

# Economic Outcomes of Percutaneous Coronary Intervention Performed at Sites With and Without On-Site Cardiac Surgery

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CPORT-E Economic Study supported by  
Johns Hopkins University

November 4, 2012

# Background and Objectives

The Cardiovascular Patient Outcomes Research Team trial (CPORT-E) assigned patients to undergo non-primary PCI:

- At a hospital without on-site cardiac surgery (No SOS)
- Or, to be transferred to a hospital with surgical back-up (SOS)

## Co-Primary Clinical Outcomes for Non-Inferiority:

- Mortality at 6-weeks (No SOS, 0.9%; SOS 1.0%;  $p=0.004$ )
- Major adverse cardiac events at 9 month (No SOS, 12.1%; SOS, 11.2%  $p=0.05$ ).

## Resource Use Differences:

- SOS patients had more staged PCI procedures but fewer subsequent revascularizations at 9 months.
- Protocol required No SOS sites use ICU/CCU for post-PCI care.

**Economic Objective:** Conduct a prospective economic study to compare medical resource use and medical costs for SOS and No SOS patients.

# Economic Study Methods

**Population:** 18,273 of 18,867 CPORT-E patients

**Endpoints:**

- Primary: Total medical costs at 9 months
- Secondary: Admissions, length of stay, medical costs

**Subgroups:** Annual PCI volume at enrolling site

- Low volume (<200 cases)
- High volume ( $\geq$  200 cases)

**Study period:** Index diagnostic catheterization through 9 months

**Costing methods:**

- Coordinators at CPORT-E sites collected inpatient bills.
- Duke EQOL coordinating center performed remote site management.
- Estimated hospital costs using patient bills using Medicare correction.
- Physician and ambulance transportation for SOS patients estimated using Medicare reimbursement.
- Results reported in 2011 US dollars.

# Baseline Patient Characteristics

	SOS (n=4569)	No SOS (n=13,704)
<b>Demographics</b>		
Age	64 (55, 73)	64 (55, 73)
White race	80	79
Male sex	63	64
<b>Medical History</b>		
Diabetes	39	39
Procedure status		
Elective	73	73
Urgent / emergent	27	27
Clinical status		
STEMI / NSTEMI	28	27
Unstable angina	36	37
Stable angina	13	14
Other	22	21

\* Continuous as 50<sup>th</sup> (25<sup>th</sup>, 75<sup>th</sup>), Categorical as %

# Selected Resource Use

Resource Type	SOS (n=4569)	No SOS (n=13,704)	P-value
<b>Index Procedures</b>			
Diagnostic catheterization	0.99	0.06	<.0001
PCI procedure	0.99	0.13	<.0001
PCI + diagnostic cath	0.01	0.94	<.0001
Total Index	1.99	1.13	<.0001
<b>Follow-up Period</b>			
Total revascularizations	0.07	0.08	0.002
Emergency department	0.23	0.27	0.002
Total Follow-Up	0.81	0.87	0.001
<b>Cumulative 9 Months</b>			
Total admissions	2.80	1.99	<.0001

# Selected Length of Stay Days

Resource Type	SOS (n=4569)	No SOS (n=13,704)	P-value
<b>Index Procedures</b>			
Diagnostic catheterization	2.22	0.12	<.0001
PCI procedure	1.48	0.19	<.0001
PCI + diagnostic cath	0.03	2.83	<.0001
Total Index	3.73	3.14	<.0001
<b>Follow-up Period</b>			
Total revascularizations	0.33	0.31	0.74
Emergency department	0.26	0.29	0.03
Total Follow-Up	2.48	2.62	0.17
<b>Cumulative 9 Months</b>			
Total length of stay	6.20	5.76	0.002

# Total Medical Costs

Cost Type	SOS	No SOS	P-value
<b>All Subjects (\$)</b>	(n=4569)	(n=13,704)	
Index procedure	18,975	19,840	0.12
Follow-up period	5015	5620	0.001
Cumulative 9 months	23,991	25,450	0.02

# Index Procedure Medical Costs: By Cost Center Group

Cost Type	SOS	No SOS	P-Value
<b>All Patients (\$)</b>			
Non-ICU Room	1091	680	<.0001
ICU Room	2280	3032	<.0001
Total Room	3371	3692	0.001
Cardiac Procedure	8308	9189	0.07
Other costs	7297	6960	0.15
Total Costs	18,975	19,840	0.12



# Selected Resource Use: High and Low Volume Sites

Cost Type	SOS	No SOS	P-value
<b>High Volume Sites</b>	(n=2389)	(n=7161)	
Index procedure	2.00	1.15	<.0001
Follow-up period	0.79	0.82	0.17
Cumulative 9 months	2.79	1.96	<.0001
<b>Low Volume Sites</b>	(n=2106)	(n=6234)	
Index procedure	1.99	1.12	<0.0001
Follow-up period	0.83	0.92	0.0004
Cumulative 9 months	2.81	2.04	<.0001

# Selected Length of Stay Days: High and Low Volume Sites

Cost Type	SOS	No SOS	P-value
<b>High Volume Sites</b>	(n=2389)	(n=7161)	
Index procedure	3.87	3.06	<.0001
Follow-up period	2.46	2.42	0.75
Cumulative 9 months	6.33	5.48	<.0001
<b>Low Volume Sites</b>	(n=2106)	(n=6324)	
Index procedure	3.57	3.24	0.0002
Follow-up period	2.50	2.85	0.02
Cumulative 9 months	6.07	6.09	0.89

# Total Medical Costs: High and Low Volume Sites

Cost Type	SOS	No SOS	P-value
<b>High Volume Sites</b>	(n=2389)	(n=7161)	
Index procedure	18,666	19,912	0.18
Follow-up period	5172	5453	0.23
Cumulative 9 months	23,838	25,365	0.15
<b>Low Volume Sites</b>	(n=2106)	(n=6324)	
Index procedure	19,365	19,807	0.41
Follow-up period	4857	5836	0.0004
Cumulative 9 months	24,222	25,643	0.02

# Conclusions

- Patients receiving PCI at sites with versus without on-site cardiac surgery had:
  - Greater resource use
  - Longer lengths of stay
  - Slightly lower medical costs at 9 months.
- Higher medical costs for patient at sites without on-site cardiac surgery were attributable to:
  - Use of ICU for post-PCI care and
  - Higher rate of subsequent revascularization.
- Greater follow-up hospitalizations in low volume sites without on-site cardiac surgery.