AIDC Application Standards for Healthcare

GS1 DataMatrix

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23 October 2012

Topics…

A <u>General</u> Discussion of GS1 DataMatrix, with a GS1 Healthcare Application Standards Focus

- Why GS1 DataMatrix in Healthcare
- Data Matrix… The Symbology
  - "GS1 DataMatrix" son of "ISO/IEC Data Matrix"
- Thoughts on Structure & Quality
- Practical Application - Printing / Reading
- Q&A

Topics…

A <u>General</u> Discussion of GS1 DataMatrix, with a GS1 Healthcare Application Standards Focus

- **Why GS1 DataMatrix in Healthcare**

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Why… Bar Code use in Healthcare

AIDC Application Standards…

Define which **data** to carry in which **data carrier** for any Healthcare product at all packaging levels

Improve patient safety

- Reduce medical errors
- Enable effective product recalls
- Fight counterfeiting
- Enable adverse event reporting
- Increase time for patient care

Increase efficiency & save costs

- Improve order and invoice process
- Optimise receiving
- Reduce inventory & improve shelf management
- Increase productivity
- Improve service levels/fill rate
- Improve benchmarking and management of supply cost
- Efficiently document treatment in patients' Electronic Health Record

Healthcare specific – data & carrier requirements…

Expiry Date, Lot, and/or Serial Number

Small space

Direct part marking

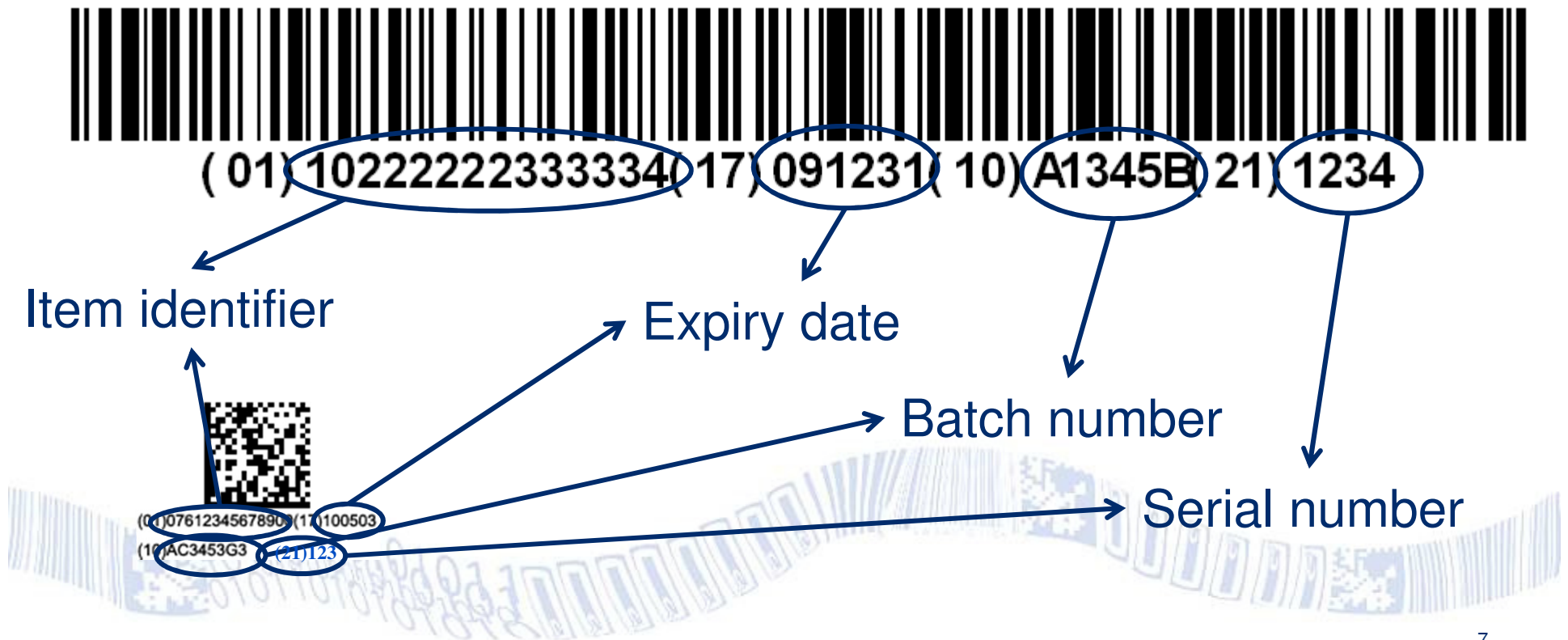Additional data & variable data at high production rates

Non-retail channels

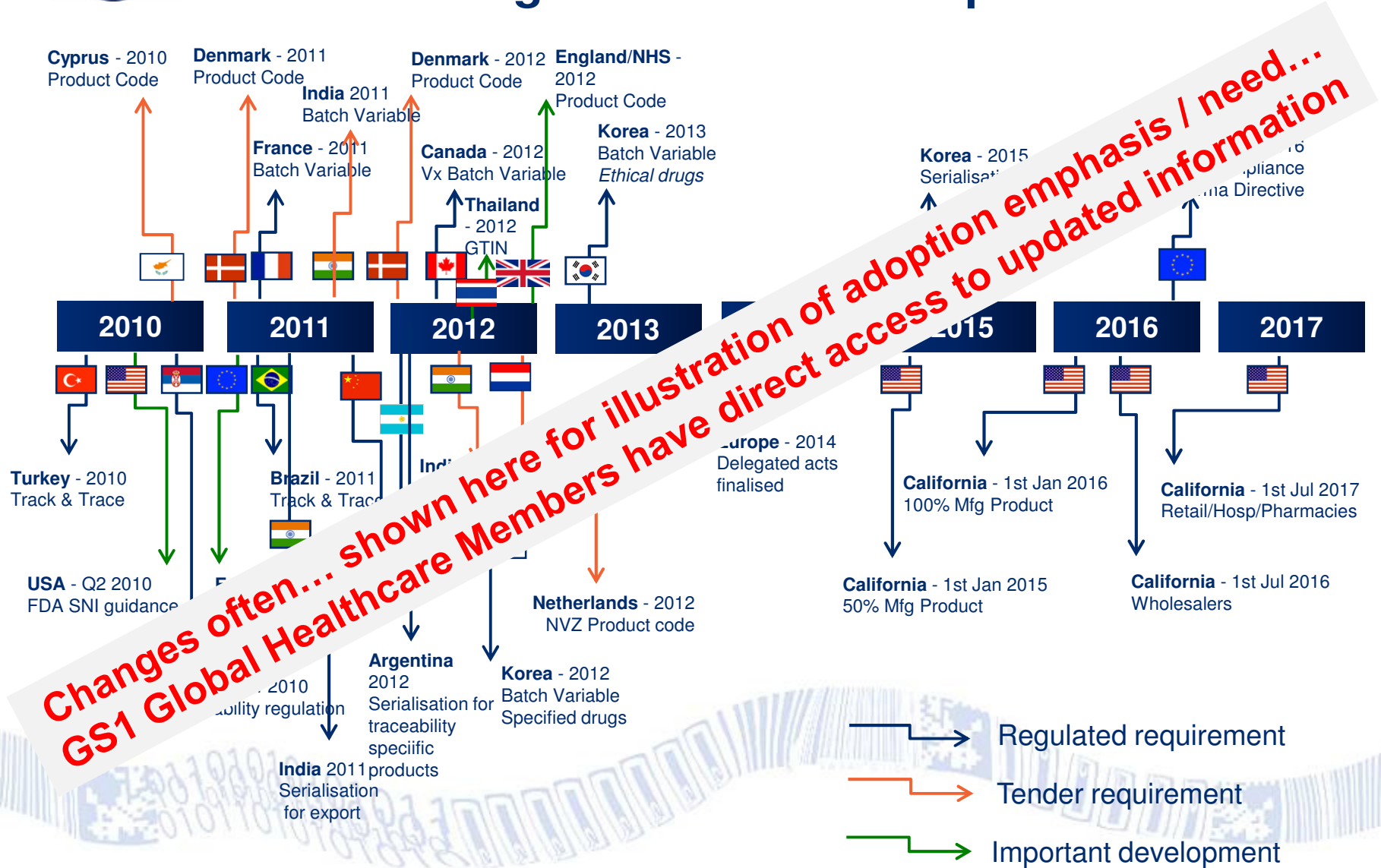**And more…**

The need to capture the ID key ... and beyond...

GS1 Keys prevail... but some users need more detailed information about that specific unit

(01) 10222222333334 (17) 091231 (10) A1345B (21) 1234

Item identifier

Expiry date

Batch number

Serial number

(01) 07612345678909 (17) 100503
(10) AC3453G3 (21)123

Pharma
New coding & serialisation requirements

Cyprus - 2010
Product Code

Denmark - 2011
Product Code

India 2011
Batch Variable

France - 2011
Batch Variable

Denmark - 2012
Product Code

Canada - 2012
Vx Batch Variable

Thailand - 2012
GTIN

England/NHS - 2012
Product Code

Korea - 2013
Batch Variable
Ethical drugs

Korea - 2015
Serialisation

Korea - 2015
Serialisati...

...pliance
...ma Directive

| 2010 | 2011 | 2012 | 2013 | 2015 | 2016 | 2017 |

Turkey - 2010
Track & Trace

Brazil - 2011
Track & Trace

Indi...

USA - Q2 2010
FDA SNI guidance

Europe - 2014
Delegated acts finalised

California - 1st Jan 2016
100% Mfg Product

California - 1st Jul 2017
Retail/Hosp/Pharmacies

California - 1st Jan 2015
50% Mfg Product

California - 1st Jul 2016
Wholesalers

Netherlands - 2012
NVZ Product code

... 2010
...ability regulation

Argentina 2012
Serialisation for traceability speciific products

Korea - 2012
Batch Variable
Specified drugs

India 2011
Serialisation for export

→ Regulated requirement

→ Tender requirement

→ Important development

Changes often... shown here for illustration of adoption emphasis / need...
GS1 Global Healthcare Members have direct access to updated information

© 2012 GS1

Medical devices
New coding and database requirements
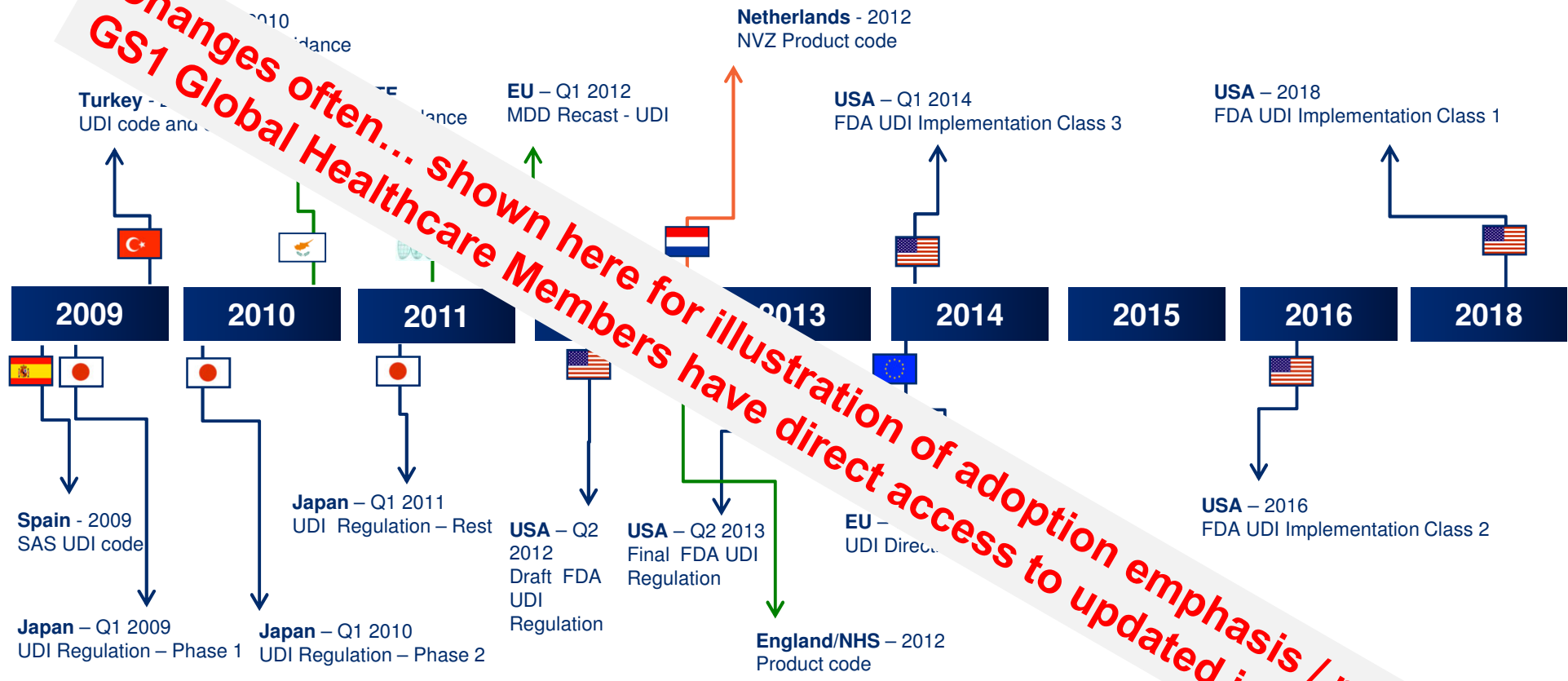
Netherlands - 2012
NVZ Product code

EU – Q1 2012
MDD Recast - UDI

USA – Q1 2014
FDA UDI Implementation Class 3

USA – 2018
FDA UDI Implementation Class 1

Turkey -
UDI code and

Changes often… shown here for illustration of adoption emphasis / need… GS1 Global Healthcare Members have direct access to updated information

| 2009 | 2010 | 2011 | 2013 | 2014 | 2015 | 2016 | 2018 |

Spain - 2009
SAS UDI code

Japan – Q1 2011
UDI Regulation – Rest

USA – Q2 2012
Draft FDA UDI Regulation

USA – Q2 2013
Final FDA UDI Regulation

EU –
UDI Direc

USA – 2016
FDA UDI Implementation Class 2

Japan – Q1 2009
UDI Regulation – Phase 1

Japan – Q1 2010
UDI Regulation – Phase 2

England/NHS – 2012
Product code

Canada, China, Italy, Korea, UAE, etc.: UDI regulation under development

India: UDI requirements pending

Tender requirements

Regulated requirements

Important development

© 2012 GS1

Serialisation of pharmaceuticals

Changes often… shown here for illustration of adoption emphasis / need…
GS1 Global Healthcare Members have direct access to updated information

- = country requires serial number
- = country developing requirement for serial number
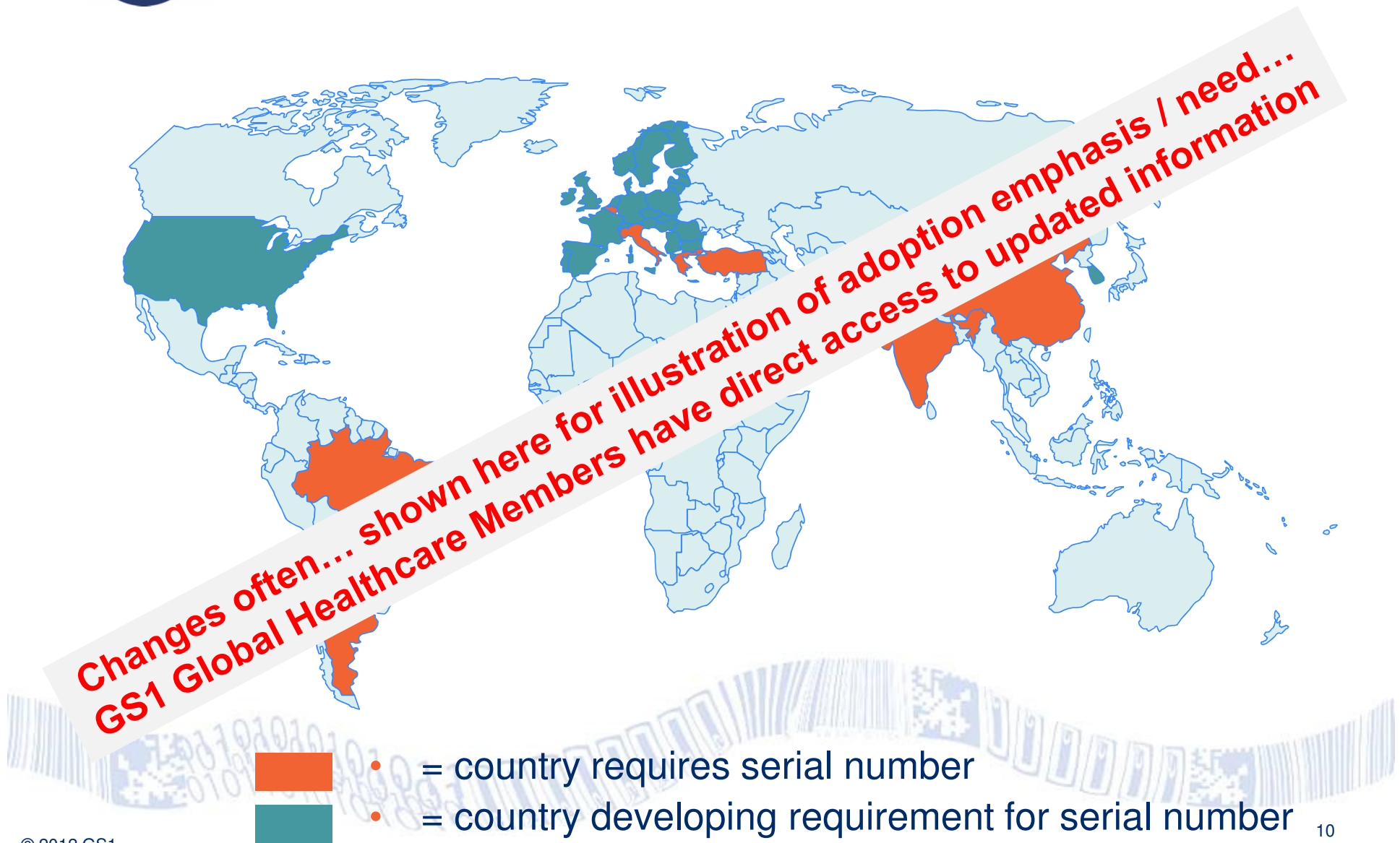
DataMatrix on pharmaceuticals

Switzerland: Sma... Pilot

Spain: Pilot

France: AFSSAPS regulation (2011)

Belgium: Pilot project unit dose marking

Austria: Cytostatics

Canada: Vaccines

Serbia: Pilot

Turkey: Regulatory requirement (2010)

US: ... on Vacci...

Korea: pharma regulatory requirement (2012)

Brazil: Traceability pilot successfully completed – ANVISA regulation

Argentina: Traceability regulation

...quirement for ... 11

Changes often... shown here for illustration of adoption emphasis / need... GS1 Global Healthcare Members have direct access to updated information

• ■ = country requires DataMatrix
• ■ = country using DataMatrix in pilots and/or developing requirement for DataMatrix

Why… Bar Code use in Healthcare

…**for patient care**

(Youngest GS1 system user?)

GS1 Data Carriers for Healthcare… an example…

Product type?	Pharmaceutical
Distribution channel?	Retail POS
Information need?	Minimum
Package level?	Secondary

Ideal…

EAN/UPC

Looking forward…

GS1 DataMatrix

Composite Component

GS1 DataBar

Future POS use…

GS1-128

ITF-14

GS1 Data Carriers for Healthcare… an example…

Product type?	Pharmaceutical
Distribution channel?	Non-retail
Information need?	Enhanced
Package level?	Secondary

EAN/UPC

5 012345 678900

Ideal…
GS1 DataMatrix
(01) 00012345678905

Composite Component

(00) 0 0123456 123456789 6
(02) 5 0123456 78901 7 (37) 000288 (02) 5 0123456 11111 5 (37) 000045
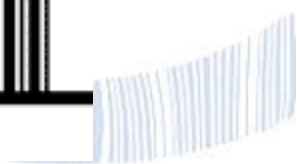
LOT: T12345
EXP: 03/2012

GS1 DataBar
IF space allows…

GS1-128
IF space allows…
(00) 0 0123456 123456789 6

ITF-14
0001234567 8905

14

Topics...

A General Discussion of GS1 DataMatrix, with a GS1 Healthcare Application Standards Focus

- Why GS1 DataMatrix in Healthcare
- **Data Matrix... The Symbology**
  - **"GS1 DataMatrix" son of "ISO/IEC Data Matrix"**
- Thoughts on Structure & Quality
- Practical Application - Printing / Reading
- Q&A

Data carriers for specific HC needs

GS1-128 &
GS1 DataBar
Preferred options if:
- ✓ package allows

(01) 0 0012345 67890 5

GS1 DataMatrix
Preferred option if:
- ✓ Large amount of data in a small space
- ✓ Variable information at high production rates
- ✓ Direct part marking

(01)07612345678900(17)100503
(10)AC3453G3

EPC/RFID
Additional option
- ✓ Non-line of sight
- ✓ Large amount of data

Data Carriers: Bar Code Symbologies

Symbologies…

Bar code symbology "evolution"

| 1D "Linear" | 2D "Multi Row" | 2D "Matrix" |

0   1 2 3 4 5   6 7 8 9 0   5

Data Carriers: Bar Code Symbologies

Symbologies more simply…

BARCODE SYMBOLOGIES

"1D"

"2D"

"COMPOSITE"

"STACKED"

"MATRIX"
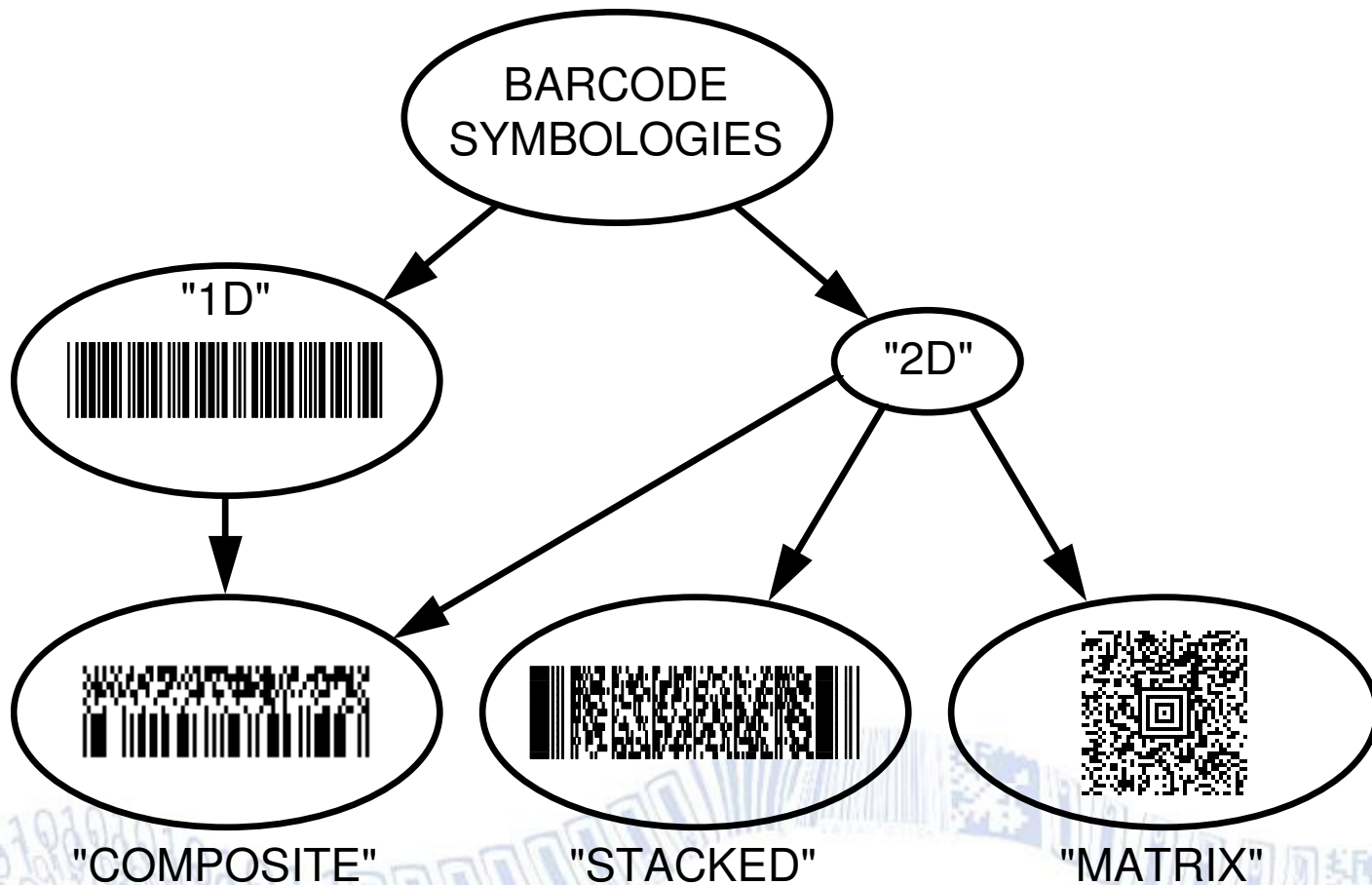
Data Carriers: Bar Code Symbologies

Symbology "categories"…

- ## 1D Linear
  - The "normal" symbologies we are all familiar with… UPC/EAN, Code 39, Code 128, etc.

- ## 2D "Multi Row"
  - Also known as "stacked" symbologies, linear or "row" based… Code 16K, Code 49, PDF 417, etc.

- ## 2D "Matrix"
  - True "two dimensional" codes based on dot or element placements in a matrix… DataMatrix, QR Code, Aztec Code, MaxiCode, etc.

Data Carriers: 2D Bar Code Symbologies

Many to choose from… are they all "the same"…

QR Code

MaxiCode

Aztec Code
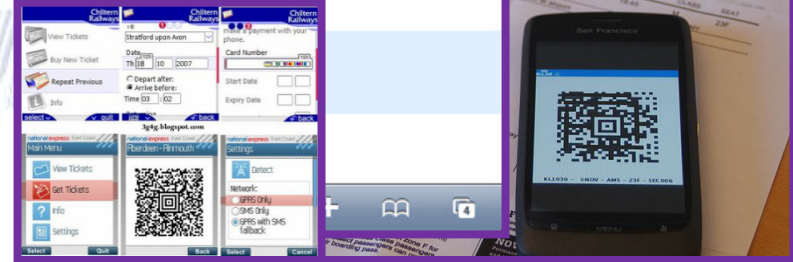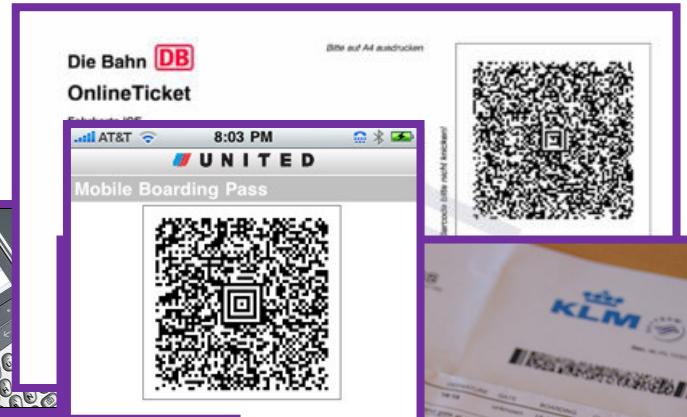
ISO Data Matrix Symbology

- Established 1989 by International Data Matrix
- Internationally standardized in ISO/IEC 16022
- Scaleable matrix from 9 x 9 to 49 x 49 modules
  (Size Change w/ Data Content… in "block steps"… an example later on)
- Error Detection & Multiple Error Correction Levels
- Multiple encoding formats and macros
- More adaptable to "direct" marking (DPM)
- Primary Applications - Parts marking (Automotive, Semiconductor, Healthcare instruments, Aerospace), Pharmaceutical packaging, Package labeling / addressing

One cell quiet zone surrounds the matrix

Clocking pattern

This cell is always white for ECC200

Clocking pattern

Data Region

L shape locator pattern
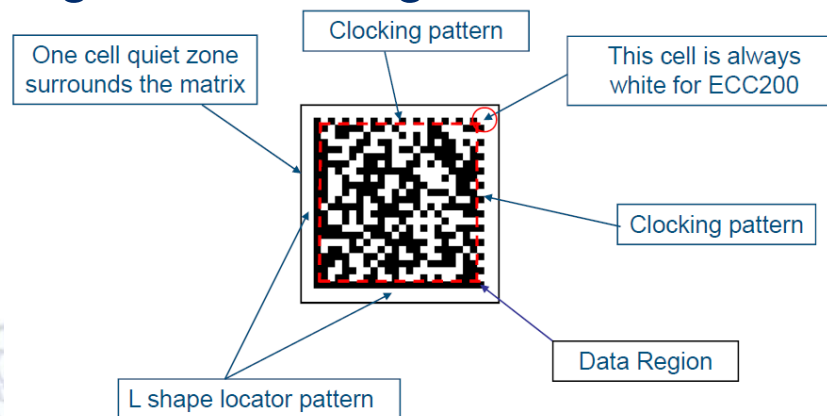
"Some" Data Matrix Applications

Direct Part Marking (DPM)

Identification & Document Tracking

Item Package & Label Marking
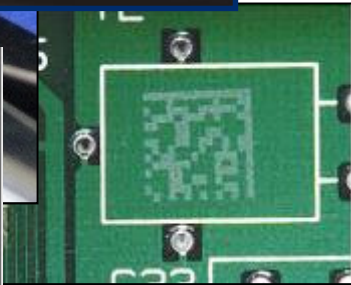
Packaging Verification

GS1 DataMatrix Symbology

One cell quiet zone surrounds the matrix

Clocking pattern

This cell is always white for ECC200

Clocking pattern

Data Region

L shape locator pattern
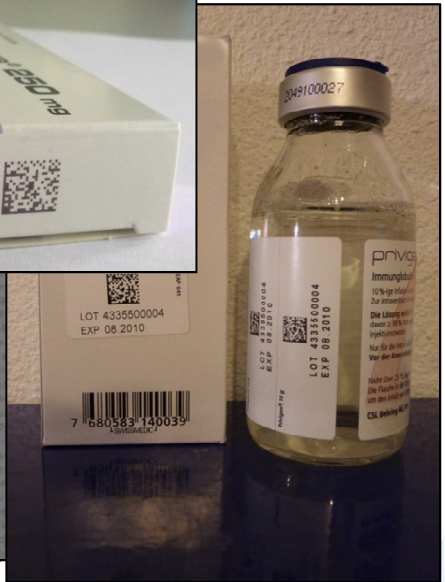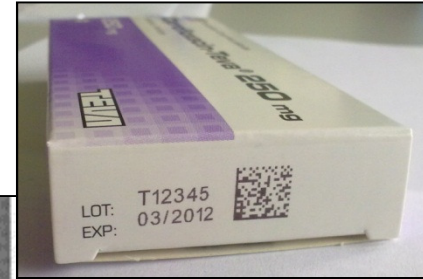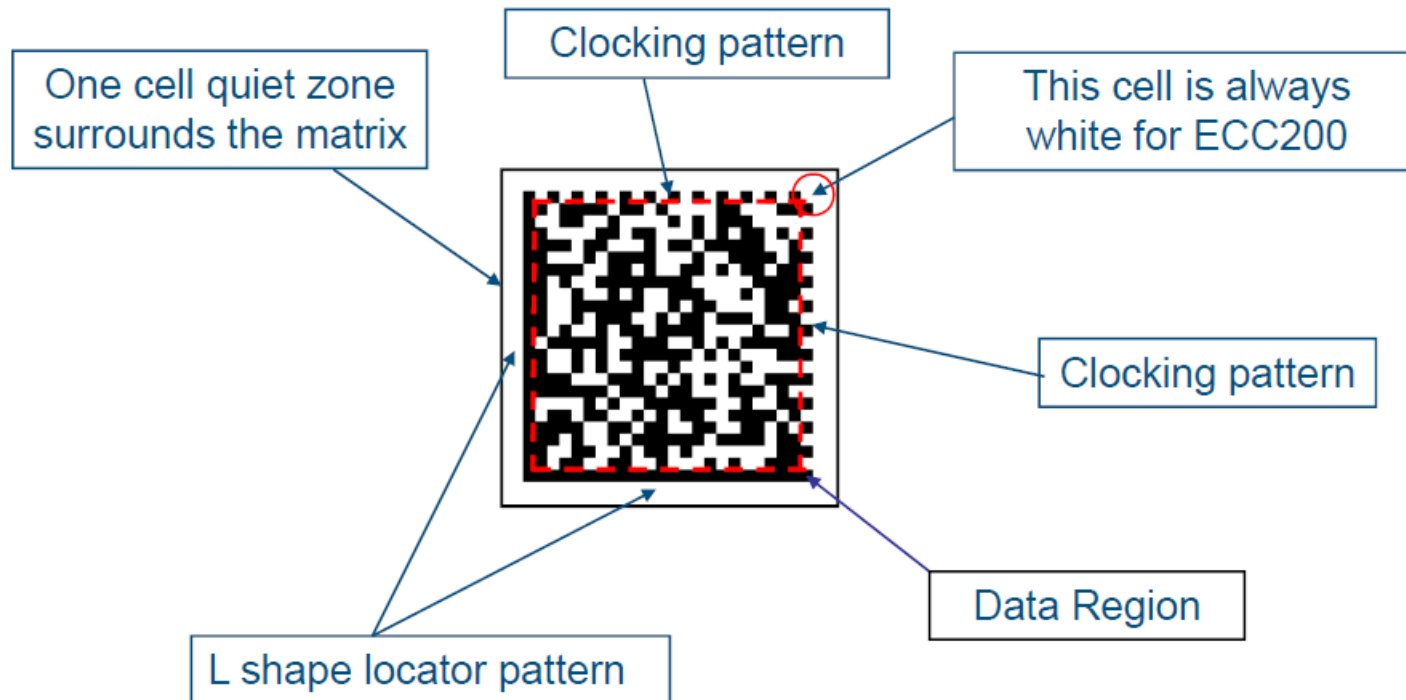
- ISO/IEC 16022 Data Matrix… used as "GS1 DataMatrix":
  - Special considerations?
    - Similar to the Code 128 / GS1-128 "relationship", <u>an FNC1 in the first data position signals GS1 formatted data</u> & a **GS1 DataMatrix**
    - Is always "ECC 200" & Alpha-Numeric encodation capable
    - GS1 DataMatrix has a specific ISO/IEC Symbology Identifier

GS1-128…
Size Changes w/ Data Content… in "steps"

Symbol 1 - GTIN Only

Symbol 2 - GTIN + AI(17)

Symbol 3 - GTIN + AI(17) + AI(10) of 4 numeric & 6 alpha

Symbol 4 - GTIN + AI(17) + AI(10) of 8 numeric & 12 alpha + AI(21) of 13 numeric & 1 alpha

For <u>EACH</u> extra individual character you add to the data string… the symbol increases in length…
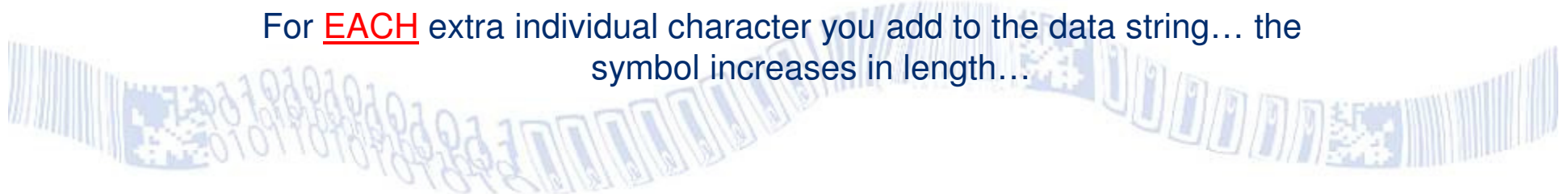
GS1 DataMatrix…
Size Changes w/ Data Content… in "block steps"

Symbol 1 - GTIN Only → 0.107in x 0/107in (0.011 sq inch)

Symbol 2 - GTIN + AI(17) → 0.121in x 0.121in (0.015 sq inch)

Symbol 3 - GTIN + AI(17) + AI(10) of 4 numeric & 6 alpha → 0.134in x 0.134in (0.018 sq inch)

Symbol 4 - GTIN + AI(17) + AI(10) of 8 numeric & 12 alpha → 0.147in x 0.147in (0.022 sq inch)

Symbol 5 - GTIN + AI(17) + AI(10) of 8 numeric & 12 alpha + AI(21) of 3 numeric → 0.468in x 0.468.in (0.219 sq inch)

Symbol 6 - GTIN + AI(17) + AI(10) of 8 numeric & 12 alpha + AI(21) of 13 numeric & 1 alpha → 0.507in x 0.507in (0.257 sq inch)

Symbol 7 - GTIN + AI(17) + AI(10) of 8 numeric & 12 alpha + AI(21) of 15 numeric & 2 alpha → 0.507in x 0.507in (0.257 sq inch)

Symbol 8 - GTIN + AI(17) + AI(10) of 8 numeric & 12 alpha + AI(21) of 17 numeric & 3 alpha → 0.507in x 0.507in (0.257 sq inch)
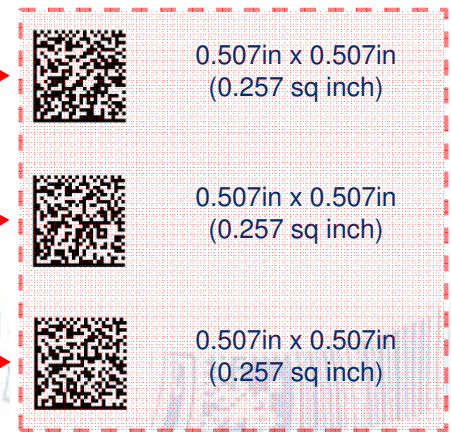
Scanning 2D Matrix Symbols

Linear Scanners:

- Laser line or linear imager based
- Massive, long-term installed base
- Scans 1D / Linear and some 2D Stacked symbols
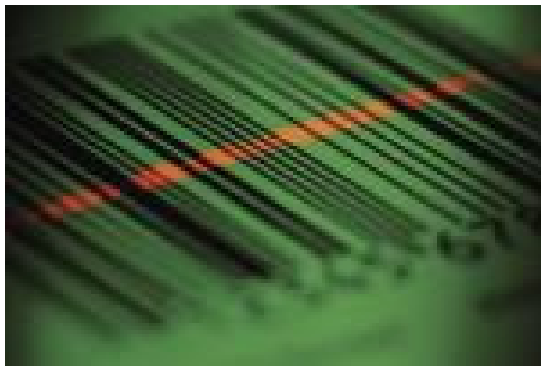
Area Image Scanners:

- Camera based
- Growing installed base in industrial, commercial, healthcare
- Scans 1D / Linear, 2D Stacked & 2D Matrix symbols

Camera-based bar code scanners are needed in Healthcare AND are a GS1 Healthcare Leadership Team recommendation!!

(01) 0 0012345 67890 5

GS1-128 & GS1 DataBar

(01)07612345678900(17)100503
(10)AC3453G3

GS1 DataMatrix

Position – Camera/Imager Scanners…
(June 2007, Re-issued October 2010)

Preparing members, solutions providers and end users for the future thru global positions…

Get your copy at:

http://www.gs1.org/docs/healthcare/GS1_HUG_ps_Camera_Based_Scanners.pdf -or-
http://www.gs1.org/healthcare/library

Position – GS1 DataMatrix Adoption…
(December 2011)

Preparing members, solutions providers and end users for the future thru global positions…

Get your copy at:

http://www.gs1.org/docs/healthcare/GS1_Data_Matrix_Position_Paper.pdf

GS1 DataMatrix Symbology

GS1 DataMatrix
An introduction and technical overview of the most advanced GS1 Application Identifiers compliant symbology

This document facilitates processes by offering detailed information on GS1 DataMatrix and its technical characteristics encoding, printing and reading. It is a repository of reference information that can support the implementation of GS1 DataMatrix in any sector, industry or country.

http://www.gs1.org/services/publications/online/

GS1 DataMatrix
An introduction and technical overview of the most advanced GS1 Application Identifiers compliant symbology

Th crucial guideline to define an application standard according to your sector business needs

GS1 BarCodes

Topics…

A General Discussion of GS1 DataMatrix, with a GS1 Healthcare Application Standards Focus

- Why GS1 DataMatrix in Healthcare
- Data Matrix… The Symbology
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- **Thoughts on Structure & Quality**
- Practical Application - Printing / Reading
- Q&A

Bar Code Symbol Quality is…

 …much more than just "optical" print quality and / or using a verifier to determine a grade... there is great benefit in looking at the whole picture of quality and gaining the knowledge and understanding of what these checks, tests and results can tell you... how they can help you… and how they can improve the AIDC system

Awareness and understanding of overall bar code symbol quality, and the complete process to determine and understand it, can have many benefits to the users of bar code driven AIDC systems

Symbol Quality in the GS1 System

GS1 General Specifications
Version 10
Issue 1, Jan-2010

+

GS1 General Specifications

ISO/IEC 15415 Information technology -- Automatic identification and data capture techniques -- Bar code print quality test specification -- Two-dimensional symbols

ISO/IEC 15426-2 Information technology -- Automatic identification and data capture techniques -- Bar code verifier conformance specification -- Part 2: Two-dimensional symbols

ISO/IEC 16022 Information technology -- International symbology specification -- Data Matrix

ISO/IEC TR 24720 Information technology -- Automatic identification and data capture techniques -- Guidelines for direct part marking (DPM)

ISO/IEC DTR 29158 Information technology -- Automatic identification and data capture techniques -- Direct Part Mark (DPM) Quality Guideline

Have the right "tools" for the job, starting with proper documentation, education, training…

Linear (1D) & Matrix (2D) Bar Code Symbols

Common Quality Parameters

- Decode / RDA
- X Dimension / Module Size
- Data Structure, Validity

- Human Readable Interpretation
- Symbol Contrast
- Modulation
- Quite Zones, as applicable

1D Only

- Bar Height
- Minimum Reflectance
- Edge Contrast
- Defects
- Decodability

2D Only

- Fixed Pattern Damage
- Axial Nonuniformity
- Grid Nonuniformity
- Unused Error Correction
- Print Growth
- Clock Track Regularity

33

Quality Parameters

Decode / Reference Decode Algorithm

Is the symbol readable, does it fulfill the rules of the Reference Decode Algorithm, is it a GS1 DataMatrix and is the data in a GS1 format.

- Has the proper structure to be a Data Matrix
- Has a Function One (FNC1) Character in the first data position
- Has data properly structured & encoded according to the GS1 General Specification
    - NOTE: This "data structure" is the same as for GS1-128…just in a different "bar code"!

GS1 DataMatrix Symbology…
…or not… how DO you know?

GS1 DataMatrix ■ **(FNC1 & AIs)**

Symbol decode:

]d2 0110857674002017171411201OKMB11205201[GS]21CEB630078700

Whether you use a Verifier or go "more manual"… it's all in the data… and the ISO Symbology Identifier!

ISO Symbology ID's are Internationally agreed (ISO/IEC 15424) 3 character codes that scanner/imagers output at the beginning of a data string that tells what bar code symbology has been read. It is in the form

]cm *where:*

] - (ASCII 93) the ID flag character
c - code (symbology) character as ISO defined ("**d**" = Data Matrix)
m - modifier character(s)

Symbol decode:

]d1 0110857674002017171411201OKMB11205201[GS]21CEB630078700

ISO Data Matrix - (No FNC1)

Quality Parameters

Symbol Contrast

Like with 1D / Linear… the difference between the light and dark parts… a bigger difference is better

Modulation

Not unlike 1D / Linear… is a measure of the uniformity of reflectance of the dark and light modules

Quality Parameters

Fixed Pattern Damage
A test for damage to any of the "fixed patterns" (finder patterns etc.)

Missing clock pattern

Finder pattern irregularity
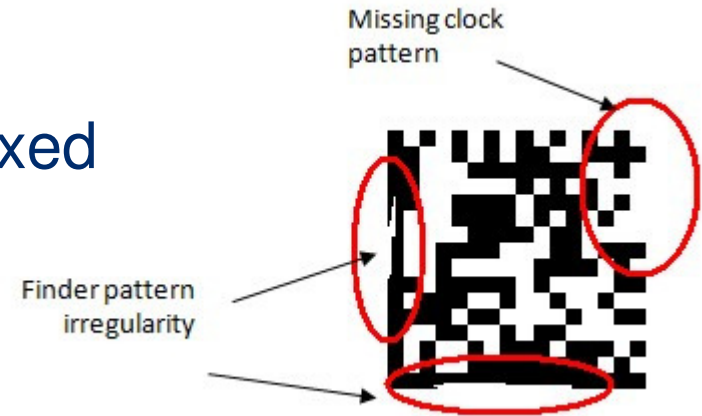
Unused Error Correction

Damage in the Symbol	High Error Correction	Reduced Unused Error Correction Capacity

Quality Parameters

Axial Non-uniformity & Grid Non-uniformity

The symbol modules are in a regular grid or matrix. Axial & Grid Non-uniformity check if the symbol has been squeezed or squashed or distorted
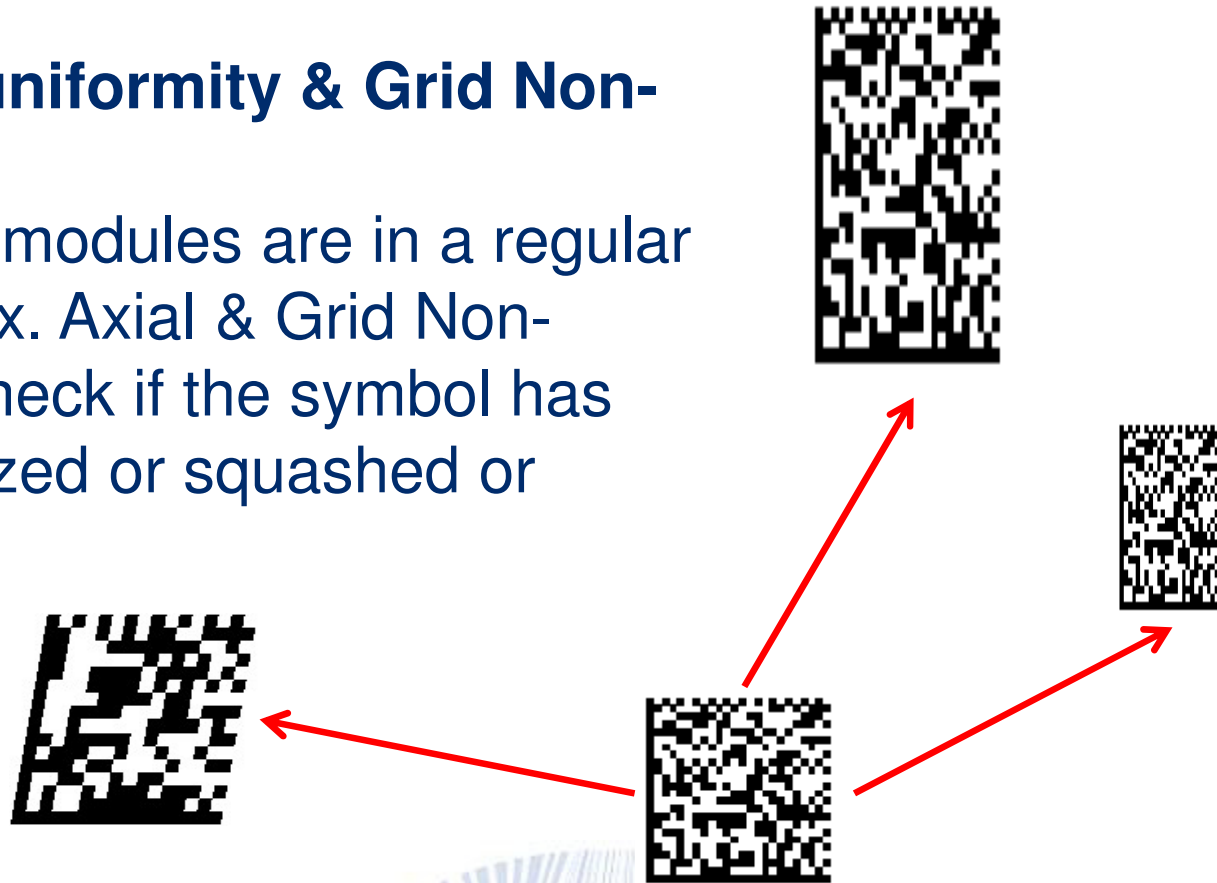
Quality Parameters

Print Growth

Have the modules grown or shrunk from normal…
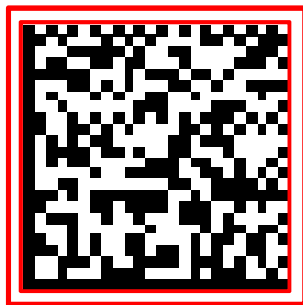
Quiet Zones (aka Light Margins)

Similar to 1D Linear symbols there is a "Quiet Zone" that must be kept clear… but it is on ALL FOUR sides…

Quality Parameters

Bar Code Print Quality Verifiers are available for testing 2D Matrix symbols like GS1 DataMatrix

Check out the <u>AIM Buyer's Guide</u> **for a listing of most manufacturers**

2D symbol verification…

…just like 1D symbol quality verification is a process where <u>before</u> you use a verifier you should:

- follow <u>common sense</u>, use your eyes, look at the whole picture…

- remember there is <u>more</u> to bar code symbol quality <u>than just getting a "grade"</u> …

- use <u>all</u> the "tools" you have available…

- learn and investigate !

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GS1 DataMatrix Symbology…
Implementation questions

Overview – Most early adopters have been hesitant to share details as yet on implementation challenges, this can be for many reasons such avoiding operational comparisons, keeping competitive advantage, protecting an active pilot implementation project, lack of long term cost information, etc. Many times we have been told the more significant costs are in IT infrastructure changes. We are all learning...

Costs - Manufacturing? – When it comes to implementation costs anecdotal estimates have run from $25K to about $500K (or more) USD per manufacturing line for printing / scanning updates (without serial number addition). Many note that with printing software it is critical to ensure automatic inclusion of the leading Function 1 character.

GS1 DataMatrix Symbology…
Implementation questions

Productivity? – In all cases we have heard that no one would even attempt to install systems if they were not assured that it would not negatively affect productivity.

Costs – User? – IT infrastructure changes may be the major unknown cost as it is different user to user. Scanner costs will depend on the type & use case need, however single, tethered/corded handheld "gun" type scanner imagers can cost about $150 - $300 USD per unit… from there (depending on quantities, type of unit, features, etc.) the costs can go slightly lower but also can rise into the $1000's USD for some systems. Bar code symbol print quality verifiers can run $2000 USD and up, but are available.

GS1 DataMatrix Symbology…
Implementation questions

Printing / Marking:

• Many existing "demand" label printers can print Data Matrix well

• May not be the case for all "in line" printers (validity of inks, needed speeds, etc.)

• DPM brings on a whole new set of challenges

• Beware the missing FNC1

(01)07612345678900(17)100503
(10)AC3453G3

GS1 DataMatrix

Printing / marking must, of course, be matched to the application use case needs… as with other bar code symbol generation

GS1 DataMatrix Symbology…
Implementation questions

Area Image Scanners:

- Camera / area imager based
- Growing installed base in industrial, commercial, healthcare
- Scans 1D / Linear, 2D Stacked & 2D Matrix symbols
- Competitive pricing more apparent

(01)07612345678900(17)100503
(10)AC3453G3

GS1 DataMatrix

Camera-based bar code scanners are needed in Healthcare AND are a GS1 Healthcare Leadership Team recommendation!!

A Practical need in the Healthcare supply chain #1…

Implementation of GS1 DataMatrix

- To meet the French "CIP" requirements
- Identification of the product with "Lot/Batch" & "Expiry"
- Tests already run to add Serial Number and a country specific NHRN (National Healthcare Reimbursement Number)
- Running at "normal" line speeds - 300 cartons/minute, 45m/min
- Print sizes – 300 DPI, Module size of 345µm, Wolke m600A, Universal Black UB 7482 HP Inkjet cartridge
- Read & verify – On and off-line camera based & verifier systems

Another practical need in the Healthcare supply chain #2, EFPIA…

EFPIA - Coding Pharmaceutical Products in Europe
Data Matrix – Coding proposal derived from GS1 standards

Manufacturer Product Code (GTIN or NTIN) - 14 digits
Unique Serial Number (randomized) - up to 20 alpha-numeric characters
Expiry Date - 6 digits (YYMMDD)
Batch Number - up to 20 alpha-numeric characters

+ minimum requirements on quality of randomisation

Example:

GTIN:	(01) 07046261398572
Batch:	(10) TEST5632
Expiry:	(17) 130331
S/N:	(21) 19067811811

Specifications provided in EFPIA's:
"European Pack Coding Guidelines"

A practical need in the Healthcare supply chain #3… B.Braun

Technical challenges

- Limited space means → small carriers + high data density
  - e.g. DMX size : 6x6 - 10x10 mm
    - Production/packaging line speed
    - Packaging materials
    - Printing technology
    - Inks

DMX through the camera of the verifier

Quality challenges

- Quality verification (ISO)
- Translucent paper
- Impact on contrast

A	B	C	D	F

4 3,5 3 2,5 2 1,5 1 0,5 0

ISO required = C (1.5 – 2.5)

(product label text)

Infusomat Space Line

Type IV-Standard-Luer Lock

2012-01   250/145cm
2010-01
LOT 0A04218SIA
REF 8700036SP
PZN 2955068
STERILE EO   GTIN : 04045928002121

GB I.V. administration set. For infusion by compatible pumps. DE Infusionsgerät. Für die Verwendung mit geeigneten Druckinfusionsapparaten. BG Набор за венозно приложение. За инфузия със съвместими помпи. CN 静脉输液装置。用于兼容输液泵输液。 CZ Infuzní sada. Pro infuzi kompatibilními pumpami. DK IV-infusionssæt. Til infusion med kompatible pumper. EE Manustamiskomplekt. Ühilduvate infusioonipumpadega infusiooniks. ES Dispositivo de infusión i.v. Para infusión mediante bombas compatibles. FI Infuusiolaite. Infusoitavaksi yhteensopivilla pumpuilla. FR Set d'administration. Pour perfusion par pompes compatibles. GR Συσκευή έγχυσης. Για έγχυση με συμβατές αντλίες. HU Infúziós készlet. Kompatibilis pumpákkal való infúzióhoz. IT Set per infusione endovenosa. Per infusione tramite pompe compatibili. KR I.V. 투여 세트. 호환가능 펌프 주입용. LT Intraveninio vaistų skyrimo rinkinys. Skirtas infuzijai naudojant suderinamus siurblius. LV Komplekts intravenozām pielietojumam. Paredzēts infūzijām ar atbilstošiem sūkņiem. NL Infusieapparaat. Voor infusie met compatibele pompsystemen. NO Infusjonsapparat. For bruk med kompatible pumper. PL Zestaw do infuzji dożylnej za pomocą zgodnych pomp. PT Conjunto de administração IV. Para perfusão com bombas compatíveis. RO Set administrare iv. Pentru perfuzie

P = Pressure (Druck)   non-pyrogenic

CE 0123

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A Practical need in the Healthcare supply chain #2…

Operating Room

Sterilisation Unit

Use

Case carts

Stock

Transport

Preparation

- ✓ Cleaning
- ✓ Dis-/assembling
- ✓ Maintenance
- ✓ Substitution
- ✓ Set configuration
- ✓ Completeness check

Sterilisation

- ✓ Creation of 'Steri Batches' (e.g. labels)
- ✓ Batch loading and release

Instruments reprocessing cycle – Micro-logistics

Surgical instruments

Specific marking needs to manage critical internal logistics processes

(use, cleaning, (dis)assembly, sterilisation, etc.)

- must fit on **small space**
- must be able to carry **sufficient information** (item identifier & serial number) to enable traceability
- must **remain readable** throughout the intended life span of the item
- must be **practical** (easily retrievable, etc.)
- must be **biocompatible**
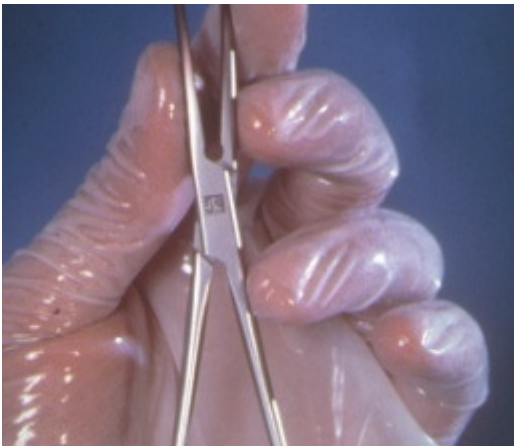- must be **standards-based**

Special cases…
Small instrument marking

Data carrier: GS1 DataMatrix

- Target useable mark area of 2.5mm x 2.5mm
- One bar code on a single instrument
- Though not limited to, laser etching is recommended
- Mixed marking technologies within the same scanning environment should be avoided (ensures highest reading performance)

Identification key: GTIN

- GTIN (Global Trade Item Number) – preferred option
  - GTIN-12, -13 or -14 allowed
- GRAI (Global Returnable Asset Identifier) or GIAI (Global Individual Asset Identifier) – in case of hospital legacy system

Attribute: Serial number

- AI(21) (Application Identifier) mandatory - Serial number

Small instrument marking
Application

Camera-based bar code scanners needed

- Fixed scanner operation (present the instrument to the scanner to be read) is likely

- Scanner specific for direct part marking will give best performance

Questions?

You can ask now…

…or you can ask later.

Contact Details

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