

A 2014 Update of Cost Savings and Marketplace Analysis of the Health Care Group Purchasing Industry

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A 2014 Update of Cost Savings and Marketplace Analysis of the Group Purchasing Industry

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Executive Summary

Dobson DaVanzo & Associates, LLC was commissioned by the Healthcare Supply Chain Association (HSCA) to update a May 2009 report detailing the value of group purchasing organizations (GPOs) to the U.S. health care system. In the 2009 report, Goldenberg and King estimated the size of the GPO marketplace and GPO market penetration. Goldenberg and King also quantified the savings produced by GPOs to the overall health care sector as well as to the Medicare and Medicaid program over a one-, five-, and ten-year period.¹ In summary, the report estimated that GPOs generated/will generate savings to the entire U.S. health care system of:

- \$29.3 billion to \$64.5 billion in 2008;
- \$164.2 billion to \$361.4 billion over the subsequent five-year period (2008 to 2012)
- \$380.8 billion to \$838.3 billion over the subsequent ten-year period (2008 to 2017)

GPOs serve as “trusted partners” to hospitals and other health care providers who must act as prudent and cost-conscious buyers in making purchases.² GPOs negotiate contracts for hospitals to purchase essential supplies while minimizing costs. GPOs do not purchase or take ownership of products; they instead negotiate competitive contract pricing. GPOs generate savings by reducing costs across sales and supply chains to providers using economies of scale, increased negotiating power, expertise in providing high value supplies, and by reducing the administrative costs to providers for purchasing these products. In total, estimates suggest that GPO activity lead to a reduction in supply-related purchasing costs to nursing homes and hospitals by 10 to 18 percent compared to the costs

GPOs are projected to reduce health care spending by up to \$864.4 billion over the next ten years.

Goldenberg and King, 2009

¹ Goldenberg D, King R. (2009). A 2008 Update of Cost Savings and a Marketplace Analysis of the Health Care Group Purchasing Industry. Locus Systems.

² Amendment to Medicare Provider Reimbursement Manual, Part 1, Chapter 8. Transmittal 450, December 2011.

Executive Summary

for providers who do not utilize GPOs.³ GPOs are able to reduce their members' price per unit by employing market intelligence, product expertise, and volume purchasing.⁴

In this report, we use updated National Health Expenditure (NHE) data published by CMS to re-evaluate the prior estimated savings that GPOs produce over a one-, five-, and ten-year period. Additionally, we incorporate updated estimates of the non-labor proportion (e.g., supplies, implantable medical devices, and prescription drugs) of hospital and nursing home spending than was used in the 2009 report. To develop these estimate, we used data points that could be confidently quantified and are generally consistent with those found in the literature.

Using these updated data, we estimate that GPOs generated/will generate savings to the entire U.S. health care system of:

- \$25.0 billion to \$55.2 billion in 2012
- \$167.9 billion to \$370.0 billion over the subsequent five year period (2013 to 2017)
- \$392.2 billion to \$864.4 billion over the subsequent ten-year period (2013 to 2022)

Overall, the savings estimates are relatively consistent with those presented in the 2009 report. Slight reductions in the impact of GPOs were observed through downward revisions in our estimates of the non-labor proportion of hospital and nursing home spending. Increases in the impact of GPOs were observed through increased estimates of hospital and nursing home spending from 2008 to 2012.

On balance, we believe this estimate is low because GPOs have been bringing down the cost of supplies to hospitals for over 100 years. This means that there is some portion of the savings attributable to GPOs which is “buried” in the baseline and is incalculable.

Using the 2012 Medicare Cost Report (MCR) data, we also analyze trends in cost for implantable medical devices (IMDs) (e.g., implantable cardioverter defibrillators, artificial knees). While GPOs negotiate purchases for a variety of supplies, including pharmaceuticals, and a wide range of medical and surgical supplies, IMDs represent a sizeable proportion of the supply purchasing agreements between hospitals and GPOs, and a relatively large proportion of total health expenditures in the U.S. Therefore, examining nationwide trends in IMD costs can help us to gain further insight into the GPO marketplace.

³ Goldenberg D, King R. (2009). A 2008 Update of Cost Savings and a Marketplace Analysis of the Health Care Group Purchasing Industry. Locus Systems.

⁴ Hu Q, Shwarz L. (2011). The Impact of Group Purchasing Organizations on Healthcare-Product Supply Chains. Purdue University.

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Our findings suggest that from 2010 to 2012, IMD costs represented a relatively stable proportion of total hospital costs, increasing from 5.3 percent of overall hospital costs in 2010 to 5.7 percent of overall hospital costs in 2012. While this increase is relatively small, the findings above suggest that any increase in market penetration of GPOs could further reduce the rate of growth of hospital' spending on IMDs.

Given ongoing fiscal pressures to reduce the rate of growth in health care spending, it is important to note the positive impact GPOs have had and will continue to have in bringing cost reduction and efficiency to the health care system.

Introduction

This study is a continuation in a series of studies commissioned by the Health Care Supply Chain Association (HSCA) detailing the importance of group purchasing organizations (GPOs) in improving efficiency and generating savings to the U.S. health care system. Specifically, this report updates an analysis published in 2009 by Locus Systems, which estimates the size of the GPO marketplace, GPO market penetration, and ultimately quantified the savings produced by GPOs to the overall health care sector as well as to the Medicare and Medicaid program over a one-, five-, and ten-year period.⁵

Background on GPOs

Group purchasing organizations play a significant role in the U.S. health care system, consolidating purchasing power across providers and bringing efficiency to sales supply chains, resulting in overall cost savings to providers and patients. Recent estimates suggest that there are over 600 GPOs, and that 96 to 98 percent of hospitals utilize GPO contracts for their purchasing functions.⁶

GPOs negotiate contracts for hospitals to purchase essential supplies while minimizing costs. They do not purchase or take ownership of products; they instead negotiate competitive contract pricing. GPOs organize providers into purchasing groups to consolidate market share. This leads to increased negotiation power, volume discounts, and outsourcing to experts that can assess the needs of providers, and appropriately supply them with the most appropriate products at the most competitive prices. GPO members and customers receive financial benefits through up-front pricing discounts, patronage dividends and distributions, and reduced administrative costs. Additionally, GPOs help to reduce administrative costs to providers, who would have otherwise been required to

⁵ Goldenberg D, King R. (2009). A 2008 Update of Cost Savings and a Marketplace Analysis of the Health Care Group Purchasing Industry. Locus Systems.

⁶ Healthcare Supply Chain Association. A Primer on Group Purchasing Organizations.

dedicate additional staff to these tasks.⁷ One study estimates that this shift in administrative responsibilities alone saves providers over \$2 billion dollars annually.⁸

GPOs reduce costs to providers through a broad range of improvements including “improvements in business processes for sourcing, procuring, receiving, storing, transferring, and consuming health care commodities. These improvements include quality control programs, training and education, information sharing/best practice guidelines (e.g., new models/methods to evaluate drugs, devices, therapies, and other products; appropriate staffing models; inventory control; product evaluations; emerging technologies; etc.), and new software systems (electronic infrastructure/connectivity) to streamline business processes and the movement of products.”⁹

In addition to the cost-savings that GPOs achieve, they can also improve care quality as GPOs ensure that hospitals and providers are delivered the appropriate supplies for each patient. The contribution of GPOs to the U.S. health care industry, therefore, go beyond reduced unit costs of individual products and encompass a much broader focus on systems and processes. Collectively, these improvements lead to increased efficiencies, better use of staff, and lower total costs. Thus, the ongoing role played by GPOs results in savings to providers, patients, and the entire health care system.

Savings Estimates of GPOs

Several studies have attempted to use survey-based approaches, and other assumption-based models to quantify the savings to U.S. healthcare produced by GPOs. A 2009 Schneller study estimated that GPOs saved approximately \$36 billion annually based on findings from a survey of hospitals.¹⁰ Goldenberg and King, the authors of the 2009 report which this study updates, estimated annual savings attributable to GPOs of \$29.3 billion to \$64.5 billion to the U.S. health care sector.¹¹ Although these studies have methodological limitations, particularly the reliance on perceptions and estimations by hospital managers, other investigators have supported these findings directionally.¹²

The following sections of the report present our methodology for quantifying the savings attributable to GPOs, and present savings estimates for 2012, as well as over the subsequent ve-, and ten-year periods. Savings are calculated across the entire health care sector, and within both the Medicare and Medicaid programs.

⁷ Goldenberg D, King R. (2009). A 2008 Update of Cost Savings and a Marketplace Analysis of the Health Care Group Purchasing Industry. Locus Systems.

⁸ Schneller, E. (2009). The Value of Group Purchasing- 2009: Meeting the Needs for Strategic Savings. Health Care Sector Advances, Inc.

⁹ Goldenberg D, King R. (2009). A 2008 Update of Cost Savings and a Marketplace Analysis of the Health Care Group Purchasing Industry. Locus Systems.

¹⁰ Schneller, E. (2009). The Value of Group Purchasing- 2009: Meeting the Needs for Strategic Savings. Health Care Sector Advances, Inc.

¹¹ Goldenberg D, King R. (2009). A 2008 Update of Cost Savings and a Marketplace Analysis of the Health Care Group Purchasing Industry. Locus Systems.

¹² Hu Q, Shwarz L. (2011). Controversial Role of GPOs in Healthcare-Product Supply Chains. *Production and Operations Management*. 20(1):1-15.

Calculating GPO Market Penetration

In order to estimate the potential value of GPOs to the U.S. health care sector, we first established the actual health care expenditures that are subject to GPO management and review using the National Health Expenditures (NHE) data.¹³ The NHE is a data set produced by the Centers for Medicare and Medicaid Services (CMS) on an annual basis. It contains historic, current, and projected health care expenditures overall and by provider type and payer. The most recent NHE data includes current expenditures for 2012 and projections through 2022. Exhibit 1.1 details health expenditures by various service categories. According to NHE data, total health care expenditures in 2012 were \$2,793.4 billion.

Exhibit 1.1 also presents the compound average growth rate (CAGR) in expenditures over the ten-year window from 2013 to 2022 for each service category. The CAGR provides projections of the change over time in expenditures among the various service categories. The CAGR for all health care expenditures is projected to grow at six percent annually from 2013 to 2022, with hospital and nursing home spending also increasing at approximately six percent annually. Among all service categories, other medical products are projected to have the lowest CAGR (slightly below five percent), while home health is projected to have the highest, at over seven percent.

While GPOs have the potential to reduce spending across numerous health care sectors, prior studies have indicated that not all health care sectors utilize GPOs. These studies instead indicate that the sectors most influenced by GPO penetration are hospitals and nursing homes. Hospitals and nursing homes account for a total of 53 percent of total

¹³ Centers for Medicare and Medicaid Services. (2013). National Health Expenditures Projections 2012-2022.

Calculating GPO Market Penetration

health care expenditures (hospitals 32 percent and nursing homes 21 percent). Other areas such as home health, and retail purchases of prescription drugs, durable medical equipment (DME) and other medical supplies were not included in our analysis due to difficulties in quantifying GPO penetration within these sectors, and our inclination toward a conservative estimate.

Exhibit 1.1. National Health Expenditures Data by Service Category (\$ in billions)

Type of Expenditure	Health Care Expenditures 2012	CAGR 2013 to 2022
National Health Expenditures	\$2,793.4	6.013%
Health Consumption Expenditures	\$2,663.4	5.924%
Personal Health Care	\$2,360.4	5.993%
Hospital Care	\$882.3	6.008%
Professional Services	\$752.3	6.033%
Physician and Clinical Services	\$565.0	6.002%
Other Professional Services	\$76.4	6.850%
Dental Services	\$110.9	5.604%
Other Personal Health Care Services	\$138.2	6.557%
Home Health Care	\$77.8	7.287%
Nursing Care and CCRC	\$151.5	5.719%
Retail Outlet Sales of Medical Products	\$358.3	5.455%
Prescription Drugs	\$263.3	5.622%
Other Medical Products	\$95.0	4.983%
Durable Medical Equipment	\$41.3	4.910%
Other Non-durable Medical Products	\$53.7	5.039%

Source: Centers for Medicare and Medicaid Services, National Health Accounts 2012.

Target of Potential GPO Impact

To calculate the value GPOs provide to both hospitals and nursing homes, it is necessary to understand the proportion of health care expenditures within these service categories that are open to the impact of GPOs.

Calculation of the Labor and Non-labor Share of Total Expenditures

While GPOs manage some labor-and staffing-related costs (e.g., nursing services), these costs have been difficult to quantify to date, and are therefore excluded from our analysis. To exclude the cost of labor, we first removed the non-labor component of expenditures for each relevant sector (hospitals and nursing homes). In the 2009 Goldenberg and King study, the authors used a survey-based approach to identify this proportion of non-labor

Calculating GPO Market Penetration

expenditures for hospitals and nursing homes. In this study, we use a revised methodology for this calculation. CMS publishes an annual final regulation for hospitals and nursing homes in the Federal Register. This annual update presents the labor proportion as a percent of expenditures, which CMS uses to apply the area wage index to Medicare payments for the upcoming year. We used this percent as our estimate of the labor proportion and calculated the non-labor proportion by subtracting the labor proportion from 100 percent. In federal fiscal year 2014, the labor proportion for hospitals was 69.6 percent.¹⁴ This results in a non-labor proportion of 30.4 percent. For nursing homes the labor proportion was 69.454 percent, resulting in a non-labor proportion of 30.455 percent.¹⁵

Summary Step #1:



As shown in Exhibit 1.2, using the non-labor proportion of NHE data for hospitals, we calculate non-labor expenditures of \$268.2 billion in 2012. We also calculate non-labor expenditures for nursing home providers of \$46.1 billion in 2012. Details of these calculations can be found in Appendix A, Exhibit A.1, line 4.

Exhibit 1.2. Calculation of the Non-labor Share of Expenditures for Hospitals and Nursing Homes, 2012 (\$ in billions)

Type of Expenditure	Total 2012 Expenditures	Labor Proportion	Non-labor Proportion
Hospital	\$882.3	\$614.1	\$268.2
Nursing Home	\$151.5	\$105.4	\$46.1
Total	\$1,033.8	\$719.4	\$314.4

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services.

¹⁴ Center for Medicare and Medicaid Services, Federal Register, Vol. 78, No 160, August 19, 2013, page 50507

¹⁵ Center for Medicare and Medicaid Services, Federal Register, Vol. 78, No 160, August 6, 2013, page 47946

Calculating GPO Market Penetration

Calculation of the GPO Penetration Rate

Our next step was to calculate the proportion of expenditures for providers already utilizing GPOs. Published estimates of the market penetration rate for GPOs range from 71.71 to 80.00 percent.^{16 17}

Summary Step #2:

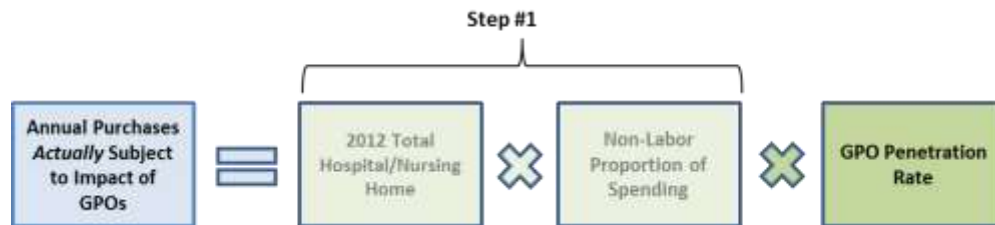


Exhibit 1.3 details the step-down calculation from the total non-labor proportion of expenditures to the range we will use for potential GPO savings. If the GPO penetration rate is 71.71 percent, the total amount of health care expenditures for hospitals and nursing homes subject to the impact of GPOs is \$225.4 billion. If the penetration rate is 80 percent, the total amount of health care expenditures subject to the impact of GPOs is \$251.5 billion. Details of this calculation can be found in Appendix A, Exhibit A.1, lines 6 and 8.

Exhibit 1.3. Calculation of GPO Penetration Rate, 2012 (\$ in billions)

Type of Expenditure	Non-labor Proportion 2012	GPO Penetration 71.71 Percent	GPO Penetration 80 Percent
Hospital	\$268.2	\$192.3	\$214.6
Nursing Home	\$46.1	\$33.1	\$36.9
Total	\$314.4	\$225.4	\$251.5

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services.

¹⁶ Goldenberg D, King R. (2009). A 2008 Update of Cost Savings and a Marketplace Analysis of the Health Care Group Purchasing Industry. Locus Systems.

¹⁷ Applied Policy. (2014). Unpublished Analysis for HSCA which found that 73% of hospital purchases were through a GPO. This is within the range we used in our analysis.

GPO Savings Estimates

GPO Impact on Total Health Care Expenditures

The following steps show the impact on health care expenditures had the savings associated with GPOs not been included in estimates of health care expenditures by CMS in the NHE. The most recent evidence available indicates that GPOs save providers approximately 10 to 18 percent on their purchases. A survey by Muse & Associates indicated that GPOs, on average, save providers between 10 and 15 percent,¹⁸ while a Schneller study found that the GPO savings rate is approximately 18 percent.¹⁹ When applying these percentages to the total expenditures penetrated by the GPO industry (as calculated in Exhibit 1.3), we find that without GPO savings, non-labor hospital and nursing home expenditures may have been as high as \$274.9 billion in 2012 (assuming a penetration rate of 71.71 percent), or \$306.7 billion (assuming a penetration rate of 80 percent) (Exhibit 2.1). Details of these calculations can be found in Appendix A, Exhibit A.2, and A.3, lines 5, 6, and 7.

Exhibit 2.1: Health Care Expenditures without Savings Attributable to GPOs (\$ in billions)

GPO Penetration Rate	Base	10 Percent Savings	15 Percent Savings	18 Percent Savings
71.71 Percent	\$225.4	\$250.5	\$265.2	\$274.9
80 Percent	\$251.5	\$279.4	\$295.9	\$306.7

¹⁸ Muse & Associates. (2002). The Role of Group Purchasing in the Health Care System and the Impact on Public Expenditures is Additional Restrictions are Imposed on GPO Processes.

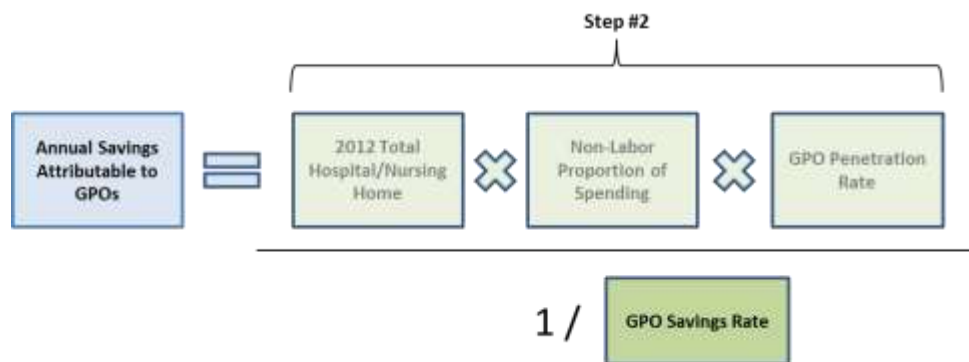
¹⁹ Schneller, E. (2009). The Value of Group Purchasing- 2009: Meeting the Needs for Strategic Savings. Health Care Sector Advances, Inc.

GPO Savings Estimates

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services.

To estimate total savings attributable to GPOs, we then found the difference between the non-labor hospital and nursing home expenditures calculated under baseline assumptions and compared it to the non-labor hospital and nursing home expenditures calculated assuming the absence of GPOs (i.e., difference between base and savings columns in Exhibit 2.1). This was accomplished by taking the product of the calculation of the non-labor portion and the GPO penetration found in Step 2 and dividing it by the ratio of 1 over the GPO savings rate.

Summary Step #3:



The results of this step can be seen in Exhibit 2.2. Based on this calculation, the total savings attributable to GPOs is between \$25.0 and \$55.2 billion in 2012.²⁰

Details of these calculations can be found in Appendix A, Exhibit A.2 and A.3, lines 8, 9, and 10.

Exhibit 2.2: Calculation of the Savings Attributable to GPOs, 2012 (\$ in billions)

GPO Penetration Rate	10 Percent Savings	15 Percent Savings	18 Percent Savings
71.71 Percent	\$25.0	\$39.8	\$49.5
80 Percent	\$27.9	\$44.4	\$55.2

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services.

Exhibits 2.3 and 2.4 provide estimates of the five- and ten-year savings attributable to GPOs based upon the various scenarios shown above. To project savings for the five and

²⁰ Applied Policy recently produced an analysis which found that the total saving attributable to GPO was “more than \$43 billion.” This is within the range we found.

GPO Savings Estimates

ten-year windows, we incorporated a blended CAGR for hospitals and nursing homes. CAGR for each service category can be found above in Exhibit 1.1. This blended rate, 5.966 percent, was applied to the values calculated above for the years 2013 through 2022. Total savings attributable to GPOs, assuming a penetration rate of 71.71 percent, are estimated to be between \$167.9 and \$331.7 billion over five years (2013 to 2017) and between \$392.2 and \$774.9 billion over ten years (2013 to 2022), depending on the savings assumption used (Exhibit 2.3).

Exhibit 2.3: Five- and Ten-Year Savings Based on a 71.71 Percent GPO Penetration Rate (\$ in billions)

Year	10 Percent Savings	15 Percent Savings	18 Percent Savings
5-Year Savings (2013 to 2017)	\$167.9	\$266.7	\$331.7
10-Year Savings (2013 to 2022)	\$392.2	\$622.9	\$774.9

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services.

Assuming a penetration rate of 80.00 percent, the total savings attributable to GPOs are estimated to be between \$187.3 and \$370.0 billion over five years (2013 to 2017) and between \$437.6 and \$864.4 billion over ten years (2013 to 2022), depending on the savings assumption used (Exhibit 2.4).

Exhibit 2.4: Five- and Ten-Year Savings Based on an 80 Percent GPO Penetration Rate (\$ in billions)

Year	10 Percent Savings	15 Percent Savings	18 Percent Savings
5-Year Savings (2013 to 2017)	\$187.3	\$297.5	\$370.0
10-Year Savings (2013 to 2022)	\$437.6	\$694.9	\$864.4

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services.

Given that GPOs have been in the marketplace for over 100 years, we believe that some of the impact of GPOs may already be captured in the baseline. For this reason, we think that the true savings attributable to GPOs is larger than that we were able to estimate in this analysis.

GPO Impact on Medicare Expenditures

We also estimated the impact of GPOs on Medicare expenditures. To calculate this impact we followed the same steps described above for total health care expenditures, but used only Medicare expenditures in the base.

GPO Savings Estimates

Medicare expenditures for hospitals and nursing homes in 2012 totaled \$274.2 billion. After removing the labor proportion, we calculated non-labor Medicare hospital and nursing home expenditures of \$83.4 billion. Applying the 71.71 GPO penetration rate, we calculated \$59.8 billion in Medicare expenditures that are impacted by group purchasing. Applying the 80 percent GPO penetration rate, we calculated \$66.7 billion in Medicare expenditures that are impacted by group purchasing. Applying the three GPO savings estimates described above (10, 15, and 18 percent) we calculate Medicare savings attributable to GPOs of between \$6.6 and \$14.6 billion in 2012. Exhibit 2.5 contains the detail of this step-down.

Exhibit 2.5. Detail of the Medicare Savings Attributable to GPOs, 2012 (\$ in billions)

Base	Hospital	Nursing Home	Total
Total Medicare Expenditures*	\$239.8	\$34.4	\$274.2
Labor Proportion^	69.600%	69.545%	-
Labor Expenditures	\$166.9	\$23.9	\$190.8
Non-labor Expenditures	\$72.9	\$10.5	\$83.4
GPO Penetration Rate at 71.71 Percent#			
Non-labor Expenditures	\$52.3	\$7.5	\$59.8
10 Percent Savings@	\$5.8	\$0.8	\$6.6
15 Percent Savings@	\$9.2	\$1.3	\$10.6
18 Percent Savings**	\$11.5	\$1.7	\$13.1
GPO Penetration Rate at 80 Percent#			
Non-labor Expenditures	\$58.3	\$8.4	\$66.7
10 Percent Savings@	\$6.5	\$0.9	\$7.4
15 Percent Savings@	\$10.3	\$1.4	\$11.8
18 Percent Savings**	\$12.8	\$1.8	\$14.6

Source: *Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services. ^Federal Register, August 6 and 19, 2013, op cit. #Goldenberg and King, May 2009, op cit. @Muse & Associates, September 2002, op cit. **Schneller, April 2009, op cit. Complete details can be found in Appendix B.

Exhibit 2.6 shows the five- and ten-year projected savings that GPOs may produce in the Medicare program assuming a GPO penetration rate of 71.71 percent. Using this rate, we calculated savings between \$44.9 and \$88.7 billion over five years (2013 to 2017) and between \$105.4 and \$208.2 billion over ten years (2013 to 2022).

Exhibit 2.6. Projection of Medicare Savings Attributable to GPOs at 71.71 Percent Penetration Rate (\$ in billions)

Year	10 Percent Savings	15 Percent Savings	18 Percent Savings

GPO Savings Estimates

5 Year Savings (2013 to 2017)	\$44.9	\$71.3	\$88.7
10 Year Savings (2013 to 2022)	\$105.4	\$167.4	\$208.2

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services. Complete details can be found in Appendix B.

Assuming an 80 percent market penetration, we calculated savings between \$49.7 and \$98.1 billion over five years (2013 to 2017) and between \$116.0 and \$229.3 billion over ten years (2013 to 2022) (Exhibit 2.7).

Exhibit 2.7: Projection of Medicare Savings Attributable to GPOs at 80 Percent Penetration Rate (\$ in billions)

Year	10 Percent Savings	15 Percent Savings	18 Percent Savings
5 Year Savings (2013 to 2017)	\$49.7	\$78.9	\$98.1
10 Year Savings (2013 to 2022)	\$116.0	\$184.3	\$229.3

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services.

GPO Impact on Medicaid Expenditures

Exhibit 2.8 contains a step-down calculation of the impact of GPOs on Medicaid spending. The calculation follows the same steps described for total health care and Medicare expenditures, but this time, with only Medicaid expenditures in the base.

In 2012, Medicaid hospital and nursing home expenditures totaled \$202.7 billion. Removing the labor proportion leaves \$61.6 billion in expenditures. Assuming a 71.71 GPO penetration rate, we estimated \$44.2 billion in Medicaid expenditures impacted by group purchasing. Applying an 80 percent GPO penetration rate, we estimated \$49.3 billion in Medicaid expenditures impacted by group purchasing. Finally, applying the three GPO savings estimates described above (10, 15 and 18 percent), we calculated Medicaid saving attributable to GPOs of between \$4.9 and \$10.8 billion in 2012.

GPO Savings Estimates

Exhibit 2.8: Detail of Medicaid Savings Attributable to GPOs, 2012 (\$ in billions)

Base	Hospital	Nursing Home	Total
Total Medicaid Expenditures*	\$156.4	\$46.3	\$202.7
Labor Proportion [^]	69.600%	69.545%	
Labor Expenditures	\$108.9	\$32.2	\$141.1
Non-labor Expenditures	\$47.5	\$14.1	\$61.6
GPO Penetration Rate at 71.71 Percent[#]			
Non-labor Expenditures	\$34.1	\$10.1	\$44.2
10 Percent Savings [@]	\$3.8	\$1.1	\$4.9
15 Percent Savings [@]	\$6.0	\$1.8	\$7.8
18 Percent Savings ^{**}	\$7.5	\$2.2	\$9.7
GPO Penetration Rate at 80 Percent[#]			
Non-labor Expenditures	\$38.0	\$11.3	\$49.3
10 Percent Savings [@]	\$4.2	\$1.3	\$5.5
15 Percent Savings [@]	\$6.7	\$2.0	\$8.7
18 Percent Savings ^{**}	\$8.4	\$2.5	\$10.8

Source: *Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services. [^]Federal Register, August 6 and 19, 2013, op cit. [#]Goldenberg and King, May 2009, op cit. [@]Muse & Associates, September 2002, op cit. ^{**}Schneller, April 2009, op cit. Complete details can be found in Appendix C.

Exhibit 2.9 contains five- and ten-year projected Medicaid savings attributable to GPOs assuming a market penetration rate of 71.71 percent. We estimated total Medicaid savings between \$33.2 and \$65.6 billion over five years (2013 to 2017) and between \$77.9 and \$154.0 billion over ten years (2013 to 2022).

Exhibit 2.9: Projection of Medicaid Savings Attributable to GPOs at 71.71 Percent Penetration Rate (\$ in billions)

Year	10 Percent Savings	15 Percent Savings	18 Percent Savings
5 Year Savings (2013 to 2017)	\$33.2	\$52.7	\$65.6
10 Year Savings (2013 to 2022)	\$77.9	\$123.8	\$154.0

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services. Complete details can be found in Appendix C.

GPO Savings Estimates

Exhibit 2.10 contains five- and ten-year projected Medicaid savings attributable to GPOs assuming a market penetration rate of 80 percent. These savings are estimated to be between \$36.7 and \$72.6 billion over five years (2013 to 2017) and between \$85.8 and \$169.5 billion over ten years (2013 to 2022).

Exhibit 2.10: Projection of Medicaid Savings Attributable to GPOs at 80 Percent Penetration Rate (\$ in billions)

Year	10 Percent Savings	15 Percent Savings	18 Percent Savings
5 Year Savings (2013 to 2017)	\$36.7	\$58.3	\$72.6
10 Year Savings (2013 to 2022)	\$85.8	\$136.3	\$169.5

Source: Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services. Complete details can be found in Appendix C.

GPOs and Implantable Medical Devices

While GPOs negotiate purchases for a variety of supplies including pharmaceuticals, and an assortment of medical and surgical supplies, implantable medical devices (IMDs) represent a sizeable proportion of the negotiated purchases by GPOs, and a relatively large proportion of total health expenditures in the U.S. Of the \$36 billion annual savings attributable to GPOs estimated by Schneller, it was estimated that \$1.9 billion was attributable to savings in the cardiology implant marketplace, and \$840 million was attributable to savings in the orthopedic implant marketplace.²¹ In total, that would represent approximately 8 percent of the overall savings achieved by GPOs. In the subsequent analyses, we examine nationwide trends in IMD costs to gain further insight into this issue.

In order to determine the cost of IMDs in U.S. hospitals, we examined the Medicare Cost Reports (MCR) produced by the Healthcare Cost Reporting Information System (HCRIS) on a quarterly basis. These data contain a detailed breakdown of costs and charges by hospital.

²¹ Schneller, E. (2009). The Value of Group Purchasing- 2009: Meeting the Needs for Strategic Savings. Health Care Sector Advances, Inc.

GPOs and Implantable Medical Devices

Beginning in 2009, hospitals were required to separately record their IMD costs on the MCR. In this analysis, we assess the completeness of IMD data on the MCR, and note any observed change in the proportion of total hospital costs related to IMDs over time.

Exhibit 3.1 shows the percentage of total hospital costs attributable to IMDs. We found a slight increase in IMD costs as a percentage of total hospital costs in each of the three years we examined, increasing from 5.3 percent in 2010 to 5.7 percent in 2012.

Exhibit 3.1: Percent of Hospital Costs Attributable to Implantable Medical Devices Billed to Patients

Year	Number of Hospitals	IMD Costs	Total Hospital Costs	IMD Costs as a Percentage of Total Hospital Costs
2010*	1,293	\$13,329,901,079	\$250,272,923,385	5.3%
2011	3,692	\$35,129,735,270	\$638,008,035,097	5.5%
2012	3,341	\$31,518,493,498	\$557,723,471,501	5.7%

Source: HCRIS Worksheet C Part 1, Line 72xx and 200, Column 3.

*Note that in 2010 hospitals could use either the 96 version of the cost report or the 10 version. About half of hospitals chose to use each version.

These findings are consistent with findings of a 2012 Donahoe and King study. In this study, the authors found that over a 22 year period from 1989 to 2010 the proportion of device expenditures as a percentage of National Health Expenditures (NHE) increased slightly from year to year. This study had a broader definition of medical devices than fits into the medical device line in the MCR however, the consistent slow rate of growth reported in the two studies is mutually reinforcing. Donahoe and King also found that price inflation for medical devices was lower than overall medical inflation; therefore, the observed increase was actually diminished by the inflation of devices relative to other medical services.²²

Exhibit 3.2 shows the types of hospitals recording costs for IMDs. Nearly all costs for IMDs are incurred in short term acute care hospitals (STACHs). Of note, however, is the decreasing percentage of IMD costs incurred in STACHs, declining from 99 percent in 2010 to 97 percent in 2012. This could be indicative of a trend toward IMD procedures being performed in non-STACH settings.

²² Donahoe and King, (2012). Estimates of Medical Device Spending in the United States.

GPOs and Implantable Medical Devices

Exhibit 3.2: Types of Hospitals Identifying Implantable Devices Charged to Patients (Line 72) on the Medicare Cost Report

Year	Type of Hospital	Number of Hospitals	Cost
2010*	Other	270	\$190,519,801
	STACH	1,023	\$13,139,381,278
	Proportion STACH	79%	99%
2011	Other	752	\$817,399,855
	STACH	2,940	\$34,312,335,415
	Proportion STACH	80%	98%
2012	Other	682	\$823,660,578
	STACH	2,659	\$30,694,832,920
	Proportion STACH	80%	97%

Source: HCRIS Worksheet C Part 1, Line 72xx, Column 3.

*Note that in 2010 hospitals could use either the 96 version of the cost report or the 10 version. About half chose to use each version.

We also examined which hospital provider control types were more likely to populate the MCR field for IMDs. Provider control is the profit or non-profit status of a hospital. Exhibit 3.3 shows that voluntary, non-profit hospitals, which are not associated with a church represent the largest proportion of all hospital provider control types recording IMD costs (47 percent). Furthermore, these hospitals incur 53 percent of total recorded IMD costs across provider control types. Additionally, of those recording IMD costs, 23 percent are proprietary corporations and 14 percent are voluntary, non-profit, church-affiliated hospitals. These provider types account for 15 percent and 19 percent of all recorded IMD costs, respectively.

GPOs and Implantable Medical Devices

Exhibit 3.3: Number of Hospitals and Costs for Implantable Medical Devices Billed to Patient by Hospital Provider Control Type, 2012 (\$ in billions)

Provider Control Type Description	STACH				Other			
	Number of Hospitals	% of Hospitals	Cost	% of Costs	Number of Hospitals	% of Hospitals	Cost	% of Costs
Vol. Non-Profit, Church	367	14%	\$5,718.2	19%	53	8%	\$72.9	9%
Vol. Non-Profit, Other	1,237	47%	\$16,202.3	53%	363	53%	\$504.2	61%
Prop., Individual	7	0%	\$75.5	0%	1	0%	\$3.7	0%
Prop., Corporation	602	23%	\$4,615.1	15%	30	4%	\$91.5	11%
Prop., Partnership	59	2%	\$529.4	2%	12	2%	\$59.2	7%
Prop., Other	50	2%	\$309.6	1%	7	1%	\$24.8	3%
Gov., Federal	3	0%	\$28.0	0%	0	0%	\$0.0	0%
Gov., City-County	42	2%	\$303.7	1%	16	2%	\$8.2	1%
Gov., County	117	4%	\$804.8	3%	108	16%	\$25.6	3%
Gov., State	26	1%	\$632.7	2%	6	1%	\$1.5	0%
Gov., Hospital District	96	4%	\$854.2	3%	67	10%	\$29.6	4%
Gov., City-County	29	1%	\$154.5	1%	11	2%	\$0.7	0%
Gov., Other	27	1%	\$466.7	2%	8	1%	\$2.0	0%
	2,659	100%	\$30,694.8	100%	682	100%	\$823.7	100%

Source: HCRIS Worksheet C Part 1, Line 72xx, Column 3. Note: Vol.= Voluntary; Prop.= Proprietary; Gov.= Government.

Our analysis of the MCR indicates that hospitals are populating the field for IMDs with costs as directed by CMS. Our analysis also showed a very slight increase in the proportion of costs that are attributable to these devices over time. If this trend continues, it could signal that IMDs are increasing as a portion of overall hospital services and costs. As such, this trend likely warrants further monitoring. Nevertheless, our findings in the above section suggest that increased market penetration of GPOs could further help to reduce the rate of growth of spending on IMDs.

Discussion

GPOs provide important value and efficiency to the U.S. health care system, by reducing costs and administrative responsibilities of providers, and facilitating the provision of high quality care by supplying providers with the most appropriate products. In 2012, it is estimated that the size of the total GPO marketplace was approximately \$314.4 billion.

Through their ability to command market share and to negotiate volume discounts, GPOs save their members and customers between 10 percent and 18 percent on their purchases. For 2012, this amounted to estimated direct savings of between \$25.0 billion and \$55.2 billion. Over the subsequent five- and ten-year period, this amounted to between \$167.9 billion and \$370.0 billion, and between \$392.2 billion and \$864.4 billion, respectively. Public sector health care programs also achieved considerable savings using GPOs, including estimated savings between \$6.6 and \$14.6 billion to the Medicare program in 2012 and estimated savings between \$4.9 and \$10.8 billion to the Medicaid program in 2012.

It should be noted that the success GPOs have had in penetrating the healthcare marketplace has resulted in the GPO price structures becoming the de facto market price. Even for items not purchased through a GPO, the power of lower prices negotiated by GPOs is present. This savings is not evident in the penetration rate or the savings rate. It appears to get lost. As a result, the estimated savings attributable to GPOs, calculated above is likely a conservative estimate.

In our report we further explored just one of the many market segments for which GPOs could continue to provide savings in the future. While IMD costs remained relatively

Discussion

stable as a percentage of total hospital costs from 2010 to 2012, there was a slight upward trend, indicating the need for future monitoring, and the potential opportunity for increased hospital contracting with GPOs to help control IMD spending.

Appendix A – Total Savings Calculations

Exhibit A.1: Calculation of Non-Labor Portion and GPO Penetration, Total Health Care

Line	Type of Expenditure	Formula/Source	Nursing		Total
			Hospital	Home	
1	Total 2012 Expenditures	NHEA*	\$882.3	\$151.5	\$1,033.8
2	Labor Portion from Federal Register	Fed. Register^	69.600%	69.545%	
3	Labor Portion of Expenditures	Line 1 Times Line 2	\$614.1	\$105.4	\$719.4
4	Non-Labor Portion of Expenditures	Line 1 Minus Line 3	\$268.2	\$46.1	\$314.4
5	Market Penetration Rate	Goldenberg and King#	71.71%	71.71%	
6	GPO Penetration 71.71 Percent	Line 4 Times Line 5	\$192.3	\$33.1	\$225.4
7	Market Penetration Rate	Goldenberg and King#	80.00%	80.00%	
8	GPO Penetration 80 Percent	Line 4 Times Line 7	\$214.6	\$36.9	\$251.5

Sources: *Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services. ^Federal Register, August 6 and 19, 2013, op cit. #Goldenberg and King, May 2009, op cit.

Appendix A- Total Savings Calculations

Exhibit A.2: Calculation of Savings at 71.71 Percent Market Penetration, Total Health Care

Line	Type of Expenditure	Formula/Source	Hospital	Nursing Home	Total
1	Expenditures at 71.71 Percent Penetration	Table 1 Line 6	\$192.3	\$33.1	\$225.4
2	10 Percent Savings	Goldenberg and King [#]	10%	10%	
3	15 Percent Savings	Goldenberg and King [#]	15%	15%	
4	18 Percent Savings	Schneller ^{**}	18%	18%	
5	Base Expenditures Without 10 Percent Savings	Line 1: Divided by 1 Minus Line 2	\$213.7	\$36.8	\$250.5
6	Base Expenditures Without 15 Percent Savings	Line 1: Divided by 1 Minus Line 3	\$226.3	\$38.9	\$265.2
7	Base Expenditures Without 18 Percent Savings	Line 1: Divided by 1 Minus Line 4	\$234.6	\$40.3	\$274.9
8	Reduced Expenditures Attributable to 10 Percent Savings	Line 5 Minus Line 1	\$21.4	\$3.7	\$25.0
9	Reduced Expenditures Attributable to 15 Percent Savings	Line 6 Minus Line 1	\$33.9	\$5.8	\$39.8
10	Reduced Expenditures Attributable to 18 Percent Savings	Line 7 Minus Line 1	\$42.2	\$7.3	\$49.5

Sources: [#]Goldenberg and King, May 2009, op cit. ^{**}Schneller, April 2009, op cit.

Exhibit A.3: Calculation of Savings at 80 Percent Market Penetration, Total Health Care

Line	Type of Expenditure	Formula/Source	Hospital	Nursing Home	Total
1	Expenditures at 80 Percent Penetration	Table 1 Line 8	\$214.6	\$36.9	\$251.5
2	10 Percent Savings	Goldenberg and King [#]	10%	10%	
3	15 Percent Savings	Goldenberg and King [#]	15%	15%	
4	18 Percent Savings	Schneller ^{**}	18%	18%	
5	Base Expenditures Without 10 Percent Savings	Line 1: Divided by 1 Minus Line 2	\$238.4	\$41.0	\$279.4
6	Base Expenditures Without 15 Percent Savings	Line 1: Divided by 1 Minus Line 3	\$252.4	\$43.4	\$295.9
7	Base Expenditures Without 18 Percent Savings	Line 1: Divided by 1 Minus Line 4	\$261.7	\$45.0	\$306.7
8	Reduced Expenditures Attributable to 10 Percent Savings	Line 5 Minus Line 1	\$23.8	\$4.1	\$27.9
9	Reduced Expenditures Attributable to 15 Percent Savings	Line 6 Minus Line 1	\$37.9	\$6.5	\$44.4
10	Reduced Expenditures Attributable to 18 Percent Savings	Line 7 Minus Line 1	\$47.1	\$8.1	\$55.2

Sources: [#]Goldenberg and King, May 2009, op cit. ^{**}Schneller, April 2009, op cit.

Appendix B – Medicare Savings Calculations

Exhibit B.1: Calculation of Non-Labor Portion and GPO Penetration, Medicare

Line	Type of Expenditure	Formula/Source	Nursing		Total
			Hospital	Home	
1	Total 2012 Expenditures	NHEA*	\$239.8	\$34.4	\$274.2
2	Labor Portion from Federal Register	Fed. Register^	69.600%	69.545%	
3	Labor Portion of Expenditures	Line 1 Times Line 2	\$166.9	\$23.9	\$190.8
4	Non-Labor Portion of Expenditures	Line 1 Minus Line 3	\$72.9	\$10.5	\$83.4
5	Market Penetration Rate	Goldenberg and King#	71.71%	71.71%	
6	GPO Penetration 71.71 Percent	Line 4 Times Line 5	\$52.3	\$7.5	\$59.8
7	Market Penetration Rate	Goldenberg and King#	80.00%	80.00%	
8	GPO Penetration 80 Percent	Line 4 Times Line 7	\$58.3	\$8.4	\$66.7

Sources: *Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services. ^Federal Register, August 6 and 19, 2013, op cit. #Goldenberg and King, May 2009, op cit.

Appendix B- Medicare Savings Calculations

Exhibit B.2: Calculation of Savings at 71.71 Percent Market Penetration, Medicare

Line	Type of Expenditure	Formula/Source	Hospital	Nursing Home	Total
1	Expenditures at 71.71 Percent Penetration	Table 1 Line 6	\$52.3	\$7.5	\$59.8
2	10 Percent Savings	Goldenberg and King [#]	10%	10%	
3	15 Percent Savings	Goldenberg and King [#]	15%	15%	
4	18 Percent Savings	Schneller ^{**}	18%	18%	
5	Base Expenditures Without 10 Percent Savings	Line 1: Divided by 1 Minus Line 2	\$58.1	\$8.3	\$66.4
6	Base Expenditures Without 15 Percent Savings	Line 1: Divided by 1 Minus Line 3	\$61.5	\$8.8	\$70.3
7	Base Expenditures Without 18 Percent Savings	Line 1: Divided by 1 Minus Line 4	\$63.8	\$9.2	\$72.9
8	Reduced Expenditures Attributable to 10 Percent Savings	Line 5 Minus Line 1	\$5.8	\$0.8	\$6.6
9	Reduced Expenditures Attributable to 15 Percent Savings	Line 6 Minus Line 1	\$9.2	\$1.3	\$10.6
10	Reduced Expenditures Attributable to 18 Percent Savings	Line 7 Minus Line 1	\$11.5	\$1.6	\$13.1

Sources: [#]Goldenberg and King, May 2009, op cit. ^{**}Schneller, April 2009, op cit.

Exhibit B.3: Calculation of Savings at 80 Percent Market Penetration, Medicare

Line	Type of Expenditure	Formula/Source	Hospital	Nursing Home	Total
1	Expenditures at 80 Percent Penetration	Table 1 Line 8	\$58.3	\$8.4	\$66.7
2	10 Percent Savings	Goldenberg and King [#]	10%	10%	
3	15 Percent Savings	Goldenberg and King [#]	15%	15%	
4	18 Percent Savings	Schneller ^{**}	18%	18%	
5	Base Expenditures Without 10 Percent Savings	Line 1: Divided by 1 Minus Line 2	\$64.8	\$9.3	\$74.1
6	Base Expenditures Without 15 Percent Savings	Line 1: Divided by 1 Minus Line 3	\$68.6	\$9.9	\$78.5
7	Base Expenditures Without 18 Percent Savings	Line 1: Divided by 1 Minus Line 4	\$71.1	\$10.2	\$81.3
8	Reduced Expenditures Attributable to 10 Percent Savings	Line 5 Minus Line 1	\$6.5	\$0.9	\$7.4
9	Reduced Expenditures Attributable to 15 Percent Savings	Line 6 Minus Line 1	\$10.3	\$1.5	\$11.8
10	Reduced Expenditures Attributable to 18 Percent Savings	Line 7 Minus Line 1	\$12.8	\$1.8	\$14.6

Sources: [#]Goldenberg and King, May 2009, op cit. ^{**}Schneller, April 2009, op cit.

Appendix C – Medicaid Savings Calculations

Exhibit C.1: Calculation of Non-Labor Portion and GPO Penetration, Medicaid

Line	Type of Expenditure	Formula/Source	Nursing		Total
			Hospital	Home	
1	Total 2012 Expenditures	NHEA*	\$156.4	\$46.3	\$202.7
2	Labor Portion from Federal Register	Fed. Register^	69.600%	69.545%	
3	Labor Portion of Expenditures	Line 1 Times Line 2	\$108.9	\$32.2	\$141.1
4	Non-Labor Portion of Expenditures	Line 1 Minus Line 3	\$47.5	\$14.1	\$61.6
5	Market Penetration Rate	Goldenberg and King#	71.71%	71.71%	
6	GPO Penetration 71.71 Percent	Line 4 Times Line 5	\$34.1	\$10.1	\$44.2
7	Market Penetration Rate	Goldenberg and King#	80.00%	80.00%	
8	GPO Penetration 80 Percent	Line 4 Times Line 7	\$38.0	\$11.3	\$49.3

Sources: *Dobson | DaVanzo analysis of the National Health Accounts 2012 as published by the Centers for Medicare and Medicaid Services. ^Federal Register, August 6 and 19, 2013, op cit. #Goldenberg and King, May 2009, op cit.

Appendix C- Medicaid Savings Calculations

Exhibit C.2: Calculation of Savings at 71.71 Percent Market Penetration, Medicaid

Line	Item	Formula/Source	Hospital	Nursing Home	Total
1	Expenditures at 71.71 Percent Penetration	Table 1 Line 6	\$34.1	\$10.1	\$44.2
2	10 Percent Savings	Goldenberg and King [#]	10%	10%	
3	15 Percent Savings	Goldenberg and King [#]	15%	15%	
4	18 Percent Savings	Schneller ^{**}	18%	18%	
5	Base Expenditures Without 10 Percent Savings	Line 1: Divided by 1 Minus Line 2	\$37.9	\$11.2	\$49.1
6	Base Expenditures Without 15 Percent Savings	Line 1: Divided by 1 Minus Line 3	\$40.1	\$11.9	\$52.0
7	Base Expenditures Without 18 Percent Savings	Line 1: Divided by 1 Minus Line 4	\$41.6	\$12.3	\$53.9
8	Reduced Expenditures Attributable to 10 Percent Savings	Line 5 Minus Line 1	\$3.8	\$1.1	\$4.9
9	Reduced Expenditures Attributable to 15 Percent Savings	Line 6 Minus Line 1	\$6.0	\$1.8	\$7.8
10	Reduced Expenditures Attributable to 18 Percent Savings	Line 7 Minus Line 1	\$7.5	\$2.2	\$9.7

Sources: [#]Goldenberg and King, May 2009, op cit. ^{**}Schneller, April 2009, op cit.

Exhibit C.2: Calculation of Savings at 80 Percent Market Penetration, Medicaid

Line	Item	Formula/Source	Hospital	Nursing Home	Total
1	Expenditures at 80 Percent Penetration	Table 1 Line 8	\$38.0	\$11.3	\$49.3
2	10 Percent Savings	Goldenberg and King [#]	10%	10%	
3	15 Percent Savings	Goldenberg and King [#]	15%	15%	
4	18 Percent Savings	Schneller ^{**}	18%	18%	
5	Base Expenditures Without 10 Percent Savings	Line 1: Divided by 1 Minus Line 2	\$42.3	\$12.5	\$54.8
6	Base Expenditures Without 15 Percent Savings	Line 1: Divided by 1 Minus Line 3	\$44.7	\$13.3	\$58.0
7	Base Expenditures Without 18 Percent Savings	Line 1: Divided by 1 Minus Line 4	\$46.4	\$13.8	\$60.1
8	Reduced Expenditures Attributable to 10 Percent Savings	Line 5 Minus Line 1	\$4.2	\$1.3	\$5.5
9	Reduced Expenditures Attributable to 15 Percent Savings	Line 6 Minus Line 1	\$6.7	\$2.0	\$8.7
10	Reduced Expenditures Attributable to 18 Percent Savings	Line 7 Minus Line 1	\$8.3	\$2.5	\$10.8

Sources: [#]Goldenberg and King, May 2009, op cit. ^{**}Schneller, April 2009, op cit.