About The Report

What is the purpose of this report?

The Pennsylvania Health Care Cost Containment Council's (PHC4) *Cardiac Procedures Report* displays outcome and volume information for a variety of cardiac procedures performed in Pennsylvania facilities on adult patients 18 years and older. The *Cardiac Procedures Report* can assist consumers and purchasers in making more informed health care decisions. The report can also serve as an aid to providers in highlighting additional opportunities for quality improvement and cost containment.

About this report

- This report includes hospital-specific outcomes (in the **Hospital Results** section) and inpatient and outpatient volume (in the **Volume Results** section) for several types of cardiac procedures. Inpatient acute care hospitalizations are defined by ICD-10-CM/PCS (International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System) diagnosis and procedure codes, and also, where appropriate, by MS-DRGs (Medicare Severity Diagnosis-Related Groups) and MDC (Major Diagnostic Category). Outpatient encounters are defined by CPT-4 (Current Procedural Technology, Fourth Edition) procedure codes and HCPCS (Healthcare Common Procedure Coding System) Level II procedure codes. Technical Notes relevant to this report provide additional detail and are accessible from PHC4's website at www.phc4.org.

- Procedures included in the **Hospital Results** section of the report:
    - Coronary Artery Bypass Graft
    - Percutaneous Coronary Intervention for a Heart Attack
    - Percutaneous Coronary Intervention without a Heart Attack
    - Surgical Aortic Valve Replacement
    - Surgical Aortic Valve Replacement with Coronary Artery Bypass Graft
    - Transcatheter Aortic Valve Replacement

- Procedures included in the **Volume Results** section of the report:
    - Cardiac Ablation
    - Cardioversion
    - Coronary Artery Bypass Graft
    - Defibrillator Implantation
    - Left Atrial Appendage Closure
    - Mitral Valve Procedure
    - Pacemaker Implantation
    - Percutaneous Coronary Intervention
    - Surgical Aortic Valve Replacement
    - Transcatheter Aortic Valve Replacement
    - Tricuspid Valve Procedure

- This report covers acute care inpatient hospital discharges, and hospital outpatient department and ambulatory surgery center (ASC) encounters from January 1, 2023 through December 31, 2024.
- Cases with a diagnosis of COVID-19 that was present on admission were not included in the **Hospital Results** section of the report.
- All Pennsylvania acute care hospitals and ASCs that performed the given cardiac procedure during the reported time period are included. Facilities that closed or merged with other facilities are not reported.
- Facility names have been shortened in many cases for formatting purposes. Facility names may be different today than they were during the period covered in this report.

About the data

The claims data compiled for this report was submitted to PHC4 by Pennsylvania facilities. The data was subject to standard validation processes by PHC4 and verified for accuracy by the facilities at the individual case level. Data accuracy and completeness were ultimately the responsibility of each individual facility.

Medicare fee-for-service payment data was obtained from the Centers for Medicare and Medicaid Services (CMS).

Accounting for high-risk patients when calculating hospital outcomes

Included in the data PHC4 receives from Pennsylvania hospitals is information indicating, in simple terms, "how sick the patient was" on admission to the hospital—information that is used to account for high-risk patients. Even when two patients are admitted to the hospital for the same procedure, there may be differences in the seriousness of their conditions. To account for differences in patient risk, PHC4 uses a complex mathematical formula to risk adjust the mortality, readmission, and extended postoperative length of stay data included in this report. This means hospitals receive "extra credit" for treating patients who are more seriously ill or at a greater risk than others. Risk adjusting the data is important because sicker patients may be more likely to die, experience a readmission, or have a longer postoperative length of stay.

PHC4 uses clinical laboratory data, patient characteristics such as age, gender, race/ethnicity, and socioeconomic status, and billing codes that describe the patient's medical conditions such as chronic lung disease, diabetes, heart failure, etc., to calculate risk for the patients in the **Hospital Results** section of this report. A comprehensive description of the risk-adjustment techniques used for this report can be found in the Technical Notes on PHC4's website at www.phc4.org.

What hospital outcomes are measured in this report and why are they important?

Displayed in the Hospital Results section of the report:

Outcomes (ratings) are displayed for the risk-adjusted measures listed below, when appropriate for the procedure. The number of inpatient acute care cases (after excluding cases not appropriate for ratings) and the average hospital charge are reported for all procedures.

To determine the risk-adjusted rating, PHC4 compares the number of patients one could reasonably expect to experience an outcome (e.g., unplanned readmission), after accounting for patient risk, with the actual number that occurred. Please refer to **Understanding the symbols** section in this document and the Technical Notes at www.phc4.org for further details.

Outcome data are not reported for hospitals that have fewer than five cases evaluated for a measure; such low volume cannot be considered meaningful and, as such, the outcome data are not displayed. Not Reported (NR) appears in the table when this occurs.

- ***Number of Cases.*** The number of inpatient acute care cases, after exclusions, for adults who underwent the given procedure. The number of cases represents separate hospitalizations, not individual patients. A patient admitted more than once for the same procedure would be included in the number of cases each time. Note that because of the excluded cases, the number of cases reported in the **Hospital Results** section of the report is typically lower than the "Total Number of Cases" displayed in the **Volume Results** section of the report.
- ***Risk-Adjusted In-Hospital Mortality.*** This measure is reported as a statistical rating that represents the number of patients who died during the hospital stay in which the procedure was performed.
- ***Risk-Adjusted 7, 30 and 90-Day Unplanned Readmission.*** These measures are reported as statistical ratings that represent the number of patients with an unplanned readmission following their initial hospital stay. A readmission is defined as a subsequent hospitalization to a Pennsylvania acute care hospital, where the admission date is within 7, 30 and 90 days of the discharge date of the original hospitalization. While some re-hospitalizations can be expected, high quality care may lessen the need for subsequent acute care hospitalizations.

  Planned readmissions were excluded from the analysis. Identifying readmissions that were planned was based on methods developed by the CMS for identifying planned readmissions (please refer to the Technical Notes at www.phc4.org). In addition,

readmissions with a diagnosis of COVID-19 that was present on admission were not counted.

- ***Extended Postoperative Length of Stay.*** This measure is reported as a statistical rating that represents patients whose length of stay following the procedure was significantly longer than expected, after accounting for patient risk.
- ***Case-Mix Adjusted Average Hospital Charge.*** This represents the average hospital charge for each procedure reported. The average hospital charge represents the entire length of the hospital stay. It does not include professional fees (e.g., physician fees) or charges associated with post-discharge care such as rehabilitation treatment, long-term care and/or home health care. The average charge is adjusted for the mix of cases that are specific to each hospital (for more details, see the Technical Notes at www.phc4.org). While charges are what the hospital reports on the billing form, hospitals typically receive actual payments from private insurers and government payers that are considerably less than the listed charge.

Displayed in the Medicare Payments section of the report:

- ***Medicare Payments.*** This section of the report displays the average payments made by Medicare fee-for-service by the MS-DRG associated with each procedure in the **Hospital Results** section of the report.

Understanding the symbols

The symbols displayed in this report represent a comparison of a hospital's actual outcome rate to what is expected after accounting for patient risk.

Using the risk-adjusted unplanned readmission measure as an example:

- ○ **Hospital's rate was significantly lower than expected.** Fewer patients were readmitted than could be attributed to patient risk and random variation.
- ⊙ **Hospital's rate was not significantly different than expected.** The number of patients who were readmitted was within the range anticipated based on patient risk and random variation.
- ● **Hospital's rate was significantly higher than expected.** More patients were readmitted than could be attributed to patient risk and random variation.

What is inpatient and outpatient case volume and why is it important?

Displayed in the Volume Results section of the report:

The total case volume for each procedure is displayed in this section of the report. The total number of inpatient acute care cases reported for hospitals in this section is often higher than the "Number of Cases" displayed in the **Hospital Results** section of the report, where cases are limited to only those included in the hospital-specific outcome measures. In general, information about the overall total number of cases performed at a facility reflects the degree of experience a facility has in caring for patients who undergo the given procedure. Additionally, higher volume has been associated with improved patient outcomes.

Some cardiac procedures are increasingly performed in hospital outpatient departments and ASCs (collectively referred to as outpatient cases). For these procedures, the total number of cases performed in both inpatient and outpatient locations are displayed separately for select cardiac procedures, to show where variations in treatment patterns may exist across care settings. These differences may reflect patient-surgeon partnership decisions and efforts to save costs.

- ***Total Number of Cases.*** This represents inpatient cases and outpatient cases, where applicable, for adults who underwent the given procedure. Note that number of inpatient cases reported in the **Volume Results** section of the report is often higher than the number of cases displayed in the **Hospital Results** section where only cases used to report outcome measures are included.
- ***Inpatient Cases.*** This represents the total number of cases performed in a Pennsylvania inpatient acute care hospital.
- ***Outpatient Cases.*** This represents the total number of cases performed in a Pennsylvania hospital outpatient department or ASC.

Displayed in the Map – Rates by County section of the report:

Case rate per 10,000 county residents is displayed for each county and is based on PHC4 claims data for Pennsylvania residents and 2024 US Census Bureau population figures.[1] The maps highlight county utilization rates and geographic differences for the procedures displayed in the **Volume Results** section of this report. Higher rates for some counties may reflect a larger number of cases with certain at-risk characteristics (e.g., patient age, sex, race and ethnicity). County rates were not adjusted for these differences so that important effects of these patient characteristics were not masked by such adjustment.

[1] U.S. Census Bureau, "Annual County Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (CC-EST2024-ALLDATA-42)", April 1, 2020 – July 1, 2024, <https://www.census.gov/data/tables/time-series/demo/popest/2020s-counties-detail.html>, accessed on March 4, 2026.

Uses of this report

This report can be used as a tool to examine a facility's performance and experience in specific procedure categories. It is not intended to be a sole source of information for making decisions about health care, nor should it be used to generalize about the overall quality of care provided by a facility. Readers of this report should use it in discussions with their physicians who can answer specific questions and concerns about their care.

- ***Patients/Consumers*** can use this report as an aid in making decisions about where to seek treatment for the procedures detailed in this report. This report should be used in conjunction with a physician or other health care provider when making health care decisions.
- ***Group Benefits Purchasers/Insurers*** can use this report as part of a process in determining where employees, subscribers, members, or participants should go for their health care.
- ***Health Care Providers*** can use this report as an aid in identifying opportunities for quality improvement and cost containment.
- ***Policymakers/Public Officials*** can use this report to enhance their understanding of health care issues, to ask provocative questions, to raise public awareness of important issues, and to help constituents identify health care options.
- ***Everyone*** can use this information to raise important questions about why differences exist in the quality and efficiency of care.

About PHC4

Created by the PA General Assembly in 1986, the PA Health Care Cost Containment Council (PHC4) is an independent council charged with collecting, analyzing, and reporting information that can be used to improve the quality and restrain the cost of health care in the state. Today, PHC4 is a recognized national leader in public health care reporting. PHC4 is governed by a council with members representing business, labor, consumers, health care providers, insurers, health economists, and state government.

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