



Quick Response code overview

1. Objectives

This overview is intended as a practical guide to Quick Response (QR) codes. It provides a framework to help you use QR codes within other elements of the communications mix.

This guide will:

- enable you to understand what QR codes are and how best to use them to optimise the reach of your message
- illustrate their increasing adoption within the communications environment
- highlight how they are used effectively
- provide pointers to help you decide which type of QR code initiative will achieve the best results.
- showcase examples of how QR codes are used
- highlight some methods that can be adopted to increase their use
- provide typical costs for selected models
- help you optimise return on investment.

2. Definition and terminology

A QR code is essentially a two-dimensional (2D) barcode that can be scanned to redirect the user to a marketing item that is online, such as a website, pdf or video. QR codes can effectively increase the reach of a message by being used in conjunction with sharing mechanisms to engage a wider audience, as well as combining them with audio-visual and interactive graphics to add stimulus and interest for the user.

QR codes are a form of 2D symbol created by Denso Wave (established under the name of Denso) in 1994, with the primary objective being a "code read easily by the scanner equipment". The code is an information matrix that carries data in the vertical direction as well as the horizontal, hence the '2D' term. By encoding in each direction, QR codes can carry up to several hundred times more information than ordinary bar codes.

QR codes can be used to add value to printed media, for example:

- Use a QR code on a leaflet that is promoting a drug. The user scans the code with their phone and is immediately sent to the product website for an interactive product presentation.
- On a poster at a medical congress. The user scans the code and receives, on their phone or iPad, a video of the chief investigator describing the study.

How do QR codes work?



3. Code formats

QR codes use technology similar to the traditional one-dimensional (1D) codes found on everyday products.

1D barcode



2D barcode



3.1. Design criteria

The QR code is created (see section 4.2) to allow a scanning device to translate the formatted code and then redirect to something online.

As well as standard QR codes, it is also possible to include design elements or branding within them.

BBC QR code example



However, the QR code's level of complexity and pixellation is set by the length of the web address that the code is linking to. This is illustrated below, with one code going to a full web address and the other to a shortened URL.

Full URL



Shortened URL



Considerations

- Branded QR codes can stand out from the others if deployed somewhere where many QR codes are competing for attention, such as a Congress or exhibition booth, and are a distinctive technique.
- Consideration should be given to whether the intended audience has the appropriate smartphone technology to enable code scanning, although market penetration of smartphones and iPads are increasing rapidly.
- The destination for the person scanning the QR code must be an attractive 'value add' option, ideally offering an incentive to scan rather than, for example, simply being a pdf version of what is being read.

4. Deployment considerations

4.1. User requirements

Users of QR codes need to have available the following:

- a camera-equipped smartphone
- a QR code reader
- good connectivity to the network.



4.2. Generating a QR code

Many free applications exist that can create a QR code immediately, with numerous examples available on the internet. One such application is:

- <http://zxing.appspot.com/generator/>

4.3. QR code uses

Once created, the code may be applied to whatever communications materials are appropriate, including:

- Handouts/reprints
- Posters
- Web pages with download links
- vCards
- SMS codes
- Videos
- Polls

Case study: Verizon/ScanLife campaign

Verizon launched a campaign to promote the wide variety of apps available using DROID devices has seen over 150,000 scans in just over 3 months. QR Codes were placed throughout an integrated campaign which included print ads, in-store displays, direct mail, websites, and even iPad ads. Interestingly, voluntary sampling of approximately 20,000 users shows the technology is used across a wide range of age groups and income levels. of 0.91% in the test group.

Key learnings

If the incentive to scan is targeted correctly and provides 'value' to the end user update on QR codes can be a very successful way of increasing message penetration at the same time and enhancing brand image through the use of an innovative marketing technique.

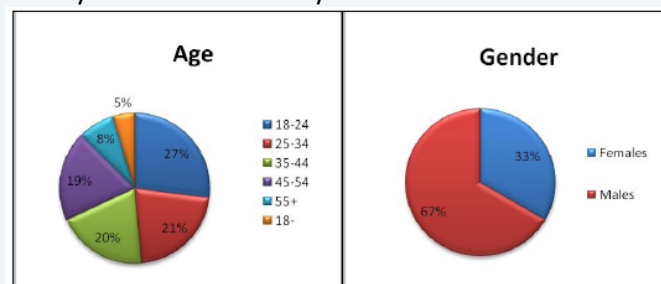
- Using codes in an integrated way, across media will significantly increase results
- The web is a good environment for codes if it adds value (i.e. linking to mobile app downloads)
- Codes should provide immediate access to relevant content when consumers need it
- The technology is universally used across a wide range of age groups



ROI and key data

Below is some specific data from the ScanLife campaign:

In just over three months, the campaign has seen **over 150,000 scans**, making it the most successful ScanLife campaigns in North America. The technology has opened up a world of immediate access for DROID customers directly from a wide variety of material.



The use of QR codes in the Pharmaceutical industry is relatively new, but gaining in popularity as general adoption levels and availability of code readers increase.

This is an example of a QR code used on a congress poster, which directed the user to a pdf copy of the paper. Although successful consideration should be given to 'what added value' will be derived from the scanning of the QR code to increase the satisfaction of the scanner. Can we provide added information over and above that provided alongside the QR code, a commentary, extra data or a link to a video of the investigator describing the study for example.

3rd International Congress of ADHD, 26-29 May 2011, Berlin, Germany

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Treatment response heterogeneity in children with ADHD during treatment with modified-release methylphenidate in the observational OBSEER study

Manfred Döpfner¹, Christopher Hautmann¹, Aribert Rothenberger²

¹Department of Child and Adolescent Psychiatry, University of Cologne, Cologne, Germany; ²Department of Child and Adolescent Psychiatry, University of Göttingen, Göttingen, Germany

Scan code and visit [www.obseer-study.com](#) to receive PDF file of the paper. (Personal: 1-6-2011) (C: 486) [www.obseer-study.com](#) 15/03/2011

Introduction

Attention deficit hyperactivity disorder (ADHD) is a chronic condition requiring continuous treatment and monitoring. Stimulants have been shown to be effective in reducing ADHD symptoms. In particular, methylphenidate (MPH) is considered the drug of choice for ADHD in many countries throughout Europe. MPH is available in short-acting, immediate-release (IR) formulations and long-acting, modified-release (MR) formulations. The latter are administered once daily and are as effective as MPH IR taken two or three times a day.¹ Equasym XLA (Janssen Development Inc.) is an MPH-MR formulation consisting of a combination of 20%, 5% and 70% extended-release (ER) MPH.

Despite the overall large effect of stimulants on ADHD symptoms, children vary in their response to treatment. Distinct subgroups of patients can be identified that present different pharmacodynamic profiles and follow different trajectories of symptom severity over time. Observations from clinical practice also suggest that some children with severe ADHD experience strong symptom reduction under medication, while for others the benefits are minor. Tailoring the distinctive features of these subgroups could help identify variables with high predictive power for the response to medication, allowing the identification of children who are likely or unlikely to benefit from treatment.

OBSEER (Observation of Safety and Effectiveness of Equasym XL in Routine Care) was a prospective, observational study examining the effectiveness and safety of Equasym XL over 2 months in children and adolescents with ADHD either newly diagnosed or treated with a different medication.

Methods

- OBSEER included children aged 6-17 years with a confirmed diagnosis of ADHD.¹ Treatment with Equasym XL (10/20/30 mg) was directly planned by the treating physician, and who were attending school. Children could be either treated once or treated with a different medication.
- Exclusion criteria were contraindications according to the Equasym XL Summary of Product Characteristics and the presence of a medical history.

Study design and treatment

- OBSEER was a non-intentional, non-controlled, multicentre, prospective observational study conducted in 149 centres in Germany. Physicians were responsible for medication and/or child and adolescent psychiatry.
- The planned observation period for each patient was 6-12 weeks after first use of Equasym XL. There were three phases:
 - **Val 1**, initial visit prior to initiation of Equasym XL treatment
 - **Val 2**, follow-up visit scheduled for 1-3 months after first use of Equasym XL
 - **Val 3**, final visit 6-12 weeks after first use of Equasym XL
- Treatment with once-daily Equasym XL was administered according to standard practice.

Assessments

- Teachers and parents evaluated ADHD symptoms at all three study visits using the German ADHD Symptom Checklist (German ADHD Symptom Checklist) (ADHD-SK) (Rothenberger et al., 2001) which is based on DSM-IV criteria, and was designed to provide information about inattention, hyperactivity/impulsivity, behavioural problems and capabilities of the child.

Statistical analyses

- Changes in ADHD symptoms, as rated by parents and teachers, were assessed post hoc in patients who had measurements at all three study visits.
- To detect subgroups with different trajectories of ADHD symptoms, growth mixture modelling was applied. Parent and teacher ratings were analysed separately, and models with up to eight classes were considered for both informants. Model selection was based on a formal statistical criterion (Bayesian Information Criterion), as well as clinical considerations.
- Using a multinomial logistic regression analysis, the following set of covariates were evaluated as predictors for trajectory groups: sex, age, MPH dose before switch to Equasym XL, medication switching (medication, or medication other than MPH), were assigned to Val 1, parent-rated conduct problems and internalising symptoms (Internalising and Difficulties Questionnaire), and parent-rated quality of life (Child Life Satisfaction Questionnaire).² Continuous covariates were transformed, while sex was coded as "1" for boys and "0" for girls.

Results

Patients

- The number of patients with complete data for all three study visits was 692 for parent ratings and 521 for teacher ratings. Of these, 156 (22.5%) and 101 (19.4%) were treatment-naïve, respectively.

Model selection

- For parent ratings, all models with up to eight classes converged, compared with only models with up to six classes for teacher ratings. For both informants, the four-class solution was chosen.

ADHD symptom trajectories

- For both parent (Figure 1) and teacher (Figure 2) ratings, one subgroup of patients with low symptom scores at Val 1 and three subgroups with higher symptom scores were identified.
- The subgroup with low symptom scores showed a relatively stable course over time (low-stable group).
- Amongst the three subgroups with high symptom scores, one responded immediately to Equasym XL after Val 1 (high-to-low response), one showed strong symptom reduction only after Val 2 (high-to-middle response) and one did not show substantial improvements (high-stable).

Predictors of trajectory groups

- Results for covariates are given in Table 1 (parent ratings) and Table 2 (teacher ratings).

Figure 1. Four-class solution growth mixture modelling of ADHD symptoms from Val 1 to Val 2, parent ratings (n=692)

	High-to-low response		High-to-middle response		High-to-high response		Low-stable	
	n	%	n	%	n	%	n	%
Sex	114	16.5	114	16.5	114	16.5	114	16.5
Age	114	16.5	114	16.5	114	16.5	114	16.5
MPH dose	114	16.5	114	16.5	114	16.5	114	16.5
Conduct problems	0.66	1.93	0.66	1.93	0.66	1.93	0.66	1.93
Internalising symptoms	0.09	0.26	0.09	0.26	0.09	0.26	0.09	0.26
Quality of life	0.04	0.12	0.04	0.12	0.04	0.12	0.04	0.12

Figure 2. Four-class solution growth mixture modelling of ADHD symptoms from Val 1 to Val 3, teacher ratings (n=521)

	High-to-low response		High-to-middle response		High-to-high response		Low-stable	
	n	%	n	%	n	%	n	%
Sex	114	21.9	114	21.9	114	21.9	114	21.9
Age	114	21.9	114	21.9	114	21.9	114	21.9
MPH dose	114	21.9	114	21.9	114	21.9	114	21.9
Conduct problems	0.66	1.27	0.66	1.27	0.66	1.27	0.66	1.27
Internalising symptoms	0.09	0.17	0.09	0.17	0.09	0.17	0.09	0.17
Quality of life	0.04	0.08	0.04	0.08	0.04	0.08	0.04	0.08

Table 1. Multinomial logistic regression analysis with latent class as criterion, parent ratings (n=692)

	High-to-low response		High-to-middle response		High-to-high response		Low-stable	
	B	SE	B	SE	B	SE	B	SE
Sex	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Age	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MPH dose	1.96	1.21	2.14	0.43	2.08	0.70	0.00	0.00
Conduct problems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Internalising symptoms	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Quality of life	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 2. Multinomial logistic regression analysis with latent class as criterion, teacher ratings (n=521)

- In most cases, sex was not a useful predictor of trajectory groups.
- In parent ratings, increasing age was associated with an increased probability of being in the low-stable group. In teacher ratings, age was not a significant predictor.
- High MPH dose before study entry decreased the probability of being in the high-to-low response group compared with all other groups. Conversely, a lower MPH dose before study initiation was a predictor of high-to-middle response. There were some inconsistencies in predictors between informants.
- For ratings from both informants, having lower conduct problems at Val 1 was associated with a higher probability of being in the low-stable group compared with any other group.
- Higher internalising symptoms at Val 1 were associated with an increased probability of being in the non-responder (high-stable or low-stable than responder) group, although inconsistencies between informants were observed.
- Higher QoL was also associated with an increased probability of being in the non-responder group, but there were some inconsistencies between informants.

Conclusions

- Four subgroups with differential treatment response after initiation of treatment with long-acting Equasym XL could be detected in both parent and teacher ratings.
- Children in the low-stable group (50%, parent ratings; 47%, teacher ratings) may have already reached good response to their previous medication, leaving little room for symptom improvement.
- Children in the high-to-low response group (20%, parent ratings; 20%, teacher ratings) were classified as "high-stable": these children are especially hard to treat, and medication adjustment or additional interventions should be considered.
- Several covariable predictors of group membership were identified.
- Age, MPH dose before switch to Equasym XL, conduct problems, internalising problems and QoL at Val 1 were all significant predictors of trajectory class.
- However, sex was not a useful predictor for most comparisons, in line with findings from the MPH study.¹
- In parent ratings, older children had a higher probability of being in the low-stable group. This could be explained by the fact that, as children get older and enter adolescence, ADHD symptoms decrease, in particular hyperactivity.
- Conduct problems were a negative predictor of low-stable response.
- Lower MPH dosage before the medication switch was generally predictive of an immediate response to Equasym XL (high-to-low response). This might reflect lower symptom control under the previous medication. Interestingly, MPH dosage was not predictive when comparing the other three subgroups to one another (high-to-middle response/high-stable/low-stable).

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Disclosures

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References

1. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
2. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
3. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
4. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
5. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
6. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
7. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
8. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
9. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
10. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
11. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
12. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.
13. Rothenberger A, Banaschewski T, Biederman J, et al. (2006) Methylphenidate in the treatment of ADHD: A meta-analysis. *Journal of Child Psychology and Psychiatry* 47: 1031-1042.

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Complete Digital, a division of Complete Medical Group Ltd
 Complete House • 19-21 King Edward Street • Macclesfield • Cheshire • SK10 1AQ • UK
 Tel +44 (0)1625 624000 • Fax +44 (0)1625 619812
 Registered in England No. 2503062



Considerations

- Is the QR code prominently displayed?
- Is there a compelling reason for the user to scan the code?
 - Ability to forward on and increase message reach through viral techniques.
 - Value-added information available, such as a narration of the poster by the author or additional data not covered on the display version.

4.4. Security considerations

When using QR codes at medical congresses, or for scanning by health-care professionals (HCPs), consideration should be given to how the destination information is made available online. A QR code on a poster at an HCP conference will only be scanned by the intended HCPs; however, if the destination is not secured it may nonetheless become available to non-HCPs and even begin to appear in search results, if indexed by search engines such as Google.

Therefore, it is always a good idea to password protect destination information linked from a QR code if it contains restricted data or off-label information or provide the information at on a destination that is not indexed by search engines and at a URL that the general public would not readily guess. This helps ensure patients and consumers cannot stumble across HCP information online.

4.5. Use of URL shortening with QR codes

It is preferable to use short web addresses as destinations for QR codes, as long addresses lead to more complex and pixellated codes. These detailed QR codes are less easy to scan, as a steady hand is required to effectively focus the smartphone and capture a clear image of the code.

However, URL-shortening services used in conjunction with QR codes can themselves create obstacles to effective use, as some firewalls prohibit URL-shortened addresses and block them. Ideally, short URLs should be used without need of a shortening redirect service to avoid problems in accessing the QR code destination.

4.5. Metrics

When a QR code campaign is being created consideration should be made on how effectiveness will be measure. Web analytics tools can be attached to the QR code to measure how many scans are undertaken of each code used within a campaign and the level of use of the code over a period of



time, similar to when analytics used in measuring the effectiveness of other digital activities such as websites.

Analytics can then be used to provide regular reports which can be used to monitor and improve the campaign over time.

5. Effectiveness

5.1. Uptake

The effectiveness of QR codes can be impacted on by many element related to their implementation.

- Are they prominent?
- Is there a compelling reason to scan?
- Are there easy-to-follow instructions on what the user should do (although QR codes are intuitive)?
- Is there a strong enough network signal in the area they are displayed?
- If the code is displayed at an event, is it possible to provide a QR code-scanner download facility, so attendees can acquire readers if they do not have one already?

6. Summary and 5 Top tips for effective QR code use

Summary

QR codes are an effective way of increasing the dissemination of information and increasing reach and therefore ROI within communication plans. In addition they also have secondary benefit of enhancing brand perceptions by utilising a novel and innovative tool.

However they should not be implemented without careful planning and assessment of what should be delivered as a result of code scanning and linking. Linked material must add value to the experience overall and provide a compelling proposition to motivate the audience to use the code.

5 Top Tips

Be Everywhere

QR Codes (mobile barcodes) should wherever possible incorporated into all digital and traditional media so the consumer has an opportunity to receive a 360-degree exposure to the mobile marketing campaign. This will also ensure that consumer experience, dialogue and interactivity are at the heart of the campaign and not simply an afterthought.



Drive Value and Make it Easy

Additional value from scanning a QR code will compel HCPs & consumers to interact with and scan your code. If your code simply offers the customer a chance to view something already available to them such as the poster or data sheet or link to a sign up for an email newsletter, it's best to try again. Scanning a barcode should provide the user with a brand experience that is exclusive, immediate, dynamic and interactive & 'adds value'

Take into account where a QR code is located. HCPs & consumers must be able to find it easily and scan it quickly. For outdoor ads for example or on posters, place the code at eye or arm-level. In a print ad, the barcode should not fall over a fold as this will hamper scanning. Be sure to leave some white space around the code, and use a minimum of 1 x 1-inch print specification.

Keep it Simple

Branded or custom QR codes are certainly getting some buzz, but it's also important to create a code everyone can recognize. Producing your code in simple black and white checkered format will increase the number of phones and code readers that can scan it. Also, ensure you use global, open standards (i.e. Datamatrix) to maximize universal customer reach and impact.

Build Customer Affinity

Remember that the user who has just scanned your code is on the move. He/she will be viewing the content that it links to on a mobile screen and, therefore, expects instant results. Make sure the QR code links through to a mobile-enabled site rather a PC-designed site. Remember that "dead links" (codes that go nowhere or deliver the wrong information) are the equivalent of a slammed door — the user will not try again.

Account for Objectives and Analytics

Boost brand awareness, increase audience engagement, effectively increase data dissemination, build brand loyalty, educate your audience. Whatever the campaign objective, be sure to define its goals *before* integrating a QR code. Consider monitoring the campaign via an analytics package.