



## Patient compliance: New media tools to help patients take their medications

by Juliet Roberts

Patient support programmes are the politically correct term for initiatives, sometimes called patient compliance (or adherence) programmes, that aim to support patients in their illness, and include elements that help them to take their medications as prescribed. Although strategies to support patients in taking medication have been around for a long time, new media are now facilitating original approaches that fit with patients' lifestyles. This article aims to look at some ways in which new technologies are helping provide novel solutions to an old problem.

### Rationale for patient support programmes

Briefly, before looking at the role of new media, it is worth reviewing why patient support programmes are necessary. First and foremost, the scale of non-adherence is immense—according to the World Health Organization, more than half of all patients with chronic conditions do not take medications as prescribed[1]. The consequences of poor adherence are that the effectiveness of treatment is severely compromised, and the cost to patients are poorer health outcomes and even death.[1] In the cardiovascular disease area alone, failure to take treatment results in an estimated 125,000 premature deaths each year, just in the US [2].

The price of non-compliance is also high to health systems. Diabetes is a prime example. The CODE-2 study (Cost of Diabetes in Europe—type 2) found that although costs of treating type 2 diabetes are 66% more than for the general population, for patients with complications, costs increase up to three times further[3]. This is despite the existence of well-documented evidence that compliance reduces diabetic complications.

There is also the cost to the pharmaceutical industry in terms of lost sales—estimated at 30 billion USD per year. With pipelines drying up, and health systems tightening their budgets by putting the brakes on some new drugs, the pharma industry has to look at new ways to sell products. It is no wonder that pharma interest in patient support programmes has perked up. It is simple mathematics—helping patients stick to their treatment means they take more doses—and more of the drug is sold.

### Win-win-win scenario

So, improving patient compliance is likely to be better for everybody concerned: fewer patients will die prematurely, they will have better health, improved quality of life and will be admitted to hospital less often, healthcare professionals will be happy to have healthier patients, costs for health systems will be reduced and, last but not least, pharmaceutical companies will maximise sales of individual products.

### Why do patients become non-compliant?

To understand initiatives used in patients support programmes, it is first necessary to understand why non-compliance occurs. However, just understanding non-compliance has become a highly specialised discipline, partly because all patients are different; the reasons a forgetful 77-year-old man fails to take his antihypertensives will most likely differ from the reasons a 15-year newly diagnosed with type 1 diabetes has not taken her insulin (see Box). So programmes to help patients adhere to their medication need to take account of multiple factors, including the characteristics of the patients, such as differences in patient knowledge, abilities, behaviour and attitudes, as well as issues specific to their disease or the treatment.

#### Some reasons for non-compliance

- Forgetfulness
- Side effects
- Difficulty in keeping medication to hand
- Difficulty in storing medication (sometimes a problem for homeless people)
- Complex treatment regimen (high pill burden, several times daily)
- Cost of the drug
- Patient sees no benefit from treatment (an issue with many preventative treatments)
- Patient decides to try non-prescription alternatives
- Patient does not understand the need for medication
- Patient struggles with self-administration
- Long-term treatment 'fatigue'
- Short-term benefit (eg weight loss in non-compliant type 1 diabetics)

It is known that simple, single interventions (e.g. simpler drug packaging) in themselves are usually insufficient to make a real difference to patient compliance, particular in chronic diseases [4]. On the other hand, a combination of factors, including greater patient medication knowledge of doses, frequency and indication for each of a patient's medications in conjunction with good skills, such as dexterity, literacy and ability to recognise individual tablets, appear to improve adherence [5]. A Cochrane review of interventions for enhancing adherence supports this view [4]. It looked at 70 randomised controlled trials, found 36 (of 83) interventions used in these trials improved adherence (and 25 improved outcome). Where interventions made a difference, nearly all included combinations of interventions, such as more convenient care, information, reminders, self-monitoring, reinforcement, counselling, family therapy, psychological therapy, crisis intervention, manual telephone follow-up and supportive care. Overall, it seemed that the key to good patient support programmes is the ability to change complex factors involving patients' attitudes and behaviours, which involves combinations of interventions. ➤

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### > **So, how do you influence patients' attitudes?**

Healthcare systems have taken data, such as the Cochrane review [4], on board and now recognise that telling patients to take medication is less effective than helping them understand why medication is necessary and getting them to agree (become concordant) to take their medication. To achieve better understanding and concordance, patient education is needed.

Educational materials used to be available only in print form or through oral education (for instance where nurses talk to patients about their illness and treatment). Now new media offers additional means of helping patients understand their disease (although printed information and nurse education remain essential components of many patient support programmes).

When new media is added into the mix, as well as old favourites like printed magazines, patients also receive emailed newsletters that educate and remind them of the need to take medication. Websites are frequently used to provide patients with the information they need, such as downloadable patient information leaflets—either for health professionals to download for patients or for patients to access themselves.

As well as basic information about the disease, websites also supply a range of materials in different media, such as written tips on coping (for example at: [www.cancerhelp.org.uk/](http://www.cancerhelp.org.uk/)) to patient stories and documentary videos from healthcare professionals and patients (for example at: [www.kcuk.org](http://www.kcuk.org)). Additionally, with the proverb: 'I see I forget. I hear I remember. I do I understand' in mind, interactive elements (like patient quizzes, an example of which is: [www.infoprostate.com/Patient-quiz.asp](http://www.infoprostate.com/Patient-quiz.asp)) are also useful to improve patient understanding.

### **Combinations of interventions**

'Multi-channel patient compliance programme' is fast becoming one of the buzz phrases among proponents of new media in such programmes. Basically, this is just new media speak for implementing the findings of the Cochrane review [4]. One intervention (whether it is new or old media) is insufficient to change adherence and a rational selection of interventions is usually needed.

For example, in addition to education, patients may receive counselling and get reminders to take their medication. Reminders are a simple intervention that may be appropriate for elderly forgetful patients or rebellious teenagers. Where telephone reminders used to be used to help patients stay adherent, now SMS text messages and iphone applications (iphone apps) may be used. For an active teenager with diabetes or ADHD, a text message is a much 'cooler' method of being reminded to take medication than a parental reminder.

### **New media supports for patients**

The Internet and interactive forum platforms makes patient peer-to-peer support easy. Patient forums include patient-initiated forums, for example: [www.patientslikeme.com/](http://www.patientslikeme.com/),

or those started by other organisations, for example [www.facebook.com/ADHDMoms](http://www.facebook.com/ADHDMoms) by Johnson & Johnson and [www.cancerchat.org.uk/](http://www.cancerchat.org.uk/) set up by Cancer Research UK. Forums are particularly useful for those who find it difficult to meet other patients face-to-face in conventional support groups, such as patients in remote locations, those with rare diseases or those who have mobility difficulties. Other advantages of on-line patient support forums and the Internet are that patients are able to learn from their peers, and they can become empowered when they blog about their illness and share experiences with other patients. For those who are too shy to blog, sites like <http://www.healthtalkonline.org/>, which have online interviews with patients of many different ages and with a myriad of conditions, can show how others cope.

Other ways in which new media may aid patient adherence is in smoking cessation programmes, where the instantaneous medium of Twitter can help prevent someone about to give into a nicotine craving or support someone during the quitting process (as described here: <http://qtwitter.tobaccofreeflorida.com/>). Similarly, [www.tweetwhatyoueat.com/](http://www.tweetwhatyoueat.com/) uses Twitter to help people keep an electronic diary of food intake and provokes public shame for those breaking their diets. What is not certain about Twitter in these applications is whether the social element is more important than keeping fingers busy by Twittering and emailing on a Blackberry or iphone.

### **The importance of self-monitoring**

Encouraging patients to self-monitor their illness is another strategy to improve compliance [6]. New media can help in this respect. For instance, iphone apps are already available to help patients keep a log of blood pressure measurements or blood glucose measurements (for more information, see: <http://mashable.com/2009/07/11/iphone-save-lives/>). For dieters or people with type 2 diabetes encouraged to lose weight, recording the distance walked everyday using an application such as the Nike+ipod sports kit may motivate patients to continue dieting and exercising (it records, time, distance, pace and calories burned). Whether patients walk or run there is a group to join at the Nike+ community (<http://nikerunning.nike.com/>) to support and spur them on. The future may see more relevant apps developed.

### **'Big brother' technologies**

Some companies in the US are looking at methods of remotely monitoring patient compliance. Remote monitoring covers a range of technologies and devices. One old media method involved telephone calls to or from patients to log pill taking (sometimes called telephone surveillance). The new media method is by telephonic interactive voice activated technology (VAT), in which patients respond to recorded questions about their medication on automated telephone calls [7]. Pre-recorded supporting information can be provided to patients at the end of each call, tailored according to their responses to the questions

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asked. Similarly, stand-alone interactive voice response surveys using VAT technology can help healthcare professionals identify patients who need further education about their illness.

Another remote monitoring approach is The Pill Phone application ([www.pillphone.com/](http://www.pillphone.com/)) for internet-enabled mobile phones, which not only acts as a reminder device but it also logs pill-taking, confirms the dose taken and logs the information on a website accessible by others (such as a parent or healthcare professional). Other methods involve the devices administering medication themselves. For example, patent applications have recently been filed for nebulisers that also incorporate technologies allowing healthcare professionals to remotely monitor delivery of aerosol medications for conditions such as asthma or chronic obstructive pulmonary disease (COPD). One study showed that such technology not only accurately assessed medication used but it also improved treatment adherence [8]. Whether technology with such 'big brother is watching you' connotations would be acceptable in Europe remains to be seen.

### Pill 'n' chips tackles non-compliance

Patient compliance with antihypertensive medications has previously been boosted by using battery-powered radiofrequency identification (RFID) tags embedded in the lids of pill bottles or in medication blister packs. These RFID tags record each time the bottle is opened or a pill is popped from the blister pack. Now, pharmaceutical companies are pushing the boundaries further by producing 'robo-pills' containing tiny microchips. The microchips send a text message to patients' phones if they fail to take their medication and are said to increase compliance by 30–80%.

### Making patient compliance fun

One big surprise to those learning about patient compliance for the first time is that, even where life depends on taking medication (such as someone with cancer), some patients are non-compliant. How do you boost compliance for patients with cancer? The answer may lie in making compliance fun.

Imagine piloting a nanobot through the bodies of fictional cancer patients, destroying cancer cells in your path, battling bacterial infections, and managing side effects. This is the Re-Mission game, developed for adolescents and young people with cancer, that [www.hopelab.org/innovative-solutions/re-mission](http://www.hopelab.org/innovative-solutions/re-mission) believe will help them develop a positive attitude, learn about their cancer and has been shown to improve adherence [9].

Healthy games have also been developed to help young people with asthma ([www.kickasthma.org.uk](http://www.kickasthma.org.uk) and <http://www.bubbliboo.com/> are just some examples) and diabetes (examples include: [www.escapefromdiab.com/](http://www.escapefromdiab.com/) and [www.nanoswarmthegame.com](http://www.nanoswarmthegame.com)) stay compliant. Another approach is Bayer's [www.bayerdidget.co.uk](http://www.bayerdidget.co.uk), a website designed to give children a fun way to monitor their glucose levels and where they earn points exchangeable for Nintendo DS™ games. Games are not just for children. Exergaming (physical activity combined with interactive video games) has been shown to help people with osteoarthritis adhere to exercise plans. It should have been obvious that

fun is important: after all, what new crazes have got people exercising in recent times? It is games like Dancing Stage EuroMIX and Wii Fit.

### Conclusions

In summary, in many therapy areas there is a great need for good patient support programmes. Traditionally, these programmes included provision of some information by a healthcare professional (which was reinforced on subsequent contact) together with, for example, additional support from counselling or by calling a telephone helpline.

With new media there is no doubt that methods for reaching patients have expanded, with social networking, mobile phone technology, specially designed computer games and voice activated telephone systems providing additional options for helping them manage their illnesses. Some of these options appeal to teenagers and young adults because they fit well with their computer-literate, SMS texting lifestyles. However, different patients require different means of communication. An 80-year-old woman with poor eyesight is unlikely to respond to text messages but maybe stimulated to adhere to therapy through old media, such as magazine articles and paper patient diaries or respond to other talking/sound media. Homeless and disadvantaged patients may not have regular Internet access and may only be reached through face-to-face interactions.

Therefore, each patient support programme needs to take into account not only the illness or medication but also the characteristics of the patients involved. New media is not the answer to non-compliance but may provide tools to support patients in their illness.

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