practices. Most Wired surveys and Innovator Award applications were mailed to hospitals nationally. A Web site, where the eight-page survey could be completed online, was publicized in a variety of vehicles, including Hospitals & Health Networks, AHA News, AHA News New and HIMSS News. We received 283 responses to the hospitals and health systems survey representing 1,177 acute care hospitals, and 35 Innovator Award applications (see figure 6).

The survey asked detailed questions about how hospitals and health systems use the Internet to connect with five constituent groups: patients, doctors and nurses, employees, suppliers, and insurers. There were also demographic questions and questions about technology infrastructure. Each survey was scored using a methodology, emphasizing the use of online technology to connect with two groups: patients, and doctors and nurses (see figure 7). As a result of the inherent value judgment in any scoring model, we made two decisions. First, we weren’t boosting a beauty contest; instead of ranking participants, we decided to publish an alphabetical list as a benchmark group. We also decided not to publish the individual scores.

The Project Team

This project was made possible through the support of Deloitte Consulting and McKessonHBOC. Each company also lent key members of their staffs to survey development and data analysis and to publicize the effort. HIMSS assisted in promoting the project through mailings, its newsletter, and its annual conference. Several HIMSS CIOs and informatics experts reviewed the survey and served as judges for the Innovator Awards. Hospitals & Health Networks appreciates their efforts and support of the program.

Hospitals & Health Networks — Aiken Selvey, Suzanne Hepworth, Mark Harris, Pat Feis, Kyle Anderson, Peter Kralovec, Chuck Lauer, Patricia Moseman, Steve Buczynski, and Marty Wolie;
Deloitte Consulting — Jeff McK, Sarah Gallihan, Eleanor Hanover, Nikhil Gaimne, Keith Scott, Daniel Parmet, and Josh Schildman;
McKessonHBOC — Randy Sprat, Tommy Dotlie, Stephen Passalacqua, Leslie White, and Laurie Haggerty.

Most Wired Survey Reviewers

John Elanet, vice president, and CIO, Partners HealthCare System, Boston.
Michael Wulf, PhD., vice president and CIO, Henry Ford Health System, Detroit.
David Miller, president, Cornerstone Health System, Springfield, Pa.
Paul C. Tang, M.D., chief medical information officer, Palo Alto (Calif.) Medical Foundation.

Innovator Award Judges

Paul Kohnen, vice president, and CIO, EYMC Regional Healthcare System, Tyler, Texas. George Ayers, senior director, Health Data Management Group, American Hospital Association, Chicago.
John Elanet, vice president, and CIO, Partners HealthCare System, Boston.
Brian T. Malay, PhD., program director of health administration, California State University at Northridge.
Lif Shon, CIO, Pacific HealthCare, Inc.
Patti Iyam, M.D., senior vice president for quality leadership, American Hospital Association, Washington, D.C.
Terry Prues, director, Web business development, Blue Cross and Blue Shield of South Carolina, Columbia.
Paul C. Tang, M.D., chief medical information officer, Palo Alto (Calif.) Medical Foundation.
Timothy Zup, vice president, information services, Northwestern Memorial Hospital, Chicago.

Scoring Distribution

The scoring for the Most Wired emphasized the use of the Internet to connect with key constituents, those involved in care—patients and physicians and nurses—receiving the largest percentage of points.

Figure 6

2001 Most Wired Respondents

A total of 283 Most Wired surveys were completed by organizations representing 277 hospitals, as follows:

<table>
<thead>
<tr>
<th>System Affiliation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent hospital</td>
<td>34.6%</td>
</tr>
<tr>
<td>Hospital owned by health network</td>
<td>14.0%</td>
</tr>
<tr>
<td>Integrated health network</td>
<td>49.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>6.4%</td>
</tr>
<tr>
<td>Government not-for-profit</td>
<td>12.4%</td>
</tr>
<tr>
<td>Government for-profit</td>
<td>77.7%</td>
</tr>
<tr>
<td>Investor-owned</td>
<td>3.6%</td>
</tr>
</tbody>
</table>

*Note: Question was not answered by all respondents and does not add up to 100 percent. Source: Hospitals & Health Networks' Most Wired Survey.*

Figure 7

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Source: Hospitals & Health Networks' Most Wired Survey.
The Big Payback

2001 survey shows a healthy return on investment for info tech

Hospital executives—concerned about finding the elusive return on investment for information technology—no longer need to take it on faith. Data from this year’s annual survey show that the Most Wired hospitals and health systems have better control of expenses, higher productivity and more efficient utilization management.

Meanwhile, a new twist has emerged to the e-commerce gap between the nation’s Most Wired and the less wired hospitals. Last year, Hospitals & Health Networks reported that the Most Wired engaged in significantly more e-commerce than the rest of the nation’s hospitals. The Most Wired provided more Internet-based services for doctors and nurses, patients, and employees.

The head start enjoyed by the Most Wired allowed them to invest in new Internet-based services for patients. As the e-commerce gap between the Most Wired and the less wired closed in some areas, it opened up in others, particularly in the use of online disease management techniques.

For the third year, Hospitals & Health Networks teamed up with Deloitte Consulting, McKesson/HBC, and the Healthcare Information and Management Systems Society to poll hospitals and health systems on their use of Internet-based technologies to connect with five constituency groups: patients, doctors and nurses, employers, suppliers, and health plans. A total of 283 surveys were completed by organizations representing 1,777 hospitals.

BEING MOST WIRED

Health care’s Most Wired appear to have a leg up when it comes to access to capital. Hospitals & Health Networks asked Standard & Poor’s Corp., New York City, to compare the credit rating distribution of the Most Wired with that for all hospitals and health systems. This is a relatively stringent test, because the universe of hospitals and health systems includes many organizations that did not complete surveys. Undoubtedly some of those organizations would have made the Most Wired list had they participated. Still, the Most Wired have significantly higher credit ratings than the rest of the nation’s hospitals (see figure 1).

“‘There are only four AA+ hospitals in the country, and you have three of them on your list,’ says Martin Arrick, a director at Standard & Poor’s health care ratings division. They are Northwestern Memorial Hospital, Chicago; Sisters of Mercy Health System, St. Louis; and Intermountain Health Care, Salt Lake City.”

“A lot of things go into the very top ratings,” Arrick says. “Time and time again it’s clear to us that management is the most important aspect of an organization. Good management also means getting your systems, broadly defined, working well. That includes IT.”

Higher credit ratings translate directly into access to capital, both in terms of debt capacity—the amount of total debt an organization can take on—and in cost of capital, because the higher the credit rating, the lower the interest rate an organization pays to borrow. There’s the rub for less wired organizations: organizations lagging behind the Most Wired lack the resources to catch up, while those at the head of the pack are positioned to stay that way.

EFFICIENCY IN ACTION

One reason may be that the Most Wired are, in general, more efficient and more productive. Hospitals & Health Networks asked American Hospital Directory, Louisville, Ky., and Market Insights, San Francisco, to examine key measures of operational performance for the Most Wired compared with those for all hospitals and health systems. Again, this is a rigorous test, because the comparison group includes hospitals and health systems that would have made the Most Wired list had they participated.

Market Insights and American Hospital Directory used Medicare Hospital Cost Reports for 1998 and 1999—the most recent data available—to calculate key performance measures. The data was adjusted for case mix index and, when appropriate, adjusted to account for outpatient volume.

Figure 1

Credit Worthiness

The Most Wired hospitals and health systems have higher credit ratings than the typical organization with more AA and A rated institutions than the nation as a whole.

Source: Standard & Poor’s Corp., New York City & Health Leaders Most Wired Survey.
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“It’s striking how well the Most Wired hospitals are controlling expenses,” says Paul Shoemaker, president and CEO of American Hospital Directory. The analysis shows that the Most Wired outperform other hospitals and that the year-over-year change is significantly better among the Most Wired. “The Most Wired hospitals increased expenses per adjusted hospital discharge by six tenths of a percent, compared with 2.8 percent for the nation as a whole.”

The Most Wired have lower median expenses per discharge and greater productivity, as measured by full-time equivalent staff (FTE) per adjusted occupied bed, paid hours per adjusted discharge and net patient revenue per FTE (see figure 2). “I’m impressed by the productivity of the workforce,” Shoemaker says. “Looking at those rates of change, the Most Wired Hospitals have improved paid hours per adjusted discharge by about 3.8 percent, while hospitals as a whole have increased productivity by about 1.8 percent.”

The net patient revenue per FTE comparison is particularly dramatic, with the Most Wired earning more than 2.5 times the net patient revenue per staff member after case-mix adjustment. "Information technology is a critical contributor to our goals of improving patient care and streamlining operations," says John Gasser, vice president and chief information officer, Partners HealthCare System, Boston.

The relationship between being Most Wired and operating performance is a critical finding of this year’s analysis, says Randy Spratt, senior vice president, technology and standards, with McKesson-HBIC, Atlanta. “These correlations aren’t surprising, but they are extremely important;” he says, noting that these results go beyond determining an ROI for individual prod.
Figure 2
Operational Performance
The Most Wired have better expense control, work-force productivity and utilization management than hospitals as a whole.

<table>
<thead>
<tr>
<th></th>
<th>All Hospitals</th>
<th>Most Wired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expense control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expense per adjusted facility discharge</td>
<td>$3,497</td>
<td>$3,920</td>
</tr>
<tr>
<td>Expense per adjusted hospital discharge</td>
<td>$4,581</td>
<td>$4,974</td>
</tr>
<tr>
<td>Productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTEs per adjusted occupied bed*</td>
<td>3.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Paid hours per adjusted discharge</td>
<td>115.9</td>
<td>112.1</td>
</tr>
<tr>
<td>Net patient revenue per FTE</td>
<td>$109,556</td>
<td>$104,241</td>
</tr>
<tr>
<td>Utilization management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aver. payer ADR*</td>
<td>3.75</td>
<td>3.73</td>
</tr>
</tbody>
</table>

Note: Data are medians and, when indicated by an asterisk, curve-adjusted. Source: American Hospital Directory, Market Insights, Hospitals & Health Networks; Most Wired Survey.

ucts. "This is the first analysis that compares overall financial performance with IT investment."

Spratt, who serves on this year's Most Wired analysis team, says these analyses make it clear "that IT solutions in health care have a significant and positive effect on productivity and expense management, and that the best-managed hospitals make extensive use of technology."

Shoemaker says that the year-over-year data suggest a pattern of aggressive operational improvements by the Most Wired hospitals and health systems. But another year of data—when it becomes available—will help to confirm the trend, he adds.

Analysts urge hospitals to take the long view to gauge technology. "Hospitals have a very small percentage of capital going to IT, compared with other industries," says Rick Louie, founder and general manager of Market Insights. One of the reasons, he says, is the need to drive return in the short run. "A return on investment in a wire infrastructure doesn't happen overnight. You have to be patient. We're beginning to see that return emerge," Louie says. "This is evidence that, over time, you'll get your dollars back...and more."

Getting those dollars back means having a broader vision of return on investment, says Jeff Miller, a Raleigh, N.C.-based partner in Deloitte Consulting's health care information technology practice. "When we look at ROI on a project basis, it's always mismeasured. There are always process changes that go along with the technical changes. It's impossible to separate whether the benefit came from the tool or from the process change."

Miller, who also serves on this year's Most Wired analysis team, says that along with organizational and process improvements, there are areas of ROI that are often overlooked, such as market visibility and employee morale.

That's the case in Gallup, N.Mex. "Our success in changing the perception from just another rural hospital to a technology leader has helped to reduce patient migration to urban hospitals," says Dwanye Jordan, chief information officer, Rehoboth McKinley Christian Health Care Services. Being Most Wired has "improved patient perception of the hospital as a health care technology leader," it has also helped the organization retain employees.

CLINICAL UNCERTAINTY
The benefits of being Most Wired are less clear when it comes to clinical effectiveness. Hospitals & Health Networks asked Health Grades Inc., Lakewood, Colo., to examine the clinical effectiveness of the Most Wired compared with the rest of the nation. Once again, the comparison likely includes hospitals and health systems that could have made the Most Wired list but had they opted to participate, making this another stringent test.

Health Grades determines both actual mortality and complication rates and predicted mortality and complication rates for each ICD-9 code for every hospital in the country using MEDPAR and state all-payer data. It rates hospitals based on a comparison of actual with predicted mortality and complication rates. Hospitals whose actual performance is significantly better than predicted get five stars; those whose actual and predicted performance are not significantly different receive three stars; and hospitals whose performance is significantly worse than predicted get one star.

Health Grades uses a separate methodology for obstetrics, Health Grades compared these ratings for the Most Wired and the rest of the nation's hospitals for six key service lines: cardiologyosus, stroke, vascular, orthopedics, pulmonary and obstetrics. For two clinical areas—cardiovascular and obstetrics—the Most Wired earned higher ratings than the average for the rest of the nation (see figure 3). In the other four service lines, the results are dead even.

"The data are too close to draw conclusions, but where there are differences, those who are wired appear to provide higher quality," says Sarah Loughran, senior vice president, Health Grades. "This is promising news. However, without a clear pattern across the service lines, we need to be cautious about drawing conclusions. It's the type of study you'd want to do for several years to see a trend emerge."

"IT is a key component of a hospital's overall strategic plan. IT is, I hope, the beginning of an important line of inquiry. The industry needs comparative data to show how applications and IT approaches have the greatest impact on financial and clinical performance."

THE E-COMMERCE GAP
One trend that has emerged in the three years of the Most Wired survey is an e-commerce gap between the Most Wired and the less wired. That difference took a new twist this year. Between 2000 and 2001, the less wired hospitals caught up in several key areas, but the gap opened in the cutting-edge uses of the Internet to connect with patients. The e-commerce gap narrowed in the use of the Internet to connect with doctors and nurses, patients, and employees (see figure 4). The less wired hospitals and health systems improved in key areas such as providing clinicians with access to patient data, the use of online pathways, physician order entry and the ability to view results. However, the improvement was incremental, not a large leap forward.

Meanwhile, in what some consider an area of potentially high return on investment, the less wired fell further behind in connecting with health plans. For example, the gap in the use of the Internet for claims submission increased by nearly one-third, from 12.7 percentage points in 2000 to 16.7 percentage points this year. The gap in the use of the Internet for precertification nearly doubled, from 14.7 to 28.4 percentage points in 2000 and 2001.

And the Most Wired jumped ahead in connecting with patients for disease management. The survey examined which of the five disease management services that hospitals and health systems provide over the Internet for 14 disease categories. The services are: information retrieval, self-test results submission, self-reported health risk assessment, online self-care and medication management.

There is a large gap in the simplistic disease management service: providing information to consumers (see figure 5). Even in clinical areas in which many less wired provide information to consumers, the less wired are still a minimum of 29 percentage points behind the Most Wired.

The Most Wired have also jumped ahead in use of the Internet to provide more sophisticated disease management. At least 15 percent of the Most Wired provide self-reported health risk assessments for at least one clinical service line. In addition, providing online self-triage and medication management via the Internet has begun to take hold in the top tier of the Most Wired, with asthma and diabetes leading the way.
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<td>$4,591</td>
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<tr>
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<td>$4,714</td>
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</tr>
</tbody>
</table>

Note: Data are medians and, when indicated by asterisk, case-wise adjusted. Source: American Health Databank, Market Insights, Hospitals & Health Networks' Most Wired Survey

Miller, who also serves on this year's Most Wired analysis team, says these analyses make it clear that "It is infeasible to claim that IT solutions in health care have a significant and positive effect on productivity and expense management, and that the best-managed hospitals make extensive use of technology." Shroemaker says that the year-over-year data suggest a pattern of aggressive operational improvements by the Most Wired hospitals and health systems. But another year of data—when it becomes available—will help to confirm the trend, he adds.

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"It's a really important and long-term investment," says Miller. "This is, I hope, the beginning of an important line of inquiry. The industry needs comparative data to show which applications and IT approaches have the greatest impact on financial and clinical performance."

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The e-commerce gaps—as well as the entire Most Wired data set—serve as a tool for hospitals and health systems to determine where to focus their technology investments. CIOs also use the Most Wired survey data to track the adoption of Internet applications in health care. "HC&O participation in the Most Wired survey gives us the ability to make general benchmark comparisons between ourselves and others in our industry," says Noel Williams, chief information officer, HCA—The Healthcare Company, Nashville. "The survey also helps us identify the more active trends and the pace in which they are being pursued."

Rebooth McKinley's Jordan agrees. "The Most Wired program provides a standard by which the best technology centers in the country are measured. By comparing ourselves to other hospitals, we are able to better plan for the coming year as to what technology we should be deploying to stay among the best."

That doesn't mean that success will come easily, adds Partners' Grasse. "Applying the technology thoughtfully and effectively is a very difficult undertaking," he says.

Still, the analytics are clear. Being Most Wired has a positive return—whether it's access to capital or operating performance—although an organization may not be able to pin the return on a specific technology investment. And staying Most Wired means a continued commitment to the use of information technology to connect with key constituents.

"What does it take to be a leader?" Miller asks. "It's the diligence to continue to look at where you are and where you need to be."

ABOUT MOST WIRED

This is the third year Hospitals & Health Networks has conducted the Most Wired Survey of hospitals and health systems. It is the second year for "H&HN's Most Wired Innovation Awards. A new category, Most Improved, was added this year.

The project has several goals: to examine how health care organizations use online technology to serve constituents, to measure how the use of online technology changes, and to create a benchmark group that CIOs can use to determine best
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The project has several goals to examine how health care organizations use online technology to serve constituents, to measure how the use of online technology changes, and to create a benchmark group that CEOs can use to determine best practices and learn from leaders in health management.
practices. Most Wired surveys and Innovator Award applications were mailed to hospitals nationally. A Web site, where the eight-page survey could be completed online, was publicized in a variety of vehicles, including Hospitals & Health Networks, AHA News, AHA News New and HIMSS News. We received 283 responses to the hospitals and health systems survey representing 1,177 acute care hospitals, and 35 Innovator Award applications (see figure 6).

The survey asked detailed questions about how hospitals and health systems use the Internet to connect with five constituent groups: patients, doctors and nurses, employees, suppliers, and insurers. There were also demographic questions and questions about technology infrastructure. Each survey was scored using a methodology, emphasizing the use of online technology to connect with two groups: patients, and doctors and nurses (see figure 7). As a result of the inherent value judgment in any scoring system, we made two decisions. First, we weren’t boosting a beauty contest; instead of ranking participants, we decided to publish an alphabetical list as a benchmark group. We also decided not to publish the individual scores.

The Project Team

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