

White Paper

**Big Data & Analytics:
Five Trends With Implications For Health Plans**

Discover the potential of big data for health care
by looking outside the lines.

October 2012

Access to increasingly more information and analytics and infinite data management capacity are critical to improving health care and business outcomes. In this Industry Insight, LexisNexis® looks at data mining and analytics used across industries and organizations, looking at the types of information available that are not being leveraged by health plans and asking the question: What if?

Trend #1 The science of habit formation

Journalist and author Charles Duhigg¹ popularized the study of habit formation in both an article and a book. In his works, he focused on what really drives habitual behavior and how that insight can be used to effect positive change.

As a simple but likely identifiable example, he used a habit he had wanted to break, that is, going to the cafeteria every afternoon and eating a cookie while talking to friends. When his weight gain hit eight pounds, he tried a number of things to resist the urge but still found himself eating his daily cookie while promising himself it was his last.

While researching his work on habits, he sought expert advice on his own issue. The journey that began with his figuring out his “habit loop” and ended in quashing his daily cookie routine was predicated on the urges, triggers and cues that got him out of his chair and down the hall. In his situation, he discovered that, although he always felt an urge to snack at 3:30, what he truly craved was the socialization.

But it would take more than acknowledgement to break the habit, he was told. For his new behavior to stick, he needed to shift the routine by piggybacking on an existing habit. For him, that meant standing up every day at 3:30 and finding someone to talk to for 10 minutes. Thus the cue and reward stayed the same; only the routine changed.

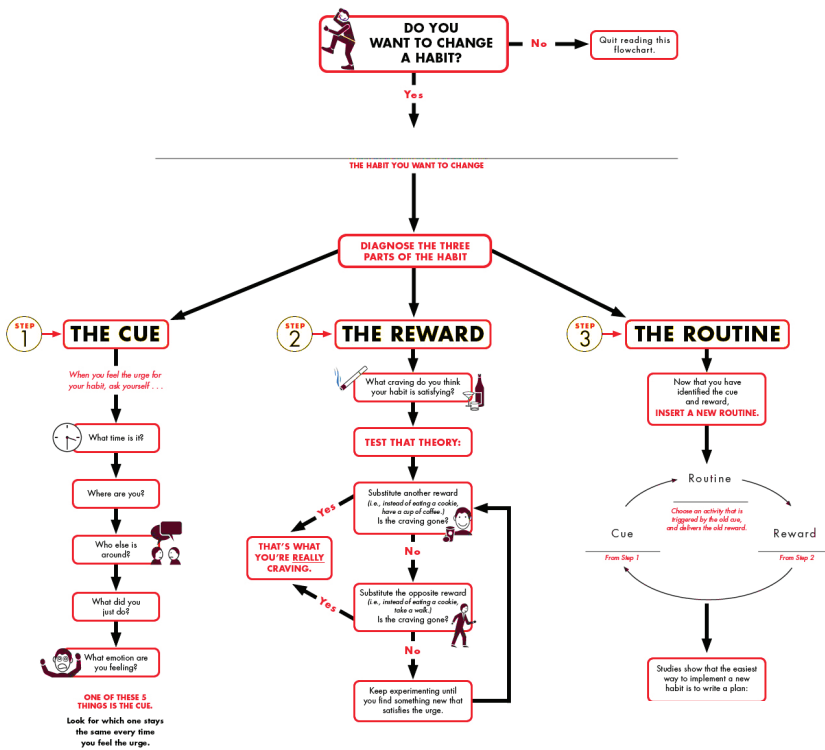
The solution ultimately was found in five data points centering on when the urge hit: (1) Where was he? (2) What time was it? (3) What was his emotional state? (4) Who else was around. and (5) What action preceded the urge?

According to Duhigg, recent discoveries in the field of habit formation “have begun to change everything from the way we think about dieting to how doctors conceive treatments for anxiety, depression and addictions.” But how far will they take us? That remains to be seen. However, as poor lifestyle choices and bad habits increase the risk of chronic disease, the diversion from overeating, smoking, drinking and inactivity has the potential for significant impact on individual and family health, as well as health care costs.

1 “How Companies Learn Your Secrets,” Charles Duhigg, The New York Times, February 16, 2012; “The Power of Habit: Why We Do What We Do in Life and Business,” Random House, 2012.

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HOW TO CHANGE A HABIT



“Target has figured out how to data-mine its way into your womb”.

Forbes Magazine

Trend #2 Leveraging buying habits

The story didn't take long to spread. Occasionally headlined, “Target Knows Your Daughter’s Pregnant Before You Do,” the article related the tale of a man angered by the baby-related store coupons his high-school age offspring was receiving, even though she wasn't pregnant. Or so he thought. As it turns out, the score was Target 1: Father 0, when it came to knowledge of his daughter, who had bought a pregnancy kit from the chain.

It's no secret that retailers collect and buy information related to our purchasing habits and consumption patterns, attempting to anticipate our needs, make us buy more or inspire us to return. Still, the Target story seemed to hit some nerves, with Forbes opining that, “Target has figured out how to data-mine its way into your womb.”² Though the story, for some, may be viewed as a cautionary tale of impending human subjugation to algorithms, panelists at a June 20 session at the America's Health Insurance Plans (AHIP) Institute 2012³ played devil's advocate.

Former Center for Medicare and Medicaid Services Administrator Kerry Weems looked at it from a preventive health standpoint. Weems, now vice president and general manager of General Dynamics Information Technology's Health Solutions sector, noted that early knowledge of pregnancy of a Medicaid beneficiary and/or member of an at-risk population could possibly spur outreach and education to set the groundwork for a healthy baby.

Glendon Schuster, senior vice president and chief technology officer of Centene Corporation, looked at the scenario from an economic perspective, as well, pointing to neonatal intensive care units (NICUs) and alluding to the fact that, while 10 percent of newborns are admitted to NICUs, they account for 75 percent of all dollars spent on newborn care.⁴

Where else could retail-type data benefit individuals and their health plans?

For instance, according to the referenced article on Target's research capabilities, the retailer is able to create a "pregnancy prediction" score for each appropriate shopper, sending coupons timed to products most appropriate to specific stages. Could equally timed health and wellness communications have more traction with patients and members than general advice? Or, knowing the approximate time between diagnosis of diabetes/hypertension and ultimate kidney failure, could plans use that knowledge to focus on those more proximate to dialysis, as panelist Schuster suggested?

Further, are there things to learn from retailers such as Amazon that can predict likes or dislikes and make recommendations? Or from pop-ups that know what you've been shopping for most recently and provide additional options? Or the coupons, samples and ads that wind up in our mailboxes? The data is there, as well as the technology and analytics. The question is how to best use it.

Trend #3 Personal data-gathering websites

Possibly more close to home for health and wellness concerns is the concept of personal data gathering through user input. Take, for example, sites such as [weightwatchers.com](http://www.weightwatchers.com), [myfitnesspal.com](http://www.myfitnesspal.com) and [ifit.com](http://www.ifit.com), all aimed at an important segment of the patient and prospective patient population – the overweight and physically unfit. While touted as personally empowering, such sites also are examples of how data, technology and analytics can take decision support to the personal level, according to LexisNexis which also participated on the AHIP Panel.

Though all three sites offer personalized plans, it is interesting to look at their choice of motivators for the audiences they've targeted. For instance, Weight Watchers offers community and support, either online or at meetings, as well as a promise that users will not be hungry.

² "How Target Figured Out A Teen Girl Was Pregnant Before Her Father Did," *Forbes*, February 16, 2012, <http://www.forbes.com/sites/kashmirhill/2012/02/16/how-target-figured-out-a-teen-girl-was-pregnant-before-her-father-did/>.

³ "Leveraging the Power of Health Plan Big Data to Contain Costs and Improve Health Care Outcomes."

⁴ "How Plans Can Improve Outcomes and Cut Costs for Pre-Term Infant Care," *Managed Care*, January 2010, Michael Kornhauser, MD, and Roy Schneiderman, MD, *Alere Women's and Children's Health*.

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iFit, on the other hand, offers competitions with friends and other members and rigorous interactive fitness training with Secure Digital card technology that can make decisions for the user, determining factors such as incline and speed for him or her on various compatible machines.

For its part, myfitnesspal.com emphasizes the writing down of every food item eaten, which, the site purports, “encourages people to consume fewer calories.” Community and support are emphasized here, as well, with discussion forums and weight-loss “badges” for use on personal blogs and web sites.

Thus, though similar in perceived goals, these sites may be addressing distinct parts of the population interested in health and fitness, seemingly based, in part, on personal traits. Could this type of approach plus the timed communications mentioned previously be more effective in supporting ongoing health and fitness efforts?

Also of note where the sites intersect, with all of them providing access to a user’s data through multiple types of apps and devices. Are there ways this could be a carrot or a stick for those on medical schedules, as well as wellness plans?

Trend #4 Monitoring social ties

Data mining at its essence is knowledge discovery, analyzing data from multiple perspectives to find correlations and useful information. Where better to use a knowledge tool than on a college campus? The New York Times⁶ recently looked at how data mining is reshaping the college experience through:

- Software to predict how well students will do before they even start, recommending courses in which they’re more likely to make better grades
- “eAdvising,” which tracks whether a student signs up for key courses or does well enough in his or her major to continue in it
- Software with genesis in the movement patterns of fish that reportedly can predict by the eighth day of class, with 70 percent accuracy, whether a student will need extra help

A system that recommends which learning activity within a course each student should do next, whether skipping a section, staying on track or accessing on-line tutoring

⁵ <http://www.mhealthalliance.org/>

A related emerging trend on the clinical side is the integration of geomapping and predictive modeling with mobile technologies to improve health, particularly in poorer regions of the world.

Those concepts under way, researchers reportedly are eyeing “the next frontier: social ties,” which they say also can influence academic success. If students are more integrated into the campus life, purportedly, they are more likely to stay in school. One academic research project attempted to track socialization through monitoring of student-ID swipes, hoping to gain insight into students at risk for leaving school and intervening when necessary.

Are there parallels in health care, where accurate predictions of success and timely interventions are critical? Could such deeply individualized education and treatment plan hit the right buttons to keep health plan members on the right track? And what about the aspect of social ties?

There have, of course, been numerous studies on topic of socialization and health. One of the latest was released on April 13, 2012, by the Harvard School of Public Health and the Dana-Farber Cancer Institute and focused on the role of social ties on dietary and physical activity. Looking at relationships among family, friends and neighbors, the study found both negative and positive effects on food intake and exercise. They also found that the negative impact might be even more pronounced and have greater consequences for minorities of lower socio-economic status, given their limited resources.

What else can be learned from social ties? We may soon know.

Research currently under way at Facebook, the on-line “nation” of 900 million strong, is looking at how its features affect users’ behavior. And it’s a target-rich environment, noted Technology Review⁷, as Facebook “has collected the most extensive data set ever assembled on human social behavior.” This unprecedented resource, the journal reports, will yield something big, “but nobody knows quite what.” A Facebook researcher contends it will revolutionize the scientific understanding of why people behave as they do.

Whatever the result, given the impact of behavior on health and wellness, the on-line behemoth’s discoveries may provide a great deal of food for thought for health care providers and plans.

Trend #5 Multi-purposing of data

Obviously, there is a growing volume of information available for use in numerable ways. Going forward, however, as referenced in the AHIP session, it will be necessary to break down data silos to get maximum value across the spectrum of potential uses.

6 “Please Be eAdvised, Netflix meets Google meets academia.” The New York Times, Education Life, July 22, 2012, pp. 24-27.

7 “What Facebook Knows. The company’s social scientists are hunting for insights about human behavior. What they find could give Facebook new ways to cash in on our data—and remake our view of society.” Technology Review, July/August 2012, <http://www.technologyreview.com/featured-story/428150/what-facebook-knows/>.

Facebook “has collected the most extensive data set ever assembled on human social behavior.”

Technology Review

For instance, in 2010 and 2011, The Wall Street Journal⁸ ran an investigative series that explored Medicare's vast databases, looking at how access to that data could be used to expose potential fraud and waste, with a focus on physicians. Integrating claims, billing and practice patterns, as well as anonymized patient files and other information, reporters ferreted out a number of dishonest health-care providers and schemes. Such methods, according to the panelists cited, could help reduce instances of pay-and-chase by taking claims triage further before funds have been distributed. The inclusion of more peripheral information also could have profound impact, according to LexisNexis. Specific examples discussed in the session included integration of Social Security data, which includes ages, to hinder identity theft and sharing, and external records, such as motor vehicle registrations and property transfers, that could help track a fraudulent practitioner. In addition, according to Lexis Nexis, public records could be blended into plan data to monitor for life events that warrant intervention and could be introduced in risk scoring. Significantly, incorporation of public information "can tell you things you didn't think to ask."

The point is that data collected for one purpose can have many uses. That's why, AHIP panelist Schuster advised, health plans might want to ensure they have done enough with the information they already have while they consider new sources and tools.

Conclusion

Despite the promise of big data in the future of health care, several critical issues will have to be addressed to capture its full potential, according to a related McKinsey report.⁹ Chief among those issues are policies related to privacy, security, intellectual property and even liability. There is also, panelists noted, the pushback born of the discomfort individuals could feel at the thought of their information being so accessible. Would the potential positive effects on their health and mortality make the concept more palatable? The debate, no doubt, will continue, as will ongoing interest in the acquisition and use of big data and analytics.

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8 "Secrets of the System," Wall Street Journal, <http://topics.wsj.com/subject/S/secrets-of-the-system/6281>.

9 McKinsey Global Institute, Big data: The next frontier for innovation, competition, and productivity, May 2011, by James Manyika, Michael Chui, Brad Brown, Jacques Bughin, Richard Dobbs, Charles Roxburgh.

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