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Advancing personal connected health



Personal Connected Health Alliance

A collaboration between HIMSS, Continua and mHealthSummit

The recently launched **Personal Connected Health Alliance (PCHA)**, a joint venture between the mHealth Summit, HIMSS, and Continua Health Alliance, convenes stakeholders to explore and share best practices with connected health initiatives.

PCHA's mission is to establish a business model and support implementation of plug-and-play interoperable personal health solutions. PCHA is focused on consumers engaging with their health via interoperable health solutions to meet their lifestyle needs, and will generate a new knowledge base for advancing education and awareness for personal connected health technologies. PCHA is a great resource for life sciences companies to learn about the issues and interact with key players in connected health.

Moving forward the PCHA will host the mHealth Summit. In its sixth year, the mHealth Summit is the largest event of its kind, and it gathers healthcare and technology leaders in government, the private sector, industry, academia, providers, and not-for-profit organizations to advance collaboration in the use of wireless technology to improve health outcomes, reduce costs, and create a new paradigm in healthcare delivery in the United States and abroad.

At the recent 5th annual mHealth Summit in Washington, DC, stakeholders from across the healthcare ecosystem, including patient and caregiver advocates, providers, payers, entrepreneurs, and life sciences companies came together for the inaugural Pharma and Life Sciences Roundtable to discuss how technology and connected health initiatives can be leveraged to enhance patient outcomes, coordinate care between all stakeholders, and decrease healthcare costs. The day-long session brought together executives who initiated a first-of-its-kind cross sector dialogue to explore connected health strategies and examine the factors involved with engineering a comprehensive connected health initiative.

This publication provides a review of the critical issues discussed during the Roundtable, and shares knowledge and insights for building outcomes-driven connected health initiatives that support the mission and work of life sciences companies.



Shelley Price, MS, FHIMSS
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INDUSTRY PERSPECTIVE

The life sciences industry is undergoing a transformative change being driven by the need for healthcare to be more affordable, efficient, and effective. In the new model, healthcare providers and payers will expect life sciences companies to provide healthcare delivery solutions that improve patient outcomes while reducing costs.

At the same time, we are seeing increased interest on the part of healthcare providers, patients, and caregivers in using mobile and digital devices, such as smartphones, tablets, condition monitors, and fitness trackers to gather and collect information so they can make better informed healthcare decisions. There is an opportunity to use technology to connect health and provide healthcare outside of traditional medical settings.

Connected health initiatives have the capacity to provide and deliver care at the right time and the right place, and they are fundamental in transforming the way health is managed. The ability to improve connections among

all stakeholders, including providers, patients, caregivers, payers, and life sciences companies changes how health and chronic conditions are managed. Ultimately, connected health initiatives improve patient care and result in better outcomes.

There are tremendous opportunities for life sciences companies to engage in connected health initiatives and to partner with healthcare providers to change the paradigm of care.

Given HIMSS' global focus on mobile initiatives to improve quality, accessibility, safety, and cost-effectiveness of care, we are able to leverage our relationships to bring together a diverse group of stakeholders. We are excited to play a part in the mHealth Summit Pharma and Life Sciences Roundtable to bring key leadership from the healthcare delivery system and the life sciences industry together to transform their businesses and prepare for a bright future.



The era of connected health

The traditional model for healthcare delivery in the United States has focused on face-to-face interactions, delivered mostly by specialized healthcare providers in silos of care. The results of this model have resulted in high costs and variable levels of quality. Additionally, the current payment model in the US focuses on fees for products and services with little incentive to improve performance. At the same time, the current system is not equipped to allow for the free flow of information necessary to allow physicians, patients, and other stakeholders to become partners in the continuum of care.

The current model is not sustainable, and change is inevitable. The growing costs of healthcare in the US, an aging population, and concerns about the future of healthcare delivery are driving change in the private- and public-sector and fueling innovative business models.

Connected health is a model for healthcare delivery that uses technology, including social, mobile, analytics, and cloud-based systems to provide healthcare outside of traditional medical settings and share data information and insights among all stakeholders. Connected health aims to improve the quality and efficiency of healthcare products and services, and provide flexible opportunities for consumers, patients, and caregivers to engage with clinicians and to better self-manage their care. As the industry evolves, connected health will become a reality. For connected health initiatives to succeed, they must address existing care delivery models, align with unmet needs, and measure patient outcomes.

Leveraging connected health initiatives in the life sciences

The way the healthcare system evaluates success for a treatment or device is evolving. To date, products and devices have primarily been assessed on efficacy and safety measures. Going forward, the focus will also involve achieving better outcomes for patients, which will necessitate having the entire healthcare ecosystem working together. To achieve this goal there needs to be

alignment between providers, patients, caregivers, payers, and life sciences companies.

Life sciences companies have tremendous product, disease, and condition knowledge to share. And how consumers are obtaining this health information is changing. Consumers are using mobile technologies more often to communicate in their everyday lives. A recent Harris Interactive/Health Day [poll](#) found that of the 2,050 Americans surveyed, one-third of respondents said they want to use their smartphone or tablet to communicate with physicians, make appointments, or receive test results.

Mobile technologies, including smartphones and tablets, are key enablers of improved self-care. These new health tools not only enable communication between patients and providers, they also collect personalized health information that can be shared between providers and payers.

A key tenet of connected health is patients and caregivers (whether they are family or friends) taking a more engaged role in managing their own health and care. As patients become more astute managers of their own healthcare they will demand the same type of consumer experiences they have in other parts of their lives, such as with banking or insurance. Consumers will demand quick access to providers; high-quality service; secure access to personal and personalized information; information on healthcare providers, including reviews and performance metrics; and transparency on the cost of procedures, treatments, and devices. All stakeholders, including life sciences companies, play an important role in meeting these expectations.

Connected health is a reality and it's time to act

Connected health, using social, mobile, analytics, and cloud technologies, will soon be pervasive in the delivery of healthcare. According to Chris Wasden, Global Healthcare Innovation Leader, PwC, there are "transformative technologies that will revolutionize the delivery of healthcare, much



like the Internet revolutionized our business and personal lives.”

The time to act is now. A connected-health future is a reality. To make improvements in patient care, health outcomes, and care delivery, the entire system needs to be addressed by new and transformative business models and operating processes. Life science companies, as an important part of the

healthcare delivery system, must too be willing to evolve their models or endure a devastating demise of their business. Revenue could be lost at every step in the care delivery ecosystem. Life sciences companies that do not embrace connected health will see healthcare providers and organizations, as well as, consumers choose other companies that embrace the concept of connected health.



Reimbursement models are changing

Payers support diverse mHealth services, and plan to support more

	Have begun to pay for	Plan to pay for in next 3 years	Have no plans to pay for	Pay for; but intend to stop	Total*
Telephone-based consultations	37%	31%	29%	4%	100%
Drug adherence and other health-related communications	31%	37%	28%	4%	100%
Text-based consultations	30%	34%	31%	4%	100%
Analysis of general health and wellness data gathered by patient's mobile devices	30%	36%	30%	4%	100%
Medical professionals receiving data as a part of patient monitoring	29%	41%	27%	4%	100%
Video consultations	22%	38%	37%	3%	100%

Note: *Numbers may differ due to rounding

Source: The Economist Intelligence Unit, 2012. Published as a part of Emerging mHealth: Paths for Growth. PricewaterhouseCoopers LLP, a Delaware Limited Liability Partnership, 2012. Website: http://www.pwc.com/en_GX/gx/healthcare/mhealth/assets/pwc-emerging-mhealth-full.pdf. Accessed February 25, 2014.

(ie, fee-for-service) to a relationship model (ie, managing a patient's health over time). New reimbursement models will require that providers demonstrate enhanced outcomes, which can be done in a number of ways, including preventing the patient's condition from escalating, supporting positive behavior change, diagnosing conditions earlier, providing more effective treatments, improving communication across stakeholders, and demonstrating better management of a patient's condition through mHealth, telehealth, analytics, and other technology-based services. Technology, which is at the heart of connected health, enables data to be collected and shared with stakeholders, as well as provides a channel for information gathering, education, and direct patient engagement to improve patient care.

Research commissioned by PwC and completed by the Economist Intelligence Unit in 2012, found that 40% of payers are encouraging patients to let physicians monitor them through mHealth services. Payers have also begun to cover mHealth related services.

Healthcare reimbursement in the US is changing dramatically due in large part to the aging population and increasing rates of chronic diseases. Today's reimbursement model is based on a set fee-for-service schedule that reimburses providers based on a fixed rate no matter the patient's outcomes.

The healthcare delivery system is shifting the reimbursement model from a transactional model

INDUSTRY PERSPECTIVE

This is a very dynamic time in the delivery of healthcare services. Reimbursement models are changing to focus on outcomes, driven in part by the Affordable Care Act. At the same time, the life sciences industry is challenged with blockbuster products losing patent exclusivity and dwindling product pipelines that reduce revenues.

To succeed in the future, life sciences companies must demonstrate that their products improve patient outcomes. This requires a new mindset that is focused on the customer, and not on a product. Successful compa-

nies will think beyond the product/device and offer products and services that change people's lives.

In thinking about patients, don't overlook the important roles caregivers play in patient outcomes. A recent [Pew Research](#) survey found that 39% of US adults said they provided unpaid care to an adult relative, child, or friend in the past year, up from 30% in 2010. The Pew Research study also found that caregivers are highly engaged in the pursuit of health information, support, care, and advice, both online and offline.



Lynn O'Connor Vos
CEO
Grey Healthcare Group



Changing reimbursement models address improved outcomes

As the reimbursement model for providers changes to focus on managing a patient's health over time, providers will expect life sciences companies to offer products and services that support improved outcomes. At a minimum, providers will look for life sciences companies to provide

enhanced educational materials and programs that support adherence.

Additionally, it is likely payers will expect life sciences companies to "share the risk" of a treatment and may only reimburse if treatments are shown to be effective, as the National Institute for Health and Care Excellence (NICE) does in the United Kingdom.



Patient and caregiver at the center of all efforts

According to the [Robert Wood Johnson Foundation](#), 75% of healthcare spending is spent treating chronic conditions such as diabetes, kidney disease, high blood pressure, heart failure, and lung disease. Additionally, 7 in 10 deaths each year in the US are caused by chronic conditions. Approximately 45% of the US population has at least one chronic condition. This is a staggering reality and managing the costs associated with chronic disease will require engagement by all sectors of the healthcare industry.

With changes in healthcare reimbursement models, payers and providers will require patients to become more accountable for their own care. In a report by McKinsey titled [Perspective: Biopharma in the Coming Era of Connected Health](#), analysts propose that "consumer accountability will force a tiered supply model, where patients perform their own frontline triage to determine the correct level of their healthcare. Their options will include home monitors and telemedicine kiosks, healthcare professionals at retail clinics for low-end care, and specialists for high-end critical care."

[The Centre for Global eHealth Innovation](#), a state-of-the-art research facility devoted to the evaluation and design of healthcare technology that changes health for all through communication and information technologies, has found through its [research](#) that well-designed technologies and enhanced access to health information that engage patients demonstrably improve outcomes at previously unheard levels.

Changes to healthcare reimbursement and

healthcare delivery models, coupled with the need to demonstrate improved patient outcomes, are compelling business needs for life sciences companies to change their focus from products to patients, and to put the patient at the center of their efforts. This requires life sciences companies to adopt a mindset of being in the business of changing patients' health, and developing products and services that support this thinking. Life sciences companies also need to broaden their engagement beyond developing novel treatments and devices, to becoming more engaged in healthcare delivery.

As patients and caregivers become more engaged in their healthcare, life sciences companies have an opportunity to build relationships and engage at a much greater level than ever before. Patients and caregivers have become quite skilled at building relationships with companies in other industries such as banking, travel, and retail, and they will expect to have the same type of relationship with life sciences companies as well.

The patient at the center

The challenge for life sciences companies is to deliver consumer-centric solutions that patients want to use, that meet FDA regulations, and support healthcare provider and patient relationships.

There are numerous opportunities for life science companies to leverage the insights they have gained during the extensive R&D process of their products into programs that drive behavior change and support patient adherence.

These are exciting times and technology is



INDUSTRY PERSPECTIVE

There are three primary opportunities for life sciences companies to become more engaged with patients and caregivers.

1. Shift to a mindset of “meeting patients where they are.” Deliver the information and support patients and caregivers are seeking when and where they want it. Mobile technologies are key to delivering these services.

2. Evolve clinical trial designs to include patients and caregivers. The Patient-Centered Outcomes Research Institute (PCORI) was authorized by Congress to conduct research to provide information about the best available evidence to help patients and their healthcare providers make more informed decisions. PCORI’s research is intended to give patients a better understanding of the

stimulating monumental progress. Many new technologies are available to help patients be more engaged and empowered to manage their health. Effective solutions are needed, and patients need options so they can select the tools that meet their needs and preferences — ranging from mobile sensors and devices to mobile health sites, mobile app-based health management tools, and telehealth and telemedicine devices.

Technologies exist that share data collected from telehealth devices and apps with healthcare providers, and upload the information directly into electronic health records. With these advances, healthcare providers receive accurate information

prevention, treatment, and care options available, and the science that supports those options.

3. Enhance health literacy for patients and caregivers.

The Patient Protection and Affordable Care Act of 2010, Title V, defines health literacy as the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions. Every day patients and caregivers confront situations that require them to make decisions that have a significant impact on their health. The [Centers for Disease Control](#) states “research indicates that today’s health information is presented in ways that are not usable by most adults. “Limited health literacy” occurs when people can’t find and use the health information and services they need.

on how a patient is managing his or her condition; as well as how effective a product or device is in treating a patient’s condition.

The role of caregivers

Caregivers play a critically important role in the health and well-being of patients, and because of this very important role they have a significant impact on patient outcomes.

The Pew Internet and American Life Project conducted a survey titled [Family Caregivers are Wired for Health](#). Through the survey they interviewed 3,014 US adults. The 2013 study found that...

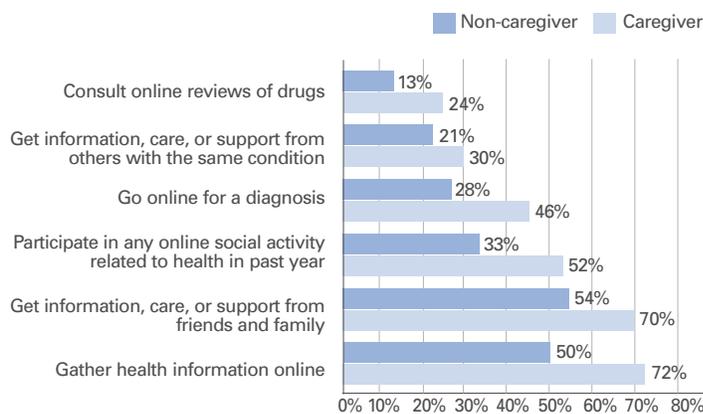
- Nearly four in 10 adults in the US are caring for an adult or child with significant health issues, up from 30% in 2010.
- Caring for a loved one is an activity that cuts across most demographic groups, but is especially prevalent among adults ages 30 to 64, a group traditionally still in the workforce.
- The study found that 39% of US adults are caregivers and many navigate healthcare with the help of technology. Caregivers are highly engaged in the pursuit of health information, support, care, and advice, both online and offline, and do many health-related activities at higher levels than non-caregivers.

Given the interest caregivers have in gathering health information, support, and diagnoses online there is an opportunity for life sciences companies to play an important role in providing information and supporting the needs and interests of caregivers.

MaryAnne Sterling
Co-founder
Connected Health Resources



% of caregivers vs. non-caregivers who do the following health-related activities...



Note: Total number of interviews = 3,014 adults age 18+ years. Interviews were conducted in English and Spanish and on landline and cell phones. Margin of error is +/-2 percentage points for results based on all adults.

Source: Pew Internet HealthTracking Survey, August 7-September 6, 2012. Published as part of Family Caregivers are Wired for Health. The Pew Internet and American Life Project. 2012. Website: <http://www.pewinternet.org/2013/06/20/family-caregivers-are-wired-for-health/>. Accessed February 25, 2014.



Driving innovation through new commercial models

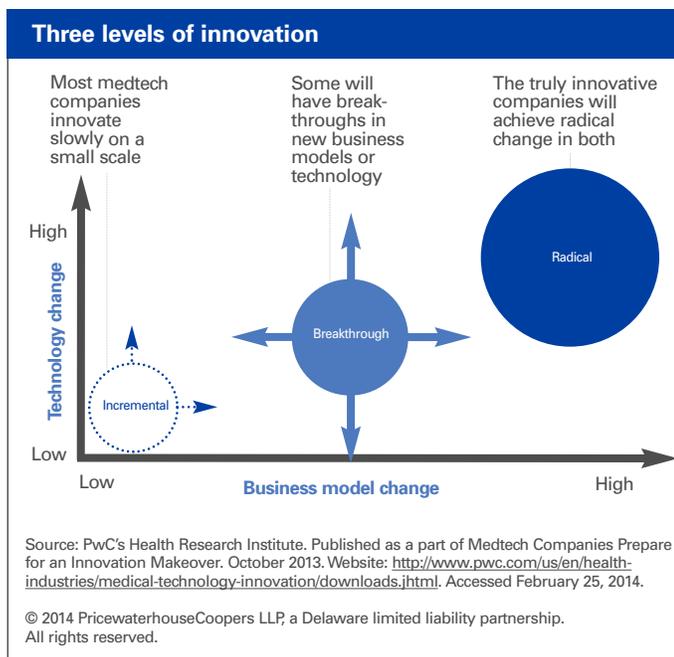
The forces reshaping the healthcare industry are placing a greater emphasis on innovation than ever before. Traditionally, innovation from life sciences companies has been focused in R&D. While many disease-altering treatments have been discovered in this manner, for the most part, in the last decade there have been only incremental advances in science leading to new treatments. For life sciences companies to succeed in the future, innovative breakthroughs are needed.

PwC defines innovation “as the creation and delivery of new value to consumers and companies that results in growth.” The graphic shows how the degree of business model and technology change determine the significance of innovation.

Total solutions needed, not just a product or device

Changes in the delivery system are pushing more risk onto providers and patients. Providers will expect life sciences companies to share the burden. It is likely that providers will only pay for products that demonstrate improved outcomes.

Life sciences companies need to provide “total solutions” that decrease patient-by-patient variability and help providers better manage risk. A key to success is integrating information and services to solve larger problems, such as increasing provider



efficiency, reducing hospital stays or readmissions, and improving patient adherence and satisfaction.

Collaborative partnerships are on the rise as the industry develops new comprehensive solutions. Life sciences companies have partnered with medical technology companies on companion diagnostic tests or imaging tools to enhance patient selection. There are many opportunities to provide unique services and expertise that bring greater value to patients, caregivers, providers, and payers.



Chris Wasden
Managing Director,
Global Healthcare
Innovation Leader
PwC

INDUSTRY PERSPECTIVE

Innovation is critical to long-term success, and the innovation process is fundamentally different from most other business activities and requires different logic, infrastructure, and style of management. Companies can create an innovation engine to help them manage disruptive innovation and find new sources of revenue in the New Health Economy.

1. Be ambidextrous. Operate as a “lean startup” while concurrently maintaining the core businesses. Apply the lean six sigma discipline to experiments and failures funded by small amounts of capital to create products that are tested quickly, fail fast, fail frugally, and feed rapid learning to fuel innovation. Attention to details of operational design is key to properly **insulate** the lean startup from the core business to enable freedom to execute, but

not **isolate** it to ensure synergistic value is created.

2. Communicate the value of innovation in new ways. As new “consumer-centric” solutions are explored, new metrics will be required that measure innovation based on a realistic rate of advancement with a long-term investment. Proactively articulate shareholder value over the long-term. Share the story of where the company is going with innovation investments and how these fit into the overall direction for the company and how they address trends in the broader healthcare industry.

3. Collaborate to share risk and enhance expertise and offerings. New value propositions require new capabilities and new revenue models. Engage new partners in innovation platforms to leverage knowledge, provide new capabilities, and share financial risk in new endeavors.



Information is the new currency in healthcare

In the last decade we have seen a quantum jump in the amount of healthcare data being collected electronically. This is fueled by advances in technology that make it easier to collect and store patient data. In the last decade we've seen...

- Life sciences companies capture R&D and clinical trial data electronically.
- Payers and providers collect large amounts of patient health data via electronic medical records.
- The US government collect and share information on clinical trials and on patients receiving public insurance.

The rapid introduction and adoption of smartphones, mobile applications, and remote monitoring devices coupled with electronic health records, patient portals, and secure messaging offer innovative ways to connect patients and providers and to engage patients to be more involved in managing their health. A [Harris Interactive/HealthDay survey](#) in mid-2013 found that more than 30% of respondents were "eager to use mobile phones and tablets for actual healthcare services, such as monitoring blood pressure or blood sugar, or even getting a diagnosis."

The large volume of data generated by new technologies provides the healthcare industry with insights into how patients use medicines and the

outcomes they experience. This information can be invaluable in demonstrating to payers and providers the real-world efficacy and value of medicines and devices, as well as other treatment protocols.

Big data has the power to transform healthcare. The challenge of big data is not in collecting it, but in translating it into actionable insights. These insights can be used to drive changes in patient care, increase patient engagement in managing their health, foster innovation, and inspire new products, devices, and services.

Patient-generated health data

A growing component of big data is patient-generated health data (PGHD). According to the Office of the National Coordinator for Health Information Technology (ONC), PGHD are health-related data, including health history, symptoms, biometric data, treatment history, lifestyle choices, and other information, created, recorded, gathered, or inferred by or from patients or their designees to help address a health concern. These data are gathered outside of the clinical setting and patients control the sharing of this data.

To date, the ability to share PGHD with healthcare providers is limited, and the ONC is working to develop a [framework of best practices and policies](#) to engage patients and providers and ensure privacy, security, and appropriate use of PGHD. With strong patient and caregiver interest it is likely that PGHD will be included in Stage 3 of meaningful use under the Medicare and Medicaid Electronic Health Record Incentive Program.

Patients have knowledge of their basic health and their insights enhance communication and long-term health management by their providers. A 2013 study with Open Notes by Wuerdeman, Volk et. al. "How Accurate is Information that Patients Contribute to their Electronic Health Record?" showed medical records are not capturing all necessary information about a patient. For example, a study of 254 patients found that 223 did not have their depression screening in their medical record.

Those interested in obtaining diagnostic tests using mobile devices

	Total %	Smartphone or tablet owner	Taking Rx med for on-going/chronic condition
Checking blood pressure	38%	44%	39%
Checking heart and heartbeat for irregularities	36%	42%	37%
Using an application that tracks health (eg, diet tracker, exercise)	34%	41%	31%
Photographing eye, cornea, or retina to diagnose an eye problem	32%	38%	32%
Checking blood sugar or glucose level	32%	37%	32%
Measuring lung function	29%	33%	30%

Notes: *Numbers may differ due to rounding
Summary of those responding "Extremely/Very Interested"

Source: Harris Interactive/HealthDay survey, May 22-24, 2013. Published as a part of Lots of Americans Want Health Care Via Their Smartphone. May 2013. Press release: <http://www.harrisinteractive.com/NewsRoom/PressReleases/tabid/446/mid/1506/articleid/1215/cil/ReadCustom%20Default%20Default.aspx>. Accessed February 25, 2014.



The study goes on to say that a patient can help fill the gaps in the longitudinal medical record (LMR) across providers. A challenge today is that patients rely on providers to track lab and test results. Another hurdle is a patient's willingness to share personal health information; trust has to be there, and it has to be earned.

Leveraging data to improve care

PGHD offers a never-before-seen opportunity to derive greater value from personalized health information and data. The devices and apps that collect individual information are extremely flexible in how information is collected and used. These data provide insights into how well a patient's condition is managed or gives immediate feedback. There are also opportunities to gather genomic insights. PGHD provides another layer of data that are useful as part of an integrated model that includes data from EHRs or clinical trial databases.

The precision medicine movement

The emerging field of precision medicine supports information as the currency of healthcare. Pfizer has defined precision medicine as "an approach to discovering and developing medicines and vaccines that deliver superior outcomes for patients, by integrating clinical and molecular information to understand the biological basis of

disease." According to Stuart Sowder, Vice President External Medical Communications at Pfizer, "connected health has the potential to generate precision medicine insights by customizing how information is interpreted and used to the individual."

In mid-2013 the University of California, San Francisco, hosted the OME2013 summit, which brought together more than 150 top leaders in government, science, technology, business, and academia to discuss precision medicine. Their goal is to "build a global network of health data that allows researchers, clinicians, and patients to share information that ultimately can lead to cures and save lives."

Key obstacles to overcome are creating an infrastructure to collect and analyze the wealth of genetic and biologic data, and generating public awareness and trust to overcome patient privacy concerns. Some life sciences companies see great value in precision medicine and are looking to form partnerships and alliances that will enhance their ability to better select disease targets and identify patient populations that demonstrate improved patient outcomes. Precision medicine, with its focus on integrating clinical and molecular information, could completely transform how life sciences companies approach the development of new treatments.

INDUSTRY PERSPECTIVE

Having access to health information, both personal and medical, allows patients to engage with their healthcare providers and supports shared decision-making. Life sciences companies have the best information about their products as well as a great deal of useful information about the disease areas they support. Healthcare providers look to life science companies for scientific information, to stay current, and to find the most appropriate treatments for their patients. Information on appropriate dosage, ingredients, disease progression, and many other topics help healthcare providers work with their patients to make the best possible decisions. Mobile technology enables instantaneous access to this kind of information, and to more of it than ever before.

Through the use of mobile and digital technologies, data collection becomes real time — not retrospective as was the past norm. Real time means that a person's health can be monitored with immediate feedback. For

example, a mobile health device that monitors a patient's blood sugar can alert him or her when it is elevated and recommend an appropriate course of action.

In addition, life sciences companies and other members of the research community are moving toward greater sharing of clinical trial data. We are in the early days, but in the years to come, we'll see the results of sophisticated analysis of larger and more diverse datasets; results that we hope will help healthcare providers and patients make more informed decisions.

The downside of the data revolution is managing the signal-to-noise ratio. We're in early days of the "big data" era and we're already at risk of being overwhelmed. We need to develop the right tools to cut through the noise to determine which signals are important to listen to in medical decision making. A priority will be to define standards and processes to ensure we're tuning into and understanding true and useful signals.



Stuart Sowder
Vice President of External
Medical Communications
Pfizer



Case Studies

The healthcare and life sciences industries are evolving rapidly. Organizations are innovating to improve patient outcomes, enhance care coordination, and reduce costs.



Engaging mothers-to-be for healthy babies: text4baby

Launched in February 2010, [text4baby](#) has shared critical health and safety information to more than 678,000 expecting and new moms. This ground-breaking educational campaign aims to reduce infant morbidity and mortality rates in the US.

Women who text BABY (or BEBE for Spanish) to 511411 receive three free text messages per week throughout pregnancy and baby's first year. The interactive messages are personalized to the mother's due date or baby's birth date. Text4baby messages now contain additional information, mobile web-pages, videos, appointment and immunization reminders, and requests for participant feedback.

Text4baby is a proven, free mobile health information service of the National Healthy Mothers, Healthy Babies Coalition (HMHB) that provides pregnant women and new moms with critical health and safety information via text message. The content includes messages about immunization, nutrition, birth defect prevention, safe sleep, and more. Text4baby was developed in partnership with founding sponsor Johnson & Johnson and founding partners Voxiva, CTIA -The Wireless Foundation, and Grey Healthcare Group (a WPP company).

A 2013 [survey](#) by researchers from the National Latino Research Center (NLRC) at California State University San Marcos and the University of California San Diego was administered to 631 unique text4baby users in San Diego. Overall, evaluation findings indicate that text4baby is increasing users' health knowledge, facilitating interaction with health providers, reminding them of their appointments and immunizations, and improving access to health services.

Study findings include...

- 74% reported that text4baby messages informed them of medical warning signs they did not know.
- 67% reported talking to their doctor about a topic they read about in a text4baby message.
- 65% reported that text4baby helped them remember an appointment or immunization.
- 50% of participants without health insurance reported calling a service number; and they were more likely to call a service number than those with insurance.
- 40% reported that they called a service or phone number they received from a text4baby message.

This research study reinforces findings from an earlier randomized evaluation by George Washington University that text4baby mothers were "nearly three times more likely to believe that they were prepared to be new mothers compared to those in the no exposure control group."



Harnessing mobile technology to support medication adherence: Care4Today

Janssen Healthcare Innovations (JHI), a subsidiary of Johnson & Johnson offers a text service, [Care4Today](#), which is a free medication reminder app, website, and platform. The app and website help patients and caregivers take their medication correctly, and the program's goal is to help improve health-care delivery.



According to the World Health Organization (WHO), approximately 50% of patients with chronic illnesses do not take their medications as prescribed. People often overlook taking medications at the right time. According to a report from the National Community Pharmacists Association published in mid-2013 the most commonly cited reason patients don't take their medication is they simply forget.

Care4Today has more than 20,000 prescription and over-the-counter drugs pre-programmed into the app. It includes pictures of the pills. Users set alarms and reminders that deliver an unambiguous cue about what meds to take. Users can easily add a drug that isn't in the database and can print out a 7-day or 30-day report of their adherence to share with their physicians.

JHI recently launched the new version of Care4Today, which runs on iOS and Android smartphones. If the user doesn't have a smartphone, he or she can set up medication reminders from a web app and have the reminders sent to his or her cell phone via SMS. The system can give reminders about any drug, not just drugs from Johnson & Johnson.

In late 2013, Aetna and Care4Today announced a partnership to integrate Care4Today into Aetna's CarePass platform. Care4Today has also launched pilots with integrated programs in heart health, orthopedics, and mental health to improve patient outcomes.

First FDA approved clinical trial using web and smartphone technology: Pfizer overactive bladder trial



There are numerous opportunities to leverage connected health (ie, mobile, social, and smartphone) technologies to transform clinical trial processes including patient recruitment, data capture, and data analysis.

In 2011 Pfizer boldly attempted the first clinical trial to be mobile-enabled and entirely remote. The study involved an overactive bladder treatment. Patients could participate entirely from home, and without the need to live close to an investigator. Study drugs were delivered to patients by mail.

This was the first randomized clinical trial under an Investigational New Drug (IND) and this model creates new opportunities for patients to participate in clinical trials. As partners in the research, Pfizer provided patients with access to all study results and their own clinical data, which were made available via personal health records. The idea was to provide patients with access to the data so they could manage their own health and wellness, including sharing this data with their treating physicians.

Approximately a year after the study was initiated, Pfizer announced the trial would be discontinued due to a lack of participation. The trial used social media channels from Facebook to Craigslist to promote the trial to patients, and while these channels were effective in getting people to the website, the number of those visitors who actually signed up for the clinical trial was too low. One possible explanation for the low study enrollment is because at that time patients did not trust online sources enough to deliver the necessary personal information.

While this pilot did not meet the study endpoints, there are lessons to be learned and it is not worth abandoning future trials based solely on web and mobile technologies. As these technologies continue to evolve and patients continue to become comfortable using new technologies in their everyday life there are opportunities to engage in this kind of trial again.

Investing in breakthrough health innovations: Merck Global Innovation Fund

Merck Global Health Innovation (GHI) invests in emerging companies that deliver breakthrough health-care solutions and that advance Merck's mission to discover, develop, and provide innovative products and services that save and improve lives.





Merck GHI invests in platform companies with proven technologies or business models where Merck's expertise and perspectives can accelerate revenue growth and enhance value creation.

Merck GHI is building an integrated portfolio of investments that are outside of Merck's core pharmaceuticals and vaccines businesses. As a strategic growth investor, Merck GHI's goal is to grow emerging healthcare solutions into meaningful businesses.

Merck GHI invests primarily in...

Technology enabled solutions

- Precision medicine
- Decision support
- Accountable care
- Provider and patient engagement

Health IT platforms

- Health informatics and analytics
- Health data liberation

The Merck GHI investment strategy connects innovative companies with complementary technologies to develop integrated healthcare solutions. Since late 2010, Merck GHI has made over 20 investments in digital health companies, and Merck GHI has \$500M under management. Merck GHI provides growth capital to emerging healthcare technology companies worldwide while leveraging the vast R&D-based, global resources of Merck.



Tools to enhance patient medication adherence and support better care coordination: WellDoc®

In mid-2013 WellDoc®, a healthcare behavioral science and technology company, launched BlueStar™, a new product in a novel class of diabetes therapy. BlueStar is a patient-centered medical product that requires a prescription from a healthcare provider and is cleared by the FDA for use by adults with type 2 diabetes. BlueStar is powered by the proprietary WellDoc Automated Expert Analytics System™ and provides real-time motivational, behavioral, and educational coaching to help patients self-manage their diabetes treatment plan.

BlueStar supports patients through smart blood glucose testing, healthy diet and exercise choices, medication adherence, and quality standards of care such as A1c tests, foot exams, and blood pressure and lipid levels. Additionally, BlueStar provides patients' physicians with clinical decision support and enables them to efficiently extend care beyond traditional office visits.

BlueStar works on feature and smartphone platforms, tablets, and desktops to help patients comply with their treatment protocols while also analyzing important data to assist clinicians in developing personalized care plans. It is supported by a national network of trainers who work with patients to introduce them to the product and make sure they fully understand its operability.

In January 2014, WellDoc secured a \$20 million round of investment that includes contributions from Merck Global Health Innovation Fund and Windham Venture Partners. According to an article posted on mobiHealthNews, "WellDoc plans to use the new funds to continue the commercialization of BlueStar, which is already in the market today and available by prescription for employees at a handful of self-insured companies (like Ford and Rite Aid), but also through a growing number of as yet undisclosed payers around the country."

The recent investment will enable WellDoc to build out its sales team to pursue the traditional sales channels that pharmaceutical and medical device companies have leveraged for prescribable products. The company also plans to "think outside the box" and support the traditional model with consumer marketing, too.



Connected health: take action and get started

There are four critical issues involved with transforming the healthcare delivery system:

1. **Changing reimbursement models**
2. **Developing patient- and caregiver-centric relationships**
3. **Driving innovation through new commercial models**
4. **Making information the new currency in healthcare**

It's time to act, and industry specialists share their recommendations on next steps to move forward.

Chuck Parker

Executive Director, Continua Health Alliance

Hurdles life sciences companies are likely to encounter

The most significant hurdles are lack of knowledge around developing effective healthcare technology tools and limited relationships with healthcare and technology companies. I encourage life sciences companies to look for partners as there are many with expertise in specific areas of development, as well as a solid understanding of the interoperability and connectivity standards that are being developed.

Through working with standards bodies and industry experts, Continua publishes certification standards built upon international criteria from IEEE, HL7, Bluetooth, USB, and others. We are a non-profit, open industry organization of healthcare and technology companies joining together in collaboration to improve the quality of personal healthcare. With more than 200 member companies around the world, Continua is dedicated to establishing a system of interoperable personal connected health solutions with the knowledge that extending those solutions into the home fosters independence, empowers individuals, and provides the opportunity for truly personalized health and wellness management.

Using the Continua certification standards ensures convenient and secure collection, communication, and access to health data for providers, patients, and caregivers.

Recommended next steps for life sciences companies

Companies need to begin to act and shouldn't be afraid to fail. Start with small pilots to minimize risk. Every mistake is a learning opportunity. Apply these new learnings and move forward. There are opportunities to connect to the consumer/patient and create a new paradigm of trials and engagement.

Stuart Sowder

Vice President of External Medical Communications, Pfizer

Mobile devices: integral to connected health

More and more healthcare providers, patients, and caregivers are using mobile devices to get the information they need to make health decisions. Connected health initiatives by life sciences companies can help with adherence based on their knowledge of the medicines they develop. Adherence helps improve outcomes, and improved outcomes are the goal of life sciences companies. Prevention, too, is an important goal to improve health and wellness and mobile health is well suited for this.



Overcoming regulatory and collaboration hurdles

Regulatory restraints in communications from a medical and scientific point of view, not marketing, is a hurdle. Several regulations inhibit free flow of scientific information. Working with third parties is a good solution and that now needs to move into the connected health space. Connected health gives life sciences companies an opportunity to provide accurate and supportive information when it is needed. For example, if a healthcare provider needs a question answered regarding a formulation of a drug for his or her specific patient, having access to the manufacturer via a third party, such as Epocrates, is beneficial.

Another hurdle is bringing the life sciences industry together to support the connected health movement. Although there are efforts afoot by life sciences companies to align and collaborate on dissemination of medical information, this is in its early stages. Timing will be key, as well as overcoming technical hurdles. We must collaborate in the best interest of patients. Areas in connected health that lend themselves to collaboration also include medical adherence programs and sharing of clinical data. In addition, it isn't only life sciences that need to collaborate, but other kinds of healthcare organizations, such as hospitals, labs, and payers.

Communication and data sharing: keys to future success

Life sciences companies should reconsider their role in supporting the patients they ultimately serve. New communication channels and technologies are disrupting the business models of the previous century, or even the previous year. Information and data are becoming more openly available to more and more "unconventional" players in the healthcare space, and the sharing of information is faster and the friction is lower.

Research will evolve in the use of real-world data and analytics. Clinical trials, while remaining rigorous, will need to be rethought to use mobile technology and real-world data. Life sciences companies need to focus not only on the delivery of the product or treatment, but on the delivery and exchange of information as an important product or service they offer.

MaryAnne Sterling

Co-founder, Connected Health Resources

Take action and get started

Companies need to begin to take action. They need to select a community, research their needs, and get involved. Next, they need to develop an engagement strategy for patients and caregivers and think about engaging people differently, which includes connected health initiatives and mobile devices to connect all stakeholders.

It's important to seek out innovative partners that have similar interests to theirs, and work with them to implement pilot programs. Learn from the pilots and apply key learnings to the next pilot or program. The key is to get involved and act quickly.

Lynn O'Connor Vos

CEO, Grey Healthcare Group

Engagement is key to enhancing patient outcomes

Life sciences companies need to be more engaged in the healthcare delivery side of the business, specifically in helping providers enhance patient outcomes. There are tremendous changes going on



in healthcare delivery, and these changes will re-shape life sciences companies and provide opportunities to make valuable contributions to health delivery services. An immediate opportunity is educating patients to know important signs and symptoms so they can avoid re-hospitalizations. Healthcare providers are focused on enhancing outcomes, and a primary financial driver for providers is in decreasing re-hospitalizations.

There are many opportunities for life sciences companies with connected health initiatives, specifically, sponsorship and providing education and information for patients and caregivers. In designing initiatives, companies need to use analytics to help personalize and target content and messages. The industry is becoming much more skilled at using data appropriately to customize communications to audiences.

Chart the patient journey

To be successful, life sciences companies should begin by examining and charting the physician and patient journey. In particular, companies need to understand the communication tools and channels that are being used today. I recommend that life sciences companies get involved at points where physicians and patients are engaging, communicating, or searching for information.

I encourage companies to think strategically and develop an overall strategy that links to the patient journey. Developing an app is a tactic, and it is not a connected health strategy. Identify innovative companies that are working in the areas of interest and explore ways to partner with them.

Next, try pilot programs, which allow companies to try things on a small scale and more cost-effectively. From the pilot programs evaluate what was successful and identify what needs to improve.

Chris Wasden

Managing Director, Global Healthcare Innovation Leader, PwC

Change needs to start at the top

The largest hurdle I see is that executive leaders generally are not at the interface of the company and customers, so they are not familiar with the challenges and they don't see the pain points. It is difficult and risky to change a business model that is producing acceptable results today. For a life sciences company to embark on an initiative to change business models requires executive leadership that is courageous, very forward-thinking, and understands the need to innovate in order to survive.

Implement an innovation incubator

Companies need to foster an innovation culture through an innovation incubator. In life sciences companies this isn't the same as R&D, which is charged with clinical advances. An innovation incubator requires broad and multi-functional experiences, as well as different structures and funding opportunities. The focus of an innovation incubator is to set up a front-end process that can identify good ideas, evaluate them, and can figure out which ideas to move forward with into piloting and testing.

As a part of the innovation incubator companies can determine commercial risk, how to accelerate a promising idea, and how to scale a good idea to commercial opportunities.

Companies need to develop the capability to start doing business model experiments and pilots. The driving idea is to conduct experiments and pilots rapidly to foster an environment where ideas fail or succeed quickly. Take the learnings from pilots to further refine the idea or move on to another idea if it isn't viable. After a few pilots, move quickly into launch mode.

Note: PwC refers to the United States member firm, and may sometimes refer to the PwC network. Each member firm is a separate legal entity. Please see www.pwc.com/structure for further details. This content is for general information purposes only, and should not be used as a substitute for consultation with professional advisors.



Connected health improves patient care, health outcomes, and transforms healthcare delivery



Chuck Parker
Executive Director
Continua Health Alliance

The current healthcare delivery model is not sustainable; change is inevitable. The growing costs of healthcare in the US, our aging population, and concerns about future healthcare costs are driving change in the private- and public-sector.

Additionally, the way the healthcare system defines success for a treatment or device is evolving to focus on achieving better outcomes for patients. A critical component of achieving better outcomes is information sharing between providers, patients, caregivers, payers, and life sciences companies. As the manufacturers of novel treatments and devices, life sciences companies have tremendous knowledge to share about their products and devices as well as the disease and therapeutic areas they support.

These changes are fueling a willingness to experiment with innovative solutions such as connected health. The goal of connected health is to improve the quality and efficiency of healthcare products and services and provide flexible opportunities for consumers to engage with clinicians and to better self-manage their care. As the industry evolves, connected health will become a reality. Life sciences companies have an opportunity to play an important role in supporting the adoption of connected health initiatives.

As you move forward, I encourage you to reach out to healthcare and technology partners to leverage their expertise as you develop and implement connected health initiatives.

We are excited to play a part in bringing stakeholders from across the healthcare ecosystem, including providers, payers, technology companies, and life sciences companies together leverage technology to improve patient care, enhance patient outcomes, and decrease costs.

Join the discussion

We look forward to continuing this discussion and to exploring best practices with connected health initiatives. Please join us at the Personal Connected Health Alliance Life Sciences roundtable discussion at the mHealth Summit in December. For information on how you can be involved in the roundtable, please e-mail Alison Drone, Director of Partnership Development and Special Projects at the Personal Connected Health Alliance, at adrone@pchalliance.org.

**Join us at the next
mHealth Summit!
December 7-10, 2014**

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