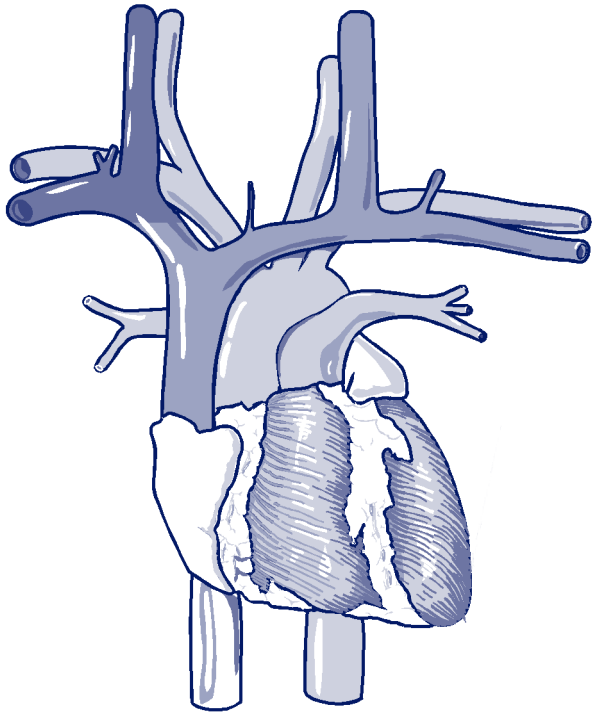
Hospital Readmissions Following Coronary Artery Bypass Graft Surgery



Pennsylvania Health Care Cost Containment Council
October 2001

Highlights in Brief

- 15.3%, or one out of six, Coronary Artery Bypass Graft (CABG) surgery patients were readmitted later for additional treatment. The figures ranged from a low of 8.2% to a high of 32.9%;
- CABG readmissions amounted to $52 million in additional hospital charges;
- Nearly 23% of all CABG readmissions were due to infections;
- Only 65% of CABG patients were readmitted to the same hospital where they had their operation; 35% were readmitted to a different hospital;
- Women were more likely to be readmitted following CABG surgery than men are;
- African-Americans and Hispanics are more likely to be readmitted following CABG surgery than whites;
- Increasing age was a significant factor in readmission rates;
- Patients who were readmitted spent as much time in the hospital during the readmission as they did following surgery in their initial hospitalization.

TOP 10 Causes for Readmission after CABG Surgery

Principal Diagnosis	Percent of Readmissions	Average Number of Days Between Discharge and Readmission
Infections	22.8%	11.8
Heart failure	16.4%	10.4
Heart rhythm irregularities	7.8%	9.3
Coronary artery blockage/heart attack	6.2%	12.0
Pulmonary blood clot/deep venous clot	5.4%	10.0
Respiratory and chest symptoms	4.0%	10.7
Pleural effusion (water on the lungs)	3.3%	10.3
Stroke/transient cerebral ischemia/anoxic brain damage	3.2%	9.9
Gastrointestinal bleeding	2.7%	11.2
Aspiration pneumonia	2.3%	9.2

Hospital Readmissions Following Coronary Artery Bypass Graft Surgery

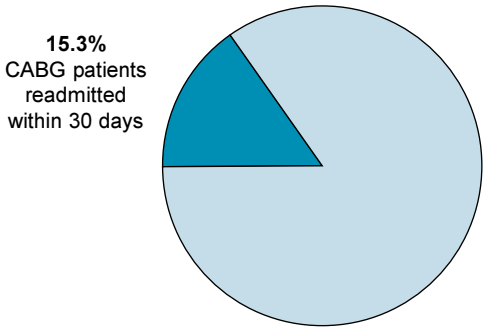
Introduction

Pennsylvania's Guide to Coronary Artery Bypass Graft Surgery has been a benchmark report of the Pennsylvania Health Care Cost Containment Council (PHC4) since 1992. Coronary artery bypass graft surgery is often referred to as CABG (pronounced "cabbage"). Because CABG surgery is the most commonly performed open-heart surgery in Pennsylvania, information about CABG surgery is important to consumers, health care purchasers, policy makers, and medical professionals. PHC4's CABG reports have presented various types of information about CABG surgery including quality of care information for hospitals, individual cardiac surgeons, and health care plans. These reports examined risk-adjusted mortality, risk-adjusted length of stay and hospital charges. PHC4 recently began looking at additional outcome measures relating to cost and quality issues surrounding CABG surgery. This analysis focused on the measure of hospital readmissions within 30 days following CABG surgery.

Key Finding

Of the 18,357 patients who underwent CABG surgery in Pennsylvania between July 1, 1998 and June 30, 1999, 15.3% were readmitted to the hospital within 30 days of their original CABG discharge. This represents 2,800 patients or approximately 1 out of every 6 patients who underwent CABG surgery.

CABG Patients in Pennsylvania



These readmissions are important from both a quality of care and cost standpoint. First, readmissions are an important measure of quality of care. While some rehospitalizations after an invasive surgery such as CABG will always occur, quality care may lessen the need for subsequent hospitalizations. Secondly, CABG surgery is expensive; the average hospital charge for CABG surgery in Pennsylvania in FY 1999 exceeded $53,000. For this reason, CABG surgery is a likely target for cost containment. Ultimately, however, if costs are contained within the initial hospitalization but additional costs are incurred by a subsequent hospitalization, the end result is cost shifting, not containment.

Finally, while PHC4 has released comprehensive reports on the CABG procedure itself, there is little information available about what happens when CABG patients are discharged from the hospital. This analysis provides some information about those patients who require rehospitalization after their CABG surgery.

Why are readmission rates important?

- In terms of cost containment and quality improvement measures, readmission rates may become as important in the future as length of stay is now.
- The most common cause for readmission was infection – a potentially preventable complication.
- If costs are contained during initial hospital stays, but additional hospital time is necessary, overall costs are only shifted, not reduced.
- Readmission rates may play a greater role if reimbursement rates should become linked to clinical outcomes or if readmission within a specified time period is included as part of the original charge.
- The fact that 35% of CABG patients are readmitted to a different hospital than that where their operation was performed raises potential questions about the management of the process of care.

How can this report be used?

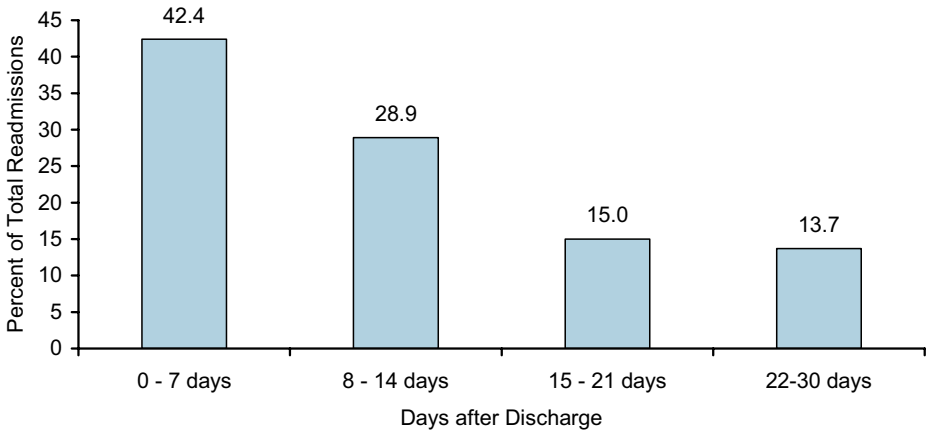
This report can be used to address some of the questions surrounding CABG surgery and why readmissions occur. More specifically, this report can help in the following ways:

- **Health Care Providers**. This report will help providers identify those who are most at risk for being rehospitalized and will assist them in decision-making that incorporates quality improvement and cost containment, both before and after surgery.
- **Group Benefits Purchasers and Insurers.** This report will aid them in determining how to increase the quality of care without increasing costs, how to reduce cost shifting and what areas need to be better addressed by the health care community.
- **Patients/Consumers.** This report can help to raise public awareness about quality of care issues regarding CABG surgery.
- **Policy Makers/Public Officials.** This report will not only enhance their understanding of issues as they relate to CABG surgery and readmissions, but it will also help them to increase public awareness about health care options, costs and quality of care.

When are CABG patients being readmitted?

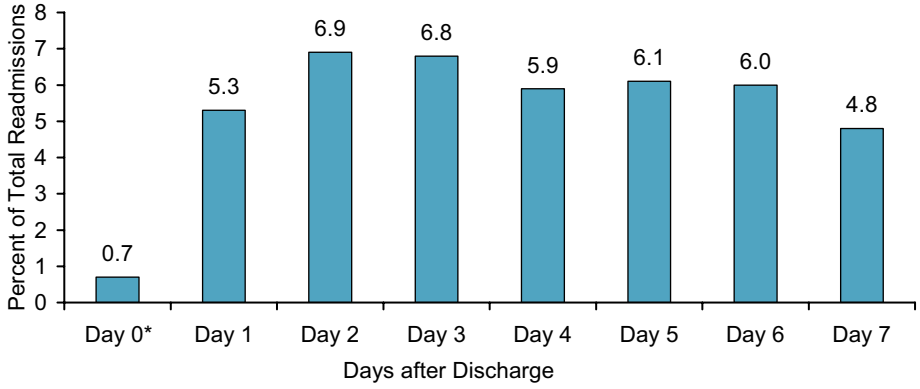
For patients who were rehospitalized following CABG surgery, most were readmitted in the first seven days after the initial discharge. As more time passed from the initial discharge, a patient was less likely to be rehospitalized.

Percent of Readmissions by Days after Discharge



Of the patients readmitted within the first seven days, the second day after discharge had the highest readmission rate.

Readmissions within the First 7 Days after Discharge

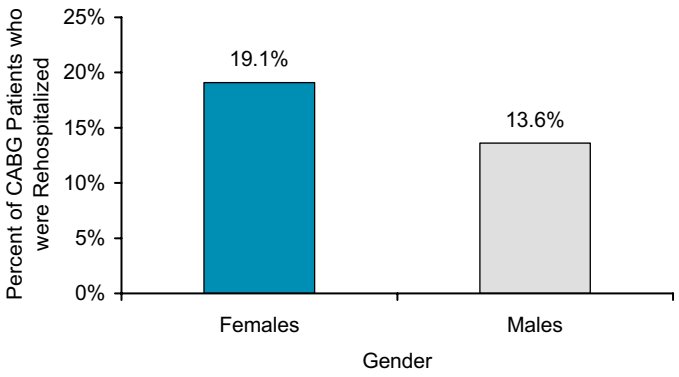


* Day 0 means patient was discharged and readmitted on the same day

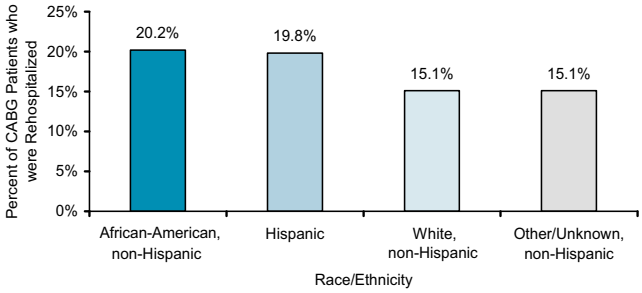
Who is being readmitted after CABG surgery?

While more males had CABG surgery overall, female CABG patients were more likely to be rehospitalized within 30 days following surgery. Of female CABG patients, 19.1% were rehospitalized within 30 days, whereas 13.6% of male CABG patients were rehospitalized. While female CABG patients were older, they still had higher rates of readmission after accounting for patient age and risk.

Percent of CABG Patients who were Rehospitalized, By Gender



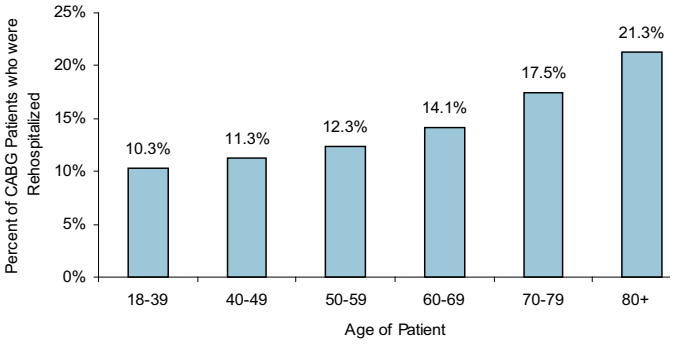
Percent of CABG Patients who were Rehospitalized, By Race/Ethnicity



Hispanics and African-Americans were rehospitalized more often than whites. Of white CABG patients, 15.1% were rehospitalized within 30 days, whereas 20.2% of African-Americans and 19.8% of Hispanics were rehospitalized.

The likelihood of readmission increased with the age of the patient. Even after accounting for patient risk, older CABG patients were the most likely to be rehospitalized within 30 days.

Percent of CABG Patients who were Rehospitalized, By Age

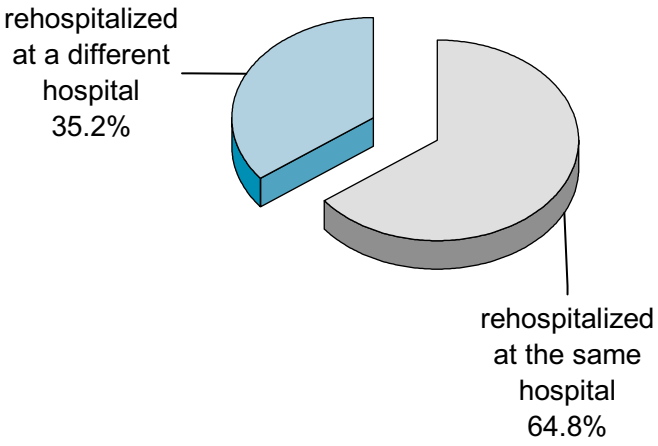


Where were CABG patients readmitted?

In Pennsylvania, 64.8% of the CABG patients who were rehospitalized were readmitted to the same hospital where their CABG surgery was performed. The remaining 35.2% were readmitted to a different hospital. This may be the case where the CABG surgery is performed in a large, urban hospital and patients are readmitted to their local community hospital. Nonetheless, this raises potential questions about the management of care.

For example, CABG patients who underwent surgery at a university hospital (which are more likely to be located in urban settings) were less likely than patients who underwent CABG surgery at a non-university hospital to be readmitted to the same hospital. Whereas 66.9% of rehospitalized patients who underwent CABG at a non-university hospital were readmitted to the same hospital, only 49.7% of rehospitalized patients who had CABG performed at a university hospital were readmitted to the same hospital.

CABG Patients who were Rehospitalized



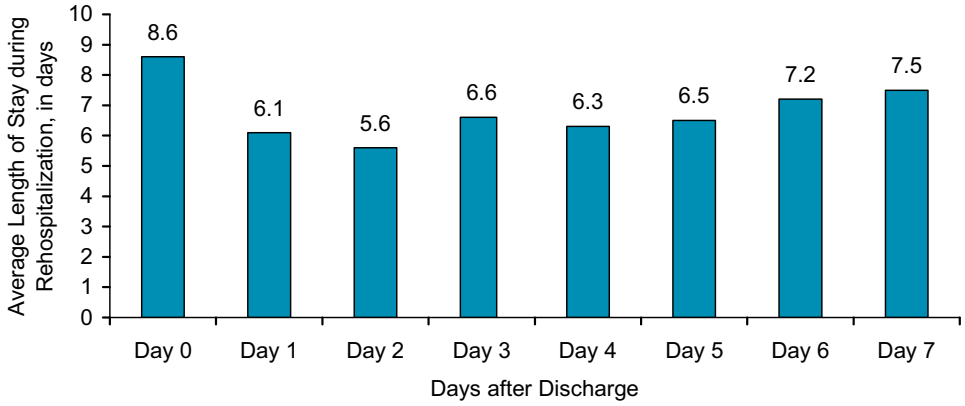
What happens to patients once they are readmitted?

Length of Stay

In the future, readmission rates may become as important to quality of care and cost containment as length of stay is today. To illustrate this point, it is noteworthy that CABG surgery patients spent as much time during their rehospitalization (6.4 days on average) as they did during their initial hospitalization. (The length of stay for the initial hospitalization includes only the post-operative length of stay, i.e., the length of stay between the CABG surgery and discharge).

Patients readmitted on the same day as their original discharge had the longest average length of stay during their readmission (8.6 days) of all patients readmitted within the first week after discharge.

Average Length of Stay during Rehospitalization
for Patients Rehospitalized within First 7 Days after Discharge



Mortality

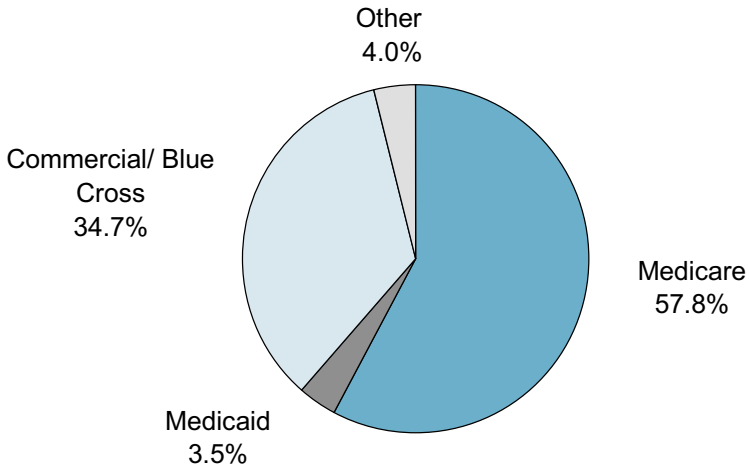
2.3% of patients rehospitalized after CABG surgery died during their rehospitalization. This is comparable to the percent of CABG patients who died during their original hospitalization (2.4%).

The mortality rate increases with age. Older patients were more likely to die during both the initial hospitalization and the rehospitalization than were younger patients.

What are the hospital charges for readmissions and who pays for them?

For patients readmitted to the hospital after CABG surgery, the average charge for the rehospitalization was $18,438. This charge is in addition to the $53,903 average charge for the original hospitalization when the CABG surgery was performed. Total charges for the readmissions analyzed here reached almost $52 million.

Primary Payor for Rehospitalizations



Patients listing Medicare as their primary source of payment were rehospitalized at a higher rate than were other patients. Where Medicare enrollees accounted for 48.7% of all CABG surgeries, they accounted for 57.8% of CABG rehospitalizations. Charges for rehospitalizations were, in general, highest amongst Medicare beneficiaries. This is not surprising considering that Medicare beneficiaries also spent the most time in the hospital - an average of 6.8 days - during their readmissions.

Readmission Rates by Discharge Status

When CABG patients were discharged from the hospital after the original hospitalization in which the CABG surgery was performed, they went to one of several different locations. As the following chart shows, the vast majority of CABG patients, 85%, were discharged to their home, while the remaining patients, 15%, were transferred to another type of health care facility.

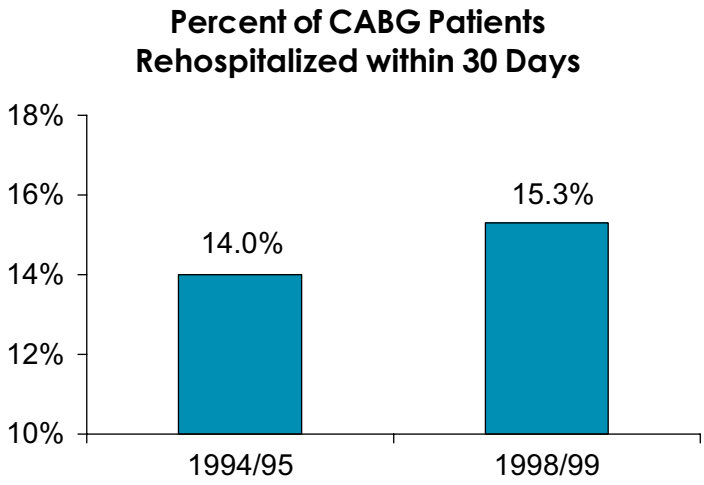
Discharge Status	# of Patients	Average Post-Op LOS (Original Hospitalization)	% Readmitted	Average LOS during Readmission	Mortality Rate during Readmission
Pennsylvania Total	18,357	6.4	15.3%	6.4	2.3%
Home	15,615	5.9	13.7%	5.6	1.3%
Transfer to general acute care or other type of facility	1,103	9.9	22.0%	9.0	4.9%
Transfer to skilled nursing facility	1,639	8.6	25.6%	9.1	6.2%

LOS = Length of Stay

Patients discharged to another health care facility were more likely to be rehospitalized following their CABG surgery than were patients discharged to their homes. Moreover, patients discharged to another health care facility had significantly longer lengths of stay and higher rates of in-hospital mortality during rehospitalization.

How have readmissions changed over time?

Over the past few years, the rate of patients readmitted to the hospital following CABG surgery has increased. Between July 1, 1994 and June 30, 1995, 14.0% of CABG patients were readmitted to the hospital. For the period July 1, 1998 to June 30, 1999, this percentage had grown to 15.3%. During this same time, the percent of CABG patients who died during the original hospitalization dropped – from 3.1% in 1994/95 to 2.4% in 1998/99. In addition, the average length of stay during the original hospitalization for CABG surgery decreased – from 7.6 days in 1994/95 to 6.4 days in 1998/99.



Summary

Readmissions can be an important quality of care issue. While a small percentage of patients may require rehospitalization after CABG surgery, potentially avoidable readmissions may be reduced with quality medical care. The increase in the rate of patients readmitted to the hospital following CABG surgery between 1994/95 and 1998/99 should be reason for further discussion.

Overall, readmissions are only one part of the whole picture of CABG surgeries and outcomes. Additional measures including mortality, complications, and length of stay should also be taken into consideration when discussing the quality of CABG surgery care as an entirety. As PHC4 continues to release information about CABG surgery (such as that presented in *Pennsylvania's Guide to Coronary Artery Bypass Graft Surgery*), patients, providers, and payors should continue to draw upon this information to assist them in making informed decisions.

Notes

This analysis is based upon adult patients (i.e., age 18 and older) who underwent CABG surgery between July 1, 1998 and June 30, 1999 who were considered "candidates" for readmission. Patients were considered "candidates" for readmission unless they (1) died during the initial hospitalization during which the CABG surgery occurred, or (2) if information was unavailable to track patients across hospitalizations (e.g., there was missing or inconsistent data in the patient records needed to determine whether a readmission occurred). Transfer cases were excluded when analyzing same-day readmissions.

The following ICD.9.CM codes (International Classification of Diseases, Ninth Revision, Clinical Modification) were used to identify hospitalizations where initial CABG surgery occurred: 36.10 – 36.17 and 36.19.

This analysis includes information about those patients who were readmitted to Pennsylvania's acute care hospitals for any reason within 30 days of their original CABG discharge; therefore, the readmissions may or may not be connected to the original CABG surgery. Further, it was not possible to distinguish between readmissions which may have been "planned" or those which may have been "unplanned", emergent, or urgent in nature.

The analysis focuses on discharges from Pennsylvania hospitals. Patients who underwent CABG surgery in Pennsylvania's general acute care hospitals, but were subsequently rehospitalized in another state are not counted as readmissions because PHC4 does not have access to that information.

Patients may have been treated in the physician's office, an outpatient setting, or an emergency department following CABG surgery. In this analysis, such patients would not be counted as readmissions unless they were also readmitted to the hospital.

The data were reported as submitted to PHC4 by the hospitals. If a hospital did not provide complete information, the number of CABG patients and/or the number of rehospitalizations would be undercounted.

The length of stay reported for the original hospitalization during which CABG surgery occurred includes only the post-operative length of stay after the patient underwent CABG surgery (i.e., any time spent in the hospital prior to the actual CABG surgery is not included in the length of stay figure for the original hospitalization). The length of stay reported for the readmission, however, includes the entire stay during the rehospitalization.

The hospital charges reported are charges associated with the entire hospitalization (not just the original CABG surgery or any subsequent treatment during the rehospitalization which may have been associated with CABG surgery) and do not include professional (e.g. physician) fees. Further, while charges are a standard way of reporting data, they do not reflect the actual cost of the treatment, nor do they reflect the payment that the hospital may have actually received.

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