Plug in digital health where it supports patient care

Discussions about digital health technologies are everywhere, with topics ranging from "smart pills" to clinical trials of mobile apps.[1–3] Companies like Fitbit are focusing on specific health care use cases, such as facilitated condition self-management and medication adherence.[4]

However, these technologies have yet to become a part of mainstream health care delivery. Concerns center on privacy, efficacy, and adoption.[5,6] While these concerns are valid, we believe a pragmatic focus is necessary. We must determine how to deploy these technologies to best fill gaps in care delivery by creating a seamlessly connected care experience for patients efficiently and proactively.

State of digital health

Digital is here to stay. Alone, these tools provide value, but ultimately, they must be incorporated into a broader care experience. Consider digital support an additional tool for filling gaps where traditional patient engagement and monitoring have been impractical.

Adoption by practitioners and health care infrastructure await testing and validation. Hence the urgency for "growing the evidence base" where digital health tools are applied, tested, and validated as integral components of a fully connected patient support experience in real-world settings.[7]

Four areas have the most practical implications for patient support:

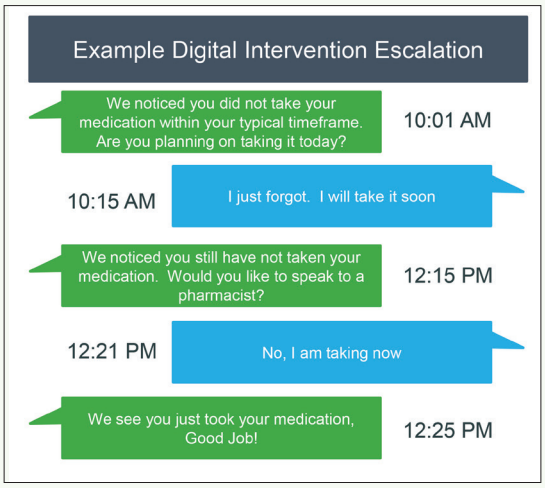
- **Mobile applications.** The ubiquitous nature of mobile health apps has advantages. In many cases, they are free to consumers and provide significant functionality. Most provide value through self-monitoring and reminder functions. Many also deliver self-management content that informs patient action and optimizes therapy. In some cases, apps can connect directly to pharmacy services.
- **Adherence technologies.** Supporting patient adherence remains a challenge in pharmacy. While traditional communication continues to drive high adherence rates (i.e., upwards of 90%), this is labor intensive, has limited scale, and cannot address adherence lapses proactively. Digital adherence technologies (e.g., smart medication dispensers and emerging ingestible technology) address these challenges by creating an automated experience that continuously monitors patient activity with notifications, analytics, and availability of live support.
- **Digital sensors.** Digital sensors take many forms, including wearables like watches and patches and peripheral devices such as smart scales, bottles, and telemedicine. The ability to collect biometric and behavioral data remotely is valuable for understanding the relationships among health, lifestyle, and the value of behavior change.
- **Artificial intelligence.** Artificial intelligence (AI), machine learning, and blockchain are hot topics in digital health. These technologies can provide interactivity that is personal yet integrated into live support resources based on clinical or business rules. AI is essentially a more sophisticated delivery technology with predictive capabilities for driving content and relationships. Nevertheless, these communications must account for human needs.

Functional considerations for digital technology

Clinical trials and validation have been significant barriers to the adoption of health care technology.[8] However, depending on the goal of a technology, the functionality is often such that true trial testing is unnecessary and a meaningless barrier to valuable patient support tools.

Characteristics for evaluating the utility of digital technology for patient support and behavior include:

- **Reminders.** Reminder functions primarily encourage two behaviors: 1) taking medications (e.g., Fitbit buzzing as a medication reminder) and 2) refilling prescriptions. Bottle technology requires physical proximity, and color-coded messages can confuse patients who are color-blind. The ubiquity of smartphones means patients will likely have mobile applications with them, but apps do not guarantee that the medication is on hand. Other considerations include multiple messaging channels and refill connectivity to the pharmacy.
- **Tracking.** Tracking allows user-entered or auto-monitored data to be collected frequently. Monitoring can reveal time or course-based patterns within the context of patients' daily routines. Functional considerations include what data can be tracked, the ease of data entry, and how data is shared, visualized, and analyzed for timely, data-driven intervention.
- **Goals**. Some digital technologies can support specific health goals or targets. Goals can be biometric, psycho-emotional, or behavioral depending on the patient's needs



Forms of health information exchange

Type	Description	Use considerations	Feature notes
mHealth	Mobile apps	Readily available Often highly functional Free or low cost	Tracking Reminders Scheduling Content delivery Connection to practitioners
Wearables	Smart watches	Wide-ranging cost and functionality Often work with one or more mHealth apps Passive data collection, reducing user burden	Tracking Reminders Scheduling Content delivery Connection to practitioners Passive collection (e.g., steps, sleep patterns, cardiac function)
Peripherals	Connected scales, smart bottles, blood pressure monitors	Wide-ranging capabilities	Vary by device Can capture weight, body fat, muscle mass, body fluid, and bone mass
Ingestibles	Smart pills/capsules	Can verify medicine ingestion, enabling strong measurement of adherence	Real-time adherence monitoring via telemetry from capsule in digestive tract
Injectables	Smart injectors	Can verify medicine ingestion, enabling strong measurement of adherence Address needle and injection fears	Configurable injection parameters (e.g., needle depth) Adherence metrics

and profile. To allow goal changes, goal functions should connect to monitoring.

- **Content.** The information and instruction provided should be evidence based, with guidelines informed by up-to-date, credible sources.
- **Motivation.** Motivation is a central driver of self-management behavior and persistence. This can include functions like achievement points or other incentives and motivational messaging. User configuration is ideal (e.g., self-written messages, posting photos of children).
- **Social.** Social functions should provide relevant information to stakeholders (e.g., providers, caregivers, pharmacies, patients). Other features to consider are privacy and security, whether the social site is monitored, and how bad behavior is identified, reported, and adjudicated.

Example applications

In the example on page 35, the patient has not taken their daily medication. The wearable collects data and pushes a notification when a lapse is detected. If the patient still has not taken their medication, escalation to a clinician can occur.

Another example is use of body temperature monitoring to identify febrile neutropenia for patients taking an oncolytic. Or imagine using movement in a patient with Parkinson disease to help determine medication efficacy.[9]

As these technologies advance, so will the ability to monitor patients remotely. For specialty pharmacy, the key is to use the data to support changing patient needs and intervene as necessary.

Toward truly connected care

For many, questions about the utility and value of a digital health strategy remain unanswered. Incorporating digital tools within a specialty pharmacy's workflow can fill care gaps in a traditional model. In a truly connected care experience, clinicians can leverage the full range of technology to help predict and monitor behavior and interact with patients. The technology can connect patients to live resources that are timely, effective, and valuable to all involved. Skilled and well-invested specialty pharmacy environments make excellent test-and-learn laboratories where success can provide significant value.

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