complications	Y/N	Did a postoperative complication occur during the hospitalization for surgery? This includes the entire postoperative period up to discharge, even if over 30 days. If yes, at least one complication below must be selected
ReOp for Bleeding/Tamponade, Vascular Dysfunction, Graft occlusion, Other Cardiac Problem	Y/N	
ReOp for Other Non Cardiac Problem	Y/N	Operative re-intervention was required for other non-cardiac reasons. It does include minor procedures that do require a return to the operating room but does not include procedures performed outside the OR (i.e. GI Lab for peg tube, shunts for dialysis etc), but may include procedures such as tracheostomy, hematoma evacuation).
Perioperative Myocardial Infarction	Y/N	A perioperative Myocardial Infarction (MI) is diagnosed by finding at least two of the following four criteria: a. Prolonged (> 20 min) typical chest pain not relieved by rest and/or nitrates. b. Enzyme level elevation: either (1) CK-MB > 5% of total CPK; (2) CK greater than 2x normal; (3) LDH subtype 1 > LDH subtype 2; or (4) troponin > 0.2 micrograms / ml. c. New wall motion abnormalities. d. Serial ECG (at least two) showing changes from baseline or serially in ST-T and/or Q waves that are 0.03 seconds in width and/or > or + one third of the total QRS complex in two or more contiguous leads.
Sternum-Deep Infection	Y/N	A deep sternal infection involves muscle, bone, and/or mediastinum. Must have one of the following conditions: 1. Wound opened with excision of tissue (I&D) 2. Positive culture 3. Treatment with antibiotics
Thoracotomy (Infection)	Y/N	An infection involving a thoracotomy or parasternal site. Must have one of the following conditions: 1. Wound opened with excision of tissue (I&D) 2. Positive culture 3. Treatment with antibiotics
Leg (Infection)	Y/N	An infection involving a leg vein harvest site. Must have one of the following conditions: 1. Wound opened with excision of tissue (I&D) 2. Positive culture 3. Treatment with antibiotics
Septicemia	Y/N	Septicemia (Requires Positive Blood Cultures) postoperatively.
Urinary Tract Infection	Y/N	UTI-Urinary Tract Infection (Positive Urine Cultures) postoperatively.
Stroke	Y/N	A central neurologic deficit persisting for > 72 hours.
Transient Ischemic Attack	Y/N	A transient neurologic deficit (TIA recovery within 24 hours; RIND recovery within 72 hours)
Continuous Coma >=24 Hours	Y/N	New postoperative coma that persists for at least 24 hours.

Prolonged Ventilation	Y/N	Pulmonary Insufficiency requiring ventilatory support - includes (but not limited to) causes such as ARDS and pulmonary edema and/or any patient ventilated > 24 hours postoperatively.
Pulmonary embolism	Y/N	Pulmonary Embolism diagnosed by study such as V/Q scan or angiogram.
Pneumonia	Y/N	Pneumonia diagnosed by one of the following: Positive cultures of sputum, blood, pleural fluid, empyema fluid, transtracheal fluid or transthoracic fluid; consistent with the diagnosis and clinical findings of pneumonia. May include chest X-ray diagnostic of pulmonary infiltrates.
Renal Failure	Y/N	Acute or worsening renal failure resulting in one or more of the following: a. increase of serum creatinine to > 2.0 & 2x the baseline creatinine level b. A new requirement for dialysis.
Dialysis, Vascular - Aortic Dissection, Illiac/Femoral Dissection, Acute Limb Ischemia	Y/N	
Heart Bock	Y/N	New heart block requiring the implantation of a permanent pacemaker prior to discharge.
Cardiac Arrest	Y/N	A cardiac arrest documented by one of the following: a. ventricular fibrillation b. rapid ventricular tachycardia with hemodynamic instability c. asystole.
Anticoagulant Complication	Y/N	Bleeding, hemorrhage, and/or embolic events related to anticoagulant therapy.
Tamponade	Y/N	Fluid in the pericardial space compromising cardiac filling, and requiring intervention. This should be documented by either: a. echo showing pericardial fluid and signs of tamponade such as right heart compromise, or b. systemic hypotension due to pericardial fluid compromising cardiac function.
Gastro-Intestinal Complication	Y/N	Postoperative occurrence of any GI complication including: a. GI bleeding requiring transfusion b. pancreatitis with abnormal amylase/lipase requiring nasogastric (NG) suction therapy c. cholecystitis requiring cholecystectomy or drainage d. mesenteric ischemia requiring exploration e. Other GI complication
Multi-System Failure	Y/N	Two or more major organ systems suffer compromised functions.
Atrial Fibrillation	Y/N	New onset of atrial fibrillation/flutter (AF) requiring treatment. Does not include recurrence of AF which had been present preoperatively.
DISCHARGE		This section is blank if patient dies during initial hospital stay
Aspirin, ACEI, Beta Blockers, Lipid Lowering, Other Anti-Platelets	Y/N	
Discharge Location	• Home • Nursing Home	
	• Extended Care/TCU	
	• Other Hospital • Other	
MORTALITY		
Mortality	Y/N	Patient death, either in hospital or long-term.
Discharge Status	• Alive • Dead	Specify whether the patient was alive or dead at discharge from the hospitalization in which surgery occurred.

Status at 30 Day after Surgery	• Alive • Dead	Specify whether the patient was alive or dead at 30 days post surgery (whether in hospital or not).
Operative Death	Y/N	Operative Mortality: Includes both (1) all deaths occurring during the hospitalization in which the operation was performed, even if after 30 days; and (2) those deaths occurring after discharge from the hospital, but within 30 days of the procedure unless the cause of death is clearly unrelated to the operation.
Mortality Date	Date	
Location of Death	• OR • Hospital • Home	
	• Other Facility	
Primary Cause of Death (select only one)	• Cardiac • Neurological	
	• Renal • Vascular	
	• Infection • Pulmonary	
	• Valvular • Other	
READMISSION		This section is blank if patient dies during initial hospital stay
Readmit <=30 Days from Date of procedure	Y/N	Patient was readmitted as an in-patient within 30 days from the date of surgery for ANY reason.
Readmission Reason		Indicate one of the following readmission reasons: Anticoagulant Complications, Arrhythmias/Heart Block/Pacemaker Insertion/AICD, CHF, MI/Recurrent Angina, Pericardial Effusion/Tamponade, Pneumonia/Respiratory Complication, Valve Dysfunction, Infection Deep Sternum, Infection Leg, Cardiac Cath, PTCA Stent, Renal Failure, TIA, Reop for Graft Occlusion, Reop for Bleeding, Permanent CVA, Acute Vascular Complication, Other

Appendix E: APPROACH Cardiac Surgery Registry Data Definitions (Addendum to Appendix B)

APPROACH – Cardiac Surgery Module ***Note:** demographics, patient history-, risk factors, medication, laboratory, and ECG data can be imported from module to module and are listed under the CATH module. The Discharge Medications and Discharge page are the same as previously documented in ACS.*		
Variable	***Field Options***	***Coding Instructions/Definitions of Variables and Field Options***
OPERATIVE DETAILS		
Procedure Type	• Unknown • CABG • CABG + Valve • CABG + Other • Valve + Other • CABG + Valve + Other • AVR/R • MVR/R • TVR/R • 2 or More VR/R • EP Surgery • Misc - Cardiac • VSD • ASD • Heart Transplant • Heart/Lung Transplant • Single Lung Transplant • Double Lung Transplant • Defibrillator Implant • Transplant + Other • PVR/R • Misc - non-Cardiac • None	Choose the most appropriate category type (based upon the scheduled procedure) from the drop down menu.

	• Aortic	
Details of OR procedure	• CABG • Valve – note type of valve and repair or replacement • Aortic surgery – note aortic repair; aneurysm (note location); and dissection (acute vs chronic) • Other cardiac – LVA, congenital, TMLR, Tumor, Atrial ablation, Septal myomectomy, ASD, VSD, Dor, Transplant, Pacemaker, Maze, AICD, Trauma, Bentall, Other • Other Non-Cardiac – carotid endarterectomy, Axillo-fem bypass, fem-fem bypass, fem-tibial bypass, aorto-fem bypass, other vascular, other thoracic • Lung transplant – Y/N – If yes left, right, bilateral	
Left Main Disease	Yes/No	Click yes if the patient has Left Main disease defined as greater than 50% stenosis
MRD	• Unknown • Aortic Aneurysm • Aortic Dissection • Aortic Rupture • Aortic Tear Post-op • ASD • ASD & VSD • CAD • Cardiac Tumor • Cardiomyopathy • Coronary Artery Dissection • Carotid Artery Aneurysm • Coarctation of Aorta • Congenital Anomaly • Graft atherosclerosis • LVA • Non-cardiac Tumor • Pacemaker lead complication • Pericardial Tamponade • Pericarditis	Select most responsible diagnosis

	• Pulmonary Conduit Stenosis • Pulmonary Hemorrhage • Tetralogy of Fallot • Thrombosis • Trauma • VSD • Valve Disease • Pacemaker Lead Complication • Ventricular Failure • Transplant Patient • Other	
Prior Surgery Details		Same as current surgery details
Prior Surgery	Incidence Reason for another surgery • Progression of CAD • IMA graft occlusion • Other arterial graft occlusion • Progression of native valve disease • Prosthetic valve dysfunction • Failed previous valve repair/replacement • Previous congenital repair • Patent IMA graft yes/No • Intraop IMA graft injury – Yes/No	Incidence – number of previous operations. If prior CV surgery complete Reason for Re-Op:
Bypass Data (if CABG performed)		
	Complete revascularization • Yes • No • Unknown	Reason – document reason for NOT performing complete revascularization
	Endarterectomy • Yes	Indicate if removal of plaque from an artery was performed

	• No	
	Arterioplasty performed • Yes • No	Indicate if repair/reconstruction of an artery was performed
	Intraop graft revision • Yes • No	Indicate if graft revision was performed during surgery
	T-graft or Y-graft • Yes • No	Indicate if T-graft or Y-graft used during surgery
	Endoscopic vein harvest • Attempted • Completed	
	○ # of distal anast (venous)	Indicate the total number of distal anastomoses with venous conduits
	○ # of distal anast (arterial)	Indicate the total number of distal anastomoses with arterial conduits, whether IMA, GEPA, radial etc
	○ # of IMA grafts	Indicate the number of IMA grafts used
	○ # of IMA Dist Anast	Indicate the total number of distal anastomoses done using an IMA (Internal Mammary Artery) arterial conduit
	• For each native vessel document: ○ Native Vessel ○ Prior PCI to native vessel – Y/N ○ Endarterectomy to native vessel – Y/N ○ Size (<1.5; 1.6-2.0; 2.1-2.5; 2.6-3.0; >3.0) ○ Distal disease – Y/N	
	• For each graft document: ○ Conduit ○ Anastomosis ○ Sequential – Y/N ○ Quality ○ Graft size	Conduit (SVG Thigh; SVG Leg; Lesser SVG; LIMA; RIMA; Free LIMA; Free RIMA; GEPA; Free GEPA; Left Radial; Right Radial; Multiple; Other) Anastomosis (end-to-side; end-to-end; side-to-side) Quality (poor; fair; good) Graft size (small <1.5; medium 1.6-3.0; large .3.0; thin-walled; thick-

	○ Flow	walled) Flow (inadequate; questionable; adequate)
Transplant		
	Transplant ID	
	Recipient Blood Type	
	Most responsible pre-op transplant diagnosis • Unknown • Alpha Antitrypsin Deficiency • Arrhythmogenic Ventricular Dysplasia • Bronchial Stenosis/Bronchiectasis • Bronchial Dehiscence • CAD • Cardiomegaly/Ventricular Hypertrophy • Cardiomyopathy - Dilated • Cardiomyopathy - Dilated Congenital • Cardiomyopathy - Dilated Congestive • Cardiomyopathy - Dilated Idiopathic • Cardiomyopathy due to meds • Cardiomyopathy due to Muscular Dystrophy • Cardiomyopathy - Hypertrophic • Cardiomyopathy - Ischemic • Cardiomyopathy - Restrictive • Cardiomyopathy - Sarcoid • Cardiomyopathy - Valvular • Cardiomyopathy - Viral • Chronic Bronchiolitis Obliterans • Congenital Anomaly • Cystic Fibrosis • Eisenmengers Complex • Emphysema/COPD Endstage • Giant Cell Myocarditis • Graft Athero - Donor Heart • Graft Occlusion	

	• Interstitial Lung Disease - Cor Pulmonale • Interstitial Lung Disease - Eosinophilia Grauloma • Interstitial Lung Disease - Idiopathic • Marfans Syndrome • Miscellaneous • Myocarditis • Pericarditis - Calcific Constrictive • Primary Graft Failure • Primary Pulmonary Hypertension • Pulmonary Fibrosis • Respiratory Failure - Endstage • Sarcoidosis • Scleroderma • Talcosis • Tracheal Dehiscence • Transplant Rejection • Tubular Sclerosis • Uhl's Syndrome • Valvular Disease • Wegner's Granulomatosis • Mucopolysacchardosis • Ventricular Failure • Other	
	Transplant list date	Date patient was placed on Transplant List
	CMV status • Unknown • Negative • positive	
	Transplant medications	Select - Neoral cyclo, Atgam, OKT3, Solumedrol, ratgam, ALG, MMM/Cell Cept, Prednisone, Imuran/azathioprine, FK506
	Complications • CMV – Y/N/CMV-treated • Rejections – Y/N/rejection treated	

	• Donor Data • Sex • Blood type • Race • Cause of death • Age • Donor ischemic type • Organ procured from city/province	Race – Caucasian, Black, Hispanic, Asian , Native American Cause of death – Unknown; Anoxic Brain Death; Congenital Heart Defect; CVA/Stroke; Drowning; Drug /Alcohol Toxicity; Fall; Gun Shot Wound; Head Injury; MVA; Non-head Injury; Non-cardiac Cancer; Subarachnoid/ Subdural Hemorrhage
CPB – cardio-pulmonary details		
	• CPB case#	
	• Personnel – Perfusionist	
	• Mini-sternotomy – yes/no	
	• Pump Status • Yes • No • Standby	
	Special procedures	(Left Heart Bypass; Retrograde Cerebral Perfusion; Antegrade Perfusion; Circulatory Arrest)

	• Cardiolplegia –- yes/no. If yes:
	  ○ TYPE – (Blood; crystalloid; O2 crystalloid)
	  ○ Infusion mode (antegrade; retrograde: both)
	  ○ Infusion dose (intermittent; continuous)
	  ○ Cardioplegia temperature (warm, cold)	

	Cannulation Site– check all that apply:
	• Arterial– arterial inflow from CPB is via catheter placed in:
	  ○ Femoral artery
	  ○ Aorta
	  ○ Arch
	  ○ Other
	• Venous – venous return to the pump oxygenator is via catheter placed in the:	

	○ Femoral vein ○ Jugular vein ○ Atrial ○ Caval ○ Bicaval • Suction augmented venous return – Y/N	
	• Lowest core Temp.	Select: Core Temp.[(35.0-37.0); Normothermic; (32.0-34.9); Hypothermia; (28.0-31.9) Mod Hypothermia; (18.0-27.9) Profound Hypothermia
	• Hgb – hemoglobin pre-op and Pre pump	
	Lactate level – first ; last	
	Intra-Op Medications Aprotonin – Y/N Transexamic Acid – Y/N	Indication Yes if patient received these medications in the OR
	Prophylactic antibiotics Pre-Op – Y/N Intra-Op – Y/N Post-Op – Y/N	
	Urine Output PrePump, post-pump, Total	
	Fluid Balance Total volume in, Total volume out	
	Blood Products used inta-op Y/N – if yes RBC (Red Blood Cells) Cryo (Cryoprecipitate) FFP(Fresh Frozen Plasma) Platelets	If blood products used intra-operatively complete number of units that were transfused intra-operatively
	IABP – Y/N If Yes document timing (pre-op, intra-op, post-op) and Indication (Prophylactic, Low CO, PCI support, hemodynamic instability, Shock)	
	Pacing – Y/N – if Yes document Atrial or Ventricular	
	ECMO/VAD – Y/N – If Yes document timing (pre-op, intra-op, post-op) and type - LVAD, BVAD, ECMO, RVAD, TAH	

	Intra_Op TEE – Y/N	
	Chest Tubes # Pleural spaces opened – Y/N and if Yes – left, right, both	
	Inotropes leaving OR Y/N	
	Antiarrhythmics leaving OR Y/N	
Valve Data		
For each valve (Aortic, mitral, tricuspid, pulmonary) document	•Disease – Y/N	
	•Stenosis – Y/N	
	•Insufficiency o none o trivial o moderate o severe	Indicate if there is evidence of regurgitation - Defined at the highest level
	• Etiology ○ Unknown; ○ Rheumatic; Cardiomyopathy; ○ Failed Previous; ○ Dilated; ○ Congenital; ○ Ischemic; ○ Marfans; Myxomatous degeneration ○ Calcific; ○ Prosthetic Valve Dysfunction ○ Endocarditis; ○ Prolapse-Anterior ○ Prolapse-Posterior	
	• Gradient	if cath done then the mean gradient (peak-peak) will populate Echo
Valves Used		
For each valve (Aortic,	• Type of surgery	List is specific to each valve

mitral, tricuspid, pulmonary) document		
	• Implant type o mechanical o bioprosthetic o homograft o autograft	
	• Explant	
	• Device Model	populated with the appropriate models depending on implant type
	• Valve size (mm)	
	• Valve sutures o continuous o interrupted	
	• Pledgets – Y/N	
POST OPERATIVE		
Post-Operative Blood Products	Y/N	note units transfused Post-op – within 4 hours of arrival in CVICU - RBC, cryo, FFP, platelets Total Post-op - RBC, cryo, FFP, platelets
Post-Operative Ventilation	• First extubation date/time • Hours ventilated • Re-intubated during hospitalization – yes/no. • if yes document intubation date/time and extubation date/time. • Total ventilation time	Software calculates hours ventilated. If patient requires re-intubation then multiple entries are allowed. Software totals time.
COMPLICATIONS		
In-Hospital Complications	• Pulmonary	If Yes - ventilator prolonged, positive culture, chest tube, PE (pulmonary embolism); pneumothorax; ARDS, pulmonary edema, pleural effusion, pneumonia
	• Re-Op	If Yes note reason for RE-Op - bleeding; graft occlusion; valve dysfunction, other cardiac; other non-cardiac and list date/ procedure type/ surgeon. Multiple entries allowed.
	• Infection	if yes document (sternum-superficial; septicaemia; leg; sternum deep; thoracotomy; port site; IABP site; UTI; Arm)

	• Neurologic	If yes note stroke- permanent; stroke-transient; Coma> 24 hours
	• Delirium	
	• Valvular	If Yes - structural deterioration; thromboembolism; non-structural dysfunction; valve thrombus; prosthetic valve endocarditis
	• Renal	If YES – Renal insufficiency, ARF (acute renal failure), dialysis required (Hemodialysis or both)
	• Vascular	If Yes – dissection, occlusion, embolic, DVT
	• Cardiac	If yes – Atrial fibrillation/flutter, Ventricular tachycardia/fibrillation, tamponade, complete heart block, low cardiac output, cardiac arrest, bradycardia, temporary pacemaker, anticoagulant complication, Other New Q-waves Y/N
	Gastrointestinal	If yes – bleeding, ischemia, Ileus, other Surgery performed-Y/N
Patient Location Tracking Grid		Enter unit and date/time for each entry so length of stay can be tracked for each unit and as a total.