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ELECTRONIC COMMERCE IN U.S. HEALTH CARE



Electronic
Commerce in
U.S. Health Care



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Electronic Data Interchange Program (EDI)

Electronic Commerce In U.S. Health Care

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Abstract

Electronic commerce in health care is the use by health care players (hospitals, pharmaceutical manufacturers, insurance carriers, etc.) of an electronic infrastructure for the coordination, administration, and delivery of health care. This report examines this infrastructure as it is today, including electronic ordering systems for pharmaceuticals, medical-surgical products, and grocery items; electronic medical claims submission and payment; commercial data bases on health care-related subjects; and other network services that interconnect disparate players, such as electronic mail/data base access for in-home care providers. This report examines the value of the infrastructure, the number of transactions that it carries, the expenditures of its users to build and maintain it, its impact on health care costs, the companies that supply it, and the issues that impinge on its further development. The report maps out the health care trading community and identifies the interfaces and transactions among the many players within this community. The report has 54 pages and contains 30 exhibits.







Table of Contents

I

Introduction	I-1
A. Electronic Commerce: Definition	I-2
B. Trading Community: Definition	I-3
C. Overview of Report Findings	I-4

II

The U.S. Health Care Trading Community	II-1
A. Players in the Health Care Trading Community	II-1
B. Community Workflow	II-4
C. Trade Volumes in the Health Care Community	II-4
1. Hospital Revenues	II-7
2. Hospital Inventory Expenditures	II-7
3. In-Home Health Care	II-9
D. Trends and Issues	II-9
E. Competitive Environment	II-11
1. Distributors	II-11
a. McKesson	II-11
b. Bergen Brunswig Corporation	II-12
2. Medical/Surgical Product Manufacturers and Distributors	II-13
a. Baxter International Inc.	II-13
3. Fiscal Intermediaries	II-14
4. Electronic Commerce Vendors	II-14
a. CIS Technologies Inc.	II-16
b. United Medicorp	II-16
c. HBO & Company	II-16
d. National Electronic Information Corp.	II-16
e. Stellar Management Corporation	II-17
f. IPN	II-17
g. CyCare Systems	II-17
h. D&B Software	II-18
i. GTE Health Systems Incorporated	II-18



Table of Contents (Continued)

II	<ul style="list-style-type: none"> j. Shared Medical Systems k. Spectrum Healthcare Solutions l. TDS Healthcare Systems 	<ul style="list-style-type: none"> II-20 II-21 II-21
<hr/>		
III	<p>Actual and Potential Electronic Commerce</p> <ul style="list-style-type: none"> A. Transaction Levels and Electronic Commerce Service Markets in the Health Care Trading Community <ul style="list-style-type: none"> 1. Hospital Material Providers <ul style="list-style-type: none"> a. Medical/Surgical Products b. Pharmaceuticals c. Grocery/Dietary Products 2. Hospital Funds Providers <ul style="list-style-type: none"> a. Claims Processing b. Claims Payment 3. Commercial Data Bases 4. Community Network Services B. Electronic Commerce Services in the Health Care Trading Community C. Standards Issues 	<ul style="list-style-type: none"> III-1 III-1 III-2 III-3 III-4 III-6 III-6 III-6 III-9 III-11 III-12 III-14
<hr/>		
IV	<p>Conclusion</p> <ul style="list-style-type: none"> A. The Impact of Electronic Commerce on Health Care B. Recommendations <ul style="list-style-type: none"> 1. For Users of Electronic Commerce in Health Care 2. For Vendors of Electronic Commerce Services and Products 	<ul style="list-style-type: none"> IV-1 IV-3 IV-3 IV-3



Exhibits

I

- 1 Definition of Electronic Commerce I-3
- 2 Definition of Trading Community I-3
- 3 Expenditures on Electronic Commerce Services Account for a Small Portion of Health Care Costs I-4
- 4 Electronic Commerce Service Markets for Health Care I-6

II

- 1 The Health Care Trading Community II-2
- 2 Players in the Health Care Trading Community II-3
- 3 Input-Output Matrix of Health Care Electronic Commerce Activity II-5
- 4 Health Care Cost Categories II-6
- 5 Health Care Revenue Sources II-7
- 6 Major Hospital Expenditures and Suitability to Electronic Commerce II-8
- 7 Driving Forces for Electronic Commerce in Health Care II-11
- 8 Leading Pharmaceutical Distributors II-11
- 9 Leading Medical/Surgical Distributors/Manufacturers II-13
- 10 Medical Claims Processing Providers II-15
- 11 Claims Processing Software Vendors II-15

III

- 1 Transaction Volume and Processing Services Value of Medical/Surgical Supplies Purchasing III-3
- 2 Transaction Volume and Processing Services Value of Pharmaceuticals Purchasing III-4
- 3 Transaction Volume and Processing Services Value of Grocery Purchasing III-5
- 4 Transaction Volume and Processing Services Value of U.S. Electronic Medical Claims, 1991-1996 III-7
- 5 Transaction Volume and Processing Services Value of U.S. Electronic Claims Payment, 1991-1996 III-8
- 6 Health Care Electronic Information Service Providers III-10
- 7 Electronic Information Services Market for Health Care III-10
- 8 Health Care Community Network Services Market III-12
- 9 Electronic Commerce Service Markets for Health Care III-13
- 10 EDI Data Formats for Health Care III-16
- 11 X12 Standards for the Claims Process III-18
- 12 X12 Standards for the Purchase Process III-19



Exhibits (Continued)

IV

- | | |
|--|------|
| -1 The Main Benefits of Electronic Commerce in Health Care | IV-2 |
| -2 Without versus With Electronic Commerce | IV-2 |
| -3 Expenditures on Electronic Commerce Services Account for a Small Portion of Health Care Costs | IV-3 |
| -4 User Recommendations | IV-4 |
| -5 Vendor Recommendations | IV-5 |

the 1990s, the number of people aged 65 and over in the United States is projected to increase from 20 million to 35 million, and the number of people aged 75 and over from 10 million to 15 million (U.S. Census Bureau, 1997).

As the number of people aged 65 and over increases, the number of people aged 75 and over will increase at a faster rate. This is because the number of people aged 75 and over is a smaller percentage of the total population aged 65 and over than the number of people aged 65 and over is of the total population aged 65 and over. For example, if the total population aged 65 and over is 20 million, and the number of people aged 75 and over is 10 million, then the number of people aged 75 and over is 50% of the total population aged 65 and over.

As the number of people aged 75 and over increases, the number of people aged 85 and over will increase at a faster rate. This is because the number of people aged 85 and over is a smaller percentage of the total population aged 75 and over than the number of people aged 75 and over is of the total population aged 75 and over. For example, if the total population aged 75 and over is 10 million, and the number of people aged 85 and over is 5 million, then the number of people aged 85 and over is 50% of the total population aged 75 and over.

As the number of people aged 85 and over increases, the number of people aged 95 and over will increase at a faster rate. This is because the number of people aged 95 and over is a smaller percentage of the total population aged 85 and over than the number of people aged 85 and over is of the total population aged 85 and over. For example, if the total population aged 85 and over is 5 million, and the number of people aged 95 and over is 2 million, then the number of people aged 95 and over is 40% of the total population aged 85 and over.

As the number of people aged 95 and over increases, the number of people aged 100 and over will increase at a faster rate. This is because the number of people aged 100 and over is a smaller percentage of the total population aged 95 and over than the number of people aged 95 and over is of the total population aged 95 and over. For example, if the total population aged 95 and over is 2 million, and the number of people aged 100 and over is 1 million, then the number of people aged 100 and over is 50% of the total population aged 95 and over.

As the number of people aged 100 and over increases, the number of people aged 105 and over will increase at a faster rate. This is because the number of people aged 105 and over is a smaller percentage of the total population aged 100 and over than the number of people aged 100 and over is of the total population aged 100 and over. For example, if the total population aged 100 and over is 1 million, and the number of people aged 105 and over is 500,000, then the number of people aged 105 and over is 50% of the total population aged 100 and over.

As the number of people aged 105 and over increases, the number of people aged 110 and over will increase at a faster rate. This is because the number of people aged 110 and over is a smaller percentage of the total population aged 105 and over than the number of people aged 105 and over is of the total population aged 105 and over. For example, if the total population aged 105 and over is 500,000, and the number of people aged 110 and over is 250,000, then the number of people aged 110 and over is 50% of the total population aged 105 and over.

As the number of people aged 110 and over increases, the number of people aged 115 and over will increase at a faster rate. This is because the number of people aged 115 and over is a smaller percentage of the total population aged 110 and over than the number of people aged 110 and over is of the total population aged 110 and over. For example, if the total population aged 110 and over is 250,000, and the number of people aged 115 and over is 125,000, then the number of people aged 115 and over is 50% of the total population aged 110 and over.



Introduction







Introduction

By a recent estimate,* health care administrative costs amounted to 24% (\$162 billion) of total spending on health care in the United States (\$676 billion) in 1990. This is more than twice the administrative cost accounted for in Canada. One-fourth of total expenditure is a significant amount and is a prime target for efficiency measures. One such measure is the introduction of electronic communication/information systems.

This report reviews the players in the health care industry of the United States and the communication transactions that occur among them. Through these transactions health care is rendered to the general population. The report examines how electronic commerce systems—such as electronic data interchange, electronic insurance claims processing, interorganizational transfers of medical files/records, etc.—can bring efficiency to the communication transactions of the industry. INPUT demonstrates that such efficiency can reduce the proportion of total health care expenditures that goes toward administrative costs.

Implementing electronic commerce technologies begs the question: Are we doing the thing right or are we doing the right thing? In other words, we can automate the existing communication flows, but given the highly inefficient administration of health care in the U.S., this may be a poor strategy. What may be needed first is an overall general plan for health care administration, that can then be implemented electronically. Woolhandler and Himmelstein argue in favor of a universal, publically administered insurance program.

* Woolhandler, Himmelstein, *The New England Journal of Medicine*, May 2, 1991, p. 1253



"The existence of numerous insurers necessitates determinations of eligibility that would be superfluous if everyone were covered under a single, comprehensive program. The fragmented and complex payment structure of the U.S. health care system is inherently less efficient than the Canadian single payer system."

INPUT takes no policy stand but examines the industry structure as a background for analysis of industry transaction costs. This report examines the cost for (primarily) hospitals to collect funds and to disburse them for health care supplies.

A

Electronic Commerce: Definition

A number of definitions of electronic commerce have been proposed. "The end-to-end digital exchange of information necessary to conduct business," is one concise definition. Unfortunately, it is vague: where are the "ends" and exactly what is the information that is necessary for business?

INPUT proposes to define electronic commerce in a way that allows businesspeople to determine the appropriateness of digital network-based systems to their business strategy.

Commerce exists when human beings exchange things and services. To conduct commerce, humans employ written, spoken, and, to some extent, sign language. "I will give you this if you give me that," or "Hey, you still owe me this. Where is it?"

Commercial and managerial conversations are conversations for actions. People, when their intentions are directed to these domains, use language to get things done. Such conversations consist of a finite set of moves; chief among them are offers, requests, and promises. From these basic moves come subsequent conversational moves, including declines, postponements, reports that a promise has been fulfilled or remains to be fulfilled, revoking of promises, etc.

Understanding that commerce (and management) originates from people making requests, offers, and promises is a framework/paradigm that enables the user and vendor of information technologies to better apply information technologies to human work and trade. Also, the fact that conversations for action have a finite number of moves has great implications for standardizing message types in EDI and EDI-like environments. With this understanding, INPUT defines electronic commerce as shown in Exhibit I-1.



EXHIBIT I-1

Definition of Electronic Commerce

Electronic commerce is the interorganizational coordination of workflow through digital network communication systems.

Electronic commerce systems are primarily interorganizational (between two firms, such as computer reservation systems, EDI systems between manufacturers and suppliers, funds transfers between banks, etc.). But due to the efficiencies and shifts in operational costs resulting from electronic commerce systems, the boundaries and profit centers of a company will change. Shifting boundaries and profit centers cause workflows and factors of production to be rearranged. It allows companies to outsource certain functions, to obliterate others, and to focus on delivering new products or services to customers. Thus, it is not enough, when considering building electronic commerce systems, to assume that one's company and the companies of one's trading partners and competitors will remain static. All the jobs, resources and practices of doing business up to that time within the larger trading community are subject to redesign.

B**Trading Community:
Definition**

The trading community, therefore, is an important unit when considering electronic commerce. It refers to more than a vertical market or value chain. Because it links buying and selling companies, electronic commerce doesn't exist solely within a single industry. Electronic commerce technologies are not contained solely within a transportation company or within the transportation industry: they are used to link transportation with other industries like manufacturing, distribution, banking, and so on. A chemical manufacturer sells to paper producers, steel companies, hospitals, etc. An apparel manufacturer buys fabric from the textile manufacturer, transport services from an intermodal carrier, and power from the local utility. Interconnected webs of buyers and sellers, going beyond narrow vertical industries, constitute a trading community. Exhibit I-2 has this definition.

EXHIBIT I-2

Definition of Trading Community

- A company, its trading partners, and the trading partners of its trading partners
- An expanded vertical market

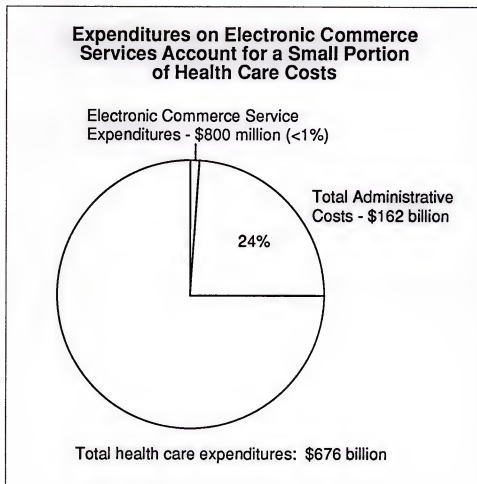


Because electronic digital networks of computing devices can radically alter productive capacity and possibilities, whole collections of interconnected companies can be reconfigured and streamlined. Electronic commerce technologies are those that link companies for the exchange of offers, requests, and promises. Because the webs of interconnected companies will change with electronics, it is best to observe the impact of electronic commerce on an entire web or trading community, rather than a single company, a single industrial category, or a narrow interconnected chain of companies (although the latter is often the relevant trading community and is the appropriate unit of analysis).

C**Overview of Report Findings**

INPUT estimates that the health care trading community is spending approximately \$800 million on electronic commerce services (such as electronic supply ordering systems, electronic claims processing services, electronic information services, etc.), which amounts to half of a percent of its total administrative costs of \$162 billion. Exhibit I-3 shows the portion of health care costs devoted to electronic commerce services.

EXHIBIT I-3





INPUT believes that this expenditure is generating savings in excess of five percent of total health care costs. Thus, the investment in electronic commerce is a sound one.

Areas in which to implement electronic commerce that promise the greatest return on invested dollars are ordering systems for pharmaceuticals, medical surgical supplies, and grocery items, because these three categories of inventory items are the source of greatest inventory cost, which can be reduced through just-in-time materials management. Also, claims submission and payment are the other most promising areas, as they greatly improve the cash-flow picture of hospitals, in some cases reducing the elapsed time for payment from two-and-a-half months to a single day.

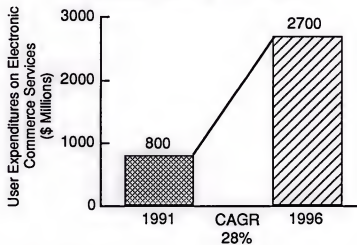
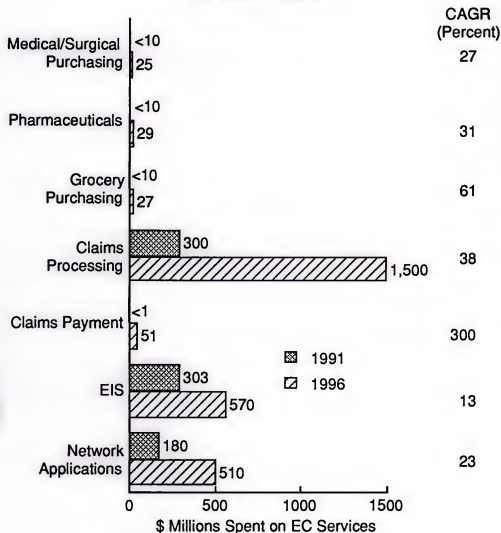
The decoupling of health care services from single-source providers (viz. hospitals) to specialty vendors (each with their own billing cycle) and the growth of the in-home health service market (growing at 20% per year) are creating a need for community-wide network integration. Many players are interconnected by a single organization.

The major opportunity areas for electronic commerce technologies and their market values now and in five years are shown in Exhibit I-4.



EXHIBIT I-4

Electronic Commerce Service Markets for Health Care







The U.S. Health Care Trading Community





II

The U.S. Health Care Trading Community

Health care is administered in a network of human conversations (conventional transactions). From doctor to patient, hospital buying agent to medical/surgical supplier, nursing home claims manager to Health Care Financing Administration (Medicare) representative, medical researcher to medical practitioner, patient to pharmacy, health care comes about through communication among people. Often these conversations are commercial in nature, and often they are recurrent to the degree that they can be standardized (as for example, in a standard purchase order or an insurance plan enrollment application). Minimizing the overhead costs of these conversations—particularly possible when they are of a financial, recurrent, and/or structured nature—is the objective of implementing electronic commerce systems.

A

Players in the Health Care Trading Community

Exhibit II-1 illustrates the health care trading community. The hospital and its trading partners is the archetypical trading community. By extension, trading communities for long-term care facilities, physicians' offices, pharmacies and specialized hospitals have the same partners in varying degrees.

There are three general categories of organizations: supply providers, service providers, and funds providers. In addition to these three categories, INPUT has identified 29 categories of players in the health care trading community. They are listed in Exhibit II-2.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial statements. This includes not only sales and purchases but also expenses and income.

The second part of the document provides a detailed breakdown of the accounting cycle. It outlines the ten steps involved in the process, from identifying the accounting entity to preparing financial statements. Each step is explained in detail, with examples provided to illustrate the concepts.

The third part of the document discusses the various types of accounts used in accounting. It categorizes accounts into assets, liabilities, equity, revenue, and expense accounts. It also explains how these accounts are used to record transactions and how they are balanced at the end of each period.

The fourth part of the document discusses the importance of the double-entry system. It explains how every transaction affects two or more accounts in a way that keeps the accounting equation in balance. This system is essential for ensuring the accuracy of the financial records.

The fifth part of the document discusses the various methods used to record transactions. It compares the journal method, the ledger method, and the T-account method. It also discusses the advantages and disadvantages of each method.

The sixth part of the document discusses the importance of the closing process. It explains how the temporary accounts (revenue, expense, and dividend) are closed to the permanent accounts (assets, liabilities, and equity) at the end of each period. This process is essential for preparing the financial statements for the next period.

The seventh part of the document discusses the various types of errors that can occur in accounting. It explains how these errors can be identified and corrected. It also discusses the importance of maintaining a good system of internal controls to prevent errors and fraud.

The eighth part of the document discusses the various types of financial statements. It explains how the balance sheet, income statement, and statement of owner's equity are prepared and how they are used to provide information to the users of the financial statements.

The ninth part of the document discusses the various types of accounting systems. It compares the manual system, the computerized system, and the hybrid system. It also discusses the advantages and disadvantages of each system.

The tenth part of the document discusses the various types of accounting software. It compares the different software packages and explains how they can be used to streamline the accounting process.

EXHIBIT II-1

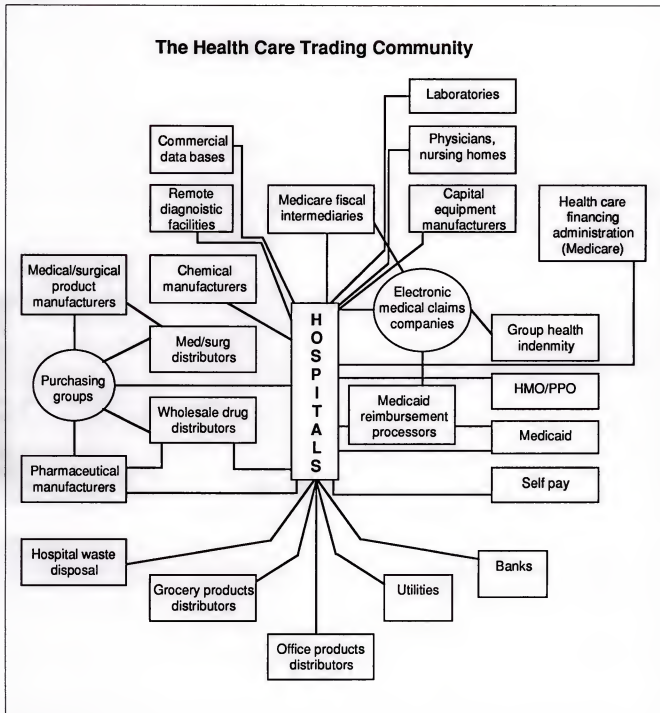




EXHIBIT II-2

Players in the Health Care Trading Community

1. Supply providers
 - a. Pharmaceuticals
 - b. Medical/surgical supplies
 - c. Grocery/food service/dietary products
 - d. Office supplies
 - e. Chemicals
 - f. Miscellaneous capital equipment (beds, lab equipment, office equipment, etc.)
 - g. Energy
 - h. Waste disposal
2. Service providers
 - a. Health care providers
 - i. Hospitals
 - ii. Pharmacies
 - iii. Health maintenance organizations/preferred provider organizations
 - iv. Long-term care facilities
 - v. Doctor's offices/medical groups
 - b. Health care research and education
 - i. Laboratories
 - ii. Remote diagnostic facilities
 - iii. Universities
 - iv. Publishers (including commercial data base publishers)
 - c. Distribution services
 - i. Pharmaceutical
 - ii. Medical/surgical supplies
 - d. Transportation
 - e. Service providers (excl. banks, finance, utilities, transport)
 - i. Claims processors
 - ii. VANs
 - iii. Medicare fiscal intermediaries/government bodies
 - iv. Buying groups
 - v. Managed care providers
3. Funds providers
 - a. Banks
 - b. Government
 - c. Commercial insurers
 - d. The Patient/The Company



B**Community Workflow**

Interorganizational workflow in the health care community occurs within a network of conversations among the players for the exchange of requests, promises, and other messages pertinent to commerce. Exhibit II-3 is an input-output chart showing where commercial activity takes place among the different players.

For each type of health care player, the player's linkages to customers and suppliers are shown in horizontal and vertical arrays of cells. Commercial activity with a hospital's suppliers, for example, is shown in the column under hospitals. Commercial activity with its customers, primarily funds providers and funds intermediaries, is shown in the row labelled hospital.

Interorganizational workflow among the different players has been already facilitated in several areas by electronic commerce technologies. Providers of medical, surgical and pharmaceutical products offer on-line electronic ordering and EDI systems for hospital purchasing. These systems are usually supplied by the vendor, typically a distributor.

On the funds provider side, a hospital typically submits health insurance claims to a third-party service bureau or fiscal intermediary. The bureau edits, sorts and sends the claims on to the appropriate payer organizations, commercial or governmental. If the claims are submitted electronically to the bureau, the hospital has prepared them using software that it has purchased. Sometimes a claims processing bureau service provides the software, other times the service uses software of other vendors.

C**Trade Volumes in the Health Care Community**

According to the Department of Commerce, total health care expenditures in the U.S. in 1990 were approximately \$676 billion (2.4% of GNP and \$2,660 per capita). Expenditures for 1991 are expected to be \$756 billion. Over the next five years, these expenditures are expected to rise 12 to 15 percent per year. As can be seen in Exhibit II-4, hospital service is the largest single category of health care cost.



Input-Output Matrix of Health Care Electronic Commerce Activity

REQUESTORS (PAYING MONEY)

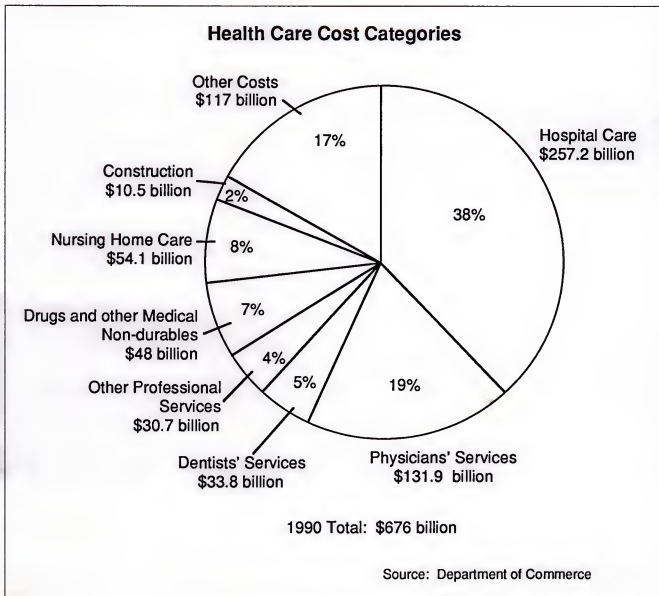
EXHIBIT II-3

(FULFILLERS (RENDERING PRODUCTS OR SERVICES))

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Supplies																													
1 Pharmaceuticals																													
2 Med./Surgical																													
3 Grocery																													
4 Office supplies																													
5 Chemicals																													
6 Cap. equip.																													
7 Energy																													
8 Waste																													
Services																													
9 Pharm. dist.																													
10 Med./surg. dist.																													
11 Transportation																													
12 Hospitals																													
13 Pharmacies																													
14 HMO/PPO																													
15 Long-term																													
16 Doctors																													
17 Laboratories																													
18 Diagnostic fac.																													
19 Universities																													
20 Publishers																													
21 Claims processors																													
22 VANS																													
23 Fiscal Intermediaries																													
24 Buying groups																													
25 Managed care																													
Finance																													
26 Banks																													
27 Medicare/caid																													
28 Private insurers																													
29 Patient/employer																													



EXHIBIT II-4



Hospital care is the dominant category of health care costs. Hospital care expenditures in 1990 were \$257 billion (38 percent of all health care costs). Physicians' services were the second largest category at \$132 billion, nursing home care was \$54 billion, and combined expenditures for dental services and other professional services reached an estimated \$65 billion.

To examine electronic commerce in health care, INPUT focuses on the trading community that surrounds the hospital.

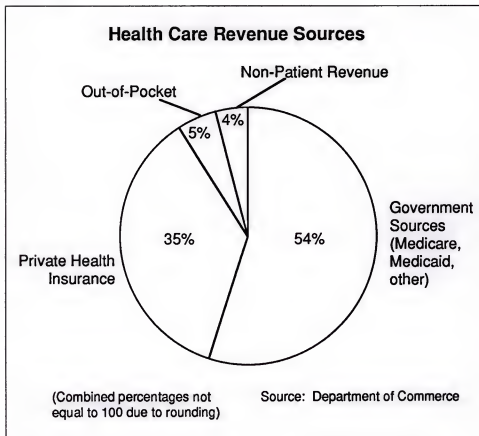


There are approximately 6,700 hospitals and 1.1 million hospital beds in the U.S.

1. Hospital Revenues

Based on 1988 data from the Health Care Financing Administration (HCFA—the federal funding source for Medicaid and Medicare), 55% of hospital revenues came from government sources and 45% came from the private sector (including private health insurance, out-of-pocket payments, and non-patient revenues). Exhibit II-5 shows revenue sources for health care.

EXHIBIT II-5



2. Hospital Inventory Expenditures

Hospitals purchase a wide variety of products and services. Exhibit II-6 lists major expense items of hospitals and their suitability to electronic commerce.



EXHIBIT II-6

Major Hospital Expenditures and Suitability to Electronic Commerce

Category	Trnsact'n/ Month	Electronic Commerce Suitability
Medical/surgical supplies	high	good
Pharmaceuticals	high	good
Grocery/food products	high	good
Waste disposal services	low	good
Chemicals	high	good
Office products	high	good
Beds/bedding supplies	low	poor
Laboratory equipment	low	poor
Utility services	low	good
Construction	low	good

Electronic commerce among suppliers is most applicable to transactions that are numerous and recurrent. Borrowing a manufacturing classification, these items can be called inventory items and include medical/surgical products, pharmaceuticals, and food products, as opposed to non-inventory items of office supplies, capital expenditures, and utility payments. There are greater opportunities for electronic commerce in inventory than non-inventory items.

The largest single category of inventory expenditure by hospitals is for pharmaceuticals. The 1990 domestic U.S. expenditures on drugs was \$50 billion—\$44 billion (88%) was for pharmaceutical preparations and the remainder divided among the categories of diagnostics, biologicals, and medicinals/botanicals. Hospital purchases of pharmaceuticals was approximately \$22 billion.

Of almost equal value are hospital expenditures on food and dietary products, which INPUT estimates to be \$20 billion.

The 1990 U.S. expenditures on medical/surgical supplies was \$28 billion, with half of this amount purchased by hospitals and the remainder purchased by solo physician practices, homes, nursing homes, and independent ambulatory centers.



3. In-Home Health Care

A new trend in health care is bringing services to the homes of patients. In-home health care has grown 20% per year for the last two years (according to the Department of Commerce) and accounted for approximately \$6.5 billion in 1990. This emerging market has important implications for providers of electronic mail, commercial data bases, network services, laptop devices, and other field-service support products and services.

D

Trends and Issues

Financing and delivery of adequate health care to the entire U.S. population have become two of the top issues on the country's political agenda. Approximately 40 million Americans are without health insurance. The average cost per American to finance total health expenditures in the country is \$2,000 per capita. Reform is being called for at the national level.

Besides a general effort on the part of health care providers to reduce costs, a prime target of reform has been the organizational and legal process for financing health care. Health care financing is administered through a labyrinth of commercial and governmental organizations. For insured patients, providers send insurance claims to any number of state agencies, third-party processing service bureaus, commercial insurers or processing bureaus set up by these insurers.

In addition, the "unbundling" of health care services and the emergence of managed care and preferred provider organizations (PPOs) and arrangements has required providers to increase record-keeping, verification and auditing procedures.

Procedures for checking insurance coverage for a patient, claims submission, and claims payment constitute an area that is ready for major overhaul and streamlining.

Below are some general trends:

- National health care expenditure will rise from \$600 billion in 1990 to \$800 billion by 1993, according to the Department of Commerce.
- Home health care, a source of transactions among different health care providers, will grow as a proportion of the overall health care market. When patients stayed in hospitals, most health care services (e.g., laboratory tests, x-rays, CAT-scans, and other specialized equipment uses) were provided under a single roof and were consolidated in a single bill. Now each service is outsourced to an individual third-party provider. Each provider generates a separate bill.



- Health care services are becoming “unbundled”—rendered by multiple, independent providers as opposed to a single hospital or clinic. This is creating a need for managed health care systems and services. Many large vendors in the health care market have organized to address this trend. EDS has created the Inter-Practic System, and GTE Health Systems Incorporated has a business unit called Systems Choice.
- The Health Care Finance Corporation announced in the fall of 1990 that it would no longer process claims on behalf of patients and is requiring physicians to electronically file them. Thus, physicians are being pushed to adopt computer software and systems to comply with this ruling.
- In the fall of 1990, Congress passed the Medicaid Prudent Pharmaceutical Purchasing law. The law requires pharmaceutical manufacturers to rebate to state Medicaid offices a portion of the revenue received from the sale of drugs to Medicaid recipients. Because the law does not specify what documentation the states must provide, manufacturers have taken the initiative to define minimum data requirements for audit and control. Manufacturers have identified EDI as the preferred mode of data exchange because of its ability to manage the volumes of data flowing between the states and manufacturers as well as between the manufacturers and the Health Care Financing Administration (HCFA). Sterling Software ORDERNET is working with these manufacturers.
- Tremendous growth in health care insurance claims filings (140% reported by NEIC), accompanied by increasing awareness of and willingness to adopt electronic technologies by health care providers and agencies, are causing the approach of critical mass in the industry, with many players expecting that in the next 18 to 24 months, EDI will become a widespread practice.
- The creation and/or adoption of standardized EDI data formats for both hospital procurement and insurance claims processing is opening up the market to multivendor solutions.
- Distribution and logistics vendors are offering new services to hospitals for material management, including just-in-time inventory techniques, multiple-vendor electronic buying systems, and integrated supplier management programs for single-source/consolidated billing.
- Public and private outcry to solve the health care crisis is causing Congress to enact sweeping health care reforms.

The driving forces for electronic commerce in health care are summarized in Exhibit II-7.



EXHIBIT II-7

Driving Forces for Electronic Commerce in Health Care

- Exploding health care costs
- Unbundling of health care services among multiple providers
- Move to adopt industry-wide EDI standards for purchasing and claims submission
- Federal reform

E

Competitive Environment

I. Distributors

Exhibit II-8 lists the leading distributors of pharmaceutical products.

EXHIBIT II-8

Leading Pharmaceutical Distributors

Company	1990 Revenues (\$ Billions)
McKesson	8.3
Walgreen	6.2
Bergen Brunswig	4.5
Rite Aid	3.3

The following are brief profiles of some of the distribution leaders.

a. McKesson

At \$8.3 billion in sales (for fiscal year ending March 31, 1991), McKesson is one of the largest distributors of pharmaceutical products in North America. Its subsidiaries are Valu-Rite, a chain of drug stores, Service Merchandise, a discount general merchandise retail chain, and Medis, a distributor of pharmaceuticals in Canada.



McKesson is the largest third-party prescription claims processor in the U.S., processing insurance claims for prescription drugs for 20 million people and 60,000 pharmacies.

McKesson uses proprietary and standard EDI in three areas:

- With product customers—Economost is McKesson's proprietary ordering system offered to its customers (pharmacies and hospitals). Seventy percent of McKesson's sales are made through Economost. Customers use hand-held order entry devices that have a built-in, acoustic modem (which attaches to a phone handset). Customer orders are verified by an automatic voice response system. Economost averages 10,000 orders per day (200,000 line items per hour). The service is ready to receive orders 24 hours per day, 365 days a year.
- With service customers—McKesson's insurance claims processing services for prescription drugs uses proprietary EDI data formats.
- With product suppliers—McKesson initiated its first use of standard X12 and NWDA EDI invoices in 1990 with its leading pharmaceutical manufacturer suppliers. As of second quarter 1991, McKesson has six suppliers communicating invoices to it. It plans to implement X12 purchase orders soon.

McKesson operates 50 local distribution centers throughout the U.S. They are connected to the Economost data center in Sacramento, CA, by satellite.

b. Bergen Brunswig Corporation

Bergen Brunswig Corporation is a diversified health services and consumer electronic products distribution organization with headquarters in Orange, CA, and with 1990 sales of \$4.5 billion. The corporation is the U.S.' second largest distributor of products sold to pharmacies and hospitals, and the largest national distributor of pre-recorded video cassettes. The company operates 32 distribution centers throughout the U.S. The area served includes more than 80% of the U.S. population.

Next-day delivery is provided to 10,000 customers. Some of the centers employ highly advanced automated warehouse and material handling systems. Bergen distributes 25,000 stock-keeping units.

Bergen has used EDI with drug manufacturers/suppliers since 1971, and today approximately 225 (32%) of its suppliers can be reached via EDI. Ninety-four percent of the dollar amount of its purchases are handled via EDI. In 1974, Bergen launched its first electronic order entry systems for its pharmacy and hospital customers. Primeline, its latest ordering system, is designed for hospital pharmacies and allows real-time, on-line order entry with PC-based custom software.



2. Medical/Surgical Product Manufacturers and Distributors

Exhibit II-9 lists the leading distributors/manufacturers of medical and surgical products.

EXHIBIT II-9

Leading Medical/Surgical Distributors/Manufacturers	
Company	1990 Revenues (\$ Billions)
Johnson & Johnson	11.2
Baxter International	8.1
Abbott Laboratories	6.1
Becton, Dickinson	2.0
Imcera Group	1.5
Bausch & Lomb	1.3

Below are profiles of some of the leading medical/surgical suppliers:

a. Baxter International Inc.

Baxter had \$8.1 billion in sales in 1990. The company develops, manufactures, and distributes more than 120,000 products that are principally used by hospitals, clinical and medical research laboratories, blood and dialysis centers, rehabilitation centers, nursing homes, and doctors' offices, and at home under physician supervision. Baxter believes it can help hospitals achieve savings in the total supply system by automating supply-ordering procedures, optimizing distribution networks, improving materials management, and achieving economies of scale associated with aggregating supply purchases. The company's ASAP[®] electronic order entry system allows hospitals to order supplies via a telephone-linked terminal. The system can be tailored to individual customer needs (including accepting X12 formats). It provides price information and order confirmation information.

The company's ACCESS[™] program brings the services of other vendors to hospitals via a single buying point. As part of the ACCESS program, Baxter formed an alliance with Comdisco, Inc. in 1990 for high-technology asset management and contingency services. Baxter also maintains alliances with Waste Management, Inc. for handling, transporting, treat-



ing and disposing of medical waste, and with Kraft Foodservice, a unit of Kraft General Foods, Inc., for hospital food service through this program. Baxter has joint ventures with Nestle, S.A. to develop, market and distribute clinical nutrition products worldwide, and with IBM to provide computer software and services to hospitals and other health care providers.

3. Fiscal Intermediaries

There are approximately 74 fiscal intermediaries in the U.S. Usually the state-run Blue Cross/Shield organizations, they receive claims from health care providers. Many of the intermediaries supply the providers with terminals that are hooked to the intermediary's host mainframe, through which the provider can key in a health care claim. Many intermediaries also supply software that runs on the health care provider's computer. The software puts claims filings into a HCFA format or into a flat file which is sent (over a telephone line or by magnetic tape delivered in the mail) to the intermediary for processing. Intermediaries charge health care providers for this service, sometimes as much as \$950 per month.

4. Electronic Commerce Vendors

Information service vendors are primarily claims processing service providers and software companies.

Exhibit II-10 lists the leading claims processing companies. Many of these companies provide software in addition to their processing services.

Exhibit II-11 lists companies that make claims processing software only.



EXHIBIT II-10

Medical Claims Processing Providers

Company	Location
Shared Medical Systems	Malvern, PA
CyCare	Phoenix, AZ
GTE Health Systems Inc.	Thousand Oaks, CA
EDS	Dallas, TX
American Express Health Systems Group	St. Louis, MO
United Medicorp	Dallas, TX
Wellmark	Century City, CA
CIS Technologies Inc.	Tulsa, OK
Physicians Practice Management	Indianapolis, IN
HealthQuest	Atlanta, GA
Stellar Management Corporation	San Francisco, CA
IPN	Nashville, TN
PCS Inc.	Phoenix, AZ

EXHIBIT II-11

Claims Processing Software Vendors

Company	Location
HBO & Co.	Atlanta, GA
TDS Healthcare Systems Corp.	Atlanta, GA
Gerber Alley & Co.	Norcross, GA



a. CIS Technologies Inc. (Tulsa, OK)

CIS submits electronic claims to 85 insurance carriers as well as Medicare, Medicaid and NEIC. Through The Electronic Highway™, an on-line system, CIS can process all claims for submission to all carriers. CIS serves more than 300 hospitals in 19 states. The company's 1990 revenues were \$10.2 million. CIS is a public company and was previously half-owned by Swiss Reinsurance Co. (Zurich, Switzerland). CIS charges hospitals \$10 per bed per month, which averages out to between 75 cents and \$1 per claim processed.

b. United Medicorp

Based in Dallas, TX, United Medicorp exemplifies one of the many ways that claims processing service providers charge their clients for services rendered. UMC gives hospitals PCs and software free of charge to link up with its processing system. UMC charges a hospital 10% of the net anticipated claims payment from the insurance company if the hospital wants its claims paid in 24 hours. For hospitals willing to receive whatever the insurance company actually pays whenever it pays it, UMC charges only 5% of the actual payment. UMC pays 45% of its customer claims within 24 hours.

c. HBO & Company

HBO (Atlanta, GA) had \$200 million in revenues in 1990. Approximately 53% of HBO's revenue is derived from minicomputer-based turnkey systems and maintenance services, 26% from professional services, systems operations and customer support services, 15% from software product licenses, and 6% from decision support processing services. In late 1990, HBO introduced its first network application, Questnet. HBO's plans for Questnet are to build a nationwide network that can be used to link HBO customers with HBO support, insurance companies, credit bureaus, Medicare, and data base services providing clinical, financial, and market information. Questnet is offered over the IBM Information Network.

d. National Electronic Information Corp.

National Electronic Information Corp. (NEIC), based in Secaucus, NJ, is the largest claims clearinghouse in the nation. It processes all the electronic claims for about 30 large commercial insurers that underwrite its costs. Hospitals, physicians' offices and other regional claims processing clearinghouses send their claims to NEIC for processing (a clearinghouse that processes claims directed to any of the 30 carriers in the NEIC consortium must submit those claims to NEIC). NEIC processed claims for approximately 20% of the nation's community hospitals last year. NEIC offers hospitals personal computer software to edit claims for it



payers. Initial set-up costs are about \$10,000, with a \$3,000 annual maintenance fee. About 200 hospitals are using the company's software.

e. Stellar Management Corporation

Based in San Francisco, CA, this company provides PC software and processing services to hospitals and physicians' offices. Its StellarNet (running on the IBM Information Network) provides health care providers with automated doctor's report preparation and claims submission processing. Completed claims are transmitted from the provider to the payer via StellarNet at an unattended transmission time which is set in the PC. Providers receive an electronic acknowledgement for each claim. A complete transmission report is printed the next morning. For insurance carriers that do not receive processed claims electronically, Stellar will print the claims on paper and send them by overnight courier. StellarNet is not a billing service or a claims payor. It merely processes claims and passes them on to payors.

f. IPN

IPN (Nashville, TN) is an electronic claims clearinghouse for 170 hospitals in 15 states in the Southeast and Southwest. Most of these facilities are owned by HealthTrust—The Hospital Company and Hospital Corp. of America. IPN received its initial financing from HealthTrust when it was formed in 1988. Most of IPN's hospital clients can transmit 70% of their claims electronically. IPN charges its hospital clients on a per-claim basis for the processing. Hospitals also must pay an annual software fee to IPN.

g. CyCare Systems

CyCare reported revenues of \$86 million in 1989, split relatively evenly among the delivery modes of processing services, network services, and software products. Its main product—available either as software (operating on the mainframe or at the PC level) or on a processing service basis—serves the needs of physicians' groups and clinics for accounts receivable, patient registration, appointment scheduling, and electronic claims submission (or EDI). CyCare's EDI-oriented Claims Clearinghouse is the other major service, providing translation and retransmission services to speed electronic claims filing.

In terms of involvement with key new technologies now impacting information services for the medical industry, as noted above CyCare has a major commitment to leadership in EDI for medical claims. CyCare is also now starting to field-test and install RDBMS-based integrated information systems connecting physicians' group practices and hospitals.

Competitively, CyCare believes that today's market requires much more



than strong product capabilities. Beyond features, CyCare emphasizes the initial and continuing support and service it provides with its products. CyCare is committed to further use of advanced technologies, as it has demonstrated with its EDI service.

h. D&B Software

The medical industry business of newly formed D&B Software is primarily based on the business built up over the years by the Management Science America component. Its \$36 million in medical industry business is primarily concentrated in mainframe software products and their maintenance. In addition to general financial, human resources, and materials management software products that are specifically tailored to the needs of hospitals, D & B Software offers decision support software in alliance with Comshare's Executive Information System that is specific to hospital concerns with case mix, product mix, and profitability. About one-quarter of D&B Software's medical industry revenue is in professional services, primarily in strategic planning, implementation, and software audits related to D&B Software products. The remaining 75% is in systems integration, tying D&B systems to patient-care systems from vendors such as TDS Healthcare Systems, Shared Medical Systems, and HBO & Company.

The key new-technology area that D&B Software is working in is image processing. In conjunction with IBM's ImagePlus systems, D & B Software will offer imaging capabilities in its next generation of hospital software for the 1992-1993 timeframe.

Competitively, D & B Software tries to steer clear of feature-to-feature comparisons. Rather, it emphasizes its 20-year commitment to the medical industry and its strong team of dedicated health care sales reps and systems consultants. Emphasizing its base in the evolving IBM mainframe architecture, D & B Software notes that full compliance with IBM SAA will be a keystone of its next generation of software and that it supports DB2 as a strategic direction if customers need it to meet their needs.

i. GTE Health Systems Incorporated

GTE (Salt Lake City, UT) has acquired its way into the medical industry information services business, assembling revenues totaling \$30 million in 1989. The overwhelming proportion of this revenue today is in mainframe software applications for hospitals and HMOs to support both financial and clinical needs, including costing, charging, and patient information. As a communications company, however, GTE clearly has firm plans for its EDI-based electronic claims service: a clearinghouse between the hospital and multiple payors that operates in both the claims-submission and reimbursement directions. With a continuing

lack of medical-industry EDI standards, GTE reports that the clearing-house function is critical to making such electronic transactions possible today.

GTE Health Systems has three business units: Hospital Information Systems, Network Systems, and Systems Choice. Information Systems has a number of software and turnkey systems for hospitals and physicians' offices. Network Services offers EMC*Express, GTE's medical claims clearinghouse and network service. GTE sells this service to health care providers directly and to third-party vendors/bureaus that service health care providers. Systems Choice offers network and software solutions to the managed care segment of the market.

GTE has focused solely on electronic claims submission and does not offer services for processing paper claims. Third parties offer this service to health care providers and then use GTE's network to submit them to insurance carriers (commercial and government).

INPUT estimates that GTE's EMC*Express service handles less than 10 million claims per year. The processing service interfaces with a hospital's (or physician office's) patient accounting system. Claims are sent in proprietary or HCFA formats to GTE. GTE edits the claims, sorts them and electronically mails them to the correct carrier. For volumes at a single client location above 500,000 per year, the per-claim charge is \$.50 for UB82 and \$.30 for HCFA 1500. Volumes of less than 10,000 per year are \$.80 per UB82 and \$.45 per HCFA 1500.

GTE Health Systems intends to be a major player in four separate new technologies that will become important to medical information services:

- It will use its experience as a local telephone company to pioneer the networking of local "communities of interest" for medical information and services, especially hospitals, physicians, and laboratories.
- It is researching optical disc and image processing technologies.
- It wants to use telephone industry experience to take a lead in expanded voice recognition applications for entry of information, as is being done now in laboratory and radiology departments.
- It is now prototyping medically oriented expert systems.

GTE Health Systems emphasizes three key factors in its competitive positioning. Its software is solidly IBM-based, and now covers midrange systems as well. The GTE parent company is a worldwide communications and networking company, capabilities it judges will become more important to the medical industry. Finally, the companies GTE has acquired in medical information services collectively represent a broad



and deep base of experience, and GTE reports that it is integrating them effectively into a single business unit without losing staff and the key medical-industry expertise needed to compete effectively.

j. Shared Medical Systems (SMS)

SMS (its currently preferred name) is the acknowledged leading vendor in medical information services, with \$350 million in 1989 U.S. revenues, 90% of which was derived from hospitals, and the remainder from physicians' groups and clinics. The company is estimated to have 25% of the nation's electronic medical claims processing business. Although downplaying the "Shared" portion of its name today, SMS earned about half of this revenue from the hospital processing services business that gave it its name and leadership position, with the other half evenly split between software products and turnkey systems. SMS' systems serve both clinical and financial functions, in some cases operating in a mixed mode where clinical information is entered and used on local, distributed computer systems for direct needs and then uploaded to SMS processing centers for aggregation—especially to meet financial needs for accountability.

SMS is positioning itself to lead the industry in three key technologies in the 1990s.

- It is using the latest LAN communication technologies to integrate existing departmental computer systems and newly installed systems.
- SMS sees image processing using optical disc technology as very important, especially in changing the use of information systems by departments like radiology.
- It is committed to RDBMS technology as the key to increasing the accessibility of information systems.

As the leading vendor, SMS places heavy competitive emphasis on its size, growth, and stability during 21 years in the business. In particular, it notes, many customers of McDonnell Douglas Health Systems (sold to American Express) and Baxter Healthcare and IBM (which merged operations into Spectrum Healthcare) felt abandoned or otherwise burned by vendors they believed were committed to the business. SMS reports that large investments it made during the 1980s began paying off in 1989 and 1990 in the form of attractive new systems capabilities that customers value. Finally, SMS is strengthening itself competitively by adding emphasis to its systems for physicians and clinics, and selling more effectively to hospitals by arguing that the capability of a single, integrated SMS system to serve both environments will help them better attract physicians and win their referrals of patients.



k. Spectrum Healthcare Solutions

The integration of Baxter Healthcare and IBM medical-industry operations into Spectrum Healthcare Solutions has resulted in a 1989 revenue stream estimated at \$75 to \$100 million. Virtually all of this revenue derived from software products and related services, and just 5% to 10% from consulting professional services. The software being sold today serves the hospital and individual physician markets, providing both clinical and financial functions. Spectrum intends to enter the managed care market as well, and announced and demonstrated—for first quarter 1991 delivery—integrated hardware and software for bedside patient-care information systems.

The key new technology that Spectrum is targeting—beyond the prior offerings of either parent company—is bedside patient-care technology. The system demonstrated is based on IBM PS/2 hardware (meeting industry wipedown and sterilization requirements) and new software modules developed jointly; it will fully support LAN connection and server technologies. Other new technologies under development are confidential.

Spectrum's key competitive strength is its combination of Baxter's and IBM's strengths and market presence in medical information services. Each can cite its historical presence in the industry since the 1970s. Also, Spectrum presents itself as working to help strengthen the medical industry itself, through more effective use of medical information systems. Spectrum points out that hospitals still fail to see the power of the contribution that information systems can make to effective operations; new recognition of the potential value of clinical and patient-care systems is up against a legacy of limited information systems budgets. The type of vendor stability Spectrum/IBM/Baxter offers, they believe, will help hospital managements move toward the multi-year commitments that will be required to realize this power.

l. TDS Healthcare Systems

TDS derived \$75 million in 1989 revenue 60% from software products and 40% from professional services; a new offering of processing services is not yet significantly contributing to revenue. TDS' patient-care and accounting system software (now offered as a new on-line processing service as well) handles both clinical and financial functions, operating in the IBM environment on either mainframe or minicomputer platforms. In professional services, TDS provides computer-based training, consulting, installation, and systems integration/interface services.

Somewhat indirectly, TDS is participating in two key new technologies. To assist the development and implementation of important new communications standards, TDS is on working committees for HL7 and MEDIX.



In image processing, it is not selling a system directly, but rather is working with optical disc vendors on systems that can save TDS records, and is consulting with hospitals in joint efforts to establish interfaces with such systems.

In its competitive positioning, TDS first cites the breadth and value of the functionality that its system offers to nurses and physicians, who use it directly. Related to this, TDS notes that its system has always incorporated light-pen access technology, and that this has been a key to professional-level acceptance of the system. TDS is now testing touch screens and other user interfaces to determine the next step in easing use of its system and thus increasing its professional-level market penetration.





Actual and Potential Electronic Commerce







Actual and Potential Electronic Commerce

To justify their cost, electronic commerce systems must be deployed where transaction volumes are highest in a given trading community and/or where the systems produce a value of coordination previously unattainable (as in the case of electronic data bases).

This chapter examines areas where electronic commerce systems offer the greatest promise in terms of cost savings and coordination.

A

Transaction Levels and Electronic Commerce Service Markets in the Health Care Trading Community

Electronic commerce in the health care trading community consists of an electronic infrastructure through which the different players in the community coordinate their recurring commercial transactions. The central player of the trading community is the hospital (long-term health care, physician offices, and specialized laboratories are secondarily important; hospitals are best organized to pursue electronic commerce).

The hospital's material suppliers on one side and its funds providers on the other side are the two general categories of a hospital's trading partners. A third group of electronic commerce players are electronic data base providers, who help distribute a wide range of health statistics, marketing data, and bibliographic/research information.

Note: For the material and funds provider segments below, INPUT estimates markets that combine user expenditures on software, network and processing services. Vendors sell systems in many cases as a turnkey combination of software and services. Vendor pricing does not make explicit or account for the costs of the specific components.



1. Hospital Material Providers

Of all suppliers to hospitals, the most needful of electronic commerce are those that supply materials on a highly variable yet frequent basis. These suppliers provide medical and surgical products, pharmaceuticals, and grocery/dietary products. More and more hospitals are moving toward just-in-time ordering strategies for these types of products.

Utility and waste disposal suppliers provide a steady, ongoing product to the hospital but require relatively little purchasing overhead to warrant electronic commerce systems. EDI payment for these services has begun among hospitals, but transaction volume (monthly payment) is inherently low.

Office supplies are highly amenable to EDI purchasing but little is being done here. The purchase of laboratory equipment, beds and bedding supplies, office equipment, and construction services are capital expenditures that do not lend themselves to EDI or EDI-like purchasing. INPUT sees little promise in the immediate future for electronic commerce systems to be built for these areas in the health care community. However, vendors in these industries are adopting EDI-based commerce with trading partners in other industries (see INPUT's *The Electronic Data Interchange Market, 1990-1995: Forecast, Implementations, Trends*).

Below, INPUT sizes the market for electronic transactions in medical/surgical products, pharmaceuticals, and dietary/grocery products.

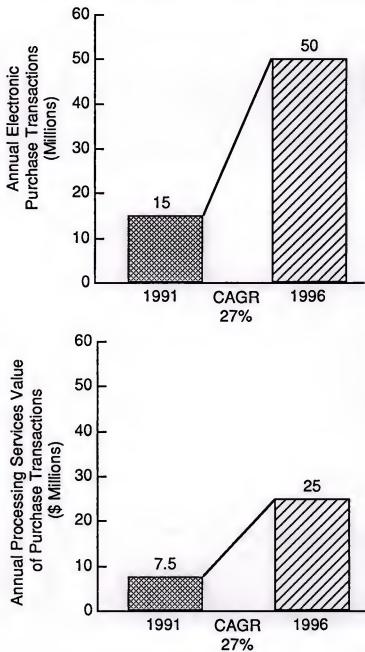
a. Medical/Surgical Products

As shown in Exhibit III-1, the processing services value of purchase transactions for medical/surgical products is estimated to grow from \$7.5 million in 1991 to \$25 million in 1996, at a compound annual growth rate of 27%. This figure is based on growth in transaction volumes, which are estimated to grow from 15 million purchase orders in 1991 to 50 million in 1996. These figures include electronic transactions from proprietary and standard/third-party systems. INPUT assumes that over time, a greater proportion of all transactions will be in standard formats and less in proprietary formats. A constant \$.50 per purchase order is assumed to derive the processing services value of these transactions. Growth in this transaction area is spurred by greater conversion of hospitals to electronic purchasing, conversion of proprietary electronic order-entry systems to standard systems, and implementation of transaction messages in addition to purchase orders (such as order inquiry, ship notice, and invoice).



EXHIBIT III-1

Transaction Volume and Processing Services Value of Medical/Surgical Supplies Purchasing

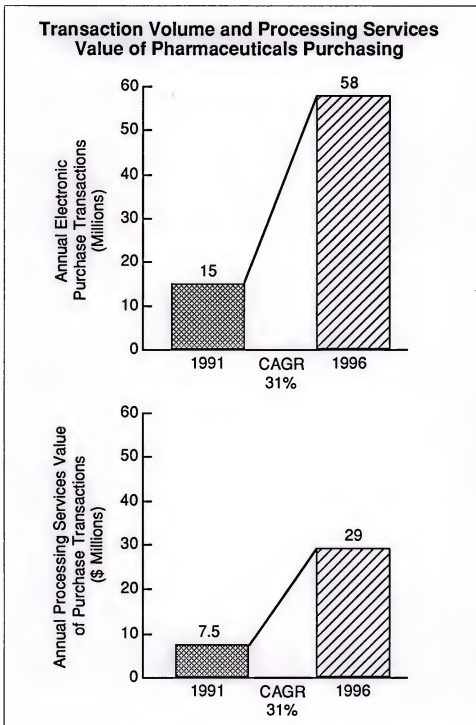


b. Pharmaceuticals

Pharmaceutical purchasing parallels medical/surgical supply purchasing in terms of transaction volumes, value of transactions, and growth. The same assumptions apply. Exhibit III-2 shows this electronic commerce market.



EXHIBIT III-2

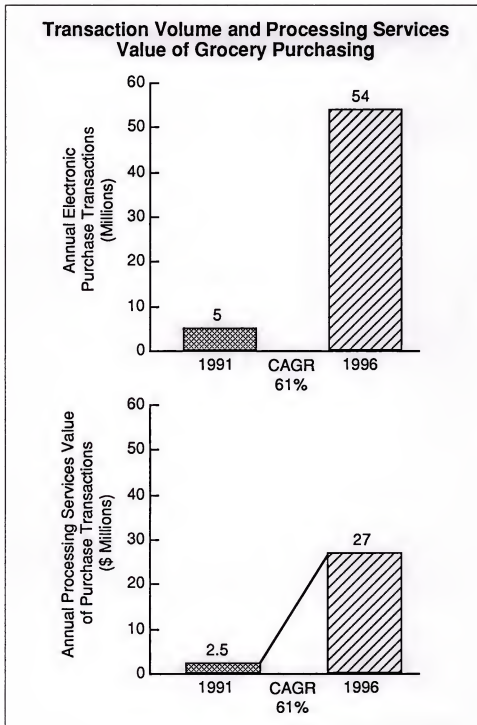
**c. Grocery/Dietary Products**

The electronic purchase of food supplies for hospitals shows the greatest potential for growth of all hospital procurement categories. Hospitals very seldom use EDI today to buy food; however, the potential for rapid implementation is great because food distributors, wholesalers, and manufacturers already have been conducting EDI for 10 years. Half the



work—including the development of standards and industry expertise on the part of the food industry—has already been done. The use of EDI by hospitals for grocery purchases is expected to grow from a \$2.5 million market in 1991 to a \$27 million market in 1996, at a compound annual growth rate of 61%, as shown in Exhibit III-3.

EXHIBIT III-3





2. Hospital Funds Providers

Providing funding to hospitals involves two basic electronic commerce linkages: electronic claims filing and claims payment. An electronically filed claim originates at the hospital, then goes to an intermediary processing company, which passes it on to the public or private carrier. A claim payment originates at the carrier and goes to the carrier's bank, which passes on payment and remittance advice to the hospital's bank.

a. Claims Processing

Four billion health insurance claims were filed by health care providers (hospitals, physicians' offices, long-term care facilities, laboratories) to government and commercial insurance carriers in 1990, according to NEIC (the clearinghouse) figures. Approximately 10%, or 400 million, were filed electronically from the provider site to a processing intermediary, either through a telephone line or by delivery of magnetic tape/diskette. Often the processing company passes the claims on to the insurance carrier in paper form. Even if only one leg of the claims submission journey is electronic, INPUT counts it as an electronic submission.

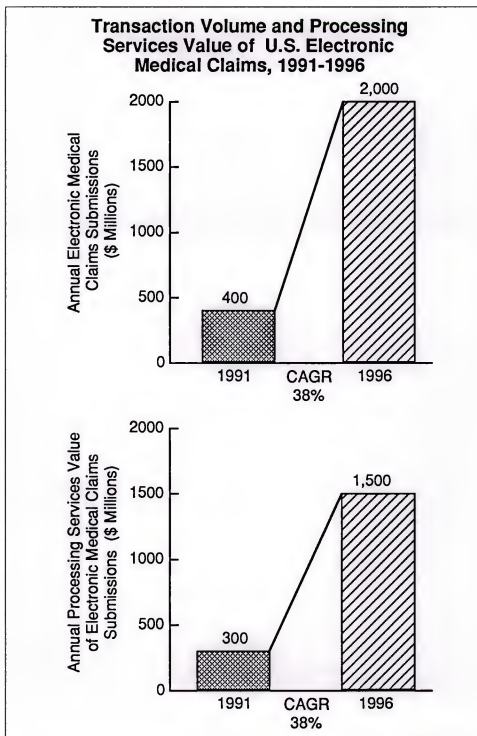
The cost per electronic claim varies widely, but INPUT concludes that the average cost is \$.75 per claim. INPUT assumes that the volume of electronic claims submission will increase in increments of 200 million per year through 1993, 300 million per year through 1995 and 500 million per year through 1996. Multiplying these transaction volumes by a constant \$.75/transaction generates the following processing services value for electronic medical claims. The market is growing at an overall compound annual rate of 38%. Exhibit III-4 shows the value of claims processing services and the growth from 1991 to 1996. (Note: Claims processing is a transaction processing function, according to INPUT's definitions of the information services industry.)

b. Claims Payment

Electronic payment of health insurance claims is virtually non-existent. Medicare (the single largest payer of health care expenses) issues approximately 110 million checks each year. Only in a few pilot projects are these payments electronic. Electronic payments of health care claims, however, is waiting to take off dramatically. An X12 payment format (835—payment/remittance advice for claims payment) is in the final stages of approval. The federal government, which pays the greatest proportion of health insurance claims, is pushing for electronic funds transfer mechanisms for both tax collection and payments to vendors, including state Medicare and Medicaid disbursement agencies.



EXHIBIT III-4

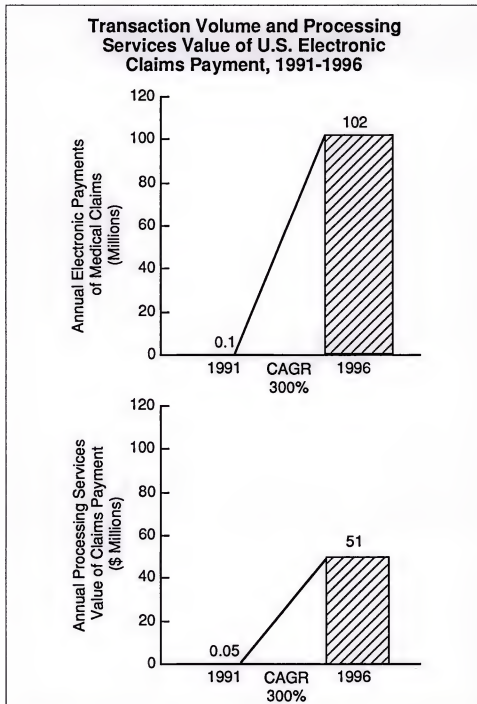


The University of Virginia Medical Center is preparing to receive electronic payment from Blue Cross and Blue Shield of Virginia. The payment program coincides with UVAMC's use of the X12 claims submission format. The use of the X12 format is significant because it is the first widescale application of X12 to claims-related information. UVAMC



files approximately 200,000 claims each year. Fifty-four percent are transmitted electronically. A much smaller proportion will be paid electronically by year-end 1991. INPUT estimates that UVAMC's program, along with other programs, will be responsible for approximately 100,000 electronically paid claims in 1991, as shown in Exhibit III-5. This is a very small number, particularly in comparison with INPUT's estimate of 12.7 million electronic corporate trade payments in the U.S. for 1991 (see the INPUT report, *Developments in Corporate Electronic Trade Payments*).

EXHIBIT III-5





The processing services value of these claims payments and its growth through 1996 is shown in Exhibit III-5. INPUT assumes that the average claim payment transaction cost is \$.50. (This is how much a bank enacting a payment for a carrier would receive for the service.) Claims payments are expected to grow explosively over the next five years. INPUT estimates a 300% compound annual growth rate from 1991 to 1996. One reason is that the starting base is so small that even increases of hundreds of thousands represent triple-digit growth rates. However, other reasons for such rapid growth include the emerging aggressive behavior by hospitals to improve cash flow, the push by HCFA and government agencies to adopt electronic methods of processing and payment, and the push by large banks to offer electronic payment services.

3. Electronic Information Services

Electronic information services (EIS) represent a third large electronic commerce market in the health care trading community. EIS cover a wide range of topics, including marketing statistics on pharmaceutical usage, bibliographic and full-text research data bases, news and updates on health care issues and specific diseases, information on drugs, etc. INPUT counts approximately 900 separate data bases that are available within the general categories of health care, biomedicine, medical devices and instrumentation, occupational safety and health, and pharmaceuticals. The data bases are published by a wide variety of publishers and often are made available electronically only through third-party resellers, such as Dialog, Mead Data Central, and BRS. A partial listing of leading health care EIS publishers and resellers is given in Exhibit III-6.

The market for these services is more mature than the purchasing and financial electronic commerce markets. Revenues are larger than for the other areas but growth rates are smaller. INPUT estimates that the health care trading community spent \$303 million on electronic information services in 1991 and expects these expenditures to grow to \$570 million by 1996 at a compound annual growth rate of 13% (see INPUT's Market Analysis Program Medical Industry Sector Report, 1990-1995). Exhibit III-7 shows this market.

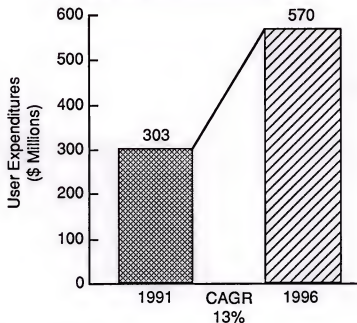


EXHIBIT III-6

**Health Care Electronic
Information Service Providers**

- DRI/McGraw-Hill
- BRS
- Data-Star
- DIALOG Information Services, Inc.
- IMS America, Ltd.
- Strategic Intelligence Systems, Inc.
- Mead Data Central
- National Library of Medicine
- NewsNet, Inc.
- ORBIT Search Service
- Executive Telecom System, Inc.
- National Planning Data Corporation

EXHIBIT III-7

**Electronic Information Services
Market for Health Care**



4. Community Network Services

Networking in the health care community—through messaging/groupware applications—shows great promise in the 1990s. INPUT expects LAN use in hospitals and clinics to increase dramatically from its relatively scant use today. Networking within the local and national communities, beyond the walls of the hospital and clinic, should become frequent in the next few years. Already, telecommunication vendors such as GTE and the regional telephone companies have announced pilot programs for such community networking.

The drivers for the use of community networking services are hospitals' desire to tie physicians to them closely, increasing outsourcing of various health care specialties, and the movement by health care professionals to offer in-home patient care.

These trends are calling for applications such as the transmission of large binary image files (such as digitized X-rays or CAT scans), remote access to medical files (by in-home patient care professionals), multi-party billing services (when multiple third-party care providers render specialty services), and beeper services, among others.

The in-home patient care market is \$6.5 billion, according to the Department of Commerce. INPUT estimates the network services market to be \$180 million in 1991 and expects it to rise to \$510 million by 1996 at a compound annual growth rate of 23%. The network services market is defined as user expenditures on network and professional services and software, but not hardware devices. Community network services are all network services except those specifically for supply procurement, as separately itemized above. INPUT includes this market in the overall electronic commerce market for the health care trading community and sees it as a significant network services market.



EXHIBIT III-8

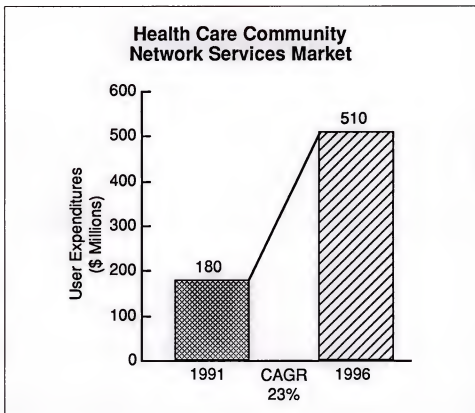
**B****Electronic Commerce
Services in the Health
Care Trading
Community**

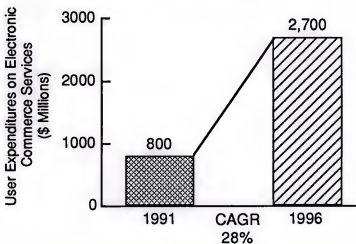
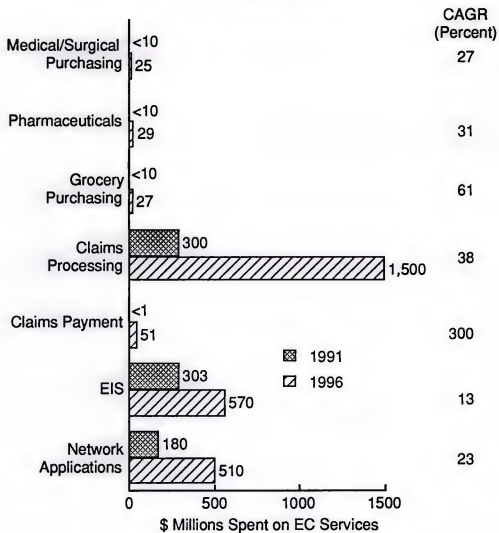
Exhibit III-9 shows the combined markets for the various electronic linkages within the health care industry. Overall, the market for electronic commerce systems and services in 1991 is \$587 million. INPUT expects this to rise to \$2.1 billion in 1996 for a compound annual growth rate of 29%. This is nine percentage points above the average growth rate for EDI making health care one of the most attractive markets for electronic commerce and EDI services.

Within the health care market, the most rapidly developing sub-markets are those for claims payment services and grocery purchasing services.



EXHIBIT III-9

Electronic Commerce Service Markets for Health Care





C

Standards Issues

EDI in the health care trading community has been implemented in different niches of the community at different times, such as procurement and medical claims processing. Now, representatives from the community are trying to align the hodgepodge of EDI formats to a single standard family—X12.

The NWDA's format that links drug makers and distributors was one of the first formats and came out in the 1970s. The HCFA formats, UB80 (for hospitals) and the HCFA 1500 (for physician services), were standardized in the early 1980s to facilitate the submission of Medicare claims. Proprietary ordering systems of large drug and medical distributors with hospitals introduced non-standard EDI and electronic order entry systems.

In the fall of 1989, representatives from primarily insurance companies and banks formed an ANSI X12 task group to develop standard formats for the claims submission and payment processes. This task group grew into a full-fledged, several hundred member subcommittee of X12. As of June 1991, it has released for trial use a data format (the 835) for claim payment/advice (to be sent by banks to provider organizations).

The rapid growth of the X12 health care subcommittee is helping to bring X12 standards to other areas of the health care trading community, particularly the previously developed linkages of materials management and HCFA submissions.

In the spring of 1991, the Health Care EDI Corporation was founded (instigated and operated by the Federation of American Health Systems, Little Rock, AR). This group's charter is similar to that of many other industry EDI trade groups such as the Automotive Industry Action Group (AIAG), the Voluntary Interindustry Communication Standard (VICS), the Chemical Industry Data Exchange (CIDX), etc. It is to facilitate the development and implementation of standard X12 EDI data formats among trading partners throughout the health care trading community.

Altogether, the trend is to standardize materials management and claims processing electronic commerce systems around a single data dictionary and standard family (X12). Already, the users of older proprietary systems and earlier standards have made efforts to give their trading partners the option of using the X12 format. For example, drug makers and distributors on ORDERNET can use the X12 format instead of the NWDA format; hospitals using Baxter's ASAP system can send X12 purchase orders instead of the ASAP format; HCFA is participating in the X12 committee and is charting a migration path from its UB80 and HCFA 1500 formats to X12 formats.



The movement to a single (X12) standard family of messages has two important and slightly counteractive effects:

- On the materials managements side (medical/surgical supplies and pharmaceutical ordering), standard formats will shift the financing of electronic ordering systems away from distributors and manufacturers and onto hospitals. The proprietary systems of distributors and manufacturers have matured, no longer provide a competitive advantage, and cost more to maintain than is gained by the remaining competitive advantage they generate. Hospitals are now venturing into purchasing and maintaining EDI translation software.
- On the claims processing side, standard formats will free hospitals and other provider organizations from the control that many of the claims processing service providers have over them. No longer will hospitals be captive to a single-vendor turnkey system. With the freedom to mix and match off-the-shelf software and services, prices of these components should fall.

The key EDI message/transaction sets for linking various parties in the health care trading community are shown in Exhibit III-10.

Below, we examine the current EDI standards in the health care industry.

Standard Family: National Wholesale Druggists Association (NWDA)

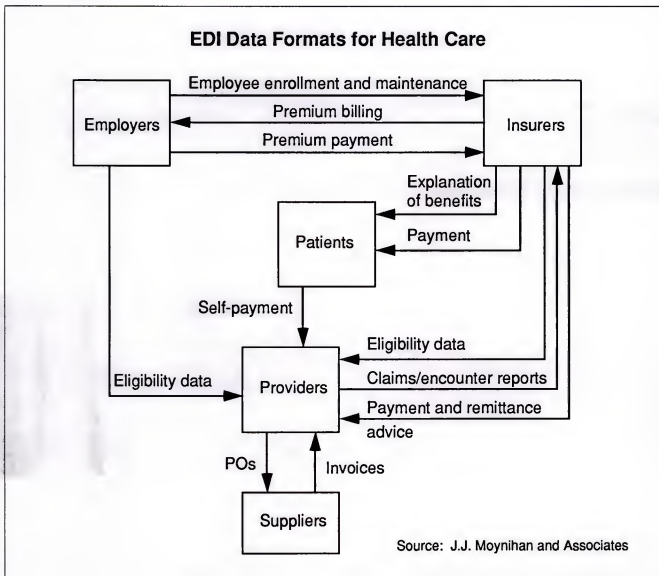
- *Business Functions:* Pharmaceutical purchasing by distributors from manufacturers. Also used by hospital buying groups to purchase from distributors.
- *Key Message Formats:* Purchase orders, invoices, charge backs
- *Background:* In 1972, the National Wholesale Druggists' Association (NWDA) developed this standard to allow EDI between drug manufacturers and distributors. It is used exclusively on Sterling Software's ORDERNET value-added network. Some trading partners are replacing the NWDA format with X12 formats. Sterling supports both in addition to UCS standards.

Standard Family: Uniform Communication Standard (UCS)

- *Business Functions:* Purchasing by distributors from food manufacturers.
- *Key Message Formats:* Purchase order, promotion announcement, invoice, item/price maintenance, ship advice, credit/debit memo, remittance advice



EXHIBIT III-10



- **Background:** The Uniform Communication Standard is the EDI communications (protocol) and data format standard for the grocery industry and was developed in the early 1980s by the Uniform Code Council (UCC). The UCC developed the ubiquitous Universal Product Code (UPC) bar code standard. UCS purchase orders are used in the majority of purchase transactions among the leading food manufacturers and wholesalers/retail chain operators in the U.S.

Standard Family: Health Care Financing Administration (HCFA)

- **Business Functions:** Claims submission
- **Key Message Formats:** UB82 (hospitals), HCFA 1500 (physicians' offices)



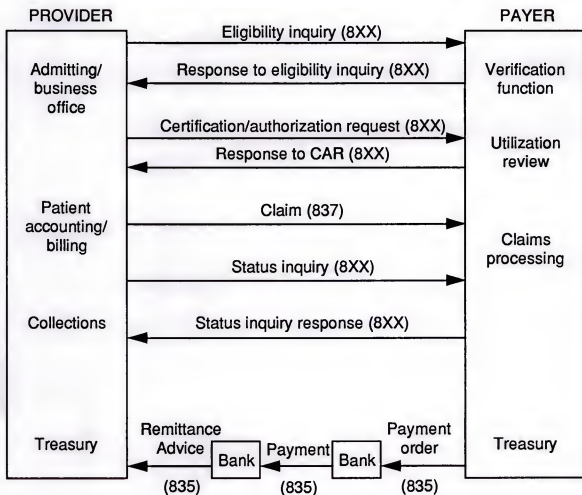
- *Background:* HCFA is the government body that disperses Medicare and Medicaid funds. Typically these funds are channeled through state-run insurance bodies (Blue Cross and Blue Shield). Third-party claims processing companies receive claims directly from health care providers and pass them on to HCFA for payment. HCFA will probably migrate the UB82 and 1500 electronic medical claims data formats to X12 formats.

Standard Family: American National Standards Institute (ANSI) Accredited Standards Committee (ASC) X12

- *Business Functions* (in health care): Supply purchasing, health care insurance enrollment, claims submission and payment, transportation communications, warehouse communications
- *Key Message Formats* (for health care): See Exhibits III-11 and III-12.
- *Background:* The ANSI X12 standards organization formed a subcommittee in 1991 to develop insurance standards. The subcommittee is largely composed of health care industry representatives and has released draft formats for insurance enrollment, claims submission and claims payment. A number of other health care formats are in development. ANSI X12 has assumed maintenance authority over what were formerly the standards bodies for the Transportation Data Coordinating Council (TDCC), which creates standards for rail, ship, air and trucking transportation; and the Warehouse Industry Network Standard (WINS), which serves the needs of the public warehousing industry.



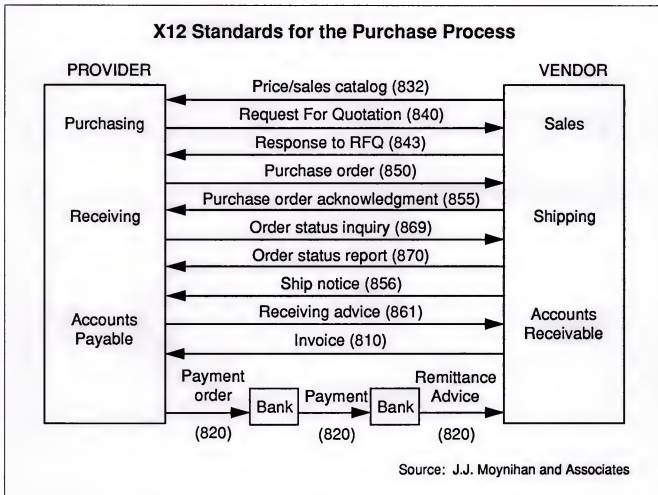
EXHIBIT III-11

X12 Standards for the Claims Process

Source: J.J. Moynihan and Associates



EXHIBIT III-12







IV

Conclusion





Conclusion

This chapter states the case for electronic commerce in health care and recommends specific action for health care providers and their electronic commerce vendors.

A

The Impact of Electronic Commerce on Health Care

Electronic commerce in the health care trading community enhances coordination of inventory materials, funds, information, and personnel. The overall impact is to bring the constituent parts of the trading community—the materiel providers, the funds providers, the specialty service clinics/labs, and the research community—together in tighter coordination and communication.

Through electronic ordering systems, inventory management is streamlined and its associated administrative costs reduced. Through electronic claims submission and payment mechanisms, cash flow is accelerated and the cost of collection is reduced. Electronic information services provide medical research information, drug usage statistics, other economic data useful to vendors in the community, and other kinds of data that helps the community improve the way it administers health care. Network services, such as in-home care provider access to hospital and commercial data bases, electronic mail, and large file transfers between specialty clinics/labs, allow for more flexible uses of health care and patient resources. The main benefits of electronic commerce in the health care community are summarized in Exhibit IV-1.

Based on the experiences of hospitals that are employing electronic commerce, Exhibit IV-2 shows some of the specific impacts of electronic commerce. The exhibit should not be interpreted as that electronic commerce has caused these results, but rather that it has enabled these results to occur.



EXHIBIT IV-1

The Main Benefits of Electronic Commerce in Health Care

- Staff reductions, higher productivity of administrative personnel
- Faster receipt of funds
- Less capital tied up in inventory
- Faster dissemination of medical knowledge
- Reduced transaction costs among health care players

EXHIBIT IV-2

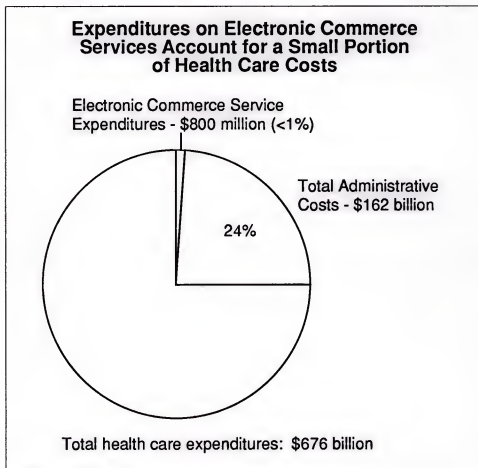
Without versus With Electronic Commerce

Business Domain	Without Electronic Commerce	With Electronic Commerce
Speed	80 days elapse between claim submission and claim payment	One day elapses
	Hospitals keep 40-60 days of stock	With just -in-time techniques, only 7 days
Asset Leverage	Large investment in supplies inventory	Inventories of medical/surgical products, pharmaceuticals, and grocery products reduced by 60%
Staffing	Large administrative staffs	Staff reduced by 20%
Relationships among community players	Many suppliers	Fewer suppliers; use of single-source vendor including claims processing
	Hospital provides many services	Many services outsourced. More in-home care



As estimated by Himmelstein et al, \$162 billion or 24% of all expenditures on health care are absorbed by administrative costs. The 1991 expenditures by the health care community (hospitals, pharmaceutical manufacturers and distributors, claims processing companies, etc.) on electronic commerce systems (including software, network services, and professional services) was \$800 million. The electronic commerce expenditure is one-half of one percent of the community's administrative costs. This is shown in Exhibit IV-3.

EXHIBIT IV-3



Therefore, an investment in electronic commerce systems is justified if it results in a greater than three-tenths of one percent reduction in administrative costs. INPUT maintains that electronic commerce certainly has the potential to reduce costs much more than such a petty amount. The reductions in salaries and inventory holding costs for just the administration of pharmaceuticals, medical/surgical supplies, and grocery products should probably reduce costs by more than five percent.

B

Recommendations

1. For Users of Electronic Commerce in Health Care

Recommendations for users of electronic commerce systems in health care are summarized in Exhibit IV-4.



EXHIBIT IV-4

User Recommendations

- Adopt electronic commerce for key materials management and claims processing functions. A wide variety of systems—from PC to mainframe-based—offers price/performance levels for every size of practitioner.
- Embrace the movement toward standardized EDI data formats. The shift by material suppliers and claims processors to X12 data formats will give users the opportunity to take a more active stance in their systems. This is beneficial in the long run, as users will be better able to integrate EDI into many different functions of their organizations.
- Participate in or at least stay informed of the EDI standardization work of the Health Care EDI Corporation, ANSI ASC X12, and other industry groups.
- Network with other health care providers in the region to share user experiences in building electronic commerce systems.
- When buying electronic commerce services and products, join with other players in the health care community as much as possible to collectively bargain with vendors of these services and products.

2. For Vendors of Electronic Commerce Services and Products

Recommendations for vendors of electronic commerce systems in health care are summarized in Exhibit IV-5.



EXHIBIT IV-5

Vendor Recommendations

- Provide trade community solutions where software, network services, and professional services are combined to build or anticipate the building of electronic commerce systems for materials management, claims/receivables, and other inter-community services.
- Concentrate on providing systems for the purchase of pharmaceuticals, medical/surgical products, and grocery products, and for claims submission.
- Develop offerings that support the ongoing uncoupling of health care services from single-source and in-home health care providers.
- Work with the Health Care EDI Corporation to develop community-wide solutions for health care.
- Follow and prepare for legislative reform of health care financing institutions.
- Prepare for increased competition from and consolidation of other vendors. Consider making alliances and acquisitions.







About INPUT

INPUT provides planning information, analysis, and recommendations for the information technology industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Subscription services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services. INPUT specializes in the software and services industry which includes software products, systems operations, processing services, network services, systems integration, professional services, turnkey systems, and customer services. Particular areas of expertise include CASE analysis, information systems planning, and outsourcing.

Many of INPUT's professional staff members have more than 20 years' experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed as a privately held corporation in 1974, INPUT has become a leading international research and consulting firm. Clients include more than 100 of the world's largest and most technically advanced companies.

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