

# A Study of Cost Variation for Percutaneous Coronary Interventions (Angioplasties) in the U.S.

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**THE HEALTH  
OF AMERICA**  
R E P O R T

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## COST VARIATIONS IN CARDIAC CARE: OVERVIEW

Cardiovascular disease is a leading cause of death and disability in the United States, responsible for 610,000 deaths — 1 in 4 — every year. Though much of heart disease is preventable by adopting healthier behaviors, and significant progress has been made in reducing deaths in recent years, millions of Americans continue to need cardiac treatment and procedures. The cost of this care is expected to reach \$918 billion by 2030 — an increase of almost 200 percent from 2010.

One of the most common procedures used in the treatment of heart disease is percutaneous coronary intervention (PCI) or angioplasty with and without stents. First developed in 1977, and in wide use since the 1990s, approximately one million angioplasties are performed annually in the U.S. — making them a top ten contributor to healthcare costs, with expenditures totaling \$10 billion in 2014. In addition, according to the Journal of the American Medical Association, 1 out of 8 of these procedures is medically unnecessary and inappropriate.<sup>1</sup>

This Health of America Report analyzed three years of independent Blue Cross and Blue Shield (BCBS) companies' claims data for angioplasties.<sup>2</sup>

The report examined angioplasties performed among patients who were not experiencing a heart attack, in both inpatient and outpatient facilities, across 86 of the 100 largest Metropolitan Statistical Areas (MSAs) where data were available. The findings reveal that even after adjusting for geographic differences in business costs, angioplasty episode costs vary widely both within and across MSAs.

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<sup>1</sup> JAMA, Improper Stenting, 2013

<sup>2</sup> This report examines medical claims for primary (non - Medicare) BCBS members incurred 36 months ending March 2014, paid through June 2014. Episode costs are based on total allowed amounts for related procedures and ancillary services for PCI without a heart attack for a period of time 30 days pre- and 90 days post-procedure across inpatient and outpatient facilities. Episodes are aggregated at a facility level based on their experience over 36 months. Only facilities with more than five episodes were included in the study. The data also limit scope of episodes it will measure in order to ensure comparability, creating a "normal" cohort. Episodes were dropped from the data where applicable, for patient age (<18 or >64), complicating conditions, non-continuous enrollment, and other criteria. 35,608 total episodes were included in this study. Geographic groupings were done for Metropolitan Statistical Areas (MSA) as defined by the US Census Bureau. Complete data were unavailable for the states of New York, South Carolina, and Texas, thus they were excluded from this study. Montana, Wyoming, North Dakota, South Dakota, Vermont and Maine did not have any MSAs in the top 100, thus they were excluded from this study.

Variations in cost within a market are significant, varying by as much as 532 percent. While the phenomenon of cost variation in healthcare is well-known and high costs are the result of many factors — including an aging population, new treatments, and technologies — data reveal that in markets with a high degree of cost variation, a significant volume of episodes occur at higher cost facilities.

Further analysis indicates that there are other facilities in these same markets that deliver quality outcomes at a lower cost.

These findings reinforce the importance of competition within a market and the need to provide consumers with effective tools to help them make informed decisions about their care.

Many angioplasties nationally are performed while a patient is suffering a heart attack. This analysis focuses solely on those procedures performed under less urgent conditions, making it possible for consumers to consider both cost and quality in choosing the best facility for their care. Cost and quality information are included in many transparency tools to inform consumers on where to seek high-quality, affordable care.

Variation in cost across markets is also significant and can vary by as much as 295 percent. This continues to concern national employers seeking solutions that help their employees in choosing quality settings for their care, while reducing overall costs.

This is the second report by Blue Cross Blue Shield, The Health of America Report, a collaboration between the Blue Cross Blue Shield Association and Blue Health Intelligence, which uses a market-leading claims database to uncover key trends and provide insight into healthcare affordability and access to care. These insights also point to where Blue Cross and Blue Shield (BCBS) innovations can address pressing market issues.

## COST VARIATION IN CARDIAC CARE: VARIATION WITHIN MARKETS

Of the top MSAs across the country that were evaluated for this report, nearly half have episode cost variations greater than 100 percent. Figure 1 below highlights cost variation within markets with 13 MSAs showing significant variation (>200 percent).

**Figure 1: Map of cost variation within markets for PCI episodes across MSAs**

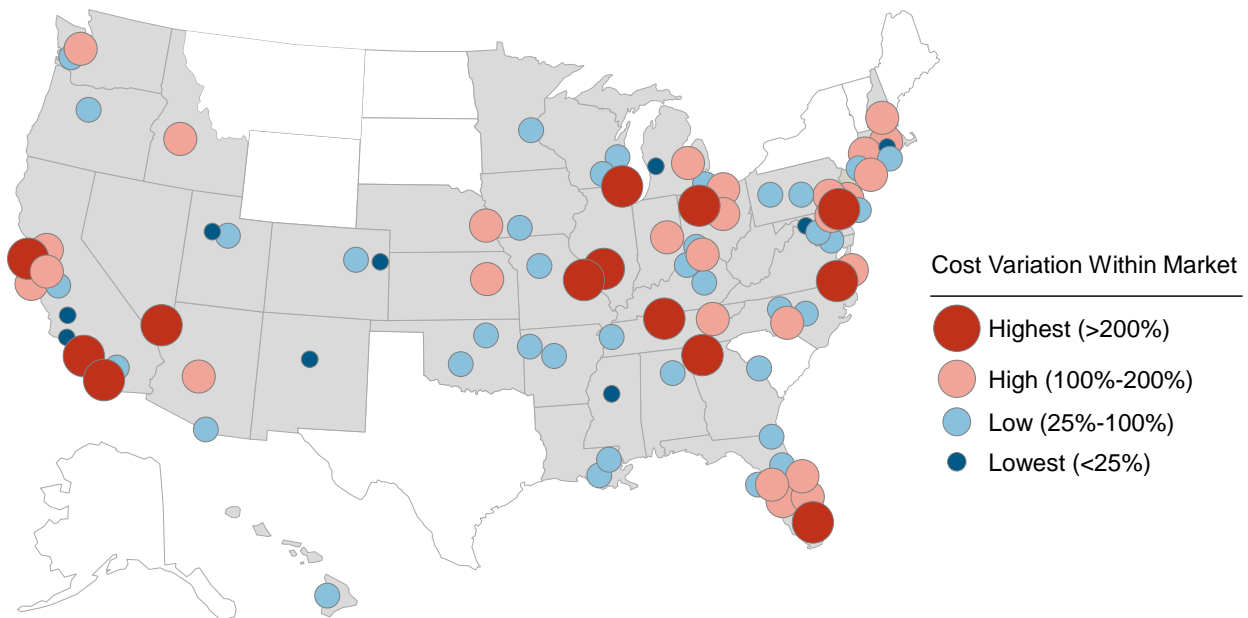


Figure 2 below highlights the top five MSAs with the highest variation in episode costs and the five MSAs with the lowest variation of episode costs within each market. Variation can be as high as 532 percent in Los Angeles-Long Beach, California, and as low as 13 percent in Ventura, California.

**Figure 2: Top markets with high and low cost variation within an MSA for PCI episodes**

Highest Variation MSAs		Lowest Variation MSAs <sup>1</sup>	
California, Los Angeles-Long Beach	532%	California, Ventura	13%
California, Oakland	504%	Michigan, Grand Rapids-Muskegon	17%
California, San Diego	443%	Colorado, Colorado Springs	21%
Virginia, Richmond-Petersburg	398%	New Mexico, Albuquerque	22%
Illinois, Southwest	381%	Mississippi, Jackson	24%

<sup>1</sup> Includes MSAs with 2 or more facilities

Interestingly, in the top five high variation markets, the findings showed that high cost facilities (that is, those with median episode costs that are at least 20 percent above the median within each MSA) have a significant portion of the total episodes performed at high cost facilities (see Figure 3 below).

It is important to note that in each of these markets, alternative facilities are, at present, delivering high-quality care<sup>1</sup> at lower episode costs. For example, in the five MSAs identified below, 16 facilities deliver high-quality care at lower episode costs. Having these options highlights the importance of competition within a market and equipping consumers with information and transparency tools to make informed decisions on where to seek care.

**Figure 3: Table of Top 5 High Variation MSAs and Level of Concentration in High Cost Facilities**

	<b>% Episode Cost Variation</b>	<b>% of Episodes Completed at High Cost Facilities<sup>2</sup></b>
California, Los Angeles-Long Beach	532%	42%
California, Oakland	504%	54%
California, San Diego	443%	55%
Virginia, Richmond-Petersburg	398%	38%
Illinois, Southwest	381%	21%

When looking at the number of facilities in the top five highest variation markets, the number of facilities ranged from six to 33 within a market. While overall, more facilities can lead to higher variation, in the five highest variation markets, the number of facilities varied considerably. It is acknowledged that greater cost variability within markets tend to exist where there are more facilities.<sup>3</sup> The underlining factors which contribute to cost variation in larger MSAs are beyond the scope of this report.

## COST VARIATION IN CARDIAC CARE: VARIATION ACROSS MARKETS

The findings confirm the widely known healthcare industry trend that significant cost variation exists across the country. Of the MSAs evaluated for this report, approximately one-third have median episode costs at least 20 percent above the median of \$27,144. Figure 4 below highlights variation across all markets relative to the national median cost.

**Figure 4: Map of median costs across markets for PCI episodes across MSAs**

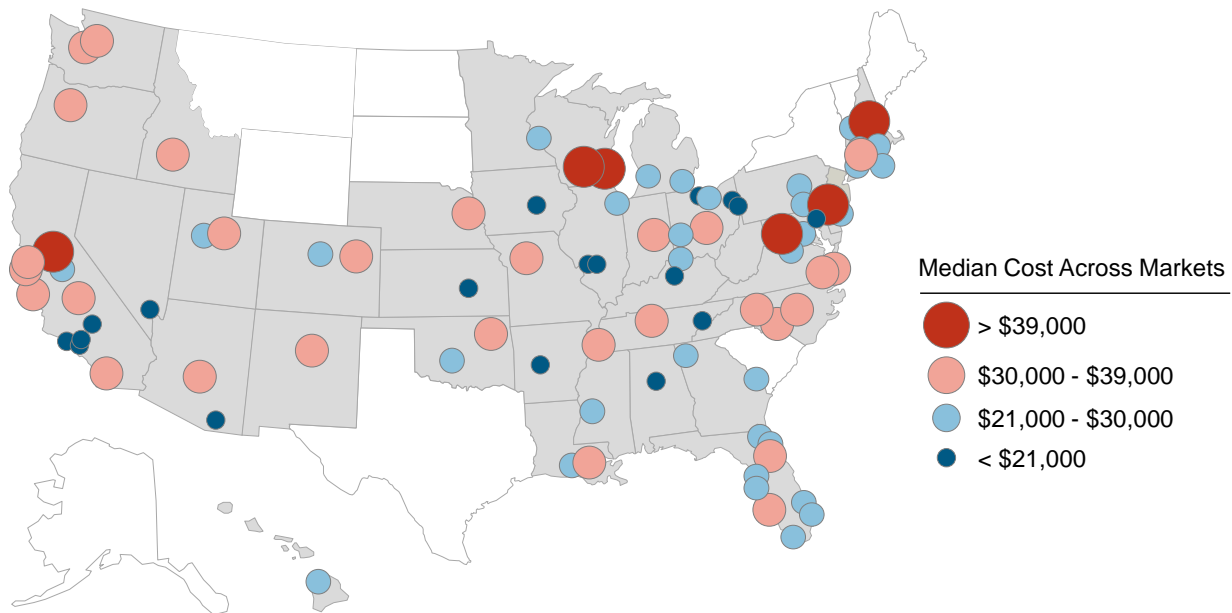


Figure 5 below shows the top five MSAs with the highest median episode costs and the five MSAs with the lowest median episode costs. Episode costs can be as little as \$15,494 in Birmingham, Alabama, or as much as \$61,231 in Sacramento, California.

**Figure 5: Top markets with high and low median costs for PCI episodes**

Highest Median Cost MSAs		Lowest Median Cost MSAs	
California, Sacramento	\$61,231	Alabama, Birmingham	\$15,494
Southwest New Hampshire	\$46,506	Maryland, Baltimore	\$16,130
Delaware, Wilmington-Newark	\$46,272	Kentucky, Louisville	\$16,313
Wisconsin, Milwaukee-Waukesha	\$44,164	Tennessee, Knoxville	\$16,655
Wisconsin, Madison	\$42,211	Southwest Maryland	\$16,906

## CONCLUSION

The Health of America Report analyzed cost variation in 86 of the 100 largest MSAs across the country and found wide disparity in the median cost per episode for angioplasty procedures performed on patients who were not experiencing a heart attack. The report examines episodes among patients whose procedures were performed under less urgent circumstances. The analysis found significant cost variation both within and across markets even after adjustments were made to reflect geographic differences in business costs. Understanding the reasons for this variation, resulting outcomes for patients, and the impacts on the healthcare system as a whole is a critical next step. The goal is to influence positive change in the market to improve clinical quality, lower healthcare costs, and increase patient satisfaction associated with PCI as a treatment for cardiovascular disease.

Blue Cross and Blue Shield companies recognize the importance of provider selection when members are faced with seeking cardiac care. To that end, BCBS companies have designated healthcare facilities as Blue Distinction<sup>®</sup> in the majority of states across the U.S. Blue Distinction<sup>®</sup> Centers and Blue Distinction<sup>®</sup> Centers+ for cardiac care provide a full range of cardiac care services including inpatient cardiac care, cardiac rehabilitation, cardiac catheterization, and cardiac surgery (including coronary artery bypass graft surgery).

To earn the Blue Distinction designation, hospitals must demonstrate better quality and improved outcomes for patients by lowering rates of complications following certain cardiac procedures and lowering rates of healthcare-associated infections compared with their peers. Blue Distinction Centers+ are also 20 percent more cost-efficient than non-designated hospitals for those same cardiac procedures. In fact, Blue Distinction Centers+ can generate savings greater than 40 percent in certain markets.

As part of its evaluation of treatment for heart disease more broadly, The Health of America Report, using BCBS data, will also be focusing on identifying current trends and treatments for women as well as other topics on the treatment of cardiovascular disease.

## About Blue Cross Blue Shield, Health of America Report

**Blue Cross Blue Shield, The Health of America Report** is a collaboration between the Blue Cross Blue Shield Association and Blue Health Intelligence that aims to mine a market-leading claims database to uncover key trends and provide insight into healthcare dynamics and ultimately support improved quality and affordability for Americans.

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### About the Blue Cross Blue Shield Association

**The Blue Cross Blue Shield Association** is a national federation of 36 independent, community-based and locally operated Blue Cross and Blue Shield companies that collectively provide healthcare coverage for more than 106 million members — one in three Americans. For more information on the Blue Cross Blue Shield Association and its member companies, please visit [bcbs.com](http://bcbs.com).

### About Blue Health Intelligence

**Blue Health Intelligence Company** is the nation's premier health intelligence resource, delivering data-driven insights about healthcare trends and best practices, resulting in healthier lives and more affordable access to safe and effective care. HIC accesses healthcare claims data from more than 140 million individuals nationwide, collected over nine years, in a safe, HIPAA compliant and secure database. The resulting conformed, reliable data set has the broadest, deepest pool of integrated medical and pharmacy claims, reflecting medical utilization in every ZIP code. Health Intelligence Company, LLC operates under the trade name Blue Health Intelligence (BHI) and is an Independent Licensee of the Blue Cross and Blue Shield Association. For more information, visit <http://www.bluehealthintelligence.com/>.



## APPENDIX A – COST VARIATION AND MEDIAN COSTS

### COST VARIATION WITHIN AN MSA AND MEDIAN EPISODE COST FOR PCI EPISODES WITHOUT A HEART ATTACK

MSA Name	% Cost Variation	Median Min	Median Max	Median
California, Los Angeles-Long Beach	532%	\$ 10,749	\$ 67,937	\$ 20,179
California, Oakland	504%	\$ 15,287	\$ 92,272	\$ 36,914
California, San Diego	443%	\$ 15,168	\$ 82,386	\$ 38,579
Virginia, Richmond-Petersburg	398%	\$ 10,828	\$ 53,881	\$ 31,686
Illinois, Southwest	381%	\$ 14,888	\$ 71,663	\$ 20,457
Nevada, Las Vegas	347%	\$ 11,391	\$ 50,913	\$ 20,177
Pennsylvania, Philadelphia	311%	\$ 12,461	\$ 51,272	\$ 25,285
Missouri, St. Louis	287%	\$ 14,926	\$ 57,814	\$ 19,697
Ohio, Toledo	273%	\$ 14,856	\$ 55,350	\$ 20,747
Georgia, Atlanta	233%	\$ 14,243	\$ 47,451	\$ 26,321
Tennessee, Nashville	223%	\$ 14,233	\$ 45,926	\$ 37,774
Florida, Miami	218%	\$ 15,993	\$ 50,781	\$ 25,046
Illinois, Chicago	211%	\$ 15,951	\$ 49,604	\$ 24,397
Arizona, Phoenix-Mesa	198%	\$ 18,866	\$ 56,265	\$ 35,059
California, San Jose	192%	\$ 14,630	\$ 42,672	\$ 30,675
Ohio, Cleveland-Lorain-Elyria	190%	\$ 12,471	\$ 36,211	\$ 24,733
Nebraska, Omaha	184%	\$ 19,603	\$ 55,763	\$ 35,540
California, San Francisco	184%	\$ 20,476	\$ 58,178	\$ 37,272
Virginia, Norfolk-Virginia Beach	181%	\$ 17,795	\$ 50,053	\$ 35,569
Maryland, Baltimore	175%	\$ 13,528	\$ 37,203	\$ 16,130
California, Sacramento	172%	\$ 24,059	\$ 65,553	\$ 61,232
Florida, Tampa-St. Petersburg	172%	\$ 19,167	\$ 52,182	\$ 28,287
Michigan, Detroit	169%	\$ 18,501	\$ 49,778	\$ 24,484
Pennsylvania, Allentown-Bethlehem	164%	\$ 18,444	\$ 48,780	\$ 31,148
Washington, Seattle-Bellevue-Everett	146%	\$ 21,714	\$ 53,498	\$ 33,157
Ohio, Columbus	143%	\$ 22,169	\$ 53,928	\$ 30,492
North Carolina, Charlotte-Gastonia	140%	\$ 17,765	\$ 42,655	\$ 34,603
Massachusetts, Boston-Worcester	139%	\$ 19,526	\$ 46,614	\$ 25,017
Florida, Fort Myers-Cape Coral	136%	\$ 18,273	\$ 43,133	\$ 30,134
Indiana, Indianapolis	132%	\$ 22,034	\$ 51,061	\$ 35,225
Connecticut, New Haven-Bridgeport	127%	\$ 19,154	\$ 43,559	\$ 28,433
Idaho, Boise City	123%	\$ 17,946	\$ 40,042	\$ 31,187
New Hampshire, Southeast	118%	\$ 37,317	\$ 81,522	\$ 46,506
Florida, West Palm Beach	117%	\$ 18,594	\$ 40,423	\$ 25,785
Florida, Fort Lauderdale	117%	\$ 17,166	\$ 37,305	\$ 24,309
Ohio, Cincinnati	110%	\$ 20,954	\$ 43,953	\$ 23,697
Tennessee, Knoxville	107%	\$ 13,674	\$ 28,271	\$ 16,655
California, Bakersfield	106%	\$ 15,991	\$ 32,904	\$ 18,153
Kansas, Wichita	102%	\$ 15,352	\$ 31,046	\$ 20,951
Arkansas, Little Rock	99%	\$ 10,039	\$ 19,947	\$ 17,619
Connecticut, Hartford	98%	\$ 21,868	\$ 43,224	\$ 30,946
Louisiana, New Orleans	94%	\$ 20,817	\$ 40,459	\$ 26,753

MSA Name	% Cost Variation	Median Min	Median Max	Median
Florida, Sarasota-Bradenton	94%	\$ 19,966	\$ 38,751	\$ 22,839
Oklahoma, Oklahoma City	92%	\$ 19,622	\$ 37,769	\$ 26,764
Virginia, Northern	90%	\$ 18,767	\$ 35,599	\$ 26,186
Wisconsin, Milwaukee-Waukesha	88%	\$ 32,848	\$ 61,749	\$ 44,164
Kansas/Missouri, Kansas City	83%	\$ 23,088	\$ 42,288	\$ 30,889
Minnesota, Minneapolis-St. Paul	82%	\$ 22,993	\$ 41,769	\$ 28,453
Tennessee, Memphis	79%	\$ 28,161	\$ 50,486	\$ 34,238
Rhode Island, Providence-Warwick	79%	\$ 16,404	\$ 29,349	\$ 23,687
Georgia, Augusta-Aiken	78%	\$ 14,504	\$ 25,747	\$ 24,474
Maryland, Southwest	76%	\$ 12,501	\$ 22,007	\$ 16,907
Kentucky, Louisville	76%	\$ 13,372	\$ 23,486	\$ 16,313
Oklahoma, Tulsa	75%	\$ 21,330	\$ 37,345	\$ 30,003
California, Riverside-San Bernardino	73%	\$ 13,842	\$ 24,010	\$ 17,535
California, Fresno	73%	\$ 23,897	\$ 41,400	\$ 30,165
Washington, Portland-Vancouver	72%	\$ 27,744	\$ 47,797	\$ 32,987
Ohio, Akron	66%	\$ 19,705	\$ 32,748	\$ 24,452
North Carolina, Greensboro-Winston-Salem	65%	\$ 22,122	\$ 36,475	\$ 32,290
Pennsylvania, Harrisburg-Lebanon	61%	\$ 20,899	\$ 33,640	\$ 25,656
Colorado, Denver	59%	\$ 23,338	\$ 37,201	\$ 27,207
Alabama, Birmingham	57%	\$ 11,956	\$ 18,786	\$ 15,495
Arizona, Tucson	53%	\$ 15,604	\$ 23,943	\$ 20,864
Delaware, Wilmington-Newark	53%	\$ 33,655	\$ 51,363	\$ 46,273
Florida, Daytona Beach	51%	\$ 19,567	\$ 29,512	\$ 22,380
Iowa, Des Moines	51%	\$ 15,064	\$ 22,716	\$ 18,355
Florida, Jacksonville	47%	\$ 21,796	\$ 32,088	\$ 25,470
Ohio, Dayton-Springfield	46%	\$ 20,360	\$ 29,684	\$ 24,396
Wisconsin, Madison	44%	\$ 36,316	\$ 52,473	\$ 42,211
Louisiana, Baton Rouge	42%	\$ 28,666	\$ 40,754	\$ 36,822
Pennsylvania, Pittsburgh	41%	\$ 16,654	\$ 23,452	\$ 19,204
Hawaii, Honolulu	39%	\$ 22,545	\$ 31,311	\$ 26,385
Utah, Salt Lake City-Ogden	38%	\$ 27,375	\$ 37,700	\$ 32,681
Florida, Orlando	37%	\$ 28,846	\$ 39,572	\$ 31,686
District Of Columbia, Washington	34%	\$ 21,160	\$ 28,257	\$ 24,709
North Carolina, Raleigh-Durham	32%	\$ 28,628	\$ 37,926	\$ 32,880
Washington, Tacoma	25%	\$ 35,383	\$ 44,251	\$ 38,002
Mississippi, Jackson	24%	\$ 23,359	\$ 28,967	\$ 25,454
New Mexico, Albuquerque	22%	\$ 31,053	\$ 37,874	\$ 34,464
Colorado, Colorado Springs	21%	\$ 32,313	\$ 39,137	\$ 35,725
Michigan, Grand Rapids-Muskegon	17%	\$ 26,538	\$ 31,041	\$ 28,790
California, Ventura	13%	\$ 17,019	\$ 19,279	\$ 18,149
West Virginia, Northeast*	0%	\$ 39,323	\$ 39,323	\$ 39,323
Utah, Provo-Orem*	0%	\$ 29,242	\$ 29,242	\$ 29,242
Massachusetts, Springfield*	0%	\$ 23,077	\$ 23,077	\$ 23,077
California, Stockton-Lodi*	0%	\$ 21,256	\$ 21,256	\$ 21,256
<i>*Only include 1 facility each</i>				