



# WHITE PAPER

## IMPROVING ACCURACY, EFFICIENCY & PATIENT SAFETY IN THE NHS - SELECTING BARCODE TECHNOLOGY TO SUCCEED WITH TECHNOLOGICAL “TRANSFORMATION”

### “TECH TRANSFORMATION IS COMING”

stated Matt Hancock during his first speech as UK health secretary, as he vowed £500m of investment on technology to make the National Health Service the most advanced in the world.<sup>1</sup> Featuring prominently in this address was the use of barcode technology, including wristbands to track patients and the treatment they receive as they move around hospitals

Following the initial Scan4Safety scheme originally tested in six NHS Trusts two years ago, officials estimated that the 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 centre of technological “transformation” in the NHS, this white paper takes a closer look at the technology and the critical questions you need to consider for a successful deployment for tracking assets.

## HOW DO YOU ENSURE YOU SELECT THE RIGHT TECHNOLOGY TO IMPROVE EFFICIENCY AND DELIVER BETTER PATIENT CARE?

### ABOUT THE DATA MATRIX BARCODE

Data Matrix 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.

Data Matrix 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 damage. Data Matrix codes can be quickly read, and because the data is encoded in the centre of the cell, it is highly immune to printing errors such as ink spread. Data Matrix is an infinitely scalable code, with commercial applications as small as 300 micrometres and as large as a 1 meter squared.



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 in a range of different devices, of 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:

#### 1. What do you want to track?

Barcodes can be used to great effect to track patients but can also be leveraged to monitor any 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. Mapping all of these out early on, 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 of items that cannot be labelled such as surgical instruments
- Provide error detection and correction capabilities to improve the readability of bar codes even when labels or packaging are damaged or dirty.

However, while Data Matrix is the most prevalent type of code, it is important to ensure that your chosen scanner can also decode common one-dimensional barcodes and specialist 2D codes to aid transition and for special applications. Blood, tissue, organ, cell 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.

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). 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 have the ability to 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 time to care back to theatre staff; 32% of which were spending more than one hour per shift on stock related duties.



## 2. 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, 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 communications 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 Teach 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 scan intensive process of checking out medicines and allows for fully automated cycle counting every 30 minutes; 20,000 times a year.

Imaging technology can also be utilised 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. Medicines 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-megapixel matrix camera, packs of medication can be placed into the order-picking system in any orientation. The four integrated cameras analyse 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.

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

We've already talked about the various scanning technologies out there and touched on scanning frequency as a consideration too. 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 wireless connected 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 may provide more functionality that is needed to carry out a standard stock check but at point of care, plus they have the potential to provide invaluable information. As they share many similarities with the smartphones that many of us know how to use by intuition alone; these devices can reduce the learning curve associated with new technology and minimise potential errors.

One thing we see across every deployment we do, regardless of whether barcode capture devices are used in retail, hospitality, manufacturing or in healthcare, is that gaining buy in from users is critically important to ensuring a smooth roll out and proper usage of the devices. After all, these people will use the technology day in, day out and are likely to offer valuable insight 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 a lot of 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" 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.

1 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-h5vvxm2nr>

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

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

## FEATURED PRODUCTS

### Joya Touch A6 Healthcare

- 2D area imaging technology using white light illumination
- Chemical resistant plastics/enclosure withstands daily cleaning procedures
- Android operating system
- Wireless charging with fast and boost charging technology to survive long shifts
- Voice over IP allows users to make and receive phone calls via WiFi



### Memor X3 Healthcare

- Microsoft Windows CE 6.0 Pro operating system
- 2D area imaging technology
- Patented 'Green Spot' technology for good read feedback
- Chemical resistant plastics/enclosure withstands daily cleaning procedures



### Gryphon Series HC scanners

- Top reading performance on 2D and 1D barcodes
- Disinfectant enclosures treated with anti-microbial additives (ISO22196 compliant)
- Coded and cordless options available
- Different connectivity options including radio and Bluetooth for seamless transfer of data



### RIDA Companion Scanner

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



## Datalogic Group

*Datalogic is a global leader in the automatic data capture and process automation markets, specialized in the designing and production of bar code readers, mobile computers, sensors for detection, measurement and safety, RFID vision and laser marking systems. Datalogic solutions help to increase the efficiency and quality of processes in the Retail, Manufacturing, Transportation & Logistics and Healthcare industries, along the entire value chain.*

*The world's leading players in the four reference industries use Datalogic products, certain of the attention to the customer and of the quality of the products that the Group has been offering for 47 years.*

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