

# The Clinical and Economic Burden of Coronary Restenosis in the Medicare Program

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## OVERVIEW

### Objective:

- To determine the clinical and economic burden of coronary restenosis in the Medicare population through retrospective claims data analysis.

### Background:

- The epidemiology of coronary restenosis after percutaneous coronary intervention (PCI) has been extensively documented in clinical trials and single-center series.
- However, these data may not reflect the true burden of restenosis in unselected patients, and no data exist on the clinical or economic burden of restenosis in the Medicare population in contemporary clinical practice.

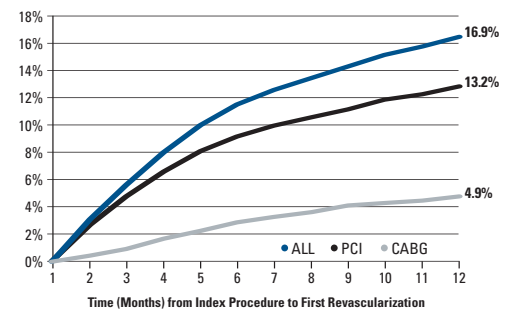
## METHODS

- Data from the Medicare 5% sample Standard Analytic File (SAF) for the years 1997, 1998, and 1999 were used in the analysis and include hospital inpatient, hospital outpatient, and physician and supplier bills.
- We identified patients >65 years of age with at least one coronary stenting (ICD-9 code 36.06 or CPT-4 codes 92980 and 92981) or PTCA (ICD-9 codes 36.01, 36.02, 36.05, 36.09 or CPT-4 codes 92982 and 92984) procedure in 1998.
- Patients who underwent a PCI procedure within 1 year prior to their first procedure in 1998 (“index procedure”) were excluded, as were patients who died within the first 30 days following the index procedure.
- 13 co-morbid conditions were identified using ICD-9 diagnosis codes grouped by the Clinical Classifications for Health Policy Research.
- All outcome measures, resource use, and costs were collected from 30 days through 365 days after the initial PCI.
- Clinical restenosis was defined as the occurrence of any repeat revascularization procedure (PTCA, stenting, atherectomy, CABG) between 30 and 365 days from the initial procedure, adjusted by 0.85 (Kimmel SE et al., AHJ 2002;143(5):833-840) to account for procedures due to non-target lesion restenosis.
- Time to repeat revascularization, defined as the interval (in days) between the index procedure and the first post-thirty-day repeat procedure, were computed.
- Hospital admissions, average length of stay, physician encounters, and hospital outpatient facility visits were identified.
- Costs were measured from the Medicare payment perspective.
- Analytic techniques included descriptive statistics, stepwise multivariable logistic regression, and multivariable linear regression.

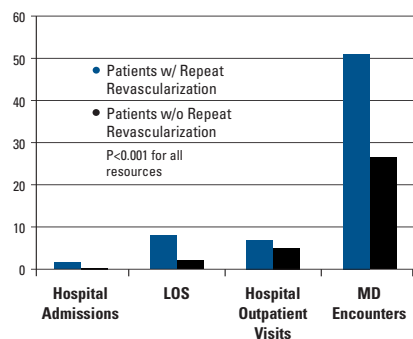
## Exhibit 1 Baseline Characteristics

	All Patients (N=9,868)	Patients with Repeat Revascularization (N=1,667)	Patients without Repeat Revascularization (N=8,201)	P Value
Mean Age (years)	73.4 ± 5.8	73.0 ± 5.5	73.5 ± 5.8	0.004
Age ≥75 (%)	39.8	38.0	40.2	NS
Male (%)	57.2	58.1	57.0	NS
Stenting as Initial PCI (%)	79.5	81.4	79.1	0.033
AMI as Principal Diagnosis (%)	28.3	23.8	29.2	<0.001
Saphenous Vein Graft PCI (%)	5.0	6.5	4.7	0.004
Diabetes Mellitus (%)	33.8	41.5	32.3	<0.001
Mean Number of Co-morbid Conditions	3.2 ± 1.7	3.6 ± 1.7	3.1 ± 1.7	<0.001

## Exhibit 2 Incidence of Any Repeat Revascularization, Repeat PCI, or Bypass Surgery >30 Days After Initial PCI



## Exhibit 3 Mean Medical Care Resource Use Per Patient



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## RESULTS

- 79.5% of all PCI patients had an initial stenting procedure.
- 16.9% (1,667 of 9,868) of patients had a repeat procedure.
- Rates of repeat PCI, CABG, or either were 0.98, 0.33, and 1.30 per patient undergoing a repeat procedure, respectively.
- After adjusting by 0.85, the repeat revascularization rate was 14.4%.
- Unadjusted mean 1-year medical costs were almost 5 times higher among patients with repeat revascularization (\$26,186 [median \$19,803]) versus those without repeat revascularization (\$5,344 [median \$1,769]),  $p < 0.001$ .
- Inpatient hospital costs comprised 74% (\$19,502) of total costs for patients with repeat revascularization versus 51% (\$2,703) for patients without repeat revascularization.
- 91% of costs for repeat revascularization patients were attributed to cardiovascular services compared to 70% of costs for patients with no repeat revascularization.
- The strongest independent predictors of repeat revascularization included congestive heart failure (OR=1.60), hypertension (OR=1.47), and cerebrovascular disease (OR=1.38).
- Adjusting for demographics and clinical and procedural characteristics resulted in an independent attributable cost for each patient with repeat revascularization of \$19,074 (95% CI \$18,440-\$19,707).
- A similar result was found when examining cardiovascular costs only (\$18,689, 95% CI \$18,122-\$19,256).

## CONCLUSIONS

- Repeat revascularization occurs in about 14.4% of unselected Medicare patients receiving PCI.
- Repeat revascularization increases 1-year Medicare costs by an average of \$2,747 for each patient undergoing an initial PCI.
- Extrapolation to the full Medicare population suggests annual Medicare expenditures for repeat revascularization treatment of more than \$730 million.
- New technologies that reduce repeat procedure rates after PCI may be helpful in reducing costs associated with these additional procedures.

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**Exhibit 4  
Mean Medical Care Costs Per Patient**

