



# Surveying the AI Health Care Landscape

A look at artificial  
intelligence technologies  
and their use cases for  
hospitals and health  
systems





## Introduction

# Health Care AI Use Cases

Read any research report, peer-reviewed journal article or credible industry survey on the possible use cases of artificial intelligence in health care, and the words “endless,” “unlimited” or “infinite” usually appear in the first few sentences. That’s because most experts agree that AI has the potential to solve many of the field’s most vexing challenges.

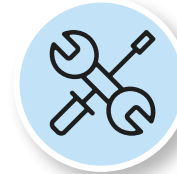
This Market Insights report from the American Hospital Association’s Center for Health Innovation offers hospital and health system leaders an overview of the health care AI landscape, including the common use cases for AI technology. It identifies AI use cases in four broad areas:



**Administrative**



**Financial**



**Operational**



**Clinical**

### Know the Difference: AI, ML, RPA

To know what vendors are selling and what resources are needed to make an AI model work, hospital and health system leaders should know the differences among artificial intelligence, machine learning and robotic process automation.



**Artificial intelligence (AI)** is technology that mimics the human thought process.



**Machine learning (ML)** is a type of AI that learns and improves as it processes more data.



**Robotic process automation (RPA)** is the use of software to handle high-volume, repeatable tasks that previously required humans to perform. In this report, we are looking at intelligent automation that combines RPA with AI for solutions that either directly assist people in the performance of nonroutine tasks or automate those tasks entirely.

The report also lists a sampling of vendors that sell, test and develop AI solutions in these four areas. The report uses color-coding to denote whether AI solutions in these areas generally are available now (green), being beta-tested at hospitals or health systems (yellow) or are still in development (red).

The Center acknowledges that this report does not attempt to identify all possible AI use cases in health care nor attempt to identify all health care AI vendors and the maturity of their AI solutions for hospitals and health systems. Inclusion in this report does not equate to a formal endorsement of a vendor by the Center or the American Hospital Association. The report’s goal is to provide hospital and health system executives with a high-level view of AI’s potential and what’s available on the market now and in the near future.

To assist in the creation of this report, the Center assembled an expert panel that generously provided insights and ideas on AI use cases. The Center also reviewed a variety of AI reports, surveys, articles and research. Many of the source materials provide exhaustive lists of AI vendors offering solutions in each of the four areas. Members of the panel appear on Page 10. The list of source materials reviewed for this report is on Page 11. The AHA Center for Health Innovation thanks everyone for their contributions.

### TECHNOLOGY READINESS LEVEL

AVAILABLE NOW (GREEN)

BEING FIELD-TESTED (YELLOW)

UNDER DEVELOPMENT (RED)



## Administrative Use Cases for AI in Health Care

### AVAILABLE NOW

AI technology is tailor-made for administrative tasks at a hospital or health system that share the following six characteristics:

- **The tasks are manual.**
- **The tasks are repetitive.**
- **The tasks are transactional.**
- **The tasks are defined by limited data elements (vs. unlimited).**
- **The tasks rely on data that are structured (vs. unstructured).**
- **The tasks generate data that are abundant (vs. scarce).**

The tasks that uniformly share these traits are administrative in nature, and hospital and health system leaders recognize the potential of AI technology to transform these tasks. In a recent survey by OptumIQ, 43% of health care executives surveyed ranked automating business processes like administrative tasks or customer service as their first choice for investment in AI technology.

Many vendors offer AI platforms and solutions that automate complex administrative processes to add capacity, decrease staffing costs and reduce errors. Staff can then be redeployed to focus on

more complex, higher touch work. AI-powered self-service helps to cut operating costs, and improves patient experience with easier processes and no hold times.

### Administrative tasks AI can transform

What administrative tasks at hospitals and health systems are most ready for AI to transform? This report's expert panel put the following use cases at the top of the list:

**Admission procedures:** Prepopulate an online form with information from the electronic health record (EHR) and billing system once the system verifies the patient's identity, allow the patient to verify or update information on the screen, prompted by cues, inform all caregivers and departments that the patient is on-site and prepare them for the episode of care.

**Appointment scheduling:** Spot when patients' and providers' appointment availability aligns.

**Customer service responses:** Give patients 24/7 access to the information they need.

Sampling of vendors offering AI technology for particular **administrative use cases** include:

*(continued on page 4)*

besthires.ai

#### Besthires.ai

Palo Alto, Calif., offers an AI-based hiring platform to analyze a person's personality, needs, values and past performance to help match the best candidate to the job.  
[www.besthires.ai](http://www.besthires.ai)

 Digital Reasoning

#### Digital Reasoning

Franklin, Tenn., offers an AI solution for oncology practices to help manage their internal workflows.  
[www.digitalreasoning.com](http://www.digitalreasoning.com)

 Lightning Bolt

#### Lightning Bolt Solutions

South San Francisco, Calif., offers an AI-enabled patient scheduling solution for physician practices, hospitals and health systems.  
[www.lightning-bolt.com](http://www.lightning-bolt.com)

SmartAction

#### SmartAction

El Segundo, Calif., offers AI agents that can mix with live agents to improve customer service in appointment setting, lab results, order status and patient onboarding.  
[www.smartaction.ai/healthcare](http://www.smartaction.ai/healthcare)



TALENYA

#### Talenya

Hoboken, N.J., offers an AI-fueled bot that helps hospitals and health systems identify and recruit talent.  
[www.talenya.com](http://www.talenya.com)



**Discharge instructions:** Eliminate standard paper forms and replace them with customized instructions based on an individual patient's health status and treatment plan that patients can access electronically through an app on their smartphones.

**Hiring and orientation protocols:** Automate routine and transactional human resources functions.

**Licensure verification:** Verify clinicians' licenses and privileges by electronically contacting state licensing agencies, state medical boards and medical specialty boards, and match that information to clinicians' records and flag any discrepancies.

**Patient check-in procedures:** Use a self-check-in process when patients arrive for scheduled outpatient visits, automatically recognizing them and engaging an AI-driven chat session, which is automatically fed into the EHR.

**Prior authorizations:** Know what health plan and what medical and drug benefits each patient has and whether a prior authorization is required for a specific service or medication, and provide the documentation for approval.

**Quality measure reporting:** Collect and submit quality measures by extracting measures from patient information, know what measures to pull for individual health plans and value-based reimbursement models and transmit them electronically to the appropriate users and payers.

All nine meet the criteria for being rich targets for AI technology.

### DEEP DIVE into admissions procedures



Consider admissions. Patients arrive at the hospital for inpatient or outpatient procedures, services or diagnostic tests, and they check in with the admissions clerk.

Patients complete the same forms and answer the same questions they have answered in the past. It's a manual process that still requires the clerk to input data from the paper form into patients' EHRs and the hospital's billing system.

With AI-enabled technology, patients can use a touch screen either before or when they arrive that prepopulates an online form with information from the EHR and billing system once the system verifies the patient's identity. The patient verifies or updates information on the screen, prompted by cues. The system automates the process, transforming the patient experience and creating a more efficient and accurate process for the hospital. Further, the AI technology informs caregivers and departments that the patient is on-site and prepares them for the episode of care.

### DEEP DIVE into prior authorizations



Consider prior authorizations, which are required by certain health plans before clinicians are able to provide a medical service or prescribe a particular drug to a patient. The average physician practice spends almost 15 hours every week obtaining nearly 30 prior authorizations for its patients, according to the American Medical Association.

Sampling of vendors offering AI technology for particular **administrative use cases** include:

apervita

#### Apervita

Chicago, offers a cloud-based AI platform for hospitals and health systems to submit electronic clinical quality measures to payers and accrediting agencies.

[www.apervita.com](http://www.apervita.com)

digitize.ai

#### Digitize.ai

Charlotte, N.C., offers AI tech that automates prior authorizations for clinicians.

[www.digitize.ai](http://www.digitize.ai)

INFINX

#### Infinx Healthcare

San Jose, Calif., also offers AI tech that automates prior authorizations for clinicians.

[www.infinx.com/online-prior-authorization-software](http://www.infinx.com/online-prior-authorization-software)

inovalon®

#### Inovalon

Bowie, Md., offers a health care AI platform that helps hospitals and health systems with flexible staff scheduling, time tracking and non-physician credentialing.

[www.inovalon.com](http://www.inovalon.com)



LEARN MORE | Visit [AHA.org/center](http://AHA.org/center)

Eighty-four percent of physicians surveyed by the AMA described that PA load as a “high” or “extremely high” burden, with 92% saying that the process delays care and negatively affects clinical outcomes. Managing PAs today is largely a manual task, featuring unique paper forms for each health plan, medical service and drug that doctors must sign and fax to the health plan. When those forms aren’t enough, the paper leads to phone calls.

AI-enabled technology can automate the PA process and provide a real-time decision as to whether or not a PA is required. It knows what health plan each patient has. It knows what medical and drug benefits each patient has. It knows if a health plan requires a PA for a specific

service or medication. It knows what documentation an individual health plan needs for PA approval. AI tech can obtain routine PA approvals in seconds and minutes rather than hours, days or even weeks. It leaves doctors to handle only the extraordinary or outlier PA cases.

### Reducing administrative burden

AI technology targeting these common administrative tasks performed by clinicians and their office staff is available now from a number of vendors, and providers welcome their arrival. Seventy-seven percent of physicians surveyed by ZS Associates said they support using AI as an assistant to pick up burdensome administrative tasks that take away time that could be spent with their patients.

## Financial Use Cases for AI in Health Care

**AVAILABLE NOW** Like the many administrative tasks that permeate a hospital or health system, many financial tasks share the same traits. They are manual, repetitive, transactional, have limited data elements and lots and lots of structured data. That makes many financial tasks ideal targets for AI’s transformational powers.

AI technology to automate, learn and improve financial tasks is available now from a number of vendors, particularly large health care

accounting practices, if a hospital or health system hasn’t already built its own automated systems.

### Financial tasks AI can transform

What financial tasks are ready for AI to transform? This report’s expert panel identified the following components of a hospital or health system’s revenue cycle:

Sampling of vendors offering AI technology for particular **financial use cases** include:



**Change Healthcare**  
Nashville, offers an AI-fueled claims management system for hospitals and health systems.  
[www.changehealthcare.com](http://www.changehealthcare.com)



**MedEvolve**  
Little Rock, Ark., offers an AI-enabled revenue cycle management platform for physician practices.  
[www.medevolve.com](http://www.medevolve.com)



**OODA Health**  
San Francisco, offers AI technology that allows providers, payers and patients to transact business over a common platform.  
[www.ooda-health.com](http://www.ooda-health.com)



**Simplee**  
Palo Alto, Calif., offers an AI platform for hospital and health system billing and collections functions.  
[www2.simplee.com](http://www2.simplee.com)



**Streamline Health**  
Atlanta, offers smart technology to help hospitals and health systems optimize their clinical documentation and coding process to improve reimbursement.  
[www.streamlinehealth.net](http://www.streamlinehealth.net)





**Billing and collections:** Generate accurate and timely bills for patients, reducing costs and increasing receivables.

**Claims management:** Edit and adjust claims to produce a clean claim, reducing payment delays and denials.

**Insurance eligibility verification:** Improve patient experience with timely and accurate insurance eligibility verification and details about coverage and co-pays, estimate patients' financial responsibility and determine eligibility for financial assistance.

**Revenue cycle management:** See in real time what's coming in from each patient by type of health plan, improve the accuracy of financial projections and speed up monthly closes.

#### **DEEP DIVE** into insurance eligibility verification



Typically, determining whether a patient has health insurance and, if so, what benefits he or she has is a manual process. It often involves copying a patient's insurance card, calling health plans on the phone and looking up

policy numbers on a computer. It's time-consuming and error-prone. Added to that is the pressure to be transparent about patients' out-of-pocket costs and to avoid surprise out-of-network medical bills.

AI can automate and optimize the entire insurance verification process. It knows through learning what insurance plan a patient has, what the benefit levels are and, absent insurance coverage, knows if the patient is eligible to enroll in a public health insurance program like Medicaid or qualify for any financial assistance. It also knows what the charge for a medical service will be and how much of that charge would be borne by the patient.

### Simplifying financial operations and improving transparency

Two large areas of opportunity for AI in health care financial operations are predicting denials and simplifying patient billing. Claims-processing errors and high claim denial rates create unnecessary administrative costs, slow down payments to physicians and frustrate patients. AI can help with validation and quality review work in the back office and simplify the entire billing experience for both patients and health systems.

## Operational Use Cases for AI in Health Care

#### AVAILABLE NOW

Most hospitals and health systems are large, complex operations with a nearly infinite number of moving parts. Making those parts move efficiently and in concert with one another is an ongoing challenge. But it's a challenge that AI can help solve.

To address changing demands and avoid disruptions, vendors offering AI tools and platforms build open, integrated operating models that offer more efficiency, transparency and agility than rigid legacy systems.

### Operational tasks AI can transform

Members of the expert panel identified four areas of a hospital or health system's operations that are ideal for AI technology to optimize operations for the institutions and improve clinical outcomes for patients:

**Facilities management:** Reduce operational costs with predictive maintenance; drive asset-replacement decisions using asset risk scores to optimize capital expenditures; decrease energy costs and make effec-

tive use of on-site power supply; and predict failures and manage sensor and network health issues for medical devices.

**Inventory management:** Track, analyze and report all medical supplies, equipment, devices and technology across an enterprise to optimize their use and reduce loss.

**Materials management:** Predict the goods and supplies that a hospital or health system will need tomorrow, next week, next month and next year based on prior usage, new market conditions and patient populations.

**Supply chain management:** Capture true case costs and alert staff when expected supplies aren't on the consumption report; provide more accurate cost-variance analysis as well as procedure and inventory-demand intelligence; present the relationship between supply variances and patient outcomes; and identify expensive supplies that have been recalled or expired.



Sampling of vendors offering AI technology for particular **operational use cases** include:



#### C3.ai

Redwood City, Calif., offers AI applications for predictive maintenance, fraud detection, sensor network health, supply network optimization and energy management.

<https://c3.ai>



#### MedeAnalytics

Richardson, Texas, offers an AI tool that analyzes hospital and health system service line costs and utilization.

[www.medeanalytics.com](http://www.medeanalytics.com)



#### Olive

Columbus, Ohio, offers a variety of AI-powered tools that learn, and automates transactional workflows inside a hospital or health system.

<https://oliveai.com>



#### Pensiamo

Cranberry Township, Pa., offers a cognitive AI tool to help hospitals and health systems manage drug inventories, costs and shortages.

[www.pensiamoinc.com](http://www.pensiamoinc.com)



#### Syft

Stratford, Conn., offers an AI platform that manages a hospital or health system's supply chain from end to end.

[www.syftco.com](http://www.syftco.com)

#### DEEP DIVE into supply chain management



Consider traditional supply chain management. What to order, how much to order, what price to pay, how to ship it, how to receive it and how to deliver it are manual processes done with the assistance of basic tools like spreadsheets, purchase orders and fax machines.

AI can automate and optimize each step in that process. By learning from past behaviors, it knows what to use, how much to order and the best prices to pay without human intervention. Hospitals and health systems reduce purchases of unapproved

or off-formulary supplies, equipment and drugs. And, they only buy what they need when they need it, thereby reducing shipping and inventory costs. AI tech also can manage the logistics of delivering and receiving supplies, equipment and drugs across an enterprise by knowing the routes trucks should take, avoiding duplicative runs and maximizing each delivery.

#### Boosting operational savings

The opportunities for hospitals and health systems to reduce costs and improve clinical outcomes by using AI for more efficient operations are tremendous, and the technology is available now.

## Clinical Use Cases for AI in Health Care

Clinical use cases feature AI-enabled technology that partners with doctors, nurses and other clinicians to make better diagnostic and treatment decisions. There are two main ways AI is helping in the clinical setting:

- **Predictive technologies** help both patients and providers by identifying the appropriate level of care the patient needs by assessing their medical conditions or symptoms. These technologies also help clinicians identify at-risk patients who would benefit from early or specific

interventions to prevent their medical conditions from escalating to a point at which they need additional care that could have been avoided.

- **Interventional technologies** help clinicians identify and diagnose diseases, illnesses or injuries and recommend customized treatment plans based on a combination of the latest evidence-based medical guidelines and the patient's unique medical characteristics — biomarkers, genes and other clinical indicators.



AI technology for clinical use, whether it's for predictive or interventional purposes, is under development now. The following examples of using AI to aid clinical decisions or improve treatment interventions have the potential to improve health and health care.

### BEING FIELD-TESTED Predictive Use Cases

**Call center responses and triaging:** Use AI tools to find correct and cost-efficient care for patients — know who can stay home, who qualifies for teleconsultation, who should see a doctor and who needs urgent medical care.

**Patient navigation:** Use AI to identify vulnerable patients who need navigation services and refer the patient to the best care services for the disease progression.

**Predictive and prescriptive analytics:** Link clinical event prediction and prescriptive analytics, including evidence, recommendations and actions for each predicted event, to clinical priorities and measurable events like cost-effectiveness, clinical protocols or patient outcomes.

**Sensors and wearables for diagnostics and remote monitoring:** Allow individual management and continuous monitoring of a patient's health status. Smart wearable systems support complex health care applications and enable low-cost wearable, noninvasive alternatives for

continuous 24-hour monitoring of health, activity, mobility and mental status.

**Speech recognition and natural language processing:** Use AI to glean clinical insights from multiple sources including scanning, natural language processing and voice recognition technology to mine written and verbal patient information.

#### DEEP DIVE into call center responses and triaging



One of the predictive clinical use cases the expert panel said is most ready for AI technologies is call centers. In a typical call center scenario, patients call into a hospital or health system seeking information. They may want to know what to do about an illness, an injury or symptoms they are having. Or, they may want information about a treatment plan like the cost or side effect of a drug that prevents them from taking their medication as prescribed. In that scenario, a person answers the phone and attempts to help the patient. Hospitals and health systems can supplement or even replace that person with an AI-enabled chatbot. The chatbot, which learns as it processes more calls, directs patients to the right level of care based on what patients say, and it does so consistently. The chatbot also can direct patients to information or the appropriate service to address their treatment plan challenges. The chatbot is always active 24/7 and can scale as needed when call volume increases.

Sampling of vendors offering AI technology for **clinical use cases** include:



#### Catalia Health

San Francisco, offers an AI-enabled patient engagement app called Mabu for hospitals and health systems that helps their patients manage their own care.  
[www.cataliahealth.com](http://www.cataliahealth.com)



#### IBM Watson Health

Cambridge, Mass., offers AI analysis of all available data to help providers prescribe personalized, data-driven treatment plans for patients.  
[www.ibm.com/watson/health](http://www.ibm.com/watson/health)



#### Jvion

Johns Creek, Ga., offers an AI tool that helps hospitals and health systems identify patients at risk for avoidable readmissions.  
<https://jvion.com>



#### Nuance

Burlington, Mass., offers an AI-powered clinical documentation tool for physicians.  
[www.nuance.com/index.html](http://www.nuance.com/index.html)



#### Philips

Cambridge, Mass., offers AI-enabled technology that lets radiologists detect previously unseen brain bleeds in routine CT scans.  
[www.usa.philips.com/healthcare/product/HC881040/illumeo](http://www.usa.philips.com/healthcare/product/HC881040/illumeo)



#### Verily

South San Francisco, Calif., offers a number of AI-powered precision medicine programs that target inflammatory diseases, multiple sclerosis, coronary artery disease, Parkinson's disease and more.  
[www.verily.com/projects](http://www.verily.com/projects)





**DEEP DIVE into prediction and prescriptive analytics**

Readmissions is another predictive clinical use case the expert panel said is ready for AI technologies, specifically using AI to predict which patients are more likely to be readmitted to the hospital within 30 days after discharge. In a JAMA Network Open study published earlier this year, three Maryland hospitals describe how they used an AI tool to more accurately predict the readmission risk of patients by using 382 different variables, including not only medical data but also demographic and socio-economic data. The AI tool outperformed the predictive power of the hospitals' existing rules to score patients' readmission risks.

**UNDER DEVELOPMENT****Interventional Use Cases**

**Automated image interpretation:** Provide valuable AI tools for radiologists and pathologists to supplement and enhance the process of using medical images to deliver high-quality patient care across a wide variety of diseases and organ groups.

**Genomic diagnostics:** Use AI to rapidly and accurately analyze a patient's entire genome sequence to deliver genetic test results so that physicians can focus on the patient's unique needs to improve outcomes.

**Interventional and rehabilitative robotics:** Expand human capacity and capability through enhanced vision, dexterity and complementary machine intelligence for improved surgical outcomes, safety and patient access, and provide targeted assistive therapeutic exercise while gathering quantitative data about patient performance and improvement.

**Precision/personalized medicine:** Give clinicians and medical researchers the ability to comb through and connect billions of bits of information from multiple sources in real time to tailor a customized patient treatment plan.

**Telemedicine for remote patient monitoring:** AI software can quickly identify health problems before they become catastrophic by sifting through data from medical telemetry products or detecting physiological patterns that reveal disease-causing genetic variations.

**DEEP DIVE into automated image interpretation**

This report's expert panel points to radiology as AI tech's most mature interventional use case — AI solutions that rely on recognizing and learning patterns in images.

- Researchers from the MIT Computer Science and Artificial Intelligence Laboratory have developed an AI model that has "learned subtle patterns in breast tissue that are precursors to malignant tumors." They say it can predict breast cancer in women as many as five years earlier than conventional screenings.
- Researchers from UCLA have developed an AI model that reads breast biopsies for cancer more accurately than pathologists.

**DEEP DIVE into precision/personalized medicine**

Cleveland Clinic-led research shows that AI can use medical scans and health records to personalize the dose of radiation therapy used to treat cancer patients. This new AI framework is the first to use medical scans to inform radiation dosage, moving the field forward from using generic dose prescriptions to more individualized treatments. Currently, radiation therapy is delivered uniformly. The dose delivered does not reflect differences in individual tumor characteristics or patient-specific factors that may affect treatment success. The AI framework begins to account for this variability and provides individualized radiation doses that can reduce the treatment failure probability to less than 5%.

**Customizing care**

In the future, physicians will need to adopt AI technology to keep up with the expanding medical knowledge and to incorporate patient-specific precision medicine concepts into their practices. The shift to precision medicine integrates diverse patient-specific data, such as environmental influences, lifestyle and genetic variability. AI tools can benefit health care providers and those they serve by giving them insight into which individuals might benefit from enhanced services or wellness activities, and creating better health outcomes for individuals and communities.

**Conclusion**

This Market Insights report provides hospital and health system leaders with a snapshot of the possible use cases for health care AI tech in four areas: administrative, clinical, financial and operational. It's clear from these examples provided by the expert panel and published reports, surveys, articles and research that AI can create more intelligent processes and generate insights to deliver more effective, efficient and affordable health care. Many health care AI solutions are available now, others are being tested and some are still in development. This report is part of a series of [assets](#) the AHA Center for Health Innovation developed to bring greater context and understanding of AI's impact on health care.



## Expert Panel

The AHA Center for Health Innovation thanks the AHA Committee on Clinical Leadership and the following people, organizations and sources for the time and insights that contributed to this Market Insights report.



**Murielle Beene, DNP, MBA, MPH, MS, PMP, RN-BC, FAAN**  
Senior vice president and chief health informatics officer  
Trinity Health  
Livonia, Mich.



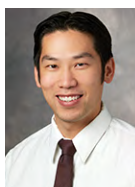
**Jonathan Gleason, M.D.**  
Executive vice president and chief quality officer  
Jefferson Health  
Philadelphia



**Thomas Kluz**  
Senior investment manager  
Qualcomm Ventures  
San Diego



**Sean O'Brien**  
Senior director  
Transformational solutions  
Intalere  
Pittsburgh



**Jonathan H. Chen, M.D., PhD**  
Assistant Professor  
Stanford Department of Medicine, Center for Biomedical Informatics Research + Division of Hospital Medicine  
Stanford, Calif.



**Steve Griffiths, Ph.D., MS**  
Senior vice president  
Enterprise Analytics  
Optum  
Eden Prairie, Minn.



**Peter Manoogian**  
Principal  
ZS Associates  
Boston



**Roy Rosin**  
Chief innovation officer  
Penn Medicine  
Center for Health Care Innovation  
Philadelphia



**Benjamin K. Chu, M.D.**  
Managing director  
Manatt Health  
New York City



**John D. Halamka, M.D., MS**  
International Healthcare Innovation Professor  
Harvard Medical School  
Executive Director  
Beth Israel Lahey Health  
Technology Exploration Center, Boston



**Richard Mackey**  
Senior vice president  
Information technology  
Intalere  
Pittsburgh



**Kaveh Safavi, M.D., J.D.**  
Senior managing director  
Head of global health care practice  
Accenture  
New York City



**Kevin Coloton**  
CEO  
TrustHealthcare  
Annapolis, Md.



**M. Michelle Hood, FACHE**  
President and CEO  
Northern Light Health  
Brewer, Maine



**Leslie Marsh, R.N., MSN, MBA**  
CEO  
Lexington (Neb.)  
Regional Health Center



**Rosemary R. Sheehan**  
Chief human resources officer  
Partners HealthCare  
Boston



**Marty Fattig**  
CEO  
Nemaha County Hospital  
Auburn, Neb.



**Pratap Khedkar**  
Managing principal  
ZS Associates  
Philadelphia



**Karen Murphy, Ph.D., R.N.**  
Executive vice president and chief innovation officer  
Founding director of the Steele Institute for Health Innovation  
Geisinger  
Danville, Pa.



**Eric Topol, M.D.**  
Executive vice president  
Scripps Research  
Founder and director  
Scripps Research Translational Institute  
La Jolla, Calif.



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