Purpose
The purpose of this paper is to facilitate discussions on the similarities and differences between GS1 DataMatrix and GS1 QR Code data carriers, their use in “business to consumer” (B2C) applications, and the Global GS1 Healthcare preference for the use of GS1 DataMatrix in the healthcare sector.

Regulatory requirements – GS1 DataMatrix as a preferred option
The unique identification of medicinal products is a key objective of regulations around the world. More and more regulators are requiring the use of unique identifiers to be encoded into machine-readable forms (also called data carriers). Increasingly, regulators are recommending or requiring GS1 DataMatrix as that data carrier.

For example, GS1 DataMatrix was widely used on the secondary packaging in successful drug traceability pilots in Austria, Brazil, Colombia, Serbia, Switzerland and the United States (U.S.), and on primary packaging in Belgium. Its use on pharmaceutical products is already specified by regulators in Argentina, France, India, Jordan, Korea, Saudi Arabia, Turkey, Ukraine and the U.S. It is also recommended for use on vaccines in Canada.

Healthcare industry practices – the drive for one bar code symbol: GS1 DataMatrix
While regulatory bodies drive the implementation of GS1 DataMatrix for the fight against counterfeit healthcare products and for better control of the supply chain, QR code is primarily found on packages as a link to marketing information about a product. Applying two or more bar code symbols on the same package or label is not recommended by GS1 Healthcare and its community.

Multiple bar code symbols on a single item can lead to potentially dangerous confusion for the user. Likewise, it can lead to scanning and reading performance issues as the caregiver/pharmacist might find it difficult to identify which bar code should be or has been scanned or read. The GS1 Healthcare Provider Advisory Council (HPAC) developed a position paper highlighting issues with bar codes symbols, which are hindering the implementation process in hospitals.¹

In addition, using multiple symbols takes up valuable package and label space, which could lead to quality issues or other practical manufacturing inefficiencies. When a packaging line must print the bar code and variable information dynamically and in multiple places on an item, two or more printing systems and verification systems may have to be installed and maintained. This leads to more equipment, more costs and more risk of errors.

Although the application of dynamic information in bar code symbols is relatively new to healthcare applications, Data Matrix was developed and in use in global industrial

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applications before QR code. GS1 DataMatrix already has an installed base and background knowledge for use in these types of packaging applications. GS1 DataMatrix is widely used in the healthcare sector, based upon the “industrial” practices in other sectors.

However, consumers are not informed on the benefits of this two-dimensional (2D) bar code and often cannot distinguish it from QR code. The creation and scanning of GS1 DataMatrix have been improved and optimised to better meet the needs of the supply chain, and to enable consumers to easily scan one with a smart phone.

In light of this, it is important to acknowledge all the work accomplished over the past years by the industry to maintain the DataMatrix and improve its printing quality, given that all these efforts can also be applied to the B2C needs. If the industry moved to QR code in place of DataMatrix, all the previous achievements would be wasted and little value realised as QR code does not bring any added benefits.

Data Matrix and QR Code: similar technical capabilities

In comparing the data carriers ISO/IEC Data Matrix (known in the GS1 System as GS1 DataMatrix) and ISO/IEC QR code (known in the GS1 System as GS1 QR Code) from a technical point of view (e.g., amount of data to be encoded, high-level technical capabilities of 2D bar codes, error prevention and detection), there is no significant practical advantage to use one versus the other. Both data carriers are 2D bar code symbologies that can encode large amounts of data in small areas and employ “error detection” and “error correction”. Potentially the only unique benefit in the use of QR code over Data Matrix is a higher efficiency when encoding (Japanese) Kanji characters. However, given that today’s international business language is English, the relevance of this technical advantage is minimal.

Over the last few years, there has been a significant growth of free and downloadable applications (referred to as ‘apps’) on smart phones and mobile communication devices that allow the consumer to remotely access information about a particular item or product. Both GS1 DataMatrix and GS1 QR Code can facilitate connectivity to product information with these types of apps. Previously, B2C apps were limited to scanning QR codes. Nowadays, new apps are developed which can scan Data Matrix as well, giving greater user flexibility.

In the future, through GS1’s increased collaboration with the Open Mobile Alliance (OMA), apps will be able to access product information via the GS1 Global Trade Item Number (GTIN), a trusted URL through the generic bar code symbologies noted, and the 2D bar code carrier (i.e., GS1 DataMatrix, GS1 QR Code). This will enable additional information in the GS1 Application Identifiers (AIs) associated with the GTIN and encoded in the data carrier. For example, when scanning a GS1 DataMatrix on a pharmaceutical packaging, the user will be able to identify the GTIN of the trade item and any relevant encoded AIs, such as expiration date, lot/batch number and/or serial
number. It could potentially provide access to the product’s Electronic Information for Use (EIFU), patient leaflet, or maybe even to an instructional online video.

GS1 Healthcare current activities on GS1 DataMatrix and Apps

- GS1 works on enabling smart phones to read both GS1 DataMatrix and GS1 QR Code bar code symbols
- GS1 has developed a healthcare demo app to demonstrate the B2C capabilities of GS1 DataMatrix

Recommendations and Conclusions

Considering all the aspects of this discussion, GS1 Healthcare and its global members continue to strongly support the implementation and use of GS1 DataMatrix as the only recommended data carrier. As per GS1 Standards, GS1 DataMatrix is the only permitted GS1 2D matrix bar code carrier for the healthcare sector.

To help bring awareness of the positive effects with the use of GS1 DataMatrix as the only 2D data carrier for the healthcare supply chain, GS1 Healthcare encourages any new investments and education in the areas of printing and scanning using GS1 DataMatrix for mobile apps.

For more information, contact Geraldine.lissalde.bonnet@gs1.org

About GS1 Healthcare

GS1 Healthcare is a global, voluntary user community bringing together all Healthcare supply chain stakeholders, including manufacturers, distributors, Healthcare providers, solution providers, regulatory bodies and industry associations. The mission of GS1 Healthcare is to lead the Healthcare sector to the successful development and implementation of global standards by bringing together experts in Healthcare to enhance patient safety and supply chain efficiencies.

GS1 Healthcare members include over 60 leading Healthcare organisations worldwide. For more information about GS1 Healthcare, and to view this paper please visit www.gs1.org/healthcare.