Reducing Cost Variance and Increasing Quality Across Medical Device Maintenance Purchasing

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Hospitals often order parts and repairs from multiple vendors selected by their healthcare technology managers, resulting in differences in quality and multiple prices for the same item or service. Online marketplace solutions that allow health systems to implement evidence-based purchasing can increase quality and produce significant savings.

As the COVID-19 pandemic continues to spread, it is more important than ever for hospitals to build resilient and clinically integrated supply procurement processes. The average hospital operating margin sank nearly 20%, on average, from January through October 2020. That drop would have been much greater if not for last spring's federal rescue package, and the recently enacted stimulus law does not give much more support to healthcare providers. Because of this, healthcare systems must conserve resources wherever they can, especially in their supply chain.

Group purchasing organizations (GPOs) aggregate the purchasing volume of hospitals to negotiate discounts on new products and equipment from vendors and distributors. By one estimate, hospitals save 10% to 18% by procuring these supplies under GPO contracts. Unsurprisingly, nearly all hospitals belong to at least 1 GPO.

What is surprising, however, is that an estimated 30% to 40% of hospital clinical engineering purchases consist of low-volume, hard-to-find products ("long tail") that are not covered by GPO contracts. This unmanaged procurement approach applies to a wide variety of seldom-purchased items, as well as virtually all replacement parts and maintenance services.

Hospitals are missing an opportunity to better manage this portion of their supply chain. In some cases, they are also buying substandard parts. This leads to avoidable returns and potentially endangers safety and patient care.

A recent study by PartsSource, the leading online marketplace for medical device parts and services, shows how price variance and inconsistent quality in hospital purchasing result in health systems spending consistently more than they need to in this area. The study of 500 000 purchase transactions in 90+ health systems with a total of 100 000 beds also suggests how hospitals can improve procurement of device parts and maintenance.

How Hospitals Order Parts

In most hospitals today, a biomedical equipment technician or a healthcare technology manager decide when to order a replacement part and select the vendor to order it from—either the medical device manufacturer or a secondary market supplier. Many Clinical Engineering/Healthcare Technology Management departments issue purchase orders in their hospital or health system, and the part or service is ordered from the vendor they prefer. Hospitals tend to have limited oversight of these procurement requests.

As a result, the study reveals health systems are spending roughly 10% to 30% more than necessary on parts and repairs. Moreover, health systems that lack an active quality control surveillance mechanism can experience product defect rates that are 6 times higher than those of hospitals that monitor the quality of their replacement parts.

The root of this problem is the high price variance that results from hospitals managing hundreds of different suppliers. Overall, depending on the size of the health system, they source replacement parts from between 200 and 700 different suppliers. Among the healthcare organizations in the study, the average number of vendors was 202. Systems with less than 1,000 beds used 161 suppliers, on average, whereas the mean number of vendors for systems with 1,000 or more beds was 298.

The purchases were usually in small-dollar amounts. Eighty-eight percent of the transactions were less than $500, and 64% of the spend was for items ordered only once or twice during the course of the year. For supply chain and purchasing managers who normally focus on capital purchases, it is difficult to manage and track the purchases of low-cost items not covered by GPO contracts.

Wide Price Variance

When hospitals use a large number of suppliers, it is inevitable that they will pay widely varying prices for the same item, both within and between health systems. In the study, 90% of health systems paid multiple prices to different

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From a recently completed study across over 90 health systems in the US, representing 100,000 beds and over 500,000 purchase transactions, the following conclusions were identified:

- Health Systems are **spending 10%-30% more** than best-in-class on medical device repair and replacement parts.
- Most health systems must source, order, manage and reconcile from **200-700 different suppliers**.
- Based on multiple time-in-motion studies at leading medical centers, the average medical replacement part order takes **80 minutes** to source, track, receive and reconcile.
- Health systems without quality control surveillance tools experience product defect rates **6x worse** than others.

FIGURE 1. Longitudinal analysis of cost, quality, price discrepancy in clinical engineering repair parts spend.

vendors for the same part (Figure 1). This implies that these parts and supplies were not necessarily the lowest-price, highest-quality items available.

The supply chain variations also extend to whether health systems purchase original equipment manufacturer or alternative/secondary market parts. In 1 large Midwestern integrated delivery system, for example, the percentage of parts ordered from medical device manufacturers ranged from 0% to nearly 93%, and the percentage ordered from aftermarket vendors varied from 7% to 100%. Across the systems in the study, the average amount of variance on this scale was 75% (Figure 2).

Hospitals could make better purchasing decisions if they adopted an active management and monitoring strategy. To start with, quality is variable for both original equipment manufacturer and aftermarket suppliers. There are dozens of other attributes that should be considered, such as stocking availability and shipping time, before replacement parts or services are ordered.

Online Marketplaces

To purchase the highest-value parts, hospitals need reliable data on product prices, return rates, and warranty failures. Health systems typically are limited to generating the requisite data from their own purchases, and the preferences of health technology managers are not typically evidence-based, although they may have had a good experience with a particular vendor.

Online marketplaces can provide the information and decision-support tools that health systems need to select the best vendor for each item they order without doing any additional research. These marketplaces act as intermediaries between healthcare organizations and thousands of suppliers. The marketplace company ensures each order is fulfilled and handles any returns. In addition, it provides feedback to each supplier on the quality of its parts; it may suspend a vendor that continues to deliver poor-quality parts.

It is easy to see how such a model can eliminate price variance. **Instead of paying multiple prices for the same part, the healthcare provider uses the marketplace to determine which vendor charges the lowest price for the highest-quality part.** Based on the data, the chosen supplier for a particular item should always deliver the highest value for that product among the vendors using the marketplace.

In the long run, Gartner Research predicts B2B marketplaces will control 75% of hospitals' long-tail spend. Already, thousands of facilities are buying these products in online marketplaces.

A. Average Number of Suppliers Managed by Providers = 202

Under 1000 Beds = 161   Max = 1327
Over 1000 Beds = 298   Max = 935

B. Average Order Price Stratification:

Under $500 = 88% of spend
$500-1500 = 8%
Over $1500 = 4%

C. Order Frequency Stratification:
Item Ordered 1-2 : 64% of spend
Item Ordered 3-5 times : 16%
Item Ordered 6-10 times : 13%
Item Ordered 11+ times : 8%

Average Order Price Stratification

Pct of Total

0% 20% 40% 60% 80% 100%
■ Under $500 ■ $500 to $1,500 ■ Over $1,500

Order Frequency Stratifaction

Pct of Total

0% 20% 40% 60% 80% 100%
■ 1 Purchase ■ 2 Purchases ■ 3-5 Purchases
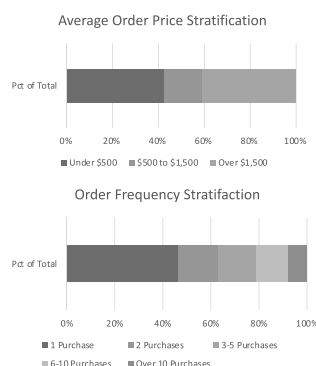■ 6-10 Purchases ■ Over 10 Purchases

FIGURE 2. Typical profile of order history across provider sample.

A. Health Systems who experienced multiple different prices for the exact same good (SKU) = <u>90%</u>

B. Between Health Systems, variance on individual SKU is <u>Significant</u> (lower-left)

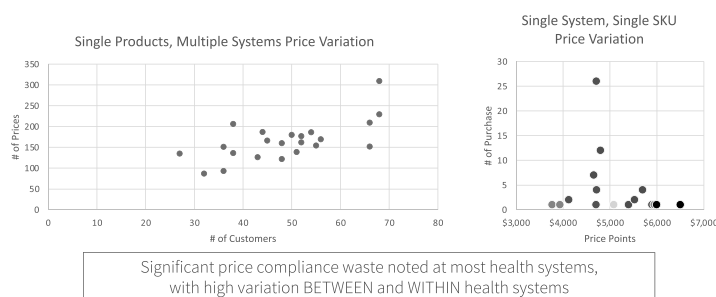C. Within Health Systems, variance on individual SKU is <u>Significant</u> (lower-right)

Single Products, Multiple Systems Price Variation

Single System, Single SKU Price Variation

> Significant price compliance waste noted at most health systems, with high variation BETWEEN and WITHIN health systems

FIGURE 3. Degree of price variance across provider sample.

Within the PartsSource study, 16 years of quality data encompassing 5,000 suppliers and 2 million orders worth about $1.3 billion was analyzed (Figure 4). The study highlighted how the savings on zero-return parts, on highest-quality, lowest-cost options, ranged from more than 30% to nearly 90%. In contrast, the savings for lower-quality parts ranged from 20% to 40% (Figure 3).

Significant Savings

Health systems that use a digital marketplace to identify high-value parts vendors can achieve significant savings. In 1 big health system, for example, 8 hospitals placed 25 orders for an electrocardiogram assembly, and they paid 9 different prices to 7 vendors. There was a 200% variance in price (Figure 5). If the system had bought that item from the vendor offering the highest value, it could have saved up to $33 000 on those 25 electrocardiogram assemblies.

The story is the same for depot repairs. Twelve of the health system's hospitals ordered repairs of Holter monitors, paying 14 different prices to 12 vendors (Figure 6). The price variance across these suppliers was 350%. If the system had funneled all of its Holter monitor repairs to the highest-value vendor, it could have saved $55 000.

Although the costs of replacement parts tend to be relatively low, the savings on them can add up. For example, a large Midwestern system paid between $175 and $484 to multiple vendors for an adult bellows assembly for magnetic resonance imaging respiratory/cardiac gating from GE Healthcare. The best price in a single marketplace for a high-quality unit was $154. The savings opportunity for directing 121 orders to this vendor was $17 435, or $144 per item.

Change Management

As with any quality improvement or cost reduction program in a healthcare organization, change is hard. Like

- $1.3B of Spend Analytics Data Across 2,000,000 orders in Data Warehouse
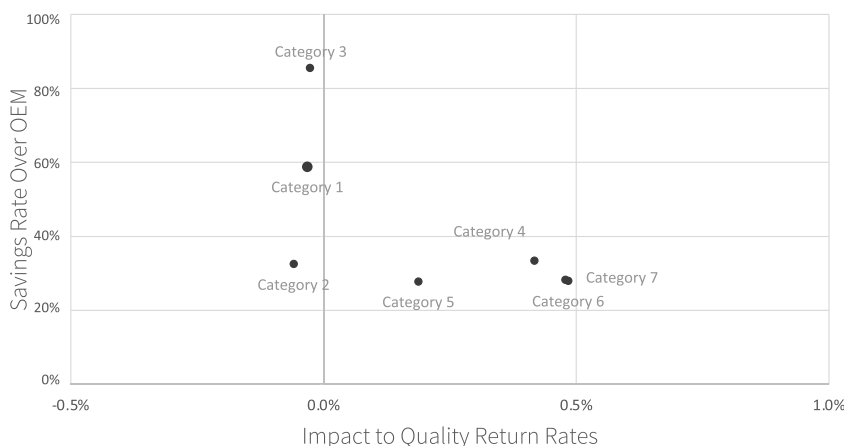- Data is merged with 16 years of Supplier Quality Data across 5,000 vendors

FIGURE 4. Product quality vs. acquisition price of SKU trade-off.

Supplier type shows the percentage of orders that are direct from OEM vs. alternative suppliers. Alternative suppliers usually offer higher savings, but quality must be monitored systematically.
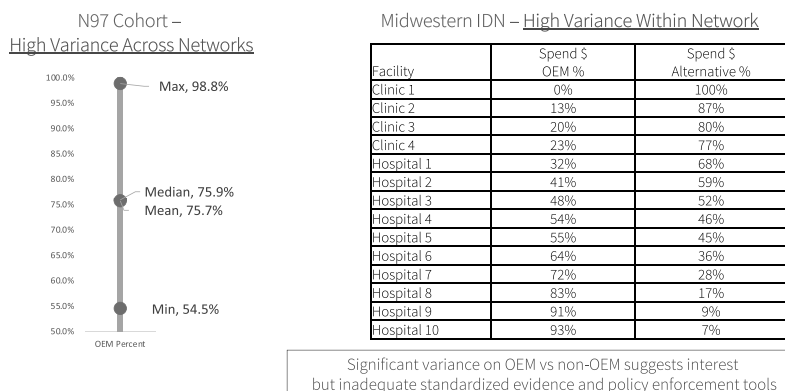
N97 Cohort –
High Variance Across Networks

Facility	Spend $ OEM %	Spend $ Alternative %
Clinic 1	0%	100%
Clinic 2	13%	87%
Clinic 3	20%	80%
Clinic 4	23%	77%
Hospital 1	32%	68%
Hospital 2	41%	59%
Hospital 3	48%	52%
Hospital 4	54%	46%
Hospital 5	55%	45%
Hospital 6	64%	36%
Hospital 7	72%	28%
Hospital 8	83%	17%
Hospital 9	91%	9%
Hospital 10	93%	7%

Midwestern IDN – High Variance Within Network

Max, 98.8%

Median, 75.9%
Mean, 75.7%

Min, 54.5%

OEM Percent

Significant variance on OEM vs non-OEM suggests interest but inadequate standardized evidence and policy enforcement tools

FIGURE 5. Supply chain variation - OEM vs. aftermarket product mix.

other specialists, healthcare technology management professionals have confidence in their own decisions and partners. Developing and implementing purchase policies across many hospitals within a single health system can be a challenge for long-tail purchasing. Centralized decision-making may also raise issues about a purchasing manager's preferences for particular suppliers, and engineers may even question the quality of certain parts.

A marketplace that manages transactions between thousands of providers and thousands of suppliers generates an enormous amount of quality data over time. By leveraging an evidence-based approach and applying those insights as decision-support within a marketplace, hospitals reduced return rates by 6x, achieving less than 0.53% in 2020. Among the defects that generated these returns, 0.21% of parts had a warranty failure, 0.16% did not work when they arrived, 0.10% were of poor quality, 0.5% did not operate as required, and 0.11% needed repairs.

Conclusion

Hospitals should consider consolidating and managing purchases of device parts and repairs to optimize effective capacity and maximize their resources. This part of the supply chain can be managed competently and scientifically, using the same digital tools that power consumer online markets.

Cultural change is always difficult, but the effort can be worthwhile if it helps healthcare systems achieve substantial savings while improving the quality of parts and services. Price variances can be stamped out by using data to inform purchasing decisions, and quality surveillance makes it easy to identify the highest-value vendors.

Actively managing the supply chain for device parts and maintenance need not create additional work for healthcare organizations if they use an online marketplace. Instead of having to create multiple purchase orders for the same part made by different vendors, supply managers simply fill out a single order form in the marketplace. With parts orders taking an average of 80 minutes each to complete, this change can significantly reduce labor costs.

Finally, there is peace of mind for healthcare technology management staff in knowing that the parts they order on the marketplace will always be of high quality. With a near-zero chance of any parts failing or having to be sent back, they can be confident that the parts needed to keep mission-critical medical devices running will always function properly as part of patient care.
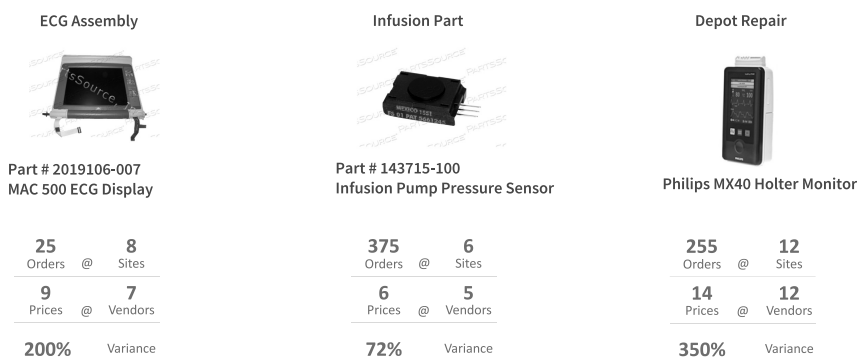
ECG Assembly

Part # 2019106-007
MAC 500 ECG Display

25 Orders	@	8 Sites
9 Prices	@	7 Vendors
200%		Variance

Infusion Part

Part # 143715-100
Infusion Pump Pressure Sensor

375 Orders	@	6 Sites
6 Prices	@	5 Vendors
72%		Variance

Depot Repair

Philips MX40 Holter Monitor

255 Orders	@	12 Sites
14 Prices	@	12 Vendors
350%		Variance

FIGURE 6. Typical medical device purchase variation.