THE NEW BEHAVIOR CHANGE MODEL

How provider dynamics, health education and mobile technology have evolved to create a path to sustainable and scalable behavior change.

fitbit

HEALTH SOLUTIONS

INTRO

In 2006, Dr. John Moore was living in Baltimore and just starting his residency as an ophthalmologist. With some of his very first encounters, he diagnosed cases of glaucoma and other blinding eye diseases. And after giving his diagnoses, Dr. Moore tried to explain the condition and help the individuals understand the gravity of their situation.

He assured them that permanent damage was completely preventable. The only requirement? Take prescription eye drops just once a day. If these people used the drops regularly, their vision would likely be saved. If they didn't use the drops, their vision would continue to decline. Eventually, he warned, they could go blind.

And yet, the majority of people he saw didn't use the drops. They returned for follow-up visits six months later with reports that the drops weren't helping or that the drops were annoying. Their eyes felt fine, they said. But as Dr. Moore had tried to explain at that first visit, their eyes were always going to feel fine until it was too late.

At the same time, Dr. Moore's physician friends experienced the same situation across different specialties. Why wouldn't a person take a life-sustaining HIV treatment? Or blood pressure medication? Or make lifestyle changes to avoid developing diabetes?

Dr. Moore wanted to understand what was happening in those six months between visits. He wanted to understand at a deeper level why, in the face of such severe consequences and with such effective treatments, there were so few individuals who were successful in behavior change. He knew that these diseases were challenging because people didn't have symptoms until it was too late. They were effectively imperceptible, and that made it challenging for them to prioritize a disease in their daily lives.

He also knew, contrary to the general belief in the medical field, that it wasn't a lack of education or intelligence that derailed their adherence. "People are smart," Dr. Moore said. "They just have an incredible number of things to balance in their daily lives, and, for some reason, their health falls to the bottom of the

> Doctor's orders: Dr. Moore wanted to understand what was happening after patients left their doctor's office and stopped adhering to their care plans.

priority list in a way that seems out of line with the consequences."

Dr. Moore became intensely interested in why so much effort was dedicated to the study of diagnosis and treatment and so little to the sciences of health engagement and behavior change. These terms were often described as part of "the art of medicine" and dismissed as unimportant. How patients experienced their diagnoses was viewed as immaterial.

After some initial research, Dr. Moore learned a few key statistics:

- People only retain about 20 percent of what is conveyed in the office[1]
- Around 50 percent of chronic disease medications aren't taken after a month[2]
- Approximately 30 percent of people never even fill their medications[3]
- Less than 20 percent of people are successful in diet and exercise change[4]

At first glance, the first three statistics seemed to confirm the biases of the medical community -- that people were foolish or uninformed. But the final statistic challenged those assumptions. What if it wasn't people that were failing; rather it was our healthcare system that was failing them? It was still treating them using the same acute care model that had been around for decades, even though the burden of disease had radically shifted to chronic conditions. If people didn't remember what they're told in the office, was there a way to remind them? What if helping

1 Kessels, R. P. (2003). Patients' memory for medical information. Journal of the Royal Society of Medicine, 96(5), 219-222.

2 Sabate, E. (2012). Adherence to long-term therapies: evidence for action. Geneva: World Health Organization; 2003.

3 Cutler, D. M., & Everett, W. (2010). Thinking outside the pillbox—medication adherence as a priority for health care reform. New England Journal of Medicine, 362(17), 1553-1555.

4 Mellen, P. B., Gao, S. K., Vitolins, M. Z., & Goff, D. C. (2008). Deteriorating dietary habits among adults with hypertension: DASH dietary accordance, NHANES 1988-1994

individuals tackle their fears about their health was more important than simply providing a prescription? Perhaps the medical community wasn't meeting people where they were.

Instead of continuing to work in a broken system, Dr. Moore wanted to fix it. So he went back to school. Dr. Moore enrolled in the MIT Media Lab's PhD program and began researching health behavior change.

His studies combined learning science, health psychology, human-computer interaction, computer science, and other diverse yet complementary disciplines. The practice of medicine was still predominantly paternalistic in its ways, yet there was a human-centered movement beginning to take hold. And although healthcare's shift to value-based incentives was still years away, volume-based care was on the verge of crumbling under the weight of ever-increasing costs and the worst outcomes in the developed world.

So the stage was set, but there was still much to learn. Through his early explorations, it was clear to Dr. Moore that the transformation and convergence of three core areas of healthcare would be central to building a new model that was capable of addressing both the chronic disease crisis and supporting sustained health behavior change. Those three areas were:

- The role of the patient and the provider;
- Patient education and communication methods; and
- The technology used for care delivery

Throughout his time at MIT, Dr. Moore spent years testing his theory with populations that were considered the most difficult to impact and the least likely to use technology, including people who had never finished high school, people who had never used a computer, and even people who lived in an assisted living facility.

He learned that their stories were no different than any other person struggling with health problems, and their ability to change and succeed was strong. The lessons that they taught him were fundamental in developing a new model to support health behavior change that was proven in randomized controlled trials to yield some of the largest impact chronic disease outcomes ever published. Here's what he discovered.

THE ROLE OF THE PATIENT AND THE PROVIDER

The old approach: Paternalistic medicine

Until relatively recently, and largely still the norm, healthcare operated under a paternalistic model, which worked quite well in the management of acute conditions. With this approach, the role of the patient and the provider were clearly defined. The provider, often a physician, told the patient what to do and when to do it.

There wasn't much discussion of patient preference around treatment options or ability for the patient to adopt the treatment into daily life because there weren't many options and treatments were relatively short-lived. It quickly became clear that this approach did

5 Centers for Disease Control and Prevention. (2015). Chronic diseases: the leading causes of death and disability in the United States. http://www.cdc. gov/chronicdisease/overview/index.htm accessed, 1, 16

> Paternalistic medicine persisted under the fee-for-service stucture of modern healthcare. Yet, as a patient-centered movement emerged, the transtheoretical model began to take hold.

not lead to meaningful outcomes in chronic disease care,[5] but there were significant barriers to change.

Under a fee-for-service structure, hospitals and physicians were financially incentivized for multiple patient visits. So if a patient couldn't get their blood pressure under control or struggled with their diabetes, it wasn't exactly bad for business.

The modern approach: The transtheoretical model and shared decision making

In the 1990s, the transtheoretical model of behavior change and the concept of shared decision-making started to gain momentum. Developed by James O. Prochaska of the University of Rhode Island and his colleagues in 1977, the transtheoretical model assessed the readiness of patients to make changes in their behavior and recommended that communication and treatment decisions should be adjusted to the person's stage of change.

This concept meshed well with a model of shared decision-making in which people make decisions in conjunction with their healthcare providers. The idea is that the provider is the expert in medicine but the patient is the expert in themselves. The two bring their relative expertise to a treatment discussion and make the choice that satisfies both.

Shared decision-making was a huge step forward for the patient empowerment movement, but many healthcare providers were skeptical. They worried that a nervous person wouldn't make the best decisions and subsequently outcomes would suffer. However many studies show that "patients can be more involved in treatment decisions, and risks and benefits of treatment options can be explained in more detail, without adversely affecting patient-based outcomes."[6]

6 Edwards, A., Elwyn, G., Hood, K., Atwell, C., Robling, M., Houston, H., . . . Group, t. S. S. (2004). Patient-based outcome results from a cluster randomized trial of shared decision making skill development and use of risk communication aids in general practice. Family Practice, 21(4), 347-354. doi:10.1093/fampra/cmh402

Other studies have shown shared decision-making can lead to an improvement in short-term outcomes, but few have demonstrated long-term improvement in health status.[7]

The Fitbit Health Solutions approach: The apprenticeship model

If a physician-led approach doesn't work and a shared decision-making approach only slightly improves outcomes for a brief amount of time, Dr. Moore wondered what would happen if patients learned to lead their own care. Understanding the notion of healthcare empowerment is a journey, he proposed a solution that provides opportunity for growth: Apply the apprenticeship model to care delivery.

Just as the name suggests, this approach aims to make people self-sufficient through practice under the guidance of an expert. To start, people first learn from a healthcare provider about managing a condition or tackling a wellness goal in the context of their own life. And consistent with the transtheoretical model, people focus on goals that are important to them and for which they are ready to change. They receive feedback that guides their mastery over a given task until eventually, they're ready to make important lifestyle decisions on their own. Change under this model happens when people recognize and understand the correlation between their health actions and health outcomes.

Although the apprenticeship model is already used in healthcare for physician training, Dr. Moore envisioned its application for patient training as well. Or as Dr. Moore described it in 2012:

"The choice of apprenticeship as a model for patient engagement is based on the observation that people have been trained to take a passive role in health care. It will not be sufficient to simply make the experience more enjoyable in order to engage them in transforming the system. We must actively work to re-empower a new generation."[8]

The key difference between this model and shared decision-making as applied to the role of the provider and the patient is the dynamic of the care team. With shared decision-making, overarching treatment decisions are, well, shared. Both the provider and patient weigh in. With the apprenticeship model, however, the scope is much larger and the aspirations are more ambitious.

The goal is for collaboration in building patient self-management skills to overcome the daily challenges of chronic disease care. Eventually, the patient becomes capable of making daily decisions independent of the physician. Of course, a physician is overseeing care and medication changes, but ultimately the responsibility for outcomes lies with the person it will impact the most: the patient.

PATIENT EDUCATION AND COMMUNICATION METHODS

The old approach: Unilateral communication

Originally, it wasn't considered important to educate patients. For example, they didn't receive an explanation for their symptoms. Instead, they were told to monitor their symptoms as just another input for the physician to make his diagnosis. The little education that the patient did receive was

> Under the apprenticeship model, the provider serves as an expert who guides the patient to self-empowerment and self-reliance.

limited to getting a terse explanation of their diagnosis and prognosis. Beyond that, people could ask a few questions, but there wasn't a culture that encouraged more interactive communication.

The modern approach: Prescriptive education

Then the brochures arrived. Clinicians suddenly believed that they could educate patients to better health. Or, just give them the information to make the right choice, and patients will then make that choice.

Except Dr. Moore knew they wouldn't.

That's what he had tried to do in Baltimore. He gave people all the information he had about glaucoma. He told them that the drops would help. He even warned them what would happen if they didn't use the drops. It was not enough.

Part of the issue was that there was too much information to digest in such a short and emotionally-charged encounter. Another problem? People still didn't feel, and subsequently didn't act, as though the choice was their own. And that meant they wouldn't stick with it and outcomes would continue to stagnate. Prescriptive education helped boost outcomes slightly but not enough to really move the numbers.[9]

The Fitbit Health Solutions approach: Situated learning

Dr. Moore realized early on that in order to really help patients understand their conditions in a way that would help them make better decisions, they needed to learn through taking

7 Joosten, E. A., DeFuentes-Merillas, L., de Weert, G. H., Sensky, T., van der Staak, C. P., & de Jong, C. A. (2008). Systematic review of the effects of shared decision-making on patient satisfaction, treatment adherence and health status. Psychother Psychosom, 77(4), 219-226. doi:10.1159/000126073

8 Moore, J. O. (2012). A New Wave of Patient-Centered Care: Apprenticeship in the Management of Chronic. JCOM, 19(7)

9 Ellis, S. E., Speroff, T., Dittus, R. S., Brown, A., Pichert, J. W., & Elasy, T. A. (2004). Diabetes patient education: a meta-analysis and meta-regression. Patient education and counseling, 52(1),

action and then seeing the results of their actions. Instead of learning through absorption of abstract information, they needed to learn through experience. Even better, if the provider could support this learning process virtually, not in an episodic, but in a more continuous fashion, then patients could progress even more quickly.

In his research, he came across the concept of situated learning. Although situated learning was an increasingly popular teaching methodology in other fields, it hadn't yet reached patient education. This theory says that real learning takes place in the context of real life.

Health Coach Melissa Gallagher Landry, MEd, RD, LDN, explains it this way:

"Imagine someone who has never cooked anything before tries to bake a cake. They read in the recipe that they're supposed to 'gently mix the eggs into the batter.' Since it's their first time cooking, this person might not know to crack those eggs first. Instead, they might just place a few cold eggs, still in their shell, right in the bowl. That's where those uniform patient information brochures or flyers fall short. You don't know if that patient knows to crack the eggs first unless you're with them, observe a misstep, and guide them through nuances as they arise."

This might sound silly, since many of us know the basics of cooking, but health management is much more complicated, and these types of missteps are common. Applying this concept to healthcare means the provider needs to be available to address those egg-cracking questions that only come up in-between visits. Physicians can't just press pause on patient education until the next visit. In other words, the care needed to be continuous rather than episodic.

In fact, this is one of the interesting findings that Dr. Moore uncovered through a study he conducted with Joslin Diabetes Center. Patients in the intervention group received the exact same care from a single team, except they also had an early version of Fitbit Health Solutions' health coaching platform (then known as the Twine platform) that, among other things, included the opportunity for video visits. The results? 100 percent of patients in the intervention group took their insulin properly on the first day because they video-conferenced in the right moment with their certified diabetes educator and received guided support.[10]

Of course, having a dietitian or doctor on-call 24 hours a day isn't feasible or scalable for the health provider. That's why technology acts as the key to get this continuous engine running.[11]

The old approach: Technology only for health providers

For a long time, the term "healthcare technology" was reserved for expensive diagnostic equipment. The few pieces of consumer-facing health tech were clunky and old-fashioned. For instance, an at-home blood glucose test wasn't developed until the mid

10 Hsu, W. C., Lau, K. H. K., Huang, R., Ghiloni, S., Le, H., Gilroy, S., ... & Moore, J. (2016). Utilization of a cloud-based diabetes management program for insulin initiation and titration enables collaborative decision making between healthcare providers and patients. Diabetes technology & therapeutics, 18(2), 59-67.

11 Lustria, M. L. A., Noar, S. M., Cortese, J., Van Stee, S. K., Glueckauf, R. L., & Lee, J. (2013). A meta-analysis of web-delivered tailored health behavior change interventions.

> The mass distribution of smartphones allowed patients to carry their doctor in their pocket and ultimately remain engaged in their health outside of traditional office visits.

1980s. Even the trends from these early tests were designed to be decoded by a physician.

That meant that the patient couldn't use their own results to inform their lifestyle choices. Eventually, electronic medical records became standard at hospitals and medical offices across the country. But these records were for providers' and insurers' eyes only. The patient knew relatively little about their own health.

Consequently, there was little they could do to improve it. At best, people could see their records, but with no distillation or opportunity to converse about and understand it.

The modern approach: Symptom checkers and patient portals

As the internet revolution took hold in other industries, healthcare was no exception. Finally, comprehensive information around conditions and diagnoses were released to the masses. The only problem? There was no context.

For example, a 2015 published evaluation of symptom checkers found that they provided the wrong diagnosis for two-thirds of common queries.[12] Healthcare providers were concerned that misapplied health information had the potential to really harm patients.

So the industry decided to move its prescriptive learning approach online and send those same brochures through patient portals. This unidirectional communication, consistent with web 1.0, had the same drawbacks as the in-office version. You still couldn't help patients between visits and they still couldn't apply the information in the documents to their own lives.

Healthcare technology - especially for consumers - became ripe for change when the first iPhone launched in 2007, bringing smartphone capabilities to the consumer audience.

2/3 Symptom checkers give the wrong diagnosis of the time

Source: BMJ

The Fitbit Health Solutions approach: Self-management support and fluid communication

It's difficult to understate the historical significance of the iPhone for the future of healthcare. For the first time, patients could have their clinician with them all of the time, providing access to contextualized, relevant information exactly when they need it. This meant people could finally lead their own care.

Dr. Moore realized that all of the issues with the first wave of consumer health tech can resolve themselves once patients can access their provider, their metrics, and what those metrics mean for them right in their pocket. The technology itself, and the humans behind it, provide the feedback needed to

12 Semigran, H. L., Linder, J. A., Gidengil, C., & Mehrotra, A. (2015). Evaluation of symptom checkers for self diagnosis and triage: audit study. BMJ, 2015(351), h3480.

support patients through difficult situations towards outcomes.

Through his research, he identified the mistakes of the old approach and the reasons for the limited success of the modern approach. He tested, retested and retested again the interventions and technological format that would lead to sustainable and scalable behavior change. These ideas about patient power, this application of the apprenticeship model, and this technological moment in time all mattered.

The result of all of this work? The Twine Health platform, which would later become Fitbit Health Solutions' health coaching platform. In 2014, the platform recorded significant outcome improvements in both hypertension and in diabetes condition management.[10 13] In a hypertension management study,[13] 75% of those in the intervention group achieved blood pressure below 130/80, as compared to 32% of those in the control group. And in a diabetes condition management study,[10] people in the intervention group who used an early version of Fitbit Health Solutions' health coaching platform saw not only a greater hemoglobin A1c decline, but also showed significant improvement in their Diabetes Treatment Satisfaction Questionnaire results (which includes measures like body mass index, A1c and insulin dosage), and spent less time with their healthcare provider.

By bringing Twine Health and Fitbit together to create Fitbit Health Solutions' health coaching platform, the combination of offerings will allow for exciting new opportunities in the future. Together we can help healthcare providers better support patients beyond the walls of the clinical environment, which can lead to better health outcomes and ultimately, lower medical costs.

13 Moore, J. O., Marshall, M. A., INCH, B., Judge, D. C., Moss, F. H., Gilroy, S. J., ... & Zusman, R. M. (2014). Technology-supported apprenticeship in the management of hypertension: a randomized controlled trial. JCOM, 21(3).

ABOUT FITBIT HEALTH SOLUTIONS

Fitbit Health Solutions, part of Fitbit, Inc., delivers health and wellness solutions designed to increase engagement, improve health outcomes and drive positive returns for employers, health plans and health systems. Our portfolio of enterprise SaaS solutions includes an engaging wellness program including challenges and reporting, and a proven health coaching platform that combines scalable technology with timely human care to drive healthy behavior change. Powered by Fitbit's world-renowned suite of smartwatches, trackers and mobile apps, our solutions span the full spectrum of care, from wellness and prevention to chronic condition management.

Learn more about how Fitbit Health Solutions' health coaching platform helps to enable real and sustainable behavior change.