Can we print a code onto a tablet or capsule?

Printing on Tablets & Blister Pouches

The following slides have been taken from a presentation created by and for Tony Walsh as Strategic Business Development Director of ISG Domino Printing plc in 2008 for the annual HDMA Conference in Arlington, Virginia USA which covered work successfully undertaken at MeditraQ in Holland and during other pilots and trials.
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Can we really code to not just unit of dispense but to tablet, capsule or dose level?


2. “The world’s largest ink producer, Hewlett-Packard, was looking to put its stamp on pharmaceutical tablets and capsules. It’s assembled a team of partners for printing and serializing drug products, and was looking for a commitment from a major drug maker”.

3. However, for many reasons the market moved towards ePedigree and serialisation at traded item (pack) level and desire for code it tablet and capsule level, at least in mass, regulated markets lost its impetus.

4. We can code each individual tablet or capsule with a unique machine readable code – yes if you wish to pay for it! – the technology exists, but it is currently slow, needs either special coatings on tablet for laser printing or use of FDA approved inks for direct printing.

Nevertheless, it is still possible to code each individual tablet or capsule with a unique machine readable code – if you wish to pay for it! – Inks need to be FDA Approved but this technology using inkjet or even laser (with a specially applied coating) has existed for many years.

More recent developments in UV Cold Laser technology seem to offer opportunities to print codes, HRI and brand identity such as logos onto capsules and tablet at high speed.
Can we print a code onto a tablet or capsule?

We can code tablets or capsules at batch level with the same code on every item ready for packaging. It is possible to code every single tablet or capsule with a unique code if required. This tends to slow down the process and make it more expensive to produce.

The following work was undertaken at MeditraQ Centre of Excellence and other global trial and pilots to test and prove that individual tablets and blister pouches could be serialised and uniquely coded.
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We can code each blister pouch with a unique machine readable code & human readable text (HRI) – this work was developed in 2008/9 printing individual blister pouches at line-speed on a pharmaceutical licenced production/packaging line in Holland.

In Europe, this offers a more cost-effective solution to unique identification and serialisation down to tablet/capsule level well beyond any current regulatory or legislative requirements.

If you print individual blister foils on the reverse, you can leave each tablet without a machine-readable code – as standard – and still retain unique identity and serialisation for each and every tablet or capsule.

We can code each blister pouch with a unique machine readable code & human readable text
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At blister strip-level you can code each blister strip with a machine-readable code on the top or the reverse of each blister including HRI (Human Readable Interpretation – text)
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You can code each carton with a unique machine readable code & human readable text – and link or aggregate it to each blister strip or each unique number on each pouch on the strip, to patient safety leaflet and to each item level pack.

You can code each carton with a unique machine readable code & human readable text – EPFIA code showing 4 data pieces, GTIN (product code), expiry, lot/batch & unique serial No.
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You can code each carton with a unique machine readable code (Data Matrix) & human readable text – GS1 code showing 4 data pieces, (01) GTIN (product code), (21) unique serial, (17) expiry date, (10) lot/batch Number.

Shown with Application Identifiers (AI’s) - (01), (21), (17) & (10) shown in brackets.

You can code each carton with a unique machine readable code (Data Matrix) & human readable text – code showing 4 data pieces, (01) GTIN (product code), (17) expiry, (10) lot/batch & (21) unique serial No. with Application Identifiers (01), (21), (17) & (10) – here showing codes sequentially – although codes are more usually – for security reasons – are randomly selected and applied making each Data Matrix code and each carton code being unique.
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Codes are a mixture of both dynamic and static data. Within the 4 data pieces, (01) GTIN (product code) is a static code (doesn’t change from pack to pack), (17) expiry (dynamic code changes occasionally from day to day or batch to batch), (10) lot/batch & (21) generally static – will not change from pack to pack on a production/packaging run – only when the batch/lot number itself changes.

The unique serial number is dynamic – changes from pack to pack – each and every pack!

Application Identifiers (01), (21), (17) & (10) – are static each part of the 4-string code is identified using the same AI, even if the actual date string changes.

How do we code 400+ Unique Data Matrix codes/minute with 4 lines of human readable text?

10 times as many at seen above – YES 10 TIMES!
We printed 2 blisters in tandem at a time. This method allowed printing in volume and each DataMatrix code was read and passed/rejected using high-speed cameras on the packaging line, prior to insertion into packs.

Each blister has shown has 10 pouches which is 20 pouches/pack.

10 pouches + 10 Pouches = 20 pouches/pack with 20 Data Matrix/pass at 24 strips/minute = 480 Data Matrix Codes with 4 pieces of data in each code.

This system require data input, data printing, data checking, pack must be checked and either passed or rejected at line-speed.
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In demonstration mode printing 24 cartons a minute (each carton holding two blisters)

This means we printing 480 Data Matrix/minute with 4 lines of text (data) in each code.

We are reading each individual code and verifying its content in real-time.

We are rejecting all strips with a faulty, unreadable or incorrect code to meet global standards.

In 2008/9 - “We can print up to 33 cartons a minute (each carton holding two blisters) – and still getting faster. This means we can print 660 Data Matrix/minute with 4 lines of text (data) in each code. Our current speed restriction is not the Control software but the vision system, pack handling and coding systems - once these can match the Control software performance who knows – in Ireland we are printing more than 150 cartons a minute but not blisters”.

Since 2009 – technology has moved on at a rapid pace, speed of data transfer at line level, speed of printing (TIJ, CIJ, Laser) and the speed of camera technology and other related equipment.

Is there a future for Printing on Tablets & Blister Pouches?

As we now move into the final implementation phase of Pharmaceutical and Medical Device serialisation across USA and Europe we will need to look to the future. Those of ‘us’ who were in the first wave of developing serialisation solutions in pharmaceutical and medical device supply chains, always knew that reaching this implementation point would not be the end, simply the end of phase 1.

History has taught us that even with significant improvements the systems that we are implementing will not be perfect and that issues will arise both from patient demands and from systems that either do not perform or fail in some way.

As we move towards more personalised medication there will be a shift to unit-dose or dose-level customisation, coding, marking and traceability. This might herald a new day for coding and marking on tablets, capsules, vials, ampoules, syringes and other means of dispensing. By then technology and patient demands will have moved on – but we will need to ensure that regulation and legislation keep pace or we will end up with a chaotic free-for-all.

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