

# Improving Accuracy, Efficiency and Patient Safety in the National Health Service (NHS)



# SELECTING BARCODE TECHNOLOGY TO SUCCEED WITH THE ‘TECHNOLOGICAL TRANSFORMATION’

“Tech transformation is coming”, stated Matt Hancock during his first speech as the UK health secretary, as he vowed £500m of investment in technology to make the National Health Service the most advanced in the world.<sup>1</sup> Featured prominently in this address was the use of barcode technology, including wristbands to track patients and the treatment they receive during hospital stays.

Following the initial Scan4Safety outline originally tested in six NHS Trusts two years ago, officials estimated that NHS could save up to £1 billion over seven years by becoming more efficient. More importantly, barcode technology and specifically the adoption of GS1 and PEPOL standards has huge potential to simplify processes and improve efficiency throughout the healthcare supply chain. By connecting every place, product and person involved in a patient’s journey, it is possible to release time and resources back to what your clinicians do best: care for patients.

With barcode technology set to be at the center of technological “transformation” in NHS, this white paper takes a closer look at the technology that tracks the assets and the critical questions you need to consider for a successful deployment.



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<sup>1</sup> Track patients with barcodes in tech revolution urges Matt Hancock – The Times, 20th July 2018

<https://www.thetimes.co.uk/article/track-patients-with-barcodes-in-tech-revolution-urges-matt-hancock-h5vxxm2nr>

## How do you ensure that you select the right technology to improve efficiency and deliver better patient care?

It's easy to underestimate the complexity of a barcode scanner; after all, they are just one element of the overall solution, but subtle features in the devices you select can have a big impact on the potential benefits. Barcode scanning capabilities are integrated into a range of different devices, varying shapes, sizes and most importantly, price points.

## With that in mind, how do you go about selecting the right technology for each application?

We recommend that you start by asking yourself some key questions:

### What do you want to track?

Not only can barcodes be used to track patients with great effect but they can also be leveraged to monitor the number of hospital assets including medical supplies, surgical equipment and lab samples.

It is entirely possible that the different elements you want to track could have different types of barcodes on them. Identifying these at an early stage will ensure you select a device with the right decoding capabilities.

GS1 standard DataMatrix barcodes are now widely replacing traditional linear barcodes as they:

- Allow the encoding and marking of a greater amount of data within a smaller space
- Enable direct part marking (DPM) of items that cannot be labelled such as surgical instruments
- Provide error detection and correction capabilities to improve the readability of barcodes even when labels or packaging are damaged or soiled

However, while DataMatrix is the most prevalent type of code, it is important to ensure that your chosen scanner can also decode common one-dimensional barcodes and special 2D codes to aid transition and for special applications. Blood, tissues, organs, cells and milk products, for example, are tracked through the supply chain using linear codes and 2D ICCBA ISBT 128 codes that are encoded with donation ID numbers.

It isn't just the type of barcode that needs to be taken into consideration when selecting a scanner. You also need to consider how the barcode has been applied to each item.

### ABOUT THE DATAMATRIX BARCODE



*DataMatrix code, a 2D matrix bar code, consists of black and white cells arranged in either a square or a rectangular pattern. The code has two solid dark edges in an 'L' shape, used as a 'finder pattern'.*

*It also has alternating dark and light patterns on the other two edges, which is used to identify the location and number of rows and columns, called a 'timing pattern'. Inside these borders are rows and columns of cells encoding information. As more data is encoded in the symbol, the number of cells (rows and columns) will increase.*

*DataMatrix can encode up to 3116 numeric digits per symbol. Error correction codes are added to increase symbol strength, which ensures the code can still be read despite potential damage. DataMatrix codes can be quickly read, and because the data is encoded in the center of the cell, it is highly immune to printing errors such as ink spread. DataMatrix is an infinitely scalable code, with commercial applications as small as 300 micrometers and as large as 1 meter squared.*

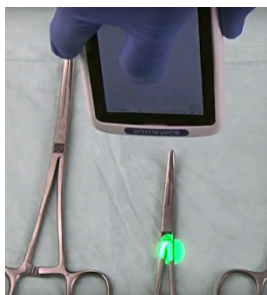
Thermal printing is one of the most widely used technologies due to its ability to print barcode labels and patient wristbands on demand. However, it is also possible to mark barcodes directly on items using laser marking (direct part marking or DPM). Older dot peen marking has largely been replaced by modern laser marking due to the infection risks of dot peen technology. However, you may still have instruments that require a scanner to read that technology. This laser marking method for applying barcodes is particularly suited to the barcoding of surgical instruments or implants where items need to be kept as sterile as possible.

Where barcodes are applied directly, camera-based scanning systems tend to perform better as they can distinguish up to 256 levels of greyscale. This functionality means that some scanners can better handle very low contrast symbols such as those directly engraved on metal.



Salisbury NHS Foundation Trust has been using barcode scanning to carry out product-to-patient tracking. This has enabled the Trust to accurately track 93% of implantable devices to a patient, ensuring it can manage product recalls quickly and efficiently to safeguard patients from avoidable harm<sup>2</sup>. As items are scanned at the point of use, the solution also reduces the risk of human error and inadvertent usage of expired stock in theatre. It also releases care time back to the theatre staff, 32% of which were spending more than one hour per shift on stock-related duties.

#### Where are you likely to scan assets and how often will you need to scan them?



When it comes to scanning patient wristbands, you probably want to ensure that it is possible to do this across all areas of the hospital. However, what about equipment and supplies that start their journey outside the four walls of the main healthcare facility? Do you want to track from the point of order, the point of dispatch, just throughout the facility, or will this be limited to specific areas? How often will you need to scan items? Answering these questions will steer the decision regarding the communication features required and will also influence the decision on the physical device you choose.

You may also want to consider data capture technologies outside of barcode scanning such as RFID or automated systems. Leeds Teaching Hospitals Trust is reportedly using an RFID based solution to effectively manage more than £740,000 worth of inventory, monitoring over 250 SKUs in the pain management departments at three hospitals<sup>3</sup>. In this case, RFID is more appropriate as the solution automates the intensive scan process of checking out medicines and allows for fully automated cycle counting every 30 minutes, 20,000 times a year.

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<sup>2</sup> Salisbury NHS Foundation Trust – product-to-patient tracking case study  
<https://www.scan4safety.nhs.uk/documents/2017/09/scan4safety-enables-product-patient-tracking.pdf/>

<sup>3</sup> Leeds Teaching Hospitals Trust – optimizing the supply chain case study  
<https://www.scan4safety.nhs.uk/documents/2017/06/leeds-teaching-hospitals-nhs-trust-cardinal-health.pdf/>

Imaging technology can also be utilized to form fully automated stock management systems. For example, Datalogic's machine vision technology has been used to develop an automated pharmaceutical sorting machine that enables fully traceable, error-free storage and retrieval of medicines. Medications can be sorted into the machine in any order, are reliably detected and automatically stored. The system uses four cameras and software to capture images of the medication boxes and scan the bar or 2D data matrix codes.

Due to the large reading field of the 2 MP matrix camera, packs of medication can be placed into the order-picking system in any orientation. The four integrated cameras analyze each pack from all sides to identify codes - a procedure that saves employees in pharmacies and hospitals huge amounts of time and reduces the risk of picking incorrect items. Using this fully automated process, up to 100 packs of medicine can be stored in just three minutes, manual effort is reduced to a minimum, and the error rate is virtually zero.

### **Who will be using the devices and what information do they need access to?**

We've already talked about the various scanning technologies available and touched on scanning frequency as a consideration as well. However, it is also extremely important to consider the physical attributes of your barcode scanning solution. Do you want a standalone scanner that can be tethered or connected wirelessly to a department computer? Or do you want to arm your staff with mobile computers that will enable them to scan 2D barcodes at the point of care, and allow them to access a patient's record in the palm of their hand?



A new breed of Android™ powered rugged mobile computers specifically designed for healthcare and resistant to harsh disinfectants provide instant access to the data captured on a touchscreen device. These devices provide additional functionality that is needed to carry out a standard stock check at the point of care, plus they have the potential to provide invaluable information. As they share many similarities with smartphones that many of us are familiar with using, these devices can reduce the learning curve associated with new technology and minimize potential errors.

Based on years of experience, we recognize that every deployment of a barcode capture device, regardless of whether they are being used in retail, hospitality, manufacturing or healthcare, is the importance of gaining the buy-in from users to ensure a smooth rollout and proper usage of the devices. As the users are working with the technology daily, they are likely to offer valuable insights into the potential problems with certain device types for carrying out daily tasks.



They will be able to tell you if the devices are easy to use. Is the device easy to hold or does it feel awkward in the user's hand? Do they need something smaller that can be carried in a pocket or on a lanyard? Small Bluetooth® companion scanners offer an ideal solution to clinicians and other staff members who need an accurate barcode scanning device that will communicate with another device such as a tablet that is fixed to a medical cart.

## SUMMARY

Finding the right balance of barcode scanning technology to meet the objectives of your patient care and asset management initiatives is a delicate process and there are many factors to take into consideration including where and how your devices will be used and by whom.

It's important to consider that different types of devices might be more suitable for different elements of the asset tracking and patient care process. To deliver the best results, it is not necessarily a case of 'one-size fits all' approach and it is worth taking the time to map out the inventory management and patient care process in full and seeking advice to determine the best device selection for each element.



## FEATURED DATALOGIC HEALTHCARE PRODUCTS



### Joya™ Touch A6 Healthcare

- 2D area imaging technology using white light illumination
- Chemical resistant plastics/enclosure withstands daily disinfectants used in cleaning procedures
- Android operating system
- Wireless charging (Qi compliant) featuring fast and boost charging technology to survive long shifts
- VoIP allows users to make and receive phone calls via Wi-Fi
- Multi-purpose device with handheld or pistol grip options



### Memor™ 10 Healthcare and Memor™ 20 Healthcare PDA's

- Features Android 9 (pie) with Google Mobile Services (GMS)
- Wi-Fi 802.11 a/b/g/ac with advanced roaming
- Chemical resistant plastics/enclosure withstands daily disinfectants used in cleaning procedures
- Wireless charging system is ideal for healthcare environments requiring daily disinfectant cleaning



### Gryphon™ Series HC Scanners

- Top reading performance on 2D and 1D barcodes
- Disinfectant enclosures treated with anti-microbial additives (ISO22196 compliant)
- Corded and cordless options available
- Bluetooth® wireless technology or Datalogic's STAR™ Cordless System for seamless transfer of data



### RIDA™ Companion Scanner

- Cordless imager measuring only 11.25 x 4.23 x 2.75 cm and weighing just 85 g
- Outstanding reading performance of 1D/2D printed codes or mobile phone screens
- Compatible with Android, Apple iOS and Windows Mobile devices



#### **About Datalogic**

*Datalogic is a global technology leader in the automatic data capture and process automation markets. We offer manufacturers in the automotive industry identification devices, vision systems and sensors. Our technology detects object presence, safeguards workers with light curtains, assures product quality with vision sensors, and identifies items using laser marking. Process and product traceability are assured by fixed industrial and handheld bar code readers, scanners, and mobile computers that track items through the manufacturing process and on to distribution.*

*For more information visit [www.datalogic.com](http://www.datalogic.com).*

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