

# ADVANCES IN IBS

Current Developments in the Treatment of Irritable Bowel Syndrome

Section Editor: William D. Chey, MD

## The Effect of Digital Health Technology on Patient Care and Research



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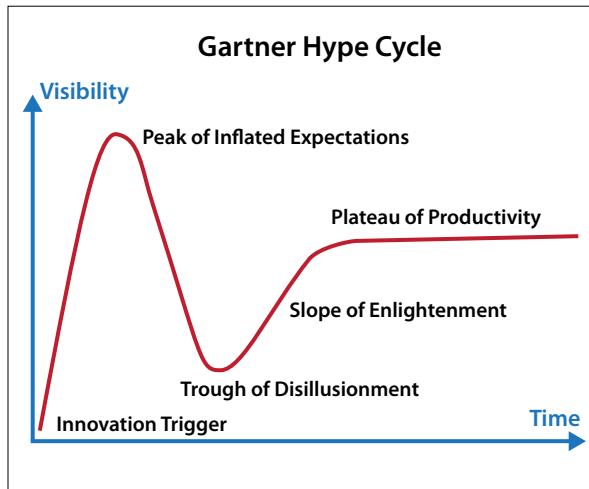
### **G&H** What is the current state of digital health?

**CA** Compared to the advances in technology outside of health care, digital health has lagged behind other fields. The Gartner Hype Cycle is a helpful way to describe the life cycle of technology within health care (Figure). The first phase, innovation trigger, is a proof-of-concept that generates a potential breakthrough with technology. That breakthrough leads into the second phase, the peak of inflated expectations; in health care, a lot of people are excited about what digital health can do and are trying to create the next newest and greatest device that they believe will change the way health care is delivered. The field of health care seems to have been in this phase for the past few years. However, recently, there have been an increasing number of studies, including some by our research group at Cedars-Sinai Medical Center, reporting that digital health is not “moving the needle” on important outcomes in the clinical setting. These early studies are also finding that many patients are not open to using these technologies and that digital health currently is not the panacea that clinicians were hoping for. Thus, we have transitioned into the third phase of the hype cycle, which is the trough of disillusionment. To bring us into the fourth phase of the hype cycle, the slope of enlightenment, investigators need to better understand how to develop and successfully implement digital health technologies into the clinical setting. Investigators are now beginning to understand how to improve these technologies to make them more

user-friendly and how to better integrate digital health into clinical practice in order to increase adoption by both patients and doctors. The fifth and final phase is the plateau of productivity, in which digital health technologies become mainstream and patients start to adopt the technologies as part of standard health care delivery. However, in order to get to this phase, the approach to digital health needs to change.

### **G&H** How should digital health be approached so that it can benefit patient care?

**CA** Before digital health interventions are deployed in the clinical setting, they first need to be tested. These technologies should be subject to rigorous clinical trials similar to biomedical devices or drugs in order to prove what these applications can do, how they can improve patient care, and how they can bring value to health care systems. In addition, these studies should focus on meaningful outcomes. Instead of concentrating on getting patients to use a device, investigators should prioritize demonstrating that digital health applications improve health-related quality of life, patient satisfaction, resource utilization, disease outcomes, and, ultimately, survival. Another way to improve the benefit-to-risk ratio is to recognize that digital health is a social and behavioral science. Investigators should develop technologies that patients will use and that will change the way they behave, which will subsequently improve outcomes.



**Figure.** The life cycle of technology has 5 phases, from proof-of-concept to mainstream adoption.

Adapted with permission from Gartner, Inc.

### G&H What is an example of a digital health platform that represents advances in patient care?

**CA** There are a number of investigators who are working on novel digital health platforms. Our research groups at Cedars-Sinai Medical Center and the University of Michigan, led by Dr Brennan Spiegel and Dr William Chey, respectively, have been collaborating for the past 6 years to develop and test a mobile application called MyGiHealth (My Total Health) that, through an algorithm, systematically collects patients' gastrointestinal (GI) symptom information. Similar to a physician interviewing a patient in the clinic, the application collects relevant symptom information, including National Institutes of Health Patient Reported Outcomes Measurement Information System (PROMIS) scores, and condenses it into a narrative history of present illness and sends it to the physician. The physician reads the report before even seeing the patient and can quickly understand why the patient is coming in and what his or her goals are for the visit. By having this information collected and reviewed before the visit, it leaves more time during the clinic encounter for patient education and counseling.

After the clinic visit, patients can keep using the application to track their symptoms. For example, those with irritable bowel syndrome (IBS) can continue to complete the GI PROMIS questionnaires to objectively monitor the severity of their abdominal pain and altered bowel habit symptoms. By tracking their PROMIS symptom scores over time, patients can see if their symptoms are truly responding well to the treatments recommended by their doctors.

### G&H Are there platforms that have application beyond patient care, such as in population health management or clinical research?

**CA** Dr Lawrence Kosinski developed a digital health platform called SonarMD (SonarMD, LLC) that monitors patients with inflammatory bowel disease (IBD) in between clinic visits. The platform sends surveys to these patients, and the responses generate a score that is then reviewed by a nurse case manager. Any worrisome trends or signs are brought to the attention of a doctor, who creates an action plan. This platform has been studied in rigorous research and has been found to improve quality of life and reduce health care utilization and costs among the IBD patients enrolled in the program. Of note, while this platform is specific for those with IBD, the same population health management approach can be applied to other prevalent, chronic conditions within gastroenterology, such as IBS and cirrhosis.

In terms of clinical research, there are plenty of opportunities to leverage these digital health applications. One example is a large-scale survey that our research group conducted called the National GI Survey, which was powered by MyGiHealth. Here, we pushed our algorithm out to nearly 72,000 Americans, and for each person we collected a wealth of data, including information on the prevalence and severity of their GI symptoms and other common disorders. "Big data" collected from digital health platforms can be used to answer important and meaningful clinical and epidemiologic questions that otherwise could not be easily answered with traditional research methods.

### G&H Do these platforms have the potential to replace the work of physicians?

**CA** As technology continues to advance, more and more articles will surface claiming that doctors will soon be replaced by these technologies. However, I believe that these digital health applications will never replace physicians. Rather, these technologies will simply serve as tools that will empower physicians to practice medicine more efficiently, provide better care for their patients, and improve meaningful clinical outcomes. In other words, these tools, which are great at collecting and synthesizing information, will allow physicians to spend more time practicing the art of medicine, which involves building a rapport with the patient, assessing the patient's response to illness and suffering, and showing empathy.

### G&H What are the potential downsides to sharing data?

**CA** Naturally, the biggest concern is centered on privacy. Therefore, it is critical for health care providers and

those who engage in digital health and who create these applications to ensure that patient information remains secure and private. Another issue that does not receive as much attention as it should relates to data management. Health care systems that leverage digital health applications for longitudinal data collection as part of population health management programs are going to be inundated with data from their enrolled patients. Someone needs to collect, manage, and interpret these data, and ultimately determine what needs to be brought to the attention of the physician. Similar to the term hospitalist, some have suggested the need for a digitalist, or someone whose primary job is to monitor these data coming in from outside the clinic and determine when to act on these data. The logistics of finding and training these digitalists, and defining and supporting their role within the health care system, is another challenge.

### G&H How can social media platforms be leveraged to more effectively interface with and care for patients?

**CA** Approximately 70% of Americans are currently on some form of social media (eg, Facebook, Twitter, Snapchat), and, thus, these platforms can be sources of vast amounts of epidemiologic data. With the use of natural language processing and topic modeling techniques, studies are being conducted that assess online behavior to examine patients' knowledge, attitudes, and beliefs regarding certain subjects (eg, the impact of opioids on GI side effects and pain management, IBD and the use of biologic agents). An advantage to this methodology of data gathering is that it is free from the inherent biases of focus group leaders and interviewers and is not affected by the Hawthorne effect.

Aside from offering new research opportunities via passive data collection, social media platforms can also be used to more effectively interface with patients. For example, they can be used for clinical trial recruitment, patient education, as a place for affinity groups to provide and seek support, or as a way for industry members and providers to monitor consumer sentiment.

### G&H Are there any other technology-driven solutions that can improve patient care?

**CA** Wearable biosensors have the potential to dramatically change and improve the way patient care is delivered. The most well-known wearable biosensors are the commercially available fitness trackers, which monitor step counts, heart rate, and sleep, among many other parameters. While fitness trackers are nearly ubiquitous, use of wearable biosensors within the GI field is a new and emerging area. One such device is AbStats (GI Logic), which is cleared by the

US Food and Drug Administration. It uses a low-profile microphone that adheres to the abdominal wall to measure intestinal rate, or the number of times the intestines contract within a certain period of time. Our research group at Cedars-Sinai has conducted studies that have shown that this biosensor can predict which postsurgical patients will subsequently develop postoperative ileus, and current research is testing whether the biosensor can differentiate between meal sizes among healthy individuals.

### G&H What are the priorities of research in this field?

**CA** Digital health applications should be treated similar to any other medical device or drug, with rigorous clinical trials to measure and test whether they impact clinically relevant outcomes. It is also important to remember that digital health is a social and behavioral science, and we need to study and consider why patients use or do not use these applications. If the applications are difficult to use with a poor user experience, there is no point in testing if they are going to make any impact on clinical outcomes, as patients will simply not use them. Along similar lines, to ensure adoption among health care providers, investigators need to create tools that report data in a form that clinicians can quickly digest and seamlessly integrate in their workflows. Finally, for digital health applications that are found to be effective in clinical trials, it is important to consider early on how to scale these applications across larger populations and health systems.

*Dr Almario has a stock option grant in My Total Health.*

### Suggested Reading

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