Accelerating Innovation in Health IT

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Even as information technology (IT) transforms many industries, the pace of innovation in health IT continues to lag. Electronic health records (EHRs) receive few accolades from providers and have been cited as a major source of professional dissatisfaction among physicians.[1] Despite a proliferation of patient-facing health apps, few have been shown to produce health improvements and many are barely used. The most common IT tools connecting patients to providers are patient portals that so far do little more than provide basic secure messaging and present unexplained clinical data. Though many startups and research programs exist and venture capital investment has been growing, health IT success stories remain rare.

A plan to accelerate innovation should begin with a diagnosis of the problem. Some observers blame perverse financial incentives in health care that reward volume rather than quality and efficiency, regulations that restrict the flow of information ostensibly to protect patient privacy, and technical integration challenges. Another factor has been the multiple demands of "meaningful use," which have delayed innovation in many areas of health IT. Though these issues are important, we believe there is a more fundamental barrier that has not yet received due attention: the disconnect between health IT developers and users. Alternative provider-payment models should create incentives for innovation by rewarding health care providers who use novel IT tools to control cost and improve quality, but the effect of these models will be attenuated unless the developer–user disconnect is addressed.

Health IT developers typically work in one of three settings — established IT companies, startups, or academic research departments — where they have little to no contact with patients and clinicians and therefore often lack a deep understanding of users' needs. Established IT firms, most notably EHR companies, have adhered poorly to user-centered design principles, despite federal certification requirements that they apply such principles.[2] In startups, developers are typically young and healthy, with little firsthand knowledge of clinicians or the chronically ill patients who consume most health care services. Much of venture capital is therefore clustered in wellness companies making products such as fitness trackers that cannot help the patients most in need and thus will have little effect on health care costs. Some health care incubators are producing startups that target clinicians and chronically ill patients, but we believe that these organizations generally underestimate the

effort needed to understand such complex and diverse users. Some academics have focused on understanding users' needs, but efforts tend to be small and fragmented and to involve multiple years of development. Rarely do findings make their way into the design of novel functionalities, for which relatively few funding sources are available.

Users of health IT systems also face challenges in addressing this disconnect. Although clinicians may know what aspects of their system they dislike and may have ideas about how they might work better (e.g., perhaps notes could be made into a wiki, so that various clinicians could add to or revise them), few are trained to specify their ideas in a way that can be turned into workable software or understand IT capabilities well enough to propose technically feasible approaches. Experienced clinicians may also have difficulty imagining how their workflows may be altered, especially in ways that relegate some of their revenue-generating activities to others.

We have observed myriad unfortunate results of this developer–user disconnect. Tools are built on the basis of fundamental misconceptions about the clinical utility of new data sources (e.g., episodic blood-pressure readings or accelerometry). Developers make incorrect design assumptions about when and how clinicians are available to respond to data produced by monitoring devices and when such contact is appropriate and clinically useful. Developers incorrectly assume that the same features can be used for drastically different purposes — for example, for both individual inpatients and large outpatient populations. Tools are highly customizable but require enormous effort from individual users to tailor and configure them before they become practical. One-size-fits-all functionality does not accommodate differences in users' technical proficiencies or in individual triggers of patients' clinical events. Critical tasks that are important to users, such as care coordination, are not prioritized.

What can be done to bridge this chasm? One solution might be sustained innovation programs that could foster long-term collaboration between developers and users, incubate ideas for new IT functionalities, and facilitate rapid-cycle testing and evaluation. Programs will be most effective, in our view, if they include four key characteristics.

The first is involvement of multidisciplinary teams including both developers and users. The developers may include employees of established IT firms, entrepreneurs, and researchers. Users may include relevant clinicians and patients with various disease conditions. To plan for implementing sustainable ideas within complex incentive structures, teams may also involve public and private payers and health services researchers. Since these participants may not interact often, it's helpful to get people who can "speak more than one language" to serve as liaisons, especially between users and developers.

The second essential trait is a focus on users' needs. The two key stakeholders in health care — patients and clinicians — are diverse and have complex needs and expectations. The first step toward effective solutions is developing a thorough understanding of these needs through direct interaction with users, including interviews and observations. Technology is too often based on incorrect assumptions about users' needs, and most organizations underinvest in this critical activity.

A third key is for health care innovators to redesign care processes in parallel with IT tools. Research from other industries shows that most IT benefits do not result from "paving the cow path." Instead, major transformations occur after intensive process reengineering to leverage the technology's potential.[3] Major IT innovations can't be bolted onto existing health care processes either. Changes in the work of patients and clinicians will require not just knowledge of current user needs, but also the imagination to address latent needs that users haven't yet considered. Such work will require a deep and sustained relationship between developers and users, as well as fundamental understanding of the biology of diseases.

Fourth, developers can serve users' needs better when they have the freedom to experiment and fail quickly. Innovation programs can offer an environment in which ideas can be tested rapidly in simulated or real clinical settings, allowing users to try out innovations and provide in-depth feedback in a systematic fashion. Such environments have been called "sandboxes."

Programs with these characteristics can accelerate innovation through spinoff companies, open source technology, care models based on redesigned workflows, provision of implementation services, and published knowledge and best practices. An innovation program can help its developers and researchers decide which dissemination channel is most appropriate.

Because such programs don't currently exist, new funding models will be needed. Funding options to explore include public and private research sources, health plans, and private investment. Traditional approaches to the management of intellectual property used by academic centers may not be effective, because the primary financial returns will probably come from first-mover advantage and early discovery of best practices. Flexibility will allow programs to support the full spectrum of research and development, from early-stage formative research through prototype development and evaluation of clinical impact.

The transformative potential of IT is no less powerful in health care than in other industries. The essential missing ingredient is a forum for innovation. Dedicated programs that facilitate collaboration among developers and users will help accelerate innovation so that health care can catch up with the modern world. As other industries have demonstrated, there's an insatiable demand for new, useful, user-friendly IT functionality. As emerging provider-payment models take hold and providers seek tools to help them reduce costs and improve quality, the demand for new health IT functionality will grow. With sustained commitment, the IT-enabled transformations that have revolutionized so many other industries might finally come to health care.

References

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