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CLINICAL DATA STANDARDS

2020 AHA/ACC Key Data Elements and Definitions for Coronary Revascularization

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Coronary Revascularization)

Developed in Collaboration With the Society for Cardiovascular Angiography and Interventions

Endorsed by the Society of Thoracic Surgeons

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PREAMBLE

The American College of Cardiology (ACC) and the American Heart Association (AHA) support their

members' goal to improve the prevention and care of cardiovascular diseases through professional education, research, and development of guidelines and standards and by fostering policy that supports optimal patient outcomes. The ACC and AHA recognize the importance of the use of clinical data standards for patient management, assessment of outcomes, and conduct of research, and the importance of defining the processes and outcomes of clinical care, whether in randomized trials, observational studies, registries, or quality improvement initiatives.

Hence, clinical data standards strive to define and standardize data relevant to clinical topics in cardiovascular medicine, with the primary goal of assisting data collection by providing a platform of data elements and definitions applicable to various conditions. Broad agreement on a common vocabulary with reliable definitions used by all is vital to pool and/or compare data across studies to promote interoperability of electronic health records (EHRs) and to assess the applicability of research to clinical practice. The increasing national focus on adoption of certified EHRs along with financial incentives for providers to demonstrate "meaningful use" of those EHRs to improve healthcare quality render even more imperative and urgent the need for such definitions and standards. Therefore, the ACC and AHA have undertaken to define and disseminate clinical data standards—sets of standardized data elements and corresponding definitions—to collect data relevant to cardiovascular conditions. The ultimate purpose of clinical data standards is to contribute to the infrastructure necessary to accomplish the ACC's mission of fostering optimal cardiovascular care and disease prevention and the AHA's mission of being a relentless force for a world of longer, healthier lives.

The specific goals of clinical data standards are:

1. To establish a consistent, interoperable, and universal clinical vocabulary as a foundation for clinical care and clinical research
2. To facilitate the exchange of data across systems through harmonized, standardized definitions of key data elements
3. To facilitate the further development of clinical registries, quality and performance improvement programs, outcomes evaluations, public reporting, and clinical research, including the comparison of results within and across these initiatives

The key data elements and definitions are a compilation of variables intended to facilitate the consistent, accurate, and reproducible capture of clinical concepts; standardize the terminology used to describe cardiovascular diseases and procedures; create a data environment conducive to the assessment of patient management and outcomes for quality and performance improvement and clinical and translational research; and increase opportunities for sharing data across disparate data sources. The ACC/AHA Task Force on Clinical Data Standards (Task Force) selects cardiovascular conditions and procedures that will benefit from creation of a clinical data standard set. Experts in the subject area are selected to examine and consider existing standards and develop a comprehensive, yet not exhaustive, data standard set. When undertaking a data collection effort, only a subset of the elements contained in a clinical data standard listing may be needed, or conversely, users may want to consider whether it may be necessary to collect some elements not listed. For example, in the setting of a randomized, clinical trial of a new drug, additional information would likely be required regarding study procedures and drug therapies. Another example is as follows: If the data set is to be used for quality improvement, safety initiatives, or administrative functions, other elements such as Current Procedural Terminology codes and *International Classification of Diseases and Related Health Problems, 10th Revision, Clinical Modification* codes, or outcomes may be added. The intent of the Task Force is to standardize the clinical concepts, keeping the focus on the patient and the clinical care, not necessarily on administrative billing or coding concepts, and the clinical concepts selected for development are generally cardiovascular specific, where a standardized terminology already exists. The clinical data standards can therefore serve as a guide for development of administrative data sets, and complementary administrative or quality assurance elements can evolve from these core clinical concepts and elements. Thus, rather than forcing the clinical data standards to harmonize with existing administrative codes, such as *International Classification of Diseases and Related Health Problems-10th Revision-Clinical Modification* or Current Procedural Terminology codes, we would envision the administrative codes to follow the lead of the clinical data standards. This approach would allow the clinical care to lead standardization of the terminologies in health care.

The ACC and AHA recognize that there are other national efforts to establish clinical data standards, and every attempt is made to harmonize newly published standards with existing standards. Writing committees are instructed to consider adopting or adapting existing nationally recognized data standards if the definitions and characteristics are validated, useful, and applicable to the set under development. In addition, the ACC and AHA are committed to continually expanding their portfolio of clinical data standards and will create new standards and update existing ones as needed to maintain their currency and promote harmonization with other standards as health information technology and clinical practice evolve.

The Privacy Rule of the Health Insurance Portability and Accountability Act privacy regulations, which went into effect in April 2003, heightened all practitioners' awareness of our professional commitment to safeguard our patients' privacy. The Health Insurance Portability and Accountability Act privacy regulations specify which information elements are considered "protected health information." These elements may not be disclosed to third parties (including registries and research studies) without the patient's written permission. Protected health information may be included in databases used for healthcare operations under a data use agreement. Research studies using protected health information must be reviewed by an institutional review board or a privacy board.

We have included identifying information in all clinical data standards to facilitate uniform collection of these elements when appropriate. For example, a longitudinal clinic database may contain these elements because access is restricted to the patient's caregivers. Conversely, registries may not contain protected health information unless specific permission is granted by each patient. These fields are indicated as protected health information in the data standards.

In clinical care, caregivers communicate with each other through a common vocabulary. In an analogous manner, the integrity of clinical research depends on firm adherence to prespecified procedures for patient enrollment and follow-up; these procedures are guaranteed through careful attention to definitions enumerated in the study design and case report forms. When data elements and definitions are standardized across studies, comparison, pooled analysis, and meta-analysis are enabled, thus deepening our understanding of individual studies.

The recent development of quality performance measurement initiatives, particularly those for which the comparison of providers and institutions is an implicit or explicit aim, has further raised awareness about the importance of clinical data standards. Indeed, a wide audience, including nonmedical professionals such as payers, regulators, and consumers, may draw conclusions about care and outcomes. To understand and compare care patterns and outcomes, the data elements that characterize them must be clearly defined, consistently used, and properly interpreted.

Biykem Bozkurt, MD, FACC, FAHA
Chair, ACC/AHA Task Force on Clinical Data Standards

1. INTRODUCTION

Heart disease is the leading cause of death in the United States (1), and coronary artery disease is the most common type of heart disease (2). The annual estimated cost of heart disease in the United States is $218 billion (3). A substantial portion of this expense is related to the cost of hospitalizations for interventional cardiology and cardiac surgery (3). As healthcare costs continue to rise, increased emphasis is placed on the need to develop platforms to measure outcomes, quality, and value in medicine and surgery. Large databases, such as the Society of Thoracic Surgeons (STS) National Database, the ACC National Cardiovascular Data Registry (NCDR), and the Get With The Guidelines-Coronary Artery Disease database, contain a wealth of information on cardiac surgical procedures, invasive cardiac procedures, and selected clinical conditions but do not contain information about healthcare economics (charges and costs) and only limited data on longitudinal outcome. To address these limitations, the STS and NCDR metrics must be linked to other sources of data such as Centers for Medicare and Medicaid Services data. Such linkages of large data sets facilitate comparative effectiveness research as well as the study of longitudinal outcomes and healthcare economics, as exemplified by the ASCERT (American College of Cardiology Foundation-Society of Thoracic Surgeons Collaboration on the Comparative Effectiveness of Revascularization Strategies) trial of coronary artery bypass grafting and percutaneous coronary intervention, funded by the National Heart, Lung, and Blood Institute of the National Institutes of Health (4–6). The success of this type of research, using linked data sets, depends on the harmonization of clinical data standards and definitions across databases. The purpose of this article is to publish consensus-based key data elements and definitions for databases capturing information about coronary revascularization.

2. METHODOLOGY

2.1. Writing Committee Composition

The Task Force selected the members of the writing committee. The writing committee consisted of 14 individuals with domain expertise in cardiothoracic surgery, cardiovascular angiography and interventions, cardiovascular imaging, outcomes assessment, medical informatics, health information management, and healthcare services research and delivery.

2.2. Relationships With Industry and Other Entities

The Task Force makes every effort to avoid actual or potential conflicts of interest that might arise because of an outside relationship or a personal, professional, or business interest of any member of the writing committee. Specifically, all members of the writing committee are required to complete and submit a disclosure form showing all such relationships that could be perceived as real or potential conflicts of interest. These statements are

reviewed by the Task Force and updated when changes occur. Authors' and peer reviewers' relationships with industry and other entities pertinent to this data standards document are disclosed in Appendixes 1 and 2, respectively. In addition, for complete transparency, the disclosure information of each writing committee member—including relationships not pertinent to this document—is available online as a supplement to this document. The work of the writing committee was supported exclusively by the AHA and ACC without commercial support. Writing committee members volunteered their time for this effort. Meetings of the writing committee were confidential and attended only by committee members and staff.

2.3. Review of Literature and Existing Data Definitions

A substantial body of literature was reviewed to create this manuscript. The primary sources of information reviewed were the "2013 ACCF/AHA Key Data Elements and Definitions for Measuring the Clinical Management and Outcomes of Patients With Acute Coronary Syndromes and Coronary Artery Disease" (7); and the data definitions from STS (8) and NCDR (9,10). This information was augmented by multiple peer-reviewed references listed in the tables under the column "Mapping/Source of Definition."

2.4. Development of Data Elements

The data element set addressed in this article includes coronary revascularization terminology of interest to clinical care, research, and public reporting such as history and risk factors, clinical presentations, laboratory tests, invasive and noninvasive testing, surgical revascularization, percutaneous coronary intervention, and other outcomes. For some data elements, the result should be associated with a date and time. This also applies to data elements in which results are obtained at different times. In such circumstances, the generic date/time data elements, as defined in Appendixes 4, 5, and 8, should be used to collect this information in association with the data element of interest. Several recent publications have focused attention on the need to reach consensus for the definitions of several key variables commonly used in cardiovascular studies (11–15). These are important efforts, because achieving a common vocabulary with reliable definitions is the long-range goal of all clinical data standard documents. Where appropriate, some of these new recommended definitions have been incorporated into this document. However, these newer definitions have not yet been fully integrated into the major large registries (i.e., ACC NCDR, STS National Database, and Get With The Guidelines-Coronary Artery Disease). In this document, we focused on current definitions from the large registries and, where appropriate, identified where newer definitions may be adopted in future clinical data standard documents.

The writing committee aggregated, reviewed, harmonized, and extended these terms to develop a controlled, semantically interoperable terminology set that would be usable, as appropriate, in as many varied contexts as possible. As necessary, the writing committee identified the contexts where individual terms required differentiation according to their proposed use (i.e., research/regulatory versus clinical care contexts).

This document was developed with the intent that it will serve as a common lexicon and base infrastructure for end users to augment work related to standardization and healthcare interoperability including, but not limited to, structural, administrative, and technical metadata development. The resulting appendixes (Appendixes 4 to 12) list the data element in the first column, followed by a clinical definition of the data element. The allowed responses (i.e., permissible values) for each data element in the next column are the acceptable answers for capturing the information. For data elements with multiple permissible values, a bulleted list of the permissible values is provided in the row listing the data element, followed by multiple rows listing each permissible value and corresponding permissible value definition, as needed. Where possible, clinical definitions (and clinical definitions of the corresponding permissible values) are repeated verbatim as authored by the Standardized Data Collection for Cardiovascular Trials Initiative (14) or as previously published in reference documents.

2.5. Consensus Development

The Task Force established the writing committee according to the processes described in the Task Force on Clinical Data Standards' methodology paper (16). The primary responsibility of the writing committee was to review and refine the "2013 ACCF/AHA Key Data Elements and Definitions for Measuring the Clinical Management and Outcomes of Patients With Acute Coronary Syndromes and Coronary Artery Disease" (7); and develop a harmonized data set for coronary revascularization that will provide the attributes and other informatics formalisms required to attain interoperability of the terms. The work of the writing committee was accomplished via a series of teleconference and web conference meetings, along with extensive email correspondence. The review work was distributed among subgroups of the writing committee based on interest and expertise in the components of the terminology set. The proceedings of the subgroups were then assembled, resulting in the vocabulary, and associated descriptive text in Appendixes 4 to 12. All members reviewed and approved the final vocabulary.

2.6. Relation to Other Standards

The writing committee reviewed the available published clinical data standards, including registry data dictionaries from NCDR and STS, which were specifically developed for coronary revascularization. Adjustments to existing published definitions were made to eliminate verbiage irrelevant to an actual definition (e.g., instructions such as the phrase "indicate whether the patient has …" have been eliminated). In these cases, the writing committee retained only the definition proper.

For the purpose of this document, the writing committee also reviewed the terminology sets developed by national and international standards development organizations. Recognizing that interoperability and harmonization can be truly achieved only by adopting standards that had already been set, we look to the formal recommendations of the Office of the National Coordinator for Health Information Technology. As such, for the computable code sets of the terminologies used in this document, we highly recommend the use of RxNorm (17) for medications, Systematized Nomenclature of Medicine-Clinical Terms (18) for findings and conditions, Logical Observation Identifiers Names and Codes (19) for laboratory tests, and Health Level 7 standards (20) for exchange or transfer of clinical and administrative data among EHR systems as references. The writing committee also acknowledges other ongoing national initiatives in data standardization, specifically the Systemic Harmonization and Interoperability Enhancement for Lab Data (21), which is a multistakeholder collaboration of EHR vendors, professional medical organizations, standards developers, and US agencies including the US Food and Drug Administration, Centers for Disease Control and Prevention, Office of the National Coordinator for Health Information Technology, Centers for Medicare and Medicaid Services, US Department of Veterans Affairs, and National Institutes of Health.

Relative to published clinical data standards, the writing committee anticipates that this terminology set will facilitate the uniform adoption of these terms, where appropriate, by clinicians, clinical and translational researchers, plus those in the regulatory, quality, outcomes, and EHR communities.

2.7. Peer Review, Public Review, and Board Approval

This document was reviewed by official reviewers nominated by ACC and AHA. To increase its applicability further, the document was posted on the ACC website for a 30-day public comment period. This document was approved for publication by the AHA Science Advisory and Coordinating Committee and ACC Clinical Policy Approval Committee in November 2019, and the AHA Executive Committee in January 2020. The writing committee anticipates that these clinical data standards will require review and updating in the same manner as other published guidelines, performance measures, and appropriate use criteria. The writing committee will, therefore, review the set of data elements on a periodic basis, starting with the anniversary of publication of the standards, to ascertain whether modifications should be considered.

3. DATA ELEMENTS AND DEFINITIONS

3.1. History and Risk Factors

See Appendix 4.

3.2. Clinical Presentations

See Appendix 5.

3.3. Laboratory Tests

See Appendix 6.

3.4. Noninvasive Tests

See Appendix 7.

3.5. Invasive Testing

See Appendix 8.

3.6. Surgical Revascularization

See Appendix 9.

3.7. Coronary Artery Nomenclature

See Appendix 10.

3.8. Percutaneous Coronary Intervention

See Appendix 11.

3.9. Other Outcomes

See Appendix 12.

4. INFORMATICS OF CONTROLLED VOCABULARIES

Varying data definitions, data formats, and data encoding, and lack of a standardized vocabulary for representing clinical concepts in healthcare information systems are known barriers that limit the capacity of computer systems to transmit data seamlessly. The ambiguity of clinical concepts and terminologies used in health data exchange makes standardization, harmonization, and maintenance of clinical vocabulary an effortful task that demands considerable time, specialized knowledge, and a specific skill set. The writing committee identified the basic attributes of a standardized vocabulary that allow creation of a basic data dictionary—data elements, data element definitions, permissible values, permissible value definitions, mapping/source of definitions, and notes. For this published data set to be used for full

representation of clinical data, attributes such as synonyms, preferred abbreviations, data formats, data types, target values, use of case information, mapping to standardized code sets (e.g., Systematized Nomenclature of Medicine-Clinical Terms, Logical Observation Identifiers Names and Codes, RxNorm), concept unique identifiers, and concept stewards must be included in a data dictionary (15). Development of comprehensive clinical data standards and use of standardized vocabularies are key to healthcare data interoperability and ultimately will help improve effective communication of patient care across all areas of practice in the healthcare continuum. This document presents a clinical lexicon comprising data elements and associated clinical metadata with a focus on: 1) defining what to collect, 2) deciding how to represent what is collected (by designating data types or terminologies), and 3) determining how to encode the data for transmission. Informatician development of the metadata of the lexicon and technical development of a database specification for semantic interoperability remain outside the scope of this document and can be customized according to user objectives and database capacity.

5. ANTICIPATED USE OF THESE CLINICAL DATA STANDARDS

It is anticipated that these clinical data standards should have a wide applicability in various settings including but not limited to:

1. Cardiovascular procedure reports related to coronary revascularization:
   a. Stress testing reports
   b. Nuclear perfusion study reports
   c. Cardiac magnetic resonance, computed tomography, and positron emission tomography reports
   d. Echocardiogram reports
   e. Cardiac catheterization reports
   f. Percutaneous intervention reports
   g. Cardiac surgery reports
   h. Revascularization summary for the patient's records
2. EHR systems that store and retrieve data related to coronary revascularization
3. Cardiovascular clinical studies related to coronary revascularization
4. Registries that collect, analyze, store, and report information on coronary revascularization
5. Digital health information technology interoperability
6. Public reporting programs
7. U.S. medical schools, for incorporation into medical teaching

The data element tables are also included as an Excel file in the Online Data Supplement.

PRESIDENTS AND STAFF

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KEY WORDS **ACC/AHA Clinical Data Standards, acute coronary syndrome, clinical trials, coronary artery bypass graft, coronary artery disease, coronary revascularization, percutaneous coronary intervention**

APPENDIX 1. AUTHOR RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES (RELEVANT)—2020 AHA/ACC KEY DATA ELEMENTS AND DEFINITIONS FOR CORONARY REVASCULARIZATION

Committee Member	Employment	Consultant	Speakers Bureau	Ownership/ Partnership/ Principal	Personal Research	Institutional, Organizational, or Other Financial Benefit	Expert Witness
Gregory J. Dehmer, *Chair*	Carilion Clinic Cardiology—Medical Director, Quality and Outcomes for the Cardiovascular Institute; Virginia Tech Carilion School of Medicine—Professor of Medicine	None	None	None	None	None	None
Vinay Badhwar	WVU School of Medicine—Gordon F. Murray Professor; Chair, Department of Cardiovascular and Thoracic Surgery; Chair, WVU Heart and Vascular Institute and Service Line	None	None	None	None	None	None
Edmund A. Bermudez	Regional Cardiac & Vascular Associates—Cardiologist	None	None	None	None	None	None
Joseph C. Cleveland Jr	University of Colorado School of Medicine—Professor, Surgery-Cardiothoracic	None	None	None	None	None	None
Mauricio G. Cohen	University of Miami Miller School of Medicine—Professor of Medicine; University of Miami Hospitals and Clinics—Director of the Cardiac Catheterization Laboratories	None	None	None	None	None	None
Richard S. D'Agostino	Lahey Hospital & Medical Center—Chair, Division of Thoracic and Cardiovascular Surgery	None	None	None	None	None	None
T. Bruce Ferguson Jr	East Carolina University—Adjunct Professor, Department of Engineering; RFPi, Inc.—Chief Medical Officer	None	None	None	None	None	None
Robert C. Hendel	Tulane University School of Medicine—Sidney W. and Marilyn S. Lassen Chair in Cardiovascular Medicine; Chief, Section of Cardiology; and Director, Tulane University Heart & Vascular Institute	None	None	None	None	None	None
Maria Lizza Isler	AHA—Interoperability Project Manager	None	None	None	None	None	None
Jeffrey P. Jacobs*	None	None	None	None	None	None	None
Hani Jneid	Baylor College of Medicine—Associate Professor of Medicine and Director of Interventional Cardiology Research; The Michael E. DeBakey VA Medical Center—Director, Interventional Cardiology	None	None	None	None	None	None
Alan S. Katz	St. Francis Hospital—Director, Cardiac Imaging Informatics	None	None	■ ChartWise Medical Systems	None	None	None
Thomas M. Maddox	Washington University School of Medicine in St. Louis—Professor, Cardiovascular Division	None	None	None	None	None	None
David M. Shahian	Massachusetts General Hospital—Vice President, Quality and Safety; Harvard Medical School—Professor of Surgery	None	None	None	None	None	None

This table represents the relationships of committee members with industry and other entities that were determined to be relevant to this document. These relationships were reviewed and updated in conjunction with all meetings and/or conference calls of the writing committee during the document development process. The table does not necessarily reflect relationships with industry at the time of publication. A person is deemed to have a significant interest in a business if the interest represents ownership of ≥5% of the voting stock or share of the business entity, or ownership of ≥$5,000 of the fair market value of the business entity; or if funds received by the person from the business entity exceed 5% of the person's gross income for the previous year. Relationships that exist with no financial benefit are also included for the purpose of transparency. Relationships in this table are modest unless otherwise noted. According to the ACC/AHA, a person has a *relevant* relationship IF: a) the *relationship or interest* relates to the same or similar subject matter, intellectual property or asset, topic, or issue addressed in the *document*; or b) the *company/entity* (with whom the relationship exists) makes a drug, drug class, or device addressed in the *document*, or makes a competing drug or device addressed in the *document*; or c) the *person or a member of the person's household*, has a reasonable potential for financial, professional or other personal gain or loss as a result of the issues/content addressed in the *document*.

*Dr. Jacobs resigned as writing committee chair in April 2019 but continued to contribute as a writing committee member. The writing committee thanks him for his continued participation, which was extremely beneficial to the development of this document.

ACC indicates American College of Cardiology; AHA, American Heart Association; VA, Veterans Affairs; and WVU, West Virginia University.

APPENDIX 2. REVIEWER RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES—2020 AHA/ACC KEY DATA ELEMENTS AND DEFINITIONS FOR CORONARY REVASCULARIZATION

Reviewer	Representation	Employment	Consultant	Speakers Bureau	Ownership/ Partnership/ Principal	Personal Research	Institutional, Organizational, or Other Financial Benefit	Expert Witness	Salary
H. Vernon Anderson	Official Reviewer—ACC/AHA Task Force on Clinical Data Standards Lead Reviewer	University of Texas Health Science Center at Houston McGovern Medical School—Professor of Medicine, Cardiology	■ Accreditation for Cardiovascular Excellence	None	None	None	None	None	None
Ralph G. Brindis	Content Reviewer	University of California, San Francisco, Department of Medicine & the Philip R. Lee Institute for Health Policy Studies—Clinical Professor of Medicine	■ Apple	None	None	■ State of California OSHPD (DSMB)†	■ AC Wellness Network*	None	■ ACC* ■ FDA CV Device Panel
Joaquin E. Cigarroa	Official Reviewer—AHA	Oregon Health and Science University—Clinical Chief, Knight Cardiovascular Institute, Chief of Cardiology, Professor of Medicine	None	None	None	None	■ AHA Board of Directors, Western Affiliate† ■ ASA CSIAC ■ Catheterization and Cardiovascular Intervention* ■ FDA Circulatory Devices Panel ■ NIH‡ ■ OHSU† ■ SCAI Quality Interventional Council†	None	None
Kirk Garratt	Content Reviewer	Christiana Care Health System—John H. Ammon Chair, Cardiology and Medical Director, Center for Heart and Vascular Health	None	None	■ LifeCuff Technologies (formerly IRT)*	■ Abbott (DSMB)* ■ Jarvik Heart (DSMB)	None	None	None
Dennis T. Ko	Official Reviewer—AHA	ICES Central Cardiovascular Research Program—Senior Core Scientist	None	None	None	None	None	None	None
Andrea Price	Official Reviewer—ACC Science and Quality Committee	Indiana University Health—Director, Quality Databases	None	None	■ Quality Informatics Synergies, LLC	■ ACC Accreditation Foundation Board*	None	None	None
James E. Tcheng	Content Reviewer	Duke University Medical Center—Professor of Medicine and Professor of Community and Family Medicine (Informatics); Duke Health Network—Chief Medical Information Officer	■ American Board of Internal Medicine* ■ Elsevier ■ Fujifilm† ■ GE Healthcare ■ Guideline Central ■ HCA† ■ Lumedx† ■ Medstreaming† ■ Philips Medical Systems	None	None	■ AstraZeneca (DSMB)	None	None	None
Mladen I. Vidovich	Official Reviewer—ACC Board of Governors	University of Illinois—Professor of Medicine; Jesse Brown VA Medical Center—Chief, Section of Cardiology	None	None	None	■ Boston Scientific†	■ CSL Behring‡ ■ Merit Medical* ■ Stanford University‡	■ Defendant, interventional cardiology, 2018*	None

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APPENDIX 2. CONTINUED

Reviewer	Representation	Employment	Consultant	Speakers Bureau	Ownership/ Partnership/ Principal	Personal Research	Institutional, Organizational, or Other Financial Benefit	Expert Witness	Salary
William S. Weintraub	Content Reviewer	MedStar Washington Hospital Center—Director of Outcomes Research	■ Amarin ■ AstraZeneca*	None	None	None	None	None	None
David E. Winchester	Content Reviewer—ACC Solution Set Oversight Committee	University of Florida—Associate Professor of Medicine; Co-Director, Cardiac Imaging Division at Department of Radiology	None	None	None	■ NHLBI†	■ Alachua County Medical Society Board of Directors†	■ Plaintiff, delay in care of CAD, 2018 ■ Defendant, delay in care of MI, 2018 ■ Defendant, missed MI, 2018	None

This table represents all relationships of reviewers with industry and other entities that were reported at the time of peer review, including those not deemed to be relevant to this document, at the time this document was under review. The table does not necessarily reflect relationships with industry at the time of publication. A person is deemed to have a significant interest in a business if the interest represents ownership of ≥5% of the voting stock or share of the business entity, or ownership of ≥$5000 of the fair market value of the business entity; or if funds received by the person from the business entity exceed 5% of the person's gross income for the previous year. Relationships that exist with no financial benefit are also included for the purpose of transparency. Relationships in this table are modest unless otherwise noted. Names are listed in alphabetical order within each category of review. Please refer to https://www.acc.org/guidelines/about-guidelines-and-clinical-documents/relationships-with-industry-policy for definitions of disclosure categories or additional information about the ACC/AHA Disclosure Policy for Writing Committees.

*Significant relationship.

†No financial benefit.

‡This disclosure was entered under the Clinical Trial Enroller category in the ACC's disclosure system. To appear in this category, the author acknowledges that there is no direct or institutional relationship with the trial sponsor as defined in the ACC/AHA Disclosure Policy for Writing Committees.

ACC indicates American College of Cardiology; AHA, American Heart Association; ASA, American Stroke Association; CAD, coronary artery disease; CSIAC, Cryptogenic Stroke Initiative Advisory Committee; CV, cardiovascular; DSMB, Data and Safety Monitoring Board; FDA, US Food and Drug Administration; MI, myocardial infarction; NIH, National Institutes of Health; NHLBI, National Heart, Lung, and Blood Institute; OHSU, Oregon Health and Science University; OSHPD, Office of Statewide Health Planning and Development; SCAI, Society for Cardiovascular Angiography and Interventions; and VA, Veterans Affairs.

APPENDIX 3. ABBREVIATIONS

ACC = American College of Cardiology

AHA = American Heart Association

ASCERT = American College of Cardiology Foundation-Society of Thoracic Surgeons Collaboration on the Comparative Effectiveness of Revascularization Strategies

EHR = electronic health record

NCDR = National Cardiovascular Data Registry

STS = Society of Thoracic Surgeons

APPENDIX 4. HISTORY AND RISK FACTORS

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Date of birth		■ Date in mm/dd/yyyy			
Sex	Patient's sex at birth	■ Male ■ Female			
Date of event	The date an event occurred.	■ Date, in mm/dd/yyyy			
Alcohol consumption	Consumption of liquids containing ethanol	■ None ■ ≤1 alcoholic drinks/wk ■ 2–7 alcoholic drinks/wk ■ ≥8 alcoholic drinks/wk ■ Unknown		NCI Thesaurus (Code C16273) (22) Centers for Disease Control and Prevention Fact Sheets - Alcohol use and your health. Available at: https://www.cdc.gov/alcohol/fact-sheets/alcohol-use.htm. Accessed December 9, 2019 (23).	A standard drink is equal to 14.0 g (0.6 oz) of pure alcohol. Generally, this amount of pure alcohol is found in ■ 12 oz of beer (5% alcohol content) ■ 8 oz of malt liquor (7% alcohol content) ■ 5 oz of wine (12% alcohol content) ■ 1.5 oz or a "shot" of 80-proof (40% alcohol content) distilled spirits or liquor (e.g., gin, rum, vodka, whiskey) (23)
Alcohol dependency	Chronic disease in which a person craves drinks that contain alcohol and is unable to control his or her drinking.	■ Yes ■ No ■ Unknown		NCI Thesaurus (Code C93040) (22)	
Erectile dysfunction	Disorder characterized by the persistent or recurrent inability to achieve or to maintain an erection during sexual activity.	■ Yes ■ No ■ Unknown ■ Not applicable		NCI Thesaurus (Code C3133) (22)	
Depression	A mood disorder characterized by at least 2 wk of sadness or loss of interest or pleasure in things, causing clinically significant distress.	■ Yes ■ No ■ Unknown		American Psychiatric Association DSM-5 Task Force. Diagnostic and Statistical Manual of Mental Disorders (DSM-5). 5th ed. Arlington, VA: American Psychiatric Publishing, Inc.; 2013 (24).	
Use of antidepressant medication	The patient has been prescribed an antidepressant.	■ Yes ■ No ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992-1025 (7).	

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Diabetes mellitus	Presence of ≥1 of the following: ■ HbA_{1c} ≥6.5%; or ■ Fasting plasma glucose ≥126 mg/dL (7.0 mmol/L); or ■ 2-h plasma glucose ≥200 mg/dL (11.1 mmol/L) during an oral glucose tolerance test; ■ Currently taking a medication to control blood glucose irrespective of glucose control or In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose ≥200 mg/dL (11.1 mmol/L)	■ Yes, type 1 ■ Yes, type 2 ■ No ■ Unknown		American Diabetes Association. 2. Classification and diagnosis of diabetes: standards of medical care in diabetes-2018. Diabetes Care. 2018; 41:S13-27 (25).	This does not include gestational diabetes.
Diabetes mellitus treatment	The patient's diabetes mellitus treatment	■ Insulin ■ Other subcutaneous medications ■ Oral-Other than SGLT-2 inhibitors ■ Oral-SGLT-2 inhibitors ■ Diet only ■ None ■ Other ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	Patients placed on a preprocedural diabetic pathway of insulin drip at admission but whose diabetes mellitus was controlled by diet or oral methods are not coded as being treated with insulin.
		Insulin	Insulin treatment (includes any combination with insulin)		
		Other subcutaneous medications	For example, GLP-1 agonist		
		Oral-Other than SGLT-2 inhibitors	Treatment with oral agent (includes oral agent with or without diet treatment) such as metformin, sulfonylureas, thiazolidinediones, alpha-glucosidase inhibitors, meglitinides, DPP-4 inhibitors, or bile acid sequestrants		
		Oral-SGLT-2 inhibitors			Added as a separate class of oral agents because of their effect on cardiovascular outcomes.
		Diet only	Treatment with diet only		
		None	No treatment for diabetes mellitus		
		Other	Other adjunctive treatment, nonoral/insulin/diet		
		Unknown	A proper value is applicable but not known.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Diabetes mellitus control status	The patient's diabetes mellitus is optimally controlled. Professional organizations have different treatment goal recommendations. A target HbA_{1c} level between 7.0% and 7.5% may be appropriate if it can be safely achieved in healthy older adults with few comorbidities and good functional status. Glycemic control recommendations in older adults of 7.5% to 8.0% have been suggested. Higher HbA_{1c} targets (8%-9%) are appropriate for older adults with multiple comorbidities, poor health, and limited life expectancy.	■ Yes ■ No ■ Unknown		American Diabetes Association. 6. Glycemic targets: standards of medical care in diabetes-2019. Diabetes Care. 2019;42:S61-70 (26). Garber AJ, Abrahamson MJ, Barzilay JI, et al. Consensus statement by the American Association of Clinical Endocrinologists and American College of Endocrinology on the comprehensive type 2 diabetes management algorithm - 2019 executive summary. Endocr Pract. 2019;25:69-100 (27).	Older adults is generally defined as age ≥65 y.
Hypertension		■ Elevated blood pressure ■ Stage 1 hypertension ■ Stage 2 hypertension ■ No ■ Unknown		Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2018;71:e127-248 (28).	
		Elevated blood pressure	120–129 mm Hg systolic/<80 mm Hg diastolic		
		Stage 1 hypertension	130–139 mm Hg systolic or 80–89 mm Hg diastolic		
		Stage 2 hypertension	≥140 mm Hg systolic or ≥90 mm Hg diastolic		
		No	Blood pressure is categorized as normal (<120 mm Hg systolic/<80 mm Hg diastolic).		
		Unknown	A proper value is applicable but not known.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Antihypertensive medications	Taking medication to lower blood pressure.	■ Yes ■ No ■ Unknown			
Hypertension controlled by medication		■ Thiazide or thiazide-type diuretic agents ■ ACE inhibitor ■ ARB ■ CCB, dihydropyridine ■ CCB, non-dihydropyridine ■ Secondary agent(s) ■ No ■ Unknown		Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2018;71:e127–248 (28).	
		Thiazide or thiazide-type diuretic agents	Thiazide and thiazide-type diuretic agents include chlorthalidone, hydrochlorothiazide, indapamide, and metolazone.		
		ACE inhibitor	ACE inhibitors include benazepril, captopril, enalapril, fosinopril, lisinopril, moexipril, perindopril, quinapril, ramipril, and trandolapril.		
		ARB	ARBs include azilsartan, candesartan, eprosartan, irbesartan, losartan, olmesartan, telmisartan, and valsartan.		
		CCB, dihydropyridine	Dihydropyridine CCBs include amlodipine, felodipine, isradipine, nicardipine, nifedipine, and nisoldipine.		
		CCB, non-dihydropyridine	Non-dihydropyridine CCBs include diltiazem and verapamil.		
		Secondary agent(s)	Secondary agents include loop and potassium-sparing diuretics, aldosterone antagonists, beta blockers, direct renin inhibitors, alpha-1 blockers, central alpha-2 antagonist and other centrally acting drugs, and direct vasodilators.		
		No			
		Unknown	A proper value is applicable but not known.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Number of antihypertensive medications used		■ Numerical ■ Unknown			
Antianginal medications used	Use of antianginal medications	■ Long-lasting nitrate ■ Beta blocker ■ CCB ■ Ranolazine ■ No ■ Unknown			
Number of antianginal medications used		■ Numerical ■ Unknown			Sublingual nitroglycerin is not considered a chronic antianginal medication in terms of this concept.
Tobacco type	The type of tobacco product the patient uses.	■ Cigarettes ■ Cigars ■ Pipe ■ Heated tobacco products ■ Other smokeless tobacco products		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (element #4626) (29) Barua RS, Rigotti NA, Benowitz NL, et al. 2018 ACC expert consensus decision pathway on tobacco cessation treatment: a report of the American College of Cardiology Task Force on Clinical Expert Consensus Documents. J Am Coll Cardiol. 2018;72:3332–65 (30).	
		Cigarettes			
		Cigars			
		Pipe			
		Heated tobacco products	A category of tobacco products that heats tobacco to a lower temperature than required for combustion. The result is an aerosol (but not smoke) that the user inhales.		
		Other smokeless tobacco products	Includes chewing tobacco and oral snuff.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Tobacco use	Current or prior use of any combustible tobacco product (e.g., cigarettes, cigars, and pipes) or heated tobacco product captured as smoking status.	■ Current everyday user ■ Current some day user ■ Current user, frequency unknown ■ Former user ■ Never user ■ User, current status unknown ■ Unknown		Barua RS, Rigotti NA, Benowitz NL, et al. 2018 ACC expert consensus decision pathway on tobacco cessation treatment: a report of the American College of Cardiology Task Force on Clinical Expert Consensus Documents. J Am Coll Cardiol. 2018;72:3332–65 (30). NCDR CathPCI Registry Coder's Data Dictionary v5.0 (element #4625) (29) National Center for Health Statistics. National health interview survey. Prevalence of current cigarette smoking among adults aged 18 and over: United States, 1997–September 2017, sample adult core component. Available at: https://www.cdc.gov/nchs/data/nhis/earlyrelease/EarlyRelease201803_08.pdf. Accessed December 9, 2019 (31).	
		Current everyday user	As defined in the NHIS, a person who reports currently smoking tobacco every day and has smoked at least 100 cigarettes (5 packs) in his or her lifetime (31).		The only permissible value definition, as shown, currently available is for cigarette smoking. There are no current definitions for cigar, pipe, or heated tobacco product use.
		Current some day user	As defined in the NHIS, a person who reports currently smoking tobacco on some days (nondaily smoker) and has smoked at least 100 cigarettes (5 packs) in his or her lifetime (31).		
		Current user, frequency unknown	The patient smokes tobacco, but the frequency is unknown.		
		Former user	As defined in NHIS, a person who does not currently smoke tobacco but has smoked at least 100 cigarettes in his or her lifetime. Because relapse to smoking occurs frequently after quitting, long-term abstinence is often operationally defined as 6 mo of abstinence. Abstinence from smoking for at least 7 d in a row is the criterion often required in clinical studies for an individual to be considered a former smoker in the short-term.		
		Never user	A person who has not smoked tobacco regularly and does not now smoke every day or some days. NHIS defines never smoker as an individual who has not smoked 100 cigarettes (5 packs) in his or her lifetime (32).		
		User, current status unknown	The patient smokes tobacco but the frequency is unknown.		
		Unknown	A proper value is applicable but not known.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Quantity of cigarettes smoked	Quantification of lifetime tobacco exposure defined as number of cigarettes smoked/day (pack-years).	■ Numerical, pack-years		NCI Thesaurus (Code: C73993) (22)	1 pack-year is smoking 20 cigarettes/d for 1 y.
Former smoker abstinence period	Period of abstinence of former smoker	■ Between 7 d and 6 mo ■ ≥6 mo			
Exposure to secondhand smoke	The IOM defines secondhand smoke as a complex mixture that is made up of gases and particles and includes smoke from burning cigarettes, cigars, and pipe tobacco (sidestream smoke) and exhaled mainstream smoke. This includes aged smoke that lingers after smoking ceases.	■ Current ongoing exposure ■ Recent past exposure (<1 y) ■ Remote past exposure (>1 y)		Institute of Medicine Committee on Secondhand Smoke Exposure and Acute Coronary Events. Secondhand Smoke Exposure and Cardiovascular Effects: Making Sense of the Evidence. Washington, DC: National Academies Press; 2010 (33).	
Use of electronic nicotine delivery system	Use of electronic cigarettes (e-cigarettes), which are battery-operated devices that heat a liquid containing nicotine, propylene glycol, and/or vegetable glycerin and flavorants to generate an aerosol that the user inhales, or heat-not-burn tobacco products, which are tobacco products that heat tobacco to a lower temperature than required for combustion.	■ Yes ■ No ■ Unknown		Barua RS, Rigotti NA, Benowitz NL, et al. 2018 ACC expert consensus decision pathway on tobacco cessation treatment: a report of the American College of Cardiology Task Force on Clinical Expert Consensus Documents. J Am Coll Cardiol. 2018;72:3332-65 (30).	Electronic nicotine delivery systems generate an aerosol (but not smoke) that the user inhales. Users' exposure to nicotine and other chemicals in the aerosol depends on factors such as the type of device, the components of the e-liquid, and on how the devices are used.
Illicit drug use	Documented history of current, recent, or remote use of any illicit drug (e.g., heroin, cocaine, methamphetamine) or controlled substance, or misuse of prescription drugs.	■ Current user ■ Recent user (within 1 y but not current) ■ Former user (>1 y) ■ No ■ Unknown			Because laws regarding marijuana vary by state, marijuana use is excluded from consideration for this data element and listed separately.
Cannabis use	History of cannabis use	■ Yes ■ No ■ Unknown			

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Dyslipidemia	History of dyslipidemia that was diagnosed and/or treated by a physician. Criteria include documentation of the following: ■ Total cholesterol >200 mg/dL (5.18 mmol/L); or ■ LDL ≥130 mg/dL (3.37 mmol/L); or ■ HDL <40 mg/dL (1.04 mmol/L) in men and <50 mg/dL (1.30 mmol/L) in women; or ■ Lipoprotein a >50 mg/dL (125 nmol/L), or persistent elevations of triglycerides ≥175 mg/dL (≥1.97 mmol/L); ■ Currently receiving antilipidemic treatment	■ Yes ■ No ■ Unknown		Grundy SM, Stone NJ, Bailey AL, et al. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2019;73:e285–350 (34).	
Metabolic syndrome	Presence of at least 3 of the following: ■ Increased waist circumference (by ethnically appropriate cutpoints) ■ Elevated triglycerides (>150 mg/dL, nonfasting), or drug treatment for elevated triglycerides ■ Elevated blood pressure, or antihypertensive drug treatment in a patient with a history of hypertension ■ Elevated glucose (fasting glucose ≥100 mg/dL), or drug treatment for elevated glucose ■ Low HDL cholesterol (<40 mg/dL in men; <50 mg/dL in women), or drug treatment for low HDL cholesterol	■ Yes ■ No ■ Unknown		Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA guideline on the primary prevention of cardiovascular disease. J Am Coll Cardiol. 2019;74:e177–232 (35). Alberti KG, Eckel RH, Grundy SM, et al. Harmonizing the metabolic syndrome: a joint interim statement of the International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity. Circulation. 2009;120:1640–5 (36).	
Family history of premature CAD	History of having any direct blood relatives (parents, siblings, children) who have had any of the following conditions at age <55 y for male relatives or age <65 y for female relatives: ■ AMI ■ Sudden cardiac death without obvious cause ■ CABG surgery ■ PCI	■ Yes ■ No ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
Recent acute coronary syndrome	Acute coronary syndrome within the past 12 mo	■ Yes ■ No ■ Unknown		Grundy SM, Stone NJ, Bailey AL, et al. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2019;73:e285–350 (34).	

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Typical angina	1) Substernal chest discomfort with a characteristic quality and duration that is 2) provoked by exertion or emotional stress and 3) relieved by rest or nitroglycerin.	■ Yes ■ No ■ Unknown		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44–164 (37).	
Atypical angina	Meets 2 of these characteristics: 1) Substernal chest discomfort with a characteristic quality and duration that is 2) provoked by exertion or emotional stress and 3) relieved by rest or nitroglycerin.	■ Yes ■ No ■ Unknown		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44–164 (37).	
Anginal equivalent	Symptom such as dyspnea, diaphoresis, nausea, extreme fatigue, or pain at a site other than the chest, occurring in a patient at high cardiac risk. Anginal equivalents have the same importance as angina pectoris.	■ Yes ■ No ■ Unknown		Anderson JL, Adams CD, Antman EM, et al. 2012 ACCF/AHA focused update incorporated into the ACCF/AHA 2007 guidelines for the management of patients with unstable angina/non-ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;61:e179–347 (38).	Anginal equivalents are considered symptoms of myocardial ischemia.
Nonanginal chest pain	Meets 1 or none of these characteristics: 1) Substernal chest discomfort with a characteristic quality and duration that is 2) provoked by exertion or emotional stress and 3) relieved by rest or nitroglycerin.	■ Yes ■ No ■ Unknown		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44–164 (37). NCDR CathPCI Registry Coder's Data Dictionary v5.0 (element 7405) (29)	

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Angina grade	Grade of symptoms or signs in patients with suspected or presumed stable angina (or angina equivalent) according to the Canadian Cardiovascular Society grading scale	■ Class 0 ■ Class I ■ Class II ■ Class III ■ Class IV ■ Unknown		Campeau L. The Canadian Cardiovascular Society grading of angina pectoris revisited 30 years later. Can J Cardiol. 2002;18:371-9 (39).	Both preprocedure and postprocedure timing CCS class can be collected.
		Class 0	Asymptomatic		
		Class I	Ordinary physical activity, such as walking or climbing stairs, does not cause angina. Angina occurs with strenuous, rapid, or prolonged exertion at work or recreation.		
		Class II	Slight limitation of ordinary activity. Angina occurs on walking or climbing stairs rapidly, walking uphill, walking or climbing stairs after meals, or in cold, in wind, or under emotional stress, or only during the few hours after awakening. Angina occurs on walking >2 blocks on the level and climbing >1 flight of ordinary stairs at a normal pace and in normal conditions.		
		Class III	Marked limitation of ordinary physical activity. Angina occurs on walking 1 to 2 blocks on the level and climbing 1 flight of stairs in normal conditions and at a normal pace.		
		Class IV	Inability to perform any physical activity without discomfort; angina symptoms may be present at rest.		
		Unknown	A proper value is applicable but not known.		
Prior myocardial infarction	Any MI occurrence between birth and arrival at this facility, excluding a presenting MI	■ Yes ■ No ■ Uncertain			Presence of any 1 of the following criteria that meets the diagnosis of prior MI: ■ Pathological Q waves with or without symptoms in the absence of nonischemic causes. ■ Imaging evidence of a region of loss of myocardium that is thinned and/or fails to contract, in the absence of nonischemic cause. ■ Pathological findings of a prior MI.

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Atherosclerotic cardiovascular disease risk	10-y risk of ASCVD for primary prevention patients (those without ASCVD)	■ Numeric, %		American College of Cardiology. ASCVD risk estimator plus. Available at: http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/. Accessed December 9, 2019 (40).	
Acute myocardial infarction	The term AMI should be used when there is acute myocardial injury with clinical evidence of acute myocardial ischemia and with detection of a rise and/or fall of cTn values with at least 1 value above the 99th percentile URL and at least 1 of the following: ■ Symptoms of myocardial ischemia; ■ New ischemic changes on the ECG; ■ Development of pathological Q waves; ■ Imaging evidence of new loss of myocardium or new regional wall motion abnormality in a pattern consistent with an ischemic etiology; ■ Identification of a coronary thrombus by angiography or autopsy (not for type 2 or 3 MIs).	■ Type 1: Spontaneous ■ Type 2: Demand-supply mismatch ■ Type 3: Death, no biomarkers ■ Type 4a: PCI-related ■ Type 4b: Stent thrombosis ■ Type 4c: PCI restenosis ■ Type 5: CABG-related ■ Unknown		Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). Circulation. 2018;138:e618-51 (41).	
		Type 1: Spontaneous	Spontaneous clinical syndrome related to atherosclerotic plaque rupture, ulceration, fissuring, erosion, or dissection, with resulting intraluminal thrombus and leading to decreased myocardial blood flow or distal platelet emboli with ensuing myocyte necrosis. This classification requires a detection of a rise and/or fall of cardiac biomarker values (preferably cTn) with at least 1 value >99th percentile of the URL and at least 1 of the following: ■ Symptoms of myocardial ischemia ■ New or presumed new significant new significant ST-segment T wave changes or new LBBB on the ECG ■ Development of pathological Q waves on the ECG ■ Imaging evidence of new loss of myocardium or new regional wall motion abnormality ■ Identification of an intracoronary thrombus by angiography or autopsy		Cardiac troponin (cTn)—I or T—is the preferred biomarker. If a cTn assay is unavailable, the best alternative is CK-MB. ≥1 coronary arteries may be involved. Note: This definition does not require a severe underlying coronary stenosis. Typically, some degree of CAD is found by angiography, but less frequently there may be nonobstructive or no coronary artery disease. The term myocardial infarction with nonobstructed coronary arteries (MINOCA) is used to describe this clinical finding

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Type 2: Demand–supply mismatch	Spontaneous clinical syndrome where a condition other than coronary artery disease contributes to an imbalance between myocardial oxygen supply and/or demand (e.g., coronary endothelial dysfunction, coronary artery spasm, coronary embolism, tachy-/bradyarrhythmias, anemia, respiratory failure, hypotension, and hypertension with or without LVH). This classification requires a) detection of a rise and/or fall of cardiac biomarker values (preferably cTn) with at least 1 value >99th percentile of the URL and b) at least 1 of the following: ■ Symptoms of myocardial ischemia ■ New or presumed new significant ST-segment T wave changes or new LBBB on the ECG ■ Development of pathological Q waves on the ECG ■ Imaging evidence of new loss of myocardium or new regional wall motion abnormality		Cardiac troponin (cTn)—I or T—is the preferred biomarker. If a cTn assay is unavailable, the best alternative is CK-MB.
		Type 3: Death, no biomarkers	Death where symptoms suggestive of myocardial ischemia are present, and with (presumed) new ischemic changes or new LBBB on the ECG, but where death occurs before cardiac biomarkers can be obtained, or before cardiac biomarker values could rise.		
		Type 4a: PCI-related	MI associated with and occurring within 48 h of PCI, with elevation of cardiac biomarker values to >5× 99th percentile of the URL in patients with normal baseline values (≤99th percentile URL), or a rise of cardiac biomarker values ≥20% if the baseline values are elevated and are stable or falling. This classification also requires at least 1 of the following: ■ Symptoms of myocardial ischemia ■ New ischemic changes or new LBBB on the ECG ■ Angiographic loss of patency of a major coronary artery or a side branch or persistent slow- or no-flow or embolization ■ Imaging evidence of new loss of myocardium or new regional wall motion abnormality		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Type 4b: Stent thrombosis	MI associated with stent thrombosis as detected by coronary angiography or at autopsy, where symptoms suggestive of myocardial ischemia are present, and with a rise and/or fall of cardiac biomarkers values, with at least 1 value >99th percentile of the URL.		Cardiac troponin (cTn)—I or T—is the preferred biomarker. If a cTn assay is unavailable, the best alternative is CK-MB.
		Type 4c: PCI restenosis	Spontaneous clinical syndrome occurring >48 h after PCI, with elevation of cardiac biomarker values to >99th percentile of the URL in patients with normal baseline values (≤99th percentile URL), or a rise of cardiac biomarker values ≥20% if the baseline values are elevated and are stable or falling. This classification also requires the following: ■ Does not meet criteria for any other classification of MI ■ Presence of a ≥50% stenosis at the site of previous successful stent or balloon PCI (<50% result)		Cardiac troponin (cTn)—I or T—is the preferred biomarker. If a cTn assay is unavailable, the best alternative is CK-MB.
		Type 5: CABG-related	MI associated with and occurring within 48 h of CABG surgery, with elevation of cardiac biomarker values to >10 × 99th percentile of the URL in patients with normal baseline cardiac biomarker values (≤99th percentile URL). This classification also requires at least 1 of the following: ■ New pathologic Q waves or new LBBB on the ECG ■ Angiographic new graft or new native coronary artery occlusion ■ Imaging evidence of new loss of myocardium or new regional wall motion abnormality		Cardiac troponin (cTn)—I or T—is the preferred biomarker. If a cTn assay is unavailable, the best alternative is CK-MB.
		Unknown	A proper value is applicable but not known.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Heart failure	HF is a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood. The cardinal manifestations of HF are dyspnea and fatigue, which may limit exercise tolerance, and fluid retention, which may lead to pulmonary and/or splanchnic congestion and/or peripheral edema. Some patients have exercise intolerance but little evidence of fluid retention, whereas others complain primarily of edema, dyspnea, or fatigue. Because some patients present without signs or symptoms of volume overload, the term HF is preferred over congestive heart failure. There is no single diagnostic test for HF because it is largely a clinical diagnosis based on a careful history and physical examination.	■ Yes ■ No ■ Unknown		Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147-239 (42).	
Functional class of heart failure	NYHA functional class if HF present.	■ Class I ■ Class II ■ Class III ■ Class IV ■ Unknown		The Criteria Committee of the New York Heart Association. Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels. 9th ed. Boston, MA: Little, Brown & Co; 1994 (43). Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147-239 (42).	Both preprocedure and postprocedure timing of NYHA class can be collected.
		Class I	Patients with cardiac disease but without resulting limitations of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or dyspnea.		
		Class II	Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, or dyspnea.		
		Class III	Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, or dyspnea.		
		Class IV	Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms are present even at rest or minimal exertion. If any physical activity is undertaken, discomfort is increased.		
		Unknown	A proper value is applicable but not known.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Stage of heart failure	Classification of HF stage.	■ Stage A ■ Stage B ■ Stage C ■ Stage D ■ Unknown		Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147-239 (42).	
		Stage A	Patients at high risk for HF without structural heart disease or symptoms of heart failure (e.g., patients with hypertension, CAD, diabetes mellitus).		
		Stage B	Structural heart disease but without signs or symptoms of HF (e.g., patients with previous MI, LVH, low EF, asymptomatic valvar heart disease).		
		Stage C	Structural heart disease with prior or current symptoms of HF.		
		Stage D	Refractory HF requiring specialized interventions.		
		Unknown	A proper value is applicable but not known.		
Heart failure with reduced ejection fraction (HFrEF)	EF ≤40%. Also referred to as systolic HF.	■ Yes ■ No ■ Unknown		Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147-239 (42).	Also: SNOMED-CT 417996009
Heart failure with preserved ejection fraction (HFpEF)	EF ≥50%. Also referred to as diastolic HF.	■ Yes ■ No ■ Unknown		Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147-239 (42).	Also: SNOMED-CT 418304008
Heart failure with preserved ejection fraction borderline (HFpEF, borderline)	EF 41%-49%. These patients fall into a borderline or intermediate group.	■ Yes ■ No ■ Unknown		Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147-239 (42).	The European Society of Cardiology guideline for the diagnosis and treatment of acute and chronic heart failure uses the term "heart failure with mid-range ejection fraction (HFmrEF)" (44);
Heart failure with preserved ejection fraction improved (HFpEF, improved)	EF >40%. It has been recognized that a subset of patients with HFpEF previously had HFrEF. These patients with improvement or recovery in EF may be clinically distinct from those with persistently preserved or reduced EF.	■ Yes ■ No ■ Unknown		Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147-239 (42).	

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Prior diagnostic coronary angiography	The passage of a catheter into the aortic root or other great vessels for angiography of the native coronary arteries or bypass grafts supplying native coronary arteries. This element would NOT include noninvasive CT angiography.	■ Yes ■ No ■ Unknown			
Prior PCI	Prior PCI (even if unsuccessful) of any type (balloon angioplasty, stent, or other) performed before the current admission.	(Multi-select) ■ None ■ Balloon angioplasty ■ Atherectomy or other plaque-modifying device ■ Bare-metal stent ■ Drug-eluting stent ■ Drug-eluting with bioabsorbable polymer ■ Bioresorbable stent ■ Covered stent ■ Other ■ Unknown			Timeframe does NOT include current admission.
		None			
		Balloon angioplasty	PCI performed only by the use of a balloon.		
		Atherectomy or other plaque-modifying device	PCI performed with the adjunctive or stand-alone use of any atherectomy device (rotational, orbital, directional, laser, or cutting balloon).		
		Bare-metal stent	Coronary stent without eluting drugs.		
		Drug-eluting stent	Coronary stent placed into narrowed, diseased coronary arteries that slowly releases a drug to prevent cell proliferation, thereby preventing fibrosis, that together with clots, could block the stented artery (restenosis).		
		Drug-eluting with bioabsorbable polymer	Metallic coronary stent with a bioabsorbable polymer with an antiproliferative drug coating.		
		Bioresorbable stent	A coronary stent placed into narrowed or diseased coronary arteries that is manufactured from a material that may dissolve or be absorbed by the body.		
		Covered stent	Metallic coronary stent scaffold incorporating fabric or graft material, such as polytetrafluoroethylene (PTFE) or polyurethane as a membrane component.		
		Other			
		Unknown	A proper value is applicable but not known.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
PCI timing	Time between last documented PCI and presentation	■ ≤6 h ■ >6 h ■ Unknown		Society of Thoracic Surgeons. Online STS adult cardiac surgery risk calculator. Available at: http://riskcalc.sts.org/stswebriskcalc/calculate. Accessed December 9, 2019 (45).	
Date of prior PCI	The date of the most recent PCI of any type done on patient (balloon angioplasty, stent, or other)	■ Date, in mm/dd/yyyy ■ Unknown			
Prior coronary artery bypass graft (CABG) surgery	CABG surgery before the current admission	■ Yes ■ No ■ Unknown			Timeframe does NOT include current admission.
Number and location of prior coronary artery bypass graft(s)	Number and location of prior coronary artery bypass graft(s), if applicable.	■ Number ■ Location (specify) ■ Not applicable ■ Unknown			
		Number	Number of distal sites receiving a bypass graft		
		Location (specify)	The specific vessels receiving bypass grafts		
		Not applicable			
		Unknown	A proper value is applicable but not known.		
Date of prior CABG	The date of the most recent CABG done on patient	■ Date, in mm/dd/yyyy ■ Unknown			
Coronary artery disease	CAD is present as documented by invasive coronary angiography at any time before the current admission. Additional acceptable evidence documenting the presence of CAD includes: 1) presence of a prior MI with Q waves and/or fixed perfusion defect, 2) history of prior revascularization procedure (either PCI or CABG), and 3) coronary CT angiography showing obstructive coronary stenoses and other noninvasive imaging studies showing findings diagnostic of CAD.	■ Yes ■ No ■ Unknown		Hillis LD, Smith PK, Anderson JL, et al. 2011 ACCF/AHA guideline for coronary artery bypass graft surgery: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2011;58:e123–210 (46). Levine GN, Bates ER, Blankenship JC, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol. 2011;58:e44–122 (47).	
		Yes	Significant stenosis defined as: ■ ≥50% for left main ■ ≥70% stenosis for other vessels ■ Physiological criteria of significant stenosis defined by an FFR of <0.80		
		No			
		Unknown	A proper value is applicable but not known.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Cerebral artery disease	A disorder resulting from inadequate blood flow in the arteries that supply to the brain	Diagnostic criteria may include: ■ Ischemic stroke ■ TIA ■ Noninvasive or invasive arterial imaging test ■ Prior cervical or cerebral artery revascularization surgery or percutaneous intervention ■ None ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	This does not include chronic (nonvascular) neurological diseases or other acute neurological insults such as metabolic and anoxic ischemic encephalopathy.
		Ischemic stroke	An acute episode of focal, cerebral, spinal, or retinal dysfunction caused by infarction of the central nervous system tissue	Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). Circulation. 2013;127:1052–89 (7). Hicks KA, Mahaffey KW, Mehran R, et al. 2017 Cardiovascular and stroke endpoint definitions for clinical trials. Circulation. 2018;137:961–72 (14).	Hemorrhage may be a consequence of ischemic stroke. In this situation, the stroke is an ischemic stroke with hemorrhagic transformation and not a hemorrhagic stroke. The newer definitions as described by Hicks KA, et al. have been included wherever possible.
		TIA	Transient episode of neurological dysfunction caused by focal or global brain, spinal cord, or retinal ischemia without acute infarction	Hicks KA, Mahaffey KW, Mehran R, et al. 2017 Cardiovascular and stroke endpoint definitions for clinical trials. Circulation. 2018;137:961–72 (14). Sacco RL, Kasner SE, Broderick JP, et al. An updated definition of stroke for the 21st century: a statement for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2013;44:2064–89 (48).	The distinction between a TIA and ischemic stroke is the presence of infarction. The unifying concept driving the definition is that stroke is a marker of potentially disabling vascular brain injury. The duration of ≥24 h has been used as an operational definition of persisting symptoms of stroke rather than TIA, based mostly on consensual practice rather than objective evidence.

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Noninvasive or invasive arterial imaging test	Noninvasive or invasive arterial imaging test demonstrating ≥50% stenosis of any of the major extracranial or intracranial vessels to the brain	Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
		Prior cervical or cerebral artery revascularization surgery or percutaneous intervention	History of cervical or cerebral artery revascularization surgery or percutaneous intervention	Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
		None			
		Unknown	A proper value is applicable but not known.		
Stroke	An acute episode of focal or global neurological dysfunction caused by brain, spinal cord, or retinal vascular injury as a result of hemorrhage or infarction. The duration of ≥24 h has been used as an operational definition of persisting symptoms of stroke rather than TIA, based mostly on consensual practice rather than objective evidence.	■ Yes ■ No ■ Unknown		Hicks KA, Mahaffey KW, Mehran R, et al. 2017 Cardiovascular and stroke endpoint definitions for clinical trials. Circulation. 2018;137:961–72 (14). Sacco RL, Kasner SE, Broderick JP, et al. An updated definition of stroke for the 21st century: a statement for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2013;44:2064–89 (48).	
Type of stroke	Categories of stroke	■ Ischemic ■ Hemorrhagic ■ Undetermined ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #9001) (49)	

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Ischemic	An acute episode of focal neurological dysfunction of the brain, spinal cord, or retina as a result of infarction of the central nervous system tissue, where the neurological dysfunction lasts for >24 h.		Hemorrhage may be a consequence of ischemic stroke. In this situation, the stroke is an ischemic stroke with hemorrhagic transformation and not a hemorrhagic stroke. If ischemic stroke, list most likely etiologies: ■ Large artery atherosclerosis of the extracranial vessels (e.g., carotid) ■ Large artery atherosclerosis of the intracranial vessels (e.g., middle cerebral artery stenosis) ■ Cardioembolism ■ Small vessel occlusion (lacunar) ■ Ischemic stroke of other determined etiology (e.g., arterial dissection) ■ Large artery atherosclerosis of the extracranial vessels (e.g., carotid)
		Hemorrhagic	An acute episode of focal or global neurological dysfunction of the brain, spinal cord or retina caused by intraparenchymal, intraventricular, or subarachnoid hemorrhage, where the neurological dysfunction lasts for >24 h.		Subdural hematomas are intracranial hemorrhagic events and not strokes.
		Undetermined	An acute episode of focal or global neurological dysfunction caused by presumed brain, spinal cord, or retinal vascular injury as a result of hemorrhage or infarction but with insufficient information to allow categorization as either ischemic or hemorrhagic, where the neurological dysfunction lasts for >24 h.		
		Unknown	A proper value is applicable but not known.		
Cerebrovascular event timing	Time period between last documented cerebrovascular event (TIA or stroke) and presentation	■ Recent ■ Remote ■ Unknown		STS Risk Calculator (45)	
		Recent Remote	≤2 wk. >2 wk.		
		Unknown	A proper value is applicable but not known.		

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Peripheral artery disease	Diagnosis of PAD, which includes lower extremity from iliac to tibialis and upper extremity with subclavian and brachial vessels but excludes renal (kidney), coronary, cerebral, and mesenteric vessels and aneurysms. The criteria for the diagnosis of PAD include: ■ Claudication on exertion that is relieved by rest. ■ Positive noninvasive test (e.g., ankle-brachial index ≤0.9, ultrasound, MR imaging, or CT scanning of >50% diameter stenosis in any peripheral artery [i.e., subclavian, femoral, iliac]) or angiographic imaging. ■ Vascular reconstruction, bypass surgery, or percutaneous revascularization in the arteries of the lower and upper extremities. ■ Amputation for severe arterial vascular insufficiency.	■ Yes ■ No ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7). Creager MA, Belkin M, Bluth EI, et al. 2012 ACCF/AHA/ACR/SCAI/SIR/STS/SVM/SVN/SVS key data elements and definitions for peripheral atherosclerotic vascular disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Peripheral Atherosclerotic Vascular Disease). J Am Coll Cardiol. 2012;59:294–357 (50).	
Aorta disease	Disease in the thoracic, thoracoabdominal, or abdominal aorta (typically aneurysm)	■ Yes ■ No ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7). Creager MA, Belkin M, Bluth EI, et al. 2012 ACCF/AHA/ACR/SCAI/SIR/STS/SVM/SVN/SVS key data elements and definitions for peripheral atherosclerotic vascular disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Peripheral Atherosclerotic Vascular Disease). J Am Coll Cardiol. 2012;59:294–357 (50).	
Ascending aorta aneurysm disease	Known ascending aorta aneurysm between sinotubular junction and innominate artery	■ Yes ■ No ■ Unknown			
Thoracic aorta aneurysm disease	Known descending thoracic aneurysm from the left subclavian to the diaphragm	■ Yes ■ No ■ Unknown			
Thoracic aorta stenotic or occlusive disease	Known significant stenotic disease of this segment or complete occlusion	■ Stenosis ■ Occlusion ■ Unknown			

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Abdominal aorta aneurysm disease	Known abdominal aneurysm from the diaphragm to pelvis	■ Yes ■ No ■ Unknown			
Abdominal aorta stenotic or occlusive disease	Known significant stenotic disease of this segment or complete occlusion	■ Stenosis ■ Occlusion ■ Unknown			
Iliofemoral artery aneurysm disease	Known aneurysm involvement of the iliac and/or femoral arteries	■ Right iliac and/or femoral artery aneurysmal involvement ■ Left iliac and/or femoral artery aneurysmal involvement ■ Both right and left iliac and/or femoral artery aneurysmal involvement ■ No ■ Unknown			
Iliofemoral artery stenotic disease	Known significant stenotic disease of this segment	■ Right iliac and/or femoral artery aneurysmal involvement ■ Left iliac and/or femoral artery aneurysmal involvement ■ Both right and left iliac and/or femoral artery aneurysmal involvement ■ No ■ Unknown			
Iliofemoral artery occlusive disease	Known complete occlusion of this segment	■ Right iliac and/or femoral artery aneurysmal involvement ■ Left iliac and/or femoral artery aneurysmal involvement ■ Both right and left iliac and/or femoral artery aneurysmal involvement ■ No ■ Unknown			

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Aortic dissection	Presence of luminal disruption in the aorta	■ Type A ■ Type B ■ No ■ Unknown		Hiratzka LF, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM guidelines for the diagnosis and management of patients with thoracic aortic disease: a report of the American College of Cardiology Foundation/ American Heart Association Task Force on Practice Guidelines, American Association for Thoracic Surgery, American College of Radiology, American Stroke Association, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of Thoracic Surgeons, and Society for Vascular Medicine. J Am Coll Cardiol. 2010;55:e27-129) (51)	
		Type A	Involves all dissections involving the ascending aorta, regardless of the site of origin		
		Type B	All dissections not involving the ascending aorta		
		No			
		Unknown	A proper value is applicable but not known		
Intramural hematoma of the aorta	Fresh thrombus within the aortic wall in the absence of an intimal tear	■ Yes ■ No ■ Unknown		Hiratzka LF, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM guidelines for the diagnosis and management of patients with thoracic aortic disease: a report of the American College of Cardiology Foundation/ American Heart Association Task Force on Practice Guidelines, American Association for Thoracic Surgery, American College of Radiology, American Stroke Association, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of Thoracic Surgeons, and Society for Vascular Medicine. J Am Coll Cardiol. 2010;55:e27-129 (51).	In practice, the term is used loosely to mean a thrombosed false lumen regardless of a small intimal defect.
Penetrating atherosclerotic ulcer of the aorta	An atherosclerotic lesion with ulceration that penetrates the internal elastic lamina and allows hematoma formation within the media of the aortic wall	■ Yes ■ No ■ Unknown		Hiratzka LF, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM guidelines for the diagnosis and management of patients with thoracic aortic disease: a report of the American College of Cardiology Foundation/ American Heart Association Task Force on Practice Guidelines, American Association for Thoracic Surgery, American College of Radiology, American Stroke Association, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of Thoracic Surgeons, and Society for Vascular Medicine. J Am Coll Cardiol. 2010;55:e27-129 (51).	

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Renal artery disease	Disease of the main kidney (renal) arteries or extrarenal branches	■ Yes ■ No ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7). Creager MA, Belkin M, Bluth EI, et al. 2012 ACCF/AHA/ACR/SCAI/SIR/STS/SVM/SVN/SVS key data elements and definitions for peripheral atherosclerotic vascular disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Peripheral Atherosclerotic Vascular Disease). J Am Coll Cardiol. 2012;59:294–357 (50).	
Prior implantation of a CIED	History of CIED implanted prior to the current encounter	■ Yes ■ No ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	Information about the type of device (pacemaker, biventricular/resynchronization/CRT, implantable cardioverter-defibrillator, combination), cardiac chamber(s) involved, and year of implantation may be helpful.
Atrial fibrillation or flutter	Atrial fibrillation or flutter is present within 2 wk before the current encounter.	■ Yes ■ No ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	The occurrence of any atrial fibrillation or flutter (permanent, persistent, or paroxysmal) within the 2 wk before admission irrespective of whether cardioversion was performed restoring sinus rhythm.
Current dialysis	Current requirement for dialysis treatment, which is a procedure to remove toxic substances from the blood that is used in patients with end-stage chronic kidney disease or acute kidney failure, including hemodialysis or peritoneal dialysis.	■ Yes ■ No ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	

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APPENDIX 4. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Risk stratification for mortality before revascularization	Classification of risk for mortality from CAD	■ Low risk ■ Intermediate risk ■ High risk		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44–164 (37).	
		Low risk	Cardiac mortality <1%/y		
		Intermediate risk	Cardiac mortality 1%–3%/y		
		High risk	Cardiac mortality >3%/y		

ACE indicates angiotensin-converting enzyme; AMI, acute myocardial infarction; ARB, angiotensin II receptor blocker; ASCVD, atherosclerotic cardiovascular disease; CABG, coronary artery bypass grafting; CAD, coronary artery disease; CCB, calcium channel blocker; CIED, cardiovascular implantable electronic device; CK-MB, creatine kinase MB; CRT, cardiac resynchronization therapy; CT, computed tomography; cTn, cardiac troponin; DPP-4, dipeptidyl peptidase-4; DSM, Diagnostic and Statistical Manual of Mental Disorders; ECG, electrocardiogram; EF, ejection fraction; FFR, fractional flow reserve; GLP-1, glucagon-like peptide-1; HbA_{1c}, hemoglobin A_{1c}; HDL, high-density lipoprotein; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; IOM, Institute of Medicine; LBBB, left bundle branch block; LDL, low-density lipoprotein; LVH, left ventricular hypertrophy; MI, myocardial infarction; mm/dd/yyyy, month/day/year; MR, magnetic resonance; NCDR, National Cardiovascular Data Registry; NCI, National Cancer Institute; NHIS, National Health Interview Survey; NYHA, New York Heart Association; PAD, peripheral artery disease; PCI, percutaneous coronary intervention; SGLT-2, sodium-glucose cotransporter-2; SNOMED-CT, Systematized Nomenclature of Medicine–Clinical Terms; TIA, transient ischemic attack; and URL, upper reference limit.

APPENDIX 5. CLINICAL PRESENTATIONS

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Date of collection	The date the sample for laboratory testing was collected.	■ Date, in mm/dd/yyyy			This is a generic field that can be used to establish the date when specimen for the laboratory test was collected and can also be used for specimen drawn multiple times or at intervals.
Time of collection	The time the sample for laboratory testing was collected.	■ Time, in hh:mm:ss			This is a generic field that can be used to establish the time when specimen for the laboratory test was collected and can also be used for specimen drawn multiple times or at intervals.
Asymptomatic	No typical or atypical symptoms or nonanginal chest pain	■ Yes ■ No ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (elements #11005, #4012) (29)	
Typical angina	1) Substernal chest discomfort with a characteristic quality and duration that is 2) provoked by exertion or emotional stress and 3) relieved by rest or nitroglycerin.	■ Yes ■ No		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44–164 (37).	
Atypical angina	Meets 2 of these characteristics: 1) Substernal chest discomfort with a characteristic quality and duration that is 2) provoked by exertion or emotional stress and 3) relieved by rest or nitroglycerin.	■ Yes ■ No		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44–164 (37).	
Refractory angina	Refractory angina is the persistence of angina pectoris with substantial functional limitations (Canadian Cardiovascular Society class 3 or 4) despite maximum tolerated doses of optimal medical therapy.	■ Yes ■ No			
Anginal equivalent	Symptom such as dyspnea, diaphoresis, nausea, extreme fatigue, or pain at a site other than the chest, occurring in a patient at high cardiac risk	■ Yes ■ No ■ Unknown		Anderson JL, Adams CD, Antman EM, et al. 2012 ACCF/AHA focused update incorporated into the ACCF/AHA 2007 guidelines for the management of patients with unstable angina/non-ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;61:e179–347 (38).	Anginal equivalents are considered symptoms of myocardial ischemia. Anginal equivalents have the same importance as angina pectoris.

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APPENDIX 5. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Nonanginal chest pain	Meets 1 or none of these characteristics: 1) substernal chest discomfort with a characteristic quality and duration that is 2) provoked by exertion or emotional stress and 3) relieved by rest or nitroglycerin.	■ Yes ■ No		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44–164 (37). NCDR CathPCI Registry Coder's Data Dictionary v5.0 (element 7405) (29)	
Non-STEMI	Non-STEMIs are characterized by the presence of both criteria: 1). Cardiac biomarkers (CK-MB, troponin T or I) exceed the ULN according to the individual hospital's laboratory parameters with a clinical presentation which is consistent or suggestive of ischemia. Changes on the ECG and/or ischemic symptoms may or may not be present. 2). Absence of changes on the ECG that are diagnostic of a STEMI (see STEMI).	■ Yes ■ No		NCDR CathPCI Registry Coder's Data Dictionary v4.4 (seq. #5000) (9)	
STEMI or STEMI-equivalent	STEMIs are characterized by the presence of both criteria: 1) Evidence on the ECG of STEMI: new or presumed new ST-segment elevation or new LBBB not documented to be resolved within 20 min. ST-segment elevation is defined by new or presumed new sustained ST-segment elevation at the J-point in 2 contiguous ECG leads with the cut-off points: ≥0.2 mV in men or ≥0.15 mV in women in leads V_2-V_3 and/or ≥ 0.1 mV in other leads and lasting ≥20 min. If no exact ST-elevation measurement is recorded in the medical chart, a licensed healthcare provider's written documentation of ST-elevation or Q-waves is acceptable. If only 1 ECG is performed, then the assumption that the ST elevation persisted at least the required 20 min is acceptable. LBBB refers to new or presumed new LBBB on the initial ECG. 2) Cardiac biomarkers (CK-MB, troponin T or I) exceed the ULN according to the individual hospital's laboratory parameters a clinical presentation, which is consistent or suggestive of ischemia. Note: For purposes of the registry, ST elevation in the posterior chest leads (V_7–V_9), or ST depression that is maximal in V_1–V_3, without ST-segment elevation in other leads, demonstrating posterobasal MI, is considered a STEMI equivalent and qualifies the patient for reperfusion therapy. New or presumably new LBBB has been considered a STEMI equivalent.	■ Yes ■ No		NCDR CathPCI Registry Coder's Data Dictionary v4.4 (seq. #5000) (9) O'Gara PT, Kushner FG, Ascheim DD, et al. 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;61:e78–e140 (52).	

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APPENDIX 5. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Coronary artery disease symptom onset	The date the patient first noted ischemic symptoms lasting ≥10 min. 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 an MI. In the event of stuttering symptoms, ACS symptom onset is the time at which symptoms became constant in quality or intensity. The time the patient first noted ischemic symptoms lasting ≥10 min. Indicate the time (hours:minutes) using the military 24-h clock, beginning at midnight (0000 hours). 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.	■ Date, in mm/dd/yyyy ■ Time, in hh:mm (24-h clock)			
Fibrinolytic administration for STEMI	Fibrinolytic therapy received as a treatment for STEMI	■ Yes ■ No			
Fibrinolytic administration for STEMI, start date and time	Date of either the first bolus or the beginning of the infusion. If the facility receives a patient transfer with infusion ongoing, the date that infusion was started is recorded at the transferring facility. The time of either the first bolus or the beginning of the infusion. If the receiving facility receives a patient transfer with infusion ongoing, the date that infusion was started is recorded at the transferring facility. Indicate the time (hours:minutes) using the military 24-h clock, beginning at midnight (0000 hours).	■ Date, in mm/dd/yyyy ■ Time, in hh:mm (24-h clock)			
Heart failure within 2 weeks	Rapid onset of symptoms and signs of HF and may occur with or without prior cardiac disease occurring within 2 wk of surgery. HF is described as unusual dyspnea on light exertion, recurrent dyspnea occurring in the supine position, fluid retention; or the description of rales, jugular venous distension, pulmonary edema on physical examination, or pulmonary edema on chest x-ray presumed to be cardiac dysfunction. A low EF alone, without clinical evidence of HF does not qualify as HF. An elevated BNP without other supporting documentation should not be coded as HF.	■ Yes ■ No ■ Unknown		STS ACSD v2.9 Training Manual (seq. #912) (8) Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147–239 (42).	

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APPENDIX 5. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Heart failure, newly diagnosed	No documentation of a prior diagnosis of HF.	■ Yes ■ No ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (elements #4011, #4012) (29) Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147–239 (42).	
Stages of cardiogenic shock	The stage of cardiogenic shock based on physical examination, biochemical markers, and hemodynamics	■ A, at risk ■ B, beginning cardiogenic shock ■ C, classic cardiogenic shock ■ D, deteriorating/ doom ■ E, extremis ■ Unknown		Baran DA, Grines CL, Bailey S, et al. SCAI clinical expert consensus statement on the classification of cardiogenic shock. Catheter Cardiovasc Interv. 2019;94:29–37 (53).	
		A, at risk	A patient who is not currently experiencing signs or symptoms of cardiogenic shock but is at risk for its development. These patients may include those with large AMI or prior infarction acute and/or acute on chronic HF symptoms.		
		B, beginning cardiogenic shock	A patient who has clinical evidence of relative hypotension or tachycardia without hypoperfusion.		
		C, classic cardiogenic shock	A patient who manifests with hypoperfusion that requires intervention (inotrope, pressor or mechanical support, including ECMO) beyond volume resuscitation to restore perfusion. These patients typically present with relative hypotension.		
		D, deteriorating/ doom	A patient who is similar to category C but is getting worse. They have not responded to initial interventions.		
		E, extremis	A patient who is experiencing cardiac arrest with ongoing CPR and/or ECMO, being supported by multiple interventions.		
		Unknown	A proper value is applicable but not known.		

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APPENDIX 5. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Cardiac arrest	Cardiac arrest includes pulseless clinical scenarios that can be bradycardia arrests or tachycardia arrests requiring cardiopulmonary resuscitation (requiring ≥2 chest compressions, or open chest massage) and/or requiring emergency defibrillation.	■ Cardiac arrest out of hospital ■ Cardiac arrest witnessed ■ Cardiac arrest after arrival of EMS		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #4630) (29)	
Cardiomyopathy	A reason for the cardiac catheterization laboratory procedure is evaluation of cardiomyopathy and/or evaluation of LV systolic or diastolic function.	■ Yes ■ No ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #7400) (49)	
Preoperative evaluation before noncardiac surgery	A reason for the cardiac catheterization laboratory procedure is preoperative evaluation before noncardiac surgery.	■ Yes ■ No		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7400) (29)	
Cardiovascular instability	Cardiovascular instability is defined as persistent ischemic symptoms, decompensating HF, arrhythmias (e.g., ventricular arrhythmias, rapid atrial fibrillation, severe bradycardia), cardiogenic shock and hemodynamic instability (not cardiogenic shock).	■ Yes ■ No		Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2016 appropriate use criteria for coronary revascularization in patients with acute coronary syndromes: a report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and the Society of Thoracic Surgeons. J Am Coll Cardiol. 2017;69:570–91 (54). NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7410) (29)	

ACS indicates acute coronary syndrome; AMI, acute myocardial infarction; BNP, B-type natriuretic peptide; CK-MB, creatine kinase MB; CPR, cardiopulmonary resuscitation; ECG, electrocardiogram; ECMO, extracorporeal membrane oxygenator support; EF, ejection fraction; EMS, emergency medical services; HF, heart failure; hh:mm:ss, hours:minutes:seconds; LBBB, left bundle branch block; LV, left ventricular; MI, myocardial infarction; min; minute; mm/dd/yyyy, month/day/year; NCDR, National Cardiovascular Data Registry; STEMI, ST-elevation myocardial infarction; and ULN, upper limit of normal.

APPENDIX 6. LABORATORY TESTS

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Date of collection	The date the sample for laboratory testing was collected.	■ Date, in mm/dd/yyyy			This is a generic field that can be used to establish the date when specimen for the laboratory test was collected and can also be used for specimen drawn multiple times or at intervals.
Time of collection	The time the sample for laboratory testing was collected.	■ Time, in hh:mm:ss			This is a generic field that can be used to establish the time when specimen for the laboratory test was collected and can also be used for specimen drawn multiple times or at intervals.
Glucose value	Serum concentration of glucose	■ Numeric, mg/dL		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992-1025 (7).	
Creatinine value	Serum concentration of creatinine	■ mg/dL		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992-1025 (7).	
Estimated glomerular filtration rate value	eGFR rate	■ Numeric ■ Unknown			
Stages of chronic kidney disease	Stages of chronic kidney disease.	■ Stage 1 ■ Stage 2 ■ Stage 3a ■ Stage 3b ■ Stage 4 ■ Stage 5		National Kidney Foundation. A to Z Health Guide. Estimated Glomerular Filtration Rate (eGFR). Available at: https://www.kidney.org/atoz/content/gfr. Accessed December 9, 2019 (55).	

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APPENDIX 6. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Stage 1	Kidney damage with normal kidney function (GFR ≥90 mL/min/1.73 m^2)		
		Stage 2	Kidney damage with mild loss of kidney function (GFR 89–60 mL/min/1.73 m^2)		
		Stage 3a	Mild-to-moderate loss of kidney function (GFR 59–45 mL/min/1.73 m^2)		
		Stage 3b	Moderate-to-severe loss of kidney function (GFR 44–30 mL/min/1.73 m^2)		
		Stage 4	Severe loss of kidney function (GFR 29–15 mL/min/1.73 m^2)		
		Stage 5	Kidney failure (GFR <15 mL/min/1.73 m^2)		
Hemoglobin value	Serum concentration of hemoglobin.	■ g/dL		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
Hemoglobin A_{1c} value	Serum concentration of HbA_{1c}.	■ Percent		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
International normalized ratio value	Value of INR.	■ INR		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
aPTT value	Value of partial thromboplastin time.	■ Numeric, s			
Initial CK-MB value	Serum or plasma concentration of CK-MB obtained from within the first 24 h of care either from the transferring hospital or the receiving hospital. If the patient was transferred, data from the transferring facility takes precedence.	■ Numeric, IU/L ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
Peak creatine kinase-MB value	Results of the highest sample obtained during this admission. If the value is reported using a less than symbol (e.g., "<0.02"), record the number only (e.g., "0.02").	■ Numeric, IU/L ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	

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APPENDIX 6. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Creatine kinase-MB, upper limit of normal	The initial CK-MB sample ULN for the test. If a range is given, record the highest number in the range. Examples: 1) Reference range given as 0–5 IU/L: Record ULN as 5 IU/L. 2) ULN given as <5 IU/L: Record ULN as 5 IU/L. The initial sample value refers to the first sample obtained within the first 24 h of care, either from the transferring hospital or the receiving hospital. If the patient was transferred, data available from the transferring facility should take precedence.	■ Numeric, IU/L ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/ American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
Initial troponin value	First serum cTn value obtained from within the first 24 h of care either from the transferring hospital or the receiving hospital. If the patient was transferred data from the transferring facility takes precedence.	■ Initial cTnI, ng/mL ■ Initial cTnT, ng/mL		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/ American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7). Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). Circulation. 2018;138:e618–51 (41).	
Initial high-sensitivity troponin value	First serum hs-cTn value obtained from within the first 24 h of care either from the transferring hospital or the receiving hospital. If the patient was transferred data from the transferring facility takes precedence.	■ Initial hs-cTnI, ng/L ■ Initial hs-cTnT, ng/L		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/ American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7). Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). Circulation. 2018;138:e618–51 (41).	
Peak troponin value	Peak serum concentration of cTn obtained during admission.	■ Peak cTnI, ng/mL ■ Peak cTnT, ng/mL		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/ American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7). Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). Circulation. 2018;138:e618–51 (41).	
Peak high-sensitivity troponin value	Peak serum concentration of hs-cTn obtained during admission.	■ Peak hs-cTnI, ng/L ■ Peak hs-cTnT, ng/L		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/ American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7). Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). Circulation. 2018;138:e618–51 (41).	

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APPENDIX 6. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Total cholesterol value	Total cholesterol value.	■ Numeric, mg/dL		Grundy SM, Stone NJ, Bailey AL, et al. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2019;73:e285–350 (34).	
High-density lipoprotein value	HDL cholesterol value. If the value is reported using a greater than symbol (e.g., >300), record the number only (e.g., 300).	■ Numeric, mg/dL		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
Triglycerides value	Triglycerides value. If the value is reported using a greater than (e.g., >300), record the number only (e.g., 300).	■ Numeric, mg/dL		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
Low-density lipoprotein value	LDL cholesterol value. If the value is reported using a greater than symbol (e.g., >300), record the number only (e.g., 300).	■ Numeric, mg/dL		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
BNP/NT-proBNP value	Results from first BNP or first NT-proBNP performed during this admission. If done, enter the numerical value and specify which assay type was done.	■ First BNP performed, numerical value ■ First NT-proBNP, numerical value		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
High-sensitivity C reactive protein value	Serum hs-CRP level and units.	■ Numerical value ■ Unknown		Cannon CP, Brindis RG, Chaitman BR, et al. 2013 ACCF/AHA key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes and coronary artery disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards). J Am Coll Cardiol. 2013;61:992–1025 (7).	
Fasting state	Abstinence from all food and liquid for a defined period of time (e.g., no food or liquid from midnight to blood draw).	■ Yes ■ No			

aPTT indicates activated partial thromboplastin time; BNP, B-type natriuretic peptide; CK-MB, creatine kinase-MB; CRP, C-reactive protein; cTnI, cardiac troponin I; cTnT, cardiac troponin T; eGFR, estimated glomerular filtration rate; GFR, glomerular filtration rate; HbA_{1c}, hemoglobin A_{1c}; HDL, high-density lipoprotein; hh:mm:ss, hours:minutes:seconds; hs-cTnI, high-sensitivity cardiac troponin I; hs-cTnT, high-sensitivity cardiac troponin T; INR, international normalized ratio; mm/dd/yyyy, month/day/year; NT-proBNP, N-terminal pro b-type natriuretic peptide; and ULN, upper limit of normal.

APPENDIX 7. NONINVASIVE TESTS

An exhaustive list of noninvasive testing terms across the spectrum of every test is beyond the scope of this document. Further details can be found in: Hendel RC, et al. ACC/AHA/ARC/ASE/ASNC/HRS/NASCI/RSNA/SAIP/SCAI/ SCCT/SCMR/SIR 2008 key data elements and definitions for cardiac imaging: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Cardiac Imaging). J Am Coll Cardiol. 2009;53:91-124 (56).

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Rhythm	The recurrent, measured movements (rhythm) of a beating heart.	■ Sinus rhythm ■ Atrial fibrillation ■ Atrial flutter ■ Sustained VT ■ Nonsustained VT ■ VF ■ Paced ■ Other rhythm (e.g., supraventricular tachycardia)		NCI Thesaurus (Code: C87081) (22)	
		Sinus rhythm	A finding on the ECG of an atrial rhythm, which originates from the sinoatrial node.	NCI Thesaurus (Code C100076) (22)	
		Atrial fibrillation	Atrial fibrillation is a supraventricular tachyarrhythmia characterized by uncoordinated atrial activity with consequent deterioration of atrial mechanical function. On the ECG, atrial fibrillation is characterized by the replacement of consistent P waves with rapid oscillations or fibrillation waves that vary in amplitude, shape and timing, associated with an irregular, frequently rapid ventricular response when atrioventricular conduction is intact.	NCDR Chest Pain MI Registry Coder's Data Dictionary Version 3.0 (data element 12246) (10)	
		Atrial flutter	Atrial flutter is defined as a cardiac arrhythmia arising in the atrium, which has a regular rate typically between 250 and 350 bpm (cycle length 240-170 ms) in the absence of antiarrhythmic drugs.	NCDR Chest Pain MI Registry Coder's Data Dictionary Version 3.0 (data element 12247) (10)	
		Sustained VT	VT that is >30 s in duration and/or requires termination due to hemodynamic compromise in <30 s.	NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #5034) (29)	
		Nonsustained VT	≥3 consecutive beats of VT that self-terminate in <30 s.		
		VF	Fibrillation is an uncontrolled twitching or quivering of muscle fibers occurring in the lower chambers of the heart (ventricles).	NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #5034) (29)	
		Paced	A finding on the ECG that the cardiac rhythm is initiated by an electrical impulse from a mechanical cardiac pacemaker.	NCI Thesaurus (Code C88140) (22)	
		Other rhythm (e.g., supraventricular tachycardia)			

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
New or presumed new ST depression	New or presumed new horizontal or downsloping ST depression ≥0.05 mV in 2 contiguous leads and/or T inversion ≥0.1 mV in 2 contiguous leads with prominent R wave or R/S ratio >1. T-wave negativity may be normal in leads with predominant negative QRS complexes but are usually abnormal when the QRS complex is upright.	■ Yes ■ No		Amsterdam EA, Wenger NK, Brindis RG, et al. 2014 AHA/ACC guideline for the management of patients with non-ST-elevation acute coronary syndromes: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;64:e139–228 (57).	
New or presumed new T-wave inversion	New or presumed new T-wave inversion of ≥0.1 mV in 2 contiguous leads. The T wave usually has a polarity of the T wave vector similar to the QRS vector. Thus, in normal patients, negative T waves may be observed when the QRS is negative (e.g., lead aVL with vertical axis). Juvenile T wave patterns, marked pectus excavatum, and other conditions may also be associated with T-wave inversion that is not ischemic in origin.	■ Yes ■ No			
Transient ST elevation lasting <20 min	New or presumed new ST elevation at the J point in 2 contiguous leads with the cutpoints ≥0.1 mV in all leads other than leads V_2 through V_3, where the following cutpoints apply: ≥0.2 mV in men age ≥40 y, ≥0.25 mV in men age <40 y, or ≥0.15 mV in women.	■ Yes ■ No			
Pre-existing left bundle branch block	Known presence of a LBBB.	■ Yes ■ No ■ Unknown			
New left bundle branch block	Compared with the most recent ECG, a LBBB is now present.	■ Yes ■ No ■ Unknown			
		Data Elements Related to LV Function			
LVEF, imaging modality	Imaging technique used to assess LV function.	■ CT ■ Transthoracic echocardiography, 2D ■ Transthoracic echocardiography, 3D ■ Transesophageal echocardiography ■ Gated SPECT ■ CMR ■ RNA			
LVEF, quantitative	Quantitative, computer-derived number reflecting the percentage of blood ejected from the LV	■ Numerical ■ Unknown		Hendel RC, Budoff MJ, Cardella JF, et al. ACC/AHA/ACR/ASE/ASNC/HRS/NASCI/RSNA/SAIP/SCAI/ SCCT/SCMR/SIR 2008 key data elements and definitions for cardiac imaging: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Cardiac Imaging). J Am Coll Cardiol. 2009;53:91–124 (56).	

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
LV function, global, categorical	Category of function, often based on visual assessment alone	■ Hyperdynamic ■ Normal ■ Mildly reduced ■ Moderately reduced ■ Severely reduced		Hendel RC, Budoff MJ, Cardella JF, et al. ACC/AHA/ACR/ASE/ASNC/HRS/NASCI/RSNA/SAIP/SCAI/ SCCT/SCMR/SIR 2008 key data elements and definitions for cardiac imaging: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Cardiac Imaging). J Am Coll Cardiol. 2009;53:91-124 (56).	
		Hyperdynamic	>70%		
		Normal	50%-70%		
		Mildly reduced	40%-49%		
		Moderately reduced	30%-39%		
		Severely reduced	<30%		
LV function, pattern	Contractile pattern of LV	■ Normal ■ Global dysfunction ■ Regional dysfunction ■ Mixed dysfunction			
		Normal	Normal contraction in all segments of the LV		
		Global dysfunction	Abnormal contraction pattern in all segments of the LV (diffuse)		
		Regional dysfunction	Abnormal contraction pattern in some but not all segments of the LV		
		Mixed dysfunction	Diffuse hypokinesis with more severe wall motion abnormality in regional segments of the LV		
Risk assessment based on LV function	Based on LV function not readily explained by noncoronary causes	■ High risk ■ Intermediate risk ■ Low risk		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44-164 (37).	
		High risk	Severe dysfunction; LVEF <35%		
		Intermediate risk	Mild-moderate dysfunction; LVEF 35%-49%		
		Low risk	Normal function; LVEF >49%		

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Left ventricle chamber volume	Visual or quantitative determination volume of the LV at end-diastole.	■ Normal ■ Reduced ■ Mildly enlarged ■ Moderately enlarged ■ Severely enlarged ■ Unknown		Douglas PS, Carabello BA, Lang RM, et al. 2019 ACC/AHA/ASE key data elements and definitions for transthoracic echocardiography: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Transthoracic Echocardiography) and the American Society of Echocardiography. J Am Coll Cardiol. 2019;74:403-69 (58). Lang RM, Badano LP, Mor-Avi V, et al. Recommendations for cardiac chamber quantification by echocardiography in adults: an update from the American Society of Echocardiography and the European Association of Cardiovascular Imaging. J Am Soc Echocardiogr. 2015;28:1-39.e14 (59).	
		Normal	Size of the LV at end-diastole is normal.		
		Reduced	Size of the LV at end-diastole is smaller than normal.		
		Mildly enlarged	Size of the LV at end-diastole is slightly larger than normal.		
		Moderately enlarged	Size of the LV at end-diastole is moderately larger than normal.		
		Severely enlarged	Size of the LV at end-diastole considerably larger than normal.		
		Unknown	A proper value is applicable but not known.		
		Data Elements Related to Valvular Heart Disease			
Aortic stenosis	Echocardiographic assessment of aortic stenosis	■ Aortic stenosis, severe, high-gradient aortic stenosis ■ Aortic stenosis, severe, low-flow/low-gradient aortic stenosis with reduced LVEF ■ Severe low-gradient aortic stenosis with normal LVEF or paradoxical low-flow severe aortic stenosis ■ Aortic stenosis, moderate ■ Aortic stenosis, mild ■ Aortic stenosis, none ■ Aortic stenosis, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57-185 (60).	

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Aortic stenosis, severe, high-gradient aortic stenosis	V_{max} ≥4 m/s or mean gradient ≥40 mm Hg.		
		Aortic stenosis, severe, low-flow/low-gradient with reduced LVEF	■ AVA ≤1.0 cm^2 with resting aortic V_{max} <4 m/s or mean ΔP <40 mm Hg ■ Dobutamine stress echocardiography shows AVA ≤1.0 cm^2 with V_{max} 4 m/s at any flow rate		
		Severe low-gradient aortic stenosis with normal LVEF or paradoxical low-flow severe aortic stenosis	■ AVA ≤1.0 cm^2 with aortic V_{max} <4 m/s or mean ΔP <40 mm Hg ■ Indexed AVA ≤0.6 cm^2/m^2 and, ■ Stroke volume index <35 mL/m^2 measured when patient is normotensive (systolic <140 mm Hg)		
		Aortic stenosis, moderate	Aortic V_{max} 3.0–3.9 m/s or mean gradient 20–39 mm Hg		
		Aortic stenosis, mild	Aortic V_{max} 2.0–2.9 m/s or mean gradient <20 mm Hg		
		Aortic stenosis, none			
		Aortic stenosis, not assessed			
Aortic regurgitation	Echocardiographic assessment of aortic regurgitation	■ Aortic regurgitation, severe ■ Aortic regurgitation, moderate ■ Aortic regurgitation, mild ■ Aortic regurgitation, none ■ Aortic regurgitation, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57–185 (60).	
		Aortic regurgitation, severe	■ Jet width ≥65% of LVOT ■ Vena contracta >0.6 cm ■ Holodiastolic flow reversal in the proximal abdominal aorta ■ RVol ≥60 mL/beat ■ RF ≥50% ■ ERO ≥0.3 cm^2		
		Aortic regurgitation, moderate	■ Jet width 25%–64% of LVOT ■ Vena contracta 0.3–0.6 cm ■ RVol 30–59 mL/beat ■ RF 30%–49% ■ ERO 0.10–0.29 cm^2		
		Aortic regurgitation, mild	■ Jet width <25% of LVOT ■ Vena contracta <0.3 cm ■ RVol <30 mL/beat ■ RF <30% ■ ERO <0.10 cm^2		
		Aortic regurgitation, none			
		Aortic regurgitation, not assessed			

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Mitral stenosis	Echocardiographic assessment of mitral stenosis	■ Mitral stenosis, severe ■ Mitral stenosis, mild to moderate (progressive) ■ Mitral stenosis, none ■ Mitral stenosis, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57–185 (60).	
		Mitral stenosis, severe	■ MVA ≤1.5 cm^2 (MVA ≤1.0 cm^2 with very severe mitral stenosis) ■ Diastolic pressure half-time ≥150 ms (diastolic pressure half-time ≥220 ms with very severe mitral stenosis)		
		Mitral stenosis, mild to moderate (progressive)	■ Increased transmitral flow velocities ■ MVA >1.5 cm^2 ■ Diastolic pressure half-time <150 ms		
		Mitral stenosis, none			
		Mitral stenosis, not assessed			
Mitral regurgitation, primary	Echocardiographic assessment of mitral regurgitation	■ Mitral regurgitation, severe ■ Mitral regurgitation, moderate (progressive) ■ Mitral regurgitation, mild (at risk of MR) ■ Mitral regurgitation, none ■ Mitral regurgitation, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57–185 (60).	
		Mitral regurgitation, severe	■ Central jet mitral regurgitation >40% LA or holosystolic eccentric jet mitral regurgitation ■ Vena contracta ≥0.7 cm ■ Regurgitant volume ≥60 mL ■ Regurgitant fraction ≥50% ■ ERO ≥0.40 cm^2		
		Mitral regurgitation, moderate (progressive)	■ Central jet mitral regurgitation 20%–40% LA or late systolic eccentric jet mitral regurgitation ■ Vena contracta <0.7 cm ■ Regurgitant volume <60 mL ■ Regurgitant fraction <50% ■ ERO <0.40 cm^2		
		Mitral regurgitation, mild (at risk of MR)	■ No MR jet or small central jet area <20% LA on Doppler ■ Small vena contracta <0.3 cm		
		Mitral regurgitation, none			
		Mitral regurgitation, not assessed			

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Mitral regurgitation, secondary		■ Mitral regurgitation, severe ■ Mitral regurgitation, moderate (progressive) ■ Mitral regurgitation, mild (at risk of MR) ■ Mitral regurgitation, none ■ Mitral regurgitation, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/ American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57-185 (60).	
		Mitral regurgitation, severe	■ ERO ≥0.20 cm^2 ■ Regurgitant volume ≥30 mL ■ Regurgitant fraction ≥50%		
		Mitral regurgitation, moderate (progressive)	■ ERO <0.20 cm^2 ■ Regurgitant volume <30 mL ■ Regurgitant fraction <50%		
		Mitral regurgitation, mild (at risk of MR)	■ No MR jet or small central jet area <20% LA on Doppler ■ Small vena contracta <0.30 cm		
		Mitral regurgitation, none			
		Mitral regurgitation, not assessed			
Tricuspid regurgitation	Echocardiographic assessment of tricuspid regurgitation	■ Tricuspid regurgitation, severe ■ Tricuspid regurgitation, moderate (progressive) ■ Tricuspid regurgitation, mild (progressive) ■ Tricuspid regurgitation, none ■ Tricuspid regurgitation, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/ American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57-185 (60).	
		Tricuspid regurgitation, severe	■ Central jet area >10.0 cm^2 ■ Vena contracta width >0.70 cm ■ CW jet density and contour: dense, triangular with early peak ■ Hepatic vein flow, systolic reversal		
		Tricuspid regurgitation, moderate (progressive)	■ Central jet area 5.0-10.0 cm^2 ■ Vena contracta width not defined but <0.70 cm ■ CW jet density and contour: dense, variable contour ■ Hepatic vein flow: systolic blunting		
		Tricuspid regurgitation, mild (progressive)	■ Central jet area <5.0 cm^2 ■ Vena contracta width not defined ■ CW jet density and contour: Soft and parabolic ■ Hepatic vein flow: Systolic dominance		
		Tricuspid regurgitation, none			
		Tricuspid regurgitation, not assessed			

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Data Elements Related to Determination of Risk by Noninvasive Testing					
Met target heart rate for exercise testing	≥85% of maximum predicted HR ([220 − age] × 0.85)	■ Yes ■ No		Hendel RC, Budoff MJ, Cardella JF, et al. ACC/AHA/ACR/ASE/ASNC/HRS/NASCI/RSNA/SAIP/SCAI/ SCCT/SCMR/SIR 2008 key data elements and definitions for cardiac imaging: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Cardiac Imaging). J Am Coll Cardiol. 2009;53:91-124 (56).	
Chest pain during exercise	Type of chest pain during stress test	■ Limiting chest pain ■ Nonlimiting chest pain ■ Anginal equivalent ■ None		Hendel RC, Budoff MJ, Cardella JF, et al. ACC/AHA/ACR/ASE/ASNC/HRS/NASCI/RSNA/SAIP/SCAI/ SCCT/SCMR/SIR 2008 key data elements and definitions for cardiac imaging: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Clinical Data Standards for Cardiac Imaging). J Am Coll Cardiol. 2009;53:91-124 (56).	
Risk assessment: exercise stress test	Findings of exercise stress on the 12-lead ECG that define patient risk of adverse coronary events	■ High risk ■ Intermediate risk ■ Low risk		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44-164 (37).	
		High risk	>2 mm ST depression at low workload, ST elevation, VT/VF; Duke treadmill score <-10		
		Intermediate risk	>1 mm ST depression, with symptoms; Duke treadmill score +4 to -10		
		Low risk	No ST changes or low treadmill score (≥+5)		
Resting echocardiogram	Findings of 2D echocardiogram at rest that define patient risk of adverse coronary events.	■ High risk ■ Intermediate risk ■ Low risk		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44-164 (37).	

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		High risk	Severe resting LV dysfunction (LVEF <35%) not readily explained by noncoronary causes		
		Intermediate risk	Mild/moderate resting LV dysfunction (LVEF 35%-49%) not readily explained by noncoronary causes		
		Low risk	LVEF ≥50%		
Risk assessment: Stress echocardiogram	Findings of exercise or pharmacologic stress on LV function and wall motion that define patient risk of adverse coronary events	■ High risk ■ Intermediate risk ■ Low risk		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44-164 (37).	
		High risk	Inducible wall motion abnormality in 2 coronary beds or >2 segments, or stress-induced LV dysfunction; or wall motion abnormality developing at low dose dobutamine or low heart rate		
		Intermediate risk	Small wall motion abnormality in 1 coronary bed and 1-2 segments		
		Low risk	Normal stress or no change of resting wall motion abnormalities		
Risk assessment: Radionuclide imaging	Findings of myocardial perfusion imaging performed by SPECT or PET, in conjunction with exercise or pharmacologic stress, that define patient risk of adverse coronary events	■ High risk ■ Intermediate risk ■ Low risk		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44-164 (37).	

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		High risk	Stress defect of >10% myocardium, multiple vascular distribution; or LV dilation, or resting perfusion defect in >10% of myocardium if without prior MI		
		Intermediate risk	Stress-induced defect of 5%–10% myocardium, no LV dilation, 1 vascular territory; or resting perfusion defect in 5%–10% of myocardium if without prior MI		
		Low risk	Normal or small defect (<5% of myocardium)		
Risk assessment: Coronary artery calcium score	Findings of CAC assessment by CT scan of the heart (in Agatston units) that define patient risk of adverse coronary events	■ High risk ■ Intermediate risk ■ Low risk		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44–164 (37).	
		High risk	CAC score >400		
		Intermediate risk	CAC score 100–400		
		Low risk	CAC score <100		
Risk assessment: Coronary CT angiography	Findings on coronary CT angiography that define patient risk of adverse coronary events	■ High risk ■ Intermediate risk ■ Low risk		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44–164 (37).	
		High risk	Multivessel disease with ≥70% stenosis or LM with >50%		
		Intermediate risk	1 vessel ≥70% stenosis or >1 vessel with ≥50%–69% stenosis		
		Low risk	No stenosis >50%		

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APPENDIX 7. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Coronary CT angiography functional assessment, with CT-FFR	Findings of FFR by CCTA that define patient risk of adverse coronary events	■ Normal ■ Abnormal		Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60:e44-164 (37).	
		Normal	FFR ≥0.8 as determined by computer-derived measurement with CCTA		
		Abnormal	FFR <0.8 as determined by computer-derived measurement with CCTA		
Risk assessment: CMR imaging	Findings of CMR imaging that define patient risk of adverse coronary events	■ High risk ■ Intermediate risk ■ Low risk	Criteria for risk assessment variable depending on the CMR imaging technique used. Risk markers for adverse coronary events include low myocardial strain values on CMR-feature tracking, low global coronary flow reserve (ratio of total myocardial blood flow at stress to total myocardial blood flow at rest), and abnormal stress CMR results.	Kwong RY, Ge Y, Steel K, et al. Cardiac magnetic resonance stress perfusion imaging for evaluation of patients with chest pain. J Am Coll Cardiol 2019;74: 1741–55 (61). Shah R, Heydari B, Coelho-Filho O, et al. Stress cardiac magnetic resonance imaging provides effective cardiac risk reclassification in patients with known or suspected stable coronary artery disease. Circulation. 2013;128:605–14 (62). Amier RP, Smulders MW, van der Flier WM, et al. Long-term prognostic implications of previous silent myocardial infarction in patients presenting with acute myocardial infarction. J Am Coll Cardiol Img. 2018;11:1773–81 (63). Heitner JF, Kim RJ, Kim HW, et al. Prognostic value of vasodilator stress cardiac magnetic resonance imaging: a multicenter study with 48000 patient-years of follow-up. JAMA Cardiol. 2019; 4:256–64 (64).	Risk assessment by CMR imaging is an emerging methodology with several different imaging techniques, each having different criteria for assessment of risk. Additional methods may also be useful for risk determination.
		High risk	Ischemia noted in >10% of the myocardium and/or the presence of extensive late gadolinium enhancement		
		Intermediate risk	Presence of ischemia but in <10% of the myocardium or presence of small-moderate areas of late gadolinium enhancement		
		Low risk	Absence of ischemia on stress CMR imaging and absence of late gadolinium enhancement		

2D indicates 2-dimensional; 3D, 3-dimensional; bpm, beats per minute; AVA, aortic valve area. CAC, coronary calcium score; CCTA, coronary computed tomography angiography; CMR, cardiac magnetic resonance; CT, computed tomography; CW, continuous wave; ECG, electrocardiogram; ERO, effective regurgitant orifice; FFR, fractional flow reserve; HR, heart rate; LA, left atrium/atrial; LBBB, left bundle branch block; LM, left main; LV, left ventricular/ventricle; LVEF, left ventricular ejection fraction; LVOT, left ventricular outflow tract; MI, myocardial infarction; MR, mitral regurgitation; MVA, mitral valve area; NCDR, National Cardiovascular Data Registry; NCI, National Cancer Institute; PET, positron emission tomography; RF, regurgitant fraction; RNA, radionuclide angiogram; RVol, regurgitant volume; SPECT, single-photon emission computed tomography; VF, ventricular fibrillation; V_{max}, maximal pulmonic valve jet velocity; and VT, ventricular tachycardia.

APPENDIX 8. INVASIVE TESTING

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Date of procedure	The date the procedure was performed.	■ Date, in mm/dd/yyyy			This is a generic field that can be used to establish the date of any other type of diagnostic or invasive procedure.
Time of procedure	The time the procedure was performed.	■ Time, in hh:mm:ss			This is a generic field that can be used to establish the time of any other type of diagnostic or invasive procedure.
Coronary Angiography Performed Only as a Diagnostic Study					
Most recent diagnostic angiography date/time	The date and time the patient had diagnostic coronary angiography.	■ Date, in mm/dd/yyyy ■ Time, in hh:mm (24-h clock)			
Culprit artery	This is the vessel considered to be responsible for the ACS. The operator should use his or her judgment in choosing the primary vessel. Note: "None" should be considered if there is no apparent coronary vessel lesion that could be responsible for evidence of ischemia.	■ LAD ■ LCx ■ RCA ■ LM ■ Ramus intermedius ■ Graft ■ None ■ Cannot determine		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8002) (29) Levine GN, Bates ER, Blankenship JC, et al. 2015 ACC/AHA/SCAI focused update on primary percutaneous coronary intervention for patients with ST-elevation myocardial infarction: an update of the 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention and the 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol. 2016;67:1235–50 (65).	
Culprit artery TIMI flow	TIMI grade flow in the culprit artery	■ TIMI 0 ■ TIMI 1 ■ TIMI 2 ■ TIMI 3 ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8007) (29) The Thrombolysis in Myocardial Infarction (TIMI) trial. Phase I findings. N Engl J Med. 1985;312:932–6 (66).	This data element is intended to capture culprit artery TIMI flow in a setting in which there is no intent to perform PCI.
		TIMI 0	No flow/no perfusion		
		TIMI 1	Slow penetration without perfusion		
		TIMI 2	Partial flow/partial perfusion (TIMI >1 but TIMI <3)		
		TIMI 3	Complete and brisk flow/complete perfusion		
		Unknown	A proper value is applicable but not known		

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APPENDIX 8. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Maximum coronary vessel stenosis	Stenosis represents the percentage occlusion, from 0%-100%, associated with the identified vessel system. 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. For the denominator, take the maximum internal lumen diameter proximal and distal to the lesion. In instances where multiple lesions are present, enter the highest percent stenosis noted. Include only major branch vessels of >2 mm diameter.	■ Numerical value, %		NCDR CathPCI Coder's Data Dictionary v5.0 (data element #7508) (29)	
Native lesion segment number and name	Coronary artery segment that the current lesion spans. A lesion can span ≥1 segments.	■ Numerical value(s) and segment name(s) according to the coronary segment classification in Appendix 10			
Other Invasive Testing					
Fractional Flow Reserve Performed Only During a Diagnostic Study					
Fractional flow reserve	FFR is the ratio of maximum blood flow distal to a stenotic lesion to normal maximum flow in the same vessel. It is calculated using the pressure ratio: FFR=Pd/Pa, where Pd is the pressure distal to the lesion, and Pa is the pressure proximal to the lesion at maximal hyperemic flow. FFR is measured after the pressure sensor tip wire is placed distal to the lesion being assessed. Adenosine is administered intravenously or intracoronary to dilate the microvascular coronary circulation. An FFR value of ≤0.8 is considered abnormal and indicative of hemodynamically significant lesion.	■ Normal FFR ■ Abnormal FFR		Levine GN, Bates ER, Blankenship JC, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol. 2011;58:e44-122 (47).	
		Normal FFR	≥0.80		
		Abnormal FFR	<0.80		

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APPENDIX 8. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Instantaneous wave-free ratio	iFR is the Pd/Pa ratio during the wave-free period, which occurs in diastole. Pd is the pressure distal to the lesion, and Pa is the pressure proximal to the lesion. iFR is measured after the pressure sensor tip wire is placed distal to the lesion being assessed.	■ Normal iFR ■ Abnormal iFR		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7513) (29) Neumann FJ, Sousa-Uva M, Ahlsson A, et al. 2018 ESC/EACTS guidelines on myocardial revascularization. Eur Heart J. 2019;40:87-165 (67).	
		Normal iFR	≥0.89		
		Abnormal iFR	<0.89		
Other diastolic indices not requiring coronary vasodilation	RFR and DFR measurements	■ Normal ■ Abnormal		Svanerud J, Ahn JM, Jeremias A, et al. Validation of a novel non-hyperaemic index of coronary artery stenosis severity: the Resting Full-cycle Ratio (VALIDATE RFR) study. EuroIntervention. 2018;14:806-14 (68). Ligthart J, Masdjedi K, Witberg K, et al. Validation of resting diastolic pressure ratio calculated by a novel algorithm and its correlation with distal coronary artery pressure to aortic pressure, instantaneous wave-free ratio, and fractional flow reserve. Circ Cardiovasc Interv. 2018;11:e006911 (69).	Newer indices are diagnostically equivalent to iFR but less well validated.
Intravascular Ultrasound Performed Only During a Diagnostic Study					
Intravascular ultrasound	Imaging of a coronary artery using a small caliber catheter with an ultrasound probe at its tip. The catheter is advanced into the artery and uses high frequency sound waves to produce an image of the artery from the lumen outward.	■ Yes ■ Not performed		Mintz GS, Nissen SE, Anderson WD, et al. American College of Cardiology clinical expert consensus document on standards for acquisition, measurement and reporting of intravascular ultrasound studies (IVUS): a report of the American College of Cardiology Task Force on Clinical Expert Consensus Documents. J Am Coll Cardiol. 2001;37:1478-92 (70).	
Intravascular ultrasound, proximal reference diameter	The site with the largest lumen proximal to a stenosis but within the same segment (usually within 10 mm of the stenosis with no major intervening branches). This may not be the site with the least plaque.	■ Numerical value, mm			
Intravascular ultrasound, distal reference diameter	The site with the largest lumen distal to a stenosis but within the same segment (usually within 10 mm of the stenosis with no intervening branches). This may not be the site with the least plaque.	■ Numerical value, mm			

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APPENDIX 8. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Intravascular ultrasound, average reference lumen size	The average value of lumen size at the proximal and distal reference sites	■ Numerical value, mm^2			
Intravascular ultrasound, presence of a lesion	A reduction in the lumen area of an artery compared with the normal reference segment	■ Yes ■ No			
Intravascular ultrasound, stenosis	A stenosis is a lesion that compromises the lumen by ≥50% by CSA (compared with a predefined reference segment lumen).	■ Numerical value, %			
Intravascular ultrasound, lumen cross-sectional area	The area bounded by the luminal border	■ Numerical value, mm^2			
Intravascular ultrasound, minimum lumen diameter	The shortest diameter through the center point of the lumen	■ Numerical value, mm			
Intravascular ultrasound, maximum lumen diameter	The longest diameter through the center point of the lumen	■ Numerical value, mm			
Intravascular ultrasound, lumen eccentricity	1 ([maximum lumen diameter minus minimum lumen diameter] divided by maximum lumen diameter)	■ Numerical value			
Intravascular ultrasound, lumen area stenosis	(Reference lumen CSA minus minimum lumen CSA)/reference lumen CSA. The reference segment used should be specified (proximal, distal, largest, or average).	■ Numerical value, %			

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APPENDIX 8. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Optical Coherence Tomography Performed Only During a Diagnostic Study					
Optical coherence tomography	OCT is a light-based imaging modality that generates high-resolution (~10 μm) cross-sectional images of tissue microstructure, enabling visualization of blood vessel wall microstructure in vivo.	■ Yes ■ No ■ Unknown		Bashore TM, Balter S, Barac A, et al. 2012 American College of Cardiology Foundation/Society for Cardiovascular Angiography and Interventions expert consensus document on cardiac catheterization laboratory standards update: a report of the American College of Cardiology Foundation Task Force on Expert Consensus Documents. Developed in collaboration with the Society of Thoracic Surgeons and Society for Vascular Medicine. J Am Coll Cardiol. 2012;59:2221–305 (71). Tearney GJ, Regar E, Akasaka T, et al. Consensus standards for acquisition, measurement, and reporting of intravascular optical coherence tomography studies: a report from the International Working Group for Intravascular Optical Coherence Tomography Standardization and Validation. J Am Coll Cardiol. 2012;59:1058–72 (72).	
Optical coherence tomography, proximal reference	The site with the largest lumen proximal to a stenosis but within the same segment (usually within 10 mm of the stenosis, with no major intervening branches). This may not be the site with the least plaque.	■ Numerical value, mm			
Optical coherence tomography, distal reference	The site with the largest lumen distal to a stenosis but within the same segment (usually within 10 mm of the stenosis, with no intervening branches). This may not be the site with the least plaque.	■ Numerical value, mm			
Optical coherence tomography, largest reference	The largest of either the proximal or distal reference sites	■ Numerical value, mm			
Optical coherence tomography, average reference lumen size	The average value of lumen size at the proximal and distal reference sites	■ Numerical value, mm^2			
Optical coherence tomography, lesion	A lesion is seen by OCT as a mass lesion within the artery wall, focal intimal thickening, or loss of the layered architecture of intima, media, and adventitia.	■ Yes ■ No			
Optical coherence tomography, stenosis	A stenosis is a lesion that compromises the lumen by at least 50% by CSA, compared with a predefined reference segment lumen.	■ Numerical value, %			

ACS indicates acute coronary syndrome; CSA, cross-sectional area; DFR, diastolic flow ratio; FFR, fractional flow reserve; hh:mm:ss, hours:minutes:seconds; iFR, instantaneous wave-free ratio; LAD, left anterior descending artery; LCx, left circumflex artery; LM, left main artery; mm/dd/yyyy, month/day/year; NCDR, National Cardiovascular Data Registry; OCT, optical coherence tomography; PCI, percutaneous coronary intervention; RCA, right coronary artery; RFR, resting full cycle ratio; and TIMI, Thrombolysis in Myocardial Infarction.

APPENDIX 9. SURGICAL REVASCULARIZATION

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Aortic regurgitation	The degree of aortic regurgitation (insufficiency) reported closest to incision but not >6 mo before surgery	■ Aortic regurgitation, severe ■ Aortic regurgitation, moderate ■ Aortic regurgitation, mild ■ Aortic regurgitation, none ■ Aortic regurgitation not assessed.		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57–185 (60).	
	Aortic regurgitation, severe	■ Jet width ≥65% of LVOT ■ Vena contracta >0.6 cm ■ Holodiastolic flow reversal in the proximal abdominal aorta ■ RVol ≥60 mL/beat ■ RF ≥50% ■ ERO ≥0.3 cm^2			
	Aortic regurgitation, moderate	■ Jet width 25%–64% of LVOT ■ Vena contracta 0.3–0.6 cm ■ RVol 30–59 mL/beat ■ RF 30%–49% ■ ERO 0.10–0.29 cm^2			
	Aortic regurgitation, mild	■ Jet width <25% of LVOT ■ Vena contracta <0.3 cm ■ RVol <30 mL/beat ■ RF <30% ■ ERO <0.10 cm^2			
	Aortic regurgitation, none				
	Aortic regurgitation, not assessed				
Aortic valve disease	The presence of any stenosis or regurgitation (insufficiency) greater than "trace"	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #1595) (8)	
Aortic stenosis	The presence of any degree of aortic stenosis	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #1600) (8)	Most recent value closest to surgery but not >6 mo before surgery.
Hemodynamic/ echocardiography data available	Aortic valve hemodynamic measurements are available.	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #1605) (8)	Most recent value closest to induction but not >6 mo before induction, or the value closest to and before incision if no reported values are available.
Aortic valve area	The documented aortic valve area closest to the time of incision, before induction	■ Numeric, in cm^2		STS ACSD v2.9 Training Manual (seq. #1610) (8)	Most recent value closet to induction but not >6 mo before; the value closest to and before incision if no reported values are available.

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Mean aortic valve gradient	The documented mean gradient across the documented aortic valve	■ Numeric, in mm Hg		STS ACSD v2.9 Training Manual (seq. #1615) (8)	Most recent value before induction but not >6 mo before, or the value closest to and before incision if no reported values are available.
Mitral regurgitation, primary	The degree of mitral regurgitation reported	■ Mitral regurgitation, severe ■ Mitral regurgitation, moderate (progressive) ■ Mitral regurgitation, mild (at risk of MR) ■ Mitral regurgitation, none ■ Mitral regurgitation, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57–185 (60). O'Gara PT, Grayburn PA, Badhwar V, et al. 2017 ACC expert consensus decision pathway on the management of mitral regurgitation: a report of the American College of Cardiology Task Force on Expert Consensus Decision Pathways. J Am Coll Cardiol. 2017;70:2421–49 (73). STS ACSD v2.9 Training Manual (seq. #1680) (8)	Most recent value closest to incision but not >6 mo before.
		Mitral regurgitation, severe	■ Central jet mitral regurgitation >40% LA or holosystolic eccentric jet mitral regurgitation ■ Vena contracta ≥0.7 cm ■ Regurgitant volume ≥60 mL ■ Regurgitant fraction ≥50% ■ ERO ≥0.40 cm^2		
		Mitral regurgitation, moderate (progressive)	■ Central jet mitral regurgitation 20%–40% LA or late systolic eccentric jet mitral regurgitation ■ Vena contracta <0.7 cm ■ Regurgitant volume <60 mL ■ Regurgitant fraction <50% ■ ERO <0.40 cm^2		
		Mitral regurgitation, mild (at risk of MR)	■ No mitral regurgitation jet or small central jet area <20% LA on Doppler ■ Small vena contracta <0.3 cm		
		Mitral regurgitation, none			
		Mitral regurgitation, not assessed			

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Mitral regurgitation, secondary	The degree of mitral regurgitation reported	■ Mitral regurgitation, severe ■ Mitral regurgitation, moderate (progressive) ■ Mitral regurgitation, mild (at risk of MR) ■ Mitral regurgitation, none ■ Mitral regurgitation, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57-185 (60). O'Gara PT, Grayburn PA, Badhwar V, et al. 2017 ACC expert consensus decision pathway on the management of mitral regurgitation: a report of the American College of Cardiology Task Force on Expert Consensus Decision Pathways. J Am Coll Cardiol. 2017;70:2421-49 (73).	
		Mitral regurgitation, severe	■ ERO ≥0.20 cm^2 ■ Regurgitant volume ≥30 mL ■ Regurgitant fraction ≥50%		
		Mitral regurgitation, moderate (progressive)	■ ERO <0.20 cm^2 ■ Regurgitant volume <30 mL ■ Regurgitant fraction <50%		
		Mitral regurgitation, mild (at risk of MR)	■ No mitral regurgitation jet or small central jet area <20% LA on Doppler ■ Small vena contracta <0.30 cm		
		Mitral regurgitation, none			
		Mitral regurgitation, not assessed			
Mitral stenosis	Presence of mitral stenosis	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #1690) (8)	Most recent value closest to incision but not >6 mo before, even if patient is not scheduled for valve repair and/or replacement.
Hemodynamic/ echocardiography data available	Availability of mitral valve hemodynamic measurements	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #1695) (8)	
Mitral valve area	The documented MV area closest to the time of incision, before induction	■ Numeric, in cm^2		STS ACSD v2.9 Training Manual (seq. #1700) (8)	Most recent value before induction but not >6 mo before, or the value closest to and before incision if no reported values are available.
Mean gradient	The documented mean gradient (in mm Hg) across the MV closest to the time of incision, before induction	■ Numeric, in mm Hg		STS ACSD v2.9 Training Manual (seq. #1705) (8)	Most recent value before induction but not >6 mo before, or the value closest to and before incision if no reported values are available.

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Carpentier mitral leaflet motion classification	Mechanism of leaflet motion	■ Type I ■ Type II ■ Type IIIA ■ Type IIIB		O'Gara PT, Grayburn PA, Badhwar V, et al. 2017 ACC expert consensus decision pathway on the management of mitral regurgitation: a report of the American College of Cardiology Task Force on Expert Consensus Decision Pathways. J Am Coll Cardiol. 2017;70:2421–49 (73).	The next STS ACSD version upgrade will collect Carpentier classification (I, II, IIIA, IIIB, mixed [II and IIIA])
		Type I	■ Normal leaflet motion ■ Annular dilation, leaflet perforation ■ Regurgitation jet directed centrally		
		Type II	■ Excessive leaflet motion ■ Papillary muscle rupture, chordal rupture, redundant chordae ■ Eccentric jet, directed away from involved leaflet		
		Type IIIA	■ Leaflet motion restricted in both systole and diastole ■ Rheumatic heart disease ■ Jet may be centrally or eccentrically directed		
		Type IIIB	■ Leaflet motion restricted in diastole ■ Papillary muscle dysfunction, left ventricular dilation ■ Jet may be centrally or eccentrically directed		
Mitral valve disease etiology	Cause of MV disease.	■ Myxomatous degeneration/ prolapse ■ Rheumatic ■ Ischemic—acute, post infarction (MI ≤21 d) ■ Ischemic-chronic (MI >21 d) ■ Nonischemic cardiomyopathy ■ Endocarditis ■ Hypertrophic obstructive cardiomyopathy ■ Tumor, carcinoid ■ Tumor, myxoma ■ Tumor, papillary fibroelastoma ■ Tumor, other ■ Carcinoid ■ Trauma ■ Congenital ■ Pure annular dilatation ■ Reoperation—failure of prior MV repair or replacement ■ Mixed etiology ■ Not documented		STS ACSD v2.9 Training Manual (seq. #1731) (8)	Note that in the next STS ACSD version upgrade the choices for tumors will be combined, carcinoid will be renamed as carcinoid syndrome, and endocarditis (prosthetic valve), and radiation-induced heart disease will be added as options for etiology.

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Mitral valve lesion	Type of MV lesion	■ Leaflet prolapse, posterior ■ Leaflet prolapse, bileaflet ■ Leaflet prolapse, anterior ■ Leaflet prolapse, unspecified ■ Elongated/ruptured chord(s)/flail ■ Annular dilatation ■ Leaflet calcification ■ Leaflet perforation/hole ■ Mitral annular calcification ■ Papillary muscle elongation ■ Papillary muscle rupture ■ Leaflet thickening ■ Leaflet retraction ■ Chordal tethering ■ Chordal thickening/retraction/ fusion ■ Commissural fusion ■ Mixed lesion ■ Not documented		STS ACSD v2.9 Training Manual (seq. #1746) (8)	
Tricuspid valve regurgitation	Evidence of tricuspid valve regurgitation/ insufficiency	■ Tricuspid regurgitation, severe ■ Tricuspid regurgitation, moderate (progressive) ■ Tricuspid regurgitation, mild (progressive) ■ Tricuspid regurgitation, none ■ Tricuspid regurgitation, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57-185 (60).	Most recent value closest to incision but not >6 mo before .
		Tricuspid regurgitation, severe	■ Central jet area >10.0 cm^2 ■ Vena contracta width >0.70 cm ■ CW jet density and contour: Dense, triangular with early peak ■ Hepatic vein flow: Systolic reversal		
		Tricuspid regurgitation, moderate (progressive)	■ Central jet area 5.0-10.0 cm^2 ■ Vena contracta width not defined but <0.70 cm ■ CW jet density and contour: Dense, variable contour ■ Hepatic vein flow: Systolic blunting		
		Tricuspid regurgitation, mild (progressive)	■ Central jet area <5.0 cm^2 ■ Vena contracta width not defined ■ CW jet density and contour: Soft and parabolic ■ Hepatic vein flow: Systolic dominance		
		Tricuspid regurgitation, none			
		Tricuspid regurgitation, not assessed			

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Tricuspid valve disease	The presence of any stenosis or regurgitation/ insufficiency greater than "trace"	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #1780) (8)	
Tricuspid stenosis	The presence of any degree of tricuspid valve stenosis	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #1785) (8)	
Incidence (of cardiac surgical procedures)	Whether this is the patient's first or subsequent cardiac surgical procedure	■ First cardiovascular surgery ■ First reop cardiovascular surgery ■ Second reop cardiovascular surgery ■ Third reop cardiovascular surgery ■ Fourth or more reop cardio-vascular surgery ■ N/A—not a cardiovascular surgery	For the purposes of this data element a cardiothoracic surgical procedure is defined as a surgical procedure performed on the heart, great vessels or major pericardial procedures with or without the use of CPB. The procedure must involve surgical (open) entry into the pericardial space to qualify.	STS ACSD v2.9 Training Manual (seq. #1970) (8)	
		First cardiovascular surgery	The first cardiovascular surgical procedure involving entry into the pericardium. The exception to this would be a patient with a prior transcatheter valve procedure that requires surgical replacement of the prior transcatheter prosthesis. This situation would qualify as a reoperation.		
		First reop cardiovascular surgery	A second intrapericardial procedure.		
		Second reop cardiovascular surgery	A third intrapericardial procedure.		
		Third reop cardiovascular surgery	A fourth intrapericardial procedure.		
		Fourth or more reop cardiovascular surgery.	A fifth or more intrapericardial procedure.		
		N/A—not a cardiovascular surgery	A procedure that does not qualify.		
Status	The clinical status of the patient prior to entering the OR.	■ Elective ■ Urgent ■ Emergency ■ Emergency/salvage		STS ACSD v2.9 Training Manual (seq. #1975) (8)	
		Elective	The patient's cardiac function has been stable in the days or weeks before surgery. The procedure could be deferred without increased risk of compromise cardiac outcome.		
		Urgent	Procedure required during same hospitalization to minimize chance of further clinical deterioration. Examples include but are not limited to worsening, sudden chest pain, HF, AMI, anatomy, IABP, UA, with IV nitroglycerin, or rest angina.		

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Emergency	Patients requiring emergency surgeries will have ongoing, refractory (difficult, complicated, and/or unmanageable) unrelenting cardiac compromise, with or without hemodynamic instability, and not responsive to any form of therapy except cardiac surgery. An emergency surgery is one in which there should be no delay in providing operative intervention.		
		Emergency/salvage	Patients requiring CPR en route to the OR before induction of anesthesia or requiring ECMO to maintain life.		
Urgent/emergency reason for surgery		■ AMI ■ Anatomy ■ Aortic aneurysm ■ Aortic dissection ■ HF ■ Device failure ■ Diagnostic/interventional procedure complication ■ Endocarditis ■ Failed transcatheter valve therapy ■ IABP ■ Infected device ■ Intracardiac mass or thrombus ■ Ongoing ischemia ■ PCI incomplete without clinical deterioration ■ PCI or attempted PCI with clinical deterioration ■ Pulmonary edema ■ Pulmonary embolus ■ Rest angina ■ Shock, circulatory support ■ Shock, no circulatory support ■ Syncope ■ Transplant ■ Trauma ■ Unstable angina ■ Valve dysfunction ■ Worsening CP ■ Other reasons		STS ACSD v2.9 Training Manual (seq. #1990) (8)	These terms are not further defined by the STS.

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Initial operative approach	The initial operative approach	■ Full conventional sternotomy ■ Partial sternotomy ■ Transverse sternotomy (includes clamshell) ■ Right or left parasternal incision ■ Subxiphoid ■ Subcostal ■ Left thoracotomy ■ Right thoracotomy ■ Bilateral thoracotomy ■ Limited (mini) thoracotomy, right (transapical TAVR) ■ Limited (mini) thoracotomy, left ■ Limited (mini) thoracotomy, bilateral ■ Thoracoabdominal incision ■ Percutaneous ■ Port access ■ Other ■ None (canceled case)		STS ACSD v2.9 Training Manual (seq. #2100) (8)	Note that in the next version of the STS ACSD, transverse sternotomy, right or left parasternal, subcostal, port access, and none will be removed as separate options and coded as "other." Additionally, all thoracotomy and mini thoracotomy approaches will be combined into 1 "thoracotomy" option.
Approach converted during procedure	Operative approach converted during the procedure	■ Yes, planned ■ Yes, unplanned ■ No		STS ACSD v2.9 Training Manual (seq. #2105) (8)	Note that these options will change to yes or no in the next STS ACSD version upgrade.
Robot used	Robotic assistance used during cardiac surgery	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #2110) (8)	These terms are not further defined by the STS.
Extent of robot use	Time frame of robotic use	■ Entire operation ■ Part of the operation		STS ACSD v2.9 Training Manual (seq. #2115) (8)	
Surgical coronary revascularization (i.e., CABG); planned or unplanned	CABG performed	■ Yes, planned ■ Yes, unplanned due to surgical complication ■ Yes, unplanned due to unsuspected disease or anatomy ■ No		STS ACSD v2.9 Training Manual (seq. #2120) (8)	These distinctions are made so that STS can accurately classify the category of the operation for the purposes of risk stratification and performance assessment.
		Yes, planned			
		Yes, unplanned due to surgical complication	Surgical coronary revascularization is required to address a complication of another cardiac surgical procedure performed during this same operation.		
		Yes, unplanned due to unsuspected disease or anatomy	Surgical coronary revascularization is necessitated by disease or anatomy that was not anticipated and/or recognized prior to surgery.		
		No			

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Other cardiac procedure, atrial fibrillation	Surgical procedure was performed for atrial fibrillation.	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #2145) (8)	
Valve surgery performed	Surgical procedure performed on ≥1 cardiac valves.	■ Yes, planned ■ Yes, unplanned due to surgical complication ■ Yes, unplanned due to unsuspected disease or anatomy ■ No		STS ACSD v2.9 Training Manual (seq. #2125) (8)	These distinctions are made so that STS can accurately classify the category of the operation for the purposes of risk stratification and performance assessment.
		Yes, planned			
		Yes, unplanned due to surgical complication	Surgical valve procedure is required to address a complication of another cardiac surgical procedure performed during this same operation.		
		Yes, unplanned due to unsuspected disease or anatomy	Surgical coronary revascularization is necessitated by disease or anatomy that was not anticipated and/or recognized before surgery.		
		No			
Aorta procedure performed	Surgical procedure performed on the aorta.	■ Yes, planned ■ Yes, unplanned due to surgical complication ■ Yes, unplanned due to unsuspected disease or anatomy ■ No		STS ACSD v2.9 Training Manual (seq. #2128) (8)	These distinctions are made so that STS can accurately classify the category of the operation for the purposes of risk stratification and performance assessment.
		Yes, planned			
		Yes, unplanned due to surgical complication	A procedure on the aorta is required to address a complication of another cardiac surgical procedure performed during this same operation.		
		Yes, unplanned due to unsuspected disease or anatomy	A procedure on the aorta is necessitated by disease or anatomy that was not anticipated and/or recognized before surgery.		
		No			

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Other cardiac procedure performed	Another cardiac procedure was performed other than CABG and/or valve procedures.	■ Yes, planned ■ Yes, unplanned due to surgical complication ■ Yes, unplanned due to unsuspected disease or anatomy ■ No		STS ACSD v2.9 Training Manual (seq. #2140) (8)	
		Yes, planned			
		Yes, unplanned due to surgical complication	An "other" cardiac procedure was required to address a complication of another cardiac surgical procedure performed during this same operation.		
		Yes, unplanned due to unsuspected disease or anatomy	An "other" cardiac procedure was necessitated by disease or anatomy that was not anticipated and/or recognized before surgery.		
		No			
Other noncardiac procedure performed	Noncardiac procedure performed.	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #2155) (8)	
Operating room entry date and time	Date and time to the nearest minute (using 24-h clock) that the patient enters the OR.	■ Date, in mm-dd-yyyy ■ Time, in hh:mm (24-h clock)		STS ACSD v2.9 Training Manual (seq. #2245) (8)	If the procedure was performed in a location other than the OR, record the time when the sterile field, or its equivalent, was set up.
Operating room exit date and time	Date and time to the nearest minute (using 24-h clock) that the patient exits the OR.	■ Date, in mm/dd/yyyy ■ Time, in hh:mm (24-h clock)		STS ACSD v2.9 Training Manual (seq. #2250) (8)	If the procedure was performed in a location other than the OR, record the time when the sterile field, or its equivalent, was set up.
Appropriate antibiotic selection	Documentation of an order for a first- or second-generation cephalosporin prophylactic antibiotic, and documentation that it was given preoperatively or in the event of a documented allergy an alternate antibiotic choice is ordered and administered.	■ Yes ■ No ■ Exclusion		STS ACSD v2.9 Training Manual (seq. #2280) (8) Engelman R, Shahian D, Shemin R, et al. The Society of Thoracic Surgeons practice guideline series: antibiotic prophylaxis in cardiac surgery, part II: antibiotic choice. Ann Thorac Surg. 2007;83:1569–76 (74).	
Appropriate antibiotic administration timing	Prophylactic antibiotics administered within 1 h of surgical incision or start of procedure if no incision required (2 h if receiving vancomycin or fluoroquinolone).	■ Yes ■ No ■ Exclusion		STS ACSD v2.9 Training Manual (seq. #2285) (8) Edwards FH, Engelman RM, Houck P, et al. The Society of Thoracic Surgeons practice guideline series: antibiotic prophylaxis in cardiac surgery, part I: duration. Ann Thorac Surg. 2006;81:397–404 (75).	

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Cardiopulmonary bypass utilization	Level of CPB or coronary perfusion used during the procedure	■ None ■ Combination ■ Full		STS ACSD v2.9 Training Manual (seq. #2325) (8)	
		None	No CPB or coronary perfusion used during the procedure		
		Combination	With or without CPB and/or with or without coronary perfusion at any time during the procedure (capture conversions from off-pump to on-pump only)		
		Full	CPB or coronary perfusion was used for the entire procedure		
Cardiopulmonary bypass utilization, combination	Use of both off-pump and on-pump technique was planned or unplanned	■ Planned ■ Unplanned		STS ACSD v2.9 Training Manual (seq. #2330) (8)	
Reason for unplanned combination cardiopulmonary bypass utilization	Reason there was unplanned use of a combined approach	■ Exposure/visualization ■ Inadequate size/diffuse disease of distal vessel ■ Hemodynamic instability (hypotension/ arrhythmias) ■ Conduit quality and/or trauma ■ Other		STS ACSD v2.9 Training Manual (seq. #2335) (8)	
Arterial cannulation insertion site	Arterial cannulation site for CPB	■ Aortic ■ Femoral ■ Axillary ■ Innominate ■ Other ■ No		STS ACSD v2.9 Training Manual (seq. #2340, 2345, 2350, 2355) (8)	
Venous cannulation insertion site	Venous cannulation site for CPB	■ Femoral ■ Jugular ■ Right atrial ■ Left atrial ■ Pulmonary vein ■ Caval/bicaval ■ Other		STS ACSD v2.9 Training Manual (seq. #2365, 2370, 2375, 2380, 2385, 2390, 2395) (8)	
Cardiopulmonary bypass time	Total minutes of CPB	■ Numeric, in min		STS ACSD v2.9 Training Manual (seq. #2400) (8)	
Aorta occlusion	Technique of ascending aortic occlusion	■ None, beating heart ■ None, fibrillating heart ■ Aortic cross clamp ■ Balloon occlusion		STS ACSD v2.9 Training Manual (seq. #2430) (8)	
Cross clamp time	Total number of minutes the coronary circulation is mechanically isolated from the systemic circulation either by an aortic cross clamp or systemic circulatory arrest.	■ Numeric, in min		STS ACSD v2.9 Training Manual (seq. #2435) (8)	

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Cardioplegia delivery	Method of cardioplegia delivery	■ None, if not used ■ Antegrade ■ Retrograde ■ Both		STS ACSD v2.9 Training Manual (seq. #2440) (8)	
		None	Cardioplegia not used		
		Antegrade	From the aortic root or by coronary artery cannulation		
		Retrograde	From the coronary sinus		
		Both	From the aortic root and coronary sinus		
Type of cardioplegia	Composition of the cardioplegic solution	■ Blood ■ Crystalloid ■ Blood and crystalloid ■ Other		STS ACSD v2.9 Training Manual (seq. #2445) (8)	
Cerebral oximetry used	Cerebral oximetry used to monitor the cerebral circulation.	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #2450) (8)	
Intraoperative blood products	Transfusion of any blood products (packed red blood cells, platelets, fresh frozen plasma or cryoprecipitate) during surgery	■ Yes ■ No ■ Refused		STS ACSD v2.9 Training Manual (seq. #2515) (8)	
Intraoperative blood products, type	Type of blood products infused intraoperatively	■ Red blood cells ■ Platelets ■ Fresh frozen plasma ■ Cryoprecipitate		STS ACSD v2.9 Training Manual (seq. #2520, 2525, 2530, 2535) (8)	
Intraoperative blood products, quantity	Units of each type of blood product transfused during surgery.	■ Numeric, in units for: – Red blood cells – Platelets – Fresh frozen plasma – Cryoprecipitate		STS ACSD v2.9 Training Manual (seq. #2520, 2525, 2530, 2535) (8)	
Intraoperative clotting factors	Clotting factors administered intraoperatively.	■ Yes, Factor VIIa ■ Yes, FEIBA ■ Yes, composite ■ No		STS ACSD v2.9 Training Manual (seq. #2545) (8)	
Intraoperative antifibrinolytic medications	Antifibrinolytic medications administered intraoperatively.	■ Epsilon aminocaproic acid ■ Tranexamic acid ■ No		STS ACSD v2.9 Training Manual (seq. #2550, 2555) (8)	Aprotinin will be included as an option in the next STS ACSD version upgrade.
Transesophageal echocardiography performed postprocedure	TEE performed in the OR, post cardiac procedure, off CPB and before OR exit.	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #2560) (8)	

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Highest level of aortic regurgitation found	Highest level of aortic regurgitation/insufficiency demonstrated by TEE post CPB and before OR exit.	■ Aortic regurgitation, severe ■ Aortic regurgitation, moderate ■ Aortic regurgitation, mild ■ Aortic regurgitation, none ■ Aortic regurgitation not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57-185 (60).	
		Aortic regurgitation, severe	■ Jet width ≥65% of LVOT ■ Vena contracta >0.6 cm ■ Holodiastolic flow reversal in the proximal abdominal aorta ■ RVol ≥60 mL/beat ■ RF ≥50% ■ ERO ≥0.3 cm^2		
		Aortic regurgitation, moderate	■ Jet width 25%-64% of LVOT ■ Vena contracta 0.3-0.6 cm ■ RVol 30-59 mL/beat ■ RF 30%-49% ■ ERO 0.10-0.29 cm^2		
		Aortic regurgitation, mild	■ Jet width <25% of LVOT ■ Vena contracta <0.3 cm ■ RVol <30 mL/beat ■ RF <30% ■ ERO <0.10 cm^2		
		Aortic regurgitation, none			
		Aortic regurgitation, not assessed			
Highest level of mitral regurgitation found	Highest level of mitral regurgitation/ insufficiency demonstrated by TEE post CPB and before OR exit.	■ Mitral regurgitation, severe ■ Mitral regurgitation, moderate (progressive) ■ Mitral regurgitation, mild (at risk of MR) ■ Mitral regurgitation, none ■ Mitral regurgitation, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57-185 (60).	

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Mitral regurgitation, severe	■ Central jet mitral regurgitation >40% LA or holosystolic eccentric jet mitral regurgitation ■ Vena contracta ≥0.7 cm ■ Regurgitant volume ≥60 mL ■ Regurgitant fraction ≥50% ■ ERO ≥0.40 cm^2		
		Mitral regurgitation, moderate (progressive)	■ Central jet mitral regurgitation 20%–40% LA or late systolic eccentric jet mitral regurgitation ■ Vena contracta <0.7 cm ■ Regurgitant volume <60 mL ■ Regurgitant fraction <50% ■ ERO <0.40 cm^2		
		Mitral regurgitation, mild (at risk of MR)	■ No MR jet or small central jet area <20% LA on Doppler ■ Small vena contracta <0.3 cm		
		Mitral regurgitation, none			
		Mitral regurgitation, not assessed			
Highest level of tricuspid regurgitation found	Highest level of tricuspid regurgitation /insufficiency demonstrated by TEE and post CPB before OR exit.	■ Tricuspid regurgitation, severe ■ Tricuspid regurgitation, moderate (progressive) ■ Tricuspid regurgitation, mild (progressive) ■ Tricuspid regurgitation, none ■ Tricuspid regurgitation, not assessed		Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:e57–185 (60).	
		Tricuspid regurgitation, severe	■ Central jet area >10.0 cm^2 ■ Vena contracta width >0.70 cm ■ CW jet density and contour: Dense, triangular with early peak ■ Hepatic vein flow: Systolic reversal		
		Tricuspid regurgitation, moderate (progressive)	■ Central jet area 5.0–10.0 cm^2 ■ Vena contracta width not defined but <0.70 cm ■ CW jet density and contour: Dense, variable contour ■ Hepatic vein flow: Systolic blunting		
		Tricuspid regurgitation, mild (progressive)	■ Central jet area <5.0 cm^2 ■ Vena contracta width not defined ■ CW jet density and contour: Soft and parabolic ■ Hepatic vein flow: Systolic dominance		
		Tricuspid regurgitation, none			
		Tricuspid regurgitation, not assessed			

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Ejection fraction, post procedure	LVEF obtained intraoperatively post procedure.	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #2581) (8)	
Ejection fraction	Measured EF	■ Numeric value		STS ACSD v2.9 Training Manual (seq. #2582) (8)	
Combined cardiac surgery and PCI performed	Combination of a cardiac surgical procedure and PCI performed.	■ PCI + CABG ■ PCI + valve ■ PCI + aortic ■ PCI + other ■ No			Commonly referred to as a hybrid procedure
Combined cardiac surgery, status	Timing of combined procedure.	■ Concurrent, same setting ■ Staged, PCI followed by surgery ■ Staged, surgery followed by PCI			
PCI procedure		■ Angioplasty ■ Stent ■ Angioplasty and stent ■ Atherectomy ■ Attempted PCI			UDIs could be substituted in the future if available.
		Angioplasty	PCI performed only by the use of a balloon.		
		Stent	A metal scaffold intended to expand a stenosis and prevent vessel recoil.		
		Angioplasty and stent	Combination of a balloon angioplasty at 1 location and stent placement at a different location.		
		Atherectomy	Endovascular procedure in which atheromatous plaque is excised by a cutting or rotating catheter.		
		Attempted PCI	A PCI that was attempted but unsuccessful.		

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Stent type		■ Bare-metal ■ Drug-eluting ■ Drug-eluting with bio-absorbable polymer ■ Bioresorbable ■ Covered ■ Multiple ■ Unknown			UDIs could be substituted in the future if available.
		Bare-metal	Metallic coronary stent without a polymer or antiproliferative drug coating		
		Drug-eluting	Metallic coronary stent with or without a polymer but with an antiproliferative drug coating		
		Drug-eluting with bioabsorbable polymer	Metallic coronary stent with a bioabsorbable polymer with an antiproliferative drug coating		
		Bioresorbable	Stent struts composed of bioabsorbable materials also containing an antiproliferative drug		
		Covered	Metallic coronary stent scaffold incorporating fabric or graft material, such as polytetrafluoroethylene (PTFE) or polyurethane as a membrane component		
		Multiple	Treatment of several arteries using different stent types		
		Unknown	A proper value is applicable but not known		
Planned postprocedure PCI	Planned PCI after OR exit and before hospital discharge	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #2606) (8)	
Number of distal anastomoses with arterial conduits	Total number of distal coronary anastomoses performed with arterial conduits.	■ Numeric			
Number of distal anastomoses with venous conduits	Total number of distal coronary anastomoses performed with venous conduits.	■ Numeric		STS ACSD v2.9 Training Manual (seq. #2638) (8)	

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Vein harvest technique	Technique used for venous harvesting.	■ Endoscopic ■ Direct vision (open) ■ Endoscopic and direct vision (open) ■ Cryopreserved		STS ACSD v2.9 Training Manual (seq. #2639) (8)	
Vein harvest and prep time	Total time for saphenous vein harvest and preparation.	Numeric, min		STS ACSD v2.9 Training Manual (seq. #2640) (8)	
Internal mammary artery used for grafts	IMA used for grafting.	■ Left IMA ■ Right IMA ■ Both IMAs ■ No IMA		STS ACSD v2.9 Training Manual (seq. #2626) (8)	
Primary reason for not using internal mammary artery	Reason for not using an IMA graft for coronary revascularization	■ Subclavian stenosis ■ Prior cardiac or thoracic surgery ■ Prior mediastinal radiation ■ Emergency or salvage procedure ■ No (bypassable) LAD disease ■ Other ■ Other, acceptable STS-provided exclusion		STS ACSD v2.9 Training Manual (seq. #2627) (8)	Note that in the next version of the STS ACSD, an option will be provided to account for rare STS-approved exclusions that are not currently listed by the NQF.
Total number of distal anastomoses using internal mammary artery grafts	Total number of distal anastomoses using IMA grafts	■ Numeric		STS ACSD v2.9 Training Manual (seq. #2628) (8)	Note that in the next version of the STS ACSD, this field will be removed. The total of IMA conduits will be collected if the IMA was used for the entire conduit or if a distal portion of composite graft was IMA.
Radial arteries used for grafts	Radial artery used for conduit.	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #2633) (8)	
Number of radial artery distal anastomoses	Total number of distal anastomoses with radial arteries	■ Numeric		STS ACSD v2.9 Training Manual (seq. #2634) (8)	
Number of other arterial distal anastomoses used (other than radial or internal mammary artery)	Number of arterial distal anastomoses that were used, other than radial or IMA.	■ Numeric		STS ACSD v2.9 Training Manual (seq. #2641) (8)	

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Proximal technique	Technique used for proximal graft anastomosis.	■ Single cross clamp ■ Partial occlusion clamp ■ Anastomotic assist device		STS ACSD v2.9 Training Manual (seq. #2710) (8)	
Distal graft insertion site		■ Numerical value(s) and segment name(s) according to the coronary segment classification in Appendix 10		Hicks KA, Tcheng JE, Bozkurt B, et al. 2014 ACC/AHA key data elements and definitions for cardiovascular endpoint events in clinical trials: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Cardiovascular Endpoints Data Standards). J Am Coll Cardiol. 2015;66:403–69 (15).	
Proximal site	Proximal site of bypass graft	■ In situ mammary ■ Ascending aorta ■ Descending aorta ■ Subclavian artery ■ Innominate artery ■ T-graft off SVG ■ T-graft off radial ■ T-graft off LIMA ■ T-graft off RIMA ■ Natural Y vein graft ■ Other		STS ACSD v2.9 Training Manual (seq. #2740) (8)	Note that in the next version of the ACSD the options will be aorta, T-graft off artery, T-graft off vein, in situ IMA, and other.
Conduit	Conduit type used.	■ Vein graft ■ In situ LIMA ■ In situ RIMA ■ Free IMA ■ Radial artery ■ Other arteries, homograft ■ Synthetic graft ■ Composite artery-vein		STS ACSD v2.9 Training Manual (#2750) (8)	Note that in the next version of the STS ACSD, the options will be in situ IMA, free IMA, vein, radial artery, and other. If composite, then the distal portion of the composite will be captured.
Distal anastomotic technique	Anastomotic position of distal site	■ End-to-side ■ Sequential (side-to-side)		STS ACSD v2.9 Training Manual (seq. #2755) (8)	
Coronary endarterectomy	Coronary endarterectomy performed.	■ Yes ■ No		STS ACSD v2.9 Training Manual (seq. #2760) (8)	

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Postoperative events		■ Sternal superficial wound infection ■ Deep sternal infection/ mediastinitis ■ Thoracotomy site infection ■ Conduit harvest site infection ■ Cannulation site infection ■ Reoperation for bleeding/ tamponade ■ Reoperation for valvular dysfunction ■ Reintervention for MI ■ Aortic reintervention ■ Reoperation for other cardiac reasons ■ Returned to the OR for other noncardiac reasons ■ Open chest with planned delayed sternal closure ■ *Sternotomy issue* ■ Sepsis ■ Stroke, ischemic ■ Stroke, hemorrhagic ■ Stroke, undetermined cause ■ *TIA* ■ Encephalopathy, anoxic ■ Encephalopathy, drug-induced ■ Encephalopathy, metabolic ■ Encephalopathy, unknown cause ■ *Coma/unresponsive state (not stroke)* ■ Lower extremity paralysis ■ Paresis, transient ■ Paresis, permanent ■ *Phrenic nerve injury* ■ Recurrent laryngeal nerve injury ■ Prolonged ventilation ■ Pneumonia ■ Pulmonary thromboembolism ■ *Deep venous thrombosis* ■ Pleural effusion requiring drainage ■ *Pneumothorax requiring intervention* ■ Renal (kidney) failure ■ Dialysis, newly required ■ *Ultrafiltration required* ■ *Iliac/femoral dissection* ■ Acute limb ischemia		STS ACSD Data Collection Form v2.9 (76)	Note that in the next version of the STS ACSD, the italicized postoperative events will be eliminated. The underlined events will be revised as follows: The 3 subcategories of stroke will be combined into a single field "stroke"; for patients undergoing aortic surgery the field related to paresis/paralysis will be revised to "Paralysis >24 h" and "Paresis >24 h"; the fields related to encephalopathy will be combined into a single field "encephalopathy/delirium"; anticoagulant event will be more specifically defined as "anticoagulant bleeding event"; GI event will be subcategorized to include liver dysfunction/failure, ischemic bowel, GI bleeding, pancreatitis, cholecystitis, and other. New postoperative events will include heparin-induced thrombocytopenia and heparin-induced thrombocytopenia with thrombosis.

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		■ Mechanical assist device-related complication ■ Rhythm disturbance requiring permanent device ■ Cardiac arrest ■ Postoperative aortic endoleak ■ *Aortic rupture* ■ Aortic dissection ■ Aortic side branch malperfusion ■ Aortic stent graft-induced entry tear ■ Anticoagulant bleeding event ■ Pericardiocentesis ■ GI event ■ Liver dysfunction/failure ■ *Multisystem failure* ■ Atrial fibrillation ■ Operative mortality ■ Other			
		Sternal superficial wound infection	A superficial sternal wound infection was diagnosed within 90 d of the procedure or any time during the hospitalization for surgery.	STS ACSD v2.9 Training Manual (seq. #6695) (8) Surgical Site Infection (SSI) Event. National Healthcare Safety Network (NHSN) Patient Safety Component Manual (77).	Additional details of this metric can be found in the STS Training Manual.
		Deep sternal infection/ mediastinitis	A deep sternal wound infection or mediastinitis was diagnosed within 90 d of the procedure or any time during the hospitalization for surgery.	STS ACSD v2.9 Training Manual (seq. #6700) (8) Surgical Site Infection (SSI) Event. National Healthcare Safety Network (NHSN) Patient Safety Component Manual (77).	Additional details of this metric can be found in the STS Training Manual.
		Thoracotomy site infection	A surgical site infection involving a thoracotomy or parasternal site was diagnosed within 30 d of the procedure or any time during the hospitalization for surgery.	STS ACSD v2.9 Training Manual (seq. #6710) (8)	
		Conduit harvest site infection	A surgical site infection involving a conduit harvest site was diagnosed within 30 d of the procedure or any time during the hospitalization for surgery.	STS ACSD v2.9 Training Manual (seq. #6715) (8)	Additional details of this metric can be found in the STS Training Manual.
		Cannulation site infection	A surgical site infection involving a cannulation site was diagnosed within 30 d of the procedure or any time during the hospitalization for surgery.	STS ACSD v2.9 Training Manual (seq. #6720) (8)	Additional details of this metric can be found in the STS Training Manual.

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Reoperation for bleeding/ tamponade	The patient was re-explored for mediastinal bleeding with or without tamponade either in the ICU or returned to the OR.	STS ACSD v2.9 Training Manual (seq. #6755) (8)	Additional details of this metric can be found in the STS Training Manual.
		Reoperation for valvular dysfunction	The patient returned to the OR for prosthetic or native valve dysfunction. Dysfunction may be structural and/or nonstructural failure. Dysfunction may be of prosthesis, a progressive native disease process, or an acute event process that disrupts valve function and creates either clinical compromising insufficiency/ regurgitation or valve orifice narrowing.	STS ACSD v2.9 Training Manual (seq. #6765) (8)	Additional details of this metric can be found in the STS Training Manual.
		Reintervention for MI	The patient required postoperative reintervention for MI.	STS ACSD v2.9 Training Manual (seq. #6771) (8)	Additional details of this metric can be found in the STS Training Manual.
		Aortic reintervention	The patient underwent postoperative aortic reintervention.	STS ACSD v2.9 Training Manual (seq. #6774) (8)	
		Reoperation for other cardiac reasons	The patient returned to the OR for other cardiac reasons.	STS ACSD v2.9 Training Manual (seq. #6778) (8)	
		Returned to the OR for other noncardiac reasons	The patient returned to the OR for other noncardiac reasons. This includes procedures requiring a return to the OR such as tracheostomy, general surgery procedures. This does not include procedures performed outside the OR such as GI lab for PEG tube, shunts for dialysis.	STS ACSD v2.9 Training Manual (seq. #6780) (8)	Additional details of this metric can be found in the STS Training Manual.
		Open chest with planned delayed sternal closure	The chest was left open with planned delayed sternal closure.	STS ACSD v2.9 Training Manual (seq. #6785) (8)	
		Sternotomy issue	Presence of a postoperative sternotomy issue	STS ACSD v2.9 Training Manual (seq. #6790) (8)	Additional details of this metric can be found in the STS Training Manual.

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Sepsis	Sepsis is defined as evidence of serious infection accompanied by a deleterious systemic response. In the time period of the first 48 h postoperative or post procedural, the diagnosis of sepsis requires the presence of a SIRS resulting from a proven infection (e.g., bacteremia, fungemia, or UTI). In the time period after the first 48 h postoperative or post procedural, sepsis may be diagnosed by the presence of a SIRS resulting from suspected or proven infection. During the first 48 h, a SIRS may result from the stress associated with surgery and/or CPB. Thus, the clinical criteria for sepsis during this time period should be more stringent. A SIRS is present when at least 2 of the following criteria are present: hypo- or hyperthermia (>38.5 or <36.0), tachycardia or bradycardia, tachypnea, leukocytosis or leukopenia, or thrombocytopenia.	STS ACSD v2.9 Training Manual (seq. #6800) (8)	Additional details of this metric can be found in the STS Training Manual.
		Stroke, ischemic	The patient had a postoperative ischemic stroke (i.e., confirmed neurological deficit of abrupt onset caused by blockage of a blood vessel supplying the brain) that did not resolve within 24 h.	STS ACSD v2.9 Training Manual (seq. #6810) (8)	Additional details of this metric can be found in the STS Training Manual.
		Stroke, hemorrhagic	The patient had a postoperative hemorrhagic stroke (i.e., confirmed neurological deficit of abrupt onset caused by bleeding into or around the brain) that did not resolve within 24 h.	STS ACSD v2.9 Training Manual (seq. #6810) (8)	Additional details of this metric can be found in the STS Training Manual.
		Stroke, undetermined cause	The patient had a postoperative stroke (i.e., confirmed neurological deficit of abrupt onset) of undetermined cause that did not resolve within 24 h.	STS ACSD v2.9 Training Manual (seq. #6810) (8)	Additional details of this metric can be found in the STS Training Manual.
		TIA	The patient had a postoperative TIA: Loss of neurological function that was abrupt in onset but with complete return of function within 24 h.	STS ACSD v2.9 Training Manual (seq. #6815) (8)	Additional details of this metric can be found in the STS Training Manual.

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Encephalopathy, anoxic	The patient had encephalopathy caused by lack of oxygen or blood flow to the brain.	STS ACSD v2.9 Training Manual (seq. #6821) (8)	Additional details of this metric can be found in the STS Training Manual.
		Encephalopathy, drug-induced	The patient had encephalopathy caused by prolonged exposure to drugs.	STS ACSD v2.9 Training Manual (seq. #6821) (8)	Additional details of this metric can be found in the STS Training Manual.
		Encephalopathy, metabolic	The patient had encephalopathy caused by metabolic dysfunction.	STS ACSD v2.9 Training Manual (seq. #6821) (8)	Additional details of this metric can be found in the STS Training Manual.
		Encephalopathy, unknown cause	The patient had encephalopathy of unknown cause.	STS ACSD v2.9 Training Manual (seq. #6821) (8)	Additional details of this metric can be found in the STS Training Manual.
		Coma/unresponsive state (not stroke)	The patient developed a postoperative coma or unresponsive state (not stroke).	STS ACSD v2.9 Training Manual (seq. #6822) (8)	Additional details of this metric can be found in the STS Training Manual.
		Lower extremity paralysis	The patient had a new postoperative paralysis, paraparesis, or paraplegia related to spinal cord ischemia and not related to a stroke.	STS ACSD v2.9 Training Manual (seq. #6825) (8)	Additional details of this metric can be found in the STS Training Manual.
		Paresis, transient	Postoperative paresis was present. Transient is nonlasting and of short (<24 h) duration.	STS ACSD v2.9 Training Manual (seq. #6829, #6830) (8)	Additional details of this metric can be found in the STS Training Manual.
		Paresis, permanent	Postoperative paresis was present. Permanent is enduring, lasting, or without change for >24 h.	STS ACSD v2.9 Training Manual (seq. #6829, #6830) (8)	Additional details of this metric can be found in the STS Training Manual.
		Phrenic nerve injury	The patient has symptoms of phrenic nerve injury, (e.g., immobility or elevation of the diaphragm).	STS ACSD v2.9 Training Manual (seq. #6832) (8)	Additional details of this metric can be found in the STS Training Manual.
		Recurrent laryngeal nerve injury	The patient has symptoms of recurrent laryngeal nerve injury, (e.g., hoarseness, difficulty speaking).	STS ACSD v2.9 Training Manual (seq. #6833) (8)	Additional details of this metric can be found in the STS Training Manual.
		Prolonged ventilation	The patient had prolonged postoperative pulmonary ventilation >24 h. The hours of postoperative ventilation time include OR exit until extubation, plus any additional hours following reintubation. Include (but not limited to) causes such as acute respiratory distress syndrome, pulmonary edema, and/or any patient requiring mechanical ventilation >24 h postoperatively.	STS ACSD v2.9 Training Manual (seq. #6835) (8)	Additional details of this metric can be found in the STS Training Manual.

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Pneumonia	The patient had pneumonia according to the CDC definition.	STS ACSD v2.9 Training Manual (seq. #6840) (8)	STS uses the CDC's definition of pneumonia. National Healthcare Safety Network Patient Safety Component Manual. Pneumonia (ventilator-associated and non-ventilator-associated pneumonia) event (78).
		Pulmonary thromboembolism	The patient had a pulmonary thromboembolism diagnosed by radiologic study such as V/Q scan, angiogram, or spiral CT.	STS ACSD v2.9 Training Manual (seq. #6850) (8)	Additional details of this metric can be found in the STS Training Manual.
		Deep venous thrombosis	The patient had thrombosis (clot formation) in a deep vein.	STS ACSD v2.9 Training Manual (seq. #6855) (8)	Additional details of this metric can be found in the STS Training Manual.
		Pleural effusion requiring drainage	A postoperative pleural effusion required drainage via thoracentesis or chest tube insertion.	STS ACSD v2.9 Training Manual (seq. #6860) (8)	Additional details of this metric can be found in the STS Training Manual.
		Pneumothorax requiring intervention	The patient had a postoperative pneumothorax requiring intervention.	STS ACSD v2.9 Training Manual (seq. #6865) (8)	Additional details of this metric can be found in the STS Training Manual.
		Renal (kidney) failure	The patient had acute renal (kidney) failure or worsening renal (kidney) function resulting in ONE OR BOTH of the following: 1. Increase in serum creatinine level 3.0× greater than baseline, or serum creatinine level ≥4 mg/dL. Acute rise must be at least 0.5 mg/dL 2. A new requirement for dialysis postoperatively.	STS ACSD v2.9 Training Manual (seq. #6870) (8)	Additional details of this metric can be found in the STS Training Manual.
		Dialysis, newly required	The patient had a new requirement for dialysis postoperatively, which may include hemodialysis, peritoneal dialysis.	STS ACSD v2.9 Training Manual (seq. #6875) (8)	Additional details of this metric can be found in the STS Training Manual.
		Ultrafiltration required	The patient required ultrafiltration.	STS ACSD v2.9 Training Manual (seq. #6885) (8)	Additional details of this metric can be found in the STS Training Manual.
		Iliac/femoral dissection	The patient had a dissection occurring in the iliac or femoral arteries.	STS ACSD v2.9 Training Manual (seq. #6890) (8)	Additional details of this metric can be found in the STS Training Manual.
		Acute limb ischemia	The patient had any complication producing limb ischemia. This may include upper or lower limb ischemia.	STS ACSD v2.9 Training Manual (seq. #6891) (8)	Additional details of this metric can be found in the STS Training Manual.
		Mechanical assist device-related complication	There was a postoperative event related to a mechanical assist device.	STS ACSD v2.9 Training Manual (seq. #6892) (8)	

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Rhythm disturbance requiring permanent device	The patient developed a new dysrhythmia requiring insertion of a permanent device.	STS ACSD v2.9 Training Manual (seq. #6900) (8)	Additional details of this metric can be found in the STS Training Manual.
		Cardiac arrest	The patient had an acute cardiac arrest documented by 1 of the following: ■ Ventricular fibrillation ■ Rapid ventricular tachycardia with hemodynamic instability ■ Asystole ■ ICD shocks	STS ACSD v2.9 Training Manual (seq. #6905) (8)	
		Postoperative aortic endoleak	A postoperative endoleak occurred. An endoleak is defined as persistent blood flow in the aneurysm sac through and around the endovascular seal and is the most common complication after endovascular aneurysm repair.	STS ACSD v2.9 Training Manual (seq. #6906) (8)	
		Aortic rupture	Aortic rupture occurred postoperatively.	STS ACSD v2.9 Training Manual (seq. #6908) (8)	
		Aortic dissection	The patient had a dissection occurring in any part of the aorta. This includes ascending, arch, descending, thoracic or abdominal aorta. Aortic dissection is bleeding into or along the wall of the aorta. This does not include an aneurysmal event, unless it goes on to rupture or dissect.	STS ACSD v2.9 Training Manual (seq. #6909) (8)	
		Aortic side branch malperfusion	Aortic side branch malperfusion occurred.	STS ACSD v2.9 Training Manual (seq. #6911) (8)	Additional details of this metric can be found in the STS Training Manual.
		Aortic stent graft-induced entry tear	An aortic stent graft-induced entry tear occurred.	STS ACSD v2.9 Training Manual (seq. #6912) (8)	Additional details of this metric can be found in the STS Training Manual.
		Anticoagulant bleeding event	The patient had bleeding, hemorrhage, and/or embolic events related to anticoagulant therapy postoperatively. This may include patients who experience disseminated intravascular coagulopathy or heparin-induced thrombocytopenia.	STS ACSD v2.9 Training Manual (seq. #6914) (8)	Additional details of this metric can be found in the STS Training Manual.
		Pericardiocentesis		STS ACSD v2.9 Training Manual (seq. #6915) (8)	

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APPENDIX 9. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
			The patient had a pericardiocentesis to remove fluid in the pericardial space compromising cardiac filling.		Additional details of this metric can be found in the STS Training Manual.
		GI event	The patient had a postoperative occurrence of any GI event, including but not limited to: ■ Ischemic bowel ■ GI bleed ■ Pancreatitis ■ Cholecystitis ■ Liver dysfunction ■ Ileus ■ Other	STS ACSD v2.9 Training Manual (seq. #6920) (8)	Additional details of this metric can be found in the STS Training Manual.
		Multisystem failure	The patient had ≥2 major organ systems suffer compromised functions.	STS ACSD v2.9 Training Manual (seq. #6925) (8)	Additional details of this metric can be found in the STS Training Manual.
		Atrial fibrillation	The patient experienced atrial fibrillation/flutter requiring treatment. Exclude patients who were in atrial fibrillation at the start of surgery.	STS ACSD v2.9 Training Manual (seq. #6930) (8)	Additional details of this metric can be found in the STS Training Manual.
		Operative mortality	1) All deaths, regardless of cause, occurring during the hospitalization in which the operation was performed, even if after 30 d (including patients transferred to other acute care facilities) and 2) all deaths, regardless of cause, occurring after discharge from the hospital but before the end of postoperative day 30.	STS ACSD v2.9 Training Manual (seq. #7124) (8)	
		Other	A postoperative event occurred that is not identified in the categories above yet impacts hospital length of stay and/or outcome.	STS ACSD v2.9 Training Manual (seq. #6950) (8)	Additional details of this metric can be found in the STS Training Manual.

ACSD indicates Adult Cardiac Surgery Database; AMI, acute myocardial infarction; CABG, coronary artery bypass graft; CDC, Centers for Disease Control and Prevention; CP, constrictive pericarditis; CPB, cardiopulmonary bypass; CPR, cardiopulmonary resuscitation; CT, computed tomography; CW, continuous wave; ECMO, extracorporeal membrane oxygenator support; ERO, effective regurgitant orifice; GI, gastrointestinal; h, hour; hh:mm, hours:minutes; HF, heart failure; IABP, intra-aortic balloon pump; ICD, implantable cardioverter-defibrillator; ICU, intensive care unit; IMA, internal mammary artery; IV, intravenous; LA, left atrium/atrial; LAD, left anterior descending artery; LIMA, left internal mammary artery; LVEF, left ventricular ejection fraction; MI, myocardial infarction; mm/dd/yyyy, month/day/year; MR, mitral regurgitation; MV, mitral valve; N/A, not applicable; NQF, National Quality Forum; OR, operating room; PCI, percutaneous coronary intervention; PEG, percutaneous endoscopic gastrostomy; reop, reoperation; RF, regurgitant fraction; RIMA, right internal mammary artery; RVol, regurgitant volume; SIRS, systemic inflammatory response syndrome; STS, Society of Thoracic Surgeons; SVG, saphenous vein graft; TIA, transient ischemic attack; TAVR, transcatheter aortic valve replacement; TEE, transesophageal echocardiography; UA, unstable angina; UDI, unique device identifier; UTI, urinary tract infection; and V/Q, ventilation/perfusion.

APPENDIX 10. CORONARY ARTERY NOMENCLATURE

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Native lesion segment number and name	Coronary artery segment that the lesion spans. A lesion can span ≥1 segments.	■ 1a, Right coronary artery ostium ■ 1, Proximal right coronary artery ■ 2, Mid right coronary artery ■ 3, Distal right coronary artery ■ 4, Right posterior descending artery ■ 5, Posterolateral segmental artery ■ 6, First right posterolateral branch ■ 7, Second right posterolateral branch ■ 8, Third right posterolateral branch ■ 9, Posterior descending septal perforator ■ 10, Right ventricular branch ■ 11a, Left main coronary artery ostium ■ 11b, Left main coronary artery body ■ 11c, Left main coronary artery bifurcation ■ 12a, LAD artery ostium ■ 12, Proximal LAD ■ 13, Mid LAD ■ 14, Distal LAD ■ 15, First diagonal branch ■ 15d, First diagonal lateral branch ■ 16, Second diagonal branch ■ 16d, Second diagonal lateral branch ■ 17, Third diagonal branch ■ 17d, Third diagonal lateral branch ■ 18, Anterior descending septal perforator ■ 19a, Left circumflex artery ostium ■ 19, Proximal left circumflex artery ■ 20, Mid left circumflex artery ■ 21, Distal left circumflex artery ■ 22, First obtuse marginal branch ■ 22d, First obtuse marginal lateral branch ■ 23, Second obtuse marginal branch ■ 23d, Second obtuse marginal lateral branch ■ 24, Third obtuse marginal branch ■ 24d, Third obtuse marginal lateral branch ■ 25, Left atrioventricular artery ■ 26, Left posterior descending artery ■ 27, First left posterolateral branch ■ 28, Second left posterolateral branch ■ 29, Third left posterolateral branch ■ 30, Ramus intermedius branch ■ 30d, Ramus intermedius lateral branch		Hicks KA, Tcheng JE, Bozkurt B, et al. 2014 ACC/AHA key data elements and definitions for cardiovascular endpoint events in clinical trials: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Cardiovascular Endpoints Data Standards). J Am Coll Cardiol. 2015;66:403-69 (15).	

LAD indicates left anterior descending artery.

APPENDIX 11. PERCUTANEOUS CORONARY INTERVENTION

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Percutaneous coronary intervention date	Date of PCI	■ mm/dd/yyyy		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7000) (29)	Any attempt (successful or unsuccessful) to treat a stenosis by any technique, or even failed attempts to cross the stenosis with a wire or device, should be counted as PCI at any time point (13,14).
Percutaneous coronary intervention time	Time of PCI	■ hh:mm (using 24-h clock)		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7000) (29)	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 (whichever is earlier).
Percutaneous coronary intervention status	Classification of the urgency of a PCI procedure at the time the operator decides to perform the PCI	■ Elective ■ Urgent ■ Emergency ■ Salvage		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7800) (29) Hicks KA, Tcheng JE, Bozkurt B, et al. 2014 ACC/AHA key data elements and definitions for cardiovascular endpoint events in clinical trials: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Cardiovascular Endpoints Data Standards). J Am Coll Cardiol. 2015;66:403-69 (15).	
		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 before discharge. If the diagnostic catheterization was elective and there were no complications, the PCI would also be elective. Note: STS Equivalent definition: 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.		
		Urgent	The procedure is performed on an inpatient basis and before 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. Note: STS Equivalent definition: Procedure required during same hospitalization in order to minimize chance of further clinical deterioration. Examples include but are not limited to: Worsening or sudden chest pain, HF, AMI, anatomy, IABP, UA with IV nitroglycerin, or rest angina.		

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Emergency	The procedure is 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 a scheduled case would be cancelled to perform this procedure immediately in the next available room during business hours, or the on-call team would be activated if this were to occur during off-hours. Note: Equivalent to STS Registry's Emergency status: Patients requiring emergency operations will have ongoing, refractory (difficult, complicated, and/or unmanageable), unrelenting cardiac compromise, with or without hemodynamic instability, and not be 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. Patients requiring emergency operations will have ongoing, refractory (difficult, complicated, and/or unmanageable) cardiac compromise, with or without hemodynamic instability, and not be responsive to any form of therapy except cardiac surgery. Hemodynamic picture of shock that is being chemically or mechanically supported. (IV inotrope or IABP to maintain cardiac output. Requires intubation and ventilation for pulmonary edema. The patient is extending an MI and requires immediate surgery. The patient continues to show signs of ongoing ischemia, i.e., changes on the ECG and acute native valve dysfunction (i.e., as acute papillary muscle rupture or torn leaflet). Prosthetic valve dysfunction is defined as a structural failure with that valve—fractured or torn leaflet, thrombus formation, pannus development that impedes flow through the valve orifice, or valvular dehiscence (coming loose or disconnected at the suture line). Acute dissection secondary to trauma or dissection secondary to progression of disease. Rupture or dissection during cardiac catheterization; perforation, tamponade following cardiac catheterization.		

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Salvage	The procedure is a last resort. The patient is in cardiogenic shock when the PCI begins (i.e., at the time of introduction into a coronary artery or bypass graft of the first guidewire or intracoronary device for the purpose of mechanical revascularization). Within the last 10 min before the start of the case or during the diagnostic portion of the case the patient has also received chest compressions for a total of at least 60 s or has been on unanticipated extracorporeal circulatory support (e.g., extracorporeal mechanical oxygenation, or cardiopulmonary support). Note: Equivalent to STS Registry's Emergency Salvage status: The patient is undergoing CPR en route to the OR before anesthesia induction or has ongoing ECMO to maintain life.		
Percutaneous coronary intervention indication	Reason the PCI is being performed.	■ Immediate PCI for acute STEMI ■ PCI for STEMI (stable, ≤12 h from symptom onset) ■ PCI for STEMI (stable, >12 h from symptom onset) ■ PCI for STEMI (unstable, >12 h from symptom onset) ■ PCI for STEMI (after successful fibrinolytics) ■ Rescue PCI for STEMI (after unsuccessful fibrinolytics) ■ New-onset angina ≤2 mo ■ NSTE-ACS ■ Stable angina ■ CAD (without ischemic symptoms) ■ Other		NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #7825) (49)	

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Immediate PCI for STEMI	Immediate PCI for patient with STEMI (or STEMI equivalent). PCI is performed as an emergency and without delay after diagnosis (<12 h).		
		PCI for STEMI (stable, ≤12 h from symptom onset)	PCI for STEMI (or STEMI equivalent) occurs ≤12 h from symptom. There are no symptoms of recurrent or persistent ischemia, symptoms of HF or electrical instability.		
		PCI for STEMI (stable, >12 h from symptom onset)	Patient with STEMI (or STEMI equivalent) who is stable and is >12 h from symptom onset. The patient does not have any symptoms of recurrent or persistent ischemia, symptoms of HF, or electrical instability.		
		PCI for STEMI (unstable, >12 h from symptom onset)	PCI for STEMI (or STEMI equivalent) >12 h from symptom with recurrent or persistent symptoms, symptoms of HF or ventricular arrhythmia.		
		PCI for STEMI (after successful fibrinolytics)	PCI for STEMI (or STEMI equivalent) after receiving full-dose thrombolysis. There are no symptoms of recurrent or persistent ischemia, symptoms of heart failure or electrical instability.		
		Rescue PCI for STEMI (after unsuccessful fibrinolytics)	Rescue PCI for STEMI (or STEMI equivalent) after failed full-dose fibrinolytics for symptoms of recurrent or persistent ischemia, symptoms of HF or electrical instability.		
		New-onset angina ≤2 mo	PCI is performed for the patient's new-onset angina (typical or atypical angina) that developed within the prior 2 mo.		
		NSTE-ACS	PCI for non-STEMI/ACS.		
		Stable angina	Angina without a change in frequency or pattern for the 6 wk before this catheterization lab presentation. Angina is controlled by rest and/or oral or transcutaneous medications.		
		CAD (without ischemic symptoms)	PCI is performed for known CAD there are no symptoms of ischemia (typical angina and/or ST-segment elevation).		
		Other	PCI indication not listed.		
Mechanical ventricular support	The patient required mechanical ventricular support.	■ Yes ■ No ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7422) (29)	

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Mechanical ventricular support device	Mechanical ventricular support device used.	■ IABP ■ Tandem heart ■ LVAD ■ RVAD ■ BiVAD ■ VA ECMO ■ VV ECMO ■ Impella ■ Impella-RP ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7423) (29)	
		IABP			
		Tandem heart			
		LVAD			
		RVAD			
		BiVAD			
		VA ECMO			
		VV ECMO			
		Impella			
		Impella-RP			
		Unknown	A proper value is applicable but not known.		
Native lesion segment number and name	Coronary segment that the current lesion spans. A lesion can span ≥1 segments.	■ Numerical value(s) and segment name(s) according to the coronary segment classification in Appendix 10			
First lesion treated		■ Numerical value and segment name according to the coronary segment classification in Appendix 10			
Other lesions treated		■ Numerical value(s) and segment name(s) according to the coronary segment classification in Appendix 10			
Lesion in graft	Lesion is in a bypass graft.	■ Yes ■ No		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8015) (29)	
Type of bypass graft	Type of bypass graft in which the lesion is located.	■ Left IMA ■ Right IMA ■ Radial artery ■ Vein		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8016) (29)	

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Lesion complexity		■ Non-high/non-C ■ High/C		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8019) (29) Levine GN, Bates ER, Blankenship JC, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol. 2011;58:e44-122 (47). Krone RJ, Laskey WK, Johnson C, et al. A simplified lesion classification for predicting success and complications of coronary angioplasty. Registry Committee of the Society for Cardiac Angiography and Intervention. Am J Cardiol. 2000;85:1179-84 (79).	
		Non-high/non-C	Low-risk or type A lesions: Discrete (<10 mm length), concentric, readily accessible, nonangulated 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 guidewires, some thrombus present, total occlusion <3 mo. Medium-risk (type B2) lesions: ≥2 "B" characteristics.		
		High/C	Descriptions of a high lesion risk (C lesion): diffuse (length >2 cm), excessive tortuosity of proximal segment, extremely angulated segments >90 degrees, total occlusions >3 mo and/or bridging collaterals, inability to protect major SBs, degenerated vein grafts with friable lesions.		
Lesion length	Length of the lesion treated.	■ Numeric, in mm		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8020) (29)	
Thrombus present	Presence of thrombus.	■ Yes ■ No ■ Unknown	Intracoronary thrombus is defined as a (spheric, ovoid, or irregular) noncalcified filling defect or lucency surrounded by contrast material (on 3 sides or within a coronary stenosis) seen in multiple projections, or persistence of contrast material within the lumen, or a visible embolization of intraluminal material downstream.	Cutlip DE, Windecker S, Mehran R, et al. Clinical end points in coronary stent trials: a case for standardized definitions. Circulation. 2007;115:2344-51 (80). Hicks KA, Tcheng JE, Bozkurt B, et al. 2014 ACC/AHA key data elements and definitions for cardiovascular endpoint events in clinical trials: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Cardiovascular Endpoints Data Standards). J Am Coll Cardiol. 2015;66:403-69 (15).	

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Bifurcation lesion	Coronary stenosis involving a bifurcation or branch point of a vessel into at least 2 branches, each of which is ≥1.5 mm in diameter. In a bifurcation or branch lesion, the plaque extends from at least 1 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 1 lesion, no matter how many limbs are treated.	■ Yes ■ No		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8022) (29)	In a bifurcation or branch lesion, the plaque extends from at least 1 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 1 lesion, no matter how many limbs are treated
Medina class	Classification of coronary bifurcation lesions based on the presence or absence of stenosis in the MBP, MBD, and SB.	■ 1,1,1 ■ 1,1,0 ■ 1,0,1 ■ 0,1,1 ■ 1,0,0 ■ 0,1,0 ■ 0,0,1		Medina A, Suarez de Lezo J, Pan M. [A new classification of coronary bifurcation lesions]. Rev Esp Cardiol. 2006;59:183 (81).	
		1,1,1	Stenosis involving MBP, MBD, and SB.		
		1,1,0	Stenosis involving MBP and MBD.		
		1,0,1	Stenosis involving MBP and SB.		
		0,1,1	Stenosis involving MBD and SB.		
		1,0,0	Stenosis involving MBP only.		
		0,1,0	Stenosis involving MBD only.		
		0,0,1	Stenosis involving SB only.		
Guidewire across lesion	Guidewire successfully crossed the lesion.	■ Yes ■ No		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8023) (29)	
In-stent restenosis	Previously treated and stented lesion that has a ≥50% stenosis.	■ Yes ■ No ■ Unknown	In-stent restenosis is defined as a previously stented lesion that has ≥50% stenosis.	NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8011) (29)	
In-stent thrombosis	Previously treated and stented lesion being treated because of the presence of a thrombus in the stent.	■ Yes ■ No ■ Unknown	The formation of a blood clot inside a previously treated and stented lesion.	NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8012) (29)	
Stent thrombosis classification	Class of stent thrombosis	■ Definite ■ Probable ■ Possible		Cutlip DE, Windecker S, Mehran R, et al. Clinical end points in coronary stent trials: a case for standardized definitions. Circulation. 2007;115:2344–51 (80).	
		Definite	An ACS with angiographic or autopsy evidence of thrombus or occlusion within or adjacent to a stent.		
		Probable	Unexplained death within 30 d after stent implantation or AMI involving the target vessel territory without angiographic confirmation.		
		Possible	Any unexplained death beyond 30 d after the procedure.		Academic Research Consortium-2 classifies stent thrombosis as definite

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Stent thrombosis timing	Timing of stent thrombosis	■ Acute ■ Subacute ■ Early ■ Late ■ Very late ■ Unknown		Cutlip DE, Windecker S, Mehran R, et al. Clinical end points in coronary stent trials: a case for standardized definitions. Circulation. 2007;115:2344–51 (80).	or probable (they no longer list "possible" as a permissible value). Academic Research Consortium definitions
		Acute	Acute within 24 h (excluding events within the catheterization laboratory)		
		Subacute	From 1 to 30 d		
		Early	Within 30 d (excluding events in within the catheterization laboratory)		
		Late	From 30 d to 1 y		
		Very late	After 1 y		
		Unknown	A proper value is applicable but not known		
TIMI flow prior to percutaneous coronary intervention	Indicate if the previously treated and stented lesion is being treated for in-stent restenosis.	■ TIMI 0 ■ TIMI 1 ■ TIMI 2 ■ TIMI 3 ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8007) (29)	
		TIMI 0	No flow/no perfusion		
		TIMI 1	Slow penetration without perfusion		
		TIMI 2	Partial flow/partial perfusion (TIMI >1 but TIMI <3)		
		TIMI 3	Complete and brisk flow/complete perfusion		
		Unknown	A proper value is applicable but not known		
TIMI flow after percutaneous coronary intervention		■ TIMI 0 ■ TIMI 1 ■ TIMI 2 ■ TIMI 3 ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8026) (29)	
		TIMI 0	No flow/no perfusion.		
		TIMI 1	Slow penetration without perfusion.		
		TIMI 2	Partial flow/partial perfusion (>TIMI 1 but <TIMI 3).		
		TIMI 3	Complete and brisk flow/complete perfusion.		
		Unknown	A proper value is applicable but not known.		
% stenosis prior to percutaneous coronary intervention	Percent diameter stenosis immediately before the treatment of this lesion	■ Numeric, in %	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.	NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8004) (29)	

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
% stenosis after percutaneous coronary intervention		■ Numeric, in %	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.	NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8025) (29)	
Balloon angioplasty performed	PCI performed only by the use of a balloon	■ Yes ■ No			
Atherectomy or other plaque-modifying device used	PCI performed with the adjunctive or stand-alone use of any atherectomy device (rotational, orbital, directional, laser or cutting balloon)	■ Yes ■ No			
Stent used		■ Yes ■ No			
Unique device identifier	A unique numeric or alphanumeric code developed by an FDA-accredited issuing agency's system to adequately identify medical devices sold in the United States from manufacturing through distribution to patient use	■ String			
Stent type		■ Bare-metal ■ Drug-eluting ■ Drug-eluting with bioabsorbable polymer ■ Bioabsorbable ■ Covered ■ Multiple ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8013) (29)	UDIs could be substituted in the future if available.
		Bare-metal stent	Metallic coronary stent without a polymer or antiproliferative drug coating		
		Drug-eluting stent	Metallic coronary stent with or without a polymer but with an antiproliferative drug coating		
		Drug-eluting with bioabsorbable polymer	Metallic coronary stent with a bioabsorbable polymer with an antiproliferative drug coating		
		Bioabsorbable	Stent struts composed of bioabsorbable materials also containing an antiproliferative drug		
		Covered	Metallic coronary stent scaffold incorporating fabric or graft material, such as polytetrafluoroethylene (PTFE) or polyurethane as a membrane component		
		Multiple	Treatment of several arteries using different stent types		
		Unknown	A proper value is applicable but not known.		

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Intracoronary device diameter		■ Diameter of the intracoronary device in mm		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8031) (29)	
Intracoronary device length		■ Length of the intracoronary device in mm		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #8032) (29)	
Percutaneous arterial access	Arterial access site(s)	*(Multi-select)* ■ Femoral artery ■ Brachial artery ■ Radial artery ■ Other ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7320) (29)	
Percutaneous arterial access site failure	Access attempted but unsuccessful at selected site.	*(Multi-select)* ■ Femoral artery ■ Brachial artery ■ Radial artery ■ Other ■ Unknown			
Diagnostic device used during procedure		■ IVUS, cross-sectional area in mm^2 or dimensions in mm ■ OCT, cross-sectional area in mm^2 or dimensions in mm ■ FFR ■ iFR ■ Other diastolic indices not requiring coronary vasodilation ■ None		Cardiology Audit and Registration Data Standards for Percutaneous Coronary Intervention (CARDS PCI) (82).	
Adjunctive therapeutic device(s) or drug(s) used		■ Cutting/scoring balloon ■ Distal protection device ■ Rotational atherectomy ■ Orbital atherectomy ■ Laser atherectomy ■ Manual thrombectomy ■ Rheolytic thrombectomy ■ Continuous aspiration mechanical thrombectomy ■ Vascular brachytherapy ■ Intracoronary thrombolytics ■ Intracoronary GP IIb/IIIa inhibitors ■ Other ■ Unknown		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data elements #8028) (29) Cardiology Audit and Registration Data Standards for Percutaneous Coronary Intervention (CARDS PCI) (82). NCDR CathPCI Registry Intracoronary Devices Master File v4 (83).	UDIs could be substituted in the future if available.

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Cutting/scoring balloon	Device used with microblades (cutting balloon) or a helical scoring element (scoring balloon) mounted on a balloon delivery catheter.		
		Distal protection device	Device delivered distal to the stenosis used to prevent or reduce distal embolization (e.g., filter device).		
		Rotational atherectomy	Device with a circumferentially rotating burr on a wire used to ablate atherosclerotic plaque.		
		Orbital atherectomy	Device with elliptically rotating crown on a wire used to ablate atherosclerotic plaque.		
		Laser atherectomy	Catheter delivering excimer laser ablation to atherosclerotic plaque.		
		Manual thrombectomy	Catheter that is used to manually aspirate and remove intracoronary plaque.		
		Rheolytic thrombectomy	Device that uses a catheter to create a vacuum that fragments intravascular thrombus and then removes debris by suction.		
		Continuous aspiration mechanical thrombectomy	Catheter-based device that provides operator-controlled continuous mechanical thrombectomy to remove intracoronary thrombus.		
		Vascular brachytherapy	Catheter-based delivery of intravascular radiation locally to reduce restenosis.		
		Intracoronary thrombolytics	Administration of a thrombolytic drug directly into the coronary artery.		
		Intracoronary GP IIb/IIIa inhibitors	Administration of a GP IIb/IIIa inhibitor into the coronary artery.		
		Other			
		Unknown	A proper value is applicable but not known.		
Guide extension catheter used during a procedure		■ Yes ■ No			

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Intraprocedural complications, type		■ MI ■ HF ■ CVA ■ Acute vessel closure ■ Heart block requiring pacing ■ DC cardioversion ■ Need for mechanical ventilation ■ Tamponade ■ Cardiogenic shock ■ Other vascular complications requiring treatment ■ Need for transfusion ■ Bleeding event during procedure ■ Allergic reactions ■ Cardiac arrest ■ Significant coronary dissection ■ Perforation, type I ■ Perforation, type II ■ Perforation, type III ■ No reflow/slow flow phenomenon ■ Death, cardiovascular ■ Death, noncardiovascular ■ Death, undetermined cause ■ None			
		MI	PCI-related MI is defined by an elevation of cTn values >5 times the 99th percentile URL in patients with normal baseline values. In patients with elevated preprocedure cTn in whom the cTn level are stable (≤20% variation) or falling, the intraprocedural cTn must rise by >20%. However, the absolute intraprocedural value must still be at least 5 times the 99th percentile URL. In addition, 1 of the following elements is required: ■ New ischemic changes on the ECG; ■ Development of new pathological Q waves; ■ Imaging evidence of new loss of myocardium or new regional wall motion abnormality in a pattern consistent with an ischemic etiology; ■ Angiographic findings consistent with a procedural flow-limiting complication such as coronary dissection, occlusion of a major epicardial artery or a SB occlusion/thrombus, disruption of collateral flow, or distal embolization.	Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). Circulation. 2018;138:e618–51 (41).	This is a Type 4a MI in the Fourth Universal Definition of Myocardial Infarction (2018)

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Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		HF	HF is a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood. The cardinal manifestations of HF are dyspnea and fatigue, which may limit exercise tolerance, and fluid retention, which may lead to pulmonary and/or splanchnic congestion and/or peripheral edema. Some patients have exercise intolerance but little evidence of fluid retention, whereas others complain primarily of edema, dyspnea, or fatigue. Because some patients present without signs or symptoms of volume overload, the term "heart failure" is preferred over "congestive heart failure." There is no single diagnostic test for HF because it is largely a clinical diagnosis based on a careful history and physical examination.	Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147–239 (42).	
		CVA	Loss of neurological function caused by an ischemic or hemorrhagic event with residual symptoms lasting at least 24 h after onset or leading to death.		
		Acute vessel closure	Epicardial flow graded as TIMI 0 occurring during the procedure and unrelated to coronary artery spasm.		
		Heart block requiring pacing	Placement of a temporary electrical intracardiac pacemaker because of electrical and/or hemodynamic compromise.		
		DC cardioversion	Any occurrence of the delivery of synchronized electrical energy used to convert an arrhythmia to normal sinus rhythm.		
		Need for mechanical ventilation	The patient required endotracheal intubation and mechanical ventilation.		
		Tamponade	Tamponade should be documented by either: 1. Echocardiogram showing pericardial fluid and signs of tamponade such as right heart compromise, or 2. Systemic hypotension attributable to pericardial fluid compromising cardiac function.	NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #9001) (49)	

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Cardiogenic shock	The stage of cardiogenic shock based on physical examination, biochemical markers, and hemodynamics: ■ A, at risk: A patient who is not currently experiencing signs or symptoms of cardiogenic shock but is at risk for its development. These patients may include those with large AMI or prior infarction acute and/or acute on chronic heart failure symptoms. ■ B, beginning cardiogenic shock: A patient who has clinical evidence of relative hypotension or tachycardia without hypoperfusion. ■ C, class cardiogenic shock: A patient who manifests with hypoperfusion that requires intervention (inotrope, pressor or mechanical support, including ECMO) beyond volume resuscitation to restore perfusion. These patients typically present with relative hypotension. ■ D, deteriorating/doom: A patient who is similar to category C but is getting worse. They have not responded to initial interventions. ■ E, extremis: A patient who is experiencing cardiac arrest with ongoing CPR and/or ECMO, being supported by multiple interventions. ■ No ■ Unknown	Baran DA, Grines CL, Bailey S, et al. SCAI clinical expert consensus statement on the classification of cardiogenic shock: Catheter Cardiovasc Interv. 2019;94:29-37 (53).	
		Other vascular complications requiring treatment	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.		
		Need for transfusion	There was a transfusion(s) of either whole blood or packed red blood cells.		
		Bleeding event during procedure	The patient experienced a suspected or confirmed bleeding event observed and documented in the medical record that was associated with any of the following: 1. Hemoglobin level 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 (e.g., surgical closures/ exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear, endoscopy with cautery of a GI bleed).		A more detailed characterization of bleeding events is located in the PCI postprocedural complications section.

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Allergic reactions	Encompass a spectrum from cutaneous lesions, the most common, through severe reactions potentially culminating in eventual respiratory or vascular collapse.	Goss JE, Chambers CE, Heupler FA Jr. Systemic anaphylactoid reactions to iodinated contrast media during cardiac catheterization procedures: guidelines for prevention, diagnosis, and treatment. Laboratory Performance Standards Committee of the Society for Cardiac Angiography and Interventions. Cathet Cardiovasc Diagn. 1995;34:99-104 (84).	
		Cardiac arrest	Cardiac arrest is the sudden cessation of cardiac activity. The victim becomes unresponsive with no normal breathing and no signs of circulation.	NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #9001) (49)	
		Significant coronary dissection	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.	NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #9146) (29) Huber MS, Mooney JF, Madison J, et al. Use of a morphologic classification to predict clinical outcome after dissection from coronary angioplasty. Am J Cardiol. 1991;68:467-71 (85). NHLBI. Coronary artery angiographic changes after percutaneous transluminal coronary angioplasty. Manual of Operations: NHLBI PTCA Registry. Bethesda, MD: National Heart, Lung, and Blood Institute, 1985:6-9 (86). Hicks KA, Tcheng JE, Bozkurt B, et al. 2014 ACC/AHA key data elements and definitions for cardiovascular endpoint events in clinical trials: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Cardiovascular Endpoints Data Standards). J Am Coll Cardiol. 2015;66:403-69 (15).	
		Perforation, type I	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. Perforation, type I: Extraluminal crater without extravasation.	NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #9145) (29) Ellis SG, Ajluni S, Arnold AZ, et al. Increased coronary perforation in the new device era. Incidence, classification, management, and outcome. Circulation. 1994;90:2725-30 (87).	
		Perforation, type II	Type II: Pericardial or myocardial blush without contrast jet extravasation.		
		Perforation, type III	Type III: Extravasation through frank (>1 mm) perforation.		
		No reflow/slow flow phenomenon	Presence of intraprocedural epicardial coronary flow graded as TIMI <3, despite the lack of mechanical coronary obstruction.	Klein LW, Kern MJ, Berger P, et al. Society of cardiac angiography and interventions: suggested management of the no-reflow phenomenon in the cardiac catheterization laboratory. Catheter Cardiovasc Interv. 2003;60:194–201 (88).	

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Death, cardiovascular	Death attributable to AMI, sudden cardiac death, HF, stroke, cardiovascular procedure, cardiovascular hemorrhage, or other cardiovascular cause.	Hicks KA, Tcheng JE, Bozkurt B, et al. 2014 ACC/AHA key data elements and definitions for cardiovascular endpoint events in clinical trials: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Data Standards (Writing Committee to Develop Cardiovascular Endpoints Data Standards). J Am Coll Cardiol. 2015;66:403-69 (15).	
		Death, noncardiovascular			
		Death, undetermined cause			
		None			
Postprocedural complications, type	Complications identified after completion of the PCI procedure.	■ MI ■ HF ■ CVA ■ Acute vessel closure ■ Perforation, type I ■ Perforation, type II ■ Perforation, type III ■ Heart block requiring pacing ■ DC cardioversion ■ Need for mechanical ventilation ■ Tamponade ■ Cardiogenic shock ■ New requirement for dialysis ■ Other vascular complications requiring treatment ■ Need for transfusion ■ Allergic reactions ■ Cardiac arrest ■ Death, cardiovascular ■ Death, noncardiovascular ■ Death, undetermined cause ■ None		NCDR CathPCI Registry Coder's Data Dictionary v5.0 Data Dictionary Supplement (49)	

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		MI	PCI-related MI is defined by an elevation of cTn values >5 times the 99th percentile URL in patients with normal baseline values. In patients with elevated preprocedure cTn in whom the cTn level are stable (≤20% variation) or falling, the postprocedure cTn must rise by >20%. However, the absolute postprocedural value must still be at least 5 times the 99th percentile URL. In addition, 1 of the following elements is required: ■ New ischemic changes on the ECG; ■ Development of new pathological Q waves; ■ Imaging evidence of new loss of myocardium or new regional wall motion abnormality in a pattern consistent with an ischemic etiology; ■ Angiographic findings consistent with a procedural flow-limiting complication such as coronary dissection, occlusion of a major epicardial artery or a SB occlusion/thrombus, disruption of collateral flow, or distal embolization.	Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). Circulation. 2018;138:e618–51 (41).	This is a Type 4a MI in the Fourth Universal Definition of Myocardial Infarction (2018)
		HF	HF is a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood. The cardinal manifestations of HF are dyspnea and fatigue, which may limit exercise tolerance, and fluid retention, which may lead to pulmonary and/or splanchnic congestion and/or peripheral edema. Some patients have exercise intolerance but little evidence of fluid retention, whereas others complain primarily of edema, dyspnea, or fatigue. Because some patients present without signs or symptoms of volume overload, the term "heart failure" is preferred over "congestive heart failure." There is no single diagnostic test for HF because it is largely a clinical diagnosis based on a careful history and physical examination.	Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147–239 (42).	
		CVA	Loss of neurological function caused by an ischemic or hemorrhagic event with residual symptoms lasting at least 24 h after onset or leading to death.		
		Acute vessel closure	Postprocedure epicardial flow graded as TIMI 0 within 24 h.		
		Perforation, type I	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. Perforation, type I: Extraluminal crater without extravasation.	NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #9145) (29)	
		Perforation, type II	Type II: Pericardial or myocardial blush without contrast jet extravasation.		

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Perforation, type III	Type III: Extravasation through frank (>1 mm) perforation.		
		Heart block requiring pacing	Placement of a temporary electrical intracardiac pacemaker because of electrical and/or hemodynamic compromise.		
		DC cardioversion	Any occurrence of the delivery of synchronized electrical energy used to convert an arrhythmia to normal sinus rhythm.		
		Need for mechanical ventilation	The patient required endotracheal intubation and mechanical ventilation.		
		Tamponade	Tamponade should be documented by either: 1. Echocardiogram showing pericardial fluid and signs of tamponade such as right heart compromise, or 2. Systemic hypotension attributable to pericardial fluid compromising cardiac function.	NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #9001) (49)	
		Cardiogenic shock	The stage of cardiogenic shock based on physical examination, biochemical markers and hemodynamics: ■ A, at risk: A patient who is not currently experiencing signs or symptoms of cardiogenic shock but is at risk for its development. These patients may include those with large AMI or prior infarction acute and/or acute on chronic heart failure symptoms. ■ B, beginning cardiogenic shock: A patient who has clinical evidence of relative hypotension or tachycardia without hypoperfusion. ■ C, class cardiogenic shock: A patient who manifests with hypoperfusion that requires intervention (inotrope, pressor or mechanical support, including ECMO) beyond volume resuscitation to restore perfusion. These patients typically present with relative hypotension. ■ D, deteriorating/doom: a patient who is similar to category C but is getting worse. They have not responded to initial interventions. ■ E, extremis: A patient who is experiencing cardiac arrest with ongoing CPR and/or ECMO, being supported by multiple interventions. ■ No ■ Unknown	Baran DA, Grines CL, Bailey S, et al. SCAI clinical expert consensus statement on the classification of cardiogenic shock. Catheter Cardiovasc Interv. 2019;94:29-37 (53).	
		New requirement for dialysis	The patient experienced acute or worsening renal (kidney) failure necessitating renal (kidney) dialysis, which may include hemodialysis or peritoneal dialysis.	NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #9001) (49)	Continuous venovenous hemofiltration should be noted "yes" if results of renal (kidney) failure (and not as treatment to remove fluid for heart failure)

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Other vascular complications requiring treatment	Vascular complications can include, but are not limited to, pseudoaneurysm, retroperitoneal hemorrhage, arterial occlusion requiring intervention, AV fistula, peripheral embolization and arterial dissection. 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.	NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #9001) (49)	
		Need for transfusion	There was a transfusion(s) of either whole blood or packed red blood cells.		
		Allergic reactions	Encompass a spectrum from cutaneous lesions, the most common, through severe reactions potentially culminating in eventual respiratory or vascular collapse.	Goss JE, Chambers CE, Heupler FA Jr. Systemic anaphylactoid reactions to iodinated contrast media during cardiac catheterization procedures: guidelines for prevention, diagnosis, and treatment. Laboratory Performance Standards Committee of the Society for Cardiac Angiography and Interventions. Cathet Cardiovasc Diagn. 1995;34:99-104 (84).	
		Cardiac arrest	Cardiac arrest is the sudden cessation of cardiac activity. The victim becomes unresponsive with no normal breathing and no signs of circulation.	NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #9001) (49)	
		Death, cardiovascular	Cardiovascular death includes death resulting from an AMI, sudden cardiac death, death due to HF, death due to stroke, death due to cardiovascular procedures, death due to cardiovascular hemorrhage, and death due to other cardiovascular cause.	Garcia-Garcia HM, McFadden EP, Farb A, et al. Standardized end point definitions for coronary intervention trials: The Academic Research Consortium-2 consensus document. Circulation. 2018;137:2635-50 (13). Hicks KA, Mahaffey KW, Mehran R, et al. 2017 Cardiovascular and stroke endpoint definitions for clinical trials. Circulation. 2018;137:961-72 (14).	
		Death, noncardiovascular	Non cardiovascular death is defined that is not thought to be the result of cardiovascular cause, including malignancy, pulmonary causes, infection (includes sepsis), GI causes, accident/trauma, and other noncardiovascular organ failure.	Garcia-Garcia HM, McFadden EP, Farb A, et al. Standardized end point definitions for coronary intervention trials: The Academic Research Consortium-2 consensus document. Circulation. 2018;137:2635-50 (13). Hicks KA, Mahaffey KW, Mehran R, et al. 2017 Cardiovascular and stroke endpoint definitions for clinical trials. Circulation. 2018;137:961-72 (14).	

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Death, undetermined cause	Undetermined cause of death is defined as a death not attributable to any other category because of the absence of any relevant source documents. Such deaths will be classified as cardiovascular for end point determination.	Garcia-Garcia HM, McFadden EP, Farb A, et al. Standardized end point definitions for coronary intervention trials: The Academic Research Consortium-2 consensus document. Circulation. 2018;137:2635-50 (13). Hicks KA, Mahaffey KW, Mehran R, et al. 2017 Cardiovascular and stroke endpoint definitions for clinical trials. Circulation. 2018;137:961-72 (14).	
		None			
Type of blood product used		■ Whole blood ■ Packed red blood cells ■ Fresh frozen plasma ■ Cryoprecipitate ■ Platelets		STS ACSD v2.9 Training Manual (#6560) (8)	
Hemoglobin before transfusion		Numeric, in g/dL			
Bleeding event		■ Bleeding at access site ■ Hematoma at access site ■ Retroperitoneal bleeding ■ GI bleeding ■ GU bleeding ■ Other bleeding		NCDR CathPCI Registry Coder's Data Dictionary Supplement v5.0 (data element #9001) (49)	
		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. 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 (e.g., surgical closures/exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear).		
		Hematoma at access site	The patient experienced a hematoma at the percutaneous entry site. To qualify, it must be 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 (e.g., surgical closures/exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear).		

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Retroperitoneal bleeding	The patient experienced retroperitoneal bleeding. To qualify, it must be 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 (e.g., surgical closures/exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear).		
		GI bleeding	The patient experienced GI bleeding. To qualify, it must be 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 (e.g., surgical closures/exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear, endoscopy with cautery of a GI bleed).		
		GU bleeding	Genital or urinary bleeding occurred. To qualify, it must be 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 (e.g., surgical closures/exploration of the arteriotomy site, balloon angioplasty to seal an arterial tear, endoscopy with cautery of a GU bleed).		
		Other bleeding			
Size of hematoma at access site		■ Numeric, in cm			
BARC definitions of bleeding	Category of bleeding as defined by the Bleeding Academic Research Consortium.	■ Type 0 ■ Type 1 ■ Type 2 ■ Type 3 ■ Type 4 ■ Type 5		Mehran R, Rao SV, Bhatt DL, et al. Standardized bleeding definitions for cardiovascular clinical trials: a consensus report from the Bleeding Academic Research Consortium. Circulation. 2011;123:2736–47 (89).	
		Type 0 Type 1	No bleeding. Bleeding that is not actionable and does not cause the patient to seek unscheduled performance of studies, hospitalization, or treatment by a healthcare professional; may include episodes leading to self-discontinuation of medical therapy by the patient without consulting a healthcare professional.		

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
		Type 2	Any overt, actionable sign of hemorrhage (e.g., more bleeding than would be expected for a clinical circumstance, including bleeding found by imaging alone) that does not fit the criteria for type 3, 4, or 5 but does meet at least 1 of the following criteria: 1) requiring nonsurgical, medical intervention by a healthcare professional, 2) leading to hospitalization or increased level of care, or 3) prompting evaluation.		
		Type 3	Type 3a: ■ Overt bleeding plus hemoglobin drop of 3 to <5 g/dL* (provided hemoglobin drop is related to bleed) ■ Any transfusion with overt bleeding Type 3b: ■ Overt bleeding plus hemoglobin drop ≥5 g/dL* (provided hemoglobin drop is related to bleed) ■ Cardiac tamponade ■ Bleeding requiring surgical intervention for control (excluding dental/nasal/skin/hemorrhoid) ■ Bleeding requiring intravenous vasoactive agents Type 3c: ■ Intracranial hemorrhage (does not include microbleeds or hemorrhagic transformation, does include intraspinal) ■ Subcategories confirmed by autopsy or imaging or lumbar puncture ■ Intraocular bleed compromising vision		*Corrected for transfusion (1 U packed red blood cells or 1 U whole blood=1 g/dL hemoglobin).
		Type 4	CABG-related bleeding ■ Perioperative intracranial bleeding within 48 h ■ Reoperation after closure of sternotomy for the purpose of controlling bleeding ■ Transfusion of ≥5 U of whole blood or packed red blood cells within a 48-h period† ■ Chest tube output ≥2 L within a 24-h period		†Cell saver products not counted.
		Type 5	Fatal bleeding Type 5a: Probable fatal bleeding; no autopsy or imaging confirmation but clinically suspicious. Type 5b: Definite fatal bleeding; overt bleeding or autopsy or imaging confirmation.		

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APPENDIX 11. CONTINUED

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/Source of Definition	Additional Notes
Method of hemostasis		■ Manual compression ■ Mechanical compression ■ Vascular closure device		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7331) (29)	UDIs could be substituted in the future if available.
		Manual compression	Primary hemostasis provided by operator or assistant applying manual pressure to arterial access site.		
		Mechanical compression	Access site compression provided by mechanical means such as C clamp or variable inflation device (e.g., FemoStop).		
		Vascular closure device	A device used for facilitating sealing of the arterial access site.		
Vascular closure device, type		■ Patch ■ Sealant ■ Staple ■ Suture ■ Other		NCDR CathPCI Registry Coder's Data Dictionary v5.0 (data element #7331) (29) NCDR CathPCI Registry Closure Devices Master File v4 (90).	UDIs could be substituted in the future if available.
		Patch	Topically delivered sealant usually applied with compression to accelerate hemostasis.		
		Sealant	Device delivered at the arterial access site either actively or passively providing arterial hemostasis.		
		Staple	Device providing active approximation of vessel wall by deployment of an arterial clip.		
		Suture	Percutaneous deployment of suture for active arterial wall approximation providing hemostasis.		
		Other			

ACS indicates acute coronary syndrome; AMI, acute myocardial infarction; AV, arteriovenous; BARC, Bleeding Academic Research Consortium; BiVAD, biventricular assist device; CABG, coronary artery bypass graft; CAD, coronary artery disease; CPR, cardiopulmonary resuscitation; cTn, cardiac troponin; CVA, cerebrovascular accident; DC, direct-current; ECG, electrocardiogram; ECMO, extracorporeal membrane oxygenator support; FFR, fractional flow reserve; GI, gastrointestinal; GU, genitourinary; hh:mm, hours:minutes; HF, heart failure; IABP, intra-aortic balloon pump; iFR, instantaneous free-wave ratio; IMA, internal mammary artery; IV, intravenous; IVUS, intravascular ultrasound; LVAD, left ventricular assist device; MBD, main branch distal; MBP, main branch proximal; MI, myocardial infarction; mm/dd/yyyy, month/day/year; NCDR, National Cardiovascular Data Registry; NSTE, non–ST-segment elevation; OCT, optical coherence tomography; OR, operating room; PCI, percutaneous coronary intervention; PTFE, polytetrafluoroethylene; RVAD, right ventricular assist device; SB, side branch; STEMI, ST-elevation myocardial infarction; STS, Society of Thoracic Surgeons; TIMI, Thrombolysis in Myocardial Infarction; UDI, unique device identifier; URL, upper reference limit; VA, venoarterial; and VV, venovenous.

APPENDIX 12. OTHER OUTCOMES

Data Element	Data Element Definition	Permissible Values	Permissible Value Definitions	Mapping/ Source of Definition	Additional Notes
Length of stay, total	The total number of days of hospital inpatient admission	■ Numeric			The duration of a single episode of hospitalization
Length of stay, postprocedure	The number of days the patient remained in the hospital after the procedure.	■ Numeric			
Readmission within 30 d of discharge		■ Yes ■ No			
Rose Dyspnea Scale score	The Rose Dyspnea Scale is a patient questionnaire that assesses dyspnea with common activities at baseline and 1 mo after PCI.	■ 0 ■ 1 ■ 2 ■ 3 ■ 4			
		0	No dyspnea		
		1	Dyspnea only when hurrying or walking up a hill		
		2	Dyspnea when walking with people of similar age on level ground		
		3	Dyspnea when walking at own pace on level ground		
		4	Dyspnea when washing or dressing		
Seattle Angina Questionnaire Short Form (SAQ-7) summary score	The SAQ-7 is a patient questionnaire that assesses symptoms, function, and quality of life.	■ Numerical value			
		Numerical value	The summary score ranges from 0 (worst status) to 100 (best possible status).		

PCI indicates percutaneous coronary intervention.