

# Patient adherence; addressing the largest global therapeutic area with packaging solutions

**KEYWORDS:** Packaging, pharmaceutical, adherence, medication, marketplace.

## ABSTRACT

Can Pharmaceutical treatment adherence, arguably the largest therapeutic area and biggest issue facing the Pharma industry be addressed through innovative packaging solutions - what technologies can be used to influence behaviour, improving adherence to medication regimes and thus improving outcomes? In this article we will discuss the size of the opportunity for the industry and how, through packaging; improved structural designs and interaction with smart technologies, can improve the patient experience with benefits for Governments and manufacturers alike.

For the pharmaceutical industry, the overwhelming challenge for 2018 remains the delivery and ongoing implementation of product and production changes coupled with the handling of increased data flows and management that are required to meet the deadlines for serialisation and authentication required by the Falsified Medicines Directive (FMD) on a global and perhaps fragmented platform.

The FMD legislation will, it is suggested, support the reduction of dangerous, counterfeit pharmaceutical products in circulation within the wider pharmaceutical market. There is however another key challenge, a challenge that the pharmaceutical and health industry has been wrestling to address. Affecting product effectiveness, patient outcomes and business sales, namely medicinal non-compliance or as some would label it patient adherence. Statistics suggest that in the order of 50% of all scripts generated do not reach the patient or to put it in context some \$700bn plus of sales are lost to the Pharmaceutical industry! Taking this to its logical conclusion it would suggest that patient adherence is the largest therapeutic area, however it receives but a fraction of the R&D budget that is allocated to other more resource intensive areas; oncology, pain relief, diabetes and so forth... if the pharmaceutical industry woke up to the fact that they could theoretically double their sales for no capital cost then maybe there would be some movement.

Attributed to some 125,000 US deaths annually, the causes of non-adherence are largely grouped under the categories of communication and complexity. Both Rx and OTC pharmaceuticals can benefit from the introduction of innovation and smart technologies delivered through the packaging systems, enhancing communication and ultimately improving the patient experience via integration

with the Internet of Things (IoT) and other digital technologies. Creating an improved adherence culture is possible through a variety of relatively new technology advances; digital print technology capabilities combined with the decreasing cost of the specialist printing inks required for these processes have opened the door for communication through packaging. Additionally, the IoT is connecting the patient to the care giver or indeed into a world of "reminders" driven through the exceptional capabilities of the ubiquitous smart phone.

## SMART BARCODES

Through the Smart Phone, providing the power and capability to drive the on-pack systems the provision of communication can be leveraged - as stated earlier the correlation 'Communication = Adherence'. Smart Barcodes (1) are now available that provide links and access to 'reminders' via user friendly apps and then through the IoT the delivery of talking packaging and other rich media occurs. This is hugely powerful as a medium; connecting the patient adherence functionality easily and cost effectively. These Smart Barcodes can also be used to deliver other rich data; audible, video etc relating to Patient Information, ingredients, adherence and so forth making access easy for those with visual impairment or in regions where literacy is an issue. Until now, unit on-cost of typical 'chip' (2) technology has been prohibitive. Providers of the smart barcodes have developed their technologies, reducing costs; a secure 2-way connection to an information platform with associated content merely from scanning a standard printed product barcode using an app on a smart device, ...this must be good! A major advantage to brands implementing this technology is that there are no artwork changes or physical packaging modifications required, which are often a barrier to entry for some tech solutions.

## PRINT TECHNOLOGY

Looking now at printed technologies, the application of electronic circuits printed onto blister pack foil allows the capture of compliance data, useful to the care-giver community, producing time stamps which are recorded when breaking each individual blister pocket. Uploaded to a cloud-based adherence tracker this data confirms patient adherence to the treatment, accuracy of dose, feeling at the time of dose; mood, side-effect etc. The data is then used by physicians to review outcomes... the opportunities are obvious.



Using a device for enhanced communication.

### ON-PACK PERSONALISATION

A growing understanding of personalised packs or dispensers and then the correlation of personalised medicines to patient "ownership" and thus adherence is growing too. Improved capabilities in decorative print provide advanced late stage personalisation opportunities. Direct to container print permits complex packaging profiles to be printed, transforming perhaps a generic, boring, asthma inhaler into a fully printed, lifesaving superhero sidekick for kids, or with personalised dosage instructions for seniors. Graphic design and print is already employed successfully on inhalers and similar functional devices to humanise them to younger users; the ability to personalise creates a stronger bond and therefore the increased likelihood of adherence.



Photo courtesy of Cypak.

### Discretion through design

On the same basis, packaging design excellence can improve adherence. The development of 'stylish', discreet or travel-style formats prompted by deploying the well-worn

FMCG strategy of increasing a product's 'usage occasions' is key, developing pack systems that are sympathetic to a busy, active lifestyle. Sophisticated-sleeve packs or slim personal care-style compacts, discreet in design, size and are pocket/bag friendly. Creating packs that benefit from personal discretion during dispense of medication are perfect and do deliver adherence benefits. Keeping the treatment 'secret' through primary or secondary packaging designs will encourage adherence by reducing the embarrassment of treatment being broadcast. These design options are increasingly used in the Cx product portfolios where legislation is more relaxed, the challenge is however to meet all current market regulatory guidelines for Rx implementation and to build the case for future inclusion as a benefit to patient adherence.



Market examples of discreet pocket packs.

### INSTRUCTIONAL EXPERIENCE FROM GAMING TECHNOLOGY

Upping the ante now, Smart technologies utilising Augmented Reality (AR) capabilities are also proving valuable within the wider medical field, providing platforms for remote video support, training aids and real-time overlays during surgical procedures. In 2017 30% of global 2000 companies were reportedly (3) trying out virtual or augmented reality content as part of their media strategies. Familiarity is building, the growing middle classes in emerging markets are increasingly seeing AR in the home (often in the West for immersive gaming experiences).



Image capture of journey inside artery courtesy of Sliced Bread Animation.

It is now but a matter of time before AR is more widely utilised for 'at-home' medication uses, maybe visual overlay guides for newly diagnosed diabetics to assist with rotation of insulin injection sites as an example. Some animation production companies now specialise in the pharma arena as the demand from the market for training and promotional content grows, thus the creative foundations for adoption of AR as patient guidance are already in place. With the potential of hosted brand channels securely accessible from smart devices, via scannable packaging, delivery of educative AR content tailored to the patients' needs is already available.

## FUTURE OPPORTUNITIES

The collation of patient data, albeit anonymised, aided by smart technologies opens the door for a more effective approach to medicinal dispensing and adherence.

What price a centralised 'Amazon Prime' style dispensing service. The capability is all there, personalised packs for Mrs Jones via IoT and printing technologies for the personalised packs. A patient's prescription will be dispensed, combined into a daily scheduled packaging format, printed with unique, individualised dose instructions all delivered next-day. This methodology provides simple management of even the most complex of drug regimens.

It is perhaps likely that Pharmaceutical companies will start to deliver drugs in 'bulk' packaging or perhaps modified individually packed units ready for final dispense into the personalised patient pack.

We started with serialisation, in this scenario big pharma might have to consider the coding of the individual pill or dispenser. Specialist and complex medicinal needs could be managed and customised and regimes easily scheduled and dispensed, thus taking any guess work out of the mix for the patient.



Image courtesy of Sky News.

The benefits for first adopters of enhanced solutions within Pharma are far reaching. Increased medicinal compliance improves quality of life and patient outcomes, decreasing pressure on health services. Conservatively the pharma industry can significantly improve its sales channel by almost double, the net results being:

- better patient outcomes,
- sales numbers,
- lower drug costs etc.

on top of that the perceived brand value and product effectiveness elevating those early technology adopters to be the prescribed 'brand of choice' for medical practitioners and ultimately for the brand to achieve the nirvana of peer group endorsement.

So, growth of sales, improvements in patient outcomes, endorsement by the medical profession... what is not to like???

Finally, the quality of the drug when reaching the patient – again managed by the packaging solution. Not directly adherence but to do with delivering the drug in best quality to ensure most effective use. Smart sensor labels are added to cold chain packs, changing colour at a pre-defined temperature to highlight product spoilage or safety issues, ensuring that at point of dispense a visual record can be reviewed and confirm the medication has not been compromised and can optimally deliver its active ingredients to the patient. Alternatively smart sensors (NFC, RFID or others) can be scanned with devices to confirm product authenticity for patients and consumers, or even be paired with mobile devices to track, monitor and provide reminders to use the drugs to ensure adherence to a prescribed regime. The potentials for connectivity are endless... as are the opportunities for improvements in patient outcomes.



Photo courtesy of Stora Enso.

## REFERENCES

1. Smarter Barcodes via SmartGlyph Ltd
2. RFID, NFC etc
3. <https://www.idc.com/getdoc.jsp?containerId=prUS41888916> ■

## ABOUT THE AUTHOR

**Chris Waterhouse** is the Managing Director of iDi Pac Ltd, passionate in delivering improved functionality and performance through packaging and Supply Chain solutions.

