

## Bar Coding in Healthcare – A Critical Solution

a report by

**Dr Robert A Hankin**

*President and Chief Executive Officer, Health Industry Business Communications Council (HIBCC)*



Dr Robert A Hankin has served as President and Chief Executive Officer of the Health Industry Business Communications Council (HIBCC) since 1987. HIBCC is an American National Standards Institute (ANSI)-accredited standards development organisation that maintains the provider and supplier bar code labelling standards for business-to-business commerce in the healthcare industry. He is also a member of the Board of Directors of the Data Interchange Standards Association (DISA), where he served as Chairman of the Board from 1996 through 1999. Prior to being appointed HIBCC President, Dr Hankin held senior executive positions at the American Dental Association (ADA) and the American Medical Association (AMA). He is a former Research Associate at the Center for Medical Manpower Studies, as well as an Assistant Professor of Economics at Northeastern University. Dr Hankin earned his PhD in Medical Economics from Northeastern University in Boston.

Bar code technology has been available and widely implemented in non-healthcare settings for decades. Historically, bar coding has been viewed by the healthcare industry as strictly a logistics tool, meant to organise and automate inventory management. Its benefits were seemingly limited to the cost savings associated with automated processes that eliminate and reduce the opportunity for human error. However, recent reports of the high rate of medical error and the ever-increasing costs of healthcare delivery have begun to change this perception. Now it seems, the use of bar codes has as much to do with safety and quality assurance as it does with automation and cost containment.

Recent findings on the prevalence of medical error and its impact on patient safety have necessitated the adoption of control measures in the healthcare delivery process. As such, healthcare device and drug manufacturers and healthcare providers are increasingly held to a higher degree of accountability and liability. Meanwhile, pressures to rein in costs, coupled with dramatic improvements in information technology, have led the industry towards e-commerce. Increasingly, efforts to recover 'lost charges', i.e. product consumption in hospitals that cannot be accounted for because it cannot be tracked, have revealed the direct financial benefits of bar code systems.

Creating integrated communications systems to support supply chain and care-giving activities depends on industry-wide acceptance and use of standards-based bar code data. Technological advances in scanning technology now make it possible for manufacturers to source mark durable medical equipment and supplies successfully, even at the smallest 'single use' packaging levels. At the same time, dramatic reductions in the cost of bar code readers have made the technology highly affordable for hospitals.

The use of bar codes requires a logical and consistent method for designing them. Standards provide users with a formula to accomplish these goals in a manner that can be followed throughout the healthcare system by all parties involved.

### The Health Industry Bar Code (HIBC) Standard

The Health Industry Bar Code (HIBC) Standard was developed nearly two decades ago when it was determined that the retail-based standards were inadequate for the specific requirements of healthcare applications.

The HIBC Standard was designed for critical applications such as medical product identification and device tracking. As such, it utilises a variable length, alphanumeric data structure that is consistent throughout packaging levels, enabling the implementation of secure and efficient tracking processes in both domestic and global markets.

The HIBC Standard is approved by the European Committee for Standardization (CEN) and the American National Standards Institute (ANSI). It is administered by the Health Industry Business Communications Council (HIBCC), an accredited standards development organisation that has affiliates throughout Europe.

The HIBC Standard includes both a primary and an optional secondary label. The HIBC primary label includes the labeller identification code (a unique four-character alphanumeric identifier assigned and maintained by HIBCC), the labeller's product or catalogue number and the packaging level (see *Figure 1*).

The HIBC secondary label is used at the discretion of the labeller and provides the capability of adding additional data to bar code labels, such as expiry date, lot number, quantity, batch number and serial number. These attributes are especially important for pharmaceuticals and medical devices, the uses of which can have direct impact on the health and safety of a patient. In a situation of recall due to defect or failure, having this information resident on the product can enable fast and efficient tracking.

When label space does not allow for the use of a normal, linear bar code, HIBC labellers may choose to utilise HIBC small package symbol. The HIBC small package symbol uses the Data Matrix bar code,

which requires the least amount of label space of any available bar code (see *Figures 2*).

Data Matrix is also appropriate for marking products such as implantable medical devices that require a higher level of print durability than can be achieved adequately with standard labelling. Data Matrix can be marked or etched directly onto any surface, including low contrast or reflective materials such as metal, plastics and foil packaging, and still be read reliably (see *Figure 3*). It is currently being used for marking implantable devices, surgical instruments and small packages of medical products.

## A Business Case for Bar Coding

### Efficiency

The trend in healthcare, as in virtually all private and public sectors, is the incorporation of standards-based technology in the advancement of business systems and processes. While the retail, apparel and grocery industries have successfully established universally accepted product identifiers, the healthcare industry has yet to take this critical step towards supply chain efficiency.

Healthcare facilities will be able to identify and order necessary items without extensive catalogue research. Manufacturers will realise improved product visibility, and distributors will save by not having to develop and maintain multiple cross-references to track their product lines. Everyone benefits from the increased ease, speed and accuracy of ordering, distribution, payment and reimbursement.

### Safety

The application of standards-based bar code technology in provider settings is also relevant to patient safety. Healthcare associations and government agencies worldwide support the use of bar coding as a tool to reduce medical errors. In its much publicised report, *To Error is Human: Building a Safer Health System*, the US Institute of Medicine advocated the application of bar codes on pharmaceutical and medical supplies, stating that their use would ensure that “the dispensing and administration processes are checked for timeliness and accuracy.” Bar coding is widely used in many industries outside medicine, and results in error rates are about a sixth of those due to keyboard entry.

### Cost Savings

A 1998 report drafted by the consulting firm of Ernst and Young on behalf of the Efficient Healthcare Consumer Response (EHCR) coalition

**Figure 1: HIBC Primary Label**



**Figure 2: HIBC Data Matrix Symbol Printed onto a 1ml Vial**



(comprising the American Hospital Association, HIBCC, Health Industry Distributors Association, Healthcare Distribution Management Association and Uniform Code Council) concluded that the automation of the healthcare supply chain could yield financial savings of about US\$11 billion in the US market. The savings identified in the report were indicated as follows:

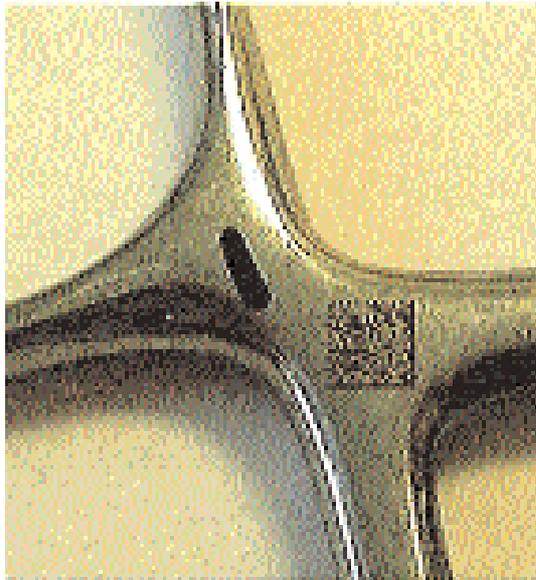
- efficient product movement – US\$6.7 billion savings;
- efficient order management – US\$1.7 billion savings; and
- efficient information sharing – US\$2.6 billion savings.

The use of standards-based bar coding throughout international markets would ideally accomplish similar cost savings in contracting, inventory management, product identification, utilisation and benchmarking, distribution and logistics management and claims and auditing.

### Reimbursement Accuracy

In the US, as in many other countries, provider systems must rely on general product categories as identifiers for billing and payment and these include a broad range of cost and quality of items. By not requiring specific product identification on submitted claims, the system is susceptible to unintentional error, overpayment and fraud.

**Figure 3: HIBC Data Matrix Symbol Laser-etched Directly onto a Surgical Instrument**



The use of automated, specific product identifiers would engender a system of accurate billing, thereby reducing the opportunity for error. A similar system for pharmaceutical reimbursement in the US was implemented using the National Drug Code (NDC). The unique labelling of drugs with product-specific identifiers enables the accurate tracking of utilisation by recording the exact product used.

## Conclusion

Many organisations within the international healthcare community have proactively begun taking steps in anticipation of system reform. For example, the US Department of Veterans Affairs (VA) has installed tracking systems within its VA hospital system to monitor medical products at the bedside and link the products to the patient via electronic medical records. Studies at VA hospitals have indicated that the implementation of this system has reduced error rates significantly.

Standards-based bar coding offers the best opportunity for the most accurate and cost-effective data communications systems to improve healthcare supply chain efficiency and the safety of patient care processes.

As society and technology advance, so too must healthcare systems and services. Wide availability and relative affordability of automated identification technologies support the implementation and use of bar coding. Current system failings make the need evident. HIBC standards-based product identification can foster the creation of a system that is not susceptible to fraud and abuse, is less prone to error and is better able to monitor the quality of care that beneficiaries are receiving. ■