

HEALTHCARE SUPPLY CHAIN
MANAGEMENT AND THE INTERNET

MCKESSON

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INTRODUCTION AND SCOPE

The world of healthcare is changing at a head-snapping pace. Managed Care, Stark Laws, HIPAA, the Balanced Budget Act, APCs, Medicare and Medicaid, IPAs, IDNs, PHOs, MSOs are entities that were virtually unknown fifteen years ago. Yet today, they are forcing major changes in the way that medical institutions do business. Healthcare providers and institutions feel pressure from all sides: consumer, payer and government.

Many institutions are approaching the breaking point:

- In 1999 one-third of US Hospitals had negative operating margins (Source: Robert Wood Johnson Foundation)
- It is projected that nearly two-thirds of US hospitals will be losing money by the end of 2004. (Source: Lewin Group study, 2000)
- The US population that consumes the greatest amount of healthcare resources (people 65 or older) is projected to grow from 35 Million in 2000 to 54 million in 2020 or a growth of 54%. (Source: US Census data - 2000 Census)
- The ten-year costs of implementing the privacy rule component of HIPAA are estimated to be \$17.5 billion. (Source: US Department of Health and Human Services)

As one of the largest areas of spending, supply costs and the supply chain have received substantial focus as opportunities for savings. In 1996 five healthcare-related trade groups sponsored the Efficient Healthcare Consumer Response document (EHCR) to investigate opportunities and strategies available to eliminate costs and improve value in the healthcare supply chain. The study focused on supply chain costs in the non-retail portion of the healthcare arena, i.e., Acute Care, physician offices, extended care facilities, home care/surgery centers and integrated healthcare systems. The EHCR identified an incredible \$11 billion in potential savings in supply chain “process costs”-savings opportunities that organizations are not currently exploiting.

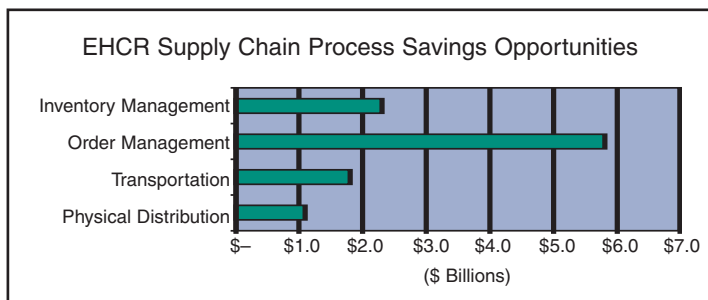


Figure 1

Another key area of rapid change is Information Systems and Information Technologies. Through the early 1990s, the healthcare industry had one of the lowest rates of IS/IT investment of any industry sector in the country. Healthcare is now playing “catch up.” Organizations are grappling with how to cost-effectively meet their infrastructure needs. The quality of the investments that healthcare institutions make in systems and eCommerce will drive future process changes and savings opportunities within the supply chain.

In the past several years we’ve also seen the Internet grow up. The eStock Market experienced explosive growth, followed recently by plummeting stock prices and numerous business failures. A number of dot com firms that purported to have the “right” eCommerce solution for the healthcare supply chain have either lost significant value or have gone out of business entirely. This has created confusion and skepticism in the marketplace as healthcare institutions attempt to formulate and implement their Internet supply chain strategies.

OUR OBJECTIVE

The objective of this white paper is to take an independent look at the supply chain and identify the key areas that would allow cost savings, and process and quality improvements, to be realized.

Our particular concentrations are:

- Identify the participants, tasks and processes that comprise the healthcare supply chain.
- Describe the structural links and information flows that must be addressed by supply chain related systems.
- Analyze the current eCommerce offerings to determine their viability in meeting the needs of the healthcare supply chain.
- Determine the attributes of the “ideal” eCommerce solution.

THE CURRENT STATE OF THE SUPPLY CHAIN

To date, the healthcare industry has made little progress in capturing the \$11 billion in process cost-saving opportunities identified by the EHCR. Key industry metrics show the severity of the issues:

- \$150 total transaction costs per order for health care buyers and sellers (Source: Paine Webber, “A Brave New World,” 6/00)
- Only 10 percent to 15 percent of enterprises use EDI currently (Source: Healthcare Informatics, February 2001, p. 76)

The Director of Purchasing and Materials for a major independent delivery network states the primary issues very succinctly:

“Healthcare institutions have done a reasonable job in implementing systems that address individual segments of the supply chain. But where they are lacking in technology and perspective is in implementing solutions that target the entire supply chain.”

His point is well taken. Further automating individual processes that are already automated is not going to create significant improvements to the supply chain. The gains are going to come from providing solutions that link disparate segments of the supply chain, allowing for a global view of the supply chain.

All partners in the supply chain must be able to see activity throughout the chain to optimize their own decision-making. This “end-to-end view” of how each activity, process and decision affects all other activities, processes and decisions is essential to drawing costs out of the supply chain and to optimizing performance.

THREE DIMENSIONS OF THE SUPPLY CHAIN

Taking a view of the supply chain from three dimensions can assist us in understanding how the supply chain operates, and can ultimately help us identify cost reduction opportunities through implementation of well-reasoned eCommerce strategies:

1. The organizations that comprise the supply chain.
2. The process tasks that drive activities from consumer demand through manufacture, distribution and delivery.
3. The information flows that need to be in place to meet the needs of the institutions and organizations that make up the supply chain and its processes.

The Organizations of the Healthcare Supply Chain

When the EHCR was published in 1996 it proposed three elements to the healthcare supply chain — Production,

Distribution and Consumption as shown below. While this is the classic view of how a supply chain operates, it aggregates some very important organizations/decision-makers in the supply chain.

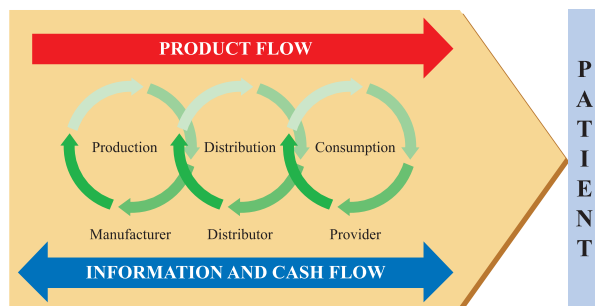


Figure 2
Source: Efficient Healthcare Consumer Response
November 1996

In order to understand how the supply chain can be optimized we must disaggregate these elements, and understand each organization’s distinct information requirements. Only when we understand more about each organization and how it relates to the other organizations within the supply chain, can we reach the proper conclusion on how to optimize the entire system.

Let’s look at these organizations in more detail:



Figure 3
Healthcare Supply Chain Organizations

PATIENT/CLINICAL PROVIDER

This is the place where demand is created, care is delivered and products and services are consumed. It can be anywhere in the IDN; the acute care hospital, an outpatient clinic, the operating room or an extended-care facility.

Key Clinical Provider Challenges:

- Access to information to coordinate key decision factors in product choice-clinical requirements, quality, cost.
- Ability to requisition products easily (automated) with full visibility to cost, standardized product choices and availability.

IDN/PROVIDER ADMINISTRATION

This is the hub of the healthcare supply chain. It is where the demand for healthcare supply is scheduled, measured, stocked and replenished. It is the focus of communication to the other members of the supply chain, not only for logistical considerations, but also for financial activities. It also links the supply chain to the clinical and payment worlds.

Key IDN/Provider Challenges:

- Integrating diverse internal systems to provide the necessary supply chain information for operational and analytical needs:
 - Materials Management
 - Accounts Payable
 - Clinical Decision Systems
 - Surgical Systems
 - Finance — G/L
 - Patient Charge
- Providing efficient, automated communication with external organizations to optimize supply chain costs, service levels and quality. This includes:
 - Order information
 - Product specifications
 - Invoicing
 - Product availability
 - Delivery information
 - Payment

DISTRIBUTOR

The distributor provides critically important logistic, transportation and inventory management services to the healthcare supply chain.

Key Distributor Challenges:

- Providing services and communication that optimize inventory levels both at the healthcare provider locations and in their own locations to minimize costs.
- Working with healthcare providers to optimize delivery costs and inventory levels at an increasing number of remote satellite locations within IDNs and other diverse healthcare organizations.
- Providing product data in a form compatible with pricing data provided by GPOs and the information on product specifications provided by manufacturers.

MANUFACTURER

Manufacturers have the responsibility for designing and manufacturing products to meet the needs of the healthcare market.

Key Manufacturer Challenges:

- Optimizing manufacturing and inventory costs through the ability to see original demand data at the hospital/IDN level.
- Identifying creative solutions to decrease costs and improve quality in the supply chain (i.e. unit dose packaging, which has reduced handling and error costs for many pharmaceutical products)
- Coordinating communication with GPOs, Distributors and healthcare providers to ensure timely, cost-effective movement of product and pricing information.

GPO/BUYING GROUP

The GPO/Buying Group is an attempt to aggregate demand by multiple healthcare providers to access more favorable pricing and terms from the product and service producers and distributors of the healthcare supply chain. Their growth has occurred as a result of the pricing/cost pressure that has been placed on the providers by the payers, both private and government.

Key GPO Challenges:

- Currently GPOs provide only pricing information — not full product information. All of the information concerning products, availability and pricing must be available from a single source to optimize the healthcare supply chain.
- GPOs do not typically have agreements with the full range of medical product suppliers, only the largest manufacturers. Healthcare institutions need access to both a broad range of underlying products, as well as product alternatives/substitutes, in order to make optimal choices.
- Prices can vary from member to member on the buy side based on usage or other factors. They can vary on the sell side based on specific agreements with distributors for services and volume commitments. Maintenance of this rapidly changing information can result in discrepancies in pricing and product information that add significant cost to managing the supply chain.

eCOMMERCE PROVIDER

Providing appropriate communication throughout the supply chain is one of the keys to generating efficiencies and savings in the healthcare supply chain. The eCommerce Provider is a new entity in the healthcare supply chain. There are several versions of eCommerce Providers currently emerging in healthcare, such as eExchanges/eMarketplaces. Each has its own particular vision, depending on the sponsoring entities.

Key eCommerce Challenges:

- Who is going to pay for these services? Current models have high transaction-based fees that are often for redundant activities already being performed by healthcare providers' MMIS systems.
- How are these systems going to integrate with the existing systems of healthcare providers? This integration is critical to the success of any efforts to remove process costs from the supply chain. In today's environment it is not reasonable to expect healthcare institutions to make large investments in new systems.
- What information will be captured, integrated and provided by the eCommerce providers? Current offerings appear to lean towards providing only one segment of information (i.e. price, but not product specs; or specs without pricing).
- How are the eCommerce Providers going to link to the product fulfillment end of the supply chain?

The Process Tasks of the Healthcare Supply Chain

At the most basic levels, there are 12 fundamental tasks in the cycle of the supply chain. These are the tasks that are required to get from: I need a bandage for Sammy's finger, to having it there and being able to apply it. Each of these tasks has its own information needs and requirements to be able to contribute to optimizing the supply chain. In addition each must provide information to others in the supply chain. These fundamental tasks are:



Select

Product selection is a key part of the supply chain. It involves functional and financial considerations. Is it the right size bandage? Is it sterile? Is there a better or cheaper alternative?

The selection process in the health care supply chain can be very complex involving standards committees, access to all contract pricing and alternative products available to the institution.

Key Selection Process Challenge:

- Availability of multi-disciplinary information to make optimal product selection(s) for standardization—Clinical, Product Specification, Pricing, Inventory impact.



Requisition

The requisition is the tool used to communicate the user's selection to the orderer. It can be used as a tool to limit or specify the choices available to the requisitioner. Generally, the requisition is fed into purchasing or an ordering system for vetting and consolidation. This is a major method of achieving savings over unregulated, unconsolidated purchases.

The requisition can be triggered by a scheduling event, directly by an individual provider or by an inventory system as the result of a consumption event.

Overall, requisitioning is one of the least automated elements in the health care supply chain, causing a lack of visibility to alternatives in products, services and pricing. In many institutions a significant part of the total supply spend (30-40%) escapes review. This causes up to a 20% price increase for those unreviewed/unconsolidated items, as well as unnecessary inventory increases and product waste.

Key Requisition Process Challenges:

- Providing universal access to potential product users to the automated requisitioning system. Currently, remotely located users and users without a direct network connection are often excluded from automated requisitioning.
- Integrating requisitions into existing MMIS systems.
- Providing appropriate rule based control of users ability to view products (standard, non-standard and pre-approved alternatives).



Order

The order process involves several components. It is a control function insuring that there is authority to order and the pricing is appropriate. It also checks availability and delivery and

may substitute an alternative if necessary. Typically the ordering process consolidates requirements from multiple departments to optimize pricing, inventory and logistics costs.

Key Order Process Challenges:

- Consolidation of requisitions to insure optimal order size and pricing.
- Use of EDI or other electronic data transmission standards to improve the quality and timeliness of information flow, as well as to reduce administrative costs.



Manufacture

A major issue with producing goods in the healthcare supply chain is how well the manufacturer is linked into the creation of demand. If the manufacturer is blind to real consumption,

significant cost is added to the system through excess inventory creation to maintain safety stocks. Or alternatively, rush manufacturing costs in the form of overtime and premium transport costs to meet unforecasted demand. These can only be reduced by improved data from the consumption end of the supply chain.

Key Manufacturer Process Challenge:

- Linking directly to the healthcare provider to see demand creation at the point and time of use to optimize build and inventories.

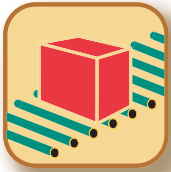


Transport

When shipment size, timing and location are not optimized, the cost of transporting goods can significantly increase. (For example: \$175K annually in excess costs at one studied mid-size hospital.)

Key Transportation Process Challenge:

- Receiving consolidated order and inventory data from the healthcare provider.



Receive

Receiving is a key control function in the supply chain. It confirms the accuracy of the vendor's shipment (whether done on every shipment or on a statistical test basis). It triggers stocking inventory or distribution to end-users

and the vendor payment process.

Key Receiving Process Challenges:

- Automated order and packing slip information to reduce manual effort and errors on the receiving process.
- Automated transmission of data to financial and payables systems.



Inventory

The degree to which inventory is successfully managed effects whether costs are optimized or increased. Done well, it can balance the competing pressures of shipment size, transport costs on the one side and financial

carrying costs, storage costs and improved service levels on the other side. Or it can add significant costs to each of these elements if poorly managed with inaccurate/incomplete information.

Key Inventory Process Challenges:

- Automated data and use information collection from point of use inventories.
- Improved forecasting and transmission of data to distributors and manufacturers.



Distribute

The product needs to be moved from receiving or stocking locations to the point of use. This requires not only the physical movement, but also the control mechanisms to account for the product.

Key Distribution Process Challenge:

- Minimizing internal handling and transport costs.



Consume

This is the reason for the entire supply chain. This is where the right product must be there at the right place and time, and at the right cost.

Key Consumption Process Challenge:

- Collecting point-of-use data that allows automated transmission to materials management, patient charging, financial and clinical systems.

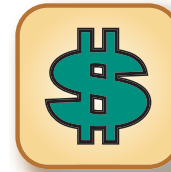


Pay (Product Provider)

Product payment may be triggered by receiving, inventory or consumption events. These events may occur directly in an MMIS system, or another system such as an OR system.

Key Product Payment Process Challenge:

- Matching order, receipt, invoice and pricing data from disparate systems in an automated fashion to insure proper and timely payment.



Charge (Consumer)

Capturing patient-related usage of product is essential in optimizing the healthcare supply chain, whether the data is used to charge the patient directly, or to perform activity-based costing and information feeding to a

clinical outcomes measurement system.

Key Patient Charge Process Challenge:

- Identifying and implementing a point-of-use system that will integrate with patient charging systems and MMIS.



Reporting (Finance/Analysis)

The healthcare institution needs information in enough detail to be able to prepare financial reports. In addition, the ability to analyze usage, quality, outcomes and cost efficiency must be available.

Key Reporting Process Challenge:

- Automating the collection and integration of data from both internal and partner systems allowing easy access to information for reporting and analysis.

Information Flows — the Key to Supply Chain Improvement

As we have seen, almost all of the key process challenges shown above relate to the collection, processing and flow of information from one process to another, from one system to another and from one organization to another. Optimizing these information flows provides the fuel that is required to make good decisions about supplies and the supply chain.

PUTTING IT TOGETHER — THE PROCESS, ORGANIZATION, INFORMATION FLOW MATRIX

The next step in understanding the needs of the overall supply chain is to understand the relationships between the

processes and the organizations. The following matrix demonstrates where each organization fits into the tasks and the information flows in the healthcare supply chain.

It is clear from the figure below that there are multiple participants at almost every stage of the supply chain process. The 18 primary information flows (*shown in red*) are the minimum required to place, receive, pay for and use a product in today's healthcare supply chain. The 28 supplementary information flows (*shown with dotted lines*) are those additional flows required to provide each organization with the information to optimize decision-making and have a cost-reduction impact.

Healthcare Supply Chain Information Flows

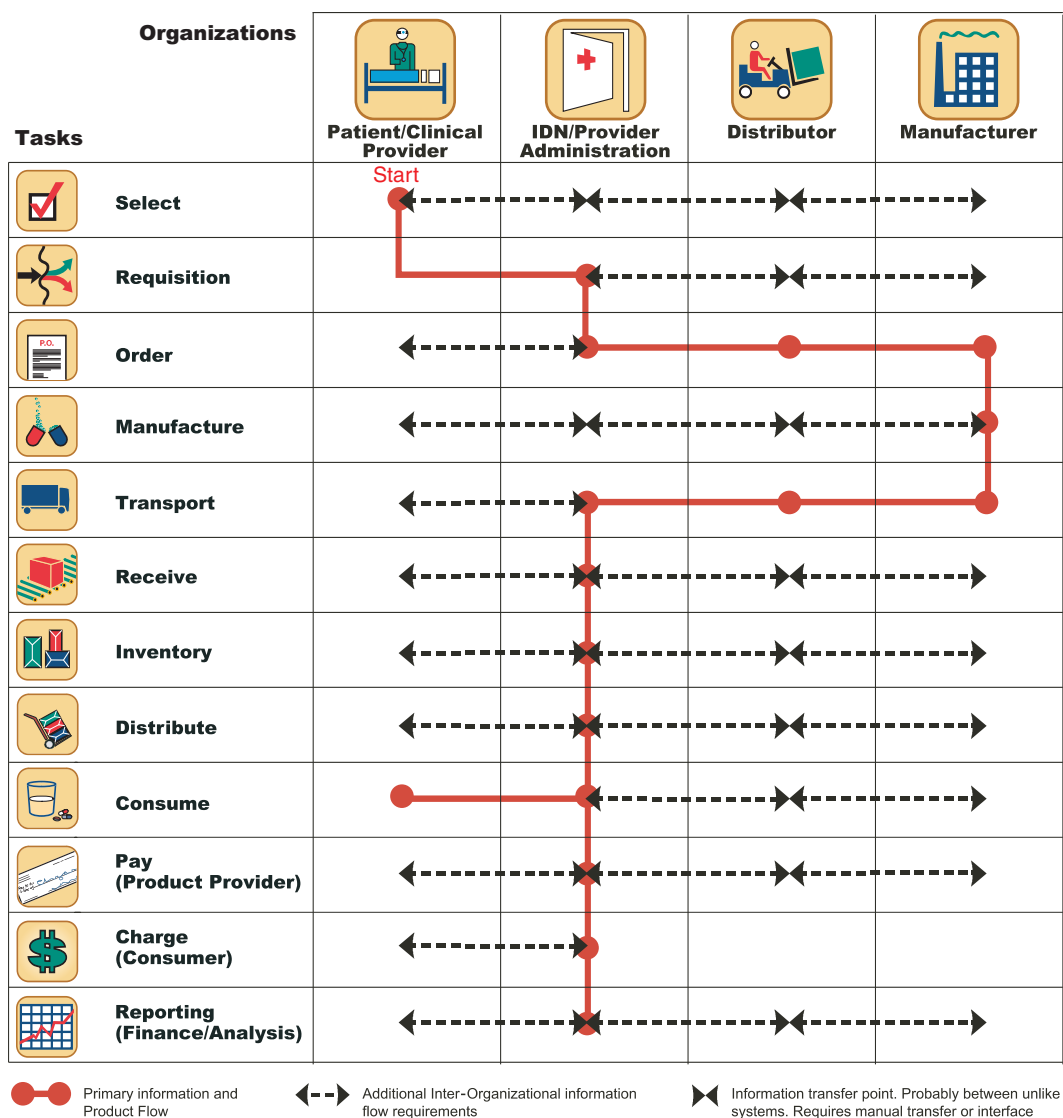


Figure 4

INFORMATION FLOWS AND “TRANSLATION STOP” CONSTRAINTS IN THE SUPPLY CHAIN

Those flows moving horizontally represent inter-organization flows. Orders, invoices, shipments, receipts and payments all must be communicated across the various entities of the supply chain in order to reconcile transactions. These inter-organization information flows are generally moving between disparate systems and require the ability to be “translated” from one system to another. They are required whether they are performed by manual typing and “snail mail” or with real-time automated transactions directly between disparate systems.

The vertical flows are those occurring within the provider organization. (*There are certainly flow requirements within the distributor and manufacturer; however, they are beyond the scope of this document*). These vertical flows often occur between dissimilar systems (i.e. Materials and Finance) even within the same healthcare provider.

Each arrowhead in the diagram represents a “translation stop” in the communication flow. At a “translation stop” the information must be communicated by “translating” from one system’s data format to another’s. Specifically:

- The information may need to be manually re-entered.
- A custom interface may need to be designed and implemented.
- In best case, a standard interface may be available. “Translation stops” add time, cost and the possibility of error at each point where they occur. This continues to be a significant technology issue for providers.

INFORMATION REQUIREMENTS AND CONSEQUENCES IN THE SUPPLY CHAIN

Let’s look at the logical groupings of the process of ordering a bandage for Sammy’s finger and identify the specific information and flow requirements and the consequences of not meeting those requirements:

SELECTION AND REQUISITION are the first two process tasks:

Requirements:

- Each manufacturer’s product and pricing data must be transmitted to the distributor and translated into the distributor’s system.
- The distributor(s) must transmit information on each bandage alternative, its specifications and its pricing to the hospital.
- The distributor’s information must be translated into the item master file of the Materials Management Information System (MMIS) of the provider organization.
- The information from the item master must be available to the selector and the requisitioner, at any location throughout the provider organization.

Consequences:

- The failure of this information to move quickly, without significant effort or error, is critical to optimizing the selection and requisitioning of the product. If information flows do not make it to the clinical provider, selection of product will be made solely on the basis of individual choice, without regard to the institution’s pricing leverage and planning.
- Many institutions attempt to stop-gap this situation by manually entering requisitions from non-connected users into their MMIS systems. This is an expensive process and has the perils of additional errors and miscommunication.
- Up to 40% of med/surg supply products purchased by provider organizations escape the “vetting” process of having the requisition compared to the item master and the scrutiny of the purchasing system. This occurs because of the failure of current systems to provide the availability of an automated system to many of the end user/orderers. The resulting “rogue spending” adds substantially to healthcare supply chain costs.

ORDER, MANUFACTURE, TRANSPORT AND RECEIVE represent the “Procurement” phase of the processes of the healthcare supply chain:

Requirements:

- Requisition information must be translated and consolidated into “Orders” within the provider’s system and then transmitted to the distributor and manufacturer in an accurate and timely fashion.
- Data must be available to the provider through the distributors’ and manufacturers’ systems for the provider to facilitate appropriate service levels and allow for substitution of “out of stock” products, where required.
- Order acknowledgement and/or packing lists must be transmitted to the provider organization to furnish receiving information to check shipments against, and to feed both the financial and inventory systems of the provider organization.
- Information integrates into the provider organization’s existing finance systems, particularly Accounts Payable and General Ledger, to facilitate payment and financial reporting requirements.

Consequences:

- Unconsolidated orders result in smaller orders, higher unit prices, and increased transportation, receiving and handling costs.
- Lack of availability data can cause service level decreases and/or unit price increases.
- Manual or missing receiving information increases both errors and product handling costs.

- If systems are not able to feed fully matching receipts to the financial systems, the identification of pricing and rebates cannot be done in an automated fashion. This adds substantially to payment processing costs, errors, disputes and lost discounts.
- EDI has made progress in automating these processes in the healthcare supply chain. However, many smaller and even some mid-size organizations do not have the systems in place to allow them to use electronic communications tools and resort to manual implementation of these processes (i.e. manual receiving).

INVENTORY, DISTRIBUTE AND CONSUME represent flows of product within the healthcare provider. However, the electronic capture and transmission of information concerning these flows has significant implications throughout the supply chain:

Requirements:

- Consumption data provides the most accurate forecast base for manufacturer and distributor planning.
- Consumption can also trigger payment to the distributor/manufacturer, depending on contract terms.
- Inventory and internal distribution data are required for internal control and forecasting by the healthcare organization.
- Internally, consumption (or inventory charge data) feeds the financial reporting of the healthcare system and the consumer (patient) charges.

Consequences:

- When this information is not available, as is the case today, it forces manufacturer inefficiencies, requiring them to overbuild product in order to create safety stock supplies.
- Lack of consumption data also causes inventory build at the distributor level.
- If these processes are not integrated, there will be substantial loss of revenue through lost charges.
- Accurate consumption data is required to drive patient charges and accurate activity-based costing information. And without the necessary information to drive product use/outcomes analysis, organizations are missing opportunities to optimize product selection based on clinical effectiveness.

PRODUCT PAYMENT, PATIENT CHARGING AND REPORTING (FINANCIAL AND ANALYTICAL) information from the other processes in the health care supply chain is critical to the ability to perform these functions:

Requirements:

- In order to efficiently resolve and pay invoices, data must be available from all parties involved in the product purchase transaction: receiving, distributor/manufacturer shipment and invoice information, pricing information from GPO and/or a contract information database (usually MMIS).

- Point-of-use consumption information is required for accurate patient charging.
- Supply cost information must be integrated into the general ledger accounting system for financial reporting.
- Supply information must integrate with clinical and financial decision support systems, to optimize selection and forecasting.

Consequences

- Failure to have accurate data from both the provider's MMIS system and the distributor or manufacturer on product, price and quantities causes substantial effort on both sides of the buy cycle for resolving invoicing and payment discrepancies. These discrepancies can result in late payments, loss of discounts and a substantial increase in the costs of administering the Accounts Payable/Accounts Receivable processes for both buyer and seller.
- Linking product use to a patient charge system is essential to maximize revenue opportunities. Even where capitated payment precludes direct charging of patients there is a need to utilize activity-based costing, i.e., associating product use to patient and procedure type in order to optimize product use and outcomes.
- There is significant need for the healthcare provider organization to perform both financial reporting and decision support analysis within the organization. In addition, the distributors and manufacturers require the same reporting. The ability of the healthcare supply chain to deliver information from all of the disparate systems is directly related to the quality of analysis.

SUMMARY OF THE STATUS OF THE SUPPLY CHAIN

We have looked at how the supply chain operates today in terms of process and information flows and how each affects the ability of the supply chain to operate efficiently. The following chart summarizes the major inefficiencies to be found in the supply chain as it operates today. Cumulatively, these inefficiencies represent savings opportunities of the same order of magnitude as those proposed by the EHCR report.

It is clear that the savings opportunity based on improving processes and information flows is significant and worth pursuing.

Or as the VP of Operations at a large health care IDN has put it:

“They have come and scraped at the supply chain every year for savings. The big direct savings on price and waste aren't there any more. Process changes and utilization improvements are the big gainers for the future.”

Consequences of Supply Chain Process and Communication Inefficiencies

















Organizations					
Tasks		Patient/Clinical Provider	IDN/Provider Administration	Distributor	Manufacturer
	Select	<ul style="list-style-type: none"> • No Link between product choice and outcomes • Product cost overweighted or underweighted - low quality or high cost • Reduced product consolidation/standardization 			
	Requisition	<ul style="list-style-type: none"> • High "non-stock" purchases (up to 40%) - increased product cost • Increased product cost to remote users (i.e. Outpatient, Clinics without access to automated systems and item master) 			
	Order	<ul style="list-style-type: none"> • Inability to consolidate requisitions, increasing number of orders and reducing items/lines per order • High cost of manually processing orders 			
	Manufacture	<ul style="list-style-type: none"> • Inefficient build schedules and high inventory levels from being blind to demand 			
	Transport	<ul style="list-style-type: none"> • Low order consolidation, increasing number of shipments and transport costs • High premium freight costs due to demand forecast errors 			
	Receive	<ul style="list-style-type: none"> • Manual receiving increases process costs • Discrepancies at receiving causes payment delays and increased reconciliation costs 			
	Inventory	<ul style="list-style-type: none"> • Bad demand data causes higher than needed inventory levels, increasing carrying costs 			
	Distribute	<ul style="list-style-type: none"> • Increased labor costs of small deliveries caused by bad usage information • Reduced service levels 			
	Consume	<ul style="list-style-type: none"> • High cost of manual data capture 			
	Pay (Product Provider)	<ul style="list-style-type: none"> • Manual reconciliation of pricing, terms and chargebacks • High cost of manual payment processing 			
	Charge (Consumer)	<ul style="list-style-type: none"> • Incomplete charge capture lowers revenue • High cost of manual charge processing 			
	Reporting (Finance/Analysis)	<ul style="list-style-type: none"> • Reduced effectiveness of decision - support system • High administrative cost of manual financial data entry • Inability to include supplies in outcomes, clinical pathways, benchmarking, and best practices analysis 			

Figure 5

eCOMMERCE AND THE FUTURE OF THE HEALTHCARE SUPPLY CHAIN

There is general recognition that it is improved processes and information flow that are going to provide significant savings throughout the healthcare supply chain. The growth and ubiquitous nature of the Internet has demonstrated to the world the power of electronic communication and eCommerce.

As a result, a number of different "eCommerce" models have started to materialize and evolve. They all aim to improve processes and communication within the health-

care supply chain, but there are distinct differences among the offerings and approaches. Product manufacturers, distributors and GPOs are all entering the market with eCommerce-related offerings. Each is trying to protect and leverage their particular strengths. How they meet the fundamental needs of providing communication, integration and the support for process changes will determine how well they will serve the needs of each member of the supply chain and how much improvement can be wrung out of the supply chain. We will look at the models that have appeared to date and then detail an optimal model based on the healthcare supply chain process and communication requirements as we have reviewed them.

GPOs — ANOTHER LAYER IN THE SUPPLY CHAIN PROCESS

One of the major opportunities in the healthcare supply chain was the reduction of product prices. Was, because most of that opportunity has already been drawn out of the system. Early on after “Prospective Payment” (in the form of DRGs) put pressure on Acute Care Hospitals, a new entity emerged—Group Purchasing Organizations or GPOs. What the GPO offers hospitals is the ability to consolidate

their purchasing power with other hospitals to leverage the best pricing from manufacturers and distributors. This has been, by and large, a successful effort to reduce the cost of the product. There has been, however, an unintended consequence to the growth of GPOs and other similar entities—the addition of substantial complexity to the pricing for medical supplies and the attendant information and reporting requirements. In order to gain commitments for the best available pricing, hospitals and GPOs have entered into

Healthcare Supply Chain GPO Information Flows

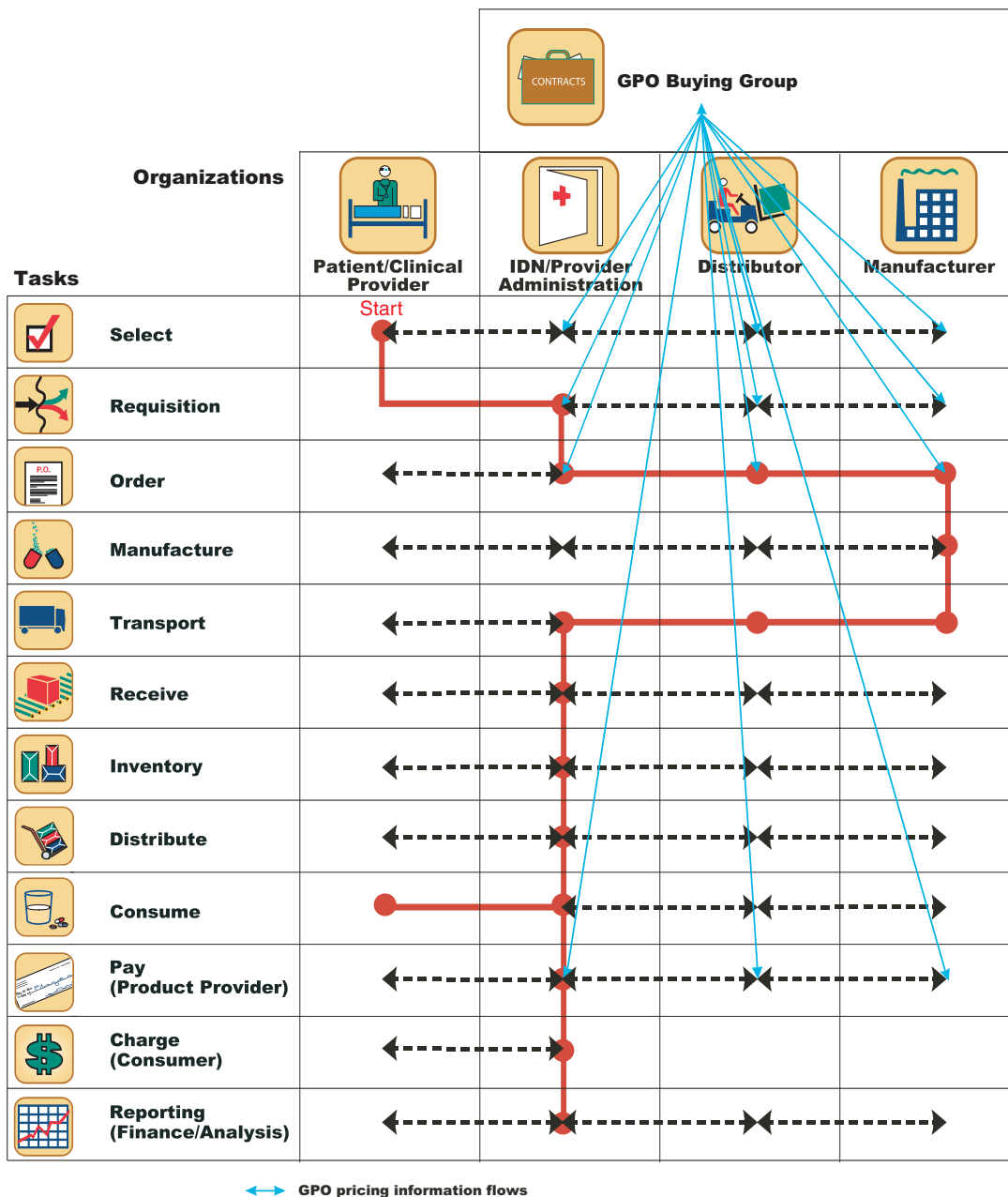


Figure 6

complex agreements with manufacturers and distributors requiring commitments for volumes, percent of compliance for purchases from a contracted entity, rebates, dating, consignment product and other methods of managing price. These pricing agreements can go to the level of different discount amounts for individual SKUs from individual manufacturers based on overall volume and percent of total consumption.

This complexity of agreement has resulted in a corresponding quantum increase in the amount of pricing information transmission requirements between all of the participants in the healthcare supply chain. Figure 6 shows how the typical GPO has inserted itself into the information flow of the healthcare supply chain.

The GPO has become the chief intermediary for providing pricing information to all of the players in the health care supply chain. They maintain the official record of contractual agreements and terms for all of the products covered under their agreements. Unfortunately, this has become an “add-on” to the information requirements of the supply chain rather than a replacement.

The dozen additional information flows that are required to provide accurate pricing information (*in the figure on facing page*) do not replace any of the direct communication links required between the manufacturer, distributor and health-care provider organization. Those are all still required to transmit data on product specifications, shipments, receipts, invoicing and payment data.

This means that the GPO-related pricing benefits have come at a cost. That cost is a substantial increase in the level of information and complexity of information that must be communicated between the members of the supply chain. This in the face of systems already strained by the increasing need to improve electronic data interchange, accuracy and inclusiveness.

THE “DOT COM” EXCHANGE MODEL

These “dot com” exchanges have grown out of the Internet “business-to-consumer” model of exchanges, such as Amazon.com. They focus purely on the communications ability of the Internet to provide access to a great many products at good prices. As with consumer sites, using one of these exchanges is touted to provide everyone in the institution access to view, price and order any product they might need at the best possible price (under an existing contract).

Certainly having the ability for remote users of the system to see and order products electronically does improve

handling costs (by eliminating paper requisitions). These exchanges can also provide a broader view of supply acquisition, for those products that go through the exchange.

On the other hand, this model is typically linked to a limited number of GPOs as their primary conduit to the market place. They are in essence the captives of their GPOs. They do not have full visibility of or control over the fulfillment end of the supply chain.

Currently none of the “dot com” exchanges are able to integrate significantly into existing MMIS or ERP solutions at the IDN/Provider end of the supply chain. ***They provide a streamlined requisitioning model only.*** Based on what we have identified as the information flow requirements, this substantially limits their ability to enhance supply chain process savings.

Another significant issue is pricing. It is unclear who is going to pay for the services of the “dot com” exchanges. Their pricing is generally based on a per-transaction fee. This is an “add on” to all existing fees and margins in the supply chain; there is no apparent offset anywhere in the system. Distributors and providers alike appear unwilling to accept this fee. So this creates serious doubt — what are the value propositions of the “dot com” exchanges?

Or as described by one VP of Materials:

“They are automating a set of tasks I already have automated. I sent them an entire vendor list and they could not do EDI or fax with the first significant vendor of ours that they came to. I am very frustrated with their deliverables, they seem to be concentrating on the easy stuff, not what I need to make any improvement.”

Where these exchanges will go after the Internet hype shakes out remains to be seen. At this point in time they appear to suffer from being long on duplicating existing systems and short on delivering real incremental benefits to any participants in the supply chain except the owners of the exchanges.

As can be seen by the following chart, the “dot com” exchanges provide limited information flow across the supply chain.

These exchanges provide requisition and ordering capability over the Internet. The dotted line in the IDN/Provider column indicates the fact that while these “dot com” exchanges can be used to requisition and order, they are not able to link in to the IDN’s MMIS or financial systems at this time. They are essentially a requisition/order system that operates separately from existing legacy systems without integrating with them.

Process/Information Links Provided by “Dot Com” Exchanges

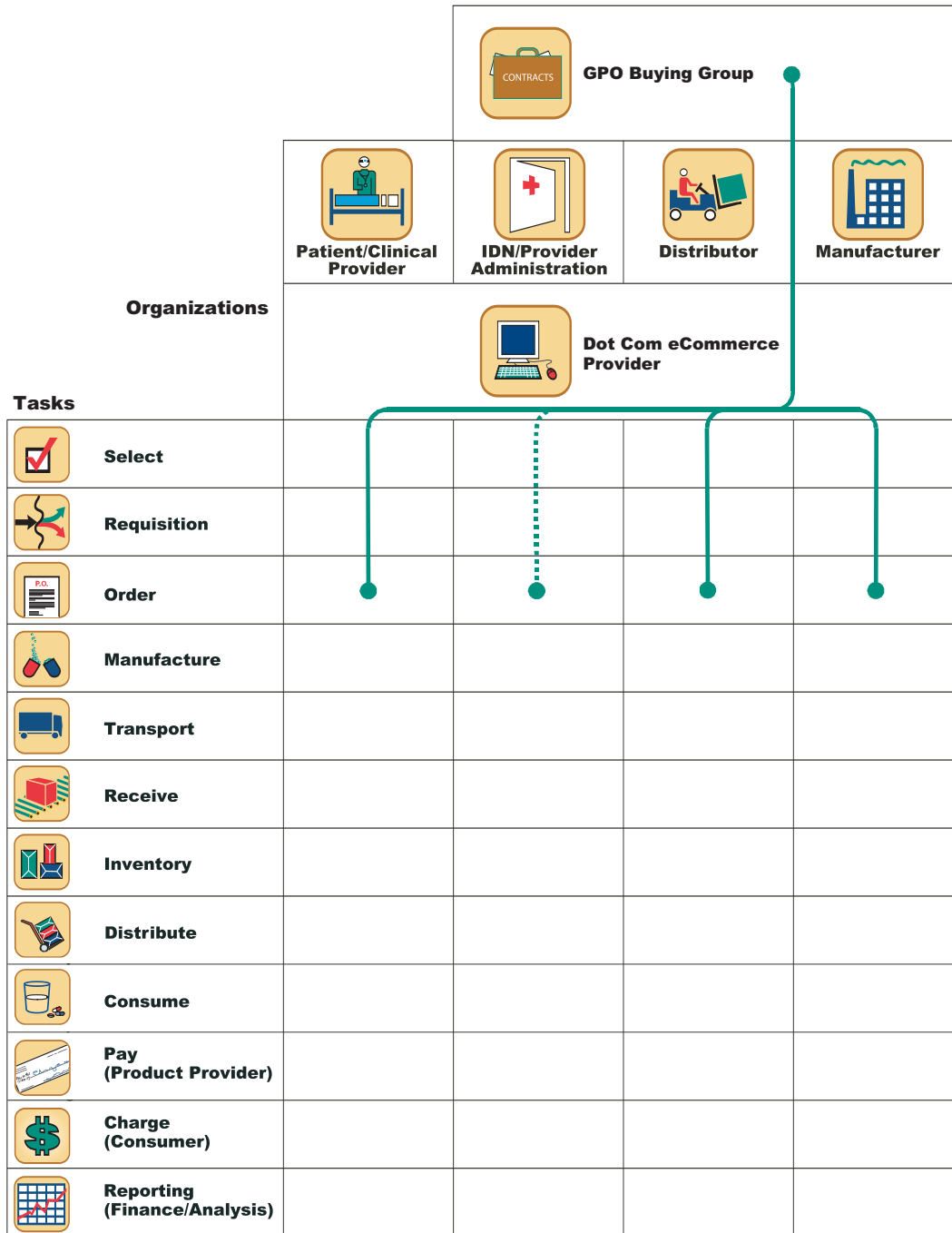


Figure 7

MANUFACTURER DRIVEN EXCHANGES

This exchange structure appears to be leveraging the strength of its member manufacturers in response to the creation of the “dot com” exchanges. They certainly provide a breadth of product offerings, with a substantial number of the medical and pharmaceutical manufacturers quickly becoming members.

However, it is not clear exactly what the true offerings of this type of exchange are yet. There are a number of questions not yet addressed:

- How are the GPOs going to relate to this model? They have signed up only one GPO to date and there is no indication of how they will provide pricing information for those IDNs having existing GPO contracts.
- How are they going to intermediate the services and pricing of distributors? The supply management and logistics services provided by distributors are not yet factored into the manufacturer exchange model-with one of the most critical being current product availability. In addition, the services provided by the distributors are essential to the

efficient functioning of the supply chain. The cost for these must be factored in to any purchase decision.

- How will the IDN/Healthcare Institution customer identify product equivalency and pricing opportunities? The proposed structure of manufacturer exchanges appears to have a group of individual manufacturers “silos” in its presentation to the marketplace. One of the great benefits from the users point of view is the ability to identify prod-

uct equivalency and pricing opportunities across manufacturers. It appears that this will not be an early part of the manufacturer exchange model.

- How is the manufacturer driven exchange going to integrate with healthcare providers’ existing ERP systems? This question is critical to any healthcare institution’s ability to derive benefits from the flexibility of an eCommerce system. This question is not yet fully answered.

Process/Information Links Provided by Manufacturer Exchanges

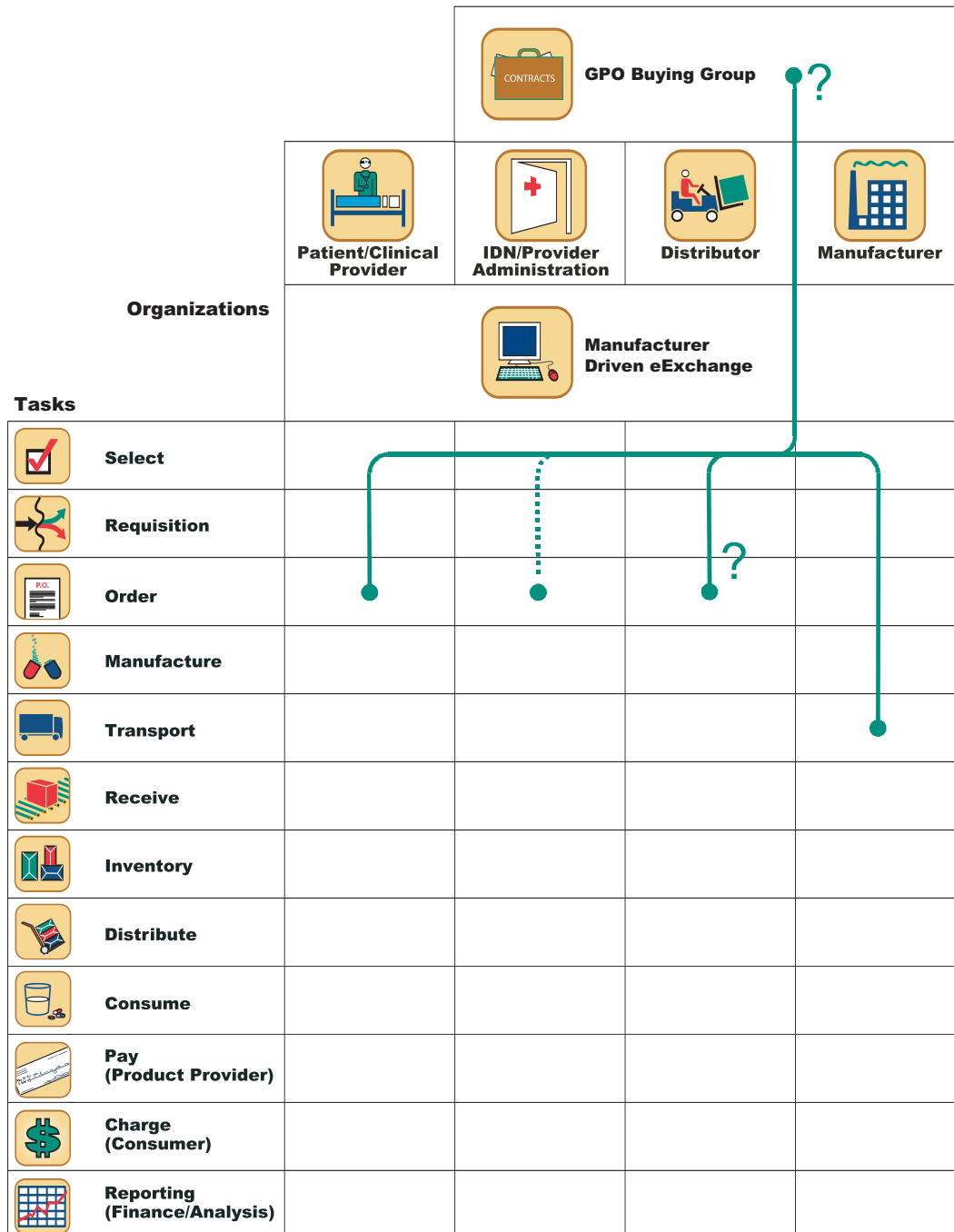


Figure 8

DISTRIBUTOR EXCHANGES

Distributor exchanges are growing up from the premise that there is a strong need to improve the process of information flow between the manufacturers, distributors and “purchasing organizations.” While it is certainly true that communication needs to be improved between these members of the supply chain, there are some fundamental issues with these exchanges:

- The complete focus of the distributor exchanges is on automating catalogs and price lists addresses. But this addresses only one slice of the information needs of the supply chain. It does not currently address issues such as

the integration of disparate systems (for example: OR, Materials, Financial) that are required to optimize the supply chain. There is an absolute need to integrate information between all members, both on the consumption side and the supply side. It is not yet clear how the distributor driven exchanges will handle this.

- The distributor driven exchange will provide the ability to consolidate catalog and pricing information. It is unclear as to how this will provide any benefit over current EDI transaction-based information flow. In fact, it may provide an additional step for the healthcare institutions by requiring data to make a “stop” at the exchange before it can be used by the native IDN systems. This stop is

Process/Information Links Provided by Distributor Exchanges

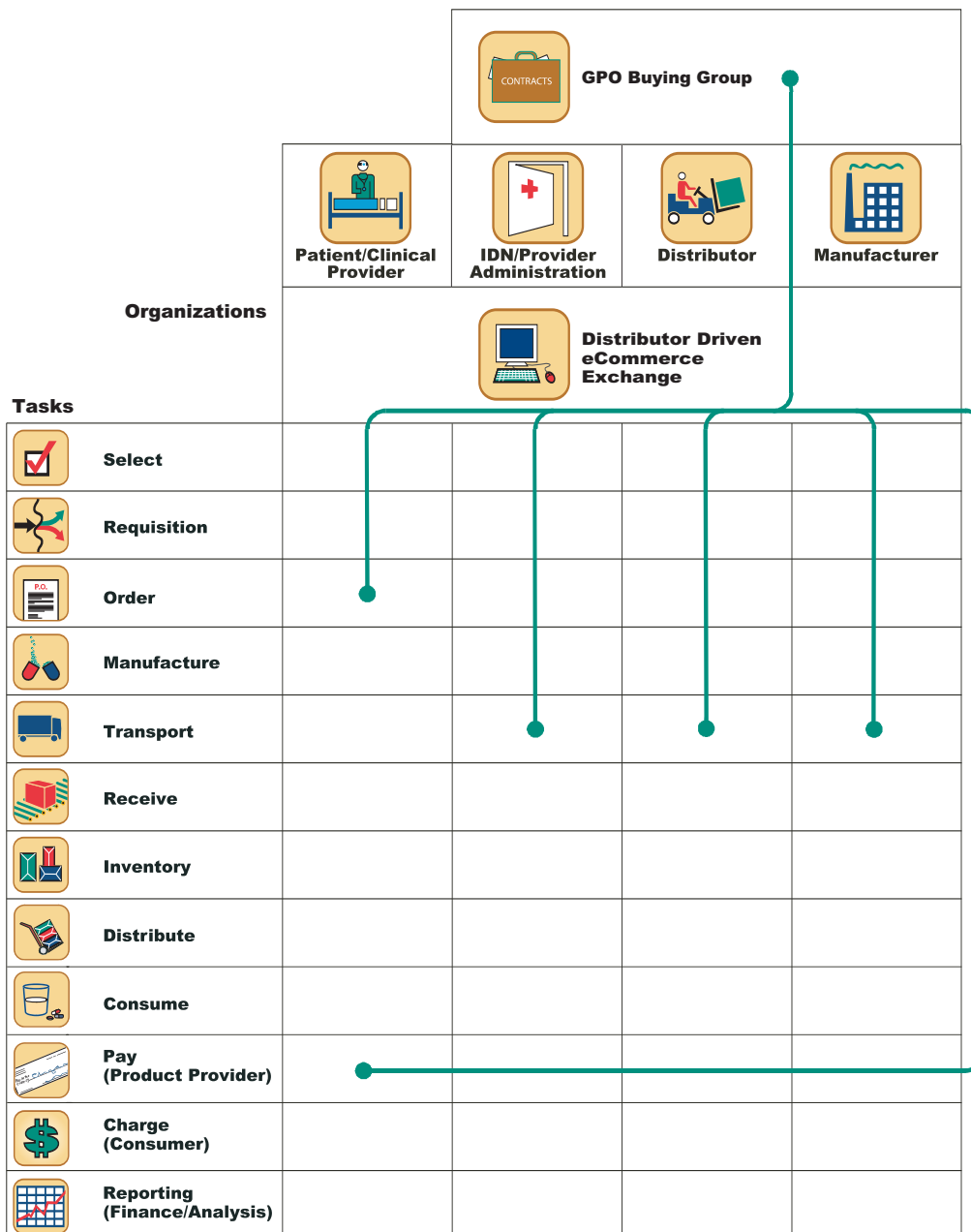


Figure 9

unnecessary since under this model all pricing must be loaded into the item master of the healthcare institution's system before it can be utilized for product selection, requisitioning and ordering.

- It appears that for the distributor exchanges to work, clear and rigid information exchange standards must be in place, standards that must be universally adopted by everyone within the supply chain. While this is an admirable goal, it is one that has been elusive over the past 5-10 years. It appears unlikely that rapid adoption could ever take place, as the complexity of establishing standards, and the sheer number of players who need to embrace these standards, is substantial.

As can be seen in Figure 9, the distributor-based exchange model extensively addresses the communication between the distributor, manufacturer and the pricing intermediaries (GPOs). It also communicates to the IDN/Provider, but only at the front end of requisitioning and ordering, limiting its depth and ability to effect process changes. It will link to the product payment system, as one might expect of a distributor-driven system.

OPTIMAL eCOMMERCE REQUIREMENTS TO ADD VALUE TO THE SUPPLY CHAIN

The world of the healthcare supply chain being what it is, any system that wants to contribute to the improvement of processes, the quality of decision-making and ultimately the reduction of costs, will have to be extremely flexible in its approach. It must be able to communicate easily with systems on both sides of the supply chain without major investments in translation software or hardware. It must provide access to the broadest number of users at each level of the system (Caregivers, IDNs, product information, price and availability information providers). In the current environment Hospitals and IDNs do not have the money to replace their legacy systems for the purpose of improving their view of the supply chain. Therefore any eCommerce provider solution must work with existing systems, and provide good communication and value without significant additional investment.

Critical Elements of an eCommerce Solution:

- Requisitioning tools that are highly inclusive of all possible users who may need to select and requisition product. It should:
 - Provide fundamental controllership by being configurable by the IDN/Provider to provide selective views of available products to users. This limits time and complexity of the selection/requisition task as well as insuring that items are ordered on contract and at the best price.

- Utilize the Internet to link users and systems such as the OR, Outpatient clinics, cath labs, ambulatory surgery centers and all other remote activities, so all potential orderers of product are included.
- Allow requisitioning data to be passed through the MMIS system and other legacy hospital systems, where appropriate, to insure contract compliance and for better needs consolidation with fewer orders per vendor and within a shorter time period.
- Low cost of entry to the system, without requiring substantial investment in other systems, particularly by the IDN/healthcare provider organization.
- Easy deployment, without requiring incremental investment in PCs or networks.
- Full integration with existing MMIS, Accounts Payable and General Ledger accounting systems to protect and extend the investment in those systems.
- Access to pricing, specifications and availability through the Internet for all healthcare and non-healthcare vendors. This greatly increases access to pricing and product information to the orderer and should greatly reduce the need to order items off contract and off the IDN's product database.
- The capability to use information as a data repository for benchmarking, quality and outcome analysis, both internally and across similar organizations.
- The capability to link to and feed clinical analysis systems, allowing evaluation of product use vis-à-vis outcomes.
- The ability to host manufacturer, distributor and pricing contract information (GPO). It should also allow IDN users to go through the system directly to access supplier information and tools, depending on their needs.
- The capability to link requisitioning, pricing and order data to the IDN's existing ERP systems to capture virtually all of the organization's total supply purchases and provide the information base required to perform advanced decision-support analysis. Maximum flexibility must be maintained in data formats for the transmission of information, including existing EDI standards, as well as XML and other Internet-based open information exchange standards.
- Hosting of critical information, databases and processes either on the IDN's own IT infrastructure or in an exchange facility based on the organizations desires and resources.

These attributes combine the best of the eCommerce exchange models with the power of the internal MMIS and other hospital systems, linking all the players and all the activities in the supply chain, and promoting improved processes and decision-making to drive major savings in the healthcare supply chain.

As can be seen, the ideal eCommerce solution provides for all of the necessary inter-organization flows. It is flexible enough to host processes and information that the IDN cannot with their legacy systems (i.e. Internet requisitioning available to all potential product users, that integrates into the MMIS system for review and control). These advances

greatly increase the ability of the entire supply chain to continue to make gains in process and cost savings without having to replace legacy ERP and materials systems. In addition, the ability to have data repositories that cover multiple entities allows benchmarking, and process analysis and comparison, leading to further improvement.

Process/Information Links Provided by Optimal eCommerce

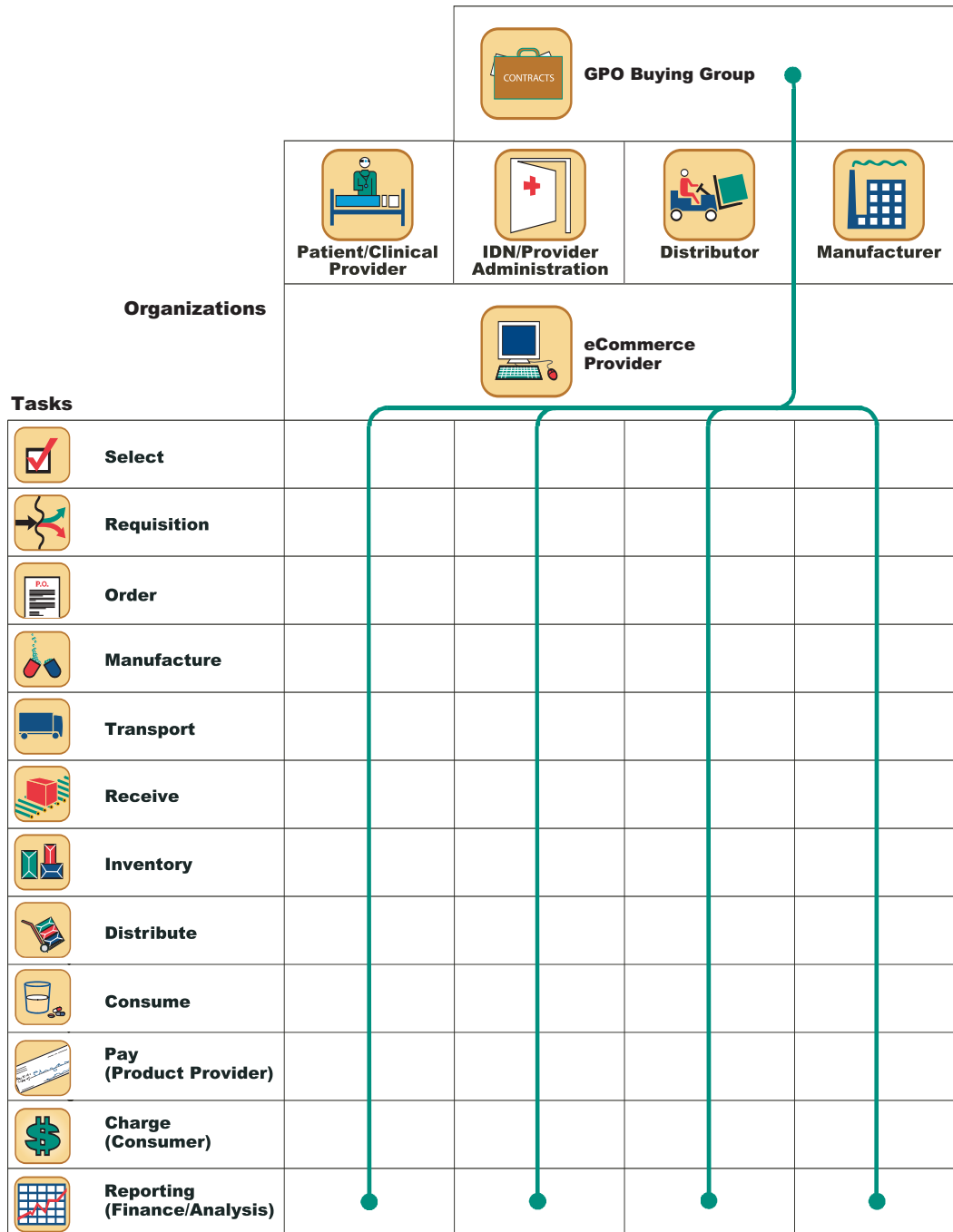


Figure 10

CONCLUSION

Given the size of the potential savings in the healthcare supply chain and how fragmented current systems are, the attempt to integrate the chain's operation is inevitable. Intermediary organizations are going to continue to grow and evolve to meet the need for integration across the chain. It appears that the models proposed to date ("Dot Com," Manufacturer and Distributor driven) all have significant potential pitfalls. These range from an inadequate understanding of the breadth and depth of the healthcare supply chain, to structural limitations based on the origins and biases of the sponsoring organizations.

The advances in technology and communication do have the promise to continue to provide substantial improvement to the healthcare supply chain over the next several years. The range of eCommerce will certainly be expanding through the supply chain. The details of what standards and techniques of communication are utilized is probably less important than several key factors:

- An eCommerce solution must not require that major systems, particularly in the IDN/healthcare institution, be replaced. In order to be feasible in today's financial environment any eCommerce solution must integrate fully with existing legacy systems including materials, scheduling, surgery, financial and decision-support products.
- An eCommerce solution must provide full access and visibility to all of the participants in the healthcare supply chain. This includes all of the internal users in the healthcare institution (which is a major change from today's

environment). It must also include all of the inter-organization information flows.

- It must also be flexible enough to meet the varying needs of healthcare provider organizations—from those who only want a simple transaction tool, to those who would have a virtually hosted supply chain tool. This implies that the system must allow the healthcare provider to determine which blocks they wish to maintain as internal systems and which they would prefer to have outsourced.
- To maximize benefit, eCommerce systems must grow to provide data repository capabilities and the accompanying data analytical services/capabilities. This should include the ability to provide benchmarking and linking to clinical systems to provide associations between product usage and clinical outcomes.

As eCommerce solution providers continue to clarify and refine their offerings over the next several years, it will become easier for healthcare organizations to make an educated choice for an eCommerce partner. Even now, it is clear that the eCommerce providers who are going to be around for the long haul are those who focus on integrating their offerings with existing legacy systems in the healthcare provider organizations in order to maximize their impact on process changes, rather than those who are seeking to further automate already automated processes. It is this integration and facilitation of communication and processes that will ultimately help healthcare organizations realize the substantial savings opportunities that still exist within today's healthcare supply chain.

MCKESSON

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