

Technology and Business Case for Optical Memory Card-Based Patient Record Card

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People are familiar with the concept of the Patient Record Card (PRC), but the ideas on the functions of a PRC are varied due to the many types of cards available. This makes it difficult and confusing to define the business case for implementing a PRC. The following information focuses on card technology issues and the business case for using an optical memory card based PRC as part of an enterprise wide computerized system.

PRC Function and Card Types

The PRC falls into several categories based on their function. The insurance membership card being the most common and simple example. Each category builds on the previous category's functional capability:

- Insurance Membership (Passive Eligibility)
- Registration with Machine Interface (Active Eligibility)
- Record Subsets
- Records + Images

Regardless of the role, the common factor among all PRCs is they supplement the integrated health systems (EMR, PPM, HIS, etc.) by providing a standardized communication tool between the patient to the system. This is true for both digital systems and manual systems.

There are several types of card technologies. Card selection depends on the functionality desired for the cost to issue and use. Functionality is based on how much data the card stores, how data is recorded and used, and how data is (or is not) updated.

	Data Security	Digital Capacity	# Text Pages	Updateable
Visual Data				
paper, plastic	none	none	2-4 text lines	No
Digital Data				
magnetic stripe	encryption	237-900 bytes	3-9 text lines	No
barcode	encryption	20-3,000 bytes	1-45 text lines or photo	No
Memory chip	encryption	32 bytes – 8K.Bytes	up to 2 pages	Yes
Smart IC chip	PIN, format	1 - 8KBytes	up to 4 pages	Yes
Optical	PIN, format	1.1MBytes	up to 500 pages	Yes
		2.8MBytes	up to 1,600 pages	Yes

For example, a paper or plastic card with barcodes or magnetic stripe is low cost, but holds little data and offers limited functionality. How much does it cost to issue a new card?

If the card is not updateable, does the card remain useful? Can updateable data cards meet future data storage needs as the computerized patient record system expands to add new functionality? Can the card secure record data, including medical images? How does the card supplement and enhance an enterprise wide system?

LaserCard® Optical Memory Card

The LaserCard® optical memory card is an optical storage device particularly suited as a patient record card. In fact, it is the only card-based technology with enough SECURE capacity to store medical records and images.

High Capacity – Up to 1,400 pages of text (assumes 2,000 byte pages), or 200 scanned pages, or 40 MRI & CT scans or X-rays images can be stored on the optical memory card.

Optical WORM Recording – Data can be updated and added thousands of times, but never deleted. Like compact disks, which also employs a laser to form “pits” on the optical WORM media, it is impervious to magnetic fields, electrostatic charges, heat and cold. Optical WORM media is a legally admissible form of data storage and is the most secure recording medium.

Secure Data Storage – Data can be protected against unauthorized access, deletion, alteration or copying. Data access is restricted to the individual card, not the entire hospital database. All access attempts and changes/updates can be tracked on the card. Through a combination of the optical media, drive software and computer hardware, various levels of security can be achieved affordably. An IC microprocessor chip can be added, but is not necessary to ensure data security.

Secure Data Storage Growth – Data from single or multiple applications can be stored on the LaserCard. The LaserCard can accommodate up to 16 independent partitions. Data can be segmented by category and access rights. Storage requirements can be expanded due to flexible format structure. New partitions can be added independently at any time to allow different departments of providers to share space and share resources.

The card issuer can guarantee separation between application data or grant conditional access.

Domestic and International Standards – Data is stored to the LaserCard using device drivers or the LaserCard (optical card) file system through the existing EMR or HIS or PPM system. The LaserCard is manufactured to ISO standards for basic plastic cards (ISO 7810) and optical memory cards (ISO 11693 and 11694). It comes in two configurations: 16mm optical stripe with 1.1MByte capacity or 35mm optical stripe with 2.86Mby optical capacity. Over 85% of all optical memory cards in the world are ISO/DELA format cards.

Multi-Technology Functionality – The LaserCard can be personalized with color photos, text and barcodes, incorporate a magnetic stripe or IC chip and supports biometric verification and identification. Image using a card with securely recorded information on the optical medial and an IC chip or magnetic stripe to make payments from a health savings account.

Durability – made of polycarbonate plastic, the LaserCard is more durable than paper and other cards (magnetic stripe or IC card) made of PVC plastic. Data is protected by an Error Detection And Correction algorithm designed to accommodate data loss from scratches or other damage to the media.

Cost Effective –There is no additional cost to add data to the card. Unused portions of the card can be configured at anytime, as the CPR system requirements grow. It takes:
over 1,300 plastic or paper cards with 3000byte barcodes costing over \$130, or
over 4,500 plastic cards with 900byte magnetic stripes costing over \$3,300, or
over 500 8Kbyte Smart Cards costing over \$6,500
to equal the capacity of one LaserCard costing \$6. And, data security is included.

Proven Technology – the optical memory card is a unique data storage device developed in the mid 1980s by Drexler Technology Corporation of California. Drexler's card manufacturing facility is designed for a production capacity of up to 25 million optical cards annually. Over 4 million cards have been ordered for secure identification card use, 200,000 for automated manifest use and nearly 1 million cards for laser eye-surgery equipment access control.

Business Case for Patient Record Cards

Leading experts recognize the business and clinical necessity for computer automation in the health care industry. The industry is working towards a future where access to all types of data is available on a true, enterprise-wide level. However, there are several major issues preventing or slowing these networked systems from delivering the full benefits of computer automation to all who need it within the enterprise: implementation cost, user interface flexibility, software updates and data security.

Large investments are being made for a variety of enterprise wide systems, but it is very costly to connect and integrate newly added members from mergers and acquisitions. It is costly to keep large systems up to date with the continuous changes in computer hardware technology, software and legislation. Custom user interface screens for each department specialty may not be supported or cost effective to implement. Data security is complicated to enforce and monitor on large databases and systems. Security issues are still under development for Internet file transfers.

While it is accepted that computer automation is beneficial, some fail to understand why a PRC is a necessary part of the enterprise wide system. Realizing the business case for the PRC means realizing that it is a data communication tool for the data input requirements of an enterprise wide solution. The common factor of all PRCs is that they supplement an existing (integrated) health information system with data from the patient or other enterprise sources.

The very nature of being credit card in size allows the PRC and PRC based software to address the problems large enterprise system face: implementation cost, user interface flexibility, software updates and data security.

Depending on the data requirements of the enterprise system, PRC can serve as a:

- visual identification and membership eligibility interface. It serves as a marketing tool for brand recognition and if it contains data, market differentiation.
- machine readable eligibility and registration interface. Registration data is automated to reduce data entry errors and billing system errors.
- data communication tool to connect all members in an enterprise more cost effectively with faster implementation than a LAN or WAN. Access to essential patient data at all points within the enterprise helps to reduce costs and improve care.
- smaller, configurable user interface to the enterprise system.
- revenue source by retaining patients within the preferred referral providers who in turn, are connected to the enterprise system via the PRC.

The trend in information technology shows that sooner than later, more storage capacity is needed. This is no different for card technologies in the health care field as higher capacity means more functionality and security features. Cards can contain basic patient demographic and emergency information, specific data sets that are secure from unauthorized access, and medical images. Patient record cards can have a specific, limited function, but will ultimately face the need for more data capacity due to the requirements of enterprise systems in health care.

The business case for implementing a PRC is dependent on the enterprise's needs. Successful implementations have well defined and specific functional requirements that the PRC fulfills more cost effective than alternative data communication systems. Following are a few examples.

Laser Vision Correction:

- Revenue Generation: Single-use "ticket" for Laser Vision Correction equipment. VisionKey® card cannot be counterfeited, duplicated, or re-used. (Off-line "token" requirement.)
- Patient record card: containing pre- and post-op patient data, prescription and treatment algorithm. Permanent and auditable record of procedure automatically written to card. (Multi-function card requirement.)
- Equipment control: Pre-recorded data controls equipment. System files automatically read from card. Optical WORM media ensures data integrity. (Data security requirement.)

Novus® Image Archive Card:

- Cost Control: FDA approved system to capture, display, archive and communicate up to 80 MRI and CT scans on an optical memory card. Entire study can be stored on card. Reduces incidence of lost film. Reduces storage and film duplication costs. (High capacity requirement)
- Physician & Patient Satisfaction: faster retrieval of film studies. Patient confidence in having card and not losing scans. (Data access requirement.)
- Revenue Generation: new and repeat referrals to imaging center (Market differentiation requirement.)

Novus® HealthPass:

- ♦ Links IT Infrastructure and Vender Platforms: Provides common link between information systems. Stores data subset for import/export into network system. (Cost effective data communication requirement.)
- Flexible User Interface: customizable for each specialty's data requirements. (Customizable user interface requirement.)
- Image Capture/Display Features: Before and after photographs and patient records stored on card (SurgiCard application). Reduce film and development costs and patient file storage/retrieval costs. (Data capacity requirement.)

Regimed MediVital with Vital Plus Card:

- ♦ Links Clinics to Clinics/Hospitals: Provides common link to centralized repository, providing access to medical records. Both a provider card and patient card are required to authorize access to the patient record in the central repository. (Data access requirement.)
- ♦ Provides Off-line Access to Medical Images: essential for (rural) environments without effective or affordable telecommunication lines. (High capacity and cost effective data communication requirement.)
- ♦ Provides Medical Records at the Point of Delivery (Data access requirement.)

The LaserCard® optical memory card, as a data communications and membership card, an “enabling technology” for enterprise systems.