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#### Executive Summary

Everybody is talking about e-commerce in healthcare, but a chaotic market and incompatible information systems are shackling providers to their old ways. Web-enabling the healthcare supply chain will move incrementally as a handful of hospitals this year test e-procurement in small bites. In our November 1999 global research report, HealthCast 2010: Smaller World, Bigger Expectations, we discussed two themes that are critical to the efficiency of the healthcare supply chain. Procurement in healthcare supplies must move toward an **e-business** platform for data interchange. Buyers and suppliers also must work together toward **standardization**, including a universal product numbering system. In the U.S., e-procurement of medical supplies is estimated to grow to 15% of medical supply spending in the U.S. by 2003, according to Deutsche Banc Alex Brown. (See chart 1.)

As part of our research, we surveyed 15 e-procurement firms in the U.S. While e-procurement firms tout savings in both supply costs and processing costs, we have found their business models are still in flux. That makes for a risky environment for hospitals looking for stable partners. Yet, the timing couldn't be better for severely strapped hospitals. Even a 10% savings on supplies through web-enabling the supply chain could add 1% or more to a hospital systems' cash flow. With hospitals experiencing total margins of between 2% and 3%, that's worth considering. As we discuss later in this report, the adoption of e-procurement in Canada and Europe will vary by region, depending on various regulatory and economic factors.

In summary:

- Despite the hopes and dreams of hordes of e-procurement vendors, moving the healthcare supply chain to an Internet platform will require more time and money than many hospitals are currently willing to spend. We found more e-procurement companies marketing a service than hospitals using it. A shake-out looms for the estimated 50 companies that now market e-procurement services in the U.S.
- Although the melding of group purchasing organizations and dot.coms will accelerate this adoption rate in the U.S., hospitals still must undertake significant integration of hospital information systems and re-engineering of internal processes to participate in the dawning of this new e-commerce age.

### Beginning A New Series...

Welcome to the first edition of HealthCast 2010 E-Health Quarterly. Through this publication, the healthcare practice of PricewaterhouseCoopers will focus on e-business issues and provide an overview of e-health mergers, affiliations, stock prices, and venture capital investments. As healthcare organizations transform themselves into e-health organizations, we plan to help them move forward with the knowledge, research and analysis they need. In this inaugural issue, we examine e-procurement in healthcare. We believe that health systems must begin to contemplate how their organizations will adapt and leverage Internet-based tools to manage their medical supply chains. On the following pages, we provide perspectives from the U.S., Canada and Europe. If you'd like additional information, contact names are listed at the end of this report. We also provide a summary of E-Health activity in mergers, affiliations, stock activity and venture capital. We invite your comments and suggestions.

- E-procurement firms are encountering numerous hurdles in converting the masses, including integrating with legacy information systems, and getting hospitals executives to understand how the technology works.
- Most hospitals aren't able to finance the integration of information systems and the process redesign by themselves. They'll look for various funding mechanisms and the assistance of partners, such as dot.coms, group purchasing organizations, manufacturers, or distributors.

- Manufacturers and distributors are faced with the prospect of cannibalizing their business structures to transform themselves into web-enabled service companies.
- An Internet-enabled supply chain demands some give-and-take among a seamless set of cooperative partners. Unfortunately, few such workable models exist in healthcare amid turf battles and conflicting financial incentives. Building a successful Internet platform for the supply chain could set a model in other areas of the healthcare industry.

## The U.S. Market for Medical Supplies and Today's Wired Buyers

Healthcare providers purchase an estimated \$150 billion worldwide, including approximately \$100 billion in the U.S. Of that, about three-fourths is bought by hospitals; the remainder is spent by physicians' offices, clinics, and long-term-care facilities. However, as much as one-third of this spending includes administrative and work processes, processes that could be done more effectively and inexpensively in a web-enabled world.

In the U.S., the medical supplies marketplace is complex and multi-tiered. It is populated by 6,000 hospitals, 600,000 physicians, 20,000 medical product manufacturers, 450 national medical distributors, and 10,000 regional medical distributors. In addition, 25,000 non-medical manufacturers and distributors also sell products to the healthcare industry.

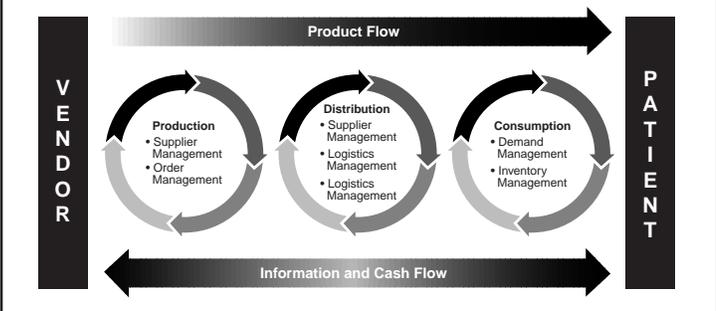
### Hospitals View Spending through GPOs

U.S. hospitals purchase about three-fourths of their supplies through purchasing cooperatives, known as group purchasing organizations (GPOs). The Health Industry Group Purchasing Association, a trade group, reports that GPOs saved hospitals between 10% and 15%, or \$12.8 billion to \$19.2 billion, in 1999. The group calculated that \$128 billion was spent in 1999 on non-labor healthcare costs that were channeled through GPOs. This is a larger number than reported by other sources. One reason may be that this figure includes big-ticket capital equipment items as well as food. Also, hospitals systems' buying is broader than just hospitals; it often includes alternate-site providers, such as nursing homes, outpatient surgery and imaging clinics, and physicians' offices. Also, the market and opportunity for e-procurement in medical supplies is

### Current Trends Affecting Supply Chain

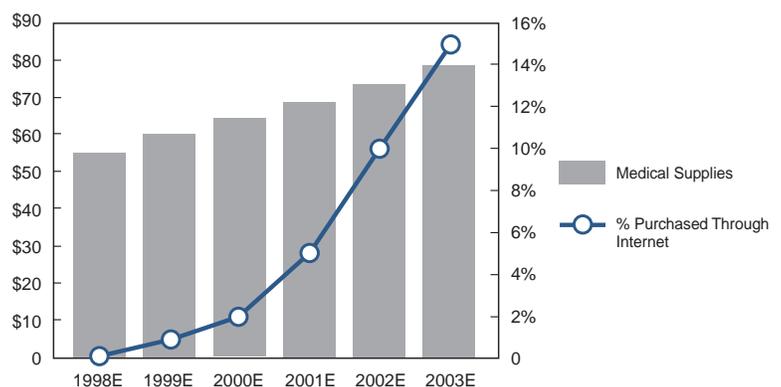
All these changes have led to a new supply chain paradigm:

- Patient/Customer Focus: Delivering Total Value-Products and Services
- Demand Pull: Delivering the "right quantity at the right time."
- Continuous Flow of Product and Information: No Boundaries, No Interruptions, Total Pipeline Visibility
- Change Role of Business Entities: To Act as One Channel Enterprise



different than that for pharmaceuticals. Pharmaceutical spending is the fastest growing part of the healthcare dollar and about one-third of all pharmaceuticals are purchased for inpatient hospital care.

### E-Procurement Expected to Capture 15% of Market by 2003



Source: Deutsche Banc Alex. Brown

Chart 1

Most hospitals belong to two or more GPOs and frequently cherry-pick price lists to get the best deals. GPOs have been successful bargaining agents for hospitals, using the clout of their membership to wring volume discounts out of suppliers and distributors. However, it's questionable how much pricing differentiation exists in the market. A recent investment banking report suggested that pricing disparity among GPOs used to be 15% to 20%, but now is between 2% and 4%.<sup>(1)</sup> The status of today's GPOs is the subject of much debate. The Internet frequently "disintermediates" middle-men. Nobody wants to be "disintermediated," and yet, savings may not accrue unless someone or something is taken out.

During the next year, how will the role of GPOs change in light of new e-supply chain companies?		
	Next Year	2005
GPOs will be absorbed into e-commerce companies	14%	53%
GPOs will lose their relevance	14%	13%
GPOs will be controlling e-commerce companies	0%	13%
GPOs will remain about the same, being the main organization through which providers purchase supplies	64%	7%
Don't know/none of the above	7%	13%

Source: PricewaterhouseCoopers, Survey of e-procurement firms

Chart 2

When PricewaterhouseCoopers asked e-procurement firms about the fate of GPOs, most thought GPOs' role would be largely unchanged in the next year, but that they would be absorbed into e-commerce companies within five years. (See chart 2.) "Manufacturers don't feel the GPOs add any value," said one e-procurement president. "The hospitals we've signed contracts with are in several GPOs." However, GPOs won't be easily disintermediated. During 2000, several e-procurement firms have partnered with GPOs to gain access to their buying volume and buyer loyalty. Over the years,

hospitals have come to rely on GPOs to sort out the thousands of products they buy and to be their bargaining agents with manufacturers. GPOs also help hospital staffs with product standardization so that hospitals can channel more volume into fewer products to maximize rebates and other discounts.

### Today's Wired Hospitals

U.S. hospitals have traditionally underinvested in information technology. Information systems represent less than 3.5% of most hospitals' budgets, according to the 2000 PricewaterhouseCoopers/Modern Healthcare Survey of Executive Opinions on Key Information Systems Issues. That's two to three times less than other industries' IT investment rates. Despite an overall acknowledgement that improved data management could reduce medical errors and improve financial performance, the investment rate has continued at the same level for several years. CEOs' fiscal conservatism is rationalized by the fact that during the past five years, hospital margins have dropped by more than half, giving executives little spare cash to invest. (See chart 3.)

In addition to falling margins, many managers have been distracted by other issues. Hospital systems have been in the process of consolidating, then shearing apart again. Integrating and disintegrating IT systems, not to mention Y2K upgrades, have diverted CIOs' attention. Even so, hospitals are slowly becoming more wired both in the executive suite and the managerial level. According to the 2000 PricewaterhouseCoopers/Modern Healthcare survey, 85% of hospitals are using e-mail throughout their enterprise. (See chart 4.) And, more than half are using enterprise-wide applications of patient registration, master patient index, billing/receivables software and general accounting software.

### Hospital Margins Thinner Despite Higher Spending

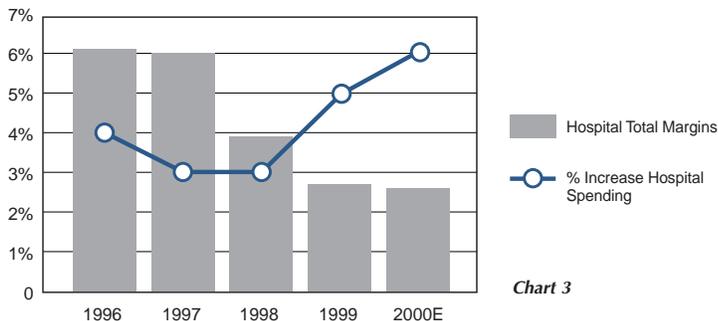


Chart 3

Source: MedPac, HCFA

### The Problem: Squeezing \$11-billion out of the Supply Chain

Today's procurement process is expensive and ineffectual from a data gathering and analysis standpoint. Hospitals and suppliers want to be able to track their costs and orders, yet that information is often delayed by months and inaccurate in today's environment. It costs between \$95 and \$140 to develop one purchase order, according to the National Association of Purchasing Managers. While this estimate isn't specific to healthcare, the price is likely to be equally high. One factor that may lower costs for

hospitals is the fact that they don't always issue purchase orders to buy supplies; instead, supplies may be automatically restocked by distributors based on preset requirements or contracts. However, this savings likely is offset by the cumbersome information systems of most hospitals, paper-based catalogs and time spent checking on orders.

To illustrate the magnitude of the supply chain waste, procurement experts often point to a 1996 report by the Efficient Healthcare Consumer Response (EHCR), an industry group of suppliers, distributors and providers. That study documented \$11 billion annually in healthcare supply chain inefficiencies. Potential savings were identified as:

- \$6.7 billion in product movement.
- \$2.6 billion in information sharing.
- \$1.7 billion in order management.

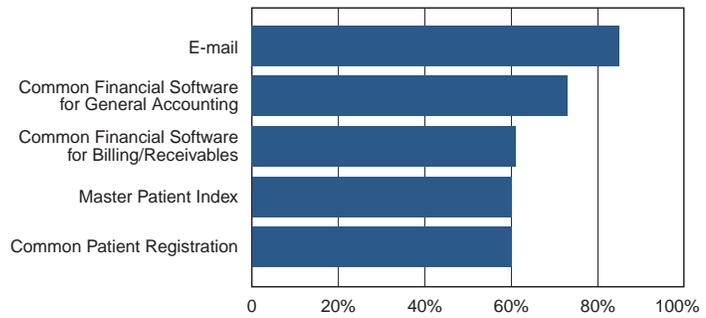
**Chaotic medical supply pricing**

The data disconnect of the supply chain is complicated by a somewhat Byzantine pricing structure that is muddled by a complicated system of rebates, discounts and charge-backs. When five of the nation's largest distributors announced their intention earlier this year to launch their own e-procurement portal, called the New Health Exchange, they said one of the goals was to redesign the rebate system which they said now consumes several hundred employees.

The lack of information sharing or delay in information sharing means that hospitals often don't know the price of what they're buying or sometimes who they're buying it from. Manufacturers also lack timely and accurate data about who their customers are and what they're buying.

Medical supply contracting is changing also. GPOs traditionally sign contracts that span two to three years, sometimes even longer. However, contract lives are declining, and medical supply pricing is moving to a more dynamic model. The Internet enables dynamic pricing models (eBay and mercata.com are well-known examples). Dynamic pricing in the forms of forward and reverse auctions of used medical equipment and surplus suppliers are already taking place on some e-procurement sites. Premier, one of the nation's largest GPOs, also has tested Internet auctions.

**% of Hospital Using Enterprise-Wide Applications**



Source: 2000 PricewaterhouseCoopers/Modem Healthcare Survey of Executive Opinions on Key Information System Issues

**Chart 4**

**The Solutions - Setting Standards, Integrating Technology and Purging Chaotic Ways**

What's really compelling about the EHCR figure is that e-commerce was in its infancy in 1996. Consider what the savings might be in light of today's e-commerce model. Our analysis of supply chain savings is between 6% and 13.5% of supply costs. (See chart 5.)

Savings from E-Supply Chain Management	
<b>Demand management</b>	Minimized supply duplication and system to track use Demand planning system Demand-driven ordering, stocking and packing tied to clinical guidelines
<b>2% - 4%</b>	
<b>Order management</b>	Consolidated purchasing Paperless order management (EDI/Internet procurement) Complete UPN implementation
<b>2.5%-4%</b>	
<b>Supplier management</b>	Supplier consolidation Optimal direct-from-manufacturer implementation 90% GPO compliance
<b>0.5%-2%</b>	
<b>Logistics management</b>	Integrated transportation network; 85% transportation capacity utilization Consolidated service center
<b>0.5%-2%</b>	
<b>Inventory management</b>	Automated point-of-service distribution; continuous replenishment Non-stock items <30% 25 - 40% reduction in SKUs
<b>0.5%-1.5%</b>	
<b>Total</b>	<b>6%-13.5%</b>

Source: PricewaterhouseCoopers

**Chart 5**

### ***Demand management and inventory management***

Web-enabled demand management and inventory management are exemplified by technology companies like Dell Computer, which only builds PCs that have actually been ordered. When a consumer orders a PC from Dell's website, Dell begins what is referred to as "mass customization." Ford Motor Co. also recently announced its intention to work with Microsoft to build made-to-order cars over the Internet. Rather than build products and look for customers to sell them to, the Web enables manufacturers to gather information and design products and services around customers. The short lifecycle of technology products such as PCs has forced manufacturers to adopt a streamlined, data-driven supply chain. However, hospitals, too, will look for technology partners that can deliver individualized needs and supply chain solutions. As more integrated delivery networks increasingly negotiate their own deals, they have had to keep track of more complex arrangements. One e-commerce company, I-many, hopes to capitalize on this confusion. The Portland, Maine-based firm provides an Internet-based software that helps buyers and sellers keep track of their contracts and the associated rebates and discounts that create headaches for hospital purchasing departments.

### ***Order management***

Buying medical supplies isn't like ordering the latest John Grisham book from Amazon.com. In fact, Amazon's executives would be bewildered how to sell them as easily as they sell books. Every book has a unique ISBN number. Pharmaceuticals also have a standard numbering systems. So do foods and semiconductors.

Despite some movement toward unique coding systems, medical supplies remain a conundrum of codes. The Health Industry Business Communications Council has developed a Health Industry Number system and some suppliers have adopted universal product codes. Yet, only slightly more than 40% of medical surgical supplies carry universal numbers, according to a recent estimate by the Health Industry Distributors Association, Alexandria, Va. (2) Some manufacturers have been loathe to give up their own proprietary numbering systems; others are fearful that unique identifiers will commoditize their products and drive down prices.

Recognizing the inefficiencies of standardization, three group purchasing organizations and three e-

procurement firms in June 2000 pledged to adopt and support a common nomenclature for identifying medical and surgical products. (See sidebar on Standard-Setters, p.10.) In addition, two industry consortiums - the Global Health Exchange and the New Health Exchanges - have pledged to move toward more standardization in product codes.

E-procurement may allow hospitals to automate functions that are now handled by individuals through phone calls, meetings and faxing. Price negotiation, invoice reconciliation, and other order management tasks will require fewer man-hours on an e-procurement platform. However, hospitals must be willing to reconstruct their ordering processes, which may include the realignment or reduction of hospital personnel to realize any savings. Those are tasks that could prove far more difficult than chasing down a renegade box of latex gloves.

### ***Integrating Technology***

For almost two decades, large manufacturers have communicated with buyers and suppliers through private and expensive, closed computer networks called electronic data interchanges (EDI). Hospitals, too, began using EDI to order supplies, although these connections weren't universally adopted. Not all manufacturers and distributors used EDI nor did every hospital.

Through the web, buyers and suppliers are using a new technology that makes electronic interchange easier and cheaper. A software language called XML (extensible markup language) will enable the creation of a standard for describing information transmitted online. The XML standard has enabled digital exchanges to blossom in other industries, such as steel and paper, where buyers can find sellers and negotiate electronically. A.L Cook, chairman of the Association for Healthcare Resource Materials Managers' e-commerce task force, says hospitals must move their procurement efforts to the Internet. "If everyone stays on EDI, we're not going to be able to share data." Cook's group recently polled its leaders at a regional conference and found that 100% of them have access to the Internet. (See chart 6.) A surprisingly large percentage (40%) said they had used the Internet to purchase materials, yet it wasn't clear how much they order. Cook, who is chief resource officer for St. Frances Medical Center, Monroe, La., said he is ordering less than 2% of his hospital's purchases on the Internet. The difficulty for hospitals comes in wedding

their enterprise-resource programs to their e-commerce partners. Without the integration of these technologies, hospitals will end up increasing their processing costs, not decreasing them. Most e-procurement firms identified technology as the primary hurdle to getting hospitals to adopt e-procurement systems. (See chart 7.)

At Rush Presbyterian St. Luke's Medical Center in Chicago, online ordering has been integrated by Palo Alto, Calif.-based Omnicell using a network of electronic supply cabinets that automatically feed information through the supply chain. At a recent healthcare internet conference, Rush's former materials management director John Webb said the system reduced costs by 24% in cardiology supplies the first year. Like Rush, many hospitals will pilot an e-procurement system in one department, then expand to others. Pat Poston of Premier, which has an exclusive

What are the biggest hurdles to getting healthcare providers to use e-commerce for purchasing supplies?	
Lack of sophisticated information systems	29%
Lack of IT staff	14%
Long-standing relationships with GPOs	14%
Uncertainty about how the market will shake out	7%
Misunderstanding about how the technology works	29%
Other operational priorities mean providers can't focus on improving supply chain management	7%

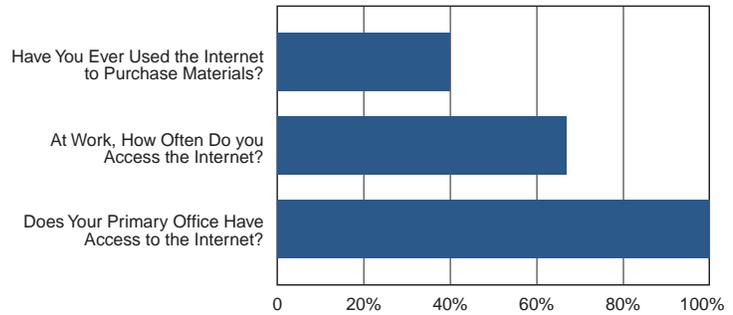
*Source: PricewaterhouseCoopers, Survey of e-procurement firms*

Chart 7

relationship with Medibuy.com, said some Premier hospitals are piloting the system in dietary and food departments. When there are IT problems, Premier is performing the integration for its members free of charge.

Technological integration must occur in more than one direction. First, the hospital or GPO must integrate its systems with the supplier or distributor. Secondly, integration must take place within the hospital itself. Hospitals need to determine whether the information is fed into the materials management information system, the accounting system, or both. Moving to an e-supply chain enables hospitals to focus on processes from the time a patient needs a product all the way through to the manufacturer. As that process is captured digitally, it can be measured and analyzed. Hospitals will have the tools to determine where time and materials are wasted. The "cost at the pump" becomes less significant than the cost of the process. A

Most Hospital Materials Managers Use the Internet Daily



Source: Association for Healthcare Resource Materials Managers

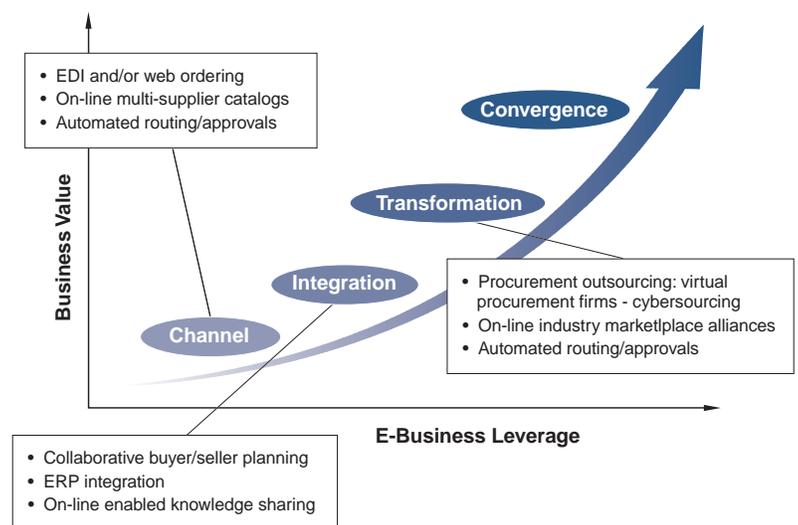
Chart 6

comprehensive supply chain and related technology redesign that manages demand, orders, suppliers, inventory, and logistics can be accomplished in approximately 12 months according to our estimates. "Our initial buyers are 'early adopters' who have fundamentally committed to changing their processes. We have not found substantial hurdles on the part of buyers thus far," said Tom Ranseen, vice president of corporate marketing at empactHealth.com, a Nashville, Tenn.-based firm.

### Selecting an E-procurement Partner

E-procurement firms use a variety of models to raise revenues. In some cases, firms don't charge buyers, only sellers. In other cases, they take possession of the goods, in which cases there are no extra fees. Most of the e-procurement firms charge suppliers. However,

Phase of a Company's E-Business Evolution in Procurement...



Tom Sawyer, president and CEO of QuoteMed, said he thinks the model will shift from suppliers to buyers paying the transaction cost. "We're like a utility that providers can use," he noted. "I think it will evolve to buyers paying the cost."

**Factors to Consider**

- **Pricing.** Most e-procurement firm won't negotiate prices for hospitals. Although some offer competitive pricing, it remains limited since most hospitals sign confidentiality agreements, preventing them from revealing pricing. Experts debate whether e-procurement will affect pricing at all. When asked about savings, all of the e-procurement vendors in our PricewaterhouseCoopers survey said they would save buyers on materials management costs in the first year and 90% said they would save on product pricing in the first year. Which is more important? "Our intent is to drive out process costs, where most of the inefficiency lies," noted Scott Schorer, president of Centrimed, Westminster, Colo.
- **Contracts.** Whose pricing will a hospital see? Some hospitals pay different prices depending on which contract they use - one they negotiate directly with a manufacturer or one they get as a member of various GPOs. When a hospital works through an e-procurement vendor, will the GPO see the prices that hospital negotiated behind its back?
- **Tracking.** Just as companies can now track their Federal Express orders on-line, many of the e-procurement firms intend to allow customers to check the status of their shipment and back orders. That reduces time on hold, checking with distributors and

manufacturers.

- **Partner relationships.** Some e-procurement firms have begun marketing services without having relationships cemented with major distributors and suppliers.
- **Customer service and help desk support.** No metrics are available for e-health, but Purdue University publishes a Help Desk Benchmarking survey that says customers wait in the queue an average of 46 seconds and their problems are resolved on the first call just 54 percent of the time. In addition, the study said that IT firms devote an average of 7.6% of their budgets to the help desk.
- **Data collection and analysis.** For example, price performance can be judged in terms of total supply costs per adjusted patient day or inventory value. E-commerce partners can help with this data.

**The Alternatives**

Nearly every sector of the economy has been disrupted by e-business upstarts. During the past year, an estimated 50 e-procurement companies have sprouted, all touting their unique methods of stripping costs out of the system. As in other sectors, these entrepreneurial start-ups have spurred traditional supply chain players into action.

Today's e-procurement alternatives fall into three categories: buy-side, sell-side and neutral exchanges. In general, the buy-side solutions are companies like Neoforma and Medibuy, which have aligned with GPOs. On the sell-side are the consortiums of manufacturers and distributors. In the middle are

**Who Pays?**

	Fees/charges	% of e-procurement firms that charge buyers	% of e-procurement firms that charge sellers	Description
<b>Subscription</b>	Monthly, quarterly or other flat fee	25%	28%	Benefits buyers with large transaction volume, but small buyers may not want to invest; Model favors sell-side and buy-side firms more than exchanges
<b>Transaction fee</b>	% of transaction (ranging from 3% to 12%) or per-transaction	15%	32%	Buyer transaction fee may discourage buyers from ordering; seller transaction fee may discourage sellers from participating; on forward or reverse auction services both buyer and seller may pay percentage fee; model favors exchanges more than buy- and sell-side models
<b>Other service charges</b>	Delivery, licensing, and Sponsorship fees	30%	21%	Licensing fees may work best for large buyers; some sites charges manufacturers sponsorship fees to feature their products
<b>No charge</b>		30%	21%	Models that rely on charging just suppliers may discourage participation of key manufacturers

*Source: PricewaterhouseCoopers, Survey of e-procurement firms*

**Chart 8**

exchange communities, such as Medpool, QuoteMed or Omnicell that remain neutral. This issue of neutrality is marketable and varies with degree as some buy- and sell-side exchanges also claim to be neutral as well. Today's e-procurement vendors sell a wide variety of supplies. (See chart 9.) However, hospitals will want to know which suppliers and distributors are online with their e-procurement vendors. Because so many of the vendors charge suppliers, hospitals shouldn't assume that all of their key supply and distribution partners are on-line. E-procurement firms sell products through electronic catalogs, exchanges, auctions, and RFQs. Many sites offer the availability for hospitals to request product and allow manufacturers to bid for its business. Of course, they may or many not receive a response back. At this early stage, we would recommend hospitals examine partners on three criteria: capital, technology, and market share.

- **Capital** is vital because hospitals are not going to immediately move into e-procurement. This is an evolution, not a revolution and survivors must have the capital strength to run the marathon to its fullest. However, capital strength is illusive. One reason companies in this segment have received so much capital is because investors saw an opportunity to webify an inefficient and fragmented sector with a new business model. If these companies can't deliver on that, capital will quickly seep away. Ventro went public in 1999 and Neoforma went public in January 2000. Although four e-health procurement companies are currently in registration, the markets have soured on e-health companies. Many will run out of cash before they can execute their plans.

- **Technology** will determine whether these systems work or not. Many companies have technology partners and customers need to weigh the value and leverage of those partnerships.

- **Market share.** Critics have scoffed at Amazon for losing money on every book it shipped to achieve marketshare. Yet, virtually the same thing seems to be happening in the e-procurement arena. Firms are paying steep prices for customers. Neoforma agreed to pay Novation (the GPO for VHA and University HealthSystem) \$4 billion in stock, and Medibuy agreed to pay Premier (the nation's largest GPO) \$2 billion in stock. Each of the largest GPOs has already aligned with an e-commerce partner (See chart 10.) Alignment is a two-edged sword, particularly in the realm of

equity investments. Many GPOs and hospital systems have invested millions of dollars in dot.coms, giving them a vested interest in their success. Yet - as we saw 20 years ago when Hospital Corp. of America almost bought American Hospital Supply -- other hospital systems don't want to contribute to the financial success of their competitors. This could hurt companies with strong allegiances. Notably, Broadlane has bridged that gap with the aggregation of AmeriNet (not-for-profit providers) and BuyPower (investor-owned hospitals).

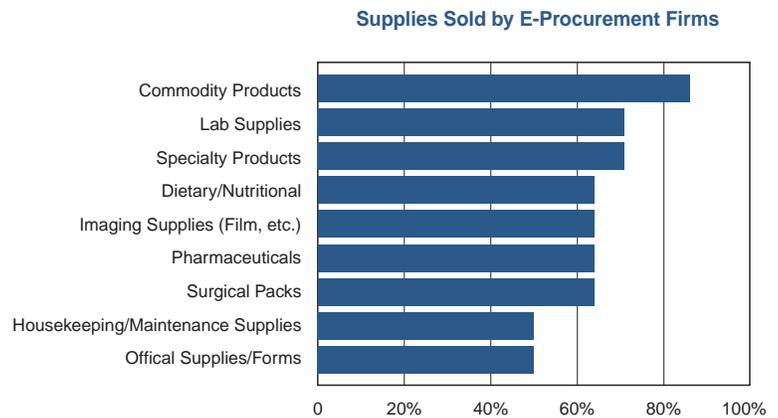


Chart 9

### Brief Descriptions of Notable E-procurement Models

**Broadlane**, Mountain View, Calif. Broadlane was capitalized and co-founded by Tenet Healthcare Corp., an investor-owned hospital system with \$11 billion in 1999 revenues, which holds a 76% ownership stake. The remainder of the firm is held by Ventro, a publicly traded holding company (NASDAQ-VNTR). Ventro also owns Promedix, which focuses on the specialty market and has a three-year agreement with Child Health Corporation of America, a group of children's hospitals that spend more than \$1 billion yearly on medical/surgical and pharmaceutical products. Broadlane is aligned with Tenet's GPO, BuyPower, and another large GPO, AmeriNet, which together buy \$7 billion annually in medical supplies

**empactHealth.com** ([www.empacthealth.com](http://www.empacthealth.com)), Nashville, Tenn. EmpactHealth.com was funded by HCA - The Hospital Company (formerly Columbia/HCA), the nation's largest investor-owned hospital chain with \$20 billion in annual revenues. HCA has pledged an investment of \$40 million.

EmpactHealth.com's electronic ordering system will be introduced shortly at several Columbia hospitals in Richmond, Va. Its technology partners are Commerce One and Dell. At press time, empactHealth.com agreed to be bought by medibuy.com.

**Global Health Exchange** Funded by its five founders, Johnson & Johnson, Baxter, Abbott, GE Medical Systems, and Medtronic, the exchange touts the fact that it will be a private company that won't be subject to the demands and market fluctuations of publicly traded companies. Technology partners are Ariba, IBM, i2, and GE Global Exchange. Since announcing the exchange, St. Jude Medical, Tyco Healthcare, Guidant, Boston Scientific, Becton Dickinson, and Bard said they will participate. The five founding members of GHCE say they sell about 70% of the equipment and supplies required by hospitals. The group also said its founding vendors conduct business with about 90% of hospitals worldwide.

TOP 5 GPOs			
Name	# of Hospitals	Volume in millions	E-Partner
Novation	1,477	\$ 11,000	Neoforma
Premier	1,781	\$ 10,000	medibuy.com
AmeriNet	2,005	\$ 4,100	Broadlane
Buy Power	490	\$ 3,000	Broadlane
HCA	315	\$ 2,900	EmpactHealth
Total		\$ 31,000	

*Source: Modern Healthcare and company reports*

Chart 10

**Medibuy (www.medibuy.com)**, San Diego. Medibuy has filed for an IPO. Its GPO partner is Premier, the nation's largest. Under the agreement, Premier will pay Medibuy \$159 million over six years and the two organizations will share transaction fees. In addition, Premier will upgrade its member hospitals information systems to enable the use of Medibuy software.

**Neoforma (www.neoforma.com)**, Santa Clara, Calif. Neoforma raised capital through its IPO in early 2000. It is aligned with Novation, the nation's second largest GPO with 6,500 healthcare organizations. Neoforma and Novation will share transaction fees generated from manufacturers through sales to Novation hospitals. Neoforma has partnered with Dell and Cisco. Dell is also an investor.

**New Health Exchange (www.newhealthexchange.com)**

Founded by four of the nation's largest medical supply and pharmaceutical distributors -- AmeriSource Corp., Cardinal Health, Fisher Scientific International and McKesson HBOC - that have each pledged \$20 million in capitalization. The group which said it distributes \$80 billion in goods annually, said it will operate a "commercially neutral" portal. (3) The Exchange also has pledged to work toward standardized product codes. Cardinal already has an Internet site that generates more than \$3 million in orders monthly.

**Omnicell (www.omnicell.com)**, Palo Alto, Calif.

Omnicell filed in April 2000 to sell \$57.5 million in an IPO. The company is using Commerce One's business-to-business e-commerce technology platform. Omnicell's automated storage cabinets for pharmacy dispensing are installed in more than 1,300 facilities.

**QuoteMed (www.quotemed.com)**, Florham Park, N.J.

Quotemed has developed an independent third-party portal that is independent of GPOs and allows providers to compare pricing. Through QuoteMed, buyers will negotiate directly with sellers, which executives say will save buyers between 4% to 25%.

**Physician market**

Estimated to be between \$15 and \$22 billion, the market for medical supplies purchased by physicians is even more fragmented than that of hospitals. Some 600,000 physicians are in active practice in the U.S. and numerous e-business companies are currying their favor with one-stop solutions that often include procurement.

However, several e-health companies are focusing solely on physicians and the alternate-site market, insisting that a hospital e-procurement model doesn't work for doctors. For example, E-surg uses the Amazon.com model, enabling office managers to order supplies from one source and receive them in one box with one invoice. This model essentially supplants the distributor because E-surg takes possession of the goods and delivers them to the customer. E-surg believes that physicians and their office managers prefer this to making orders with multiple vendors and often paying 20% to 50% premiums because their orders don't meet purchase the manufactures' order minimums. Other companies targeting physicians include Embion and CentriMed.

### **Standard-Setters at Work**

You might call it the e-business version of a triple-witching hour - the enabling power of Internet technology, the increasing complexity of product types, and the need for internal cost-cutting. All are arguments for moving hospitals into e-procurement. However, an inertia in moving towards industry standards is gumming up the works.

Hoping to jump-start past and on-going standardization efforts, a new e-standards consortium was formed in mid-2000 by three of the nation's largest GPOs -- Consorta, Novation, and Premier -- and three e-procurement firms -- Medibuy.com, EmpactHealth.com, and Neoforma.com - to drive standards through the industry. The three GPOs together buy \$30 billion annually and include three-fourths of the nation's hospitals. If they can get their members and vendors to comply, the movement toward standards may sweep the rest of the industry. "Hospitals see that e-commerce has worked in other industries and everybody's starting to say this is in our best interests," said Joe Pleasant, senior vice president of information technol-

ogy for Premier. "You can go into a grocery store and everything is coded with a UPC. We need that."

Without that type of universal coding system, e-commerce adoption will move very slowly, Pleasant noted. It's not that there aren't standards out there already. The Health Industry Business Communications Council, an industry-sponsored not-for-profit organization, has worked to develop common EDI standards that allow computers to talk to each other. The group also has developed standardized manufacturer, customer and product identification codes such as the Health Industry Number (HIN), Universal Product Number (UPN) and Health Industry Bar Code (HIBC).

Pleasant noted Premier has supported the adoption of HINs and bar codes, but acknowledges that work needs to be done to ramp up industry-wide adoption. The e-standards group will meet with the manufacturer consortium (Global Health Exchange) and the distributor consortium (New Health Exchange) on moving to universal standards for products and data exchange. Some manufacturers may have to make major changes

### **E-Procurement Case Study**

Memorial Medical Center saved \$50,000 on latex exam gloves within three months of installing a new materials procurement system - but had to return them all after discovering they had holes in them.

Like many hospital executives, those at the 220-bed Memorial Medical Center in Las Cruces, New Mexico, believe e-procurement will be part of the future for every provider. Wally Vette, the hospital's vice president of support services, has been pleased with the Internet-enabled materials management system that he has used through Marriott Systems and Medibuy.com since the spring of 2000. Currently, Memorial only purchases low-cost, high-volume materials such as latex gloves and gauze through their e-procurement system, while they are still using their traditional vendors and EDI system for highly specific items such as prosthetics.

The system not only allows low-bid orders through the Internet but also includes high-tech supply stations in the Emergency Department and CCU that can automatically create orders in the system.

Vette listed the greatest benefits of the e-

procurement system as time savings, ease of use, and reduced pricing. "Just moving to an e-procurement system encouraged many of our vendors to lower prices," Vette said, explaining that manufacturers and purchasing groups now realize the market is more competitive through Internet technology. He added that his staff spends less time on phone calls and haggling over prices. However, Memorial's experience has not been without problems. For example, Memorial found out early that vendors liked to play the "lowest bid" game by automatically lowering bids on supplies by one penny to capture the business. Vette had to spend time talking to vendors about providing real savings - not in increments of one cent per bid.

Lowest bids brought other unexpected consequences. Recently, Memorial sent back an order of latex gloves that were full of holes. This was especially disappointing as the Internet low bid was a \$50,000 savings over previous latex glove purchases.

Despite these drawbacks, Vette said he plans to move more of Memorial's procurement to an Internet platform.

in their information systems to move to a common numbering system, and the costs of doing so could be substantial.

In addition, there are other costs to consider. For example, to keep up with new HINs requires providers and suppliers subscribing to HIBCC's HIN database.

However, the e-standards group hopes to show that the benefits of a common classification system outweigh the costs. The group's goals are ambitious. They hope to move to a common product classification by the end of this year.

### Implications

- Two HealthCast 2010 themes dominate the e-procurement effort: e-business and standardization. These two themes must walk lockstep to achieve true efficiencies.
- Hospitals will move toward seamless supply systems in which products will be scanned electronically at the patient's bedside. The scan will trigger an order, which is calculated, tracked and paid for electronically.
- E-business enables customization, and procurement will move toward more customized contracting. This may require hospitals to increasingly outsource this function as it becomes more sophisticated.
- Hospitals will choose e-procurement vendors based on their supply chain management more than their products or pricing. Vendors must demonstrate an ability to gather and share effective utilization and clinical data.
- Strategic alliances with product companies, including assumption of risk sharing arrangements will become commonplace to the point of being an expectation.
- The current rebating structure will crumble amid real-time pricing and data sharing.
- The business model for e-procurement remains in flux, creating uncertainty about the survival of many e-procurement firms and hesitation by providers.

- Product utilization data can be communicated to physicians and clinicians to make them more informed decisions-makers at the bedside.

### E-Procurement Terms

**Buy-side system** - An internet-based procurement application hosted and administered by the buying organization.

**Electronic Data Interchange (EDI)** - Transferring business information from one computer application to another in a standard electronic format. EDI messages usually travel over a private, value-added network (VAN), but could be transmitted via the Net. Software at either end translates the data into a format useful to the users.

**Encryption** - Using computer hardware, software, or both to transform data from its original form into a cipher form for security and privacy reasons.

**Exchange** - Third-party established framework in which buyers and sellers can exchange bids and offers. Typically, the parties are anonymous.

**Firewall** - Software and/or hardware designed to protect a private network from unauthorized access.

**Forward auction** - Sellers control the auction. Seller post goods or services and buyers submit competing bids. Seller picks best bid.

**Reverse auction** - Buyers control the auction. Buyer post RFQ or expresses willingness to buy products. Sellers submit bids, and buyer picks best one.

**XML (Extensible Markup Language)** - A sophisticated computer language that structures and standardizes data elements to efficiently transfer them over the Internet.

### E-Procurement Companies that Are Publicly Traded or in Registration

Company	Ticker	Headquarters	CEO	FY End	1999 Revenues (in millions)	1999 Profits (in millions)	GPO Partner
medibuy.com	in registration	San Diego	Dennis Murphy	31-Dec	\$0.17	(\$39.72)	Premier
Neofarma	NEOF	Santa Clara, CA	Robert Zollars	31-Dec	\$1.00	(\$51.02)	Novation
netivation	NTVN	Post Falls, ID	Tony Paquin	31-Dec	\$1.00	(\$8.41)	
Omnicell	in registration	Palo Alto, CA	Sheldon Asher	31-Dec	\$50.41	(\$31.39)	

### E-Procurement Companies that Are Owned by Publicly Traded Firms

Company	Parent	Ticker	CEO	FY End	1999 Revenues (in millions)	1999 Profits (in millions)	GPO Partner
Broadlane	Ventro	VNTR	Trevor Fetter	31-Dec	\$30.84	(\$48.57)	BuyPower, AmeriNet
Pharmabid	Bergen Brunswig	BBC	Neil Herson	30-Sep	\$21,245.54	\$103.06	
hospitalnet work.com	Verticalnet	VERT	Mark Walsh	31-Dec	\$20.76	(\$53.48)	
empactHealth	HCA	HCA	Eddie Pearson	31-Dec	\$16,657	\$675	HealthTrust

### Privately Owned E-Procurement Companies

Company	Location	url	Description
1StopMD	Monrovia, CA	1stopmd.com	products re-seller to office-based physicians
BuyMedical.com	Aliso Viejo, CA	buymedical.com	tiered pricing structure for medical supplies
CentriMed	Westminster, CO	centrimed.com	Initially focused on physicians, now piloting in hospitals
ChannelLink	Atlanta	channellink.net	Pharmaceutical trade exchange
Cimtek	Johnson City, TN	medicalbuyer.com	physicians' offices, outpatient centers
Embion	Minneapolis	embion.com	group practices, outpatient surgery centers
e-surg	Seattle	esurg.com	physicians and other non-hospital providers
GlobeRx	Atlanta	globerx.net	global purchasing of pharmaceuticals
Go Co-op	Maitland, FL	gocoop.com	supply chain management for health, restaurants, hotels
MD Choice	Somerville, NJ	cottonball.com	non-pharmaceutical supplies for physicians' offices
MedAssets	Goodlettsville, TN	medassets.com	high-tech medical equipment; asset mgmt.
medchannel.com	San Francisco	medchannel.com	online network connecting suppliers, distributors, hospitals
Medplanet	Wilton, CT	medplanet.com	surgical and medical equipment exchange
medpool.com	Redwood City, CA	medpool.com	virtual trading online; anonymous
quotemed.com	Florham Park, NJ	quotemed.com	portal for multi-hospital systems
TradeMD	Morganville, NH	trademd.com	global community to buy and sell medical equipment

#### Footnotes

1. Cardinal Health: Review of March Quarter, Lehman Brothers, May 8, 2000
2. "Just call it gpo.com : Internet deals change the supply biz," by Scott Hensley, April 10, 2000, Modern Healthcare
3. News release, April 18, 2000.

## Canadian Providers Slowly Moving toward Electronic Procurement

The healthcare supply chain in Canada is evolving, but regionalization and disaggregation may disrupt traditional relationships, especially in light of an e-business evolution. Based on the medical supply chain savings estimated in the U.S., it has been suggested that the potential equivalent savings in Canada would be \$1 billion per year. However, we believe this figure is too high. Because of its historic focus on cost containment, the Canadian supply chain is already fairly efficient. A more reasonable estimate of savings is \$200 to \$400 million per year.

Like their U.S. counterparts, many Canadian hospitals buy through group purchasing organizations. Two of the largest GPOs in Canada are Medbuy, which has a national focus, and HealthPro, which is primarily focused on Ontario. In addition to negotiating large supply contracts, these GPOs provide contract management services thus eliminating the need for hospitals to participate in an RFP process. Both Medbuy and HealthPro are owned by their member hospitals, which receive annual dividends based on revenues earned from manufacturers' rebates and other value-added services such as consulting. While GPOs have been effective at reducing costs, a potential threat to GPOs is the regionalization of healthcare in Canada. For example, in 1997 the London (Ontario) Health Sciences Centre and St. Joseph's Medical Centre created their own Healthcare Material Management Services (HMMS). HMMS consolidated the purchasing, accounts payable, receiving and inventory management functions of the two hospitals, and cancelled their GPO membership.

HMMS claims that its buying volume provides the same cost savings as the GPO with the added benefit of enabling them to forge a closer relationship with their suppliers. Furthermore, HMMS believes it is easier to standardize products across a single organization rather than across all the members of a GPO.

To counter this threat, GPOs are looking for ways to add value and, as a result, are beginning to offer additional services such as consulting (e.g. activity-based costing) and material management outsourcing. For example, HealthPro is running the materials management function at Toronto East General Hospital. In addition, both Medbuy and HealthPro are

considering moving into e-business by establishing themselves as healthcare supply portals.

### **Adoption of EDI**

In addition to GPOs, Canadian hospitals have turned to value-added networks such as CareNet, an industry organization established to help create and popularize EDI standards. In turn, CareNet contracted with SNS Assure to operate the network carrying the EDI transactions between hospitals and suppliers. Currently, the 219 hospitals on the network have direct access to 122 suppliers and indirect access to another 900 suppliers (typically EDI to fax). With CareNet, the supplier absorbs the cost of transmitting the purchase order, but after this initial transaction the entity that sends the transmission (e.g., advance shipping notice) pays for it. The other leading EDI carrier is Sterling Commerce, which charges the sender regardless of transaction type.

Interestingly, BCE Emergis, the electronic commerce subsidiary of Bell Canada, recently purchased SNS Assure thereby obtaining access to a key piece of the healthcare e-commerce infrastructure. Clearly, they hope to leverage this network to deliver additional services to hospitals.

The Electronic Commerce Council of Canada is working on creating bar-code standards for all the goods in the healthcare supply chain, and has recently undertaken the development of pilot projects to establish end-to-end electronic commerce solutions. The first pilot project will be launched at the Ottawa Hospital this year and will result in activity-based costing of the hospital's external and internal supply chain.

### **Process Changes and Automation**

Hospitals have begun to experiment with the supply chain process and the technology by which it is managed. For example, several hospitals have incorporated EDI and hand-held scanner technology into their material management systems. A few hospitals are also using some form of electronic requisitioning albeit only in a few key departments. Electronic, or e-requisitioning, allows purchasing to be done by staff at the departmental level (who arguably know better than the purchasing department what is needed at any given time) while limiting the

department's choice to just those items that are on the electronic catalogue. This has proven to be quite successful and the purchasing directors involved indicate this initiative will continue to rollout to other areas of the hospital in the next year.

Additionally, purchasing cards ("P-cards") are becoming more prevalent as hospitals work in co-ordination with banks and suppliers to decrease the amount of time and effort spent on invoice processing. The P-card provides each hospital with one monthly invoice from each supplier rather than an invoice for each purchase order.

Many hospitals have improved inventory management, if only partially. Most have opted for outsourcing inventory to a distributor (e.g. Source Medical) and setting up a "just-in-time" or "low unit of measure" contract in order to reduce the amount of product kept on-site. Additionally, some of the distribution companies are moving into logistics and activity-based consulting. For example, York Central Hospital, Toronto, has implemented handheld scanners that are used on the floors to determine consumption from the carts. The data is then downloaded into the material management system, which creates purchase orders and transmits them via EDI to the suppliers. The purchase order approvals, advance shipping notices and invoices are received electronically and the suppliers are paid through electronic funds transfer.

Suppliers also are offering value-added services, such as direct contracting for specialty products and

consulting services in logistics and materials management.

In the future, the healthcare supply chain will look very much like the grocery supply chain where demand initiates the procurement process. When a product is used it will be scanned electronically at the patient's bedside thereby triggering an order. The advanced shipping notice and invoice will be tracked and received through the system, and then shipments will be received, scanned electronically and paid for via electronic funds transfer. All this will take place with very little human involvement.

There will, however, be continued friction between the GPOs and regional hospital entities. As more hospital mergers are fully implemented, there may be less reliance on GPOs and more regional buying as in the HMMS model. This will lead to increased consolidation of purchasing within hospitals and increased rationalization of products. Regional purchasing groups will likely do more direct contracting through suppliers rather than through distributors or GPOs.

Disaggregation will also be a trend. Product costs have already been reduced substantially so contracts that separate the product cost from the distribution cost are now being negotiated in order to achieve further savings. As a result, it is conceivable that food distributors will enter the medical supply distribution business given their expertise in dealing with perishable goods in an extremely efficient manner.

### Future Healthcare Supply Chain



The size and pace of Internet usage generally is smaller and slower in Europe than in the U.S., but dot.coms are moving rapidly onto the business landscape. Although the magnitude of change varies by country, Europe is seeing a surge in e-commerce start-ups across all industries. In many cases, the countries that are early adopters of the Internet are not the biggest markets, and venture capital tends to follow the largest market opportunities. According to Forrester Research, the Scandinavian countries are the most mature for Internet usage and business-to-business (B2B) e-commerce. However, Germany, the United Kingdom, France and the Netherlands are expected to generate the largest B2B revenues according to Forrester.

Our review of several European countries indicates that many of the e-procurement start-ups in health-care are targeting these four markets, but adoption rates will hinge on a number of environmental factors. For example, e-procurement could move swiftly in the United Kingdom where the National Health Service (NHS) is revamping a central purchasing organization, known as NHS Supplies, to explore the use of mandatory national purchasing contracts. As part of that process, the U.K. government will require a minimum 3% annual reduction in supply costs for all NHS Trusts (public sector healthcare organizations) starting in 2001.

### **Characteristics of the Market: Demand Side**

Some form of purchasing cooperative or Group Purchasing Organization (GPO) exists in most countries, but the percentage of healthcare transactions going through these channels is limited, except for in the U.K. where purchasing consortiums continue to gain strength. As consolidation in the hospital industry continues, hospital-buying power could be leveraged to a greater extent, and we may see further growth of the GPO concept.

In many European countries, hospitals have a high level of awareness about e-procurement and its potential but limited readiness and little to no real activity to date. The largest hurdle to adopting e-procurement is related to technical infrastructure issues in hospitals. A Dutch e-procurement company Vice President stated that, "Our top priority is to achieve application integration with providers." Hospitals are

using a wide variety of legacy information systems for purchasing, patient management, and financial management. Yet, these systems are often not integrated. Moreover, hospitals are reluctant to develop interfaces to e-procurement companies on their own, especially with no clear leaders in their respective markets.

Hospitals may be a bit wary of e-procurement's promise due to the limited success of several EDI initiatives over the past decade. In Belgium, only nine hospitals have joined an EDI initiative created in 1994, known as EDI Health, in spite of strong support by 42 of the country's largest pharmaceutical companies. In the Netherlands, hospitals with the highest percentage of EDI purchasing are approaching levels of only 35% of purchases through EDI.

A Spanish hospital purchasing director summed up the feelings of many: "I remember when the whole EDI discussion started in hospitals. At the beginning, everybody said that this would become a standard for hospitals, but it never really got that far. A few hospitals started to implement such solutions, but soon it became clear that it was just a fad that didn't live up to the expectations it had created."

Most European hospitals have introduced some automation in their purchasing processes but this is largely confined to linking purchasing systems to automated fax orders. An article in a leading U.K. journal noted, "Most NHS Trusts still order their supplies using paper and pen. The closest that procurement comes to high technology in most hospitals is the fax machine or the phone when they are used to send or call in orders to suppliers."<sup>11</sup>

The purchasing decision-making process is complex with multiple participants, depending on the type of product. In many countries, physicians have been able to control a large portion of hospital supply spending directly and often negotiate individual supply deals off-contract. Maverick purchasing is a significant problem but not unexpected given that hospital purchasing departments often rubber stamp invoice requests.

Another common method for setting medical supply prices is through the use of public tenders. European

Union regulations require public tenders for purchases greater than 200,000 Euros. In some countries, such as France, Italy and the U.K., country-specific requirements mandate the use of tenders by public hospitals at far lower levels. Clearly, e-procurement companies will need to be able to support the tender process to be successful.

### Characteristics of the Market: Supply Side

The medical supply market in Europe is highly-fragmented. Some estimate that the number of suppliers in any given country could be as high as 50,000 with the largest suppliers varying by country. Within sub-segments of the supplier market, there may be one or two dominant companies, but no supplier or group of suppliers dominates the European market as a whole.

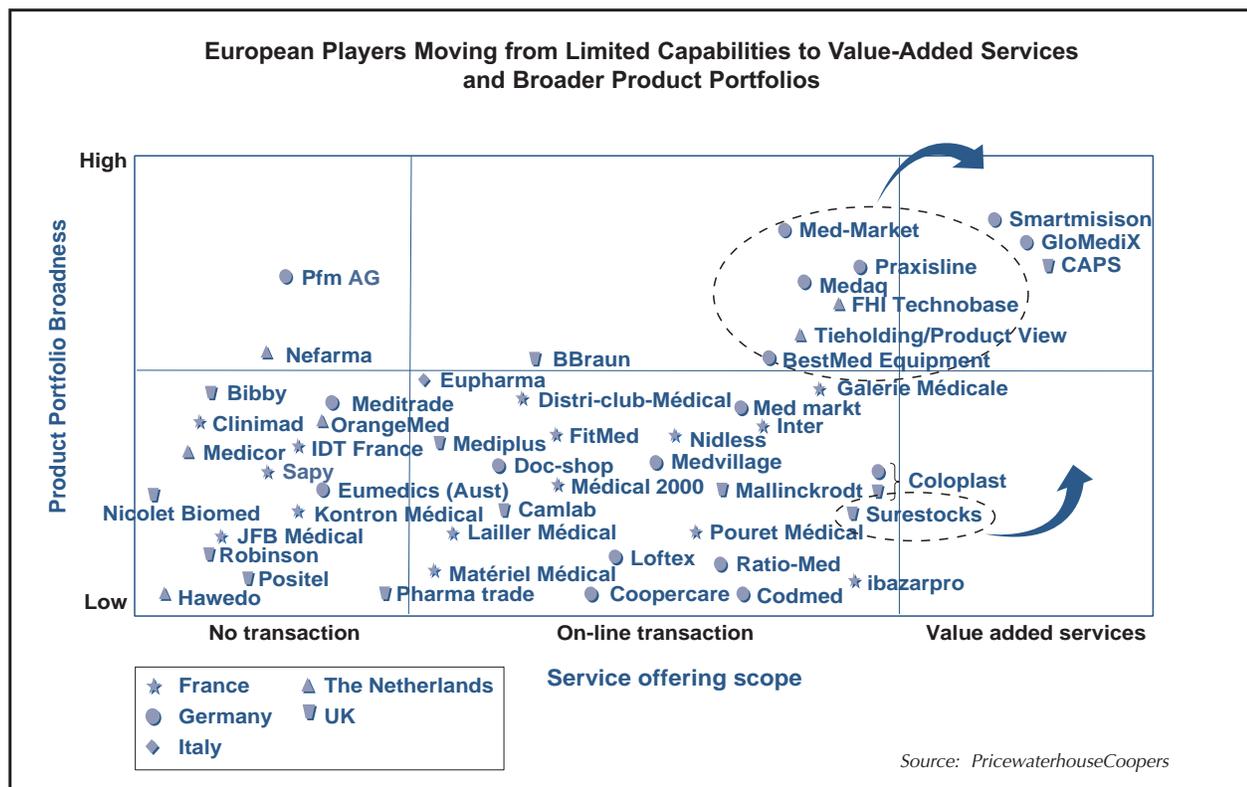
European suppliers are also very aware of e-procurement opportunities, and, relative to hospitals, appear to be more prepared to implement e-procurement actions. This higher level of supplier interest is linked partly to the desire to disintermediate distributors. In Italy, for example, distributors may purchase supplies from lower-wage countries and undercut the prices of domestic manufacturers. In addition, given the individual physician's high level of influence in the purchasing process, many suppliers view the Internet and e-procurement as a way to more directly target

physicians and provide more detailed product information while at the same time reducing the costs of their large sales and detailing forces.

### E-procurement companies: Many Players, Limited Functionality

In a review of five countries (France, Germany, Italy, the Netherlands, and the United Kingdom) we identified more than 40 e-procurement companies that have launched Internet sites related to the electronic purchase of medical supplies and/or medical equipment. Many of these e-procurement players are focusing on one country initially, but several have cross-border ambitions. Today, e-procurement services center on providing product information through on-line catalogues with an increasing number of companies offering the capability to order on-line. (See Chart) Product pricing is often at list price levels with no ability to negotiate discounts on-line.

Several new entrants are expected to focus on value-added services such as logistics, detailed reporting, loading of hospital-specific contract information, and on-line tenders. Some are also contemplating offering other services through on-line trading communities such as cleaning, maintenance, and food preparation. "I think that this business is changing so fast that e-business is going to offer us value-added services we



can't actually even think about," said a director at a large Spanish hospital. While revenue models are still evolving, e-procurement companies are exploring various pricing approaches including percent of savings fees, subscription fees, and transaction fees to both suppliers and buyers.

In fact, many e-procurement companies envision a marketplace in which electronic bids will be made but final contract prices will be negotiated off-line by GPOs or individual hospitals and then loaded to the e-procurement system. Price reductions are not the primary goal, rather, the bulk of savings are expected to come from improved contract compliance and less time spent on the materials management process. A Managing Director at a U.K. e-procurement company predicted that, "Supplies will cost slightly less, but administrative costs will drop substantially, by 25% or more." Some European e-procurement users have estimated time savings of more than 80%.

A number of partnerships are expected to develop as companies attempt to establish market leadership. Some are discussing partnerships in which each partner will specialize in a different component of the purchasing equation and create a more seamless environment for the buyer.

### **Europe is not one market**

With the introduction of the Euro, price transparency across borders is gradually expected to increase. While uncommon today in the healthcare field, one can easily imagine that a French hospital in the future would be able to issue a pan-European tender and solicit bids from across Europe.

For the moment, however, cross-border transactions and price transparency are constrained by various regulatory issues, differences in product identification codes across countries, and language barriers.

In Germany, for example, regulations such as the Discount Law prohibit product discounts of more than 3%. Several bricks-and-mortar companies have used this law to stifle e-business start-ups in the country. In Spain, public purchasing procedures do not even recognize purchasing over the Internet, causing reluctance on the part of Spanish hospitals to examine e-procurement opportunities. While many of these regulations are expected to change, the speed of that change is unpredictable.

In addition, supply companies that operate in multiple countries have different product numbering schemes that are often unique to the company and the local country operation. This makes it difficult for buyers to compare prices domestically and even more difficult across borders.

Finally, language barriers prevent a universal e-procurement service offering. For all of these reasons, e-procurement players today are focused mostly on one country.

### **How quickly will e-procurement become a reality?**

Several environmental factors will affect the speed with which e-procurement will become a reality across Europe.

Countries that will be slower to implement e-procurement in healthcare are likely to include Belgium, France, Italy and Spain. In Belgium and France, unions are particularly strong and head count reduction is typically not a focus of hospital management even if increased productivity is possible. Instead, these countries will focus on how e-procurement can bring lower prices and more services rather than on achieving improved efficiency. Italy and Spain are late adopters in use of the Internet, and many hospitals are just getting connected. Only one or two e-procurement companies have announced a launch of e-procurement services in Italy or Spain. In all four of these countries, a majority of hospitals do not have well-integrated information systems.

Countries that will be faster to adopt e-procurement in healthcare are likely to include the Netherlands and the United Kingdom. Both countries have been early entrants in the use of the Internet. In the healthcare arena, government budget authorities have mandated explicit reductions in purchasing budgets that could lead to a rapid acceleration of the use of e-procurement. In the Netherlands, purchase controls are expected to result in savings of 0.2% of total healthcare spending in 2000, ramping up each year to a 0.8% reduction in total costs in 2004. In the U.K., as mentioned earlier, the NHS is requiring all Trusts to achieve at least 3% annual savings in supply costs by 2001. NHS' revamping of a central purchasing organization could represent a major leap in e-commerce if that system moves on-line.

Not everyone thinks e-procurement should be embraced immediately. A British hospital general

manager noted, "[an e-procurement system] will come in the final part of our procurement strategy. Some Trusts are looking to introduce it in the first part of their strategy, but I think they will lock in bad practice. They should wait until the end when they know what they are doing."<sup>1</sup> Others think the sheer number of new e-procurement companies will cause confusion and, thus, inaction among healthcare providers.

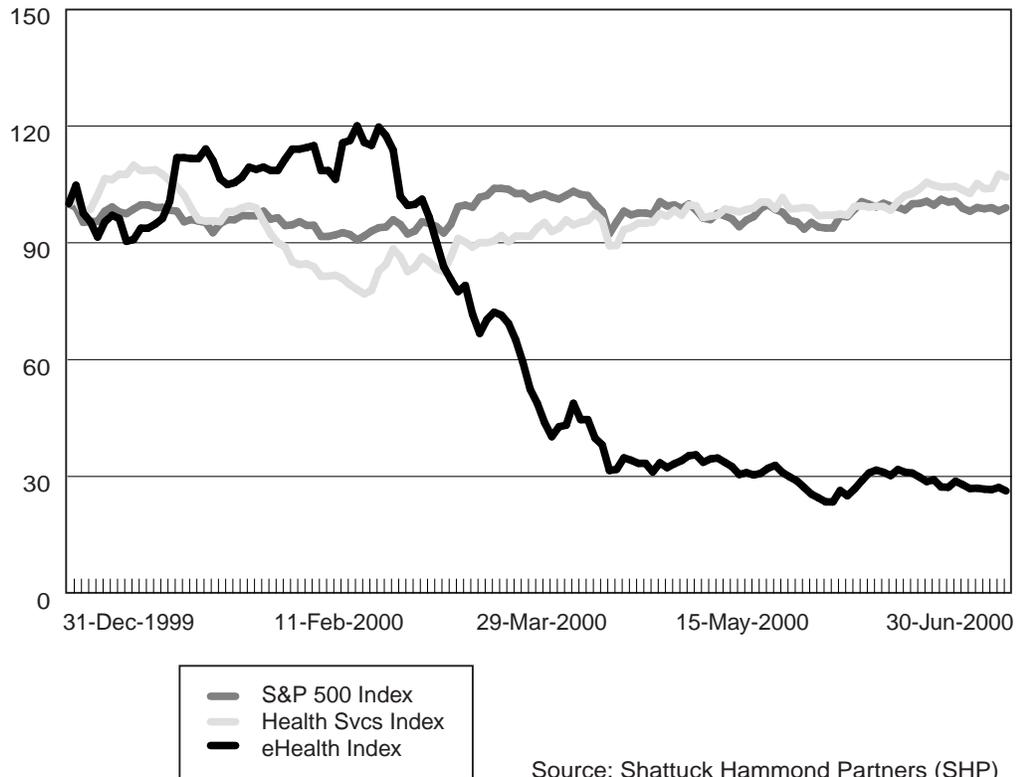
It is less clear how quickly Germany will embrace e-procurement in healthcare. On the one hand, government authorities and insurance companies reduced selected hospital rates by 1.4% in 1999, including an expected 8% reduction in hospital materials costs. Further reductions are anticipated. The market is also the largest in Europe and attracting a high number of e-procurement start-ups. On the other hand, a complex regulatory environment may reduce the ability of e-commerce companies to compete. And, hospital purchasing processes are not formalized with most suppliers targeting individual physician and nurse chiefs of service directly.

The European marketplace is changing rapidly but at different speeds. One year from now, the e-procurement landscape in some countries is likely to look dramatically different with even more companies entering and a few hospitals starting to moving their entire purchasing processes on-line. In other countries, they will be watching for true results before implementing such changes.

#### **Footnotes**

<sup>1</sup> "NHS as an on-line shopper," *Public Finance*, 21 January 2000.

**e-Health Index/Health Services Index/S&P 500 Index**



Source: Shattuck Hammond Partners (SHP)

Industry Segments	4-week Change	YTD Change
SHP eHealth Index	5.0%	-73.7%
SHP Hlth Svcs Index	10.1%	6.9%
S&P 500	2.4%	-1.0%

**Shattuck Hammond Partners Commentary**  
 E-Health companies continue to suffer from investor skepticism. Drastic declines in equity raise additional concern that companies will suffer from cash shortages. A number of companies have aborted additional public offerings and resorted to private placements. Market skepticism continues to thwart eHealth IPOs. Market shakeout and consolidation may be imminent. Investors have become more discerning, and will generally only provide capital at reduced valuations to companies with demonstrable revenue and earnings models.

Shattuck Hammond Partners is the healthcare-focused division of PricewaterhouseCoopers Securities LLC. PricewaterhouseCoopers Securities is a wholly-owned subsidiary of PricewaterhouseCoopers LLC.

## e-Health Affiliation and Partnership Activity 1Q 2000

Date	Company	Company	Focus
28-Jun	Medix Resources Inc	ZirMed.com	Software license agreement for medical claims filing
28-Jun	HealthCenter Internet Services	Lucent Technologies	Develop highly secure infrastructure to deliver patient medical records, chronic disease management, telemedicine with initial focus on cardiac care
28-Jun	PacifiCare Health Systems Inc	Compaq Computer Corp.	Launch an Internet company designed for seniors - SeniorCo
14-Jun	Consorta, Novation, Premier	Medibuy.com, EmpactHealth.com, Neoforma.com	Adopt standard product codes to ease the buying of supplies over the Internet
13-Jun	PlanetRx.com	Systems Xcellence Inc	Web-based member eligibility verification module
12-Jun	Priority Healthcare Corp	Cytura Corp	Deploy "disease neighborhoods," specialty physician portals
07-Jun	eBenX	PeopleSoft	Exchange for administration of health and welfare benefits-related transactions
01-Jun	GE Medical Systems	Society of Nuclear Medicine	Deliver and develop Web -, satellite- and computer-based educational programs
01-Jun	empactHealth.com	Medline Industries	Development of empactSupply procurement system
29-May	Neoforma.com	Eclypsis, HealthVision	Co-marketing and distribution agreement
22-May	empactHealth.com	LifePoint, Triad, HCA, Health Management Associates	E-procurement
17-May	Rx Remedy	Infospace	E-health marketing contract
16-May	QAD	MDI Source.com	Trading exchange focused on medical device manufacturers and their suppliers
10-May	AIG	WorldCare Inc	Second medical opinions over the Internet, via a link with American hospitals
08-May	CornerDrugstore.com	D&K Healthcare Resources Inc	Online pharmaceutical sales and electronic commerce partners
04-May	InfoCure	Microsoft	Joint marketing programs, funding, and promotion and development activities
02-May	Smartmeds.com	CarePlus Health Plan	Provide speciality drug, drug compliance programs on wireless Internet platform
01-May	McKesson	MediConsult	Web-based services for doctors, mobile applications for hand-held devices, pharmaceutical marketing software
01-May	Caredata	50+ deals	Co-branded Internet applications
28-Apr	InteliHealth	Harvard Medical School	Harvard content for InteliHealth website
27-Apr	PersonalMD.com	BCBS of RI	Online medical records to members
26-Apr	DoctorGeorge.com	Womensforum.com	Health and wellness issues for women
24-Apr	PlanetRx.com, Express Scripts	HIP Health Plan of New York	Prescriptions online
18-Apr	AmeriSource Health Corp	Cardinal Health Inc., McKesson HBOC Inc., Fisher Scientific International Inc. and Owens & Minor Inc.	Internet exchange for pharmaceuticals and medical devices
17-Apr	AmeriNet	Broadlane (a JV Tenet and Ventro Corp)	E-commerce purchasing
17-Apr	Humana	Healtheon/Web MD, Microsoft	Allow consumers to exchange health information over the Internet.
11-Apr	Healtheon/Web MD	Health Systems Design Corp	Databases and transaction engine for Healtheon/ WebMD's physician portal

## e-Health Affiliation and Partnership Activity 1Q 2000 (continues)

Date	Company	Company	Focus
06-Apr	Cybear	AHT Corp	Prescription and lab transaction management via the Internet
05-Apr	HealthGate Data Corp	New England Journal of Medicine	Online consumer version of the medical journal
03-Apr	CVS.com	Healtheon/ WebMD	CVS.com to be the exclusive e-pharmacy for Healtheon's WebMD
03-Apr	XCare.net	Cranespharmacy.com	Web-based exchange of products and services between XCare.net's clients and partners
03-Apr	PlanetRx.com	Helios Health	Allows patients to order from Internet pharmacy in the physician's waiting room
31-Mar	Neoforma	Novation	E-commerce services to 6,500 Novation members
31-Mar	Horizon Pharmacies	Informed.com	Develop web-based prescription fulfillment, health and wellness center
30-Mar	Johnson & Johnson, Abbott Laboratories, General Electric Medical Systems, Baxter International, Medtronic		Create Global Healthcare Exchange for online ordering, product catalogs
30-Mar	Aetna U.S. Healthcare, the Cigna Corporation, WellPoint Health Systems, Oxford Health Plans, Foundation Health Systems and PacifiCare Health Systems		Form MedUnite, online system for administrative services
23-Mar	Baxter International	Microsoft, Cisco	Web-enabled renal dialysis products and clinical software systems
20-Mar	Stayhealthy.com	Bergen Brunswig Corp.	Marketing partnership
17-Mar	CareInsite	Medical Mutual of Ohio	Internet content and connectivity services
16-Mar	Healtheon/ WebMD Corp	Kiva Genetics	Genomics channel
15-Mar	Ventiv Health	Rxcentric.com	Internet-enabled pharmaceutical marketing and sales
15-Mar	MotherNature.com	PHS Health Plans, Family Health America, WellCall	Co-marketing of MotherNature.com's products and services
14-Mar	Healtheon/ WebMD Corp	Your Health	Content, products and services for the integrative medicine channel on WebMD
14-Mar	YourOwnHealth.com	USAToday.com	Promote YourOwnHealth.com on USA Today
14-Mar	OneMain.com	Nutripeak.com	Revenue sharing
14-Mar	Cyberworks	RapidCare.com	Develop interactive physician-directed self-care system for chronic diseases
13-Mar	Humana	QualityMetric, Inc	On-line patient health assessment system
13-Mar	Healtheon/ WebMD Corp	American College of Cardiology	Technology and content delivery
13-Mar	Franklin Health Inc	Blue Cross and Blue Shield Association	Promote Franklin Health's Internet program to Blues plans
08-Mar	HealthAxis.com	Insurance.com	Health insurance quote, fulfillment and customer service platform
07-Mar	drkoop.com	Lifescape	Benefits internet group for employers
07-Mar	HealthGate	NBC's Snap portal	Content agreement
06-Mar	Drugstore.com	Medibuy	Develop co-branded e-commerce marketplace for home healthcare providers
02-Mar	HealthStream Inc	Healtheon/Web MD	Promote and market HealthStream's educational services on WebMD Practice

Source: News reports.

## E-Health Mergers and Acquisitions Activity 1Q 2000

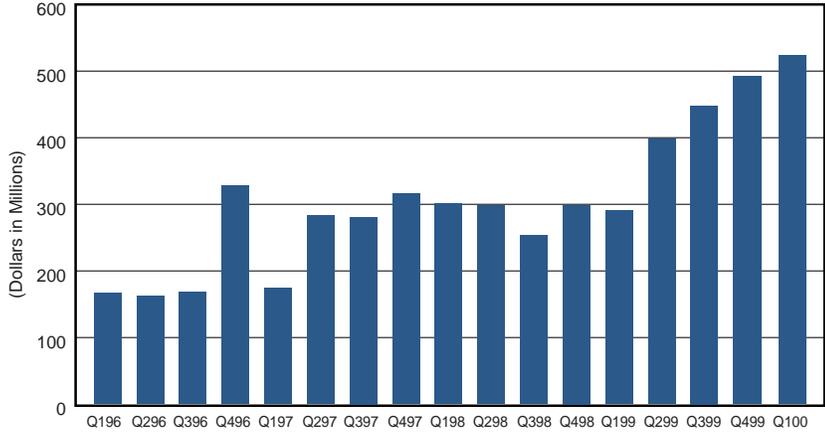
Announcement Date	Acquirer	Target	Value
20-Jun	HealthZone.com	eNutrition.com	n/a
20-Jun	Nyer Medical Group Inc	Worldhealth.net	n/a
20-Jun	Quest Diagnostics Inc	MedPlus	see Note
14-Jun	Welsh, Carson, Anderson and Stowe	SHPS Inc - sub of Sykes Enterprises	\$165M
06-Jun	E-MedSoft.com	VidiMedix Corp	n/a
06-Jun	UltraLink	IBenefits Inc	n/a
23-May	Philips Electronics	MedQuist Inc	\$1.2B
19-May	Harcourt General Inc	MD Consult	n/a
16-May	TriZetto Group Inc	IMS's (RX) Erisco Managed care unit	\$255M
08-May	MedicaLogic	Medscape, Total eMed	\$1B
01-May	Siemens	Shared Medical Systems	\$2.1B
01-May	HealthZone.com	VitaminDiscount.com and Alt-Health.com	n/a
18-Apr	E-MedSoft.com	Illumea Corporation	\$15M
12-Apr	HealthZone	SmartBasics.com	\$1M
04-Apr	Data Critical Corp	Elixis Corp	n/a
27-Mar	Neoforma.com	EquipMD Inc	n/a
23-Mar	ClaimsNet.com	VHx Co	\$32M
21-Mar	InLight	ProMedex	\$112M
21-Mar	Internet Capital Group	Internet Healthcare Group	\$70M stake
16-Mar	HealthCentral.com	Vitamins.com	\$103M
14-Mar	Medical Manager	Vectis Corp	n/a
14-Mar	E-MedSoft.com	VirTx Inc	\$23M
13-Mar	Neoforma.com	US Lifeline	\$6.5M
09-Mar	Landacorp	Interactive Healthcare Division of High Technology Solutions	n/a
09-Mar	MedComUSA	DCB Actuaries & Consultants	n/a
08-Mar	Medscape	Dialog Medical	n/a
08-Mar	Medibuy.com	Premier's e-commerce site	n/a

Source: News reports.

Note: A potential 30% equity stake in MedPlus by 2001.

# Healthcare Services Industry Venture Capital Investments Q1-2000

**Healthcare Services Venture Capital 1996 - Q1 2000**



Source: See Note.

Investments in e-health enterprises drove venture capital investments in the healthcare services industry to record heights in the first quarter of 2000, nearly doubling the amount invested during the first quarter of the prior year, according to the PricewaterhouseCoopers Money Tree™ Survey and Shattuck Hammond/PricewaterhouseCoopers Securities Healthcare Venture Capital Report. Sixty-eight healthcare services companies received total venture funding of \$523 million for the quarter. These results mark the fourth quarter in a row of record levels of venture capital flowing into healthcare services. Internet-related ventures attracted 52% of the investments in healthcare services sector, cooling off somewhat from the high of 68% in the previous quarter.

More than a dozen venture capital firms reported making investments of at least \$5 million in one or more healthcare services companies this quarter. The most active firms, by deal count:

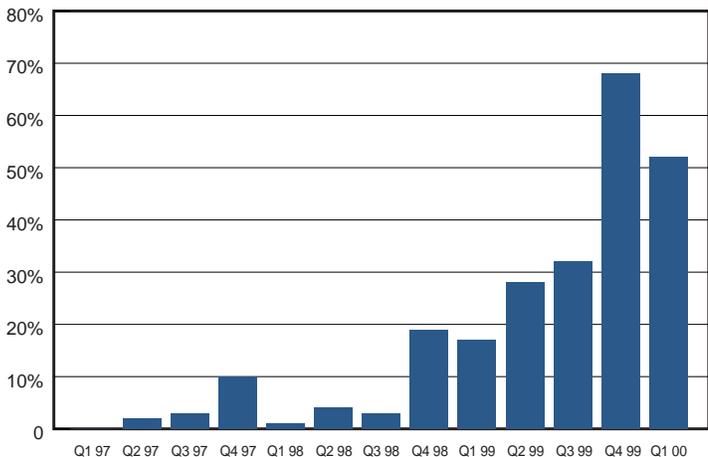
- Acacia Venture Partners (5 deals)
- BA Venture Partners (3 deals)
- Mayfield Fund (3 deals).

The five largest healthcare deals for the quarter:

- Medical Logistics Inc. (\$70 million)
- HealthMarket Inc. (\$57 million)
- Parkstone Medical Systems (\$31 million)
- WellMed, Inc. (\$30.3 million)
- GoToMyDoc.com (\$25 million)

Of these, HealthMarket, WellMed and GoToMyDoc.com are eHealth ventures.

**Percent Healthcare Venture Investments in Internet**



**Note:**

The PricewaterhouseCoopers Money Tree™ survey is conducted under the sponsorship of the Global Technology Industry Group and Shattuck Hammond Partners. Shattuck Hammond Partners is the healthcare-focused division of PricewaterhouseCoopers Securities LLC. PricewaterhouseCoopers Securities is a wholly-owned subsidiary of PricewaterhouseCoopers LLC.

Source: See Note.

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