



ELSEVIER

Contents lists available at ScienceDirect

Healthcare

journal homepage: [www.elsevier.com/locate/hjdsi](http://www.elsevier.com/locate/hjdsi)

The Leading Edge

## Academic Medical Centers as digital health catalysts

Jacqueline W. DePasse<sup>a,b,\*</sup>, Connie E. Chen<sup>c,d</sup>, Aenor Sawyer<sup>e</sup>, Kamal Jethwani<sup>f,g,h</sup>, Ida Sim<sup>i</sup><sup>a</sup> Department of Internal Medicine, Massachusetts General Hospital, United States<sup>b</sup> Consortium for Affordable Medical Technologies, United States, India, Uganda<sup>c</sup> Department of Internal Medicine, Stanford Hospital & Clinics, United States<sup>d</sup> StartX, United States<sup>e</sup> UCSF Center for Digital Health Innovation, United States<sup>f</sup> Partners HealthCare, Center for Connected Health, United States<sup>g</sup> Department of Dermatology, Massachusetts General Hospital, United States<sup>h</sup> Harvard Medical School, United States<sup>i</sup> Division of General Internal Medicine, UCSF, United States

## ARTICLE INFO

## Article history:

Received 7 January 2014

Received in revised form

19 May 2014

Accepted 29 May 2014

Available online 11 July 2014

## Keywords:

Digital health

Health IT

Innovation

Academic Medical Centers

ACO

## ABSTRACT

Emerging digital technologies offer enormous potential to improve quality, reduce cost, and increase patient-centeredness in healthcare. Academic Medical Centers (AMCs) play a key role in advancing medical care through cutting-edge medical research, yet traditional models for invention, validation and commercialization at AMCs have been designed around biomedical initiatives, and are less well suited for new digital health technologies. Recently, two large bi-coastal Academic Medical Centers, the University of California, San Francisco (UCSF) through the Center for Digital Health Innovation (CDHI) and Partners HealthCare through the Center for Connected Health (CCH) have launched centers focused on digital health innovation. These centers show great promise but are also subject to significant financial, organizational, and visionary challenges. We explore these AMC initiatives, which share the following characteristics: a focus on academic research methodology; integration of digital technology in educational programming; evolving models to support “clinician innovators”; strategic academic–industry collaboration and emergence of novel revenue models.

© 2014 Elsevier Inc. All rights reserved.

## 1. Academic Medical Centers as digital health catalysts

Academic Medical Centers (AMCs) play a key role in advancing medical care through cutting-edge medical research.<sup>1</sup> The model for accelerating biomedical innovation at AMCs is well-established, propelled by expertise in basic science and technology, co-location of patients, physicians and clinical facilities, availability of Federal funding for biomedical research, and the 1980 Bayh-Dole Act providing universities with control of intellectual property generated from Federally funded research.<sup>2</sup> Historically, these pathways for invention, validation and commercialization at AMCs have been aimed at promoting biomedical research through traditional timelines, funding, and incentive structures, which may not be optimized for newer health technologies.

Digital health technologies encompass a broad range of hardware (e.g. sensors, wearables, and mobile devices), software, Internet and social media tools, and data aggregation and analytics. In recent years, interest in consumer-centered digital health

technologies has skyrocketed, driven by the proliferation of hardware devices, growth in online and mobile social networks for health,<sup>3</sup> and the rise of the quantified self (or “DIY” healthcare) movement. Over 125 million people (40%) in the United States currently own a smartphone. Patients downloaded 44 million medical apps in 2012, and that number is projected to rise to 142 million by 2016.<sup>4</sup> Likewise, physicians are avid users of technology, with 84% of physicians using a tablet or similar “smart” device. A recent survey of hospital Chief Information Officers showed that over 80% had a “bring your own device” policy in place for providers.<sup>5</sup> Buoyed by these trends, investment in digital health research and enterprise has grown exponentially, with \$1.4B raised in venture funding last year by digital health startups, up 46% from 2011. Though the majority of startups are aimed at the consumer, i.e. personal health tracking and health engagement, there is a small but growing focus on the clinician interface.<sup>6</sup>

Researchers have taken note of this explosive growth in digital health technologies with a number of peer-reviewed journals now vetting and disseminating high quality studies in the fields of biomedical informatics,<sup>7</sup> internet-based research,<sup>8</sup> telehealth and

\* Corresponding author.

mobile interventions.<sup>9</sup> The National Institutes of Health now has a dedicated funding and investigator training pathway for mobile health<sup>10</sup> through its Office of Behavioral and Social Science. Specific funding platforms for IT solutions also exist through the NIH Small Business Innovation Research (SBIR) program and the Office of Behavioral and Social Sciences Research (OBSSR).<sup>11</sup> Public–private partnerships, such as the Innovation Challenges hosted by Health 2.0,<sup>12</sup> often proximate to universities, are providing further pull incentives for digital health innovation while accelerators like Rock Health, StartUp Health, HealthBox, and StartX offer programmatic and financial support to accelerate development of digital health solutions.<sup>13</sup>

AMCs are now recognizing the need to re-tool their innovation programs for the emerging world of digital health. In this article, we select two large bi-coastal AMCs that are nationally recognized for their health care delivery efforts. Participating centers were selected for inclusion based on press announcements describing formation of institutes dedicated to digital health. Publicly available resources such as institutional websites and news articles were carefully reviewed for descriptive content on the structure, focus areas and goals of each AMC's focus on digital health. Interviews were conducted with key leadership from each of the participating institutions to generate themes and establish a framework for the piece.

Through these methods, we describe how the Partners hospital system and the hospitals at the University of California, San Francisco (UCSF), two leading hospital systems with affiliated AMCs, are advancing digital health innovation by a focus on academic research methodology, integration of digital technology in educational programming, evolving models to support “clinician-innovators”, strategic academic–industry collaboration and emergence of novel revenue models.

### 1.1. Focus on developing academic research methodology

AMCs remain keenly interested in advancing research and academic discourse around digital health. Partner's Center for Connected Health (CCH) developed a dedicated research program to quantitatively evaluate wireless biometric remote monitoring devices, social media, mobile applications and telehealth technologies. UCSF recently announced a virtual patient cohort called the Health e-Heart study,<sup>14</sup> which combines biometric monitoring and social media tools to predict cardiac disease risk. Through its Clinical and Translational Informatics (CTSI) program, UCSF Schools of Medicine, Nursing, and Pharmacy also leads in developing research methodology, working to validate new research tools for patient entered data as *n*-of-1 trials and interrupted time series design as alternatives to randomized control trials.<sup>15</sup> Because of the extreme sensitivity of health care data, all of the AMCs profiled have formalized relationships with Information Technology (IT), legal, and compliance in developing clinical research infrastructure for IT-based solutions.

### 1.2. Integration of digital health innovation into medical education at its earliest stages

Both UCSF and Partners work to integrate digital health tools into medical education and training programs. At Partners, Agents of Change, a new program led by the Harvard Center for Primary Care, aims to provide medical students with a venue to pursue innovative solutions in primary care using digital tools. At UCSF, interprofessional HealthTech electives are available each term, and a new course allows medical students to receive credit for editing health-related Wikipedia articles. Internal and external experiential internship opportunities in Digital Health are available, and a longitudinal Digital Health Pathway is planned for the near future.

### 1.3. Early physician champions drive formation of institutional goals

Specific areas of disease and technology focus were largely predicated upon the interest of early physician champions. Partners CCH began with several initial projects in cardiology and dermatology (the initial founders' specialties), such as home monitoring for patients with congestive heart failure to prevent rehospitalization, or teledermatology for patients living in remote areas of Massachusetts. Targeting improvement in diabetes management, Tidepool, an open source data aggregation and display platform for patients with diabetes, was developed as a combined effort between UCSF Endocrinologists and entrepreneurial parents of children with Type 1 diabetes. Similarly, Trinity, a secure online multidisciplinary care technology and virtual tumor board was co-founded by UCSF physicians who observed delays in patient care due to the time and geographic barriers posed by in-person meetings. Partners is now evolving towards more targeted innovation by prioritizing new projects based on their potential impact on healthcare, as well as institution-specific business, clinical and compliance concerns. Likewise, UCSF's internal accelerator (Catalyst) and Resource Allocation grants show a shifting trend from physician champions towards overall impact assessment. The new UCSF Center for Digital Health Innovation also supports four products extending the reach of care beyond traditional settings.

### 1.4. Collaboration with industry and technology accelerators

Both AMCs collaborate closely with industry. Academic–industrial partnerships range from those with tiny start-ups in their earliest stages to large incumbent technology companies. At UCSF's Catalyst Accelerator, UCSF partners with outside industry partners from multiple disciplines. While many AMCs already have existing relationships with large IT vendors, new partnerships with technology accelerators like Rock Health and StartX play a significant role in introducing AMCs to early stage start-ups.<sup>16</sup> Involvement with technology accelerators helps AMCs stay abreast of the constantly evolving innovation landscape and gain early insight and exposure to cutting edge technologies with potential to improve health outcomes, reduce costs, or enhance the patient experience. For early stage companies participating in accelerator programs, relationships with AMCs provide critical access to clinical expertise and clinical trial infrastructure. This is extremely beneficial in the setting of increased demand on outside startups from consumers, funders and the FDA for rigorous evaluation of new technologies. UCSF and Rock Health for example co-host annual “Meet Up of the Minds” events where clinical problems from the frontlines of healthcare at UCSF are presented to tech developers and funders invited from the Digital Health community at large.

### 1.5. New business models

In addition to research collaborations with digital health companies, AMCs are also beginning to explore new business models to monetize their efforts in digital health. Partners' Healthrageous (purchased by Humana in 2013), a company and wellness program spun out of the Center for Connected Health is based on intellectual property developed and tested at the institution. UCSF has translated digital health technologies out of the university in various models including co-development, formation of new companies or nonprofits. Both UCSF and Partners have created programs where the costs of clinical pilots and trials can be offset through taking an equity stake, downstream revenue sharing agreements, or discounted contracts with industry partners. For example, UCSF has recently partnered with Samsung to create the UCSF–Samsung Digital Health Innovation Lab to validate mobile health sensor

Download English Version:

<https://daneshyari.com/en/article/514991>

Download Persian Version:

<https://daneshyari.com/article/514991>

[Daneshyari.com](https://daneshyari.com)