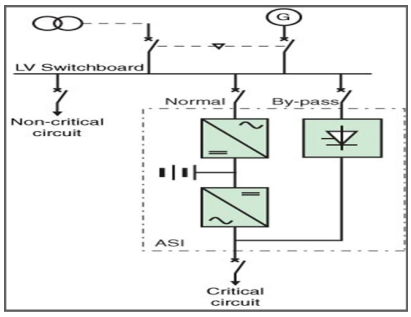

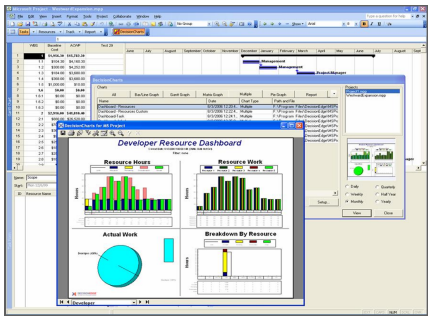

Title	Smart Cards In Healthcare Systems
Project Reference	None
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Document	Report / White Paper
Class & Distribution	Public
Version , Date	2014

EXECUTIVE SUMMARY

Introduction

The healthcare services market in general is quite complex, expensive in terms of rising costs and fragmented. A combination of managed healthcare, the extensive specialization of medicine and constant changes in medical insurance coverage forces most people to receive their medical care from a multitude of different providers. From an insurance company-patient context, this diversity affects both the quality of healthcare and restricts the ready availability of vital medical records. A patient's medical records are frequently scattered among multiple providers and places of service and there is often no easy, secure and fast way to retrieve those records. This decentralized storage of medical records leads to higher costs. Laboratory tests, examinations and prescriptions may be duplicated simply because one clinician lacks access to the information others may have already obtained. Prescription of drugs and procedures would be more accurate if doctors had access to a more complete patient record. Efficient management patient medical and insurance records the accompanying for all stakeholders.

Computer-based patient records are essential to the delivery of safe and effective healthcare. The absence of immediate and comprehensive patient medical records is a major challenge to healthcare delivery systems. This restricts improvements in quality, productivity, managing costs and protecting data. There is a clear need to provide practical and trusted solutions that can have an immediate impact on the communication and exchange of patient health information. ***Smart Cards*** have the potential to be the appropriate technology solution for insurance companies.

A ***Smart Card*** for medical insurance purposes makes secure and portable exchange of health information possible. It also allows insurance company clients to retain their personal health records at all times in a convenient and compact format. In addition to identification, demographic and insurance information, a ***Smart Card*** can also store medical information, including a list of health problems, allergies, immunizations, active medications, selected laboratory results and recent healthcare procedures. Insurance providers can read and update a ***Smart Card*** with new information at the point of care. A ***Smart Card*** can therefore reduce inefficiencies and the possibility of medical errors, fraud as well as empower insurance company clients by making them more active partners in the management and maintenance of their healthcare plans in general.

The Case for Health Insurance Smart Cards

The use of ***Smart Cards*** reduces healthcare paperwork and protects patient records. Data on a ***Smart Card*** is encrypted and use a digital signature or a biometric template to reduce ambiguity about the cardholder's identity. The use of ***Smart Cards*** can also reduce fraud in benefit claims.

Smart Cards can improve the healthcare insurance process. Eligibility verification and claims processing are often burdened by redundant information collection, multiple reimbursement forms and lengthy processing delays. Paper-based manual processes increase the risk of human error which results in avoidable costs to insurers, national health agencies, and healthcare providers.

Smart Cards can provide clean and reliable data for eligibility verification and claims processing. They can prevent administrative errors and streamline the settlement process. They can also reduce medical errors that arise when one practitioner doesn't know what another has been doing. In the long run, data

carried by ***Smart Cards*** not only can prevent illness and save lives; they also can save insurance companies money.

Many insurance company clients (or patients) lack control over their health records. ***Smart Cards*** are among the few devices on the market today that enhance both control and privacy. Reading what is contained on the ***Smart Card's*** microchip or use of the ***Smart Card*** to access records is only possible with a personal identification code (PIN Code) on authorized and secure hardware and software. ***Smart Cards*** also interact securely and reliably with a wide range of systems. They can be used over the Internet to verify information in an insurer's database; they can be read and updated offline at a physician's office or a hospital and can be used to prepare electronic claims for submission to an insurance company.

Also the ability of ***Smart Cards*** to encrypt information can protect a person's right to privacy while still allowing multiple healthcare stakeholders to share patient information more efficiently. ***Smart Cards*** can carry important health information and participate in billing and collection functions. ***Smart Cards*** can also play a role in areas such market research where provisions for confidentiality and patient control of data access encourage patients to participate.

Regardless of whether a ***Smart Card*** stores important medical data, clinical information and insurance data or simply acts as a secure tool to open distributed repositories of patient information, it is a concept that can be readily implemented medical with insurance systems. ***Smart Cards*** are a practical enabling technology that enhances the privacy and confidentiality of patient records. They are easy to use and work in a manner very similar to credit cards.

1 Benefits of Smart Cards

1.1 Insurance Companies

Insurance companies have been generally slow to adopt technology in general, including ***Smart Card*** and Web technology. Because of the changing healthcare services model, insurance companies are reevaluating their role in the healthcare delivery cycle. New technologies and changing business models should encourage insurance companies to develop an enterprise IT strategy that can provide a single business, data, and technology foundation. In general such a strategy has a number of objectives:

A. Improve the health of members
B. Improve the business
C. Leverage technology to realize the administrative cost savings
D. Streamline business processes and provide better services
E. Reduce fraud

Smart Cards have a place in an insurance company's enterprise wide IT strategy, representing as they do a secure, portable electronic file capable of linking all entities in the healthcare community. Insurance ***Smart Cards*** can improve data security and confidentiality, restricting access to sensitive healthcare information by storing access rights as keys that are used to authenticate the cardholder and control access. Managing when and where a person's private health information is accessed and making that information more readily available to those who need to know it reduces administrative overhead for everyone involved, including the insurance company.

Implementation of an insurance ***Smart Card*** automates manual tasks from eligibility to coverage updates to claims processing and reduces the time taken by administrative procedures such as verifying patient insurance status and eligibility.

Administrative costs are always an important consideration for insurance companies. They have a significant financial impact on the organization and often compete with other operational priorities. For most companies, the revenue cycle is highly dependent on the front-end registration/admission process which in turn drives the claims process. Insurance client registration is the administrative step that establishes a client's identity linking the client to medical information gathered during the course of a policy. Reducing identity errors during initial registration greatly improves billing and payment processes, enhancing cost reduction.

Insurance ***Smart Cards*** can provide a company with positive visual identification of a client (such as a photograph) linking it directly to the client's insurance record, which can be printed or included in a barcode on the face of the ***Smart Card***. More detailed demographic and insurance information can be stored on the ***Smart Card's*** chip.

Emergency medical procedures often require time-critical interventions. The availability of medical information during an emergency can save a client's life - another benefit of the insurance ***Smart Card*** - since they can store information about medical conditions, allergies, current medications information that can be critical to a successful clinical intervention in an emergency.

Insurance ***Smart Cards*** can bridge the information and communication gaps that exist between healthcare providers without the prerequisite of an Electronic Medical Record or integration with a data exchange system. The infrastructure required is minimal; to read a smart card simply a reader and viewer

software are needed. Information is exchanged securely and under the control of the client who owns the data exchange mechanism - the ***Smart Card*** itself.

1.2 Insurance Company Clients

In today's medical insurance environment, clients/patients are the only ones who do not have full access to their own medical data. Today's systems store redundant information in many places. Records are maintained by each physician treating a client/patient, by every institution serving a client/patient, and by any insurer who covers the service. However, the client/patient has virtually no access to the data, no ability to determine what is in the various databases, and no way to change anything that is incorrect.

Industry Trends: Today's medical insurance client/consumer more and more expects to enjoy secure access to portals that offer services such as payment over the Internet and advanced banking functions. Easy access to a consolidated menu of capabilities has become a standard. Healthcare payer organizations (insurance companies) will soon recognize that servicing the population will require interactions to move away from traditional channels, such as call centers, into Web-enabled channels, such as portals. When this requirement is combined with the rising costs of healthcare and the continual need for health plans to innovate to serve this population, healthcare payers will see a growing need for an insurance client ***Smart Card***.

Need for Consumer-Driven Healthcare: Health cards based on smart chip technology, combined with appropriate medical applications and data, allows individual clients/patients to maintain and control access to their own medical records. This is distinguished from other types of cards by its ability to transport confidential data securely from cardholder to practitioner and by the convenience of providing data immediately. Information can be accessed and controlled by the client/patient using a card reader connected to either the service provider's computer or to the client/patient's computer at home. Transaction audit trails tracking both card access and modification can be captured and documented. Security features restrict access to data stored on the card through the use of a PIN, making the smart card a more secure method of verifying an identity.

Higher Levels of Functionality: Technology advances that free ***Smart Cards*** from dependence on reader-based technology will open alternative channels of interaction to the consumer market. Advancements in chip technology will drive new options, such as the use of mobile phones for wireless connectivity, resulting in both reduced expenses (no physical connection to a smart card reader) and increased ease of use. Such ease of use and expanded security and access management can allow the more advanced consumer demographic to use portals, assert identity, and control access to medical data stored on the smart health card chip. Wireless connections can provide the necessary security and authentication processes required for acceptance and adoption, with the smart card making these services transparent to the users. Storing cardholder information, including primary physician and coverage information, on a ***Smart Card*** that is accessible using a mobile phone can improve access to treatment when a cardholder is traveling, moving, or changing primary providers. ***Smart Cards*** can eliminate the need for transcription of medical history or insurance information and inform a provider's office staff of the extent of coverage, thus reducing costs and streamlining service.

Demand for Improvements: Today's insurance clients/consumers are demanding improvements in healthcare services. Patients are faced with more situations that require

medical information to be shared freely among different providers. Traveling, moving, consulting specialists, or changing primary providers are all situations in which healthcare consumers require a way to transport the information needed to dispense quality medical care easily and securely. In today's work environment, a sizable number of consumers can have multiple insurance policies or plans, suggesting the utility of a single ***Smart Card*** that is secure and controlled by the client/patient—a card that can store medical records securely while providing immediate access to providers.

1.3 Identity Verification & Security

Creating and maintaining electronic insurance data sets the stage for making critical information available on demand, for the purpose of:

A. Sharing of information among healthcare services practitioners.

B. Leveraging the Internet to facilitate the exchange of healthcare data among multiple stakeholders and across vast distances.

Information access and sharing positively impacts patient care, reduces paperwork, and makes the approval process more efficient. The need to protect information from access by unauthorized users becomes a requirement. Electronic transactions depend on individual's proof of identity and right to access data whether in person or remotely. To protect electronic healthcare services systems, it is necessary both to verify the identity of anyone requesting access to the data and to determine that person's access privileges.

Many identity verification systems use ***Smart Cards*** as a key component. ***Smart Cards*** provide an important link in the chain of trust. They have the ability to verify a cardholder's identity accurately and to safeguard and offer the cardholder's credentials to a secure, trusted identity system. ***Smart Cards*** support security mechanisms such as public key infrastructure (PKI) and biometric templates. A combination of PKI and biometric security systems are increasingly applied to verify the identity of individuals in a variety of situations.

Multi-level authentication methods provide secure physical and logical access to critical information systems. ***Smart Cards*** support all methods or authentication factors such as:

A. A physical token - *something the holder has*
B. A PIN password - *something the holder knows*
C. A biometric template - *something the holder is*

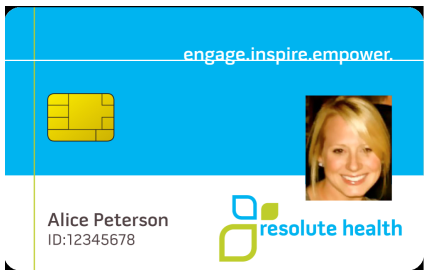
Smart Cards can verify identity using any of these authentication methods, these cards can also determine one's access privileges to that information and share it with the trusted system being accessed. That element is essential to maintaining an efficient, secure and trustworthy electronic healthcare services system.

Smart Cards technology has been implemented by a number of healthcare and insurance services organizations to meet the requirements for data availability, integrity and confidentiality. ***Smart Cards*** can actually store multiple PINs or passwords. Their use enforces stronger information security policies, employing a mix of electronic credentials without forcing a change in the user environment.

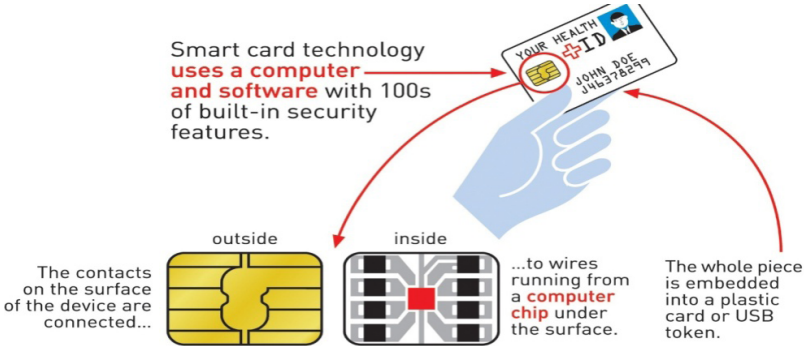
2 Technology of Smart Cards

2.1 How it Works

A ***Smart Card*** is a small card or similar device with an embedded integrated circuit chip. ***Smart Cards*** have the look and feel of a credit card. The embedded chip on the ***Smart Card*** is a powerful minicomputer that can be programmed for different applications. This chip enables a ***Smart Card*** to store and access data and applications securely and exchange data securely with readers and other systems. ***Smart Card*** technology provides high levels of security and privacy protection, making them ideal for handling sensitive information such as identity and personal health information.



A ***Smart Card*** connects to a card reader either through direct physical contact or through a remote contactless radio frequency (RFID) interface. A typical contact ***Smart Card*** has a plastic card body, a chip embedded in the body and a contact plate. The contact plate (usually gold-plated) is typically visible on the surface of the card.



How a client/patient uses an insurance ***Smart Card*** depends mostly on the issuer (e.g., insurance provider, hospital, or government-sponsored medical plan) and the applications that the issuer decides to implement. Typical uses could include:

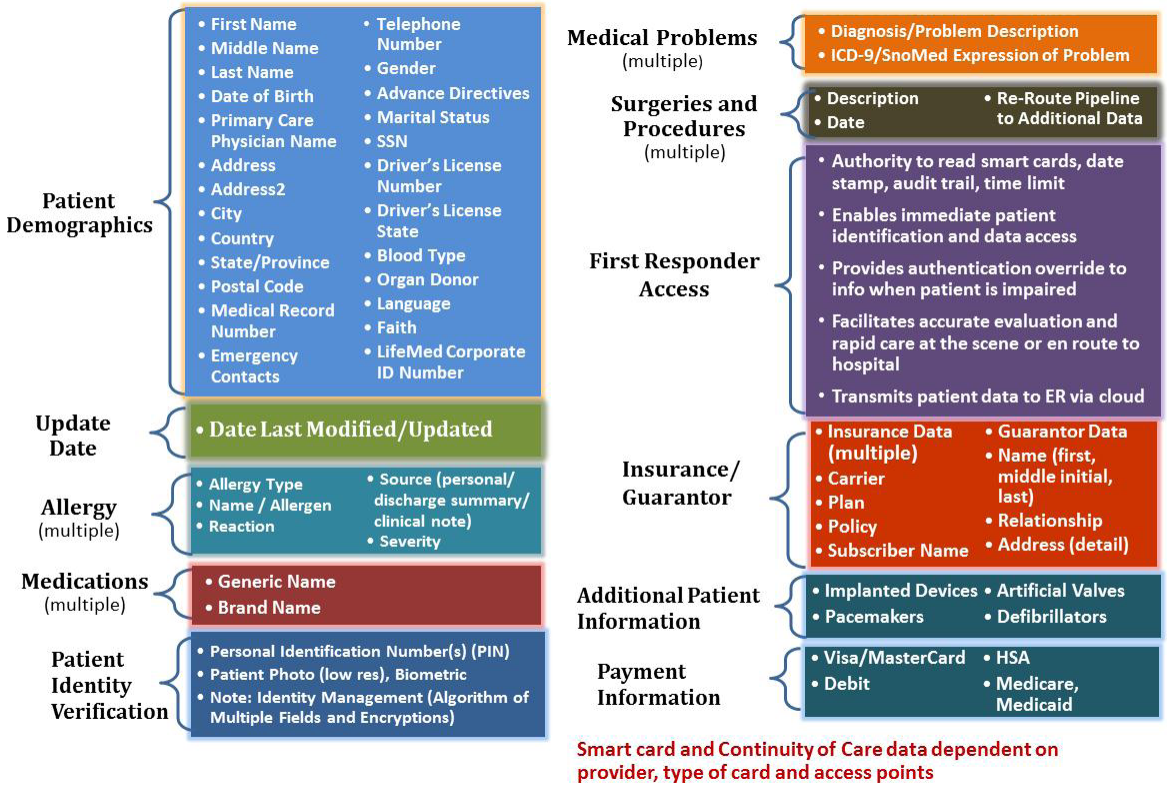
A. Registering at a physician's office or hospital
B. Securely accessing a personal record, e.g., to check or update health or insurance information or schedule an appointment
C. Updating personal, insurance, prescription, or medical record information.

Some ***Smart Cards*** can securely link to cloud-based patient information systems; ***Smart Cards*** can also store a wide variety of information to support healthcare applications.

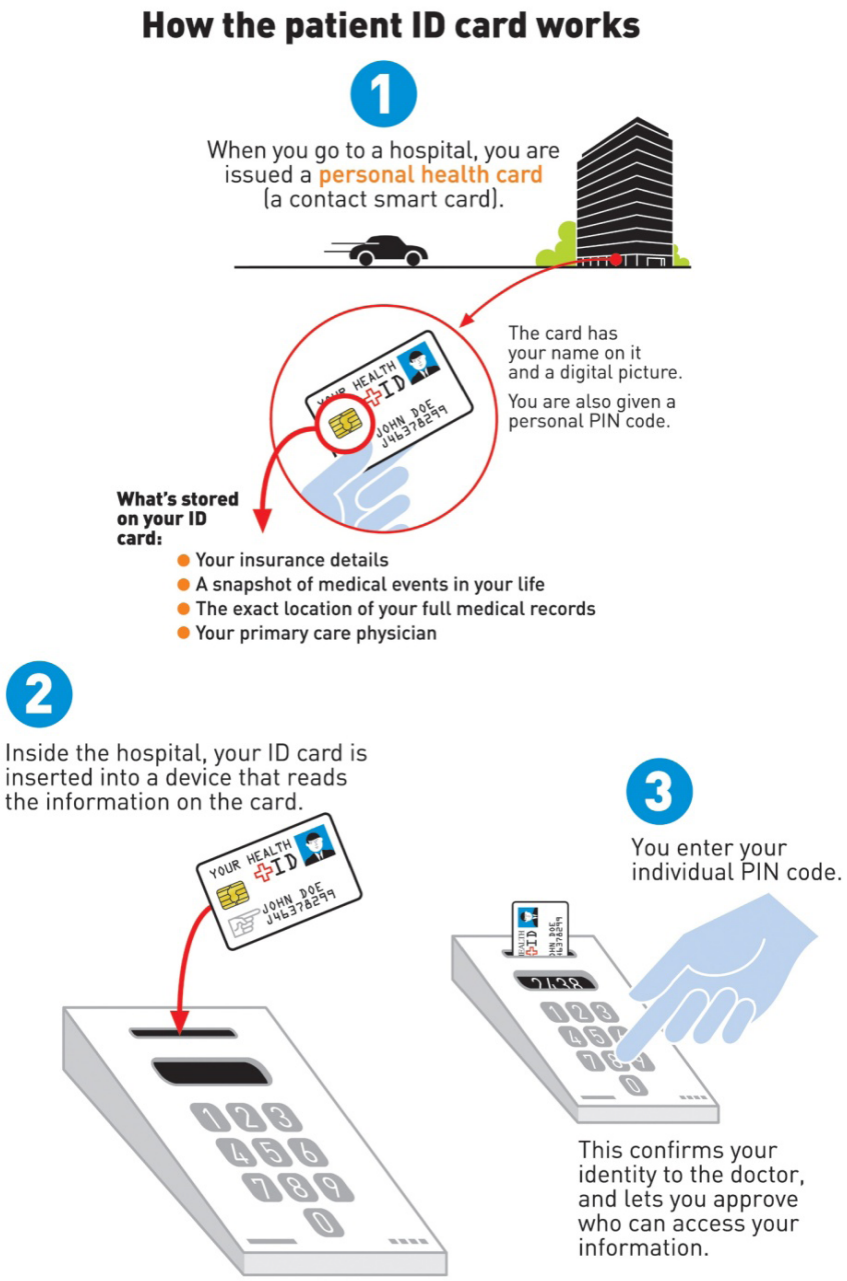
2.2 Healthcare and Insurance Information on Smart Cards

Some types of ***Smart Cards*** can securely link to cloud-based (insurance and/or patient) information systems; they can also store a wide variety of information to support healthcare services applications.

Some examples of the types of healthcare information that can be stored on an insurance ***Smart Card***:



2.3 How a Smart Card is Used



2.4 Smart Cards vs Magnetic Stripe Cards

Smart Cards have significant advantages over magnetic stripe cards used by some healthcare applications:

A. ***Smart Cards*** are highly secure; they are used worldwide when the security and privacy of information are critical requirements. Both contact and contactless smart cards can support the high levels of security required to protect sensitive information and enable secure transactions.
B. ***Smart Cards*** can protect healthcare information in a number of ways; ***Smart Cards*** with embedded micro controllers can encrypt and securely store a patient's personal health information.
C. ***Smart Cards*** can control who accesses the stored information.
D. ***Smart Cards*** can support multi-factor authentication.
E. ***Smart Cards*** can support digital signatures, which are used to determine whether the card was issued by a valid organization and whether the data on the card has changed since issuance.
F. ***Smart Cards*** use secure chip technology and are designed and manufactured with features that help deter counterfeiting, fraud and tampering.

Secure smart chip technology, encryption, and other cryptography measures make it extremely difficult for unauthorized users to access or use the information on a ***Smart Card*** or to create duplicate or clone cards. These capabilities help protect patients from identity theft and healthcare institutions from medical fraud.

Smart Cards are flexible. Information can be added securely to a card after the card is issued. This flexibility means that patient healthcare information can be written to and updated on a ***Smart Card*** by authorized healthcare providers. Updated information is then available to both the patient and all authorized healthcare providers:

A. Patient prescriptions can be written onto the ***Smart Card***, providing up-to-date information when a patient is receiving medical care from multiple providers or in an emergency.
B. Multiple patient identification or patient record identification numbers can be written onto the ***Smart Card***, facilitating record exchange and coordination of care among multiple healthcare providers.

Smart Cards can store more information than magnetic stripe cards.

Smart Card technology is incorporated into and can interoperate with mobile devices, such as Near Field Communication (NFC) enabled smart phones, laptops and tablet computers. This can enable secure transactions, such as financial transactions or secure access of personal health records by owners or authorized health professionals using a variety of portable devices.

3 Implementation Considerations

3.1 Overview of IT Requirements

As with any IT project, specific requirements for an insurance ***Smart Card*** system will depend upon the selected product and scope of the implementation. Identity software vendors can scale solutions from a simple configuration with a small IT footprint to integration with the provider's full enterprise environment, including registration, admissions/discharge/transfer (ADT), electronic medical records, and heath information exchange.

The operational concepts and architecture of an insurance ***Smart Card*** system are straightforward, regardless of implementation at any scale.

The typical system includes the following common elements:

A. Cards**:** A variety of contact and contactless form factors are available including cards, fobs and NFC-enabled smart phones among solutions available today. These may all be generically referred to as ***Smart Cards*** Actual card based solutions incorporating printed individualized information, branding material, or client/patient photos will require printers designed to deliver such cards.

B. Readers: Many readers capable of reading and updating data stored on ***Smart Cards*** are commercially available. They do have the familiar look and feel of credit card readers and are also used in commercial transaction settings. Readers may support contact transactions, contactless transactions or both.

C. Software and Servers**:** Middleware and/or application software is deployed at the point of interaction to facilitate the secure exchange of data between ***Smart Card*** and reader and to enable user inspection of ***Smart Card*** data if required.

D. Security: Transaction data is transmitted securely back to the host application or distributed based on enterprise rules to support operations.

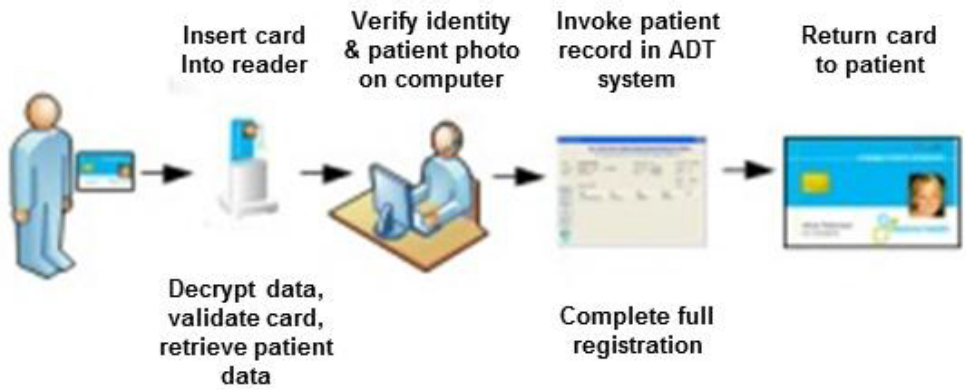
3.2 Self Containment

A ***Smart Card*** system for insurance companies can be self-contained; it does not necessarily have to be integrated with other health information systems.

The information stored on the ***Smart Card*** can be read, can identify patients correctly and provide information that a healthcare provider might not have in its own proprietary database (e.g., a recent prescription or record of medical care at another facility).

3.3 Integration with Insurance ERP Software

Smart Card solutions can interface with insurance companies' current software systems, including registration; approvals; admissions; discharge and transfer; electronic medical record; electronic health record; and heath information exchange systems, supporting continuity and automation of workflow systems.



4 Conclusions

Smart Card technology is an enabling tool to help resolve some of the issues which the health & medical insurance sector is grappling with today.

Smart Cards can help reduce the inefficiencies prevalent in health & medical insurance, diminish the number and effect of medical errors attributable to a lack of critical medical information, and empower insurance company clients/patients to take a more active role in managing their medical records. This, combined with the intra-company mobile nature of insurance clients, dictates a substantial increase in the demand for secure access to decentralized medical records. The current absence of comprehensive medical records creates a challenging environment for the healthcare services community. This also limits the community's ability to achieve its goals of improving the quality of healthcare services and reducing inefficiencies and costs. Added to the insurance companies' burden of managing patient records are requirements for patient verification, security, privacy as well as the desire of clients to control of their own medical records.

Smart Cards carrying critical medical data does support client/patient empowerment.

Smart Cards protect information privacy while ensuring information access and security. They support the flexibility of today's clients/patients by providing them with a means by which the various specialists who treat a client/patient can share information.

Smart Card technology helps reduce the burden of insurance records management, providing timely information sharing and serving as a mobile repository for coverage, diagnoses and treatments.

Smart Cards support identity verification, provide excellent security and can speed up patient approval, registration and check in processes.

Using ***Smart Card*** technology to improve healthcare and insurance providers competitiveness will promote operational efficiency, increase market share and reduce operational costs.