Selecting a Bar Code Reader
Make it work; don’t make more work.

Today, the capabilities of the different types of bar code readers—laser versus CCD, linear versus array, etc.—are far less of an issue than they were in the past. Selecting the right reader now requires more attention to workplace requirements. It is important to remember the reason we use bar codes and two-dimensional (2D) symbols: to facilitate the rapid and accurate entry of critical data.

To ensure that the reading of symbols actually does facilitate work flow—and does not just add another step to it—you should develop an understanding of the work environment, consider the ergonomics of the job function and the physical layout of the area where scanning will be done, and understand the improvements that could be made to the work area or task by enabling location-specific scanning technology.

Employees are almost always doing something other than just scanning symbols—at least, they should be, unless they are taking inventory. Scanning should to be integrated into the current job processes either seamlessly or, optimally, in a way that eliminates one or more steps from the existing process.

For example, nurses have been known to peel bar code labels off of medications and stick them on their uniforms to scan them later, in order to concentrate on the patient care activity at hand. This practice of delayed scanning ultimately adds a step to their workflow. Ideally, scanning should take place at the time of medication administration, but without affecting the nurse’s focus on the patient. This will also eliminate the possibility of the nurse leaving a trail of suddenly non-adhesive labels behind her on the unit floor.

Hands-On or Hands-Off
While there is a wide variety of reader technologies and configurations available, there are only two basic choices: hands-free or handheld. This is the first consideration to make in evaluating bar code readers for use in a given location, and is entirely dependent on the task.

For hands-free, or fixed-location, readers, the symbol is presented to the reader much like the way a bar code might be scanned in a supermarket. Fixed-location readers can be configured to scan down, sideways, or up, and this method works well for small, easily handled items.

Handheld readers, on the other hand, are brought to the bar code. This works well for large items or for repetitive scanning in a location where additional handling of an item is neither required nor desired.

There are readers that function in both fixed-location and handheld modes of operation. These are best suited for areas where items can be either handled or remain in place (generally because of their size or the inconvenient placement of the symbol).

Following are some examples in which these configurations might be used. Obviously, some of these considerations are also subject to a hospital’s policies and procedures, and there are no absolute “rules” for determining the optimal configuration.

Fixed-Location Readers
In all of the following examples, the health care workers’ hands are busy. Scanning could be integrated into their natural movements, rather than tacked on as an additional task. While not all of these tasks are related directly to pharmacy operations, developing a full understanding of how scanners will be used across the enterprise can be helpful during the purchasing decision. After all, facilities often want to work with one vendor. So, by identifying what each department needs, you will be better able to narrow your choices. Understanding the big picture can also enhance pharmacy’s decision-making role in scanner purchases.
The OR: The reader is mounted on a cart or tray containing bar code labeled supplies and materials. The OR nurse passes the item in front of the scanner as she hands it to the surgeon. With a little practice, this can become an almost seamless scanning technique. For wrapped items, the symbol is scanned as the wrapper is set aside or disposed of.

For surgical procedures, everything can be scanned as it is put on the cart/tray or in a kit. After the procedure, any remaining items are scanned as they are returned to inventory. This method provides a record, by exception, of what has been used.

X-ray Tracking: The reader is mounted on a desk or wall (pointing down) to scan symbols on X-rays that are being checked in or out. Personnel ID badges can also be scanned with the same reader to identify the individual removing or returning the X-ray. This method is not appropriate if an additional symbol has to be scanned from a menu to identify, for example, the department requesting the X-ray.

Instrument Sterilization: Each instrument is scanned as it is placed on a tray or in a sterilization pack before autoclaving. The item or kit is then scanned upon removal.

Handheld Readers
In each of these examples, symbol scanning is a major component of the task. Employees’ hands are typically free to hold or use a reader.

Supply Cabinet: Each inventory item is scanned in rapid succession. No other significant task is performed.

Asset Identification: The employee scans assets, such as beds and infusion pumps, in situ.

Document Processing: When multiple documents are to be identified or a bar code menu is to be read, the handheld reader can quickly read a number of individual symbols in rapid succession.

Key Entry Augmentation: Document or menu symbols are scanned...
during minimal key entry of other information. A handheld wand can be held like a pen even while doing key entry, although some practice is required. Where only one symbol is being scanned, and the document is already being handled, a fixed-location reader may be preferred.

**Fixed-Location — Handheld Combination**

In these examples, both easy-to-handle and large or bulky items will be encountered. As such, a scanner that can function as both a fixed-location and handheld device is the ideal choice.

*Pharmacy:* For bar coded unit dose medications and small packaged medications, the fixed-location configuration may be preferred. For some large bulk packaging or items mounted in a dispenser rack, a handheld reader may be required.

*Bedside Medication Administration:* Similar to the OR configuration, the reader in a fixed location configuration scans items as they are removed from the medication cart or cabinet and administered to the patient. To comfortably and efficiently scan patient wristbands, the reader is used as a handheld device.

**Reader Types**

Selecting the correct reader type requires understanding how the reader will be presented to the bar code (or how the bar code will be presented to the reader) and how much time the worker will have to read the symbol.

- **Wand (pen) readers** are physically moved across a symbol and are best suited to office situations, in which document IDs are to be read either in rapid succession or during minimal key entry.
- **Linear CCD/linear laser readers** produce a single scan line and are suitable for general-purpose applications during which the bar code or reader is, or can be, easily oriented to scan items like charts, wristbands, asset tags, etc.
- **Rastering laser readers** create a scan pattern of parallel or zig-zag lines that can facilitate reading when orientation is not an issue, but placement on an item may vary. Rastering lasers cover a “taller” area and can locate and decode a symbol more quickly. They are also better suited than linear readers to quickly read “composite” and PDF 417 bar code symbols.
- **Pattern (multi-line) laser readers** use multiple scan paths (linear or non-linear) to omnidirectionally locate and decode symbols. These are particularly useful when speed is important, such as in an OR setting.
- **Image array (2D) CCD readers** are essentially cameras. They offer the same reading characteristics as multi-line laser readers, but they are also capable of decoding 2D DataMatrix symbols.

**Symbology Considerations**

2D DataMatrix symbols will be increasingly used for space-constrained marking applications, and, whether you are ready or not, reduced space symbology (RSS) will some day replace the U.P.C./EAN symbol on bar coded items. Check with your reader manufacturer to see if the reader supports RSS, as well as the various GS-1 Composite variants. If the readers do not currently support those symbologies, find out if they will be software upgradeable.

It is also a good idea to find out how such an upgrade would be accomplished. Will it require a visit by a tech, which can disrupt your workflow, or can it be done via the Web, which might put stress on your IT department? It is a matter of choosing which type of pain you prefer.

**Real Considerations**

All this emphasis on workplace design and workflow should have triggered the following thought: “I’m going to have to ask someone about that.” Who better to ask than the nurses, techs, maintenance people, and others who will be...
using the equipment?

If you can arrange for representatives of each group to try a variety of products, you will gain not only insight into their job requirements, but you are also likely to uncover some ways to improve job performance, whether it is streamlining procedures, changing the workplace layout, or finding additional uses for the scanners.

While you certainly do not want to base your entire decision on user input – nor guarantee that you will purchase what someone wants – such demonstrations will certainly help you choose the right reader for a given location and encourage user buy-in when the scanners are ultimately rolled out. As an added bonus, you will help educate your staff, as well.

In summation, technology is just a tool to accomplish a task. It is important to understand the task in order to put the right tool in the hands of those who must use it.

Bert Moore is the director of IDAT Consulting & Education, a technology- and vendor-independent consulting firm located in Alpharetta, Georgia. IDAT helps companies understand, evaluate, develop, and implement automatic identification and data collection solutions. Prior to founding IDAT in 1993, he was the director of technical communications for AIM USA.

WHERE TO FIND Bar Code Scanners and Readers:

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Reader Service#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Corporation</td>
<td>5</td>
</tr>
<tr>
<td>Hand Held Products, Inc.</td>
<td>12</td>
</tr>
<tr>
<td>Intermec Technologies Corporation</td>
<td>23</td>
</tr>
<tr>
<td>Metrologic Instruments</td>
<td>32</td>
</tr>
<tr>
<td>Opticon, Inc.</td>
<td>62</td>
</tr>
<tr>
<td>Precision Dynamics Corp.</td>
<td>73</td>
</tr>
<tr>
<td>Symbol Technologies</td>
<td>80</td>
</tr>
<tr>
<td>Wasp Technologies</td>
<td>91</td>
</tr>
</tbody>
</table>

DUPLEX offers the only ready-to-use delivery system for Cefoxitin in a portfolio covering three cephalosporin generations.

Saves time and labor for pharmacists and nurses.
- Always ready—DUPLEX can be stored at room temperature until bedside activation
- No mixing vials or thawing due to innovative dual chamber design
- Reduces drug waste

Safe for patients.
- Bar code verifies correct drug and dosage to help avoid medication errors
- Latex-, PVC- and DEHP-free, and always has been

Supports compliance.
- JCAHO and USP <797> compliant, providing medications in their most ready to use forms

You can have it up and running in seconds.
To order call 1-800-227-2862 or visit www.duplex.bbraunusa.com.

Today I learned...
Pharmacists have been using the DUPLEX® IV Drug Delivery System for generations.

The DUPLEX IV Drug Delivery System is easy-to-use.

Available Now:
CeFOXitin for injection
Also available:
Cefazolin for injection
CefUROXime for injection
CefTRIaxONE for injection and dextrose injection

For more information, circle #81 on the Reader Service Card