**COMPdata Monthly Monitor - Montana**
**June/July 2006**
***Coronary Artery Bypass Graft Surgery &***
***Percutaneous Coronary Intervention***

## INTRODUCTION

The life-saving services that hospitals provide are never more evident than in the case of cardiovascular disease. In particular, coronary artery bypass surgery (CABG) and percutaneous coronary intervention (PCI), have extended and improved the quality of life for millions of patients. PCI was formerly referred to as percutaneous transluminal coronary angioplasty (PTCA). Some sections of this report will refer to PTCA since that is the terminology used in the ICD-9 coding documentation and in other sources.

It is well documented that cardiovascular diseases (CVD) ranks as the number 1 reason for death in America.[1] It is estimated that one in three adults has some form of CVD and nearly 7% of adults have coronary heart disease.[2] In Montana, the 2002 age-adjusted death rate per 100,000 population from coronary heart disease was 116.6 compared to 170.8 for the U.S.[3]

In 2003, approximately 268,000 patients in the U.S. underwent a CABG procedure compared to 652,000 for PCI.[2] Among adults 18 and older, the age-adjusted rate per 10,000 population for PCI increased 43.8% from 1993 to 2003. Contrastingly the rate for CABG during the same time period decreased 21.9%.[4] The fact that CABG procedures have been on the decline since 1995 raises an important question for hospitals with open heart programs to consider. While there is still some discussion and disagreement on this issue, several researchers have concluded that there is a relationship between the volume of procedures performed and post-procedure mortality. Two of the Agency for Healthcare Research and Quality (AHRQ) Inpatient Quality Indicators are CABG volume and PTCA volume. These are the published annual volume benchmarks:[5]

| | Threshold 1 | Threshold 2 |
|---|---|---|
| CABG | 100 | 200 |
| PTCA | 200 | 400 |

Hospitals will need to monitor the trends for CABG and PCI in their own facility as well as the demographic trends in their service area to assess this concern.

The focus on patient outcomes in heart surgery is also a part of the Surgical Care Improvement Project (SCIP).[6] Two of the SCIP process measures examine the administration of prophylactic antibiotics for surgical patients, including CABG and other cardiac patients. Under proposed Medicare rules, it is expected that beginning October 1, 2006 hospitals will be required to report data on these measures to the Centers for Medicare and Medicaid Services as part of the Medicare Annual Payment Update.

Scrutiny of a different sort has recently been put on PCI, particularly regarding the use of drug-eluting stents. Since their introduction in 2003, drug-eluting stents have become by far the most common form of stent used in PCI. A June 22, 2006 Wall Street Journal article reported that some major hospitals have pared back their use of drug-eluting stents because of concerns over possible blood clots.[7] These concerns were raised because of some research that shows higher rates of blood clots than expected. On the other hand, the Food and Drug Administration was reported as saying the rates are acceptably low. Undoubtedly these issues are under ongoing review by heart center medical staff. As happens when medical topics are presented in

the popular media though, hospitals should be prepared to answer the questions of both patients and the media regarding this issue.

***Special Coding Note***

There was a significant change in the coding requirements for PTCA for discharges after October 1, 2005. Prior to that date the following codes were used to describe PTCA:

36.01 Single vessel PTCA or coronary atherectomy without mention of thrombolytic agent
36.02 Single vessel PTCA or coronary atherectomy with mention of thrombolytic agent
36.05 Multiple vessel PTCA or coronary atherectomy with or without mention of thrombolytic agent

As of October 1, 2005 these codes are used:

00.66 PTCA or coronary atherectomy
00.40 – 00.43 Procedure on 1, 2, 3 or 4 or more vessels
00.45 – 00.48 Insertion of 1, 2, 3, or 4 vascular stents

Both before and after October 1, 2005 these codes are used to indicate whether non-drug or drug-eluting stents were used:

36.06 Insertion of non-drug-eluting coronary artery stent.
36.07 Insertion of drug-eluting coronary artery stent.

## COMPdata STATISTICS ON CABG & PCI/PTCA INPATIENTS IN MONTANA HOSPITALS

*(Note: All of the following inpatient statistics exclude newborns and obstetric cases – Major Diagnostic Categories 14 and 15. PCI/PTCA is sometimes coded only as a secondary procedure, so the tables below report statistics for "all procedures" for PCI/PTCA rather than just as the principal procedure.)*

***Table 1 - Total Montana Inpatients***
Excludes MDCs 14 & 15

| | 2002 | 2005 | |
|---|---|---|---|
| | **Discharges** | **Discharges** | **% Change 2002 to 2005** |
| **Total Montana Patients** | 82,448 | 86,051 | 4.4 |

***Table 2 – CABG & PTCA by Procedure Code – Montana 2002 & 2005***

2005 inpatient discharges - (Excludes MDCs 14 &15)
ICD-9 principal procedure codes for CABG - 3611-3616
ICD-9 all procedure codes for PTCA - 0066, 3601, 3602, 3605

| | 2002 | 2005 | % Change 2002 to 2005 |
|---|---|---|---|
| **All CABG Surgeries (ICD-9 Principal Procedure)** | 836 (100%) | 736 (100%) | -12.0 |
| **36.11 CABG-1 Artery** | 85 (10.2%) | 72 (9.8%) | -15.3 |
| **36.12 CABG-2 Arteries** | 230 (27.5%) | 240 (32.6%) | 4.3 |
| **36.13 CABG-3 Arteries** | 257 (30.7%) | 262 (35.6%) | 1.9 |
| **36.14 CABG-4+ Arteries** | 130 (15.6%) | 137 (18.6%) | 5.4 |
| **36.15 CABG-1 Internal Mammary** | 126 (15.1%) | 23 (3.1%) | -81.7 |
| **36.16 CABG-2 Internal Mammary** | 8 (0.9%) | 2 (0.3%) | -75.0 |
| | | | |
| **All PTCA Surgeries* (ICD-9 Procedure All)** | 2,728 (100%) | 2,966 (100%) | 8.7 |
| **00.66 PTCA/Atherectomy (As of 10/05)** | n/a | 729 (24.6%) | n/a |
| **36.01 1 PTCA/Atherect w/o Thromb Agent (Ret 10/05)** | 2,189 (80.2%) | 1,782 (65.3%) | -18.6 |
| **36.02 1 PTCA/Atherect with Thromb Agent (Ret 10/05)** | 20 (0.7%) | 25 (0.8%) | 25.0 |
| **36.05 PTCA/Atherect Multiple Vessels (Ret 10/05)** | 533 (19.5%) | 441 (14.9%) | -17.3 |

*Does not equal the sum of the four PTCA procedures due to coding of more than one procedure per patient.

Table 2 provides a look at the volume of patients undergoing CABG or PTCA procedures in 2002 and 2005. The number of overall CABG procedures declined in recent years, while the incidence for the less invasive PTCA procedure has increased. Highlights from table 2 include:

- For CABG, the most common operations were on 2 or 3 arteries, comprising over 60% of CABG surgeries in both 2002 and 2005. There was a dramatic decline in internal mammary CABG procedures over that time period.
- The coding change during 2005 has somewhat obscured the trend in individual PTCA procedures, but the trend from 2002 to 2005 was clearly upward for the procedure overall.

While PTCA procedures are performed on an outpatient basis, they represented less than 1% of all PTCAs performed in Montana hospitals.

***Table 3 – PTCA by Type of Stent – Montana 2002 & 2005***
***ICD-9 Procedure All***
2005 inpatient discharges – (Excludes MDCs 14 &15).
ICD-9 all procedure codes for PTCA - 0066, 3601, 3602, 3605

| | 2002 | 2005 | % Change 2002 to 2005 |
|---|---|---|---|
| **PTCA** | 2,728 (100%) | 2,966 (100%) | 8.7 |
| **36.07 Drug Eluding Stent** | 0 (0.0%) | 2,000 (67.4%) | n/a |
| **36.06 Non-Drug Eluding Stent** | 1,965 (72.0%) | 633 (21.3%) | -67.8 |
| **No Stent** | 763 (28.0%) | 333 (11.2%) | -56.4 |

Tables 3 breaks down the usage of stents in PTCA procedures. Highlights from Tables 3 include:

- In 2002 before drug-eluting stents were generally available, 72% of PTCA procedures used stents. In 2005 more than 88% of PTCA procedures used stents and in 67.4% of all PTCA cases drug-eluting stents were used.

***Table 4 – CABG & PTCA by Gender – Montana 2002 & 2005***
2005 inpatient discharges - (Excludes MDCs 14 &15)
ICD-9 principal procedure codes for CABG - 3611-3616
ICD-9 all procedure codes for PTCA - 0066, 3601, 3602, 3605

| | 2002 | 2005 | % Change 2002 to 2005 |
|---|---|---|---|
| **CABG** | 836 (100%) | 736 (100%) | -12.0 |
| **Male** | 639 (76.4%) | 559 (76.0%) | -12.5 |
| **Female** | 197 (23.6%) | 177 (24.0%) | -10.2 |
| | | | |
| **PTCA** | 2,728 (100%) | 2,966 (100%) | 8.7 |
| **Male** | 1,896 (69.5%) | 2,090 (70.5%) | 10.2 |
| **Female** | 832 (30.5%) | 876 (29.5%) | 5.3 |

***Table 5 – CABG & PTCA Surgery Inpatients by Age Group- 2005***

2005 inpatient discharges - (Excludes MDCs 14 &15)
ICD-9 principal procedure codes for CABG - 3611-3616
ICD-9 all procedure codes for PTCA - 0066, 3601, 3602, 3605

| ICD-9 Procedure All | Under 55 | 55 to 64 | 65 to 74 | 75 and Over | Total |
|---|---|---|---|---|---|
| **CABG** | 85 (11.5%) | 191 (26.0%) | 276 (37.5%) | 184 (25.0%) | 736 (100%) |
| **PTCA** | 513 (17.3%) | 738 (24.9%) | 926 (31.2%) | 789 (26.6%) | 2,966 (100%) |
| **Total** | 598 (16.2%) | 929 (25.1%) | 1,202 (32.5%) | 973 (26.3%) | 3,702 (100%) |

Tables 4 and 5 focus on the breakdown of CABG and PTCA patients by two demographics-gender and age. Facts of interest in the two tables include:

- As illustrated in Table 4, a slightly larger percentage of females received PTCA procedures than CABG procedures. In both groups, however, the men received a majority of the procedures performed in each category.
- The age distribution in Table 5 shows that more than half of CABG and PTCA procedures were performed on patients older than 65 years and more than one quarter were for patients 75 years or older.
- In addition, Table 5 shows that a greater portion of PTCA patients were under 55, 17.3%, compared to the 11.5% of CABG patients who were under 55 years of age.

***Table 6 – CABG & PTCA Surgery Inpatients – Montana 2005***

2005 inpatient discharges - (Excludes MDCs 14 &15)
ICD-9 principal procedure codes for CABG - 3611-3616
ICD-9 all procedure codes for PTCA - 0066, 3601, 3602, 3605

| **Table 6 – Part I**<br><br>**Admission and Discharge Patterns** | | **CABG Surgery Inpatients**<br>Total N = 836<br>(%) | **PTCA Surgery Inpatients**<br>Total N = 2,966<br>(%) |
|---|---|---|---|
| **Admission Source** | Emergency Room | 17.7 | 32.3 |
| | Physician Referral | 65.4 | 48.5 |
| | Hospital Transfer | 14.3 | 13.2 |
| | Other | 2.6 | 6.0 |
| | | | |
| **Admission Type** | Emergency | 14.0 | 23.6 |
| | Urgent | 35.7 | 44.4 |
| | Elective | 50.1 | 31.8 |
| | Other | 0.2 | 0.2 |
| | | | |
| **Discharge Status** | Routine to Home | 80.0 | 94.7 |
| | To Skilled Nursing | 6.7 | 1.7 |
| | To Home Health | 7.1 | 1.1 |
| | To Rehab Facility | 3.0 | 0.6 |
| | Other | 3.2 | 1.9 |
| | | | |
| **Hospital Location** | Other Urban | 68.1 | 52.6 |
| | Rural | 31.9 | 47.4 |

| **Table 6 – Part II**<br><br>**Patient Characteristics** | | **CABG Surgery Inpatients**<br>Total N = 836<br>(%) | **PTCA Surgery Inpatients**<br>Total N = 2,966<br>(%) |
|---|---|---|---|
| **Primary Payer** | Medicare | 53.1 | 55.1 |
| | Commercial Ins | 42.1 | 39.1 |
| | Medicaid | 0.4 | 1.4 |
| | Other | 4.4 | 4.4 |
| | | | |
| **Average Age** | | 67.7 | 66.9 |
| | | | |
| **Avg Length of Stay** | | 7.5 | 2.4 |
| | | | |
| **Avg Total Charge** | | $61,827 | $35,999 |
| | | | |

Table 6 (Parts I and II) provides statistics that explore in more detail the characteristics of those patients who were discharged in 2005 and had CABG as a principal procedure and those who had PTCA as any procedure. There were 836 CABG patients and 2,966 PTCA patients. Some additional highlights found in Table 6 are:

- PTCA patients, 32.3%, were more likely to be admitted from the emergency room than CABG patients, 17.7%.
- The great majority of PTCA patients, 94.7%, were routine discharges to home. A similar percentage of CABG patients are discharged home, but 80.0% were routine discharges while 7.1% were discharges to home health.
- For both procedures, the majority of the patients had surgery in a Other Urban area hospital, though nearly the same percentage of PTCA patients were served in Rural hospitals.
- The patient's average age was older for the CABG procedures, 68.1 years, compared to 52.6 years for PTCA.
- As expected CABG was more expensive on average, $61,827, and required a longer inpatient stay, 7.5 days, than PTCA, which had an average charge of $35,999 and average length of stay of 2.4 days.

## MONTANA STATISTICS FROM COMPdata

All of the Montana patient statistics were derived from MHA's COMPdata. We encourage you to use COMPdata to examine your hospital community area(s) regarding CABG and PTCA procedures so that you might better understand the impact of these patients on the care and treatment of your patient population and the resources needed to diagnose, treat, and manage heart disease patients.

The COMPdata graphing feature can be utilized to examine in a pictorial fashion trends in your state and hospital community area(s) regarding CABG and PTCA. Click here to obtain a pie chart that illustrates the distribution of CABG procedures for Montana discharges in 2005: http://www.compdatainfo.com/news/monitor/montana/mtcabgpcigraph.pdf.

## ADDITIONAL INFORMATION

If you would like to develop the COMPdata reports that will provide similar statistics for your hospital or community, a training tool is available to guide you through the process. The training tool may be requested by e-mailing compdata@ihastaff.org. For additional assistance on using the COMPdata system, contact the COMPdata Hotline at compdata@ihastaff.org.

For questions and suggestions regarding the *COMPdata Monthly Monitor*, contact: David Rivers, Sr. Director, Health Information at drivers@ihastaff.org.

**COMPdata Monthly Monitor - Montana**
**June/July 2006**
***Coronary Artery Bypass Graft Surgery & Percutaneous Coronary Intervention***

## *APPENDIX*

## CABG and PCI Procedures

Coronary artery bypass graft surgery (CABG) is an open heart surgery that requires grafting an artery or vein around the blocked coronary artery.[8] Also called cardiac revascularization, this procedure was introduced in the late 1960's. Percutaneous coronary intervention (PCI) is a less invasive alternative for arterial blockage introduced in the late 1970's. PCI uses a balloon catheter to unclog the artery, and is commonly known as balloon angioplasty.

## CABG and PCI Patients[2]

- From 1987 – 2003, the number of PCI procedures in the U.S. increased 326%.
- In 2003, CABG surgery was performed 467,000 times on an estimated 268,000 U.S. patients.
- 664,000 PCI procedures were performed on 652,000 patients in the U.S. in 2003.
- The most recent national data shows that 65% of PCI procedures are performed on men, and 52% are performed on patients 65 and older.

## SOURCES FOR ADDITIONAL INFORMATION

*For Hospitals*

Founded in 1964, the Society of Thoracic Surgeons is a not-for-profit educational organization representing more than 5,000 surgeons worldwide who provide heart, lung, esophageal, and other surgical procedures of the chest. Included on their web site at http://www.sts.org/index.html is information about indications, risks, and outcomes for PCI and CABG procedures.

Among the valuable aspects of the web site for the American College of Cardiology (http://www.acc.org) is the Quality and Science section. The Clinical Statements and Guidelines are readily searched and can be downloaded. And the Guidelines in Applied Practice highlights applications from sites around the country and includes downloadable tool kits.

The American Heart Association is an excellent ongoing resource for heart disease information, including "Heart Disease and Stroke Statistics-2006 Update." The "Heart and Stroke Encyclopedia" allows the user to look up any heart-related topic quickly. These and other features can be found at www.americanheart.org.

The National Heart, Lung, and Blood Institute (NHLBI) is a division of the National Institute of Health and is a source for publications, interactive web applications, and fact sheets for CABG and PCI procedures. The contents of the site are geared toward health care professionals, researchers, and consumers and can be found at http://www.nhlbi.nih.gov/index.htm.

*For Patients and the Community*

The American Heart Association is an excellent ongoing resource for heart disease information, including a "Heart and Stroke Encyclopedia" which allows the user to look up any heart-related topic quickly. This feature and others can be found at www.americanheart.org.

A step-by-step tour of the heart surgery process is available at the University of Southern California's Cardiothoracic Surgery web site. Descriptions of the heart and arteries, coronary artery disease, and surgical procedures and treatments are all part of the presentation, which can be found at http://www.cts.usc.edu/hpg-index.html.

Heart surgery patients share their experiences at Providence St. Peter Hospital in southwest Washington in this 15-minute video that can be found on their web site at http://www.providence.org/swsa/services/heart_program/e60heartsurgery_video.htm.

## REFERENCES


1. Centers for Disease Control and Prevention. National Center for Health Statistics. Mortality Tables - LCWK9. *Deaths, percent of total deaths, and death rates for the 15 leading causes of death: United States and each State, 2003.* http://www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm. (Accessed 7/25/2006)
2. American Heart Association. *Heart Disease and Stroke Statistics – 2006 Update.* http://www.americanheart.org, found under Publications & Resources-Statistics. (Accessed 7/20/2006)
3. American Heart Association. *Death Rates by State – Statistics.* http://www.americanheart.org, found under Publications & Resources-Statistics– *Statistical Fact Sheets – Miscellaneous*. (Accessed 7/20/2006)
4. Centers for Disease Control and Prevention. National Center for Health Statistics. *Health, United States, 2005.* http://www.cdc.gov/nchs/hus.htm. (Accessed 7/20/2006)
5. Agency for Healthcare Quality and Research. *Guide to Inpatient Quality Indicators.* Version 3.0. February 20, 2006. http://www.qualityindicators.ahrq.gov/iqi_download.htm. (Accessed 7/15/2006)
6. MedQIC - Medicare Quality Improvement Community. *Surgical Care Improvement Project.* http://www.medqic.org, found under the Hospitals tab. (Accessed 7/20/2006)
7. Westphal, Sylvia. Concerns prompt some hospitals to pare use of drug-coated stents. *Wall Street Journal*, June 22, 2006.
8. American Heart Association. *Heart & Stroke Encyclopedia.* http://www.americanheart.org. (Accessed 7/20/2006)