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Sign up today for our Personal Health Information workshop, on September 30 in New York City. www.release1-0.com/events/

BY ESTHER DYSON

When we first wrote about personal health information last January, pressures for consumer access to personal health information and specifically to personal health records (PHRs) were beginning to be felt, but not much was happening. The larger vendors of hospital-as-enterprise software were offering electronic medical records, and some even offered an option for the health-care provider to offer PHRs to individual patients, but take-up was low.

Now, the situation has changed. Like it or not, individuals are becoming more and more responsible for their own health (care) financially. That is creating a new market of vendors interested in catering to them, and a beneficial ancillary market of consumer-oriented "system navigators" interested in helping them understand other vendors' offers and figuring out the best deal for themselves (financially and fundamentally). Most personal health information out there is messy and fragmented, but now individuals are beginning to see the need for a PHR that consolidates all their information. Entrepreneurs who have been toiling for years to fill latent needs are now seeing real demand (though they may still be underestimating their marketing challenges) and investors are ready to fund them.

The rhetoric has changed, too. The US government has made personal health information a priority (though without much funding), and, tragically, Hurricane Katrina has illustrated the importance of reliable access to medical records in a way that will no doubt drive many people to start collecting their records. But then what?

For this market to flourish – and we believe it will – many different pieces need to start fitting together, not into a static jigsaw puzzle but into a fluid system of interoperating services. Consumers will

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be driving much of it – with their money, with their needs and with their own measures of utility – but in many cases they will drive it through services that will help them navigate the systems and aggregate their demands to the institutions they must deal with.

The underlying architecture of the data structures is still open. For some time, it will remain heterogeneous – data held by institutions, data held by doctors, data aggregated and manipulated by intermediaries, and, at the centers of each of millions of universes, individuals collecting and controlling their own information for themselves. In the long run, we believe, most individuals will take successful control of their own data, but in a world full of large aggregated databases with anonymity protected. At the same time, the amount of data generated “locally” by monitoring devices and other consumer tools will create a need for more local data processing as well.

If you’re an individual, you face a world of more responsibility, more choices – and more help getting and understanding the data you need to make those choices. If you’re an investor, it’s an exciting market. And if you’re in the health-care business, be prepared for a world where consumers call the shots. Figuratively, health care has been a mainframe world; it needs to get ready for an onslaught of PCs.

The power of information

There is no shortage of personal health information. It’s around us everywhere, on paper, in files, receipts, bills, images, partly filled-in forms, scribbled prescriptions. Much of it is redundant, some of it is contradictory or inaccurate, and some of it – if put together – would be screaming alarms such as “Don’t take that drug!” or “Do take that test!” Other information is even less formally represented as distant memories in people’s minds: Did aunt Alice die of breast cancer or pneumonia? Was Juan ever vaccinated for smallpox? Or it’s everyday knowledge that is never spoken or written down: Fred’s fondness for a drink or two with breakfast, Susan’s battle with cigarettes. And someday soon, health information will also include 24/7 readings from consumer monitoring devices that are meaningless without context.

Indeed, most health information is incomplete or lacking in context – and there’s also too much of it. A doctor may be able to scan a list of conditions and therapies and make sense of it, but most individuals cannot. And even a doctor may miss the intricacies of interacting drugs and conditions – even assuming they are all listed together for any particular patient seeing multiple doctors.

Yet, if that information can be made liquid – flowing from where it is generated to where it is needed, combining with other bits of information to make sense – it can be tremendously powerful. It can suggest diagnoses and treatments, direct resources, affect behavior and ultimately, prolong lives and make them more satisfying. It can also introduce new economic efficiencies to a notoriously inefficient and ineffective market. In theory at least, these efficiencies can make more and better health care available to more people, which would further increase the overall health benefits for the country.

Specifically, personal health information is powerful in two distinct ways: First is when all the information for a single patient is digitized, aggregated and made meaningful for that person and her health-care providers. When a consolidated list of medications, conditions, allergies, procedures and other information is available for each patient, it’s easier to figure out the best care. Such information can also be analyzed by expert systems and algorithms to derive information, such as a deadly combination of drugs, that might not be immediately visible or noticeable to a clinician. That can determine treatment and save money – or even save lives. It can also be used to generate customized patient-education and care-management protocols.

Second is when that same kind of information is rendered in standard formats aggregated across patients, and then data-mined, analyzed and refined. It can help health-care plans make sure their rules and medical protocols are followed (both in the aggregate and for individual patients), improve care and outcomes, increase efficiency and save money. Aggregated even more broadly, such information can help predict the consequences of various forms of treatment, discover disease patterns and help to identify individuals at risk. Thus it can help health-care plans and providers *change* their rules and policies, to ones that evidence shows to be more effective (for care or cost). And that can loop back to help individual patients, with knowledge applied in real time to make sure therapies are in line with the latest evidence.

Health-care vendors are getting smarter at reaching out to consumers, and consumers are beginning to feel comfortable leading more and more of their lives online. But health-care information is still not liquid. There are huge challenges

around getting the data into the record, dealing with issues of trust and selective access, and marketing the concepts to consumers.

The tipping point

This issue of **Release 1.0** covers some of the progress that has been made in the last year, and even since January, when we published “Health and Identity: No Patient Left Behind?” As we wrote then, the US health system seems stuck in unhappy equilibrium and uniquely resistant to evolution. Yet we are now seeing some “punctuation” in the equilibrium – sharp movements that portend bigger changes ahead. The US government is focusing attention on the use of IT in health care overall, and President Bush has said that “every American should have an electronic health record in ten years” – not, for what it’s worth, “every hospital needs electronic medical records to track patients better.” Since then, Aetna has acquired Active Health Management (SEE **RELEASE 1.0**, JANUARY 2005) and a number of Regional Health Information Organization (RHIOs) have set up shop and started to trade information (though most still in pilot mode).

More significantly, things are starting to happen where it matters most – users, investors, start-ups – as we describe in this issue. A growing number of consumer-oriented start-ups is figuring out how to help individuals collect and make sense of their own data, and also to make health-care information liquid across organizational boundaries and available to and *for* those to whom it matters most – the individuals concerned.

Come one, come all! Our workshop on September 30

At our workshop on this same topic, scheduled for September 30, we will address another obstacle to health information liquidity: a profusion of players who don’t know each other. CEOs of most of the companies mentioned here will be attending or speaking; we will also have speakers from some of the larger, more institutional companies *not* covered here. Most of the tools and services we describe here would benefit from tighter technical and business connections with other players. Medem, for example, is busy building interfaces so that its personal health record software can import data from electronic medical record (EMR) systems deployed in large hospitals and health-care plans. But there are many smaller companies – testing labs, providers of specialized monitoring tools and the like – who would no doubt be delighted to design interfaces themselves to export data into Medem’s PHR and those of other vendors. This is only one example among many; health care – and health-care IT – will remain a fragmented, diverse field. Technical connections won’t

happen without business and personal connections. Those connections are starting to happen, both at our workshop and through the efforts of other conveners such as the Markle Foundation, numerous medical conferences that every year become more and more like trade shows, and even the demands of consumers for the suppliers to work together. Someday, we hope, large, trusted consumer-facing companies will help to aggregate all that consumer demand.

Killer applications – or savior data

A personal health record is not a sexy consumer proposition. The way to get users to manage their own information is not to offer them a “record” for storing information, but to provide applications or services that generate or use the information for the users’ benefit. Yet – for now at least – those applications should be discrete, simple services that provide tangible benefits and that don’t require systemic transformations in the health-care system that haven’t yet occurred. Although over time all these different efforts will interact and coalesce and emerge into systemic change, they are starting in isolated pockets. Over time, their mere presence will be a powerful force for interoperability and standardization.

In the meantime, many things that you can do or get with personal health information are of interest to individuals. They include online communication with doctors (which many patients, especially the growing number already online, wish they could take for granted), gentle reminders about good behavior along with specific advice about everything from drinking alcohol to vitamin supplements, automated notices of an FDA recall or warning, and online support groups for various diseases and conditions. Useful applications also include help with bills – no, not *paying* them, but simply understanding them!

We are already in an age where individuals increasingly use e-mail and the Web daily, at work and at home, and where consumers expect institutions to be transparent and responsive. They use software such as Quicken to manage their own finances, and they expect their banks and other financial institutions to make their records available for direct importation into their own aggregating user database. Simultaneously, millions of people are using personalized portals for everything from news preferences to self-descriptions on dating sites, and millions more store their mail, photos or other personal data online with trusted services. Some of these same individuals work at health-care jobs, but generally consumers are more Web-savvy than your typical health-care institution (even those with extensive IT capabilities).

In health care specifically, millions of individuals are facing more responsibility, more paperwork and higher bills as employers shift more of the health-care cost burden onto individuals through higher premiums, co-pays and deductibles and various kinds of health savings accounts. Health-care providers are well aware of this – and are nervous about an explosion of unpaid bills. Although in theory health-care providers should be in a stronger position vis a vis consumers than vis a vis big payer organizations, the reality is different: Negotiating with heartless payers may be tough, but trying to get money out of sick people is even tougher – and definitely less socially acceptable.

In short, everyone in health care wants to reduce costs and improve outcomes, but everyone nonetheless responds to short-term incentives that often have the opposite effect. Now, however, with better, evidence-based assessments of risks and outcomes and more transparency about costs and consequences, there are opportunities to align incentives more appropriately and to make more reliable risk assessments.

And let's be clear: All the parties benefit. It's a positive-sum game. Reducing costs does not necessarily mean reducing overall revenues when there is so much work to be done, not just curing the sick but keeping everyone more healthy.

Here's a progress report.

The Marketers: Getting the Message Through

The two companies below are both about 10 years old and hardly qualify as start-ups, but they are just now coming into their own. Their commercial energy and out-right salesmanship are a model for what the health-care establishment lacks. To gain trust and credibility, both take care to take advice from recognized authorities, and RealAge, as a content/media company, develops its own basic content with a staff that includes statisticians and two medical doctors.

Both companies bring to health care the animal spirits it so desperately needs, making health care inviting and even fun. Doctors may want accuracy and dignity, but people lead real lives. Health-care services compete not just with one another, but with food, clothing and even a trip to the beauty parlor. RealAge's reminders and HealthExpo's exhibits, even though they may be made possible by companies trying to sell a product, have a practical value. Many people don't realize the impact of their

DATA, DATA, WHO'S GOT THE DATA?

We have been proceeding on the premise that individuals own their own data, but of course that's often just a polite fiction. Quite apart from the requirements of HIPAA, which can tie data up in red tape as well as protect it from prying eyes, personal health data is illiquid for two primary reasons: It's in a variety of formats that keep it from moving from application to application, let alone from doctor to doctor or institution to institution. And second, the institutions that generate the information – whether it's lab results, doctor's notes or diagnoses – have a commercial reason to hold that information tight. The most liquid health information is billing information (and related diagnoses and CPT codes) and prescription information, because it is designed for generation by one party to engage in (financial) transactions with another. Other than clinical studies, much aggregated health information is gleaned and reverse-engineered from such records.

In particular, for each patient a number of parties hold data. Those may include the patient's doctors and specialists, testing labs, health-care providers such as hospitals and clinics, health-care payers such as health plans or self-insured employers, and pharmacies and pharmacy benefits managers (PBMs). Aside from whatever tension there might be between an employee and the health plans or employers who try to limit what they pay

for (and may use a patient's data or self-reported behavior against him), there's tension between the health plans/employers and the health providers; each considers that it owns not just the patients' data but the patient; keeping the data is one way to keep the patient.

In this issue, we do not have the space to cover the work of the large institutions, whether insurers or providers such as Kaiser Permanente, or the hospital-as-enterprise software vendors (Cerner, EPIC et al.) who sell to them. Many of them are doing stunning work, both in health care and in using IT to manage it. They face many of the same problems, though they have the benefit of better access to information, within a defined universe. Thus, they do not face the biggest challenge for most of the companies outlined here: finding customers, and getting data about those customers which is often spread across many different locations, physical and virtual, in many different formats.

In a world where personal health information was completely liquid, it would no longer confer an advantage on the holder, but until that day arrives (or at least, until the user is in full control) that struggle over control of individuals' data will persist. The goal has to be not to eliminate it completely, but to give individuals the power to render it moot.

most basic habits on their health – and even those who do usually benefit from a reminder or two. It's easier to dismiss a nagging spouse than to ignore the impartial report of an authoritative study that outlines the consequences of those habits. RealAge and HealthExpo are not family, with all its emotional overtones.

Sure, RealAge and HealthExpo want you to buy from their advertisers, but they are not going to deny you coverage or fire you no matter what you tell them. (On the other hand, would we list “concealing embezzlement” under “other stressful events” in a survey from either of them? Probably not. Privacy protections go only so far.)

RealAge: The magic number

RealAge is a model – unfortunately a rare one – of effective personalized outreach to consumers about health care. RealAge.com is an online service accessible through a consumer website that interacts directly with individuals, stores their histories for them only, and uses their self-reported data to figure out their RealAge. “We’re a media company,” says founder Charlie Silver, a serial entrepreneur who sold his chain of quick-oil-change centers to Jiffy Lube in 1994. Now he’s in the preventive mainte-

nance business again – for human beings. RealAge is not an outgrowth of, say, a disabled child or a mourned spouse, but of Silver’s perception that people needed a simple way not just to collect or store health data, but to understand the meaning of it.

That perception didn’t come easy. The company began in 1994, when Silver’s previous business partner, Marty Rom, introduced him to Michael Roizen, MD. Rom and Roizen had met in medical school; in 1994, Roizen was developing medical informatics programs at the University of Chicago. Rom and Roizen recruited Silver to help start a business using interactive tools to collect personal health information. The product was basically a dumbed-down PC with five buttons that doctors could put in front of patients to take their medical histories.

But in hindsight, Silver realizes, the founders got it wrong. The challenge isn’t taking the patient’s history, but rather representing it electronically for easy analysis and making it meaningful to the individual. Most health information is hard to summarize even for a doctor – though it’s easy enough to see and say “You

look terrible,” or “You’re looking great.” But exactly how terrible or how great? The numbers people focus on, from cholesterol level and weight to blood pressure and pulse rate, are all too discrete. No one of them tells the overall tale of an individual’s overall health. There’s a complex skein of conditions and dependencies and hedges. In other words, it’s hard to keep motivated to stay healthy when there’s no way to measure the impact of doing so.

By contrast, there’s a person’s RealAge, which *does* change when you change your behavior. It is based on actuarial analysis of numerous studies and health statistics, and an ever-expanding array of epidemiological survey results and clinical trials. “It needed to be a single number,” says Silver. “In sports, in business, in school. . .we measure things with a single number” – even though it hides lots of complexities. With such a number, an individual can use variety of strategies to lower her RealAge, just as a business may use any number of strategies to raise its profitability.

To be sure, there is lots of specific advice and complex background information that RealAge uses to supplement the RealAge (and keep users coming back), depending on each user’s (self-reported) conditions, behavior and prospects. But there is also a bottom line: Your RealAge is 44.5, even though you were born in 1965. Or, congratulations! Your RealAge has dropped two years since you stopped smoking, started walking to work and, oh yes, quit that job you hate and lowered your stress.

REALAGE INFO
Headquarters: San Diego, CA
Founded: 1994
Employees: 51
Funding: \$15 million from Camelot Ventures, Broadview, Dain Rauscher and angels
Key metric: \$12 million in 2005 revenues (expected)
URL: www.realage.com

RealAge, RealAge, on my screen, who's the youngest ever seen?

The tests to determine a RealAge are more than the 10-questions variety. Developed by doctors and medical statisticians and updated based on new studies, they are finely tuned to discern the factors that affect health and mortality. In addition to the basic RealAge questionnaire, there are two dozen others focused on more specific issues such as arthritis, anxiety, sleep problems. . .and of course diet and exercise.

While 10 of RealAge's 51 (and growing) staff are marketing and sales, it also has 15 full-time content people, including two medical doctors, who work on the statistical analysis, modeling and algorithms that underlie the tests. The company updates its own database and algorithms regularly, and of course new information fosters ad-supported communications with members.

For example, registered users received the following tip a week after a journal article casting doubts on vitamin E appeared: "You've no doubt noted articles like 'Vitamin E Linked to Higher Death Rates' [with a summary]. [It] may have you wondering if you should change your own health habits based. However, according to a health alert, "Is Vitamin E Bad for You?" published in *RealAge Magazine*, RealAge's premium subscription service, you shouldn't give up on it, especially if you are a relatively young, healthy adult. Just don't take too much. The RealAge Optimum dose of vitamin E is 400 IU per day. Use this as your upper intake limit. Also, if you take supplements, avoid being a solo supplement taker. Treat supplements the same way you treat your diet and go for balance."

By contrast, says Roizen, "With all the new information about hormone replacement therapy, we waited for the dust to settle – about three months – and then we tried to summarize the pros and cons." As for Vioxx, he adds, "In the database we have everyone who says they are taking Vioxx, so we sent them all a message when it was withdrawn. One of the real values of e-mail is that you can get a lot more information out than in a 30-second TV slot."

In reality, the mailings can sometimes be undercustomized. The studies that RealAge cites sometimes contradict one another. Of course, that's a function of real life, not just RealAge. Many of them do in fact contradict each other. RealAge's basic messages, however, are the ones that the medical establishment seems to have the toughest time getting through: Eat right, don't smoke, exercise, check for the most common diseases. Just getting those messages acted upon would save more lives than any drug invented so far.

DO YOU NOW OR HAVE YOU EVER. . . ?

As you might expect, the RealAge questionnaire is easier – and more fun and less work – than any of the formal “personal health record” tools. Indeed, it has the interactive feel of a dating questionnaire with ample pick lists and suggestions, whereas the PHRs are closer to a legal “Do you now or have you ever. . . ? And if so, exactly when?” approach. RealAge wants to calculate a number, and the goal is to help you change that number downwards, so trend is more important than accuracy. But the experience of filling out any of these questionnaires makes one appreciate the case for data portability and standard terminology. We consider ourselves unusually healthy, yet it’s amazing how much there is to report, and how little we know: When were those immunizations, and for what? Which doctor was it that did the procedure last winter?

And when exactly was that ocular migraine? – which anyway we had to volunteer under “other.”

It would be nice for RealAge’s system to be even more interactive. Right now, it calculates your RealAge after each segment of the questionnaire, and you can see it go up or down: good answers about diet, bad answers about stress, for example. But if you can’t see (as opposed to being able to derive) the change in your RealAge as you modify specific answers – even hypothetically, so that you can see what a change *could* do. Yes, the lawsuit was stressful, but not that stressful, so what’s the difference whether I leave it out or put it in? Are you happily married or unhappily married? Your answer may vary from day to day, and it accounts for a good 6.5 years on or off your RealAge. (Take those flowers home tonight!)

While doctors may sniff at RealAge’s commercial aspects and its obsession with vitamins, we’d wager that it has been far more effective in changing people’s behavior than most doctors. It’s not that doctors don’t care; it’s that they aren’t *there*. RealAge is there every days a week with its e-mailed tip-of-the-day, reaching 4 million people.

RealAge’s bottom line

The company’s business model is fairly simple. Even at a time when other companies were going after eyeballs, Silver was collecting information volunteered by individuals who saw some value in what RealAge could do with the information – provide both a measure of their health, and advice on how to improve it.

The company is a canny marketer, with its own TV show in the Netherlands (on a channel run by Bertelsmann) and plans for one in the US. Its scientific advisory board includes luminary doctors such as Michael Roizen and Mehmet Oz, who have both appeared on Oprah’s TV show; Roizen is almost a regular on the Today show (17 times). Roizen and Oz co-authored the best-seller, “You: The owner’s manual” (published this year by HarperCollins); Roizen has also co-authored a series of RealAge-branded books including “The RealAge Makeover” (2004), “Cooking the RealAge Way” (2003), “The RealAge Diet: Make Yourself Younger with What You Eat” (2001), and “RealAge: Are You as Young as You Can Be?” (1999). The books, the website and all the other media support each other. . .and of course RealAge uses viral marketing, too: Its users are constantly reminded to invite their friends.

But it hasn’t been easy, says Silver. First of all, consumer take-up was slow at first. “You can’t simply post content on your site and hope people will show up,” says

Silver. Marketing is expensive, but over the last couple of years the books and TV appearances have finally begun to pay off for RealAge.

In parallel, the company has earned the trust of the pharma companies – who in turn must follow FDA guidelines – to run ads both on the RealAge site and more importantly as part of the targeted e-mails it sends out almost every day. “We don’t just promote Lipitor to people with self-reported high cholesterol. We market to overweight, sedentary people who are at risk: ‘You may be susceptible to this condition. Talk to your doctor.’ And mention Lipitor.”

This all has resulted in a nice \$12-million (heading for \$25 million in 2006) business – and a lot of data that is not covered by HIPAA but that is – Silver stresses – kept secure and revealed to no third parties. RealAge doesn’t sell data; it sells advertising space in e-mail messages and some parts of its website to carefully targeted consumers. Advertisers can reach RealAge’s registered users only through RealAge (unless of course the users go to an advertiser’s site or respond to an ad in some way).

Are individuals wary of revealing their information? Obviously, the people who register at RealAge are not. . . though at least some of them may be filling in fake information. Silver thinks his customers represent the mainstream; others may disagree. But there’s clearly a market for this kind of service. Silver says that in the last few months he has gotten more interest from would-be partners – both VCs and media companies – than ever before.

Over time, the data of people using RealAge may merge nicely (and with permission) with the more formal data of a PHR. In the meantime, the company brings the right marketing skills and outreach to the more refined world of medical institutions. They often care just as much about money, but they aren’t as transparent about it.

HealthExpo: Health care can be fun!

Only one company here does not presume to reach individuals online, but it’s worth noting because it *does* reach about 12 million individuals a year offline – at places where they go for fun – with a variety of direct health messages, demos, samples and tests. Indeed, health care doesn’t just happen in the doctor’s offices anymore. That was especially apparent to Cynthia Tsai, formerly a VP for Merrill Lynch and Kidder Peabody who handled 144 stock – that is, the registered stock that early shareholders are usually forbidden to sell until some time after an IPO. That led her to meet and serve many entrepreneurs, including quite a few in biotech such as Amgen CFO

HEALTHEXPO INFO
Headquarters: New York, NY
Founded: July 1995
Employees: 6
Funding: \$6 million from founder and other angels
Key metric: 12.5 million visitors in 2004
URL: www.healthquest.com

Gordon Binder and John Pappajohn, president of biotech VC firm Equity Dynamics in Des Moines, IA.

In 1995, Tsai took note when Shelly Adelson sold Comdex for \$700 million. “I’d always thought you had to invent something to be an entrepreneur,” she says, “but I realized Adelson hadn’t invented anything. He just organized the market for what other people invented.”

She took PR advice from Burson-Marsteller and PR maven Richard Rubinstein, and she got encouragement and investment from individuals including Binder, Stanley Gold, Roy Disney, Patton Boggs senior partner Elliot Colesenior and Senator Larry Pressler. With that she started HealthExpo in 1995, presciently just a couple of years before the FDA allowed broad direct-to-consumer advertising of pharmaceuticals.

Another world - the real world

HealthExpo grew from 42,000 visitors in 1997 to 12.5 million visitors in 2004; they are now spread over 100 days and 10 separate events per year. By the way, that’s “visitors” showing up at booths and standing in lines and talking with pharmacists and booth staff, not website visitors. With a few exceptions, HealthExpo co-locates with state fairs and pays for the privilege. “It’s not ‘Build it and they will come,’” says Tsai. “It’s already been built, and we’re the health element.” About 158 million people went to state fairs last year, she says, and they are the kind of healthy, active people it’s often hard to reach through a doctor’s office. Moreover, they go as families, she says, “so we have the women pushing the men to get a prostate screening, or the parents forcing the college-bound senior to get a meningitis vaccination [now recommended for all college freshmen]. ‘Frozen soy dessert’ doesn’t sound very good – but if you actually taste it at the fair, you realize it’s just like ice cream.”

In short, the HealthExpos are a giant marketing channel and a relatively cost-effective way for health-care marketers to meet healthy (seemingly) people at a point of care. “I took a New York Madison Avenue executive up to the State Fair in Buffalo,” she says, “and he was just amazed. Madison Avenue just doesn’t know about this world.”

But perhaps it should. Tsai notes that visitors to HealthExpo average about 90 minutes there; compare that to your typical 10-to-15-minute doctor visit. Moreover, many visitors give out information freely, filling in forms and providing physical addresses and phone numbers in order to get follow-up information. They also occasionally give their e-mail addresses, Tsai says, but they are more reluctant to do

so than a few years ago. That is, the number of e-mail addresses is increasing (though she won't specify it), but the percentage of people with an e-mail address who are willing to give it out is declining. "They're right there, so we ask them why," she says. "It's generally not because of privacy [about health conditions], but because they're afraid of spam."

The big weenie

In general, she observes, people are always ready to give out information for something in return, whether it's a chance to win some of the furniture from the dorm-room exhibit (called "Big Shot") where teenagers can get their meningitis vaccinations, or a follow-up report on a colon-cancer screening. "Whatever it is," she says, "you always need an attraction – a 'big weenie,' the thing people come to see." Examples include a giant colon, a celebrity chef cooking low-spice meals [to promote Prevacid] and a standing-room-only session with a Pfizer-sponsored celebrity Nascar driver talking about men's health. Overall, says Tsai, "This is what Walt Disney would be doing if he were still alive." (Or if it were still alive?)

Sponsors include Aventis, Pfizer, AstraZeneca, Maxim Pharmaceuticals and Panasonic – for whom, Tsai notes, "We sold many more automatic massage chairs than Comdex ever did!" Other sponsors include drugstore chains (who supply pharmacists for many of the exhibits and tests), magazines (*Sports Illustrated* and *Newsweek*, for example) and employer American Airlines. Originally, Pfizer for one didn't want to be near alternative and complimentary medicine services such as acupuncture and chiropractic, but once those services became reimbursable (and respectable), their attitudes changed, notes Tsai.

The business model is simple. HealthExpo organizes the events and sells the leads back to the sponsors. Third parties can market through HealthExpo, but only the sponsors have access to individuals' information, as provided for specific purposes.

The Applications: Action <-> Data

Despite all the focus on the personal health record, a record is really just an artifact, a byproduct of activity. Any PHR worth its salt should (ideally) be created mostly automatically as people (and care-givers) go about their work. Despite the blandishments of doctors and press, people simply aren't likely to spend their time putting data into a record unless they get some tangible benefits from doing so. That's why

COMPANY	SERVICE/PRODUCT	# ACTIVE USERS	SOURCE OF DATA	WHO PAYS?
ActiveHealth Management	drug purchases monitored to detect contraindications, other quality issues	10 million people monitored; periodic messaging to patients	PBMs	health plan or employer
CapMed	personal PHR/storage device	110,000	individual	individual or hospital/clinic
DNA Direct	private DNA tests	fewer than 1000	individual	individual; some request insurance reimbursement
HealthExpo	exhibits, tests, etc.	12.5 million visitors	individual (on paper)	advertisers, sponsors
Medem	PHR linked to clinic system	30,000	individual or doctor	doctor (may charge patient in turn)
RealAge	RealAge determination, personalized health content	4 million	individual	advertisers
RelayHealth	secure doctor/patient messaging, doctor workflow	150,000 (4000 doctors)	individual, doctor or RxHub	health plans and large medical groups
Resolution Health	plan quality control, plus plans active care monitoring	30,000	health plans and PBMs	health plan, employer or PBM
SimoHealth	medical-bill management, PHR "lite"	500 individuals plus an employer pilot	individual	individual

Reaching consumers one-on-one about health care

This chart illustrates how much more effective “non-PHR” methods generally are at reaching consumers about health care. Right now, many companies count PHR users in the same way that cable companies count “houses passed by cable.” Here we try to count not patients whose plans or doctors offer a PHR, but individuals who actually use the PHR offered by their plans or doctors. But someday, as PHRs become more integrated into the processes of health care on the one hand and of people’s daily lives on the other, these numbers will grow.

the most successful PHRs are likely to be tools that are part of a broader, integrated system from which they can capture data. . .and at the same time, their data should somehow promote action, whether it’s the delivery of educational material or specific advice. Currently (courtesy of Katrina), the promise of emergency access to medical data online (and which therefore follows you from place to place) is also a compelling spur, but that urgency will fade.

RelayHealth and Medem are converging on a PHR model that both serves and drives a doctor’s workflow: It’s the data store for patient and doctor, but the information in it may also drive activity, whether protocols for treatment or the generation of relevant information for doctor and patient.

RelayHealth began with the idea of reimbursable doctor-patient communication sessions in the context of a host of practice workflow activities – appointments,

reminders, prescriptions and the like. Those activities populate a “lite” PHR with records of visits, immunizations, prescriptions and the like, though we expect RH to extend the PHR soon. For its part, Medem began with a more traditional hosted-website-for-doctors offering and then produced, last May, a full-blown PHR that doctors could offer to their patients as a discrete product. For Medem, the PHR itself is a new product and available standalone to individuals, though it interoperates with many of the same activities as RelayHealth does.

In short, both companies understand that the PHR is a snapshot of a stream of activities. Both rely primarily on third parties to reach consumers: RelayHealth goes through health plans and employers, while Medem focuses on doctors and on vendors who sell to them. Both companies are based in the Bay Area and are engaged in friendly rivalry. For now, at least, the market is big enough for both of them.

Other vendors offering PHRs direct to consumers include CapMed (covered in our January issue). Most of the large hospital-as-enterprise software vendors also include PHR functionality that plans or providers can offer. So far most providers and plans don’t offer such tools, and consumer take-up is low even for those who do provide them. We suspect that in the long run consumers simply want their health records kept by someone other than their plan or employer. (SEE **RELEASE 1.0**, JANUARY 2005).

RelayHealth: Only connect!

One practical application that is getting users started on handling their health online is secure doctor-patient messaging. That’s the basic appeal of RelayHealth to individuals, but the story is more complex than that. RelayHealth started out in late 1999 as a secure webmail service marketed to doctors and patients. It wasn’t gaining much traction despite several rounds of funding, and in 2000 the investors (USVP and Venrock) turned to Giovanni Colella, who was a former practicing doctor and BCG consultant, and senior executive at Sapient at the time, to become CEO.

“The consumer side of the business was almost a no-brainer,” says Colella, “with national surveys from HarrisInteractive, Manhattan Research and others showing that the vast majority of people online wanted to connect online with their own doctors. Getting the doctors to play was the challenge.”

The RelayHealth team concluded that the best way to spur adoption was to get doctors paid to use it. . .but that the money should come from health plans, not from patients’ own pockets. “If I charge my patients, the savings still go to the health

CAPMED UPDATE

The experience of PHR vendor CapMed (SEE **RELEASE 1.0**, JANUARY 2005) is instructive. General manager Wendy Angst estimates the company has about 110,000 active users for its PHR, a standalone product on a CD or USB, though it can be customized by a hospital or other institution to include links to a provider's website. That's up only about 10 percent from 100,000 in January, although interest is now high because of Katrina. In addition, a co-mar-

keting deal with MedicAlert just launched last month should also help the product gain users. Long-term, we predict, users will want a version of CapMed (or any other PHR) that includes some automatic data-import capabilities. Indeed, later this year CapMed will launch a PHR (branded to a health plan) that includes data-import capabilities. It also plans some demo projects that will populate the PHR directly from physician record systems.

plans," he says. "So we charge the plans. We went to the trouble of getting a CPT code." That effort started as a joint project with Medem (below), but RelayHealth is now the primary independent exponent of the plan-paid model for online consultations. (It also gets revenues for other software it provides to practices.)

The next step was to convince the health plans to pay for what the code describes. That required a study: "Doctors and health plans respond to evidence," says Colella. So, with his investors behind him, he persuaded researchers from Stanford and Berkeley to organize a 13-month de-facto clinical trial of RelayHealth's service. It had sponsorship from Blue Shield of California and was conducted in a "laboratory" that included both Blue Shield's doctors and members and a consortium of 10 large self-insured Silicon Valley employers, including Cisco.

The study fulfilled Colella's expectations and more: Patients found the service – dubbed webVisit – easy to use, convenient and time-saving. Better yet, doctors found it easy to integrate into their practice, and more than 60 percent who used it 30 or more times actually preferred a webVisit over an office visit for patients with non-urgent needs. . . even though webVisits were reimbursed at a lower rate (\$25) than office visits (typically \$65 to 85) for these doctors.

Moreover there were tangible savings to health plans compared to a control group: For every member able to access her doctor using webVisit, the health-care cost savings were more than \$1.50 per month at the doctor's office, and more than \$3 per month overall (including reduced lab tests and hospital-based services such as emergency-room visits). "The savings are real pure hard-core savings," says Colella. "As a doctor, I can understand it. I used to have patients come in just to chat, and that was \$60 from some health plan. Even worse are the \$800 emergency room visits, where all someone has is a headache." To put this in context, average net earnings per patient is on the order of \$1 to \$3, so in theory RelayHealth could allow a plan to double its profits or surplus. In other studies RelayHealth showed that doctors can

also benefit tangibly and financially from improved productivity – around \$20,000 per year for a typical primary-care doctor, mostly from reduced phone calls.

Much harder to quantify are any benefits in better care or better outcomes, admits Colella. But we assume they exist, especially when you include the effects of RelayHealth’s array of reminders, follow-ups and easily accessible customized information for each patient, making all the specific points that a doctor might forget to make or that a patient might fail to remember. And, notes Colella, “Just for a patient to have access to a doctor anytime is quality.” He knows whereof he speaks. His father, still living in Italy, is in daily touch with doctors at Cornell and in California as well as in Italy, all through RelayHealth.

The Blue Cross/Blue Shield study was a breakthrough for RelayHealth when a story about it was published in the *Wall Street Journal* (rather than a medical journal) in August 2004, though it still took the company a while to gain traction. Now it has contracts with 11 large health plans across seven states, including many of the “Blues,” and is working on relationships with a couple of national health plans and a number of large, self-insured employers.

What the product does

Although it is positioned to consumers as “messaging,” RelayHealth’s service is in fact a fairly robust workflow system, offered as an online service connecting to various data sources. It allows patients to do a variety of things, depending on how their doctors have set up the system. They can request, reschedule or cancel an appointment, refill or renew a prescription (with automated medication-interaction checking as well as formulary checking against the patient’s health plan), get lab or test results, request a referral or ask a simple question, as well as “visit” a doctor online using a clinically structured, algorithm-driven webVisit interview.

The webVisit asks questions such as “How long have you had the back pain? What do you think caused it? How severe is it on a 1-10 scale? What have you tried? How has it worked? Do you have any of these other symptoms?” The answers inform the doctor’s decision about whether the patient needs to come in or not, and it allows the doctor’s office to set up reminders, referrals and other routine communications automatically in response to the answers. It will also link to or print out appropriate information for patients according to the doctor’s specification. This is nothing that most modern

RELAYHEALTH INFO

Headquarters: Emeryville, CA
Founded: February 1999
Employees: 83
Funding: \$7 million in most recent round of financing from McKesson and Cisco.
(Previously raised \$57.7 million in 6 rounds from US Venture Partners, Venrock, Lilly Ventures, and SI Venture Management.)
Key metric: 60 percent of active patients are female; average patient uses system twice a year
URL: www.relayhealth.com

practice management/electronic medical records (EMR) systems can't do, but RelayHealth does it in a way that seems to revolve around each specific patient rather than around the doctor's office.

As it operates, RelayHealth also populates a lite PHR comprising patient-entered data and prescription records, as prescribed by their doctor or recorded by RxHub (a company that aggregates prescription data).

The next step will be interoperability with leading EMR systems, with connections to three of the largest such systems – GE Medical's Centricity EMR, NextGen EMR, and Allscripts' HER (electronic "health" record, substantially similar). And eventually RelayHealth's PHR will include links to health plans (payers) as well as providers.

RelayHealth now has more than 150,000 active patient-users who use it to communicate with some 7000 doctors, and it is doubling the size of its message database every 9 months.

P2D communications

RelayHealth's example is good news for others in the field. For example, many doctors are scared of being inundated with mail once they start communicating with their patients online. That has not happened – though as with regular e-mail, patient spam may be on the horizon. If that happens, though, we're sure doctors will figure out how to charge for it and staunch the flow.

Another issue around online health information is that it leaves a record. . .but that may also be its benefit. In these litigious days, there's a sense that the last thing a doctor wants is more records that could be evidence of some misbehavior or omission. "In truth, experts agree that documented care is far safer than undocumented. Most lost liability suits stem from lack of documentation on the part of the health-care provider. WebVisit creates an automatic, authenticated, secure, auditable trail of communication," says Colella.

The overall messages are two: Doctors – at least the ones who use the service – are generally surprised to find how effective it is, and how little it is over-used. We expect that the formality – a "webVisit" rather than an e-mail chat – may have something to do with that. (The overall feel is that of a Web contact form: There's space for free text, but there are also pick lists for past medical history, current symptoms, self-care approaches and the like.)

Relay race: Will the long-haul team keep up the pace set by early adopters?

The question is: Are the successes documented by the studies a result of the enthusiasm of early adopters, or will the technology have the same impact on a broader range of users as adoption spreads? Typically, says Colella, once a doctor starts using RelayHealth, 15 to 20 percent of his or her patients will use it, though that number grows gradually over time.

Some might complain that RelayHealth routinizes health care. . .and indeed it does, for the routine parts. Our take is that it ensures a minimum level of care that many patients now don't get. . .and ideally leaves doctors free to provide more personal, non-routine care with the time RelayHealth frees up. One could argue that the personal care with which a longtime family physician dispenses aspirin to a child with the flu is worth something. . .but society is no longer willing to pay that cost. The truth is that much of health care is routine. . .and there is room in the RelayHealth services, as well as in doctors' schedules, for the non-routine.

Medem: No more clipboards!

Medem has a pedigree from medical heaven – investments and contributions such as content, board members and outreach assistance from seven medical associations, including the American Medical Association and also from medical software vendor Allscripts, along with endorsements from 41 more associations. It was founded in 1999 by the seven associations; the group hired Ed Fotsch, a medical doctor with 10 years of experience in the emergency room and also the founder of Metis (sold to Healtheon in 1998), to make it a commercial venture.

Medem's current business is primarily selling Web presence to clinics and doctors' offices, so that they in turn can offer automated care management, appointment scheduling, content, online patient communication and – most recently – personal health record services to their patients. Currently, 100,000 US physicians have a Web presence on the Medem network, which gives each practice its own website. That colors Medem's essential approach, which is that PHRs are most likely to succeed when they come from the doctor.

So far, in the “homes passed by cable” formulation, Medem has signed up institutions serving tens of million of patients to offer its iHealth Record PHR. Now the trick is to get patients to sign up to use it. Since the launch of the iHealth Record last May, the company has signed up approximately 30,000 iHealth individual users – 27,000 through doctors and about 3000 through its website.

Says Fotsch, who's a lively spokesman for the movement as well as for Medem, "Ultimately it's the consumer driving this. So we asked ourselves, 'Who do consumers want a PHR from?' They don't want it from their employer or insurer. They know what will happen if they try to leave and take it with them. So they want it from their doctor, of course." And certainly not from a start-up they have never heard of.

More broadly, says Ed Fotsch, "We learned that the way to sell this to patients is with the message 'no more clipboards!' You can do it online at home before you come in."

There's no real urgency to filling in a form online. . .until it lets you avoid filling in a form on a clipboard in your doctor's office, with the knowledge that if you complete that record once online at your physician's website, you'll never have to do it again. . .at least, not for that physician. Although the iHR data is owned by the patient, getting another doctor to accept it may be a challenge. (This is not a challenge unique to Medem.)

MEDEM INFO
Headquarters: San Francisco, CA
Founded: October 1999
Employees: 33
Funding: undisclosed
Key metric: 100,000 physician subscribers
URL: www.medem.com

Indeed, most of Medem's sign-ups have come in the context of a visit to some medical office or clinic, and usually at the urging of a doctor or nurse. Naturally enough, the most frequent visitors to doctors' offices are the sickest, and the most likely to benefit. "We

have a huge overrepresentation of ill people in our early sign-ups," says Fotsch. "If the average person has one or two conditions, our users have more than twice that." The company's main focus is thus the 30 percent of patients who could really benefit from preventive care – to avoid moving these patients into the 10 percent of patients whose care accounts for 80 percent of every health-care dollar spent in the US. "We're not concerned with the 21-year-old athletes," says Fotsch.

What the product does

The iHealthRecord service was developed over 30 months, and designed for users to put their own data in – but it also has hooks for Allscripts electronic medical records to update information. The company says it is also developing interfaces for other sources of data including other EMRs and health plans. (Allscripts is a scrappy vendor of PC-based EMR and other software for independent medical practices. It is the only corporate investor in Medem and serves 30,000 doctors caring for tens of millions of patients.)

At this point, the user controls the data, and can allow or prohibit anyone from seeing the entire record. However, there's no way to permit selective access; it's all or nothing for any particular party. Next spring, in response to user feedback, Medem

will add a lockbox function. That is, the user can designate any item to go into the lockbox, which keeps it private from everyone. Then, of course, the user can take out any particular piece of data and send it to someone.

The appeal of the iHealth Record to doctors is better records, a differentiating service to offer to patients, and a spur to more targeted communication with patients. The basic Medem service (much like RelayHealth's) helps medical offices manage proliferating paperwork around appointments, refills, test results and the like.

Private education

In addition, iHealthRecord automatically signs up users for education programs according to the conditions the patient lists – for example, living with diabetes, health in pregnancy, a hypertension education program. The education content isn't advertising as such; it comes mostly from respected sources such as the various medical societies, patient advocacy groups such as the American Heart Association, the Centers for Disease Control and others. It gets sent as secure e-mails. And, miracle of miracles, says Fotsch, patients respond to subtle hints to come in for check-ups, tests and other revenue-generating maintenance opportunities. (Yes, this increases revenue short-term, but it does also reduce emergency-room visits and improves quality of care and prevents illness over the long run. Medem itself has not done formal tests of this proposition, but we're prepared to take it on faith.) Says Fotsch, "Your mom influenced consumer behavior by nagging, threatening, cajoling and threatening some more. That's one of the things we have automated [in the education programs]."

In addition, when the patient requests an online consultation or makes an appointment, the iHealthRecord shows up at the appropriate moment, providing background as doctor and patient converse. It's available for new data – say, the reason for a visit – to be entered.

It also offers – for both patient and doctor, with different messages – same-day e-mail notification to affected patients of alerts from the FDA.

In addition to the medical practices it currently serves, Medem is also looking to sell the iHealth Record with regional health information organizations, medical software companies, electronic medical record vendors (who resell the iHealth services), and practice groups.

The Navigators: You Can Do This At Home

There's more to health-care information than just medical information to analyze. There's also process and paperwork, which is often as confusing to individuals as the underlying medical information. And while some people might prefer to leave health care and advice to their doctor, no one would argue that individuals should not be responsible for – sorry, we mean “empowered to” – handle their own medical expenses and administration. . . specially now that many deductibles are increasing and patients are playing a bigger economic role in health care.

Two new companies are helping individuals to deal with the processes of health care – SimoHealth for the heartbreak of medical bills, and DNA Direct for the relatively new world of genetic testing. Both tools embed real-world and medical knowledge; they both represent and execute necessary workflow on behalf of the user. And they operate strictly for the user, without requiring any cooperation from health-care providers or payers. (Although someday, when standards exist, they will benefit from the ability to exchange data with those institutions.)

SimoHealth is client software with an embedded browser that lets consumers access information online; DNA Direct is a service company that helps consumers to understand genetic testing and to get the test done if they decide to do so. It also offers them anonymity by acting as their intermediary in the process.

SimoHealth: Painkiller for your medical bills

While the promise of expert systems helping doctors or patients to determine the best treatment for an individual seems remote, the reality of incomprehensible medical bills is real and painful. Fortunately, bills are easier to represent electronically than the intricacies and nuances of actual clinical data. That's one reason that SimoHealth can produce tangible, discrete results for individuals – not in health care, but in paying for health care.

SimoHealth is the outgrowth of Todd Lash's experience over years of trying first to diagnose and then to get treatment for his son Simon, after whom the product is named. (Simon has developmental apraxia and a host of other medical issues, says his father. He is now five and in is making vast improvements with a combination of speech, occupational and physical therapy – mostly through services unreimbursed by insurance companies who called them “not medically necessary.”)

PERSONAL HEALTH INFORMATION: BUSINESS PROTOCOLS

Clinicians have protocols for every condition: a defined set of procedures, drugs, tests and therapies for any particular condition. But what is the protocol for covering the costs of personal health information? There's no single - or simple - answer: Finding sponsors is hard because medical advertising (especially to consumers) is regulated; health plans and employers don't like to pay for anything without demonstrated short-term ROI; health-care providers want to *charge*, not to pay, for new services (although they much prefer to charge insurers - not their patients). And of course consumers aren't in the habit of paying for much when it comes to the Web, and they feel they are already paying too much for health care.

There are a variety of approaches to making money providing personal health information services. RealAge funds its healthy-living website business with advertising; Health Expo likewise relies on sponsors selling to consumers for its offline health advice. Many may not consider them "proper" medical companies, but we think anything that overall gets people to floss regularly, exercise more than they might, check for common diseases, eat less bad stuff and stop smoking, can't be all bad. RealAge's model is hard to adopt easily, both because it requires scale to work, and because pharma companies - 85 percent of RealAge's advertising revenues - are required by the FDA to be very careful about the content that they support.

RelayHealth has gone to the trouble of getting a CPT code (for "current procedural terminology"), i.e. a listing in the catalogue of things that health plans pay for, so that health plans will pay for its services. (Of course, that code, 0074T, is a generic code for electronic "visits" that any company can use.)

Medem sells its iHealthRecord PHR and secure online doctor-patient messaging to doctors who can decide for themselves whether to provide the service to patients for free (recommended), charge for it, or perhaps even offer discounts to people who use it. . .since in the long run it will reduce practices' paperwork costs and it also serves as an advertising vehicle of sorts for the practices that offer it. All this is fairly nuanced; patients control their iHealthRecord and can use it with multiple doctors, but at least for now it's something of a differentiator for those practices that offer it.

SimoHealth plans to charge, perhaps \$50 a year, after a trial period. That strikes us as reasonable. We

believe that such a clear and transparent business model is likely to work better than a complicated hidden-agenda money trail for a "free" PHR that may leave a patient wondering who benefits from giving her this lock-in device for free. (Individuals generally trust their doctors, as Medem's Ed Fotsch notes, but they're skeptical of the system as a whole.) The straightforward SimoHealth message is most credible: "This is what we sell, and we're giving it to you for \$50 with a year of updates. We don't care if you spend a lot or a little for health care; we're not trying to deny you care or to get you to spend more. Please buy it and use it to achieve your own goals, not those of any third party. And by the way, we'll help you to deal with those third parties. . .not because we're selfless, but because we think that's the best way to win and keep your business." DNA Direct has much the same message - This is what we do, and this is what we charge - though it's a little more complex since the company outsources its testing services to independent labs. And eHealthTrust, on the back-end database side, is firmly in the camp of user pays. . .and thereby controls his own data.

Learning to share

Next up is the question of how to motivate individuals to share their health information for the good of society. (Shades of similar issues around blood and organ donations, participating in clinical trials and the like.)

Three things could help: One is making it easy. Many people would be happy to share their health information on an anonymous basis, but not if it costs them extra time and money or risk to their privacy.

Second is making it worthwhile: PHRs should support applications with tangible benefits to consumers.

And third is making it feel natural: Keeping personal health information online and contributing it to aggregated databases should be part of the culture - in the assumptions people make, in the movies and soap operas they see (where the heroine, say, goes online to get the (secure) results of a genetic test) and in society's defaults - doesn't everyone share genetic information (anonymously) so as to help others? That's the goal of George Church (PAGE 45), a geneticist who has already posted his own medical records online and will add his genome information as soon as he can.

(See the movie "Talk to Her" by Pedro Almodovar for a look at the human side of organ donation, medical and human ethics and a lot more. . .)

That experience gave the Lashes respect for the complexities of medicine, and it also overwhelmed them with bills. Lash soon realized, “We had to wake up and take matters into our own hands with a vengeance – treatment, and the whole insurance process of getting paid and appealing denials of service and handling incorrect plan paperwork that put the onus on us. Most of our claims were initially declined (probably automatically) until we appealed. A frightening amount of claims are reversed on appeal, which shows that health-care [and financial] literacy can have a huge effect on what services you receive and how much they cost you.”

Specifically, as a software designer, Todd Lash figured there had to be a better, more routine way of handling all the bills. Behind each bill there were specific events, rules and amounts – just the sort of thing a computer can handle. As he struggled to understand them and to express them in a spreadsheet, he decided the best thing would be to build a more scalable, reusable platform that could support rules and workflow rather than just a spreadsheet with cascading formulas and no logical error correction. The platform could also be extended to track medical histories.

Lash, a former AOL exec, joined with Martin Fisher, former senior VP of technology at AOL, last year to build the software. Lash developed the Web’s first banner ad at Global Network Navigator, a division of O’Reilly & Associates. AOL acquired GNN in 1995, and Lash then served as director of product marketing for AOL’s Internet division through 1996. Fisher was most recently president of AOL advanced services and president of technology development. In his 10 years at AOL he oversaw the development of software and systems across all AOL platforms, including Netscape Communicator; Netscape’s freely available source code morphed into Firefox.

Open software to close bills

Interestingly, SimoHealth is the first broadly commercial non-browser product built on top of Firefox. It uses the browser as an interface, both to online/imported data and to the user’s own data, which is kept locally under the user’s control in a Firebird database.

“We looked at Quicken 18 months ago and asked, Why not a Quicken for health care? We wanted to make it simple – as simple as possible but no simpler,” says Lash. The sad truth is that health care payments are complicated, and no system can eliminate that complexity.¹

¹ Quicken recently launched Medical Expense Manager, which is more of a personal bookkeeping tool tracking expenditures than the enterprise-system workflow front-end offered by SimoHealth. It’s probably fair to say that MEM comes closer to achieving its own more limited goals.

Lash and Fisher have gone to the trouble of abstracting and representing the basic rules and processes for reconciling provider bills and payments with insurance-company reimbursements and “explanation of benefits” documents, and of integrating those rules with the user’s personal medical history and reports. The user (or a sponsor such as an employer) still has to enter plan-specific details and parameters, such as what is covered and what isn’t, deductible levels, coverage percentages and other allowances, along with the individual’s own data. Then the software handles each of them appropriately and reconciles one against the other. It doesn’t eliminate arguments over diagnoses or eligibility, but it can clarify what the dispute is. And for those disputes, it offers canned, editable letters of complaint, appeal and the like.

In addition, it generates money-saving alerts about meeting deductibles, approaching out-of-pocket maximums and getting payments or reimbursements when due. The result is that the user knows what to pay, and when to wait, appeal or fold.

SIMOHEALTH INFO
Headquarters: Oakland, CA
Founded: April 2004
Employees: 8; board includes Lisa Gansky of GNN, AOL and Ofoto
Funding: undisclosed
Key metric: 500 users during preview period; plans to launch this fall
URL: www.simohealth.com

However, SimoHealth (still officially in beta) can’t yet fully represent the complexity of many health plans – for example, a rule that sets a joint deductible for medical and pharma spending. You could classify all your spending as medical expenses, but then you’d lose the use of the nice form for prescriptions and tracking refills. Or you could apply half the deductible to each bucket, and simply readjust the limits if you hit the threshold for drugs while you still had some left in medical. It’s these kinds of tricky details that bedevil any tool as ambitious as SimoHealth. With luck, the company will fix some of them in a new release.

The holy grail

One can imagine that someday a series of VARs would produce employer- or plan-specific templates for SimoHealth. Also, Lash expects that SimoHealth users will be able to import the data directly from their payers and providers rather than enter it by hand.

Says Lash: “Success will be when we can download clinical and carrier data, and provide back to our doctors parts of our medical history that are offline, out of network, or derived from allopathic treatments alone: exercise, sleep patterns, events or conditions worth tracking that may not require a physician visit but are relevant to your overall health picture.”

Even now, the product also works well as a PHR lite. It can help users track medications, monitor values (self-defined, so anything from weight to mood, blood pressure, pedometer steps or – shades of Bridget Jones – cigarettes smoked). It doesn't include doctors' medical records, but it does let the user enter and track her own medical information, whether tied to billable events or not.

Eating the dog food

So far, about 500 individuals (including us) have downloaded the preview version of the software. Although the vision is to serve individuals, says Lash, the company will probably also sell through employers, brokers and provider networks with access to the rule set for any particular insurer's or provider's health plan. The data, however, remains in the user's control, stored locally.

The process of entering information is annoying, but at the same time satisfying, since you know it will be there the next time you need it (unlike, say, filling out a clipboard in a new or even an old doctor's office). For us, it makes us want to sit down with our employer to find out what our plan actually is/allows, since we do not know. With SimoHealth, it may be worth figuring it out, because the effort of entering the initial data and rules gets repaid every time you get a new bill. The aha! moment is when you can use SimoHealth to *retrieve* data as well as to store it.

In short, we really like SimoHealth, which is self-funded by its management team and board. However, it probably needs a partner to reach the broad market it could be serving. While it doesn't deal with the high-level problems of health care, it's more than just aspirin for the most immediate symptoms; it can actually help address the financial side-effects of medical care. If you can handle your bills easily and quickly without too much angst, you may have time and energy left to focus on the medical problems of which the bills are just a symptom.

DNA Direct: Advice to Ben – Forget plastics; try genetic counseling!

The market for genetic testing should be a hot one. Every month, it seems, scientists are discovering new genetic markers. Meanwhile, there are nearly a thousand genetic tests (and more in development) that millions of people could potentially take, in response to family histories, symptoms or concerns about how they might react to certain treatments or drugs. The results of such tests can signify the presence or likelihood of some condition, or explain a collection of mysterious symptoms. They can also, of course, disturb a placid life and disrupt all kinds of assumptions and relationships with other people.

However, there's a bottleneck between all the people who might want tests, and the tests available. Although the testing process itself is generally fairly automatic, there are only about 2000 genetic counselors in the US. They are the people who can help individuals decide whether they want to take a particular test, and can help interpret the results for those who do. DNA Direct was created to fill this gap, and whether or not it is successful, the current shortage of genetic counselors will only increase.

In its own niche, DNA Direct has assembled a pool of deep expertise, including a medical geneticist and two genetic counselors, and developed an effective way for its experts to reach and serve a large number of customers. (Most doctors have not been trained in this field, and cannot help their patients with the new opportunities and challenges presented by genetic testing.) The company offers only tests that are clinically valid and that can help people understand and take steps to minimize their risks and their impact: It currently offers seven different kinds of tests, for everything from cystic fibrosis (\$299) to a full-sequence test for hereditary breast and ovarian cancer (\$3311). DNA Direct doesn't perform the tests itself, but it manages most of the paper-work (including supplying ID numbers so that the labs that do the testing never need know the patient's name), maintaining patient anonymity throughout the process. It also offers a deep base of related content.

More importantly, with every test result it prepares Web-based personalized reports which attempt to explain as much as possible for each customer individually. The information on the site is evidently sufficient for most people: Although the company offers a toll-free number, the average number of calls per test is actually below one. However, a telephone consultation with a genetic counselor is required for tests for breast cancer risk, infertility and pregnancy losses.

Phelan, who previously founded Direct Medical Knowledge, a medical content site she sold to WebMD in 1999, keeps it all as consumer-friendly as possible. The price of each test is posted; you don't need to call and ask, or even to hunt for it. Some health plans may pay for such tests, but Phelan believes that most of the tests are paid in full by individuals, although some may forgo privacy to seek reimbursement.

Overall, says Phelan, the company seems to be reaching its market effectively. Since its launch in March, it has arranged tests for "fewer than 1000" people, but the number is growing. Its rates of positive findings (determined by the labs, not by the com-

DNA DIRECT INFO
Headquarters: San Francisco, CA
Founded: March 2004
Employees: 10
Funding: \$3 million from angels including Jacob E. Safra
Key metric: arranged DNA tests for "fewer than 1000" people so far
URL: www.dnadirect.com

pany itself) are well above their rates in the US population, indicating that self-selection for testing on the basis of the site's advice is working quite well. In a clinical setting, 5 to 10 percent of patients test positive, whereas about 33 percent of DNA Direct's customers have tested positive, she says. ("Of course, journalists who take the test just for fun are screwing up our numbers!" she notes.)

Keeping its own DNA pure

In short, DNA Direct is the epitome of an Internet company: It creates necessary connections, adds value by making content available to those who need it, and fosters transparency while maintaining anonymity for users. It can do so easily in this new sector, where non-market payment systems don't interfere, where things are too new for there to be much regulation, and where supply can't easily find demand. The next challenge, of course, will be to create and enhance its reputation as the market grows. For any such company, there's always a temptation to recommend testing too vigorously, to cut costs and in other ways to take advantage of a needy market, but that's not a good long-term strategy.

Certainly there is no shortage of companies already offering paternity testing, many of them in a less than dignified way. But the big market for genetic testing will be neither paternity cases nor genetic diseases; it will be for the much larger proportion of the population (two-thirds or so) taking prescription drugs whose effectiveness will vary across individuals in ways that can likely be determined by genetic testing. In the future, you will likely no more take a drug without a genetic test than you would buy clothing without knowing your size or get a transfusion without knowing your blood type.

That's the market DNA Direct hopes to lead. And in the even more distant future, few drugs will be prescribed without a genetic test. How DNA Direct gets into that market is unclear, but by then it hopes to have a solid base of knowledge and customers that should give it value and presence as the market evolves.

The Aggregator: More than the Sum of the Data

What happens when all this patient information gets aggregated, and when it can be handled automatically and intelligently on a large scale? Already, vendors such as Resolution Health, RxHub and ActiveHealth Management (now part of Aetna) are aggregating and cross-checking privacy-protected patient data both to discern broad

patterns (clinical and financial) as well as to generate specific medical notifications about individual patients. (For legal reasons, these are not “recommendations,” but notifications from which patients and doctors can draw their own conclusions.)

Currently, the leading independent is Resolution Health, which works with health-plan data. Its primary marketing message is cost-containment for health plans, but in one of those happy accidents that actually abound in health care if we would only let them happen, the system also provides alerts and feedback for improving the care of individuals – everything from drug-taking and follow-up reminders, to alerts for missing care or two therapies that a patient should not be getting simultaneously.

Resolution Health, Inc.: Just do it!

The Resolution in Resolution Health refers to resolution of data (discerning trends and patterns) and problems (intervening to improve quality of care and reduce waste) – but it also refers to “resolve” as a noun – the firmness and persistence that makes things happen. Says CEO Earl Steinberg, “[Trident Capital partner and RH investor] John Moragne sees us as a direct-marketing company. The name of our game is behavior change – of patients and health-care providers – which is the key to improvement. People don’t appreciate how hard it is to change behavior or how much other industries know about how to do it that could be applied to health care.”

RHI was founded in 1996 by an engineer and a nurse who did data-mining to identify quality improvement opportunities for health-care providers. Steinberg, a doctor and management/policy maven at Johns Hopkins for 12 years, joined the company in 2001 and has refocused it more on responsible cost reduction than on quality improvement, since he believes the market is more inclined to pay for the former. While at Hopkins, Steinberg was a nationally recognized expert in technology assessment, outcomes research and quality measurement. But he left Johns Hopkins in 1994, a little frustrated: “I loved the work I was doing, but we had gotten far in front of what providers were doing in the real world. Why help determine what constitutes the best care if people aren’t going to provide it? I decided I could make more of an impact by developing tools to facilitate compliance with what we already knew we should do.”

(Intriguingly, his hero at the Kennedy School of Government, where he studied, was political economy professor Richard Zeckhauser, also a mentor for Steve Johnson of ChoiceStream (SEE **RELEASE 1.0**, MARCH 2005), the personalization software company. If ChoiceStream’s mission is to tell users “People who liked this movie also liked. . .”

Resolution Health is telling them “People with your condition had the best outcomes with these particular meds.”)

As he was looking around for someplace to turn his ideas into action, he came across Resolution Health. “It was an IT company focused on health care, and specifically on analyzing care with the patient as the unit of analysis,” he recalls. “But its founders weren’t focused on things customers were willing to pay for, so it was about to go bankrupt.”

After joining RHI in 2001, Steinberg raised more than \$10 million in capital from an angel investor and Trident Capital and started creating products that would provide a demonstrable economic return on investment. One of those products is a Direct-to-Member communication program (DTM) that provides health-plan members with a periodic personal health statement that contains simple messages regarding what a member can do to improve his health and health care, reduce his out-of-pocket expenses and take greater advantage of his health-insurance benefits.

Follow the money and you find. . .consumers

“Our customer is whoever is at financial risk for the health-care dollar, and companies that help those at-risk entities manage their financial risk,” he notes. And there’s the crux of the story. As the financial responsibility shifts from traditional “payers” – employers, insurers and health plans – to consumers, so is Resolution Health shifting – or at least adding – focus on individuals as active participants and potentially even customers for its services.

Its current customers include several Blue Cross/Blue Shield plans (including CNET Networks’ provider, BC/BS of CA), the Group Insurance Commission of Massachusetts, Northrop Grumman, Verizon, Caremark and consulting firm Wm. M. Mercer. By year’s end, Resolution will be assessing data on 50 million patients.

“For a [given patient] population we integrate all the data provided by our clients and create a longitudinal record for each patient. We pass that data – and monthly or quarterly updates of it – through 1000 algorithms in order to characterize each patient, and identify actionable opportunities to improve quality and reduce cost. By analyzing each person’s insurance benefits, in addition to their demographics, diagnoses, tests and treatments, we can determine exactly how much money could be saved by payers and patients if specific changes in care were made.” And, notes Steinberg, RHI recommends actions. . .to physicians, care managers, plan administrators and yes, patients. Steinberg believes that telling patients what’s in it for them

is critical to achieving behavior change. “Direct-to-Member is the most exciting product we have because it has the greatest potential to change the behavior of patients and physicians,” says Steinberg.

Periodic statements

“We’re focused totally on actionability. We send each patient a monthly or quarterly statement [on paper or electronically or both, as the patient prefers], but we limit it to one page.” That requires RHI (on behalf of the patient) to prioritize – as opposed to, say, RealAge, which serves up advice of varying relevance once a day. Perhaps some combination of the two would be helpful. The page includes several sections: one on how to improve health or care (e.g., Because you are a persistent asthmatic, you likely would benefit from using a controller medication; or, It’s been more than a year since you received a mammogram, or, You would benefit from enrolling in a free cardiac rehab program offered by your health plan), a second on how and how much you could reduce your out-of-pocket costs (e.g., If you switched from Brand Drug X to the generic form of that drug, you could save \$480 per year), and a third section that summarizes all the services the member received from different providers since his last report. This summary helps improve coordination of care provided to patients by multiple physicians because it enables Doctor Juan to see what drugs and tests Doctor Alice has prescribed or ordered for the patient.

RESOLUTION HEALTH INFO
Headquarters: Chevy Chase, MD
Founded: 1996
Employees: 35
Funding: \$10 million from an angel investor and Trident Capital
Key metric: actively monitoring health care of 30,000 people
URL: www.resolutionhealth.com

To increase the credibility of its messages, RHI has created a partnership with Harvard Medical School that lets it link its messages to consumer health education content provided by the school. “From a behavior-change perspective,” says Steinberg, “the Harvard name increases credibility” and therefore will increase the company’s success in changing patient and physician behavior.

After successful tests, RHI is about to roll out its patient-centered service on a large scale, to about 1 million patients in January – the top 10 or 15 percent out of 10 million covered by its customers. For now, the target is the most care- and cost-intensive patients: “They provide [financial] ROIs of 2.5 to 1, or 3.4 to 1 if you include the benefits to the patient [such as reduced co-pays],” Steinberg says. But the service has a low marginal cost and is certainly scalable.

RHI also has begun testing an optional new feature for its DTM program – the “SmartSwitch” coupon program. In this program, RHI sends selected patients coupons that provide a financial incentive to change behavior. For example, a 30-day

supply prescription heartburn medications such as Nexium, Prevacid and Protonix retails for about \$130, while over-the-counter Prilosec can be purchased for \$20. Monthly co-pays for Nexium can be as high as \$50. Says Steinberg, “We send patients a DTM report that says that there is no evidence that Nexium is safer or more effective than Prilosec. We enclose a coupon for free Prilosec and say, ‘If you try it and like it, we’ll keep sending you coupons for free Prilosec. Or, if you prefer, you can keep paying \$50 per month out-of-pocket for Nexium.’ It’s the ultimate in ‘It’s up to you!’” The coupon has an ID that can be tracked back to the patient who redeemed the coupon. Resolution Health then files a claim for the product to be paid for by that person’s health plan or pharmacy benefits manager. The result: The patient gets “free” drugs from his plan, and the plan saves money. RHI is also working on coupons for preferred testing labs, radiology centers and the like.

Separately, like ActiveHealth, Resolution Health also sends patient-specific care alerts to doctors through the mail or by fax. This program covers about 4 million patients and generates more than 200,000 messages per month.

Garbage in, garbage out

Steinberg acknowledges that the information Resolution Health analyzes to generate messages is not always complete or accurate: It gets its information only for services for which a health insurance claim is generated. Steinberg adds, however, that health-care claims are the only widely available source of information regarding patients and the services they receive. “It’s imperfect, but it’s the only game in town.” He also points out that some of the errors in claims data are due to fraud. He recalls one particular situation where a plan’s patients had an unusual incidence of diabetes. On examination, it turned out that in that plan, podiatrists’ treatments were covered only for diabetic patients, so. . .guess what? Most of the podiatrists “diagnosed” their patients as diabetic.

Resolution Health could be an important company going forward. For now, its services are available only for patients who happen to be covered by one of the institutions it sells to. But imagine what RHI could provide to any individual who could somehow aggregate all her records and perhaps add some data of her own. That’s the kind of value-added service that could make a PHR a compelling proposition.

The Back-ends: Who's Got the Data?

We've looked at the front-end applications that organize data around individual patients, and at one aggregator, Resolution Health, which uses large sets of data to analyze individuals' care. But how will all the data be integrated – across plans, across providers, and following individuals as they change their locations and their employers and providers? And especially, how can it be managed in a way that each individual's record can be assembled from multiple sources? Currently, most health-care institutions are linked for financial-transaction purposes, through the country's banking system. But exchanging administrative (claims, etc.) and especially clinical health data isn't so simple. Over time, health-care institutions have started exchanging administrative and clinical records among themselves, usually in an ad-hoc way, mostly following business arrangements such as common plan memberships or referrals from institution to institution (as allowed by HIPAA when they are caring for the same patient). Some of these arrangements are being formalized into RHIOs. When they need records for a patient outside the "home" network or plan, providers or plans will make a phone call, go direct to the patient or give up. Indeed, the health-care industry is probably the nation's single biggest user of fax services.

In the long run, however, there are two new models growing up. One is for administrative and clinical data to be "owned" and managed by health-care institutions and exchanged much like financial data. This generally happens through a third party such as FirstData, which currently does that on behalf of credit-card issuers and is moving aggressively into health care. Call that the banking model.

Call the second a clustered patient-centric model: Each individual patient's data will be aggregated, on behalf of that patient, in one of many databases organized around patients' data rather than belonging to a single institution.

We believe these two models will coexist.

There are two other, more centralized models being advocated by others in the industry: a single centralized database, which is just not likely to happen – whether it's government-controlled (for privacy and other reasons) or private (as propounded by Patient Command (below). Finally there's the master-index model, in which data would stay where it is and patients' records would be assembled in real time on demand (by patient or practitioner) by database requests to all the locations/institutions that hold the data. (A number of companies, such as Resolution Health, are providing the medical equivalent of credit bureaus (not in real time), but for the

consumers. This can be done for a limited number of patients, but it still suffers from limited data and incomplete records.)

We believe that attempts at these centralized models will not emerge anytime soon, despite their seeming elegance. (That may be their problem; they can't emerge incrementally.)

The banking model

The Medical Banking Project (SEE **RELEASE 1.0**, JANUARY 2005), is trying to help the banking industry move into health care in a big way. It sees a huge opportunity – and a market where its members' familiarity with real-time, geographically distributed transaction-processing and with scale could be big competitive advantages. A number of banks are entering this market. More significantly, so is the biggest player in interoperability and transactions among all banks in the US, FirstData Corp. (below). As in banking, FirstData sees its mission as providing a neutral, real-time service that allows independent institutions to provide an almost seamless experience for its institutional customers.

In the banking model, the originators keep the data and it's assembled as needed for transactions, using indexes and links and real-time data transfer. However, this model doesn't really envision a personal health record for consumers, just as the banks don't really envision integrating all of a consumer's financial records into one. Customer-centric data is stored at the three credit bureaus, but for now, that data is batch-processed and held on behalf of credit grantors, rather than for the individuals it concerns. Despite new free-access laws and increasing consumer empowerment, the credit bureaus still operate for those who pay them the most – the financial institutions. By analogy, the health data network FirstData envisions would operate on behalf of payers and providers.

FirstData Corp.: Banking on scalability

In the US banking industry, the biggest back-end transaction-processor by far is FirstData Corp., which handles the majority of credit-card transactions and authorizations. It's a trusted intermediary among banks, and between merchants and banks. It processes credit-card transactions for more than 1400 financial institutions, often handling both sides. (However, it never actually transfers money, which is the banks' role, using data sent by FirstData and its competitors.)

A couple of years ago, the company decided to enter the health-care business, seeing an opportunity in the millions of transactions, many of them far more complex than credit-card transactions. "The health-care industry is just like what we first encountered in the banking business," says Beverly Kennedy, president of Healthcare Services for FirstData. "Lots of different, incompatible systems, different formats and standards." Just as FirstData became a neutral third party for banks that wanted to work together, the company works as an intermediary for health-care provider and payer institutions.

Rather than piggyback on its existing banking network, the company is building a separate network for health-care transaction-processing, notes Kennedy. Although many aspects are similar, health-care data and transactions are fundamentally more complex and will take up a lot more bandwidth, especially as FirstData plans to handle clinical as well as financial and administrative data on behalf of institutions. However, we think the ratio of "local" clinical transactions will be much higher than local financial transactions (where payer and recipient interact directly), since financial transactions are *between* institutions and medical transactions are more complex and center *around* single patients.

FirstData is already active in health-care financial transactions via its credit-card and other financial transaction-processing activities. Its customers include large payers, benefit-management companies and third-party administrators (TPAs).

Real-time reimbursement. . .and real-time rejections

More interestingly, FirstData is rolling out its administrative processing services for health care right now. Its real-time eligibility and claims adjudication service can execute any health plan's rules for defined payments according to diagnoses, CPT codes and other data specific to each plan, provider and patient. It can determine a patient's co-pay, the doctor's allowed charges, and whether, for example, the patient can charge the amount to her HSA. . .all in real time.

Real-time payment changes everything, says Kennedy. For example, it allows doctors or hospitals to determine the correct charges while the patient is still in the office or building, thus eliminating huge amounts of paperwork and follow-up as well as lengthy, familiar cycles of "what was this bill for?" and missing account numbers and the like. Although this will indeed save both providers and patients a lot of work, it's more likely to save money for the providers and the plans: For better or worse, it will probably make plans' negative coverage decisions less likely to be appealed. On the

FIRSTDATA CORP INFO
Headquarters: Greenwood Village, CO
Founded: health initiative started in 2002
Employees: 32,800
Funding: publicly traded (NYSE: FDC)
Key metric: processes credit-card transactions for more than 1400 financial institutions
URL: www.firstdatacorp.com

other hand, real-time payment also eliminates the practical need for much data retention, thus enhancing patient privacy.

However, it does impose another, short-term burden on providers, who will need to re-engineer their systems to have more information available at the time of care provision. In fact, says Kennedy, the industry would most likely not make the necessary changes without being forced to. But it is being forced to. In the past, providers' challenge was collecting from health plans, which was bad enough. But even more difficult is collecting from individuals, who don't understand what they have to pay for when they get confusing bills and invoices months after the fact. Estimates are that

independent care providers' bad-debt ratios from their patients are ten times what the retail industry experiences; as consumer deductibles rise and patients take on the responsibility for paying a greater portion of their health-care costs, this bad-debt issue could move to the forefront.

The challenge is not just for the providers. Some of FirstData's health-care payer institutions are still doing batch processing and can't execute the necessary rules in real time. So FirstData has launched a service, called right-time claims adjudication, that allows payers to outsource real-time claims-processing to FirstData.

For any player, though, the software part is relatively simple once the rules of any plan can be represented electronically. What's harder is training thousands of medical and administrative personnel how to use the systems – and in particular to record *everything*. In the end, though, much of the paperwork will simply go away. Just as the use of credit cards collapses the endless process of purchase orders, invoices, bills, follow-ups and receipts into a single transaction, enabling e-commerce to flourish, so could real-time claims processing vastly speed up and simplify the administrative side of health care.

If it succeeds, FirstData could manage much of both health plans' and providers' paperwork, sending them summary data.

The final frontier

But FirstData has set itself one more task: the clinical side. That's the part that has the most complex transactions. . .and the one that will have the biggest impact on actual quality of health care, as we described earlier. It's tempting to think that all we need is a company with FirstData's expertise, scale and reliability to do the job. Once

there are standards for representing both users' data and medical protocols, just hand it to FirstData to do on a grand, complex scale what Resolution Health or FirstData Bank (no relation; a Hearst subsidiary) do for a smaller number of patients. That *could* happen, but we think it's more likely (and desirable) that the more patient-centric model will succeed over time.

In banking, notes Kennedy, "The bank always owns the customer. FirstData never gets between the bank and its customer; we work in the background. The same applies for health care. When it comes to the actual card record, for balance purposes, FirstData is the master. Typically banks will hotlink to our websites to get data that they display on their own branded site to their consumers. FirstData does all of the authorizations, fraud detection, etc. Optionally, FirstData provides customer care. When this option is selected, FirstData call center staff identifies themselves as a bank employee. Therefore, the bank's customers think they are dealing directly with the bank." Were the same approach to apply in health care, then, FirstData would represent a single provider or payer institution at a time in dealing with the consumer, rather than representing the consumer in dealing with a multiplicity of institutions.

Business DNA in search of phenotypes

On the flip side is an approach that would let consumers manage their own health information online, storing it securely and under their own control, with easy, automatic updating from (almost) all the health institutions with which they interact; they could also enter data themselves. Over time, these databases, which initially will simply store records in a variety of formats, will be able to interoperate at a data level, so that the user (patient or doctor or aggregating analyst) can see time-series and comparative data, rather than simply pages and pages of scanned-in records. That's Bill Yasnoff's vision with eHealthTrust (below). It's also the vision of Richard Dick of You-Take-Control (SEE **RELEASE 1.0**, JANUARY 2005), and of Patient Command, another early-stage start-up with a more centralized model (also below). We think this model will succeed, but that it will be implemented primarily by larger companies that already have consumer trust. All three of these start-ups are really just consulting/idea firms looking for larger partners/investors with whom to build their ideas into reality. Fittingly, all three have or have filed for patents, whereas FirstData has a revenue stream.

eHealthTrust: Man with a plan

Right now Bill Yasnoff is just a health-care consultant with an idea at NHII Advisors, the so-far one-man firm he founded early this year after leaving the Department of Health and Human Services, or HHS). But he is collaborating with eight interested colleagues; he has the requisite experience and pedigree to help execute his idea, and also some good client prospects such as the health-care communities of Spokane, WA, and South Bend, IN. At HHS, he served as senior advisor, NHII (National Health Information Infrastructure) and initiated and organized the activities leading to the President's \$50-million health-care budget request for the 2005 fiscal year (even though it was never in fact funded). He also established the NHII as a national goal – though he no longer believes in the architectural model he initially propounded.

More practically, he built the (still successful) immunization registry in Oregon, a complex, large-scale, multi-stakeholder project similar to the eHealthTrust concept he's working on now. Before that, he worked on three IT start-ups (one as founder), and he has both an MD and a PhD (in computer science) from Northwestern. But now, he says, he wants to make some of his ideas happen, and he has moved back to the private sector to do so.

His plan is to foster the creation of eHealthTrusts – health data banks – that would store and manage personal health records on behalf of patients. His vision is that there would be multiple such eHTs, and probably similar competing data banks with other names (though using his business-model patent; more later). An eHealthTrust would take charge of collecting patients' records from all sources – doctors, plans, labs and the like. Each patient's records would be physically stored in one of a number of community-owned and operated databases (with backups) rather than just linked to, and would always be available.

As noted, that contrasts with the purportedly cheaper, less disruptive idea of simply building a master index that would know where all the records are – and that could assemble them on demand in real time. This concept, propounded by Markle and the HHS's David Brailer, among others, is appealing technically and could work, but only when – or if – standards to make it easy have been established and all institutions are tightly connected. It's a good approach for tracking terrorists, for example, but less suitable for giving patients (or terrorists, for that matter) access to their own data. We believe less ambitious approaches are likely to succeed first.

Centralized into local clusters

Indeed, Yasnoff is expert at debunking the real-time index idea. “I should know,” he says. “I was one of the people who helped develop it” at HHS. Originally, it seemed like the appropriate alternative to a central database that would be, almost by default, government-controlled. But the idea of multiple databases built around individuals’ complete records, collecting data from institutions, rather than multiple institutional databases with subsets of individuals’ records, makes much more sense – as long as the privacy questions could be handled. We agree, although this approach has yet to percolate through the industry.

There are three major problems with the index approach, Yasnoff points out: First, building a comprehensive index system that would allow instantaneous access from anywhere to all the records in the country is probably even more complicated than building a set of heterogeneous data stores that serve individuals: i.e., each patient is the center of his own universe, rather than a short-term, multi-part database join. The first kind of system needs all the data sources to work at once; the second can be rolled out for hundreds of thousands rather than hundreds of millions of patients at a time. Moreover, it would be hard to agree on standards for such a system. In practice, standards emerge as one or two market contenders win. Unfortunately, there’s no real way around the redundancy and duplication that imposes.

Second, argues Yasnoff, there’s no system of incentives for the linked system until it’s fully operational. The investment is too great for it to be funded on spec.

And third, we’d argue, the data in an indexed system wouldn’t be liquid; it would be kept in silos until it was assembled for transactions, rather than integrated for continuous monitoring, either for the patient or for more general analytical work.

Patient at the center

By contrast, the eHealthTrust model, while it is just a data store, could easily send the data for any patient to a rules engine for processing, to a drug compliance system for monitoring, and so forth. To ensure patient control, eHealthTrust plans to rely on You-Take-Control (SEE **RELEASE 1.0**, JANUARY 2005) for its HIPAA-style permissions workflow, which is granular enough to expose only certain records or subsets of records to any particular person or role within an institution. It would keep individuals’ records in one secure database connected to the Internet, with a front-end that allowed only one person’s record for any query. That is, a user couldn’t ask for records on a group of people or make any other kind of general inquiry. And of

course, each query would have to go through the permission process that the eHealth model (and HIPAA) imposes.

That database would also be copied periodically into an air-sealed machine with no direct connections to the Internet, and with only keys to the names and IDs in the source database. Here, authorized institutions (for a small fee) could send in queries for eHealthTrust to run on records patients have agreed can be queried: everything from a manufacturer who wants to send a message to all users of a suddenly recalled

or withdrawn drug or device (as if that ever happened!), to a researcher looking for the incidence of colon cancer by geography, to a pharma company interested in finding patients with advanced prostate cancer for a clinical trial of a promising new drug. Longer term, that same database could be used to cross-reference various genetic patterns with diseases and other anomalies.

EHEALTHTRUST INFO
Headquarters: Arlington, VA
Founded: March 2005
Employees: 9 people working on project
Funding: undisclosed
Key metric: visited 18 communities in 15 states so far
URL: www.ehealthtrust.com

Of course, notes Yasnoff, people's data (or subsets) would be in that second database only with their permission, and even then it would be anonymous (except to eHealthTrust, which could pass alerts, fees and requests for more information back to the individuals

involved). Most of the fees collected for data access would go to the patients who provided the data, giving them an incentive to do so.

"I've spent enough time on this that I know many of the policy problems it will unearth. It won't *create* them," Yasnoff stresses, "but it will create possibilities that make policy choices necessary." For example, since individuals can black out any part of their records from scrutiny even by their own doctors, what about people who make a career of getting controlled substances from a multiplicity of doctors and selling the surplus? Although law enforcement has access to those records through pharmacy records anyway, all authorized viewers of the patient's record would see a notice that one or more controlled substance prescriptions had been suppressed, answers Yasnoff. Or what about psychiatric as opposed to physical health records? Yasnoff believes his system should not as a rule include detailed psychiatrists' notes. As for regular doctors' notes, he says, doctors are just going to have to learn not to write things such as "hypochondriac whiner – muscle pains from hauling too much weight around." Of course, Yasnoff hastens to add, "It's not that they don't respect their patients. These are just keys to jog the memory." We suspect that the mere physical act of typing rather than scribbling on paper will help doctors to keep their politics correct.

The more fundamental issue beyond discretion – of actual disagreements between patients and doctors – can't be resolved by the system, but they can be flagged, and both parties can contribute their versions. Any third party can make up his own mind whom to believe.

He who pays for lunch gets to choose the menu

The second major feature of eHealthTrust is its business model; Yasnoff has filed for a patent on it – not so much to generate royalties, he says, as to control use of the concept and to foster standards for submitting data to eHealthTrusts. Yasnoff believes these data standards are necessary make the concept more attractive to vendors, who will integrate the standards into systems sold to providers. Yasnoff's idea is that patients will pay for the service, perhaps \$49.95 a year or \$9.95 a month (potentially offset by fees for selling their data to researchers). Meanwhile, eHealthTrust will pass on part of those fees to physicians at \$2 to \$4 per encounter record submitted to eHealthTrust – presumably with some provisions to make sure that doctors don't generate multiple records per visit. That, plus the force of law – HIPAA requires that any holder of patient data provide it to the patient (or designated intermediary) on the patient's request – should do the trick, he says.

He adds, "You tell a doctor that if he buys a new electronic system, he'll get \$20,000 a year for, say, a busy internal medicine practice, and they'll listen to you. Before, they were told they had to buy the equivalent of a Lexus so their health plan could save money. This way, *they* make the money!" (And, he claims, the health plan also saves long-term, on likely reduced demand for duplicate tests and x-rays as well as expensive remedial care from patients getting better preventive care).

We're a bit more skeptical. Providers will get fees, and there are time limits and specifications of format in the law, but there are no penalties and enforcement is weak. Moreover, Alice the doctor isn't worried just about money. She's worried about retraining Juan, the office administrator, and getting all the nurses and assistants to adopt the new system, which inevitably will demand more process and screenwork (in lieu of paperwork) than the old system. Yes, there's a huge savings in time once all the data is entered, but entering it the first time is quite a hurdle.

And despite Yasnoff's citation of an Accenture study reporting that more than 50 percent of people queried would pay more than \$5 per month to have electronic medical record, the numbers (SEE TABLE, PAGE 14) show slow uptake when people are actually presented with the opportunity. Perhaps they were expecting more. Perhaps they don't trust the ones offered. Perhaps they really need to be marketed to like

regular consumers, as RealAge and HealthExpo have demonstrated. But it's clear it's not that simple.

Currently, Yasnoff is calling on a number of regional communities, ranging from Vermont to Washington State – many of whom he has served as a consultant. First, he had helped them to understand their problems. Now, he's offering a solution. The idea is that he will advise them on the implementation of an eHealthTrust for their community, which that community – or local investors – will own and operate. His income comes from advice; the license fee for the patent-pending business model is more a way of ensuring the system's integrity (and enforcing the use of common standards for data transmission) than of making money, he says.

We love this idea, and we think the business model of paying doctors may indeed be more effective than one that simply says, "The government wants you to." And we also think that most individuals can and should pay. That will encourage transparency and healthy competition, and will shift power away from subsidy-wielding health-care institutions.

Patient Command: All or nothing

Also in the running is Patient Command, another company with intellectual property in search of embodiment. "We're doing things in the right order," says co-founder Richard Marks, "We're getting the patent first." Marks is a DC lawyer who practiced IT law for more than three decades. The overall architecture is similar to that of eHealthTrust, but the Patient Command approach is more all-or-nothing: The company wants to be the sole provider of the model and run a single large, secure, redundant, disaster-protected database for the whole country. It is looking for one or more strategic investors (with \$125 million) to get started.

Marks' co-founder Bill Knaus is a department chair at the University of Virginia medical school and the founder and former CEO of Apache Medical Systems, which sold an automated clinical decision-support system. Started in 1988, Apache went public in 1995 and was bought by medical software vendor Cerner Corp. in 2000. Knaus contends he knows all too well the difficulties of getting clinicians to change even minor aspects of their workflow to accommodate new IT systems. This, he says, is the biggest barrier to all the new PHR proposals. Patient Command solves it, he says, by making cooperation from physicians and hospitals unnecessary. Patients can get the documents themselves and send them to Patient Command, which has employees type the information into its system.

But, he adds, while Patient Command avoids a futile stick, it does offer a carrot, making it easy for providers to adopt Patient Command by offering free software with extensive search and communications capabilities. That strikes us as likely to be less effective than eHealthTrust's straightforward offer of money.

The key to Patient Command's approach is "certification" of accuracy of transcription of the cumulative record, which typically has input from many different providers. That makes it into a legally relevant document with rights (the patient has a right to it) and obligations (the doctor must consult it). Ask yourself, Knaus and Marks say: "Where is my secure, primary, certified, electronic medical record – the one I know has all my allergies correctly listed, my current medications, and all else essential for an ER doc or a specialist to know about me?" They point out it doesn't exist now anywhere. And they want to create it: Patient Command would be the consumer's trusted agent, able to send the secure, up-to-date certified record to whomever the patient directs.

While eHealthTrust's applied-for patent is for the user-pays business model, Patient Command is focused on the issue of records quality; its applied-for patents cover the process of validating the record-transcription process and certifying the records as accurate representations of the originals (not that the originals themselves were accurate) – even if that means transcribing a fax of a doctor's notes. Their process is engineered to use and validate a variety of input means, and to indicate the different modes and sources of input so providers can evaluate the data when they consult the record. We're not a fan of such business-process patents, and we're not sure exactly what Patient Command's two patent filings cover, but at least the company seems to have a healthy appreciation of the challenges it faces. Record quality will indeed be a challenge in the early years and beyond.

Patient Command assumes it can use the force of HIPAA to get its patients' records, while it plans to collect its own revenues – at least initially – from health plans and employers who will sponsor the system because of the demonstrated benefits of consumers' use of PHRs, as well as from state Medicaid programs, where savings will be huge. It expects that its new product, the certified primary PHR, soon will create a mass market – and one they can dominate for the term of the patents.

PATIENT COMMAND INFO
Headquarters: McLean, VA
Founded: December 1999
Employees: 2, plus consultants and advisors
Funding: self-funded
Key metric: initial patent application filed in July 2000
URL: www.patientcommand.com

The patient-centric approach: Compare and contrast

We like the basic approach of both companies, but we think they underestimate the challenges. Indeed, they are both in search of partners to do the implementation while they do the system design. With its user-pays approach, eHealthTrusts are a little more focused on user needs, while Patient Command will offer providers free software (not a compelling proposition in most cases we have seen). Patient Command focuses on providers' presumed demand for certified records, and the eventual need for providers to consult those records in order to avoid malpractice liability – and once use of certified records is widespread, as part of the evolving standard of care. That's an interesting proposition, and we can see how it could be argued for in court (or Congress), but we don't see it happening anytime soon. Nor does it require a centralized approach for certification.

Indeed, we think the law is a poor spur to positive behavior change. One might argue that even HIPAA would be unnecessary if proper incentives were in place, and if informed consumers knew what was happening to their data and could make their own choices in a transparent, liquid market. Of course, that's far from true right now, but we still believe that better incentives rather than legal obligations is the appropriate direction.

On that basis, we mention Patient Command here, but we put more weight on eHealthTrust's more incremental approach. In any case, success will depend on the right partner(s). While Yasnoff believes that health-care stakeholders in a community will band together to create an entity trusted by consumers to provide the marketing (and financial) clout necessary for success, we would argue that this is the kind of enterprise that requires the market heft of a consumer-oriented company such as Google or Yahoo! or perhaps a trusted consumer company from outside the IT world. (Of course, both models can coexist.) HIPAA may be the law, but law-enforcement is hardly the basis of a healthy for-profit start-up; huge consumer outreach is. We think the value of patents pales beside the value of the customer bases and the IT infrastructure that larger companies can bring to the party. Even the eHealthTrust financial-incentives model won't mean much unless the company can team up with another whose scale makes those financial incentives meaningful; \$2 per record sounds petty, but \$20,000 a year (for 40 records a day) starts to make sense.

Yet we remain convinced that this patient-centric model is the right one in the long run. The only question is which company or companies will actually successfully implement it and offer it to consumers.

Genome Sequencing: Making Meaning from Data

Most of what we have discussed so far could have happened ten years ago, at least as far as technology is concerned. Now, as we have outlined, the social and financial picture has changed in a way that will push personal health information liquidity.

We're also about to see a wholesale change in the amount and kind of personal information potentially available, as gene sequencing becomes commonplace. Most people won't want to publish their genomes, let alone their personal health records, but such information will be tremendously valuable – even as anonymized data with access limited to researchers. Complementing all the genetic data will be huge amounts of health-monitoring information patients will start gathering for themselves. As Tim Andrews of Transform Partners observes: “While it may seem challenging to integrate all of Alice’s current and past health information about vaccinations and such, what if Alice suddenly has a pacemaker that reports information every second? Or an embedded continuous glucose monitor that reports blood sugar levels every second? That’s 76,000-plus data points a day, which aren’t particularly meaningful without at least simple analysis.”

In short, we're about to see a step function in the amount of personal health information available. . .enough to keep IT vendors and policymakers busy for years to come.

George Church: A jones for genes

George Church is professor of genetics at Harvard medical school and also heads the Lipper Center for Computational Genetics, MIT-Harvard/ Department of Energy Genomes to Life Center, and the National Institutes of Health (NIH) Center for Excellence in Genomic Science. Church’s Harvard lab is a member of the genome-sequencing technology development project of the NIH-National Human Genome Research Institute.

He also supplies scientific guidance and inspiration to a number of companies, including Genome Therapeutics (since 1989), the sequencing part of which merged with Agencourt Biosciences in 2003, and a 2005 spin-off called Agencourt Personal Genomics. (Agencourt Biosciences, arguably the largest current-generation gene-sequencing company, was recently acquired by Beckman Coulter for more than \$100 million, depending on earn-outs.) He has also contributed ideas to Codon Devices, a “synthetic biology” company that constructs large-scale integrated genetic circuits for anything from pharmaceutical manufacturing to biosensors and smart materials;

Codon has funding from Kleiner Perkins (including Vinod Khosla personally) as well as Flagship and Alloy.

Most recently, Church led Harvard's research project to design a faster and therefore cheaper way to sequence genomes, reported August 4 in the journal *Science*. This followed by four days an announcement by company 454 Life Sciences, based in Branford, CT, of a similar achievement.

Three magnitudes down, two more to go

Both groups have automated and miniaturized the process, which makes it much cheaper, faster and more accurate. The very first human genome sequence took 13 years and cost \$2.7 billion (though the second was much quicker!). The current cost – if someone wanted it – would be about \$20 million, or the price of Dennis Tito's trip into space. Church's and 454's separate but similar approaches drop the cost to about \$2 million. Their ultimate goal is about \$1000, though Church points out that even \$20,000 would be compatible with our current medical system: not for everyone, but akin to a complex operation.

But 454 sells its equipment for \$500,000, whereas Church's group is aiming for a more "community-oriented" effort. Church expects his approach to be used by 454's three major competitors (including Agencourt) and, indeed, labs all around the world. In fact, he says "You can use equipment that's currently available in most labs, for about \$150,000, starting with a digital camera and a microscope; everyone has those." The science paper includes step-by-step instructions, although they may not be for "anybody": The final words of the paper are: "We collected ~786 gigabits of image data from which we gleaned only ~60 megabits of sequence. This sparsity – one useful bit of information per 10,000 bits collected – is a ripe avenue for improvement. The natural limit of this direction is single-pixel sequencing, in which the commonplace analogy between bytes and bases will be at its most manifest."

"I like commerce," says Church. "But here, commercially, we're going to race to the bottom. We'll run workshops and do everything we can to spread the technology. Agencourt may want to become Amazon or eBay and do useful applications [but] not make money on the "browser," which spreads freely academically. We wrote the paper to make it extremely enabling. It's a total cookbook: where to order the parts, how to use them. . .the opposite of how a commercial entity would write a paper."

He describes the process, which can use tissues as simple as blood or swabs from a mouth: The material is immobilized into beads on a slide, while various solutions

flow through it slowly. The system works basically by matching fragments from the sample onto a reference genome. That is, you can't do the first instance of any species' genome this way. You have to start with the multi-million-dollar model. But after that, it's more like checking a new document against a reference copy for subtle changes, or fitting complementary pieces onto a long jigsaw puzzle. "I'm mostly a scientist, but when I touch engineering I get this rush of excitement," says Church. "You have to ignore all the things you can't do, and not beat yourself up over what you could have done long ago. It's so arbitrary, but so wonderful when you just make something work!"

Open-source medicine

But Church isn't content merely to create the technology; he understands that some people don't want their genomes sequenced, and many more don't want to share their information. "I see privacy attitudes in three buckets," he says. "Some people want total privacy; they might not even want to know the information themselves. In the middle, people want just you and your own health-care provider to see it. And on the other end, a large group of researchers could see it. These views all exist; my colleagues think the norm veers towards the private." But here too, Church is an engineer as well as a scientist, with his Personal Genome Project (PGP; see resources page for URL). "We don't seek controversy," he says, "but we do seek a safe way to explore extremes in order to arrive at a reasonable middle."

After 12 months Church's PGP has been approved by the Harvard Medical School Internal Review Board, which vets the ethics of all human-subject research proposals at the Med school. Its mission is not to expedite research but to ensure proper treatment of subjects, so this approval is a significant win.

The idea is very simple: to sequence the genomes of individuals – "however many we can afford, initially" – and to publish them along with the full medical records of those individuals, publicly identified. Then, the idea is to see what kinds of activities and research the presence of such information will foster. And how will the individuals involved feel about it after the fact?

Church has already gone ahead and put his own medical records online and will do the same with his genome; he'll be the first research subject. "It's already very useful," he says cheerfully. "I was giving a medical seminar one day, and a hematologist in the third row told me I should get my cholesterol checked. . . He said 'I looked at your Web page and you've been taking Lovastatin. You should have checked after 6 weeks whether it was working.' And indeed he was right. I had expected the drug to take

care of things, but my cholesterol level was up to 288. Following up on his suggestions brought it down to 150.”

The PGP study is carefully designed to meet ethical standards, and it’s a social as well as a technical experiment. The volunteers (we are one, tentatively, though we haven’t seen the fine print) don’t get free medical care, payment or any other benefits that might be considered coercion to say yes. The volunteers are not supposed to be representative, but rather to be articulate, well-informed people who will take the time and trouble to learn about the science and medicine behind the project, and to be spokespeople for genomic research and, by example, openness about medical matters. Yes, we can understand why a certain proportion of people might legitimately want privacy for themselves and family members, just as some people do about other matters, but openness should be perceived as, at best, generosity with data, rather than exhibitionism.

Says Church: “Ultimately, to do epidemiology and association studies we need genome and phenome data, both of which are currently expensive. But both types of costs can drop dramatically. The phenome data costs could drop via data-mining in medical records, and the genomics will drop via technology initiatives from the NIH & Department of Energy [and private-sector competition]. The more patients feel comfortable with the dual use of medical records for health care and research, the more everyone could benefit.”

Oedipus project

He’s optimistic that he’ll get the volunteers, and he also expects a high-end, early adopter market to emerge, along with a more coerced group of people desperate to understand their own anomalous conditions. “I’m looking for Oedipus,” he says. “I don’t want them to poke their eyes out, but they must want to know everything. Consider how much people love their objects – homes and cars. . . . They could have the same fascination with their bodies and genomes.” Ray Kurzweil and Larry Ellison come to mind, along with any number of age-defying Hollywood starlets.

“Imagine having 200 physicians,” he says. “Even in medicine, there’s the wisdom of crowds. It could be a social phenomenon, which could be good: the weather, or football, or your genome. It’s up to the individual to learn to be witty about their genome. The first thing is to be brief. Find out what you share genetically. If you don’t want to bore them about cholesterol, find out what you do have in common, like kidney disease. And of course, sometimes there’s *good* news. You might find out that you *can* marry your cousin with no special risk.”

Data, Data, Who's Got the Power?

In the future, we will be able to use personal health data on a grand scale, both in terms of the depth of information about any single person, and the amount of data shared across health institutions. That's a controversial subject. It affects both individuals' privacy on the one hand, and their access to health care on the other. It also raises the specter of information people might not prefer to know about themselves – everything from acknowledging that one is an alcoholic (rather than someone who occasionally overindulges) or to finding out one has a genetic predisposition to, say, pancreatic cancer.

If you can't do anything about it, that's one thing. If you can, what do you owe society in terms of caring for yourself so that you don't become an expensive patient? If your employer pays you to engage in certain healthy behaviors, how does that work given that some people are more at risk? Can those people earn more for staying well? Or are they doubly penalized when they get sick?

And finally, how should we regulate drugs and treatments? Most drugs are not, say, 60 percent effective and likely to cause a 5 percent increase in the risk of some unlikely event; rather, they are 90 percent effective for some people and useless or even dangerous for others. With genetic testing it's now often possible to tell which people are which. The current one-size-fits-all model of drug regulation breaks down when we know enough.

Finally, who should bear the costs when ill health is a combination of destiny and free will, especially when bearing the consequences of one's behavior (both in personal health and finances) can alter those free-will decisions?

Why bother?

The sum of everything described in this issue is far more than all the parts. . .and indeed it will require much more than each of them succeeding. The different players and approaches need to interoperate and collaborate. The marketers need to learn from the techies and vice versa – and everyone needs to figure out how to make software more usable.

Indeed, it all sounds entirely reasonable – and unrealistically ambitious. Most of the ideas comprise a future many people can at least

COMING SOON

- real-time markets
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- And much more. . . (If you know of any good examples of the categories listed above, please let us know.)

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Further reading:

George Church's Personal Genome Project: <http://arep.med.harvard.edu/PGP/>

envision – some with eagerness and some with jaded cynicism. But you could have said the same thing about the banking system in 1975. . .when ATMs were a glimmer in some people's eyes.

Of course, we now have not only Citibank ATMs spouting rubles in Moscow and secure online purchases. We also have Choicepoint and identity theft. So, the future won't all be simple. For us, the biggest question is, Who will be in the market along with all the respectable companies profiled here? Will they all be trustworthy? ■ R 1.0

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Carol Diamond, *Managing Director, Health Program, Markle Foundation*

Ed Fotsch, *CEO, Medem*

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Bob Kerrey, *President, The New School*

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