Quick Scan of Bar Coding: When Planning Document Imaging Systems, Don't Forget the Bar Codes

by Rose Dunn, RHIA, CHPS, CPA, FACHE

In the hybrid record, bar coding maximizes safety and efficiency.

Errant paper forms of varying shapes arrive in our records daily. Even as electronic records come online at a record pace, paper will not go away any time soon. The mix of data currently created in patient care guarantees that managing hybrid records will challenge most facilities for years to come.

In their efforts to merge the flow of paper documents with their digitized counterpart, many organizations turn to document management systems and document imaging. If you're implementing a document imaging system, don't forget the bar codes.

Bar coding offers the potential for improved patient safety. And it can streamline document management, aiding imaging systems capture the identity of paper documents into the electronic health record (EHR) at lower cost than with manual labor and with greater potential for maintaining data integrity.

A Short History of Document Imaging

Document imaging has been around for several decades, but it is experiencing a new surge of interest as organizations launch EHR systems and seek to integrate the hybrid information they collect.

Images (in a scanned format) are documents not created within an organization's established computerized infrastructure. They can be any document sent from outside the infrastructure or a document processed internally and received as a paper document. Some of that paper comes from physician offices, ambulance services, consents, prescriptions, and institution transfer documentation. Even with the beginnings of an EHR, hospitals may still scan an average of four images for emergency department visits and 100 images for inpatient stays.

A Short History of Bar Codes

Bar codes have been around for 60 years. Retail applications drove their early technological development, and industrial applications soon followed. Wallace Flint first suggested an automated checkout system for grocery stores in the 1930s, and as vice president of the National Association of Food Chains he later supported efforts that led to the Uniform Product Code (UPC). Several code formats were developed in the 1940s, 1950s, and 1960s, including a bull's-eye code and various formats of bar codes.[1] But it was nearly 40 years before the first commercial scanning of a UPC bar code took place. At 8:01 a.m. on June 26, 1974, Clyde Dawson handed a 10-pack of Wrigley's Juicy Fruit chewing gum to a checker at Marsh Supermarket in Troy, OH, and retail history was made.[2]

How Bar Codes Improve Patient Safety

Bar coding has become popular in healthcare for a number of reasons. It is a tool that can facilitate inventory monitoring, improve patient record scanning productivity and accuracy, and assist in managing equipment. Most importantly, bar codes can improve patient safety. Bar codes can be applied to patient wristbands to enhance the collection of correct patient information when ordering medications, supplies, and procedures.

Later this year, a Food and Drug Administration mandate takes effect requiring the use of bar coding on most pharmaceutical packaging. This offers the potential to link pharmaceuticals to the patients to whom they were given.

How Bar Codes Reduce Cost

Bar codes have been used in inventory management programs for years. In HIM, bar codes are a relatively new phenomenon in identifying document type, but they have been used for more than 15 years to track record folders. This use has been valuable for many HIM departments, although it is hindered by users who pass records on to others without logging the next destination. Many off-site storage facilities, microfilming, and document-scanning firms have encouraged the use of file-folder bar codes, according to Pam Mueller, RHIA, president of HITS Scanning Solutions.

"Bar-coded medical records expedite the automated check-in process at the outsourcing firm's location," Mueller says. "Reading the bar code eliminates manually keying in the information needed for check-in and tracking. This allows for immediate recognition and notification of missing medical records." However, she says, the real benefit for HIM departments that scan documents occurs in time saved indexing patient demographics and document types. "The cost savings for these forward-thinking department managers can be substantial. The savings are as substantial if the department is performing scanning internally or outsourcing it."

The use of bar coding can prove to be a significant time-saver, and the combination of standardized bar-coding schemes and automated scanning software reduces errors in indexing document data. "This is precisely the advantage of bar coding," says Ed Katz, vice president of strategic solutions at Lason, Inc. "It improves productivity, decreases errors, and decreases costs in the scanning by 10 to 20 percent, depending on the bar code type used." Using a 2-D bar code with loose sheets "allows the scanned image to automatically flow into the repository and link directly with other patient data of the same type for the given patient," Katz explains. (See "Bar Codes by Dimension", below, for differences in bar code formats.)

The manager of coding and record processing at the Medical University of South Carolina, Christine Lewis, RHIA, CCS, CCS-P, has worked in an imaging environment for several years. "First, when bar codes are determined, this forces our staff and hospital staff to work together to standardize the filing of information," Lewis explains. "For example, our hospital audits all restraint orders. In order for accurate search capabilities, we bar coded this into a separate document type. This advance planning assists in more efficient data retrieval on the back end."

Having collaboratively defined the importance of individual documents, the facility's productivity increased because the filing and indexing processes were automated through bar coding. How much? According to Lewis, productivity doubled in the processing of inpatient records, and it increased 25 percent for outpatient documents.

Cost and productivity benefits are achieved for outsourcing firms and scanning operations that now use header or separator sheets rather than bar codes. "The savings we received from the reduction in use of separator sheets was tremendous," says Jason Barnhouse, executive vice president and COO of Nauvalis Healthcare Solutions. "Our costs dropped by nearly 90 percent from the elimination in separator sheet paper costs, labor, and printing charges."

Gains in Efficiency

If an organization investing $25,000 to $250,000 to create patient identification labels fails to integrate bar codes that clinical staff can peel off and apply to documents, it is missing significant opportunities for return on its investment. HIM professionals can provide a dimension of forms management expertise that may be missing in the system acquisition process.

Organizations can go a step further by embedding patient data in bar codes that are printed directly on patient forms. This saves caregivers time spent applying labels, and it avoids the potential for mislabeling documents. "It doesn't make sense to add the cost of a label and the labor to apply it when one can print the form (which must be printed anyway) at the time it is needed and have it electronically contain the patient demographic and form type in the bar coding printed on the form," says Rob Harding, president of FormFast. "It also saves space on patient care areas since they no longer need to house stacks of forms." This approach has benefited healthcare organizations such as Capital Region Medical Center in Jefferson City, MO.

Betty Hall, RHIT, privacy officer and director of health information services at Southeastern Regional Medical Center in Lumberton, NC, says, "Bar coding our forms prior to implementing the imaging system was a no-brainer for us. It was part of

our plan early on. Now, approximately 85 to 90 percent of our forms are bar coded, identifying the form as well as including patient identification data. Bar coding makes us more efficient in prepping charts because there are fewer forms to check for stickers. The scanning systems reads bar codes better, and we have less chance of human error in transposing numbers."

Indexing and quality control efforts also benefit from the bar coded forms, says Hall. Bar coding identifies the form and reduces the number of forms to be indexed. "Imagine having to key in the identity of 100 forms per chart, versus an average of three to five," Hall says. "The indexers can then spend more time making sure the quality of the document is good."

Hall also points to another area where bar coding has helped—"those pesky loose materials. With paper, we always had a stack that we never found the time to file. Now since the forms are bar coded with everything necessary to identify the patient, the account, and the form, we just scan them, they go to the correct chart and in the correct order, and our loose material backlog has gone from stacks to zero!"

Forms Redesign Needed

Implementing an imaging system will require the redesign or reformatting of forms to ensure that, at minimum, a 1-D bar code is applied to the form in a common location. (AHIMA recommends the Code 39 bar code and provides detailed guidance on the bar code's location.[3])

With the hundreds of forms that exist in a typical healthcare facility, this effort can be monumental. Some forms management software firms provide both software and personnel to take care of this crucial phase. The forms redesign endeavor offers additional, hidden rewards. Often, outdated forms are eliminated, and redundant data collection can be quickly identified and eliminated by merging like forms.

Start the forms redesign project at least six months in advance of implementing the document imaging program. Avoid colored forms, as they result in larger file sizes that require more storage space. White paper is recommended for all documents that will be scanned, because white will provide the best results for the bar code ID, OCR, viewing, and other functions.[4]

Forms should be standardized to 8.5" x 11" if possible. If some users require larger forms, ensure they are perforated at 8.5" x 11" leaves or sections, with a space for an identifier bar code label. Verify that the scanning equipment to be used will accommodate various paper weights used in the organization or modify those forms that are printed on an incompatible paper weight. Multiple-ply forms should be avoided; this feature can be addressed through the use of electronic forms software.

Form and bar coding software serve as a foundation for enterprise-wide content management programs because the software allows users to access and print approved bar-coded forms online, create electronic forms that can be field-filled with data, and completed online by clinicians, and can carry the 2-D bar code if triggered by ADT data. It is this level of sophistication that facilitates automation of document processes so completed documents can be submitted efficiently, correctly indexes within the content server, and eliminates outdated form inventories.

Robin Gann, RHIA, MHA, identifies an added benefit of bar coding. Gann is corporate privacy officer and director of health information management at CoxHealth in Springfield, MO, where immediate post-discharge scanning has existed for nearly 10 years. "We also use the bar code to ensure the form has been approved through the forms committee," she says. "If it has no bar code, it's rejected at the prepping station and returned to our imaging supervisor for a determination of placement in the record and follow-up with the originating department manager."

As HIM professionals work with one eye on the future of interoperable, electronic data and one eye on managing the current hybrid record, bar coding offers help in improving patient safety and reducing manual labor. Bar coding is a "must do" on the list when designing document imaging systems.

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Bar Codes by Dimension

Traditional one-dimensional (1-D) bar codes encode an account number or document type in the bar code's width. All data are encoded in the width of the code, along the single row of bars. The only way to increase the amount of data is to increase its width. Increase the width too much, and the bar code becomes difficult to scan.

Typically, 1-D bar codes capture sufficient patient identification to allow them to be linked to a database. A patient identification label that contains a bar code embedded with account number and medical record number, when scanned, can link to patient information such as name, dates of service for the account, diagnoses, procedures, and physician. "Since most of the patient information resides in peripheral systems, with database scripting you can recall the information on demand and receive all the benefits of 2-D bar codes with 1-D bar codes," notes Jason Barnhouse of Nauvalis Healthcare Solutions.

Two-dimensional bar codes (2-D)—such as PDF417, Maxicode, and DataMatrix—are scanned horizontally and vertically. They hold considerably more data than 1-D bar codes. The 2-D bar code can expand the number of characters from approximately 20–30 in 1-D bar codes to more than 2,000.1 A 2-D bar code can thus contain the contents of an entire document.

A greater capacity for data in 2-D bar codes can avoid the need to pull data from databases. For instance, a patient financial services department can print a claim or statement for a third-party payer or a patient that does not use electronic remittance. Printed on the claim payment stub is a 2-D bar code containing all the claim detail. When the payer or patient submits payment, the clerk scans the bar code on the claim stub. This automatically pulls up all the account information necessary for the clerk to post the payment received.

While there are many bar code types in use today, probably the most popular at healthcare institutions are Code 39 (also known as the Code 3 of 9), Code PDF 417, and Code 128. Codes 39 and 128 are 1-D bar codes. The primary difference between them is that Code 39 is larger and more easily readable with the scanning tools available today. Recently, however, technology improved reading of Code 128. Code PDF 417 is a 2-D code capable of holding up to 1,800 characters.

Note

1. Kofax. "New Bar Code Software Enters the Next Dimension." *SmartDocs*, no.
2. Available online at www.kofax.com/learning/smartdocs/SmartDocs01_Summer.pdf

Source, both images: Barcode Man, www.barcodeman.com

Notes

1. Hagey, Warren. "The History of Bar Codes." Available online at http://educ.queensu.ca/~compsci/units/encoding/barcodes/history.html.

2. Pierce, John. "A Brief History of Bar Coding." Available online at www.ecominfo.net/supplychaindata/arts/pearce_history.htm.

3. AHIMA. "Electronic Document Management as a Component of the Electronic Health Records." October 2003. Available online in the FORE Library: HIM Body of Knowledge at www.ahima.org.

4. Ibid.

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