# *Health innovation salon dinner highlights*

## *Always On: The "quantified self"*



Continuing PwC's 180° Health Forum discussion

San Francisco, California - 2015

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PwC and Healthspottr recently convened a select group of innovators, investors, and thought leaders from across the health industry to debate the future of the "quantified self"—the movement to leverage the expanding trove of health data that consumers generate through mobile technologies, biometric devices, sensors in the environment, and more.

How can traditional and emerging players in what PwC terms the New Health Economy™ evolve this movement to deliver measurable ROI to providers, payers, employers, new entrants—and above all, to patients? How can we make better use of innovative technologies to shape the behavior of healthcare consumers and accelerate progress?



# *Introduction*

It sounds like modern medicine's dream: Beautiful technology ornaments and barely-noticeable sensors that gather, track, and deliver data to individuals—in real time—that reflects their physical activity, biometric status, and even their psychographic trends. And it all happens while they go about their daily lives at work, at home, and at play. This is how the convergence of mobile technology, supercomputing, and Big Data is making the "quantified self" manifest. The result is an ever-expanding trove of information of immeasurable value to drug companies, device manufacturers, doctors, researchers, insurers, investors, entrepreneurs, and most importantly, patients.

The quantified self movement holds particular promise for pharmaceutical and life sciences companies that can find ways to derive measurable value from consumer-generated health data. Such data could inform research and development spend; accelerate and perhaps supplant expensive clinical drug trials; and shed light on patient compliance. This rich store of health data also could provide new evidence about the relative value of individual therapies at a time when physicians, patients, and payers, both public and private, are carefully examining the practice of medicine through a cost-benefit lens.

While the potential is enormous, realizing the promise of the quantified self is by no means a simple task; merely counting steps and calories does not translate into reduced cholesterol levels or lower body mass index (BMI). Technologies can collect health data, but how patients *respond* to the data determines the ultimate health outcomes.

## *We asked our dinner guests:*

How can consumer-generated data be put to use in ways that support efficacy, care coordination, and compliance with protocols? How can our industry employ data analytics to accelerate the development of genomics and precision medicine in the marketplace? Who should pay for such expensive therapies, and who should decide what constitutes a satisfactory outcome?

***Key conclusions***

Following several hours of candid and richly informed debate, the group arrived at four key conclusions:

*1 | As payers, providers, and patients raise new questions and seek new input about treatments in the New Health Economy, pharma and life sciences companies need to embrace these stakeholders' evolving expectations and priorities.*

*2 | To derive ROI from the "quantified self" movement, we must first ask: How do we define value? How do we measure it? How do we create value from personal health data— for pharma and life sciences companies, providers, payers, and patients?*

*3 | Creating value for the health industry from "quantified self" data is more than a math problem. It requires understanding the diverse goals and motivations that drive patients to get engaged in their health.*

*4 | The "quantified self" does not exist in isolation. Pharma and life sciences companies must identify the web of relationships that motivate individuals, and tap into the power of those relationships to drive compliance and behavior change.*

Following are highlights of the dinner discussion, including key perspectives that shaped the group debate.



### *1 | As payers, providers, and patients raise new questions and seek new input about treatments in the New Health Economy, pharma and life sciences companies need to embrace these stakeholders' evolving expectations and priorities.*

The focus of pharmaceutical and life sciences companies is expanding as payers and providers seek real-world evidence of effectiveness, and as patients now inquire frankly about costs to determine the value to *themselves* of one therapeutic intervention over another. Gone is the traditional pharma business development model, codified for our dinner group into three steps by Bob Chib, Head of the Strategic Accounts Business Unit for Astellas Pharma US. Astellas, based in Japan, specializes in medications for urology, dermatology and other illnesses. In the traditional pharma model, explained Chib, in step one, companies invested hundreds of millions of dollars—if not billions—in R&D and clinical trials to demonstrate efficacy and safety. Step two: companies lobbied for regulatory approval for their products. Step three, said Chib: "You'd throw it over to your commercial side [and] have representatives sell the product to providers. And it worked very well in the fee-for-service model."

Fully 92% of physicians say they consider cost when prescribing medication.
— PwC Health Research Institute, 2014 Clinician Survey

Today, following the industry's shift towards value-based reimbursement, the pharma and life sciences industry is influenced by a much broader group of stakeholders. "Payers are influential. I think organized providers (IHN) are becoming much more influential [and] patients are becoming more empowered," said Chib. "Pharma's biggest challenge today is to break out of that traditional mold and really bring in the insights from payers, from providers, as well as from patients to inform clinical trial design and generate real world evidence [and] I think we're starting to get there."

Indeed, the call for value is resounding from all directions, according to PwC's Health Research Institute (HRI):

- In a 2012 survey conducted by HRI, 60% of insurers said a drug must show more clinical benefits than do other available treatments to be considered for coverage, and 45% of respondents said a clear cost savings argument was needed.[1]
- Nine in ten physicians (92%) responding to a 2014 survey by HRI reported that they consider cost when prescribing a medication.[2]
- In a 2015 study by HRI, 43% of pharma/life sciences executives surveyed say the FDA should consider pharmaco-economics as a criterion for drug approval.[3]

1 PwC Health Research Institute, "Unleashing the Value: The changing payment landscape for the US pharmaceutical industry," May 2012. (https://www.pwc.com/us/en/health-industries/publications/pharma-reimbursement-value.html)

2 PwC Health Research Institute, "Clinician Survey," 2014

3 PwC Health Research Institute, "The FDA and industry: A recipe for collaborating in the New Health Economy," January 2015. (https://www.pwc.com/us/en/health-industries/health-research-institute/hri-pharma-life-sciences-fda.html)



Where we are today, [with] a shift towards value-based reimbursement, there is a much broader group of influencers and stakeholders. Payers are influential. I think organized providers (IHN) are becoming much more influential [and] patients are becoming more empowered.

***– Bob Chib***
Head, Strategic Accounts Business Unit
Astellas Pharma US



### *2 | To derive ROI from the "quantified self" movement, we must first ask: How do we define value? How do we measure it? How do we return value from "quantified self" data for companies, providers, payers and patients?*

Thanks to the "quantified self," biometric measurements and patient-reported accounts of symptoms and side effects could set a new standard for how drugs are brought to market. Such consumer-generated data could also help to demonstrate how a new drug stacks up against other therapies—a critical value add as the concept of pay for performance takes hold across the New Health Economy. But in an environment in which such data has value to diverse stakeholders with disparate interests, how will we define what is valuable? What is valuable to a provider, insurer, pharma company or patient will surely be defined differently. Value may even be defined differently by the same person at different times, depending on whether the individual is well or ill. So who is the ultimate arbiter of value?

Ben Comer, a senior manager in PwC's Health Research Institute, suggested to the dinner group that before we think about value, we must consider what we will measure. A so-called "positive health outcome" looks very different to different constituents, and the definition also varies across diseases and therapeutic areas, Comer noted. He asked: "If we're to be using 'quantified self' data—or new types of evidence, consumer data, or patient data-generated evidence—who is going to ultimately make the decision about what the benchmark is for a positive outcome?" Moreover, he wondered aloud about the patient's responsibility for generating a positive outcome. "If you're a patient, and you have heart failure, and you are not acting in a healthy way, you're not exercising, you're eating poorly, at what point is the patient [on] the hook for that?"



Who is going to ultimately make the decision about what the benchmark is for a positive outcome? At what point is a patient also responsible for being a part of that equation?

***– Ben Comer***
Senior Manager, Health Research Institute, PwC

As founder of HICCup/Wellville and Chairman of EDventure Holdings, long-time technology investor Esther Dyson agrees that patients have responsibility for outcomes, but the problem is also one that pharma companies must help to solve if they wish to stay relevant in the marketplace. Said Ms. Dyson: "(If) the patient was noncompliant, it wasn't the drug that didn't work. But at the same time, pharma needs to figure out, 'how do you make your drugs more appealing, more convenient, reduce the side effects?'

### *What is valuable to pharma companies? | A clearer patient profile.*

To pharma and life sciences companies, consumer-generated data presents the opportunity to develop a more precise picture of the individual end user. Under what circumstances does a patient adhere to a treatment protocol? What can the data tell us

about what motivates adherence? What environmental or biometric indicators precede a break with the protocol?

Of course, there is value for pharma and life sciences companies in improving protocol compliance. But there's also value in focusing on wellness and overall health, according to investor and startup executive Clayton Lewis. "The healthcare system today is so focused on treating symptoms," he noted. "If we can actually come up with scientifically validated metrics for wellness by looking at correlations of data and understanding early indications that someone is about to make a transition, I think, actually, pharmaceutical solutions can be very impactful."

Earlier this year, Lewis became CEO of Arivale, which seeks to promote measurable but non-therapeutic interventions for chronic illnesses—for instance, by evaluating an individual's naturally-occurring microbiome. Arivale calls its approach "scientific wellness."

Lewis acknowledged that incenting pharma companies to shift their focus away from clinical outcomes and toward wellness will be difficult. After all, these companies are paid for developing therapeutics that perform to clinical outcomes; they are not paid to prevent people from developing medical conditions.

"I don't know how we get the incentive…unless we can get payers [on board] or if accountable care organizations actually drive some type of reform," said Lewis. "So there has got to be some learning around that. But the idea that pharma should only be focused on treating illnesses feels very shortsighted if we're actually going to reform the system."



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***– Clayton Lewis***
Co-Founder and CEO, Arivale

Sean Rooney, Director of R&D advisory services in the Pharmaceuticals and Life Sciences Practice at PwC, agreed with Lewis that realigning incentives remains a significant challenge: "Changing the incentive structure, the mindset of a pharma company [to] really think about health and wellness in totality, I think we're a long way off from that," Rooney told the group.

### *What is valuable to providers? | The right data at the right time.*

Delivering value requires getting the right information to the right person at the right time, says Hanmin Lee, MD, Director of the Fetal Treatment Center at the UCSF Medical Center and surgeon-in-chief of UCSF Benioff Children's Hospital. Having information isn't enough. We need to improve our ability to use the information, so that providers can synthesize and employ the data when making clinical decisions or other judgments about what to do. That's a difficult task.

Lee recalled: "When I went to medical school in 1987, we had hospital charts, and you wrote a note. It said, 'So-and-so is sick, and here are the three reasons why. This is what we have to do.' Now, if you take that same note, you've imported 500 bits of data from the medical record. You check off the boxes: physical exam, history, 'I have reviewed the X-rays'; 'I have reviewed the consultant notes' - and all of this gets documented and billed. But your cardiologist doesn't read that because the critical information is impossible to find in that note. And if you multiply that by a hundred bits of data, it becomes data overload. So the information is there, but to extract that data is increasingly difficult," Dr. Lee said.

***There's a shortage of attention to and investment in how the wealth of EMR data being collected can be accessed and used most effectively. This translates into a valuable market opportunity for entrepreneurial service providers in the New Health Economy.***

Under "meaningful use" guidelines developed during the earliest stages of healthcare reform, doctors would be paid to enter data into EMRs as an incentive to invest in and deploy such software. But there has been a shortage of attention to and investment in how all the data, once gathered, can be accessed and used most effectively.

Even the most beautifully designed technology systems will fail if we don't understand the context in which they will be used, cautioned Stu Winby, founder and CEO of SPRING Network, an organization strategy and design firm that focuses on bringing technology and systems innovations to industries such as healthcare. "When we go in and work in any kind of physician system, it's not the technology, it's the social system that has to be changed and redesigned," he said, adding that it's not just hospitals' systems that need re-designing: "It's not only with the provider, but also the other parts of the ecosystem, so they all work together in the service of greater value and for the patient."

Winby, who previously served as Executive Director of Strategy and Organization for Hewlett-Packard, points out that technology adoption in healthcare still lags far behind other industries, such as financial services, retail, and even hospitality. "If you look at the [adoption] lag in healthcare, a lot of it is social-system design, how [hospitals] are organized, how they're managing," he noted.

There are valuable market opportunities for entrepreneurial service providers in the New Health Economy who focus on how health data can be accessed and used most efficiently. At least one of the dinner participants, Amina Qutub, PhD, is focused on this challenge. Qutub is Assistant Professor of Bioengineering at Rice University and Co-Founder of Data is Beautiful Solutions (DiBS). The company applies visualization software to EMR and research data to make the judgment phase faster and easier for the company's physician clients. The system then makes such "actionable data" available to other physicians in real time. "We are really conscious of the time it takes for a doctor to glean information from that data," she said. "You can't be expensive, in terms of the time, and still get value [out of it] at the individual or financial level."

To deliver value in today's market, Qutub explained, "you need something that can be very rapid, that's constantly adapting to new data, and that tells somebody down the hall what they're prescribing, not [a] black box algorithm [that] will tell you how many people in the past have prescribed. [That] is what adds value."



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***– Amina Qutub, Ph.D.***
Co-Founder, DiBS

## *Case study | DiBS: Visualizing the quantified self*

*A healthcare startup spawned at Rice University is helping physicians to visualize how the "quantified self" can help them and their patients. DiBs—short for "Data Is Beautiful Solutions"—offers dynamic, interactive data visualization tools that quickly generate bioinformatics graphics. The company reports that 91% of users master its software platform, EASEL, in five minutes, and 84% have found new patterns in their data — information that can help physicians to make better clinical decisions.*

*Individual subscriptions and custom builds for enterprises provide twin revenue streams for DiBS, which is now working with a pharma and life sciences partner to bring more extensive drug data to doctors, electronically and visually. The goal, says co-founder Amina Qutub, is to enable physicians to draw on information from many cohorts of patients to make more effective prescription decisions.*

### *What is valuable to patients? | Transparency, experience, and the human touch*

Under the traditional third-party payer system, for most consumers healthcare was a financial externality; because their care was paid for by another party, they didn't need to understand what individual tests and services cost, much less the potential costs related to unhealthy behavior. The explosion of consumer-generated health data provides an opportunity to bring transparency to healthcare costs, and clarity to the consequences of behavioral decisions.



One thing that I think will really help [is] real-time feedback. When you get to real-time, non-invasive blood monitoring, you can watch your glucose go up and down after you eat the cheesecake.

***– Esther Dyson***
Chairman, EDventure Holdings
Founder, HICCup

**Investor Esther Dyson is the Chairman of EDventure Holdings and Founder of HICCUp's Way to Wellville,** a non-profit project to drive health and wellness in five small communities by creating a culture of accountability. On the technology side, Ms. Dyson believes one great benefit of "quantified self" technologies and tools is the transparency offered by immediate data feedback to patients: "When you get to real-time, non-invasive blood monitoring, you can watch your glucose go up and down after you eat the cheesecake," Ms. Dyson told the group. We will still have to deal with the inertia created by delayed consequences. "Your car breaks down within a year. Your body can take 20 or 30 years," Ms. Dyson added, but she believes such real-time data feedback should help consumers comprehend the consequences of their decisions sooner, "especially if we get kids to try such experiments at school."

But more data, even data in real time, will not be sufficient, argues **Jacob Best, Director of Medical Networks for San Francisco-based Grand Rounds.** The company matches patients to appropriate physician resources, solicits second opinions, and offers consumer friendly explanations of complex medical procedures for patients at all levels of health literacy. "One thing that we found, when we're trying to help patients make better decisions, is that there is a pretty low limit to what you can do with data alone," said Best.

Grand Rounds uses technology in combination with a broad-based network of clinical experts to help patients make better healthcare choices. "I think that sometimes people take for granted, or forget, we are in healthcare," said Best. "And we spent generations building trust in white lab coats. Supplementing the fast visualization, or the 'most targeted relevant data' with just a human saying, 'I know you, I've listened to you, and here is the best way for you, *personally*, to behave,' is very, very powerful. You have to keep the human touch involved."

## *Case study | Arivale*

*Are consumers ready to wrestle with Big Data? Arivale CEO Clayton Lewis thinks so, as do venture investors who recently poured close to $40 million into the direct-to-consumer startup he co-founded with genomics expert Lee Hood, MD, PhD, and computational biologist Nathan Price, PhD.*[5]

*Arivale, formally launched in June 2015, wants to promote a new concept it calls "scientific wellness." It involves combining* ***scientific consumer data****, such as the individual's genome, gut microbiome, and blood and saliva tests, with* ***behavioral consumer data*** *related to lifestyle (e.g., how much an individual exercises, or what he or she eats and drinks over a given time period.*

*Arivale pairs each client with a dietician/health coach and provides a Fitbit to collect data daily. The goal is to provide a "scientific path to wellness" by giving consumers the data and support they need to lead healthier lives.*

*Arivale's service retails for $2,000 a year, suggesting its target customer is more likely to be in the concierge services market than, say, a Medicare recipient coping with a chronic illness. Lewis thinks this target audience is capable of handling more data and motivated to do so.*

*"Our premise—and we have a lot to learn and a lot to prove—is that our consumers are actually at a point where you can present really complex data sets to them in very transparent ways," he told the dinner group. If the premise holds true, Arivale could help point the way toward leveraging data to produce better health outcomes.*



### *3 | Creating value for the health industry from "quantified self" data requires understanding the diverse goals and motivations that drive patients to get engaged in their health.*

The New Health Economy's focus on value and outcomes presents a key challenge for pharmaceutical and life sciences companies: ensuring patient compliance with prescriptions, so that the effects of a drug or device can be measured accurately. To achieve this goal, companies must identify what customers are trying to accomplish, and what matters to them most.

That requires a more holistic approach, said Dan Hovey, founder and CEO of Digifit, a technology-enabled wellness engagement company. The healthcare system was set up around physicians, with doctors making all the decisions. While much effort went into trying to cure sickness and alleviate pain, little thought went into understanding what health goals or preferences were most important to the patient.

At Digifit, a technology-enabled health and wellness engagement company, Mr. Hovey and his team are expanding their focus from a person's specific health condition to a full-life perspective. "What we've been thinking about a lot is: how do we understand, while helping our users understand their life's purpose. Then how do you compose a set of experiences to help them achieve those purposes?" Keeping purpose in mind provides the motivation to change ones behaviors and habits. To understand this, he cautioned, is not a unilateral task; while a person may have an overarching purpose for their life, their motivations can be numerous. To be effective you must tap into these motivations "It's more like playing a chord. Everyone has got multiple things going on: family, personal goals, work and friendships." Understand multiple motivating factors are critical to creating a successful health experience, says Mr. Hovey. "Getting to the right solution can include many experiences threads: emotions, exercise, nutrition, medications, sleep and mindfulness. Composing experiences that educate, engage, track, and measure an individual need equal consideration with how you also engage family members, and how the health system gets involved."



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***– Dean Hovey***
President and CEO, Digifit

Clayton Lewis built on the idea of a "family approach" to getting people engaged in their health: "On the whole, Americans don't aspire to be healthy, but people do aspire to have life experiences," said Lewis, Arivale's CEO. "And so, ultimately, the first thing you've got to do when you're building a relationship with a consumer is you've got to understand what they're aspiring to accomplish….And you've got to go to baseline motivations that are very different than 'eat right and exercise because you might have diabetes in five years.' " For example, Lewis noted, most consumers relate their health goals to life benchmarks: "I want to look better at my daughter's wedding" vs. "I want to lose weight." Or, "my wife is going to have her 60th birthday in five years, and we aspire to relax."

Besides understanding how personal goals can drive healthy behavior, New Health Economy players need to recognize that personal problems and psychological needs are also significant motivators of behavior, healthy or not. "It seems to me that a lot of behaviors are driven by stress," offered Dr. Lee. "So at Benioff Children's Hospital, we're thinking about ways to legislate changes [and] diminish the stress." He offered one surprisingly example of a seemingly constructive food strategy that backfired. When UCSF Benioff Children's Hospital opened, the cafeteria eschewed fried food. But the hospital's customers didn't always appreciate the health-food gesture. "They said, 'Look, I don't care what you guys are saying. Our child is seriously ill, and you're telling me that [he] can't have French fries and chicken fingers, and I can't eat what I want to eat [to] gives me a little bit of pleasure and comfort in the worst time of my life?'" In this instance, said Lee, the hospital needed to weigh the nutritional value of the food against the value of minimizing anxiety and stress for its customers during a time of crisis.

Still other dinner participants believe that, in the end, consumers are motivated by their own practical interests: "But there are different groups of consumers. If I had to vote what motivates most of them, I think it is their personal perception of value. So to the extent that co-pays are increased, for example, I think that gets them engaged," said Caroline Popper, M.D., a physician and co-founder, Popper and Co., which helps life sciences companies develop and commercialize new technology.



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***– Caroline Popper, MD***
Physician and Co-Founder,
Popper and Co.



### *4 | The "quantified self" doesn't exist in isolation. Pharma and life sciences companies must identify the web of relationships that motivate individuals, and tap into the power of those relationships to drive compliance and behavior change.*

To realize the promise of the "quantified self," pharmaceutical and life sciences companies should focus not just on the individual, but on the individual's network of relationships. There is opportunity for players that can meet consumers' desire for more personal connections with providers, Arivale's Lewis told the dinner group.

A 2013 study published in the journal *Health Affairs* found that the average amount of time a primary care physician spends with a patient was 18-20 minutes per visit.[4] As time spent with patients has been squeezed down to minutes, the opportunity for individual physicians to impact a patient's health has been diminished. This is problematic, Clayton Lewis argued, and not only because clinical tasks may be compressed into too short a time period. "Life is about relationships, and I think, on the whole, people are very lonely in our society," he noted. "But if there is a relationship [between you and your provider] and that relationship is helping you translate very complex data and holding you accountable, then that [can] motivate consumers to different behavior."

When you're treating your patient, you're not just treating them – you're treating their networks.... These multiplier effects are powerful.

***– James Fowler, Ph.D.***
Professor of Political Science, University of California at San Diego

Other dinner guests agreed that deeper engagement with care providers would benefit all healthcare consumers. But relationship-driven interactions are labor-intensive and therefore expensive. So how do we make high-touch care accessible on a broad basis?

Caroline Popper pointed to the proliferation of concierge medical practices as an example that a relationship-driven model has legs—for select constituencies: "The rise, in certain economically privileged communities, of concierge physicians [works]. You incentivize [doctors] to take your call when you want to interact with them, and they'll reciprocate by interacting with you. This is a patchy, new phenomenon and underscores how the healthcare market place, like other marketplaces, is responding to consumer diversity and consumer preference."

Most concierge practices charge annual membership fees to patients, often totaling thousands of dollars per year (and in some cases, tens of thousands of dollars). In most cases, patients must also pay for individual visits or house calls with their doctors. These are the cash incentives that motivate concierge doctors to "interact" with their patients, said Popper. The dinner group acknowledged that few consumers can afford such a high cost to recreate the kind of "old school" relationships that physicians once had with their patients.

The good news, Clayton Lewis pointed out, is that the patient-provider relationship need not include a physician. A variety of service providers, from nurse practitioners to non-professional caregivers, could create the supportive relationships that he envisions—relationships that could encourage healthier behavior.

Esther Dyson believes that families can be a valuable ally in our pursuit of healthy behavior change. Dyson's HICCup project is an experiment in data-informed

4 Brian K. Bruen, Leighton Ku, Xiaoxiao Lu and Peter Shin. No Evidence That Primary Care Physicians Offer Less Care To Medicaid, Community Health Center, Or Uninsured Patients. Health Affairs, September 2013 vol. 32 no. 9 1624-1630.

population health management. HICCup seeks to evolve the "quantified self" movement into the "quantified community" by leveraging data from diverse sources, including medical records, grocery store receipts, and even sewage data, to measure the health of local populations in a given area.

But while data can provide insights into the health of a community, data by itself will not drive better health outcomes. "Wellville is not about giving everybody a wearable health tracking device," Ms. Dyson warned. "The last thing we want to do is go in and instrument people and turn them in to specimens. It won't work." One thing that will work, she believes, is leveraging family as a motivating force for health. "What is it that's going to get people to change their behavior? And in many ways, a lot of our people, they've given up on themselves, but they still care about their kids."

## *Case study | The Way to Wellville*

*Where, exactly, is Wellville? It just may be—or come to be—in Clatsop County, Oregon; Greater Muskegon, Michigan; Lake County, California; Niagara Falls, New York; and Spartanburg, South Carolina. These five communities were chosen in August 2014 by Esther Dyson's Health Initiative Coordinating Council (HICCup) for an experiment in how to improve the health of a population through a range of interventions.*

*The challenge posed to the Wellville communities: make demonstrable progress on five measures of human and economic health in five years, with resources and expertise from HICCup to try various interventions. All of the communities are working on improving nutrition, social conditions, and preventive and chronic disease care, as well as addressing locally chosen issues ranging from teen pregnancy to community pride.*

*Across the country, says Dyson, many people "don't have access to good food, their lives are just fundamentally too busy to do all the things that are recommended," and "they're not deciding between 'should I go for a run, or should I read a book or text on my little phone?' but 'should I take care of the kids or get the car fixed' or 'my brother's in jail -- should I go visit him?'*

*Through its Wellville initiative, HICCup is striving to motivate behavior change to produce improved health outcomes. Says Dyson: "We're trying to go even further down and make it easy to make better choices, not necessarily with people making them consciously.... I really want to give people better options so that they can make those better choices."*

**The circle of potential health influencers is even wider than a household.** The power of support groups has been a cornerstone of addiction treatment and weight loss programs for decades, and recent research confirms that currents of healthy and unhealthy influence flow through populations, even without conscious effort. Political scientist Dr. James Fowler of the University of California, San Diego, and physician-sociologist Dr. Nicholas A. Christakis of Yale University made a sociological splash in 2007 with their study linking obesity to individuals' real-life social networks.[5] Their research showed that individuals with friends who are overweight are more likely to become overweight.

By influencing not just individuals but members of the social networks in which they're enmeshed, it may be possible to influence health behaviors in a positive direction. As Fowler told a gathering of health innovators and investors at the 2015 Healthspottr Annual Retreat at the Aspen Institute: "When you're treating your patient, you're not just treating them – you're treating their networks.... These multiplier effects are powerful."

5 Christakis, N. A.; Fowler, JH (26 July 2007). "The Spread of Obesity in a Large Social Network Over 32 Years". New England Journal of Medicine 357 (4): 370–379. doi:10.1056/NEJMsa066082. PMID 17652652.

# Conclusion

Realizing the promise of consumer-generated health data is not an easy task. Simply expanding on the means of collecting data—whether by EMR, health wearables, or high-touch human outreach—is not sufficient.

Our dinner guests concluded that if players in the New Health Economy are to continue to produce value, we must find new ways of demonstrating how we will leverage consumer health data to generate positive business and health outcomes. To achieve this goal will require that we spend more time comprehending what stakeholders—providers, patients, and consumers—expect of the healthcare industry; more clearly identifying how each stakeholder defines value; and understanding the motivators that drive behavior. Most important, we must continue to emphasize the role of human relationships as we strive to make greater use of technologies and the wealth of consumer health data they produce.

Healthcare companies that follow these guidelines will be well positioned to realize the promise of the "quantified self" and stay competitive in the rapidly changing environment of the New Health Economy.

The remnants of the economic incentives of the old third-party payer system still create barriers to needed change, as do political considerations and regulatory constraints. Making "This is not a pharma problem alone," says PwC Principal Ash Malik. "You need extraneous agents, investors, companies coming together. You need regulations, policies [that] say clinical trials are no longer just about monitoring, but also [about] hearing back from the patient, how they're feeling. So really, it's an ecosystem issue."



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***— Ash Malik***
Principal, PwC Health Industries



## *Participants:*

***Jacob Best**, Director of Medical Networks, Grand Rounds, Inc.*

***Bob Chib**, Head, Strategic Accounts Business Unit, Astellas Pharma US, Inc.*

***Lynne Chou**, Partner, Life Sciences Group, Kleiner Perkins Caufield & Byers*

***Esther Dyson**, Founder, HICCup*

***Dean Hovey**, President & CEO, Digifit*

***Hanmin Lee**, MD, Director, Fetal Treatment Center, UCSF Benioff Children's Hospital*

***Clayton Lewis**, CEO, Arivale*

***Doug Noland**, Executive Director, Strategic Accounts Solutions, Astellas Pharma US, Inc.*

***Caroline Popper**, MD, Founder & President, Popper and Co.*

***Amina Qutub**, PhD, Co-Founder, DiBS*

***Stu Winby**, Co-Founder & CEO, Spring Network*

## *Event hosts:*

***Ash Malik**, Principal, PwC Health Industries*

***Dimitri Drone**, Partner, PwC Health Industries*

***Sean Rooney**, Director, PwC*

***Ben Comer**, Senior Manager, Health Research Institute, PwC*

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# More information

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