

A GUIDE TO IMPLEMENTING EDI

1. Introduction

This guide is designed to help an organization implement one or more electronic data interchange transactions. Whether the organization is considering electronic data interchange for the first time, or is an experienced user of electronic commerce, this guide will provide advice and guidance in the process.

Successful electronic data interchange implementation begins with thorough planning. This guide presents steps an organization can follow to develop an implementation plan. Once the plan is developed, the organization will have a blueprint to follow in actually implementing electronic data interchange transactions. For those organizations facing pressure to implement electronic data interchange within a very short period of time, the guide also presents a section on fast-track implementation.

Within many of the chapters of this guide, the reader will be directed to worksheets. Many worksheets help an organization make decisions about the implementation process, software, and other facets of an electronic data interchange implementation. Some worksheets provide data to be included on subsequent worksheets. The final worksheet provides a summary of the implementation plan, including a financial analysis of the proposed implementation.

No single guide or series of worksheets can provide all the information that every reader may require within the reader's organization. Users of this guide should expand on the worksheets and suggestions provided as needed to meet their organization's planning requirements. The guide also provides additional references that can provide more detailed information or specific examples of topics covered in the guide.

Electronic data interchange provides a valuable tool for administrative simplification for the health care industry. This guide provides a framework for organizations to increase their ability to take advantage of this tool.

Definitions: Electronic Data Interchange and Trading Partners

Electronic Data Interchange (EDI) is the application-to-application exchange of business data in a standard electronic format between two parties.

Trading Partners are two organizations who agree to exchange business data using an EDI standard format.

These two definitions contain some important concepts. First, EDI is intended to exchange data from an application at one organization to an application at another organization, with limited human intervention. This implies that the data will not require a person to print or key the data once received.

The second concept contained in the definition is the use of a standard electronic format. This standard could be a local standard which both parties agree to use. However, most EDI users prefer to use a national standard that applies to a broad range of similar users. In health care, provider patient business offices have used local standards in the past, developed by a particular payer organization. Such standards only support a limited number of trading partners. Providers have also used a standard developed by Medicare. This standard is national in scope. However, it was designed to support the data exchange needs of one Federal program. Other payers have had difficulty adapting that standard to their needs.

At present, many payers, providers, and supporting organizations are moving toward the broader national standards developed by the American National Standards Institute Accredited Standards Committee X12 (Electronic Data Interchange), generally known as ASC X12, or simply X12. These standards, developed by a consensus process, support a broad range of organizations involved in the health care industry.

However, electronic data interchange does not require the X12 standard. EDI can use any electronic standard that meets the needs of the trading partners. The planning process in this guide applies to any EDI implementation, regardless of the standard to be implemented.

The third consideration within the definition is the exchange of "business information." The definition considers "business information" in its broadest sense: any information two organizations must exchange to continue their business relationship. This includes information beyond traditional financial information. For health care organizations, it may include information about a patient necessary to identify the patient or determine whether a payer organization can assume responsibility for payment for medical services. It may also include information about medical staff personnel who seek "credentialing" by a payer organization or a regulatory agency. It may also include limited clinical information about a patient, required by local or national regulation.

There is a broad range of national standards available to support the health care industry. In planning EDI implementations, readers are encouraged to consider all ways that the use of electronic data interchange can speed information exchange, increase efficiency, and reduce costs.

For more information about the background of electronic data interchange, users of this guide may refer to the list of resources provided on Attachment One, *General EDI Implementation Reference Materials*.

2. Implementation Planning

Even a single EDI transaction implementation can be a complex process. An EDI implementation plan provides a framework for managing the process. The implementation plan may also serve as part of an organization's business plan and as a tool in the organization budget process.

Attachment Two, *The EDI Planning Cycle*, provides a visual picture of the EDI planning process.

Planning Organization

Whether you are considering using one EDI transaction set, or whether you wish to migrate several functions to an electronic data interchange environment, planning is essential. EDI is more than a technological tool for transferring data. EDI is a business process tool that can help simplify and improve the administrative functions of an organization. Therefore, it is important that an organization address EDI from a broad business perspective, and not solely as an information systems issue.

Most organizations have found that the largest administrative savings generated by an EDI implementation have come from the changes they have made in their business functions. Because EDI allows application-to-application exchange of information, an EDI plan should address new procedures that can replace existing operations that are based on paper, phone, or fax information exchange. This generally requires a planning team representing the functional areas affected by the planned EDI implementation, along with representatives of the information systems area. Worksheet One, *Initial Organization of an EDI Project*, provides a suggested composition for the planning team.

Depending on the nature of the EDI project (a single functional implementation or a broader strategic implementation), some functional areas listed on the worksheet may not be represented on the planning team. However, it is important to include areas that may be indirectly affected by the implementation.

Example: *A Patient Access Services Department may implement an EDI transaction for electronic eligibility verification. That implementation may also provide coverage information for physical therapy services, which can be automatically stored in the patient database. The Physical Therapy Department can now change their manual*

and telephone verification procedures by adding the electronic verification information to their daily appointment listings. The application should add a warning showing those patients for whom there is no current coverage verification.

Project Leadership

Because EDI implementation should be viewed as a business process issue, many organizations have chosen a representative of an affected functional area to be the EDI implementation project manager. Information systems representatives are part of the project team and provide technical advice and support. The project leader, involved directly with a functional area, provides the leadership, enthusiasm, and commitment needed for successful process change within the functional area. This leadership is essential for an EDI implementation to provide the greatest benefit to the organization.

Training

EDI education is important for an organization that is planning an EDI implementation. While EDI does not use unusual technology, national EDI standards such as X12 and others use variable-length formats. Traditionally, many of the legacy electronic exchange formats in health care were based on older tape exchange programs, and were designed as fixed-length formats. National EDI standards also provide more flexibility in the data included, but have standard syntax rules so the data can be properly understood when output to the application format. General EDI education is necessary so that staff members can understand the capabilities of EDI and the terminology associated with national standards. More technical EDI education prepares staff members providing technical support with the tools to utilize translator software and map EDI transactions to application files. Most organizations provide EDI technical support within the Information Systems function. Some organizations also choose to have an EDI technical support staff member within other functional areas as well.

EDI education at both the general and technical level should be part of the implementation plan, and should occur early in the process. Chapter Three, *Staffing Considerations*, provides more information on training programs and training sources.

Selecting Transactions for Implementation

After the project team has become familiar with the general capabilities of EDI and EDI terminology, the team should evaluate possible EDI transactions for implementation. Most organizations providing health care or supporting the health care business environment could benefit immediately from as many as twenty EDI transactions. For EDI to be successful, the project team must prioritize the possible transactions, and select a transaction for the initial implementation. Organizations who have already implemented an EDI transaction might choose to implement more than one additional transaction at this stage. However, even experienced organizations should insure that multiple implementations do not require more support resources than the organization has available. In addition, organizations choosing to do multiple implementations should consider that the affected functional areas might not have previous EDI experience. Functional areas new to EDI may need additional outside support in reviewing and modifying business practices.

Chapter 4, *Evaluating Potential EDI Transactions*, contains more information on identifying possible EDI transactions that can benefit the organization. Once those transactions have been identified, the project team should choose a transaction for implementation. The following criteria should be considered in choosing the starting transaction:

- Ease of implementation
- Trading partner willingness
- Impact on the business process
- Visibility within the organization
- Potential for influencing other trading partners
- Ability to implement in a short period of time

Ease of implementation: The transaction should not be too complex, or require major changes to the application software that will send or receive the data. A transaction that can be mapped to or from an existing batch input or output file format accepted by the application is ideal.

Trading partner willingness: A transaction currently supported by a trading partner is a good candidate for initial selection. A trading partner also may have approached the organization about acceptance of a proposed transaction.

Impact on business process: The transaction selected should have a clear benefit to the work requirements of the functional areas affected. In addition, a financial analysis should show a cost saving within a time frame acceptable to the organization.

Visibility within the organization: Successful implementation should be visible outside of the immediate functional area affected. This will promote acceptance of future EDI transactions in other areas.

Potential for influencing other trading partners: Other trading partners, particularly competitors of the initial implementation trading partner, should see an advantage to the EDI implementation. This will encourage them to participate in expanded implementation of the selected transaction set.

Ability to implement in a short time: The initial implementation project should have a relatively short implementation period. This will allow management and other functional areas to see EDI as a viable and important business tool.

Obtaining Management Commitment

Senior management should view EDI planning and implementation as a valuable part of the business planning process. An EDI implementation plan should support the strategic and operational plans of the organization. The presence of an "EDI Champion" among senior management has contributed to the success of EDI implementations in many organizations. The "EDI Champion" should understand the benefits of EDI and the contribution EDI can make to administrative simplification and process improvement.

The project team leader must provide the "EDI Champion" with periodic project updates, including obstacles and problems to be resolved. It is important that the "EDI Champion" know the general project status and milestones reached, so that the "EDI Champion" can continue to be a supportive voice among senior management.

System and Technical Issues

The planning process must also address issues such as system capability, translator software selection, and communications issues. Research and evaluation of these issues should be assigned to project team members, who may also use the resources of areas such as information systems. These issues can be addressed once a list of potential transactions and potential volume has been prepared. Chapters Five, Six, and Seven provide more information on these issues.

Security, auditing, and legal issues must also be included in the EDI implementation plan. For many transactions in health care, these issues may be addressed routinely if one of the trading partners is an experienced EDI user. However, each organization should insure that such issues are included for review in an implementation plan. Chapters Eight and Nine provide further information.

Project Control

It is important for the project team to establish project controls and project evaluation tools early in the planning process. Establishing these controls provides a framework for project members to use in their component assignment. A project time line, even for the planning stage, should be established. In that time line, milestones should be selected. This helps all project team members, as well as management staff, understand the status of the project. Milestones should be meaningful for the organization, reflecting defined points where a visible product or outcome occurs. Attachment Two, *The EDI Planning Cycle*, suggests some appropriate milestones.

Clear goals should be established for each phase of the project. Those goals should be clearly stated in the project plan. At the end of each phase, the project should be evaluated to determine if goals were met. If necessary, plans for future phases should be adjusted.

The overall success of an EDI implementation must also be evaluated. This evaluation allows the project team to identify any particular areas of concern or areas of great success to future implementations. The evaluation also provides a tool to present the project success to others in the organization. Worksheet Two, *Evaluating an EDI Implementation*, provides an outline of some quantifiable areas for EDI implementation evaluation.

Transaction Testing Plan

The project team must establish a formal EDI transaction testing plan. The testing plan should be designed to evaluate all components of the EDI process: application interface, communications protocols, and translator mapping. The testing plan should be validated early in discussions with trading partners, to insure that test data can be exchanged.

One phase of the testing plan should be a test in parallel with existing paper processing. The project team should be aware that this may require duplicate or extra work within the functional areas involved, particularly if there is a major business process change involved. The testing plan should balance the extra workload with the need for a viable test process. If possible, the parallel test process should be planned to include the broadest possible range of application data within a reasonable time frame.

Benefits Analysis

At the end of the planning process, the project team will be able to complete a cost-benefit analysis of the proposed implementation. That analysis should consider the implementation costs as well as the process improvement savings projected for the implementation. The project team should also consider benefits that cannot be quantified, such as increased customer or trading partner satisfaction, increased employee satisfaction, and better market position. This analysis can be incorporated into an organization-wide strategic plan, or be used as part of the organization's budget process. It also provides a starting point for a project budget.

Worksheet Three, *EDI Implementation Summary Worksheet*, provides a format for a summary analysis report.

Fast-Track Implementation

Occasionally, an organization may be faced with a requirement to implement an EDI transaction within a very short period. In such a situation, the organization may not be able to develop a comprehensive EDI implementation plan. These situations often arise when an essential trading partner mandates immediate implementation of an EDI transaction, or when competitive pressures force the immediate use of a transaction.

Fast-track implementation should be avoided if possible. Often an organization forced to implement an EDI transaction without a full planning process incurs additional expenses. It may also be unable to make the necessary business process changes to obtain the benefits of the EDI processing. If requested to implement an EDI transaction on short notice, an organization should request that the trading partner grant additional time for full EDI planning. Most trading partners can provide some flexibility in an implementation schedule.

However, if fast-track implementation is necessary, the organization should attempt to complete as much of the planning process as possible. When fast-track implementation is required, the transaction for implementation is usually mandated by the trading partner. Often, the mandate also includes the connection method and protocols, and a limited testing plan.

To respond to fast-track implementation, the organization should form a project team. That team attempts to respond to the mandates of the trading partner. Worksheet Four, *Fast-Track EDI Implementation*, provides a check list for the steps needed for fast-track implementation.

3. System Evaluation

Electronic Data Interchange by itself does not generally affect application systems or hardware. Although EDI can increase the speed and accuracy of data exchange, it rarely causes an increase in overall volume of data that must be processed by the application system. However, there are some areas that a project team should consider in an EDI implementation.

Application System Impact

The use of EDI instead of paper may change the distribution or frequency of data output from or input to the application system. For example, a trading partner previously sending daily individual paper check payments might send a batch of payments once a week. In another example, patient eligibility information for future services might be posted as single on-line entries throughout the day as staff members contact payers for that information. With EDI eligibility inquiries and responses, that information may be received in batch mode once during the day.

This change in the information processing cycle does not often impact application systems. However, implementers should insure that internal application systems will support larger batch input if that should occur as a result of an EDI implementation.

Although an application system may support large batch processing, the timing of that processing could affect application system operation. Implementers should evaluate the impact of batch processing on access time for other users. The evaluation may result in scheduling application system batch processing for large batches during off-peak hours. In evaluating EDI costs, a project team should consider whether off-peak processing will require additional staff or changes in work shifts.

Implementers may need to modify application systems to accept batch input. Some application systems were designed to accept certain data entered at a terminal. These systems may not easily accept the batch file input which is the normal output of an EDI translator. If an application system requires significant modification, that cost must be considered as part of the EDI cost/benefit analysis.

Impact of Transaction Size and Volume on Translators

The size of EDI transactions and the expected volume of those transactions have a significant impact on two EDI system components. Translators and communications throughput are sensitive to the amount of data to be processed.

There are a variety of translators available, spanning a broad range of hardware platforms and operating systems. In selecting a translator, it is important to insure that the translator will support the anticipated volume of transactions and data. Implementers should choose a translator that will process the amount of data expected within a reasonable time. Most translator vendors will ask for an estimate of the size and volume of transactions before recommending specific software. However, implementers should also verify translator capacity, especially when planning to use a limited-purpose translator which may be part of an existing application software package. Capacity verification is also important when using an outside service vendor, such as a clearinghouse or value-added network.

In addition to considering the ability of a translator to process transactions rapidly, implementers must also consider whether the translator has the ability to hold transactions received for processing at a later time, or whether the

translator processes all transactions when received. If the translator can hold transactions for later processing, implementers must be prepared to provide sufficient storage for the expected volume of transactions between translation runs.

Chapter Six provides more information on translator selection.

Impact of Transaction Size and Volume on Communications Throughput

Telecommunications hardware and networks are particularly sensitive to the amount of data exchanged between trading partners. Typically, many health care organizations have exchanged EDI transactions using modems and dial-up telephone network lines. This exchange mechanism is particularly sensitive to data volume, and performance is dependent on modem speed and telecommunications line speed. Dial-up phone lines are also susceptible to data corruption, particularly in an extended communications session.

After an implementer has determined expected throughput volumes, the implementer should use the slowest link in the communications system to determine if the time involved is acceptable. Typically, the primary links for consideration are:

- Modem speed of the organization
- Modem speed of the trading partner
- Computer port speed, particularly if using a personal computer
- Transmission line speed

If an implementer determines that the proposed communications methodology will not provide an acceptable throughput time, the implementer should consider alternatives. High speed telecommunications lines, high speed modems, and other hardware is available, generally at a premium price. Implementers should consider this expense in the planning process. In some cases, trading partners may be willing to share costs resulting in mutual benefits.

Worksheet Seven, *EDI Transaction Size Estimation Worksheet*, provides information and a format for estimating transaction volumes.

Data Storage Needs

The amount of data processed through EDI transactions may affect the data storage capacity of the host system. Most organization may wish to retain the source EDI transaction for a period of time. This time period is usually determined by internal information systems policies. Implementers may also wish to retain interface batch files produced by the translator for incoming transactions, or used by the translator for outgoing transactions.

Worksheet Seven, *EDI Transaction Size Estimation Worksheet*, includes a section on calculating the storage requirements for EDI transactions. The implementer should use a similar approach to determine storage requirements for the application batch file.

Estimating Transaction Size

Worksheet Seven, *EDI Transaction Size Estimation Worksheet*, provides a suggested method of estimating transaction size.

EDI transaction use interchange "enveloping" segments. They are used to carry control information, and are relatively standard in size for almost all transactions. The size of these segments must be added to the size of the transaction itself. The worksheet provides values for these segments and for Header and Trailer segments. The size of Header and Trailer segments are relatively uniform for a given type of transaction. Chapter Eight provides more information about control segments.

The size of most EDI transactions is most dependent on the number of "data units" that are transmitted. Examples of a data unit include an individual patient payment, and individual line item on a purchase order, or an item in a price catalog. For these "data units", the types of data are usually fairly uniform (in a payment there is usually the patient identification number, name, charges, amount paid, rejection reasons, service date paid, and other data). The average size of the data unit and the number of data units can be used with the enveloping and control segment size to estimate the average size of transactions. The worksheet provides instructions for this, as well as some typical "data unit" sizes for some transactions, based on the recommended data in the X12 Insurance national implementation guides for those transactions.

Implementers should use an analysis of typical paper documents to estimate the number of "data units" they expect to receive in each EDI transaction.

4. Translator Selection

A translator is a set of software that converts application data into a EDI standard format, or converts an EDI transaction from a standard format into data acceptable to an application. This conversion process is based on data mapping, which identifies the relationship between the application data and the EDI standard.

Background

There are two major classifications of translators:

Single-purpose (or limited purpose) translators: These translators support one EDI transaction. Single-purpose translators are often part of an application program package or part of special purpose software. This type of translator includes software provided as part of packages such as patient accounting system or materials management systems. It also includes direct translation programs that might be written by an application user.

General purpose translators: These translators support a broad range of EDI transactions, usually supporting all EDI transactions in one or more versions of a standard. These translators usually support multiple standards versions. Most support multiple standards, including proprietary standards. They are usually sold as a separate product which interface with application software.

Translators are offered for a wide variety of platforms and operating systems. Vendors offer translators that operate on personal computers, mid-range computers, and main frame computers. Software is offered that operates in a variety of DEC and IBM operating systems, UNIX systems, and in DOS, Windows 3.x, Windows NT, and Windows95 systems. Most translator vendors offer products that span this range of platforms and systems.

Translator costs vary greatly, depending on features and capabilities. Costs can vary from under \$2,000 to over \$100,000. Implementers should contact several vendors for comparative offerings. Implementers can obtain vendor lists from a variety of sources:

- Consultants
- Trade Associations
- Trade Shows
- Publications

The magazine *EDI World* (2021 Coolidge Street, Hollywood, FL 33020, 954-925-5900) carries advertising for translator software. This magazine also publishes an annual listing of translator software products.

Choosing a Translator

Attachment Four, *Translator Considerations*, provides a check list in evaluating translators. Implementers should consider whether they will pursue limited-purpose translators or general purpose translators. Limited-purpose translators are often less expensive initially, and require only limited installation time. However, if an organization plans to implement several transactions over a period of time, individual limited-purpose translators can become expensive. Limited-purpose translators also usually require vendor action for version upgrades.

The worksheet section for overall considerations addresses organization-specific issues. Application platforms, networking capability, and number of functional areas supported are important factors to consider in translator evaluation.

It is also important to consider the ability of translators to hold transactions or batches for later processing. If a translator must process each transaction as received, the organization loses the flexibility to establish priorities. For example, processing a large purchase order or payment remittance advice may delay important eligibility inquiry transactions.

Many translator packages come with integrated communications packages. This may be an advantage for an implementer if that implementer does not already have a robust communications package in place.

The volume and type of transactions to be processed is another key consideration. Implementers should have determined present and future volume expectations prior to contacting vendors (see Chapter Four).

Functional acknowledgments are discussed in Chapter Eight, *Security and Auditing Issues*.

Newer versions of standards often support expanded business needs. Some organizations may use different versions of the same transaction. Implementers should determine whether the vendor will provide automatic version updates. Implementers should also understand whether the translator mapping package allows copying and editing of existing maps to create maps in newer versions of the standards.

Standards such as X12 standards, along with some proprietary standards such as the Medicare NSF standard, contain code lists. Some code lists are maintained within the standard, and some are maintained by external organizations. Implementers should determine how code lists in the translator are maintained, and what control the user has over code list validation. Translators that validate code lists may return error messages to the sender if an invalid code occurs. While some codes are essential to properly identify and map data, others are informational in nature. Implementers may prefer to have the applications software validate informational codes, allowing the application to process a transaction and produce its own error list. Implementers should seek a reasonable level of code validation, balanced with operational needs.

Determining Translator Costs

There is no uniform system of pricing translator packages. A "package price" for one vendor may include features not included by another vendor. Implementers must compare the final cost for the features needed in comparing prices.

Worksheet Eight, *Translator Selection and Related Costs*, provides a format for evaluating and comparing translator costs between vendors. This worksheet also provides input into the final cost / benefit analysis for the EDI project.

5. EDI Connections

Implementers have two choices for transmission of EDI transactions between trading partners. The first choice is a direct connection between the two trading partners. The second choice is the use of a Value Added Network or clearinghouse to receive a transaction and forward it to the recipient trading partner. Both of these choices offer advantages, depending on the particular circumstances of the organization. An implementer may use a combination of these choices, based on transaction volumes.

Direct Connection

In a direct connection, one trading partner establishes a connection directly with the other trading partner. This can occur using a dial-up connection over standard voice telephone lines, or using a dedicated connection over lines designed for high-speed data transmission. Usually, one of the trading partners becomes the "host", providing a "mail box" which stores incoming and outgoing transactions for access by the other trading partner.

Direct connections are generally offer lower transmission costs than the use of a third-party processor such as a Value Added Network. However, direct connections require that a connection be established for each transmission, unless the two trading partners are linked in a dedicated network. Even in a linked network, the organization must initiate some action to inform the network that a transmission will occur.

Establishing a communications link for each transmission may not be cost-effective when the transactions are extremely small. For example, a provider performing a benefits inquiry to a payer for a single patient once every quarter may require more effort to establish the connection than the value of the transaction. In addition, a payer may not be able to provide sufficient connection nodes or incoming phone lines to support several hundred individual provider inquiries in a day.

For these reasons, a direct connection is often limited to trading partner relationships which have a volume of transactions that both trading partners agree is reasonable and cost-effective.

Value Added Networks / Clearinghouse

A Clearinghouse or a Value Added Network (VAN) provides the ability to send data to one source, and have that data forwarded to the appropriate recipient. VANs generally provide extra services, such as reformatting data to meet the specifications of the recipient trading partner, performing some edits, or forwarding paper or fax documents to recipients who are not EDI-capable. VANs may also provide archival of transactions, transaction audit trails, and other control features to assist organizations in control and audit functions. Clearinghouses generally regroup data received and retransmit that data to the recipient. For evaluation purposes, a VAN and a clearinghouse are considered to perform the same functions, with added services offered by some vendors. The term VAN will be used here to refer to both types of service providers.

VANs may also provide translator services for an organization. Some VANs will accept an application output file and convert that file to the appropriate format for the recipient. These VANs will also return data in a format compatible with the organization's application. While this provides a great deal of convenience, it also generally results in higher overall EDI costs. In the health care industry, these services have usually been offered to providers in support of billing and patient payment functions. If an organization wishes to pursue additional EDI transactions, such as purchase orders and vendor payments, the organization will probably need to seek other assistance, possibly increasing costs over internal translation operations.

However, using a VAN to forward EDI transactions to various trading partners may be a preferred route. Many health care industry organizations must deal with several different trading partners, with a limited number of transactions for a given trading partner during a processing cycle. These transactions include purchase orders, claims, claim payments, eligibility inquiries and responses. In such cases, VANs can accept an EDI transaction with items for several trading partners, re-group those transactions with items received from other organizations, and

forward a consolidated transaction to the trading partners. This can be a more economical approach than transmitting several small transactions each day to multiple trading partners.

Health care organizations may determine that direct transmission to some high-volume trading partners may be coupled with use of a VAN for low-volume trading partners.

Attachment Five, *Evaluating VAN Features*, provides a listing of items to be considered in evaluating and comparing VAN services.

Evaluating Transaction Transmission Costs

Worksheet Nine, *EDI Transmission Cost Worksheet*, provides a framework for estimating the costs of direct transmission and VAN transmission. Implementers may need to consider both VAN and direct transmission costs for those transactions that will utilize both methodologies.

The information from this worksheet (or worksheets) will be used as part of the overall implementation cost / benefit analysis.

6. Security and Auditing Issues

Within the health care industry, security of patient information is an overriding concern. However, EDI security standards currently exist which provide strong safeguards. The banking industry uses EDI to transfer large amounts of financial information, including funds transfers and credit card information. Those transactions have been transferred securely for a number of years. Establishing reasonable security measures will provide the same level of protection to information transferred in the health care industry.

Auditing concerns are an important part of any business. Good EDI practices provide strong audit controls, and can actually improve data security.

Security Issues

Security of electronic data addresses the risks of unauthorized disclosure, lack of data integrity (intentional or inadvertent alteration of data), and unavailability of data. Security of electronic documents must be addressed both for internal and external risk.

Internal safeguards must consider the level of information protection. This includes definition of individuals or classes of individuals authorized to access information, and the types of information those individuals can access. Internal safeguards for EDI transactions should be subject to the same levels of protection as other data retained in the organization's system.

External risks fall into two categories. The first is risk of receiving fraudulent, unauthorized or altered transmissions. A direct connection between trading partners, with appropriate password protection, significantly reduces the risk of fraudulent or altered transmissions. Other verification may be needed for transactions over a network or through a third-party. The EDI enveloping and control structures also provide the ability to use passwords or to encrypt EDI transactions. Encryption is not common practice in most health care EDI today. However, encryption techniques are readily available and standards development organizations continue to update methods of incorporating encryption into transactions, either to encrypt a part of the transaction (e.g., sensitive patient information) or the whole transaction.

The second risk is that of unauthorized access to the data system. This is an issue not specific to EDI. However, if the transmission or reception of EDI is the first project to employ outside communications links to the organization's information system, those security issues must be addressed. Information about data system security is available

from the resources listed on Attachment Six, *Resource List for Security, Control, and Auditing Issues*. In particular, the Irongate, Inc. web site provides detailed information, including an information security survey that an organization can download for internal use.

In the health care industry, the security of EDI transactions has not been attacked on a large scale. As mentioned earlier, direct connections between trading partners, with password security have provided a reasonable level of security to date. Most VANs and clearinghouses provide some measure of security against unauthorized access and tampering. In most cases, VANs only accept or send transactions to trading partners with whom there is a contract. The connections with these trading partners are usually a direct connection, with password protection. VANs do not accept "blind" or "one-time" transactions.

Information about security structures and guidelines are available from the sources included in Attachment Six, *Resource List for Security, Control, and Auditing Issues*.

Confidentiality

The privacy and confidentiality of data is another consideration. This is generally addressed as part of security concerns. However, implementers should be certain that these issues are addressed. Careful review of data access authorizations is required. Both access to data and further disclosure of data must be addressed. Federal regulations are very specific with regard to mental health and substance abuse information. Many states have legislation or regulation on the confidentiality of health care data. In some states, various state agencies have differing, and not always compatible, regulations on health data. Public Health departments, planning agencies and insurance regulators may have differing regulations. Disclosure concerns can be compounded when agencies and regulators request additional data that becomes more cost-effective to provide under EDI. Professional codes of ethics, payer / provider contracts, and the organization's internal policies and procedures must be incorporated into the policy on electronic data confidentiality.

During an EDI implementation, a project team should consider the confidentiality of patient information. People who do not ordinarily have access to patient data may gain access during the EDI implementation as part of their implementation responsibilities. An organization may be using an outside consultant to assist. A translator vendor may have access to patient data while assisting in data mapping. Internal information systems operations personnel may also have access to patient data if they are attempting to resolve data problems.

These exposures to patient information are necessary in the course of an implementation. However, all personnel, both internal and external, should understand the confidential nature of patient information. Internal staff should receive the same education and sign the same disclosure acknowledgments as staff members who have regular access to patient information. Outside vendors and consultants should be informed about the organization's policies on information protection. Outside vendors and consultants should sign non-disclosure agreements as part of the contract for services. These agreements should specifically protect patient information.

Implementers should consider the following confidentiality checklist:

- What are the data elements that are sensitive?
- What is the risk of inappropriate disclosure?
- Is access to those elements appropriately controlled and restricted?
- Are there written policies in place that all staff and outside vendors understand?
- Is there a system of monitoring those who have access to confidential data?
- Does that data need to be encrypted?

Organizations must also insure the confidentiality of business information. Business records such as rate files and contract terms held in electronic format should receive the same protection as patient information. Employees, contractors, and consultants should be required to acknowledge the confidentiality of proprietary business information. Organizations using third-party processors should insure that any contract rate information contained in EDI transactions is protected. Special attention should be paid to confidentiality provisions in transaction processing

agreements with processors who may also be direct trading partners. For example, if an insurer is also acting as a bill and payment clearinghouse, a provider must seek contractual assurances that no data to or from another payer is collected or available to other areas within the processing insurer.

Confidentiality resources are included in Attachment Six, *Resource List for Security, Control, and Auditing Issues*.

X12 Control Segments

X12 standards provide for an enveloping structure for EDI transactions. The segments ISA Interchange Control Header, and IEA, Interchange Trailer provide an envelope for transmission and identification of transaction. These segments help identify an overall transmission session, and provide capability to provide security information about the enclosed transactions.

Within the ISA - IEA envelope, X12 standards provide for identification of general types of transactions, or groups. Groups identify similar transactions, such as claims, payments, or inquiries. One transmission can contain multiple groups, which can contain multiple transactions. Groups are identified by segments GS, Functional Group Header, and GE, Functional Group Trailer. In current practice, most health care providers transmit one functional group on each envelope. However, as use and types of EDI transactions expand, multiple groups could occur in one transmission. This can provide more efficiency in EDI transactions.

Example: A provider works with a VAN to send and receive claims, payments, benefit inquiries, and benefit information. Each day, the provider generates two claim transactions: one for hospital billing, and one for physician billing. In addition, the provider generates a batch of benefit inquiries for future appointments. Using a general purpose translator, all three transactions can be sent within one transmission. The structure can be represented as:

*ISA Interchange Control Header
GS Functional Group Header, specifying claim transactions
837 transaction with professional claims
837 transaction with hospital claims
GE Functional Group Trailer, ending claim transactions
GS Functional Group Header, specifying eligibility inquiries
270 transaction for eligibility inquiry
GE Functional Group Trailer, ending inquiry transactions
IEA Interchange Trailer*

In the example, a provider can make one connection and one transmission, reducing the need for multiple connections or extra transmission time.

In addition to the ability to provide security information, the ISA segment can also be used to request acknowledgment of the EDI interchange. This capability can add to the security of transactions, and provide additional audit control.

For more information about the use of control segments, implementers should review X12 standard X12.5 *Interchange Control Structures*, available from DISA.

Functional Acknowledgments

As a further control and security measure under X12 EDI standards, trading partners can return a Functional Acknowledgment Transaction Set (997). This transaction acknowledges receipt of a transaction set, and informs the sender that the receiver could process the transaction set within the translator. The acknowledgment does not guarantee that the data within the transaction set was valid.

Functional acknowledgments add a degree of security. The receipt of an acknowledgment can indicate that the correct party received the original transmission, using the security data elements in the ISA segment. Should an organization receive a 997 when no original transmission was sent, the organization can notify the 997 sender that the transmission originally received did not originate from that sender.

Functional acknowledgment also add to audit controls for EDI. They provide another assurance in the transaction audit trail of the existence and readability of the transaction.

Most general purpose translators allow a 997 transaction to be generated automatically. Implementers using single purpose or limited purpose translators should request the vendor to provide the capability of generating a 997. Trading partners should insure that agreements provide for the return of a 997 transaction, since the acknowledgment contributes to EDI control.

Auditing

The ability to perform audits is as essential to EDI as to any printed transaction. The ability to audit EDI operations begins with a carefully planned and documented operating process. Organizations beginning an EDI implementation should recognize that audit experience for EDI is also limited. It also presents an environment with a notable absence of paper. For this reason, a project team should involve internal and external auditors during the planning process. Auditors should review the implementation plan, and assist in preparing an EDI audit plan before implementation.

Other industries, including the financial industry, have used EDI for some time, and have auditing models and techniques that are fairly well developed. Organizations in the health care industry can adopt these models with only minor changes. Examples of audit guides and additional information are available from the sources listed in Attachment Six, *Resource List for Security, Control, and Auditing Issues*.

Implementers should consider the following checklist when developing the audit plan:

- Does the audit plan complement the overall organization audit plan?
- Does it address transmission controls?
- Does it address translation software controls?
- Does it address information security controls?
- Does it address maintenance of trading partner information?
- Does it address data and transaction archiving?
- Does it include a disaster recovery plan?
- Has it been reviewed by the internal auditors?
- Has it been reviewed by the external auditors?

7. Trading Partner Agreements and Legal Issues

Whether preparing an EDI implementation plan for the first time, or implementing an established transaction with a new trading partner, certain legal issues should be considered. Trading partner agreements and validating electronic commerce documents are two of the major issues. Health care organizations should discuss any EDI concerns with the organization's legal counsel. However, while counsel may provide excellent service in most matters, organizations may find that their attorney is not well-versed in the laws of electronic commerce. This is a rapidly changing field of law, driven by the expansion of electronic commerce and changing technology.

Trading Partner Agreements

Trading partner agreements are the contracts between the transmitters and receivers of EDI transactions. These agreements create a framework for the general responsibilities of both partners. Frequently, they spell out communications mechanisms and protocols. Trading partner agreements can be very simple or very complex. In health care, many partners exchanging electronic data do not have explicit trading partner agreements. In some

cases, material covered in traditional EDI trading partner agreements is contained in provider agreements (such as those required by Medicare) or service contracts (such as those used by VANs and clearinghouses).

In any EDI implementation, the project team should try to obtain copies of trading partner agreements early in the process, or create those agreements. If a document other than a specific trading partner agreement is used, implementers should insure that the topics covered in a traditional trading partner agreement are adequately addressed in the proposed document.

A model trading partner agreement is available from the Healthcare EDI Coalition (HEDIC) at <http://www.hedic.org>. A lengthier model trading partner agreement (not specific to health care) has been developed by the American Bar Association, available at <http://www.abanet.org>.

Other Legal Issues

Electronic commerce and electronic data interchange are accepted business practice in many industries. Legal concerns are important, but health care EDI implementers need no longer be overly concerned that they are breaking into totally uncharted legal territory (with the exception of patient record information). Several guides to the law of electronic commerce are available. All guides include a disclaimer that states readers should check with their own legal counsel for legal advice.

While EDI is well-enough established that it is specifically covered in federal law and in case law, there are still potential legal issues. Several states have statutes or case law defining what constitutes legally admissible documents. Some of these laws were written before 1900. In a few cases, old laws may still stipulate that pen and ink signatures are required. In most jurisdictions, electronic commerce implementers have not been hampered by such antiquated legal language, but it is best to obtain legal advice for your specific area. Conversely, some jurisdictions have recent legislation that stipulates very specifically what is necessary for a valid electronic document. For example, Utah has specific legislation on electronic signatures.

At present, most active EDI implementation centers around business information. Significant legal issues may arise when electronic medical records are exchanged between trading partners. Laws and regulations regarding electronic patient records are still in a developmental stage in most jurisdictions. At present there is no consensus on privacy, confidentiality, disclosure and secondary disclosure of information. Implementers who may be considering electronic transmission of patient records outside of their own organization should consult with the organization's attorney. It will be important to understand any applicable laws in any jurisdiction where the records will be sent, received, or processed. Federal regulations, which may be developed as a result of Public Law 104-191, the Health Insurance Portability and Accountability Act of 1996, should also be considered.

Implementers may also wish to consult the following resources:

Documents

Electronic Commerce: On-line Contract Issues

Greguras, Golobic, Mesa and Duncan, Available on the Fenwick & West web site, shown below
Electronic Contracting, Publishing, and EDI Law Baum and Peiritt. Wiley Law Publishers

Web Sites

Fenwick & West: <http://www.fenwick.com>

American Bar Association: <http://www.abanet.org>

The THOMAS federal legislative reference: <http://thomas.loc.gov>

10. Work Process Re-design

EDI by itself does not improve efficiency or produce savings. The real benefit from EDI comes through the business process changes that are part of the implementation plan. An organization which is not willing to make changes in the business process will not achieve full benefit from EDI implementation.

Changing the Business Process

Since EDI allows direct data exchange to and from application programs, management needs to modify many of the manual procedures in a functional area. Worksheet Six, *Manual Process Evaluation*, provides a framework for identifying the processes involved. Chapter 4, *Evaluating Potential EDI Transactions*, provides more information about this worksheet.

Once functional areas have determined what procedures need to be changed, the area should evaluate and modify the business processes involved. This should involve the organization's accepted change mechanisms and procedures. Areas should consider that some tasks will be modified or eliminated, allowing a reduction in staff hours or re-direction of those hours to other tasks.

Organizations may need to change the entire workflow of a department, including the time tasks are performed or the order tasks are performed. This may also include re-structuring the functional area.

Example: *A provider organization had been processing bills each morning, receiving paper copies of bills and edit worklists for correction. The work process centered around processing and mailing those bills early in the day, followed by phone calls on overdue payments in the afternoon. Priorities were set, since staff could not always process all bills in one day, or make all phone calls. After an EDI application to send bills electronically, the procedures changed. Bills were processed automatically by the system, with edit lists of bills that could not be processed available in the early afternoon. Edits were processed by two staff members.*

The area was re-structured to devote more time to unpaid bills and bills requiring manual effort or re-submission. Phone calls began in the early morning. The two staff members who processed edits performed those functions in the afternoon. The area planned to gradually reduce staff hours as the amount of unpaid bills were reduced by the extra staff time allocated to that effort.

Business process re-design made need to be implemented in stages. Functional areas should plan for testing the re-designed process during implementation testing (refer to Chapter Two, *Implementation Planning*). That testing may require that work be done in parallel: the existing manual process, and the revised EDI process.

Worksheet Ten, *Business Process Redesign Worksheet*, can help areas estimate how hours can be reduced or reallocated for each procedure affected by the EDI implementation. The worksheet also asks areas to consider changes that may be needed in application systems to support the revised process. It also suggests identifying procedures or guidelines that must be modified, and internal control procedures that will require change.

In changing the business process, implementers also have an opportunity to strengthen control processes. An EDI implementation should continue to maintain at a minimum the equivalent level of controls that existed in the manual process. When paper documents that were previously part of a control process are replaced, functional areas should determine how to establish appropriate alternatives. The re-design process provides a vehicle for a full assessment of an improved control function. When incorporated into a planned process improvement plan, new controls can improve internal control within a more efficient process.

Example 1: *Prior to implementing EDI for eligibility transactions, a provider controlled the need for pre-admission eligibility information with a manual log of inquiries made, and in a review of expected admissions. The review was conducted on the evening shift for admissions planned for the next day. If no verification was on file the reviewer checked the manual log to determine if the call had been made. The absence of log entries assisted in internal quality control. However, verification for missing eligibility information was required when the patient arrived for admission. After implementing EDI verification, the provider had the ability to match an electronic file of requests sent with the responses received. Responses not received the day after the requests were listed on a report to be resolved that day. The improvement in the process allowed provider staff to clarify eligibility prior to the arrival of the patient.*

Example 2: *Prior to implementing EDI for claims and payments, a provider identified unpaid claims from a paper report produced 30 days after the claim was sent. After implementing EDI, the provider generated a table of transmitted claims. Entries on that table were matched with Functional Acknowledgments, claim acknowledgments and payments. Claim status inquiries were generated the next day if a functional acknowledgment was not received;*

inquires were generated on the second business day after transmission if the claim was not acknowledged; inquiries were generated on the fifteenth business day if a payment was not received.

Estimating Savings from Process Redesign

Much of the cost savings that come from an EDI implementation are found in paper process savings and business process changes. Those savings should be included in an analysis of the cost of an EDI implementation. Once the procedures to be changed have been identified, the cost savings can be estimated using Worksheet Eleven, *Paper Document Cost Worksheet*.

In completing this worksheet, implementers should consider hours re-allocated to other tasks. If those tasks would not otherwise be addressed, or would not be done in a timely or efficient manner, the hours allocated to those tasks should be considered in the hours entered on the Paper Document Cost Worksheet.

That worksheet also asks for other costs saved by reducing paper processing. It also asks for an estimate of savings from reducing data entry errors. Implementers should consider costs incurred as a result of errors at trading partner locations, as well as at the implementer's organization.

Example 1: *An payer organization incurred extra processing costs resolving incorrect authorization numbers reported on claims from a provider. The payer determined this was caused by transposition errors when the provider entered the numbers in the provider's data base. Implementing eligibility inquiry and response transactions eliminated this key entry problem. The time spent at the payer organization researching incorrect numbers was 8 person hours per week. The time could reduce call waiting for other provider-relations calls. The cost of these errors should be added to the "cost of key entry errors" on the worksheet.*

Example 2: *A provider incurred extra costs because a patient control number was not returned for some payments on a remittance advice. Research indicated that this was related to the optical scanner used at the payer's site. When the print ribbon on the provider's printer degraded, the scanner could not read the patient control number on the paper claim submitted by the provider. This field, which identifies the claim to the provider, was not a mandatory field in the payer's system. This allowed the claim to process without that data. Once the provider and payer implemented the EDI claim transaction, this problem was eliminated. The provider spent an average of 36 hours a month researching missing patient control numbers. The time spent on this research could assist in posting other payments more promptly. The cost of these errors should be added to the "cost of key entry errors" on the worksheet.*

Once the cost savings from an EDI implementation have been determined, this amount can be included in the EDI implementation cost / benefit analysis.