

# Supply Chain Metrics That Matter: A Focus on Medical Device Manufacturers

Using Financial Data from Corporate Annual Reports to  
Better Understand the Medical Device Supply Chain

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**By Abby Mayer**  
Research Associate

**Supply Chain Insights LLC**

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# Research

*Supply Chain Metrics That Matter* is a series of reports published throughout the year by Supply Chain Insights LLC. They are a deep focus on a specific industry.

These reports are based on data collected from financial balance sheets and income statements over the period of 2000-2011. In these reports, we analyze supply chain effectiveness to balance profitability, growth, complexity and cycles through the comparison of supply chain ratios by peer group.

Within the world of Supply Chain Management (SCM), each industry is unique. We believe that it is dangerous to list all industries in a spreadsheet and declare a supply chain leader. Instead, we believe that we have to evaluate change over time by peer group. In this series of reports, we analyze the potential of each supply chain peer group, share insights from industry leaders from each industry, and give recommendations based on general market trends.

## Disclosure

Your trust is important to us. As such, we are open and transparent about our financial relationships and our research process. This independent research is 100% funded by [Supply Chain Insights](#).

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## Research Methodology

The basis of this report is publicly available information from corporate annual reports from the period of 2000-2011 for publicly-owned companies involved in medical device manufacturing activities. This includes everything from medical thermometers to prosthetics and CTG (or CAT) scanners.

In picking companies for the *Supply Chain Metrics That Matter* report, we traditionally rely on companies recently listed in the Fortune Global 500. However, due to the smaller size of companies operating in the medical device industry, we have taken our peer group from the

U.S.-focused Fortune 500. In choosing our peer group, we identify two companies ranked in the 2011 Fortune 500 operating within the industry of focus. We augment these companies with three hand-selected companies that we believe provide a meaningful comparison. This analysis thus focuses on five companies within the medical device industry.

The financial ratios used enable supply chain leaders better understand where the industry is on the [Supply Chain Effective Frontier](#). In this report, we share a framework for supply chain excellence that balances growth, profitability, cycles and complexity metrics. In each *Supply Chain Metrics That Matter* report, we share insights from each of these metrics categories. Due to the fact that the supply chain is a complex system that must be managed holistically, we share the trends on each of these dimensions over the course of the last decade.

We use the financial data to help readers learn from past trends, to better understand current operating environments, and we provide recommendations for the future. We augment the financial data analysis with information from our quantitative and qualitative research studies as well as our work with clients operating within the industry.

## Executive Overview

Medical device company supply chains are in transition. Traditionally, this peer group has not excelled at supply chain management. Many would label them as supply chain laggards. As a result, there is a need to retool and gain greater competency in supply chain management to better manage costs, weather the storm of impending legislation, and manage the complications of increasingly complex global supply chains.

As shown in this report, today, the medical device manufacturer is on a supply chain plateau. Costs are rising; consumers', including both hospital procurement departments and end user, expectations are rising. Processes need to be redesigned. Delivery of medical devices by a salesperson out of the trunk of a car is no longer sufficient; and, the number one issue of Global Procurement Organizations is serial tracking of products through the lifecycle. It is time for the medical device manufacturer to step up and take supply chain to the next level.

# Setting the Stage

The healthcare supply chain including hospitals, pharmaceutical manufacturers and medical device manufacturers is entering a period of great change and upheaval. Previous *Supply Chain Metrics That Matter* reports have focused on the challenges facing both the [hospital](#) and [pharmaceutical](#) industries. This report examines the third component of the healthcare value chain: medical device manufacturers.

The healthcare value chain is in transition. It is shifting from a focus on efficient sickness to health and wellness. This change is affecting every aspect of the industry.

Costs are rising; consumers, including both hospital procurement departments and end user patients, are becoming more demanding, regulations are growing and technological possibilities are increasing. In the face of this, we believe supply chain matters now more than ever for medical device manufacturers. Table 1 illustrates the changing face of the industry segments involved in the healthcare industry.

**Table 1. Healthcare Value Chain Average Changes (2000-2011)**

Healthcare Value Chain Average Percent Changes (2000-2011)			
Industry Segments	Operating Margin	Days of Inventory	Revenue per Employee
Hospitals	8.5%	-8.5%	66.0%
Medical Device Manufacturers	5.1%	7.9%	56.7%
Pharmaceutical Manufacturers	-32.4%	33.0%	94.3%

Source: Supply Chain Insights LLC, Corporate Annual Reports (2000-2011)  
Hospitals: Community Health Systems, HCA Holdings Inc., Tenet Healthcare Corporation, Universal Health Services, Inc.  
Medical Device Manufacturers: Baxter International Inc., Boston Scientific Corp., Stryker Corp., St. Jude Medical, Inc., Zimmer Holdings Inc.  
Pharmaceutical Manufacturers: Abbott Laboratories, Amgen Inc., Eli Lilly & Co., Merck & Co., Inc., Pfizer, Inc.

These three metrics offer a simple way to measure the health of the healthcare value network. A supply chain that is improving would see stable or increasing operating margin values, decreasing days of inventory, and increasing revenue per employee. Hospitals are the only of the three profiled industry segments that demonstrate that pattern. The other two segments have seen increasing inventory values and sometimes even decreasing operating margin.

Furthermore, while we see extreme growth in revenue per employee metrics, there is very little improvement on days of inventory across the healthcare value chain. Profitability is top of mind with the providers in the value network reporting mixed results on operating margin. This creates a difficult environment for growth.

In addition, the placement of medical device manufacturers two-to-three steps removed from the patient makes it more difficult to sense market changes and drive adaption.

In this report, we analyze different financial metrics organized into categories of growth, cycle, profitability and complexity to present a full picture of the medical device industry at the current moment. While all companies involved in the healthcare industry will face specific challenges in the coming year, we believe a focus on improved supply chain processes will enable medical device manufacturers to prosper in a shifting environment.

## Growth: Stagnant Prognosis

As with other industries operating within the healthcare value chain, the times are increasingly challenging for medical device manufacturers. As seen in table 2, for five of the largest medical device manufacturers in the world, year-over-year sales growth has been steadily declining over the past decade. In fact, all five manufacturers have gone from double digit growth at the beginning of the decade to single digit (and even negative) growth in the most recent time period.

**Table 2. Year-over-Year Sales Growth (2000-2011)**

Year-over-Year Sales Growth				
Companies	Average	2000 – 2003	2004-2007	2008-2011
Baxter International Inc.	7%	10%	6%	5%
Boston Scientific Corp.	11%	10%	26%	-2%
Stryker Corp.	13%	14%	15%	9%
St. Jude Medical, Inc.	16%	18%	18%	9%
Zimmer Holdings Inc.	15%	23%	21%	3%

Source: Supply Chain Insights LLC, Corporate Annual Reports (2000-2011)

The slow growth environment is likely to continue into the future as the healthcare industry as a whole struggles with increasing regulation, rising costs, and increased expectations from consumers in both the form of hospitals and end users. With this new reality, medical device manufacturers are faced with a challenging situation to not only survive, but prosper during low growth years. We believe that a focus on supply chain excellence will enable them to leapfrog other companies and industries that currently possess a more advanced supply chain maturity. For example, chemical manufacturers also occupy an upstream location in a long supply chain, and grapple with several of the same challenges that continue to perplex medical device supply

chains. By learning from other industries, medical device manufacturers may discover how to prosper during low-growth and high-cost years.

## Cycle: Inventory on the Rise

Inventory management is a complex issue for all industries in striking the balance of the right amount at the right cost at the right place at the right time. However, this issue is heightened for medical device manufacturers whose products can often mean the difference between life and death. Not surprisingly, the solution has been to keep high levels of inventory at all levels of the enterprise in various forms and sizes to meet changing demand. After all, it's hard to predict what injuries will land someone in the emergency room on any given day. Table 3 illustrates days of inventory performance for the five manufacturers since 2000.

**Table 3. Days of Inventory (2000-2011)**

Days of Inventory				
Companies	Average	2000 – 2003	2004-2007	2008-2011
Baxter International Inc.	137	136	136	140
Boston Scientific Corp.	119	121	109	127
Stryker Corp.	156	154	150	164
St. Jude Medical, Inc.	183	190	176	185
Zimmer Holdings Inc.	293	266	285	329

Source: Supply Chain Insights LLC, Corporate Annual Reports (2000-2011)

Four of the five medical device companies profiled in this report illustrate increasing inventory levels over the past decade. This finding would likely surprise most executives and supply chain professionals whom we find believe that inventory levels have decreased across the board. In our research, we find that a project-based mentality can often lead to short-term improvement in inventory management that is accepted as a permanent change. Sustainable long-term improvement is much rarer.

Each industry is different and medical device companies will never compete with high-tech & electronics companies with single digit days of inventory (DOI). However, with advancements in technology and improved communication with clinicians using the devices, we believe companies should be able to improve upon their past performance. In this sample, this is true only for St. Jude Medical, Inc. which reduced DOI from 190 to 185 days. We believe that a

refocus on supply chain management and improved communication through the value chain is an enabler to improved inventory management.

## Profitability: Balancing Act

With all of the negative talk above of rising costs and decreasing growth potential, it may surprise most readers that when we examine Cost of Goods Sold (COGS) from the balance sheet as a percentage of revenue, it is generally declining. This means that the raw cost of the goods sold is decreasing as a percentage of top-line revenue. However, with decreasing growth as seen in table 2, costs are rising elsewhere. Other areas of rising cost would include R&D, as well as business changes to deal with a stretching global supply chain, in addition to increasing regulation.

**Table 4. Cost of Goods Sold as Percent of Revenue (2000-2011)**

Cost of Goods Sold as Percent of Revenue				
Companies	Average	2000 – 2003	2004-2007	2008-2011
Baxter International Inc.	53%	54%	56%	50%
Boston Scientific Corp.	29%	31%	25%	33%
Stryker Corp.	33%	35%	32%	32%
St. Jude Medical, Inc.	29%	32%	28%	28%
Zimmer Holdings Inc.	24%	26%	23%	24%

Source: Supply Chain Insights LLC, Corporate Annual Reports (2000-2011)

The goods news here is that medical device manufacturers are holding COGS consistent as a percent of revenue. This bodes well for the future as the industry continues to weather a shifting operating environment. With this level of discipline, it is possible to achieve stable profitability even with the low level year-over-year sales growth that will become the new norm.

In addition, we see that operating margin is generally stable or increasing for the same medical device companies. Results are presented in table 5. This is unexpected given that operating margin has decreased for other companies within the healthcare industry, including dramatically for pharmaceutical manufacturers. Again, this is a point of great optimism because with stable operating margin and COGS percentages, there is more room for improved profitability, even with decreased sales growth.



**Table 5. Operating Margin (2000-2011)**

Operating Margin				
Companies	Average	2000 – 2003	2004-2007	2008-2011
Baxter International Inc.	0.17	0.16	0.15	0.20
Boston Scientific Corp.	0.04	0.17	0.01	-0.06
Stryker Corp.	0.20	0.18	0.20	0.23
St. Jude Medical, Inc.	.21	0.20	0.22	0.21
Zimmer Holdings Inc.	0.26	0.25	0.30	0.24

Source: Supply Chain Insights LLC, Corporate Annual Reports (2000-2011)

## Complexity: Facing Greater Challenges

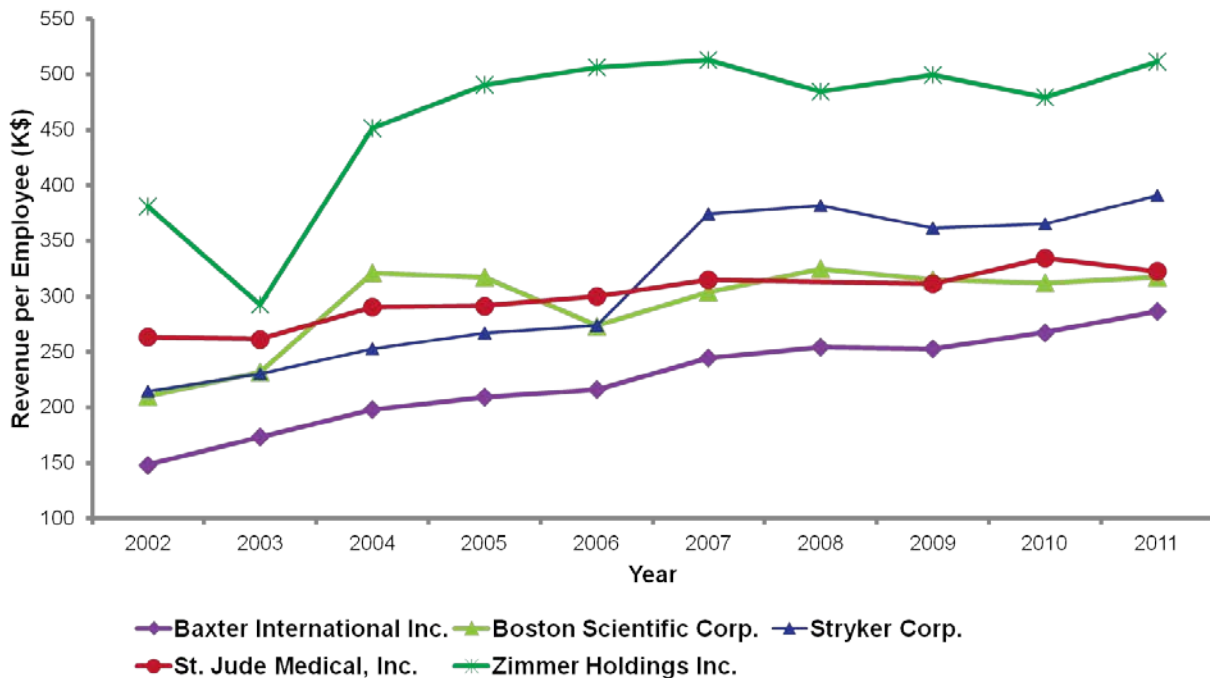
*"Manufacturers have complex regulatory, customs and excise, and security regulations to contend with, and logistics - for example, if cold chain storage or end-to-end sterility is required - can be a further challenge."*

•Nic Paton, Medical Device Developments<sup>1</sup>

The level of complexity in the supply chain that exists within medical device manufacturers is higher than most other industry peer groups. However, even given that high level of complexity, medical device manufacturers have been able to drive improvement on revenue per employee, one of the most meaningful metrics of complexity, as figure 1 shows.

<sup>1</sup> MedicalDevice-Network.com. Moving mountains: the medical device supply chain. <http://www.medicaldevice-network.com/features/featuremoving-mountains-the-medical-device-supply-chain/>

**Figure 1. Revenue per Employee (2002-2011)**



Source: Supply Chain Insights LLC, Corporate Annual Reports 2001-2011

All five companies have shown improving performance since 2002. However, increasingly, revenue per employee is a measure of historically acceptable performance, but a poor proxy for future success. Our research indicates that revenue per employee has a high correlation to successful implementation of Enterprise Resource Planning (ERP) and Advanced Planning Systems (APS) which most companies integrated into operations over the past decade.

Moving forward, we believe that ERP and APS will have less of a transformative role to play in the modern supply chain. While these systems are important foundational processes to have mastered, they are no longer sufficient for the next stage of supply chain processes and maturity. We believe that increasing complexity within the medical device market may halt the rising trend of revenue per employee metrics. Regardless, future gains in revenue per employee will not be driven by ERP and APS.

Companies that embrace the new complexity and begin to transition to an outside-in market driven approach to supply chain will prosper, while others that stick to an outdated understanding of supply chain focused on push-based processes will falter. In moving forward, companies would do well to look outside the sector to understand how more mature industries, from high-tech to chemical, are redesigning their supply chain to be more attuned to client and customer demands.

# Recommendations

Medical device manufacturers will be faced with both challenges and opportunity in the coming years. Here are our recommendations to turn those challenges into opportunities:

- **Transition from Supply Chain to Value Network Orchestrator.** Traditionally, companies have operated in separate spheres, interacting in transactional manners with both upstream and downstream partners. However, the shifting ecosystem of the healthcare environment will force companies to work and collaborate more closely with both customers and suppliers. Additionally, it is not enough to move from a vertical to horizontal orientation with external partners, the same horizontal processes must be created within separate functions of the same company.

As medical device manufacturers build value network capabilities through redesign (e.g., use of RFID for consignment-based inventory management, part serialization and tracking of products and the kitting of common components for more typical surgeries), there is an opportunity to redefine and improve the entire value network.

- **Control Costs.** In an unstable environment, with increasing regulation, rising customer expectations and decreasing year-over-year sales values, it is critical that medical device companies focus on reining in costs. So far, the majority of companies profiled in this report have managed to maintain operating margin and cost of goods sold percentages. In that regard, they have done better than most companies in other segments of the healthcare world. However, the shift in healthcare is ongoing and medical device companies should continue to focus on controlling costs in a changing operating environment.

Additionally, companies need to focus on revenue management: management of multiple payee systems with complicated rebates and return policies. This management of bifurcated trade with a focus on revenue management will help companies to weather the impending storm.

- **Inventory Matters.** Inventory is a tough nut to crack for medical device companies. An out-of-stock can be the difference between life and death; and as a result, companies are used to keeping available large stores of every size and shape imaginable. Understanding that inventory management in this environment will never reach the single digit stores of companies in retail or high-tech & electronics operations, we believe there is room for improvement.

Improved visibility within the supply chain, and communication inter- and intra-enterprise, will enable companies to better understand the true usage statistics and adjust inventory accurately. Companies should measure their performance against their own historical performance and focus on small, but sustainable improvements.

- **Learn from Others.** Finally, we believe that the low maturity of medical device supply chains is ultimately an advantage. These companies may learn from others who have led the way and can avoid common mistakes. We would especially encourage medical device supply chains to look to chemical companies who also occupy a downstream location in the highly competitive and fast moving consumer value chain.

## Conclusion

The healthcare industry is undergoing a massive shift from a historic focus on efficient sickness to a new focus on holistic wellness. This change will affect all companies operating within the space, but medical device manufacturers have advantageous positioning compared to their hospital and pharmaceutical peers. These companies have a relatively low level of maturity and more room to improve on supply chain processes. In addition, medical device companies demonstrate a stable operating margin in the face of shrinking year-over-year growth that bodes well for the shifting environment. By focusing on supply chain redesign, and transitioning to an outside-in orientation, medical device manufacturers have a lot of potential for increased performance through improved supply chain management.

# Appendix

## Company Profiles

Company	Stock Exchange: Ticker Symbol	2011 Revenue (billions USD)	2011 Global Employees (thousands)	Country Where Based
 <b>Baxter International Inc.</b>	NYSE: BAX	13.9	48.5	USA (Illinois)
 <b>Boston Scientific Corp.</b>	NYSE: BSX	7.6	24.0	USA (Massachusetts)
 <b>Stryker Corp.</b>	NYSE: SYK	8.3	21.2	USA (Michigan)
 <b>St. Jude Medical, Inc.</b>	NYSE: STJ	5.2	16.0	USA (Minnesota)
 <b>Zimmer Holdings Inc.</b>	NYSE: ZMH	4.5	8.7	USA (Indiana)

Source: Supply Chain Insights LLC, Corporate Annual Reports 2011

## Other Reports in This Series:

[Supply Chain Metrics That Matter: A Focus on Retail](#)

Published by Supply Chain Insights in August 2012.

[Supply Chain Metrics That Matter: A Focus on Consumer Products](#)

Published by Supply Chain Insights in September 2012.

[Supply Chain Metrics That Matter: A Focus on the Chemical Industry](#)

Published by Supply Chain Insights in November 2012

[Supply Chain Metrics That Matter: The Cash-to-Cash Cycle](#)

Published by Supply Chain Insights in November 2012

[Supply Chain Metrics That Matter: A Focus on the Pharmaceutical Industry](#)

Published by Supply Chain Insights in December 2012

[Supply Chain Metrics That Matter: Driving Reliability in Margins](#)

Published by Supply Chain Insights in January 2013

[Supply Chain Metrics That Matter: A Focus on Hospitals](#)

Published by Supply Chain Insights in January 2013

## About Supply Chain Insights LLC

**Supply Chain Insights LLC** is a research and advisory firm focused on reinventing the analyst model. The services of the company are designed to help supply chain teams improve value-based outcomes through research-based Advisory Services, a dedicated Supply Chain Community and public training. Formed in February 2012, the company is focused on delivering **actionable and objective advice for supply chain leaders**.

## About Abby Mayer



Abby Mayer (twitter ID [@indexgirl](#)), Research Associate, is one of the original members of the [Supply Chain Insights LLC](#) team. She is also the author of the newly-founded blog, [Supply Chain Index](#). Her supply chain interests include connecting financial performance and supply chain excellence, as well as talent management issues, and emerging markets.

Abby has a B.A. in International Politics and Economics from Middlebury College and a M.S. in International Supply Chain Management from Plymouth University in the United Kingdom. She has also completed a thru-hike of Vermont's 280 mile Long Trail, the oldest long distance hiking trail in the United States. As part of the planning and food prep process, she became interested in supply chain management when she was asked to predict hunger pangs for the entire three-week trip before departure. If that isn't advanced demand planning, what is?!?!