

# A Contemporary View of Diagnostic Cardiac Catheterization and Percutaneous Coronary Intervention in the United States

A Report From the CathPCI Registry of the National Cardiovascular Data Registry, 2010 Through June 2011

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- Objectives** This study sought to provide a report to the public of data from the CathPCI Registry of the National Cardiovascular Data Registry.
- Background** The CathPCI Registry collects data from approximately 85% of the cardiac catheterization laboratories in the United States.
- Methods** Data were summarized for 6 consecutive calendar quarters beginning January 1, 2010, and ending June 30, 2011. This report includes 1,110,150 patients undergoing only diagnostic cardiac catheterization and 941,248 undergoing percutaneous coronary intervention (PCI).
- Results** Some notable findings include, for example, that on-site cardiac surgery was not available in 83% of facilities performing fewer than 200 PCIs annually, with these facilities representing 32.6% of the facilities reporting, but performing only 12.4% of the PCIs in this data sample. Patients 65 years of age or older represented 38.7% of those undergoing PCI, with 12.3% being 80 years of age or older. Almost 80% of PCI patients were overweight (body mass index  $\geq 25$  kg/m<sup>2</sup>), 80% had dyslipidemia, and 27.6% were current or recent smokers. Among patients undergoing elective PCI, 52% underwent a stress study before the procedure, with stress myocardial perfusion being used most frequently. Calcium scores and coronary computed tomography angiography were used very infrequently (<3%) before diagnostic or PCI procedures. Radial artery access was used in 8.3% of diagnostic and 6.9% of PCI procedures. Primary PCI was performed with a median door-to-balloon time of 64.5 min for nontransfer patients and 121 min for transfer patients. In-hospital risk-adjusted mortality in ST-segment elevation myocardial infarction patients was 5.2% in this sample.
- Conclusions** Data from the CathPCI Registry provide a contemporary view of the current practice of invasive cardiology in the United States. (J Am Coll Cardiol 2012;60:2017–31) © 2012 by the American College of Cardiology Foundation

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**Abbreviations and Acronyms**

- ACCF** = American College of Cardiology Foundation
- BMS** = bare-metal stent(s)
- CABG** = coronary artery bypass graft
- CAD** = coronary artery disease
- DES** = drug-eluting stent(s)
- NCDR** = National Cardiovascular Data Registry
- PCI** = percutaneous coronary intervention
- STEMI** = ST-segment elevation myocardial infarction
- STS** = Society of Thoracic Surgeons

The National Cardiovascular Data Registry (NCDR) of the American College of Cardiology Foundation (ACCF) was developed to assist healthcare providers and institutions in documenting their processes and outcomes of care in the cardiac catheterization laboratory. As a resource, the NCDR is positioned to help medical professionals and participating hospitals identify and close gaps in the quality of care; reduce wasteful and inefficient care variations; and implement effective, continuous quality improvement processes. As we move into the era of transparency and public reporting, the value of the NCDR is increasing, not only for benchmarking out-

comes, but also as a potent repository of clinical data to answer research questions.

**History of the CathPCI Registry**

A full description of the historical development of the NCDR is presented elsewhere (1,2). Today, 1,488 facilities in the United States are enrolled in the CathPCI Registry, which captures an estimated 85% of the percutaneous coronary interventions (PCI) performed in the United States (Fig. 1). The Society for Cardiovascular Angiography and Interventions collaborates with the ACCF on the registry effort.

**Participation, Data Definitions, and Collection**

Participation in the NCDR CathPCI Registry is voluntary. Most participating facilities (68%) submit data on diagnostic catheterization and PCI procedures, 29% submit data only on PCI procedures, and 3% provide information only on diagnostic procedures. Because interventional practices are driven by technologies that change quickly, there have been several registry modifications leading to the current version 4.4 that began receiving data on April 1, 2011. This version expanded data collection on pre-catheterization imaging procedures, used a new bleeding definition, and provided the first report of test metrics for assessment of the appropriate use criteria for coronary revascularization. The current version has 253 data fields, with definitions and specifications available online (3). Data are collected up to the time of hospital discharge, which is a potential limitation (4).

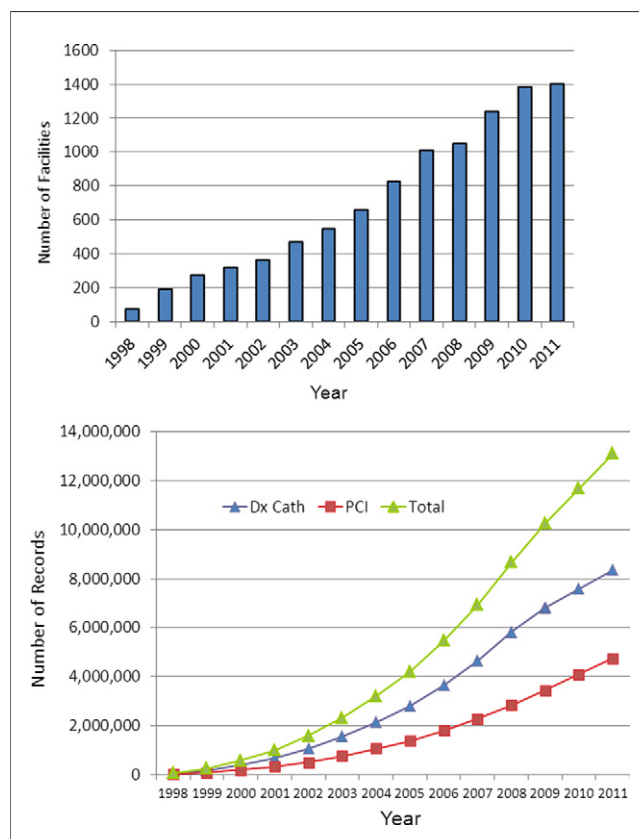
**Site Performance and Auditing Program**

The NCDR Data Quality Program was developed to ensure that data submitted are complete, consistent, and accurate

and thus usable to improve the quality of clinical practice. Participant submissions are reviewed for completeness and are not accepted if data completeness criteria are unmet. Each year, 25 sites are selected randomly for a comprehensive on-site data audit. The structure of the Data Quality Program and audit results recently were reported (5). Several states conduct more extensive audits of data, because they are used for statewide reporting programs.

**NCDR Reports and Risk Adjustment Methods**

Participants in the registry receive quarterly reports reflecting their aggregate data and a rolling summary of the previous 4 quarters. Results from facilities with similar procedure volumes and from the entire registry are provided for comparison with a recent online tool developed to allow facilities to perform a detailed analysis of their own data. An executive summary of key metrics is provided in a box-and-whisker plot format (Fig. 2). The NCDR provides an in-hospital risk-adjusted mortality model that is endorsed by the National Quality Forum (6,7). Bleeding and acute kidney injury risk models also have been developed (8).



**Figure 1** Cumulative Facilities and Records in the CathPCI Registry

(Top) Facilities and (bottom) individual records in the registry. Dx Cath = diagnostic cardiac catheterization; PCI = percutaneous coronary intervention.

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