



# The forest and the trees: An integrated approach to designing adherence interventions

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## REVIEW

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## Abstract

While many have identified medication adherence as a critical part of therapy success and recognize that most therapies have adherence rates that are too low, few successful solutions to improve adherence have emerged. The palette of potential adherence interventions continues to grow, but the literature does not provide a general understanding of what works and what doesn't. Instead, many papers describe adherence problems within a single condition, therapy, or patient population or assess traditional interventions: support phone calls, informational literature, reminder text messages. Furthermore, the specifics of adherence approaches tested are not typically discussed in the literature. One can imagine multiple telephonic "support" experiences, some of which motivate and truly support patients, and others which may annoy them. The missing piece is an approach to adherence that considers design. A more careful consideration of the details of the design will open new possibilities for effective adherence intervention systems. Understanding the broader context of design: the particular condition, therapy, and patient population, will help ensure that those details are most appropriate. The combined focus on details with sensitivity to context creates a foundation for innovation that can be both customized to the particular problem and generalizable for other researchers and designers.

### Why is adherence a problem?

One reason why healthcare costs so much and yet isn't as effective as we'd like is the problem of medication adherence. When patients are adherent, they take their therapies correctly, on the right schedule, and for the prescribed duration – however many patients fail at one or all of these. As a result, pharmaceutical companies spend huge development budgets<sup>1</sup> to create efficacious drugs that doctors invest in learning about and insurance companies spend millions paying for, that people fail to take. Patients don't get needed treatment or may miss out on the opportunity to prevent or delay disease, leading to more

expensive care later on. Today, most approaches to addressing medication adherence problems are failing.

It is time for a new way of thinking about adherence—one that is centered on patients and their needs. By understanding adherence as an *integrated design* problem, interventions can be targeted to solve critical challenges. Currently, many articles in medication adherence focus on documenting poor adherence and intervention trials and discussing methodologies for measuring adherence. While this is understandable in a field with a messy problem where measurement is difficult, this focus has been to the detriment of designing successful adherence interventions. Detailed attention should be paid to the design of adherence interventions so that they – like adherence measurement methodologies -- can be refined over time.

More broadly, adherence, loyalty, and retention are terms applied to consistently doing something over time to derive a benefit. In many cases, this benefit only accrues with time and continued use. Inspiration for designing for medication adherence can be found in other industries where adherence matters. Whether in consumer health, financial, or other services, there are customer/consumer retention programs that are working. These analogous examples can be mined for successful adherence solutions. While not all such interventions are suited to healthcare, insights can spring from taking a broader view of adherence and adherence interventions. Understanding the root causes of adherence failure is the first step towards designing successful interventions.

### What causes Adherence failures?

Articles on adherence (i.e. defined more broadly than medication adherence) can be found in journals focusing on business, marketing, psychology, and medicine/healthcare, all commonly diagnosing one or more root problems:

- The problem is people
- The problem is the system
- The problem is instructions
- The problem is reminders

Most articles focus on a single type of problem, such as pharmacy loyalty, rental-car customer loyalty, adherence in diabetes, or blood donor retention. Other articles cross several problem types focusing on single underlying causes, such as human motivation. This paper reviews the range of root-cause diagnoses to show that all merit consideration, but some are more useful for the design of effective interventions.

### The problem is people

"The bad patient." Physicians often believe, "If I tell them to take it, they will!" Then they are shocked when patients



disobey<sup>2</sup>. This perspective highlights frustration with patients, but has yielded a call for more physician involvement in fostering patient adherence<sup>3</sup>.

*“The conflicted customer.”* Psychologists and anthropologists also see the locus of the problem in the individual. These professionals may focus on underlying emotional issues, a search for novelty, or a lack of self-efficacy as the root cause. The resulting solutions try to change beliefs or tailor approaches<sup>4-6</sup>. While important to understand, the problem of personality change is overwhelming as an intervention.

*“The unmotivated consumer.”* Patients’ drug costs certainly affect adherence<sup>7</sup>, but eliminating costs doesn’t solve the problem. The world of business and business consulting often views consumers as relatively averse to change and primarily financially motivated<sup>8</sup>. They reward consumers for sticking with a service (“pay for three months, get the fourth free”) or try to discourage potentially non-adherent consumers from initiating in the first place in order to improve apparent adherence rates. Rewarding behaviour with money can serve to devalue intrinsic benefits, creating even higher barriers to long-term adherence.

#### ***The problem is the system***

*Inadequate attention.* Some articles argue that if nurses and physicians had more time with patients, they could educate them about the importance of adherence and help them find viable solutions<sup>9</sup>. While more attention and time could only help, this solution is difficult to implement in today’s healthcare environment.

*Impossible economics.* Researchers find that some high-intensity programs involving daily calls and/or personalized counselling are successful, but they come with a prohibitive pricetag<sup>10</sup>. Handholding interventions may also reduce patients’ self-sufficiency.

*Pharmacists as providers.* There are several examples of successful programs in which pharmacists are filling a void in adherence counseling<sup>11</sup>. This approach is a component of an effective intervention, but likely insufficient on its own.

#### ***The problem is the instructions***

Researchers who blame the instructions focus on ignorance of how to follow the plan and what to expect. Some have legitimately criticized the quality of the instructions<sup>12,13</sup>. However, better instructions alone will not solve the problem.

#### ***The problem is reminders***

If people are monitored and given feedback, perhaps adherence can improve. Reminding programs range from emails or printed letters to devices that emit sounds or flashing lights to alert the user of a missed dose. The latter approach is buoyed by the technological possibilities of electronic packaging that can more explicitly remind patients<sup>14</sup>. Used alone, reminding can be perceived as annoying or patronizing. Within an integrated system, gentle reminders can be quite helpful.

#### **Solutions Tried**

Articles comparing adherence solutions are plentiful. However, the comparisons are always at the level of solution classes—primary or secondary packaging, educational material, reminding tools (digital and analogue), MEMS (Medication Event Monitoring System), counselling (in person or by phone), etc.—and rarely, if ever, describe the details of design execution. Even one of the most thorough examinations to date<sup>14</sup> only describes the classes of solutions, without illustration. In a cursory review of 9 meta-analyses of intervention efficacy, only three<sup>15-17</sup> spend roughly the same space describing interventions as they spend describing the methods for statistical analysis.

Despite the paucity of attention, the details of design can drive an intervention’s success. For example, the blanket group “packaging interventions” varies tremendously in labelling, ease of use, size, and reminding cues. A birth control pill package, Advair diskus, and a Target pill bottle (a new container and label design created by a U.S. pharmacy chain) are highly differentiated. For telephone reminding interventions, the frequency, prompting (do patients or callers set the time?), tone, and script all impact the experience. Educational materials can range widely. Consider the difference between a doctor’s office pamphlet, a diet infomercial, and the website [cnn.com](http://cnn.com), and it becomes easy to understand how the specifics of an educational piece can determine desirability, usability, and efficacy.

Most current research is directed at creating, evaluating, and refining very limited features of adherence measurement techniques and evaluating single-pronged interventions (likely due to complexity and budget-constraints), rather than assessing how integrated interventions fare in real-world contexts.

#### **Case study**

Weight Watchers has built a successful business around one of the toughest perennial adherence challenges: losing weight. They’ve done so through iteration and taking an integrated approach to intervention design.

Weight loss is difficult for most people because there are myriad problems: dieters may have low self-efficacy and unrealistic goals; a poor understanding of how diets work and what calories mean; little knowledge of the rules of healthy eating; poor cues to prompt them to make good decisions in the moment; and little immediate feedback. Many people come with experiences of failing on numerous diet plans.

The current iteration of the Weight Watchers system addresses this cornucopia of confusion with an integrated system of interventions. There are online quizzes to help assess whether people are realistic in their goals (see [www.weightwatchers.com](http://www.weightwatchers.com) for more details) and ready to make a change. To help clarify how to diet and address individual differences, Weight Watchers offers plans based on two distinct mental models of how people choose to eat: unlimited quantities from a limited list of options, or



unlimited options in limited quantities. Weight Watchers acknowledges the temptation to cheat by incorporating Flex points, which can be used outside of regular meals either for a daily treat or saved up for a weekly splurge. While there are options for online Weight Watchers, in-person weekly meetings are a critical place to see progress and get feedback.

This integrated systems approach continues to work for consumers, and Weight Watchers remains one of the more successful commercial weight loss programs<sup>18</sup>.

### Taking an integrated design approach to adherence

The problem types discussed initially share a fairly narrow attribution of reasons for non-adherence; few have led to interventions that are successful, scalable, and cost-effective<sup>19</sup>. Taking the perspective of adherence as an integrated design opportunity<sup>20</sup> lets us consider an entire network of involved stakeholders (patients, caregivers, HCPs, pharmacists, payers, and therapy manufacturers) and multiple touch points, i.e., moments of interaction between the patient and the adherence support system. In addition, this perspective treats interventions as meriting detailed study.

What is integrated design for adherence? It means designing more than a single intervention (such as better reminding). It means designing to more than a blanket diagnosis (“people won’t be adherent without external rewards”). Taking an integrated design approach requires a commitment to choreograph each step and design detail into a complete, supportive experience, where every aspect works together. It requires constant attention to the details of design along with the context of the adherence problem. As an experience, it must evolve over time to support the changing needs of the patients and respond to them as their relationship with the therapy evolves. The steps of the process are to:

- Understand the patients
- Understand the problem
- Explore the solution space
- Design to fit

Integrated design assumes no single intervention will work for all therapies. Design can vary based on the patient population, condition, therapy, and array of potential intervention components. To fully understand these may require an in-depth look at the patients and their contexts, though interviews and observations in their homes and everyday lives outside clinical settings. Such research may yield results that are surprising to physicians, and at the very least, useful for augmenting physicians' understandings of patients and their needs. For example, the number of patients who split pills or otherwise change dosing to address side effect concerns surprises many physicians.

*Understand the patients.* It is critical to understand a condition’s distinct population to design successfully. How can they be characterized physically (abilities, limitations), mentally, cognitively, emotionally, socially, and financially? What makes them unique? Will their needs change over time?

*Understand the problem.* What makes this condition distinctive? What burdens does it impose on patients? How does the therapy work? What does it require of patients? What makes adherence hard for them? Where do they struggle?

*Explore the solution space.* Next, what are the design levers? In the highly regulated world of healthcare, fewer design components are available than in the consumer world. To design an implementable system, the palette of possible interventions must be mapped.

*Design to fit.* Now the design process can begin. Decide which channels (tools, educational materials, services, etc.) should be used and when. Decide which stakeholders to use when (LPNs and pharmacists remain particularly underutilized). Should the intervention change over time? Select the critical touch points to hit. Set the tone at different touch points. Craft the design details to fit.

The design world has long recognized how much the details matter<sup>21</sup>. The iPod shared the same basic functionality as preceding MP3 players, but the specific details of its execution set it apart. Like dozens of other diets, Weight Watchers is grounded in basic calorie counting, but is distinguished in the way it simplifies the task and offers support. The details matter. Thoughtful design means considering shapes, colours, tone, font, phrasing, and critical interaction touch points in parallel with continually building on input from critical stakeholders—patients, clinicians, pharmacists, family members, and others—to arrive at a refined solution.

Most adherence efforts to-date remain a collection of unrelated interventions. For example, a solution might include text messages and adherence packaging. These are useful features; yet, an ad-hoc handful of interventions fails to create a unified system, and hardly realizes their potential value. Weight Watchers benefits not from individual features (none of which are unique) but from the way these features are integrated. An integrated system of interventions is more powerful than the sum of its parts.

To achieve an integrated design approach, research reports need to describe the details of interventions so that other researchers can evaluate, iterate, and build on prior work. Doing so will enable thoughtful design for adherence.

### Conclusions

Achieving adherence has long bedevilled healthcare. Researchers and clinicians have historically focused on narrow interventions rather than integrated design approaches. Evaluating solution classes without studying the design details will keep us from learning what makes interventions effective. By shifting our focus to interventions as a field of study we can increase the probability of creating successful systems of adherence interventions. To build long-term adherence, researchers need to regard adherence design as an important area of inquiry, study the details, and



bring a systems perspective to designing integrated adherence interventions.

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### CONFLICTS OF INTEREST

There are no competing interests to be declared by the author