Average Price Trends for Implantable Medical Devices, 2011-2015

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Introduction and Summary of Findings

This study examines empirical evidence on reported average price trends for several major categories of implantable medical devices (IMDs) over the period 2011 through 2015.

It updates a prior analysis of average pricing trends in the same categories of IMDs over the period 2007 through 2011, which found a decline in inflation-adjusted average prices paid by sampled hospitals (using the medical care CPI) ranged from 17 to 34 percent, depending on the device category.

This study finds that the reported average price paid by hospitals for each type of implantable medical device studied continued to decline during the 2011-2015 period, both on a nominal and inflation-adjusted basis:

- Adjusting using the medical care CPI, ***inflation-adjusted prices declined from 18 to 28 percent between 2011 and 2015***, depending on the device category.
- Unadjusted for inflation, average prices declined from 8 to 20 percent between 2011 and 2015, depending on the device category.
- ***On both an inflation-adjusted basis and a nominal price basis (i.e., unadjusted for inflation), every category of medical device analyzed experienced declines in average prices paid both between 2007 and 2011, and between 2011 and 2015***.

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[2] Funding for this research was provided by the Advanced Medical Technology Association. The design, analysis, and composition of the analyses presented were conducted independently and entirely by the author, who is responsible for any errors or misstatements. The author thanks Millennium Research Group, Inc. for survey data for the selected implantable medical device categories.

Study Methodology

Average pricing data for selected device categories

Average pricing data were obtained from Millennium Research Group, Inc. (MRG), an independent third-party provider of proprietary survey data of average selling prices, for the following seven categories of medical devices:

- cardiac resynchronization therapy defibrillators (CRTDs);
- implantable cardioverter defibrillators (ICDs);
- pacemakers;
- artificial hips;
- artificial knees;
- drug-eluting stents; and
- bare metal stents.

The survey includes results from 148 to 774 hospitals, depending on the device category and year. The hospital sample is characterized by MRG as nationally representative in terms of the mix of hospital characteristics and geography. The average pricing data are described as reflecting net acquisition costs reported by hospitals after accounting for all discounts and rebates.

The methodology used to collect average selling price data differs from the prior study of 2007-2011 trends – whereas the prior methodology relied exclusively on a survey of hospital-reported average prices, the current methodology relies on directly-sampled invoice data for the interventional cardiology (bare metal and drug-eluting stent) and reconstructive joint implant (hip and knee replacement) markets. Therefore, results for the two periods are reported separately, with figures for the year 2011 being calculated separately under each methodology.

Interpreting average pricing data trends

The pricing data presented summarize *average* prices reported by the sampled hospitals for all models and manufacturers for all products in a given device category, rather than pricing trends for any specific model of device or manufacturer. The reported average prices for a given category are sales-weighted across all manufacturers and types of devices (e.g., dual chamber pacemakers vs. single chamber pacemakers) within each of the seven selected categories of medical devices for the sampled hospitals.

The price trends presented reflect the average reported price paid for the device component examined, as opposed to the average total medical device-related costs for a procedure involving that device. Factors other than the reported average selling price of the device type may affect hospital device-related costs for a patient procedure, including:

- The average device price ***does not reflect changes in the intensity of use*** of the device type per patient procedure over time (e.g., changes in the number of stents implanted during a given procedure).

- The average device price does not control for ***changes in the average quality or features*** of devices in the category over time (or the resulting implications for hospital non-device costs, such as the length of stay or utilization of other resources, or the impact on patient outcomes). To the extent that the device types examined have *increased in quality* over time and/or contribute to improved patient outcomes, the average reported price trends would *understate the decline in quality-adjusted real prices*.

- Similarly, the average device price does not control for ***changes in product mix in a given medical device category*** over time (e.g., as a result of substituting less or more expensive models of devices in the same category due to technological advances or purchasing initiatives). The price for a specific device from a given manufacturer over time may have increased or decreased.

Inflation- adjusted prices

To compare figures on a common basis, all average price figures were adjusted to real values using the Consumer Price Index for all urban consumers for medical care expenditures (medical care CPI).[3] The medical care CPI measures inflation for a market basket of medical care products and services, generally holding those products and services constant. Trends in the average reported selling price for selected IMDs adjusting for inflation using the medical care CPI are therefore compared relative to the trend in the average price of a general market basket of all medical care products and services.

For example, during this four year period, while the medical care CPI increased, a decline in the reported real (inflation-adjusted) average selling price for an IMD type means that the average cost for devices of that type decreased relative to an upward trend in prices of all medical care items.

Calculations were also conducted using the general CPI for all urban consumers (CPI-U), a measure of average prices in the economy for consumers generally, rather than the medical care CPI, and results are presented f or comparison in **Appendix A**.

Price trends for non-inflation-adjusted (nominal) reported average prices are presented in **Appendix B**.

[3] Bureau of Labor Statistics, Consumer Price Index – All Urban Consumers, Medical Care, Accessed July 11, 2016, from http://data.bls.gov/pdq/querytool.jsp?survey=cu.

Finding: Reported average prices paid by hospitals for the medical devices reviewed declined from 2011 to 2015 on both an inflation-adjusted basis and on a non-inflation-adjusted basis

Reported average device prices declined in each device category over the period 2011 to 2015, on both a real (inflation-adjusted) and on a nominal (non-inflation-adjusted) basis.

Table 1 reports the percentage change in the average selling price for each category of device relative to the 2011 average price in the same category and after adjusting for inflation.[4]

Figure 1 presents the same information graphically, and also includes the previously-reported results for 2007-2011.

The average selling price for each device category declined in real terms between 2011 and 2015. The size of this decline ranges from an 18 percent decline for artificial knees to a 28 percent decline for drug-eluting stents (corresponding to a compounded average annual rate of decline of -4.8 percent and -8.0 percent, respectively).

Table 1
Percentage Change in Reported Average Real Prices, 2011 to 2015
By Medical Device Category[5]

Inflation-Adjusted by Medical Care CPI

Device category	2011	2012	2013	2014	2015	**Total Percentage change**
CRTDs	100%	92%	86%	81%	80%	**-20%**
ICDs	100%	91%	86%	80%	79%	**-21%**
Pacemakers	100%	93%	89%	85%	81%	**-19%**
Artificial hips	100%	95%	88%	84%	77%	**-23%**
Artificial knees	100%	94%	89%	88%	82%	**-18%**
Drug-eluting stents	100%	91%	85%	78%	72%	**-28%**
Bare metal stents	100%	90%	83%	77%	77%	**-23%**

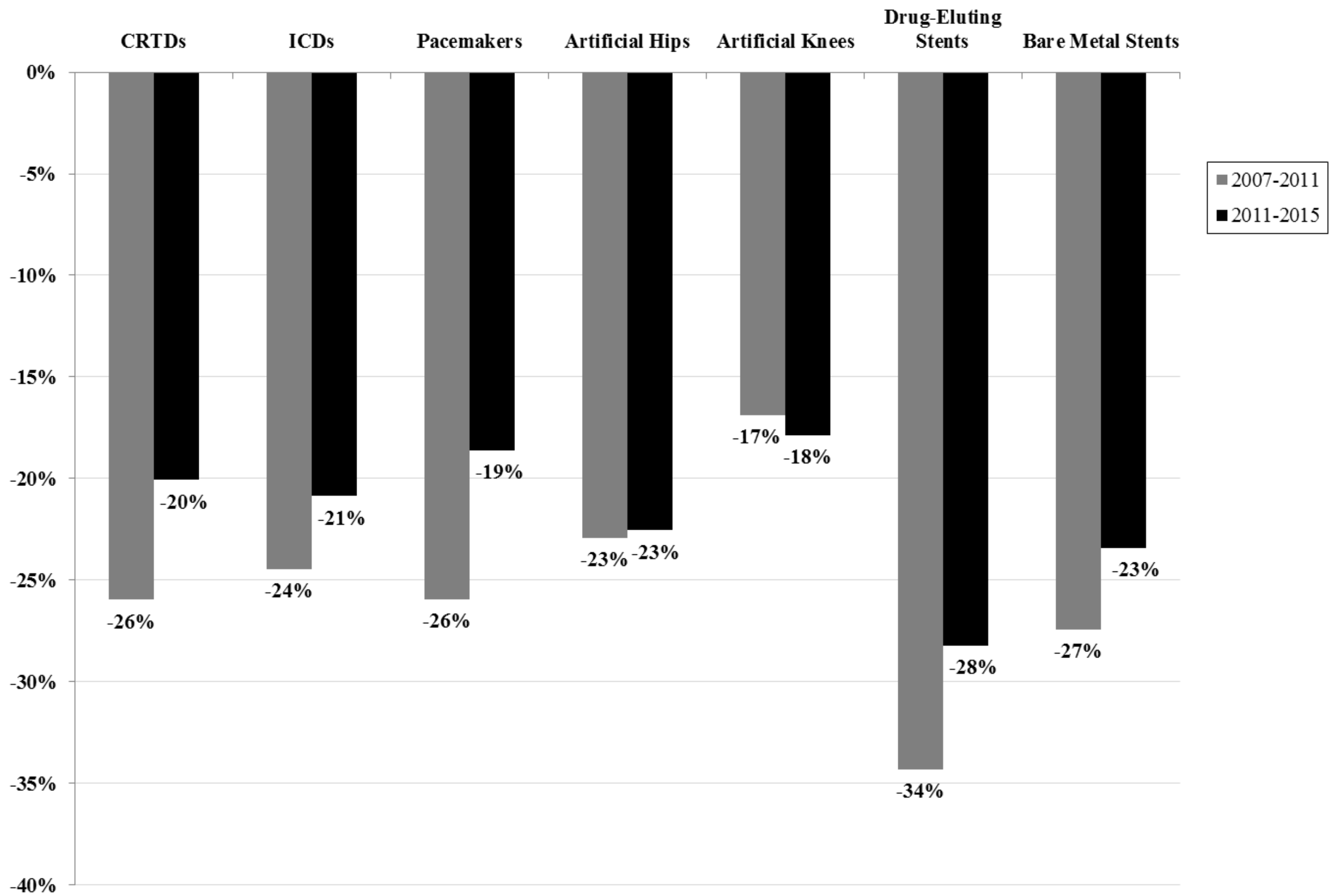
Notes: The device category “Artificial hips” reflects a total hip replacement and is calculated as the sum of the average prices for acetabular liners, acetabular cups, femoral heads, and femoral stems. The device category “Artificial knees” reflects a total knee replacement and is calculated as the sum of the average prices for femoral components, patella, tibial insert, and tibial baseplate. Inflation-adjusted using the medical care CPI.

[4] **Table 1** utilizes the medical care CPI. **Appendix A** reflects the same analysis adjusted by the CPI-U.

[5] Average price data provided by Millennium Research Group, Inc. (©2016 Millennium Research Group, Inc. All rights reserved. Reproduction, distribution, transmission or publication is prohibited. Used with permission.). Medical care CPI data accessed from the Bureau of Labor Statistics.

Figure 1
Four-Year Percent Change in Average Prices
By Medical Device Category
2007-2011 and 2011-2015

Inflation-Adjusted by Medical Care CPI[6]



[6] Average price data provided by Millennium Research Group, Inc. (©2016 Millennium Research Group, Inc. All rights reserved. Reproduction, distribution, transmission or publication is prohibited. Used with permission.). Medical care CPI data accessed from the Bureau of Labor Statistics.

Conclusion

Assuming that the reported pricing data are generally representative of U.S. hospitals and their prices paid, the findings suggest that average prices for implantable medical devices paid by hospitals have continued to decline substantially in recent years on an inflation-adjusted basis.

Regardless of whether the inflation adjustment is implemented using the medical care CPI or the general CPI for all urban consumers, average inflation-adjusted prices decreased between 2011 and 2015 in each of the seven medical device categories analyzed.

Even when unadjusted for inflation, reported nominal average prices declined in each of the seven medical device categories analyzed.

These decreases follow previously-documented decreases between 2007 and 2011 in each of the seven medical device categories analyzed, also on both an inflation-adjusted and a non-inflation-adjusted basis.

Appendix A
Trends in Reported Average Device Prices
Adjusted for General Inflation (Inflation-Adjusted Using CPI-U)

Table A1 reports the results contained in Table 1, but applies the general consumer price index for all goods for urban consumers (CPI-U) rather than the medical care CPI to adjust reported IMD average prices.[7]

In general, the CPI-U reflects a lower level of inflation compared to the medical care CPI, however, regardless of whether the inflation adjustment relies on the medical care CPI or the general CPI-U, reported average price declines are observed in each of the seven medical device categories studied.

Table A1
Percentage Change in Reported Average Real Prices, 2011 to 2015
By Medical Device Category[8]

Inflation-Adjusted by CPI-U

Device category	2011	2012	2013	2014	2015	**Total Percentage change**
CRTDs	100%	93%	89%	84%	85%	**-15%**
ICDs	100%	92%	88%	83%	84%	**-16%**
Pacemakers	100%	95%	91%	88%	86%	**-14%**
Artificial hips	100%	96%	91%	87%	82%	**-18%**
Artificial knees	100%	95%	91%	91%	87%	**-13%**
Drug-eluting stents	100%	93%	87%	80%	76%	**-24%**
Bare metal stents	100%	92%	85%	80%	81%	**-19%**

Notes: The device category "Artificial hips" reflects a total hip replacement and is calculated as the sum of the average prices for acetabular liners, acetabular cups, femoral heads, and femoral stems. The device category "Artificial knees" reflects a total knee replacement and is calculated as the sum of the average prices for femoral components, patella, tibial insert, and tibial baseplate. Inflation adjusted using the general CPI-U.

[7] Bureau of Labor Statistics, Consumer Price Index – All Urban Consumer, All Items, Accessed July 11, 2016, from http://data.bls.gov/pdq/querytool.jsp?survey=cu.

[8] Average price data provided by Millennium Research Group, Inc. (©2016 Millennium Research Group, Inc. All rights reserved. Reproduction, distribution, transmission or publication is prohibited. Used with permission.). CPI-U data accessed from the Bureau of Labor Statistics.

Appendix B
Trends in Reported Average Device Prices
Unadjusted for Inflation (Nominal Prices)

Table B1 reports the results contained in Table 1, but reflects the nominal reported IMD average prices (i.e., they have not been adjusted for inflation).

Nevertheless, reported average nominal price declines are observed for each of the seven medical device categories examined.

Table B1
Percentage Change in Reported Average Real Prices, 2011 to 2015
By Medical Device Category[9]

In Nominal Dollars (Not Adjusted for Inflation)

Device category	2011	2012	2013	2014	2015	**Total Percentage change**
CRTDs	100%	95%	92%	88%	89%	**-11%**
ICDs	100%	94%	91%	87%	88%	**-12%**
Pacemakers	100%	97%	94%	93%	91%	**-9%**
Artificial hips	100%	98%	94%	92%	86%	**-14%**
Artificial knees	100%	97%	95%	95%	92%	**-8%**
Drug-eluting stents	100%	95%	90%	85%	80%	**-20%**
Bare metal stents	100%	94%	88%	84%	85%	**-15%**

Notes: The device category "Artificial hips" reflects a total hip replacement and is calculated as the sum of the average prices for acetabular liners, acetabular cups, femoral heads, and femoral stems. The device category "Artificial knees" reflects a total knee replacement and is calculated as the sum of the average prices for femoral components, patella, tibial insert, and tibial baseplate.

[9] Average price data provided by Millennium Research Group, Inc. (©2016 Millennium Research Group, Inc. All rights reserved. Reproduction, distribution, transmission or publication is prohibited. Used with permission.).