



Internet's **IMPACT ON MEDICAL DECISIONS IS GROWING**

The Internet is having a significant impact on medical decisions, according to a survey of 400 U.S. physicians. The vast majority of doctors use the Internet as a tool for enriching their medical knowledge, and the medical information these doctors are finding on the Internet is influencing — in many cases

significantly — the types of diagnoses they are making and the kinds of medications they are prescribing.

Those are the findings of a recent study on e-health conducted by the Boston Consulting Group in conjunction with Harris Interactive.

The study — Doctors Say E-Health Delivers — also finds that about one-third of doctors are adopting or planning to adopt Internet technologies that enhance the care they deliver to patients.

The doctors who have already adopted electronic medical records, electronic prescribing, online communication with patients, and remote disease monitoring say these online patient-care tools have boosted their efficiency and the quality of care.

Those who have not yet done so plan to adopt these tools in the future at relatively aggressive rates — from about 10% to 20% depending on the tool — greatly bolstering the e-health channel in the next year and a half.

The study explores physicians' use of e-health tools and examines the sector-specific implications for pharmaceutical companies, managed-care organizations, and healthcare-delivery systems. Findings indicate that e-health is poised to quietly transform the economics of healthcare as well as the methods used to influence decision makers in the industry.

TOOLS THAT OFFER THE GREATEST POTENTIAL TO PHYSICIANS

- ▶ **26%** of physicians have online communication with patients
- ▶ **22%** of physicians rely on electronic medical records
- ▶ **11%** of physicians are prescribing drugs electronically
- ▶ **5%** of physicians monitor patients' health electronically

About one-third of the 400 doctors surveyed by BCG now use or plan to use at least one of the first three tools, and a smaller percentage plan to adopt remote disease monitoring; planned adoption would roughly triple these percentages in the next 18 months.

"Many industry experts expected that, at best, the Internet would prove a diversion for doctors who had light clinical practices or a serious interest in computers," says Carina von Knoop, a BCG VP and co-leader of the firm's e-health initiative. "But our interviews indicate that 89% of physicians use the Internet and that virtually all of these doctors have migrated some of their medical knowledge-enrichment activities online. Fully 90% of doctors online research clinical information on the Internet."

Findings also concluded that the busiest clinicians are most likely to turn to the Web to enrich their professional knowledge. These are the doctors who spend more time with patients and who therefore have more opportunities to diagnose conditions, manage patient care, select treatments, and write prescriptions. Quite simply, they are the very doctors that healthcare organizations target as they seek to influence the delivery of healthcare.

These and other findings from the study have significant implications for healthcare players, explains Ms. von Knoop. "Last year, the pharmaceutical industry in the U.S. alone spent \$13 billion to reach doctors, but spent only 1% of this amount on Internet channels. These same companies continue to rely on drug reps as the preferred medium for physician education, but the average doctor spends

POLITICAL AND ECONOMIC CLIMATE TO IMPACT 2002 R&D SPENDING

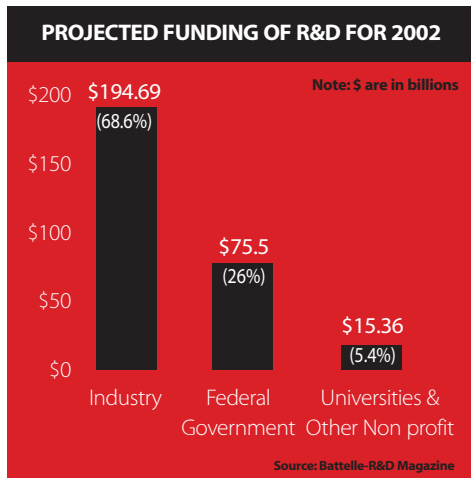
R&D FUNDING FOR 2002 BUFFETED BY POLITICAL CHANGE, ECONOMY, AND TERRORISM.

Total R&D expenditures in the U.S. are expected to increase about 3.5% to \$285.6 billion in 2002, according to the annual Battelle-R&D Magazine research and development forecast.

Three significant factors have combined to exert influence on the state of R&D funding for the upcoming year — the change in White House administration, the faltering economy, and the events and aftermath of the Sept. 11 terrorist attacks.

"The effects of these are not simply isolated and cumulative," says Dr. Jules Duga, a Battelle senior researcher and co-author of the report. "It is clear that there are interactions among the three, and — when superimposed upon what one might consider a 'normal' set of circumstances of change — their effects are somewhat more difficult to deal with."

The impact of significant external forces cannot be underestimated. "In previous years, the analysis of the emerging patterns of R&D could readily



R&D HIGHLIGHTS FOR 2002

- ▶ The federal government is expected to spend \$75.5 billion on research and development in 2002, which is a 4.7% increase over 2001
- ▶ Industry continues to lead in the number of dollars funding R&D with about \$195 billion expected to be spent in 2002, which is a 3.2% increase
- ▶ Academia and non-profits provide the other significant portion of national R&D funding, which is expected to be \$15.4 billion, about 3% more than was committed in 2001

Source: Battelle-R&D Magazine

accommodate almost any singular disruption and could present a reasonable picture of the anticipated effects," Dr. Duga says. "However, the concurrent triple-whammy experienced over the past few months creates a degree of uncertainty that is higher than usual and adds a layer of complexity to the forecast."

less than one hour a week with reps - compared with about three hours a week seeking medical information online. This disparity suggests that companies that don't reallocate some of their marketing investments may soon find themselves under investing in a highly promising new channel."

The study also found that the vast majority of doctors who visit health-related Web sites — ranging from 70% to 90% — report that the information they find online has an impact on medical decisions about diagnoses and treatment. Roughly one-third of these same doctors report that the information they find on the Internet has a major impact on the way they interact with patients; around 20% say it has a major impact on their knowledge of symptoms and diagnoses, as well as on the way they interact with patients; and 13% say it has a major impact on the drugs they prescribe.

More than two-thirds of physicians surveyed behave like online consumers, returning regularly to between two and five sites. Doctors who visit at least one site regularly named WebMD, Medscape, and Physicians' Online as their top three destinations.

"Although it is relatively easy to find doctors online, it will be challenging for healthcare organizations to market to them," Ms. von Knoop says. "It is important to remember that the sites to which doctors return most frequently place strict limits on sponsorship and content. Therefore, healthcare organizations will need to focus on devising unique and customized ways to get their messages to doctors."

According to Ms. von Knoop, "Already most users in our survey report that online patient-care tools have improved their overall efficiency, enabled them to deliver better care, increased patient satisfaction, and, in some cases, saved their practices money. The early successes with patient-care tools illustrate the depth and breadth of the opportunities they present to doctors and healthcare players."

DTC advertising HELPS IMPROVE COMPLIANCE

Direct-to-consumer advertising of prescription drugs helps patients more actively participate in their healthcare, increasing the likelihood that they will follow their treatment regimen, according to a study conducted by RxRemedy Inc. and released by Pfizer Inc.

"DTC advertising helps solve one of the biggest problems facing doctors — how to get people to take their medication," says Dorothy Wetzel, senior director, group leader, of the consumer marketing group at Pfizer. "When about 40% of patients don't take their medicines as directed, encouraging patients to get involved in treatment decisions is critical. This study shows that drug ads play a role in yielding a better bottom line for patients: good health."

PATIENTS, WITH SPECIFIC DIAGNOSED CONDITIONS, ARE MORE LIKELY TO REQUEST A SPECIFIC DRUG AS A RESULT OF SEEING A DTC ADVERTISEMENT

- ▶ **PEOPLE WITH NASAL ALLERGIES** — more than twice as likely to stay on their medication
- ▶ **ARTHRITIS PATIENTS** — 75% more likely to stay on their medication
- ▶ **PEOPLE WITH DEPRESSION** — 37% more likely to stay on their medication
- ▶ **HIGH CHOLESTEROL SUFFERERS** — 16% more likely to stay on their medication
- ▶ **PATIENTS WITH DIABETES** — 10% more likely to stay on their medication

An analysis of five medical conditions — nasal allergies, arthritis, depression, high cholesterol, and diabetes — shows that patients who involve themselves in their healthcare by asking their doctor for a prescription drug are more likely to take their medication than those who do not. The study, based on a nationally representative database of 25,000 patient participants collected and analyzed by RxRemedy, further shows that compliance is greatest among patients who asked for a medicine because they were prompted by seeing a DTC advertisement.

"It's common sense — if patients work with their doctor to decide what treatment is right for them, they are more likely to stick with that treatment," Ms.

Wetzel says. "DTC ads help patients to stay on their treatments longer."

Following treatment regimens can help decrease the burden on the nation's healthcare system. According to the Journal of Research in Pharmaceutical Economics, 5.5% of all hospital admissions are due to non-compliance, which results in \$8.5 billion in unnecessary hospital expenditures each year, plus another \$17 billion to \$25 billion in estimated indirect costs.

According to the study, patients diagnosed with nasal allergies who request a specific drug as a result of seeing a DTC advertisement are more than twice as likely to stay on their medication. Similar results were found for other conditions. Arthritis patients are 75% more likely to stay on their medication. People with depression are 37% more likely, high cholesterol sufferers are 16% more likely, and those with diabetes are 10% more likely to remain on their medication if they requested a specific drug as a result of a DTC advertisement.

"This could be especially good for men," says Dr. Jean Bonhomme of the Men's Health Network, who notes that men are difficult to engage in their healthcare. "Despite a traditional reluctance to visit the doctor or take their medications, men who are motivated by advertisements may become more active participants in their own healthcare, which can potentially have very beneficial effects."

GEOGRAPHY HAS IMPACT on prescription-drug use

A comprehensive state-by-state study of prescription drug use suggests that it is no longer just a patient's age and gender, but also where they live that can determine which and how many medications they use.

That is the finding in the study released by Express Scripts Inc. According to the study, the percent of adult beneficiaries obtaining at least one prescription in 2000 ranged from a high of 71% in Kansas to a low of 58% in California. The average number of prescriptions per member per year varied from 8.3 in New York to 12.2 in Kentucky. Generally, prescription drug use was lower in the Northeast and West, and higher in the South and Midwest.

For children, the percentage receiving at least one prescription varied from a high of 64% in Louisiana to a low of 48% in Arizona, with use higher in the Midwest and West South Central and lower in the West.

The Express Scripts research team, led by Brenda Motheral, RPh, MBA, Ph.D., tracked age and gender-adjusted prescription drug use for a random sample of commercially insured Express Scripts members who were continuously enrolled throughout 2000. The study sample consisted of 527,512 adults and 194,538 children, with more than 700 different client groups represented.

"Even greater variation was found when we

STATE-BY-STATE STUDY REVEALS THAT GEOGRAPHY PLAYS A ROLE IN RX DRUG USE BY TYPE AND QUANTITY

KENTUCKY LOUISIANA MISSISSIPPI

Ranked in top five in usage for more than 10 of the 23 therapy classes

COLORADO MINNESOTA OREGON VERMONT

Appeared in the bottom five 12 times or more and never appeared among the top five states for any therapy class

examined prevalence of prescription drug use for 23 of the most commonly prescribed therapy categories," Dr. Motheral says. For example, use of gastrointestinal drugs was greatest in the South, while antiasthmatic use was lower in the South. Estrogen use was lowest in the Northeast.

On a state-by-state basis, Kentucky, Louisiana, and Mississippi ranked in the top five in usage for more than 10 of the 23 therapy classes. Among the states with the lowest prescription use were Colorado, Minnesota, Oregon and Vermont, which appeared in the bottom five 12 times or more and never appeared among the top five for any therapy class.

The study found that variation in non-chronic therapy classes was greatest for cough/cold/allergy medications and in chronic classes such as for calcium channel blockers.

Louisiana had the highest prevalence of use of cough/cold/allergy medications, with 23% of respondents using at least one prescription, while Vermont had the lowest prevalence of use at 7.5%. For calcium channel blockers, usage ranged from a high of 5.3% in South Carolina to a low of 1.3% in Oregon.

"The variation in calcium channel blocker use could reflect uncertainty regarding diagnosis and treatment," explains Dr. Motheral, noting that the National Institutes of Health and the American Heart Association had issued statements cautioning physicians about the use of certain short-acting calcium channel blockers in specific patient groups.

"For cough/cold/allergy medications, there are a number of potential explanations for the high degree of variability," Dr. Motheral says. "Among these are climate differences and physicians' propensity to recommend non-prescription, over-the-counter cough/cold products, as well as the influence of direct-to-consumer advertising on patient preferences for non-sedating allergy and decongestant combinations available by prescription."

Among children, the greatest variation was found for cough/cold/allergy products — 26.7% in Louisiana compared with 3.5% in Maine — followed by stimulant therapy for attention deficit hyperactivity disorder — 6.5% in Louisiana versus 1.9% in Col-

orado — and antibiotic cephalosporins — 19.5% in Louisiana versus 7.2% in Washington.

"The higher variation for use of ADD stimulants likely reflects the uncertainty around the diagnosis and treatment of ADHD, while the variation in cephalosporin use may relate to differences in physicians' propensity to reserve these medications for second-line use, although differences in bacterial resistance cannot necessarily be ruled out," Dr. Motheral says.

REDUCING THE COSTS of prescription medications is a leading health concern

Respondents to a survey said reducing the costs of prescription medications is their leading health concern. The AmerisourceBergen Index polled 1,039 people nationwide on a range of topics. The quarterly survey was conducted by Opinion Research Corporation International on behalf of AmerisourceBergen, the largest pharmaceutical services company in the U.S. dedicated solely to the pharmaceutical supply chain.

The survey also looked at the issue of selecting a pharmacy. As in past AmerisourceBergen indexes conducted in 2001, convenience beat out other options, with 34% of respondents saying availability was a top priority. Next were accepting a person's insurance card, 25%; competitive pricing, 14%; and staff availability and knowledge, 13%. And while consumers expressed confidence about the quality of the medications purchased in the U.S., their faith did not carry over to prescription products purchased outside the country via the Internet. Nearly 9 out of 10 respondents, 87%, said they would not purchase prescription drugs from another country over the Internet.

The majority of consumers expressed confidence in generic medications, with more than three-quarters of respondents saying they are just as effective as their brand-name counterparts. The same held true for store-brand nonprescription products. More than half the survey respondents, 56%, said they would choose a lower-priced, store-brand medication over a brand-name over-the-counter product.

CONSUMERS RANK TOP HEALTH ISSUES FOR 2002

- ▶ 63% of respondents said a prescription drug benefit program for seniors should be paid for by drug manufacturers, pharmacies, insurance companies, and taxpayers
- ▶ 32% of respondents said the government should address the issue of drug costs in 2002
- ▶ 25% of respondents were concerned with universal health insurance
- ▶ 25% of respondents wanted a prescription drug benefit program for seniors

Lastly, consumers were asked what screening programs they would like to see at their local pharmacies. Blood pressure and cholesterol screenings led the list at 27% and 22%, respectively. Next were diabetes screenings, 16%; vision or glaucoma exams, 10%; and bone-density screenings, 7%.

Co-pays record BIGGEST INCREASES IN FOUR YEARS

Managed-care organizations report the largest increases in prescription co-pays since 1998, according to the Pharmaceutical Risk-Sharing Audit and Forecast 2002 from Market Measures Interactive LP. Based on telephone interviews with executives in 100 HMOs, the study reveals that, on average, managed-care organizations have raised co-pays for third-tier products almost \$5 since last year. They have also boosted second-tier co-pays by almost \$2.

While HMOs are increasing prescription co-pays, they are also starting to offer members a wider variety of co-pay designs with greater flexibility. Although four-tier, five-tier, and variable co-pay benefits remain rare, they are expected to become more common. The higher tiers would allow the inclusion of lifestyle drugs that are not medically necessary, as well as of biological or injectable agents that tend to be extremely expensive.

"The vast majority of managed-care organizations already offer three-tier plans to their HMO members, and now we also are seeing increases in the number of HMOs offering three-tier benefits to their PPO, POS, and indemnity members," says Chris Droukas, senior director of managed-care services at MMI. "Clearly, managed-care organizations view prescription co-pays as relatively effective cost-containment tools and continue to use them more frequently than any other risk-sharing approach."

In addition, the study provides profiles of pharmacy benefit designs in the top-20 HMOs and an assessment of three-tier structures in leading therapeutic categories.

"This high-value information is a powerful resource for guiding pharmaceutical companies in building more effective managed-care pricing, negotiating and contracting strategies," Ms. Droukas says.

MMI's Pharmaceutical Risk-Sharing Audit and Forecast helps pharmaceutical manufacturers understand and track managed care's move to higher-tier co-pays. The audit examines where the managed-care industry is headed in 2002, as it comes under increasing pressure to reduce costs. Now in its third year, MMI's Pharmaceutical Risk-Sharing Audit and Forecast presents cost-containment success stories, and illuminates actual experiences with higher co-pays, including cost savings versus revenue as well as the programs managed-care organizations are using to supplement or replace three-tier co-pays and the products already subject to variable co-pays, fourth-tier position, or other risk-share approaches.

Worldwide bioinformatics market EXPECTED TO REACH \$1.7 BILLION by 2006

The worldwide market for bioinformatics is expected to reach \$1.7 billion by 2006, driven by bioinformatic technologies that decrease the time and money required for drug discovery and development. Emerging bioinformatic applications could reduce the cost of drug discovery by 33% and also accelerate the process by two years, according to a new Front Line Strategic Market report entitled Bioinformatics, A Strategic Market Analysis.

Consisting of the content, analysis software, and IT infrastructure provider segments, bioinformatics will grow at a compound annual growth rate of 20%, with the largest growth in the analysis software segment. Large-volume data mining and the need for analysis and visualization tools to support complex analysis, such as relationship modeling, will drive the \$202 million analysis-software segment to grow to \$634 million in 2006.

One of the biggest questions facing users of bioinformatics is whether to purchase content or technologies from commercial vendors, or to develop tools in-house to meet the company's specific needs. Front Line estimates that pharmaceutical and biotechnology companies will continue to allocate

60% of their total bioinformatics spending to commercial vendors, totaling \$1.1 billion in 2006. Currently, companies allocate the largest share of their bioinformatics budgets to content, spending \$225 million in 2001, and doubling to \$445 million in 2006 as the availability of comprehensive and annotated data sets increases. Leading content suppliers include Celera, which provides genome data for DNA sequencing, and Incyte, which provides gene-expression data.

While genomics currently represents the largest application segment for bioinformatics spending, the most significant growth opportunities are presented in proteomics and pharmacogenomics, which will account for \$469 million and \$351 million in 2006, respectively. Specifically, proteomics will grow at a 39% CAGR through 2006, given that it is the most direct way of identifying and studying drug targets. In addition, pharmacogenomics will grow at a 38% CAGR, enabling the development of therapeutics tailored to patients' genetic profiles. Tempering the growth will be a lack of standard data formats, the lack of common protocols, and interoperable technologies. This will present a significant barrier for end-users when it comes time to integrate data from various sources.

Nonetheless, pharmaceutical and biotechnology companies will continue to seek tools to aid them in identifying relationships across biological data types. As bioinformatics is more widely applied to discovery and development, end-users will adopt solutions that streamline the access, tracking, interpretation and sharing of data from disparate sources and data types, with minimal impact on resources.

Follow up

AMERISOURCEBERGEN, Valley Forge, Pa., is the largest pharmaceutical services company in the U.S. dedicated solely to the pharmaceutical supply chain. For more information, visit amerisource.com.

BATTELLE, Columbus, Ohio, serves industry and government in the areas of technology development, laboratory management, and technology commercialization. For more information, visit battelle.org.

THE BOSTON CONSULTING GROUP, Boston, is a general management consulting firm. For more information, visit bcg.com.

EXPRESS SCRIPTS INC., St. Louis, is one of the largest pharmacy benefit management companies in North America. For more information, visit express-scripts.com.

FRONT LINE STRATEGIC CONSULTING INC., Foster City, Calif., offers strategic business intelligence through exclusive con-

sulting engagements and essential industry reports in the life-sciences and consumer industries. For more information, visit frontlinesmc.com.

MARKET MEASURES INTERACTIVE L.P., East Hanover, N.J., is a NOP World Health company, and a leading supplier of primary research to the global healthcare community. For more information, visit mmi-research.com.

PFIZER INC., New York, discovers, develops, manufactures, and markets leading prescription medicines, for humans and animals, and consumer products. For more information, visit pfizer.com.

RXREMEDY INC., Westport, Conn., is a leader in health-information services, producing large-scale research and marketing projects for clients in the pharmaceutical, managed care and other health-related industries. For more information, visit rxris.com.