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HOW RADIOLOGY IS CHANGING ITS IMAGE

Radiologists look to information technology to improve efficiency and cut care delivery costs



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editor's **NOTE**

Waves of change hit radiologists

THE IMPACT OF VALUE-BASED CARE ON radiology can't be minimized. Under the new reimbursement approach being used by the government and an increasing number of payers, providers no longer will be paid for each procedure they perform for patients; rather, payment will force healthcare organizations to prove quality and better manage internal costs—the more cost-effective the care, the better.

Radiology has long been a profit center for healthcare organizations, because many departments generated fees each time a patient had an imaging procedure—each one could generate a bill for services. Now, it gets hit big-time—it's no longer a profit center because it can't submit charges for all procedures. It's a cost center, with each procedure eating into the amount providers receive to manage the care of patients.

With the new payment realities, radiologists are turning to IT to manage workloads and improve efficiency, concludes Maggie Van Dyke, who wrote the cover story that begins on Page 14. For example, artificial intelligence might be able to help them cost-effectively cope with increasing volumes of work, by doing routine scans of patient imaging studies to identify abnormalities, thus enabling radiologists to focus on just those cases.

Radiologists also might be leaning on IT to increase their efficiency and in general better support the delivery of care within their organizations, for example, by ensuring that their reports are ready when physicians need them. Better integration between radiology systems and electronic health record systems almost certainly will be necessary for healthcare organizations coping with new economic stresses posed by the

need for more timely and efficient care.

In addition to the cover story, we highlight some of the leaders who are using information technology in new ways to better support radiological efforts across the industry. Our listing on imaging innovators begins on Page 18.



Other changes are coming to the healthcare industry, particularly in the area of research that looks to determine how best to use genomic and other personal data to enhance patient care. It's a radical shift from a one-size-fits-all approach to medicine. Leading the charge is the Precision Medicine Initiative, which seeks to eventually build a cohort of 1 million people to help make medical breakthroughs in fighting vexing diseases—enrollment of individuals for the cohort began in September. In a story starting on Page 20, Managing Editor Greg Slabodkin looks at the various components of the PMI and assesses their overall progress and prognosis.

And News Editor Joseph Goedert looks at the rising use by providers of social determinants of health in treating patients more specifically. Factors such as patients' social and physical environments and individual behaviors have a significant impact on how successfully providers can treat clinical conditions. Providers now are looking for ways to augment existing record systems to manage the influx of relevant personal information that impacts patient treatment and recovery. His story begins on Page 52.

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NEWSLINE



PLANNING

HHS Issues Disaster Guidance

Guidance covers IT and other operations in the wake of hurricanes and other threats.

With Florida and Texas now recovering from the effects of cataclysmic tropical events, a federal agency within the Department of Health and Human Services has issued draft guidance to help healthcare facilities with disaster planning and recovery from future hurricanes.

In Florida, 36 hospitals were forced to close, casualties of Hurricane Irma's destructive path running up the length of the Sunshine State; many of those closings were precautionary measures taken in advance of the hurricane, the Florida Hospital Association said. In Texas, more than 20 hospitals were evacuated as a result of flooding from Hurricane Harvey, and about 1,500 patients were relocated.

Based on lessons learned from Hurricanes Katrina and other hurricanes in previous years, the document—from the Office of the Assistant Secretary for Preparedness and Response—provides an overview of the “potential significant public health and medical response and recovery needs facing hurricane- and severe storm-affected areas.” Key topics include health information management.

“During a disaster, patients may be separated from their ‘medical home’ and medical records,” states the draft. “Information technology systems may be damaged in the event, and access to the systems may be limited by physical barriers, access issues, power disruptions or other impacts.

“Patients being evacuated or moved from one healthcare facility to another need complete medical records transferred with them, but that is not always possible if the facility has experienced significant damage, and paper records are damaged or missing and electronic records are not accessible,” adds the document. “Redundant IT systems and back-up paper records with the critical information are ways to mitigate this issue.”

In addition, HHS provides information to public health officials regarding Medicare beneficiaries who are dependent on electrical medical equipment and at risk from prolonged power outages due to hurricanes in the emPOWER Program. The agency says these patients are particularly vulnerable to major hurricanes.

—Greg Slabodkin

MEGERS AND ACQUISITIONS

Allscripts' Acquisition of McKesson HIT Boosts Its Client Base

WITH MCKESSON LOOKING TO divest its health IT product line, and Allscripts eyeing the small hospital market, Allscripts' acquisition of McKesson's HIT business for \$185 million was a logical step, says John Osberg, a mergers and acquisition specialist at Informed Partners, an industry consulting firm.

Through the deal, Allscripts gets the Paragon electronic health records system and the STAR software suite that includes patient accounting, financial, clinical, radiology, pharmacy and laboratory applications.

Allscripts already had a client base of about 200 hospitals, many of them larger facilities; with the deal,

it now adds another 200 generally smaller customers from McKesson, which is sun-setting its Horizon EHR for larger hospitals.

In March, McKesson closed a merger that combined the majority of McKesson Technology Solutions with revenue cycle vendor Change Healthcare's business—the new entity took on the Change Healthcare name. The Technology Solutions product line includes medical imaging, workflow, business performance services, analytics and the Relay Health connectivity unit. The Allscripts deal completes McKesson's exit from health IT.

The Change Healthcare deal gave

McKesson a continuing revenue stream while it turned its focus to its pharmaceutical business, says Coray Tate, vice president of clinical research at KLAS Enterprises. "McKesson has to be fully committed to focus on their core—most revenue comes from pharma, and health IT was ancillary."

For Allscripts, several challenges emerge. The client base for McKesson's Paragon EHR system will want assurance of Allscripts' commitment to Paragon, Tate says, adding, "Performance over the next two years for Allscripts will be critical, and its biggest challenge is to gain the trust of Paragon clients." —Joseph Goedert

PCPs Spend Half a Day in Their EHRs

Primary care physicians spend an average of nearly six hours—more than half of their workday—performing clerical and administrative tasks in their electronic health record systems, according to a study of 142 family medicine physicians at a large academic healthcare center in southern Wisconsin, which was not identified in the study. Clinicians spent 355 minutes (5.9 hours) of an 11.4-hour workday in the EHR per weekday per 1.0 clinical full-time equivalent: 269 minutes (4.5 hours) during clinic hours and 86 minutes (1.4 hours) after clinic hours. Clerical and administrative tasks including documentation, order entry, billing and coding, and system security accounted for nearly half the total EHR time.

TELEHEALTH

Most States Now Have Laws Supporting Telehealth Reimbursement

THE MARCH TOWARD WIDER acceptance of telemedicine is continuing, prodded along by activities of individual states that require private insurance plans to cover the virtual services.

A total of 34 states now have laws on the books requiring insurance plans to cover telehealth services. Most recently, governors in Oklahoma and Texas signed laws requiring payment for some telemedicine services.

That's an encouraging trend for the distance care industry, which for years struggled against barriers imposed by state and federal regulations that restricted reimbursement.

In general, recent telemedicine

legislation requires private insurers to offer reimbursement for physician services provided via telemedicine, similar to the way they pay for in-person physician services, says Gary Capistrant, chief policy officer at the American Telemedicine Association.

Still, new laws governing telemedicine vary from state to state, Capistrant notes, making it hard for telemedicine companies to operate in multiple states.

For example, Oklahoma this year enacted a law to establish new practice standards for telemedicine that enable physicians to create a doctor-patient relationship without first having an in-person examination,

says Thomas Ferrante, a health law attorney and chair of the telemedicine team at the Foley & Lardner law firm.

Similarly, the new Texas legislation allows physicians to use videoconferencing to see patients without requiring a prior in-person interaction.

However, the Texas law sets rules on the physical distance between the provider and patient and does not specify methods of delivery or additional records requirements. By contrast, the Oklahoma law defines telemedicine as two-way, real-time interactive communication and imposes specific requirements on access to patient medical records prior to the telemedicine visit. —J.G.

ARTIFICIAL INTELLIGENCE

MIT Researchers Use Machine Learning to Predict ICU Interventions

Regenstrief to Tackle Patient IDs

The Agency for Healthcare Research and Quality has awarded a five-year, \$1.7 million grant to the Regenstrief Institute's Center for Biomedical Informatics to support the development and real-world testing of automated identification solutions to match patients to their electronic health information. As many as half of EHRs are mismatched when data is transferred between healthcare systems, says Shaun Grannis, MD, director of the center and principal investigator for the new AHRQ grant. "We're increasingly reliant on disparate systems to bring data together, so patient identification is becoming an increasingly important topic," he says.

RESEARCHERS AT THE MASSACHUSETTS Institute of Technology's Computer Science and Artificial Intelligence Laboratory have developed a machine learning algorithm that leverages large amounts of intensive care unit data to predict actionable interventions for patients and improve health outcomes.

By tapping into an MIT database of de-identified data for 40,000 critical care patients—including demographics, laboratory tests, medications and vital signs—the research team is able to use deep learning to determine what kinds of treatments are needed for different symptoms.

The approach—called ICU In-

tervene—was presented in a paper recently at the Machine Learning for Healthcare Conference in Boston. According to the authors, their model is the first to use deep neural networks to predict both onset and weaning of interventions using all available modalities of ICU data.

"The decisions that are made in the ICU are made in a particularly high-stress and high-demand environment," says Harini Suresh, a Ph.D. student and lead author on the research team, who adds that clinicians in these situations are bombarded with different types of data for many patients and as a result it's can be difficult to make real-time treatment

decisions.

Using a time stamp for the data, Suresh notes, at each hour ICU Intervene extracts values from the data that represent vital signs, clinical notes and other information. "We know for a given patient what happens at every point in their stay," she says. "What we're trying to do is find insights and connections for patients which may not be immediately clear."

Based on the data, the algorithm learns from past ICU cases in the database and provides an hourly prediction of five interventions: invasive ventilation, noninvasive ventilation, vasopressors, colloid boluses and crystalloid boluses.—*Greg Slabodkin*

OPIOID ADDICTION

Intermountain Using HIT in Attempt to Cut Opioid Prescribing

INTERMOUNTAIN HEALTHCARE has set an ambitious goal of reducing by 40 percent the number of opioids prescribed at its 22 hospitals and 180 clinics serving Utah and Idaho by the end of 2018. To reach its target, the provider organization will heavily leverage its health information technology infrastructure.

The plan calls for a decrease in the number of opioid tablets prescribed by more than 5 million annually, according to Todd Allen, MD, Intermountain's acting chief quality officer, who says the organization is the first health system in the country to formally announce such an initiative.

"When you look at the toll these

medicines take in our communities, we need to be aggressive," says Allen, who notes that Utah—where Intermountain is based—ranks seventh in the nation for drug overdose deaths and has been ranked as high as fourth nationally in past years. "We're right up there at the top in terms of the damage being inflicted upon our families and our communities. We knew we needed to act differently."

Allen says Intermountain is taking a multipronged approach, which includes evidence-based best care practices and technology, to the problem of prescription opioids. He reveals that the health system has already trained about 2,500 clinicians

on "the intricacies of pain management" with new policies and tools, and that training will be expanded to the organization's other prescribers in Utah and Idaho.

"We'll make the training more specific, both to specialties and to the patient populations that physicians and their care teams work with," adds Allen. "We'll really leverage the growing capabilities of our information technology infrastructure."

Intermountain is adding default order sets to its Cerner EHR system to help reduce the number of tablets prescribed by having these resources built into the clinical workflow.

—G.S.

WASHINGTON

report

VA to Expand Telehealth Services

The Department of Veterans Affairs is dramatically expanding its current telehealth capabilities to meet the growing needs of its patient population, particularly in the area of mental health services as well as rural and underserved parts of the United States. Working with the Office of American Innovation and the Department of Justice, the VA has announced that it intends to issue a regulation allowing the department's clinicians to provide telehealth services from anywhere in the country to veterans nationwide regardless of location—including at home—thereby waiving state provider licensing requirements that limit access to care. "We're removing regulations that have prevented us from doing this," said VA Secretary David Shulkin, MD.



CMS Eases 2018 MU Provisions

The Centers for Medicare and Medicaid Services has acted to substantially reduce burdens on hospitals aiming to achieve the meaningful use of electronic health records.

Hospitals are being given another year to use the 2014 Edition of Certified EHR Technology (CEHRT) software. Facilities also now have the option of continuing to meet modified Stage 2 measures for meaningful use, rather than being required to move to Stage 3 in 2018. Under the new final rule, hospitals now are not required to meet Stage 3 until 2019.

Hospitals, at their option, also can use a combination of the 2014 and 2015 editions of meaningful use software.

The revisions to meaningful use regulations were released in a final rule covering the Fiscal Year 2018 Inpatient Prospective Payment System, which broadly covers payments to providers under Medicare.

Further, hospitals will be required to report only four electronic clinical quality measures in 2017 and 2018, instead of eight measures. And, providers can select any quarter of data for eCQM reporting for both years.

Also under the final rule, CMS is establishing new requirements or revising existing requirements for eligible professionals, eligible hospitals and critical access hospitals participating in the Medicare and Medicaid Electronic Health

Record Incentive Programs.

The College of Healthcare Information Management Executives strongly praised the new policies. "CMS took into account that both hospitals and vendors need more time to prepare for 2015 certified EHRs," said Liz Johnson, CHIME board chair and CIO of acute hospitals and applied clinical informatics at Tenet Healthcare. "Taken together, the common sense changes CMS made will provide greater stability and certainty to hospitals, allowing them to continue ... using technology to better treat the patients they serve."

—Joseph Goedert

Image from gettyimages

ONC Eases Complaint Process

The Office of the National Coordinator for Health Information Technology is making it easier for the public to report on problems with information technology. The agency has updated its Health IT Complaints Form to accept various kinds of public feedback through one central tool, and has expanded the number of categories available through which the public can provide feedback. ONC says it's hoping to make it easier for the public to contact it and inform it of concerns, questions and input on health IT topics and ONC programs. The agency's form does not require respondents to submit personally identifiable information.

LEGAL BATTLE

CMS Looks to Cut 'Unnecessary' Regulations

IN THE NEXT FEW MONTHS, THE CENTERS FOR Medicare and Medicaid Services plans to announce several initiatives to ease the burden the federal government places on healthcare providers, according to CMS Administrator Seema Verma.

The initiative is part of a bigger federal effort by the Trump administration to reduce the amount of regulations that American businesses and individual face, which they believe are limiting growth.

In healthcare, "some regulations are necessary to ensure patient safety and well-being, and to protect the integrity of federal healthcare programs," Verma announced. "However, over the past few years, regulations have tilted more towards creating burdens than towards serving as a safeguard for the programs. This shift is now having a negative impact on patient care, hindering innovation and increasing healthcare costs."

Verma said the agency must make it easier for providers to "focus on doing the work that patients and families need them to do without causing them to be subject to excessive regulatory and administrative burden."

In particular, she took aim at the burdensome regulations governing electronic health records, which she contends have made the practice of medicine difficult.

"We have heard time and again that documentation for payment and for quality reporting is unnecessarily time-consuming and keeps clinicians working late into the night just to keep up on paperwork," Verma said. "Electronic health records that were supposed to make providers' lives easier by freeing up more time to spend on patient care have distanced them from their patients. New payment structures that were meant to increase coordination have added yet another layer of rules and requirements. No one went into medicine to become a paperwork expert."

At the same time, she thanked providers for offering their thoughts on how to simplify CMS regulations, promising to continue to engage with hospitals and physicians on their concerns.

"To make sure we are addressing the actual pain points that doctors feel, we are visiting them where they work, listening to their stories about the challenges they face, and bringing those lessons back to CMS," Verma noted. "We are listening, integrating the feedback we hear into our work at CMS, and making changes that will make it easier for doctors, nurses and other clinicians to do what they entered medicine to do: take care of those in need."

—Greg Slabodkin

H.R. 3120

EHR Vendor Group Wants Faster, Clearer Regs

THE ORGANIZATION REPRESENTING ELECTRONIC health records vendors is urging federal agencies to provide clearer, more specific determinations on final rules as early as possible to aid in the implementation of new system capabilities by healthcare organizations.

In a letter to the Center for Medicare and Medicaid Services, the Electronic Health Record Association (EHRA) says it's crucial for clear rules to be provided quickly to the industry, and for more engagement of providers in the design of the program.

The EHRA's comments were included in a letter submitted last week with its comments on CMS' proposed rule on the Quality Payment Program for 2018, which was published in late June.

EHRA's letter says it understands the desire of regulators to add flexibility to the program to enable providers to meet program goals, but it urges them to realize the impact that short timelines have on EHR vendors and

on providers' ability to implement the revised systems.

"We do have concerns that repeated delays in program implementation timelines, as we have seen over several regulatory cycles, as well as a continued lack of clarity around requirements, may discourage clinicians from adequately preparing for MIPS' future performance periods," the EHRA letter states.

MIPS, the Merit-based Incentive Payment System, is a new program being implemented by CMS to change the way providers are reimbursed for treating Medicare patients, moving payment to a value-based approach that emphasizes improvements in quality. The new system will require many changes in the systems used by providers, which must be programmed into existing EHR products. Past regulatory efforts for clinical systems have been made more difficult by late releases and lack of specificity, putting pressure on providers as they implement new systems...—Fred Bazzoli

DEVICES

FDA Sets Final Rules on Interoperable Medical Devices

THE FOOD AND DRUG ADMINISTRATION HAS ISSUED FINAL guidance outlining the regulatory agency's recommendations for developing medical devices that safely and effectively exchange and use patient information electronically.

The FDA's guidance is intended to promote the design and development of interoperable electronic medical devices, which the agency says are increasingly connected to each other and offer the potential to increase efficiency in patient care and encourage innovation.

"It is important to note that the recommendations in the final guidance focus on the information and content exchanged over electronic connections such as USB and wireless, but does not focus on aspects of physical compatibility (i.e., physical connectors)," the agency announcement said. "Additionally, this final guidance will have a 60 day transition period to allow the FDA and industry to perform activities to address recommendations in the guidance."

Specifically, the document recommends that all medical device manufacturers design their devices with interoperability as

an objective; conduct appropriate verification, validation and risk management activities; and clearly specify the relevant functional, performance and interface characteristics to the user.

According to Bakul Patel, associate director of digital health in FDA's Center for Devices and Radiological Health, patient safety is the agency's primary concern when it comes to interoperable medical devices.

In addition, the document encourages transparency by recommending that designers and manufacturers provide information on a product's functional performance and interface characteristics so those using it with other devices and systems can do so safely.

While medical device manufacturers should consider these items to provide a reasonable assurance of the safety and effectiveness of their interoperable medical devices, ultimately they are nonbinding recommendations and are not legally enforceable when it comes to their design and development.

—G.S.



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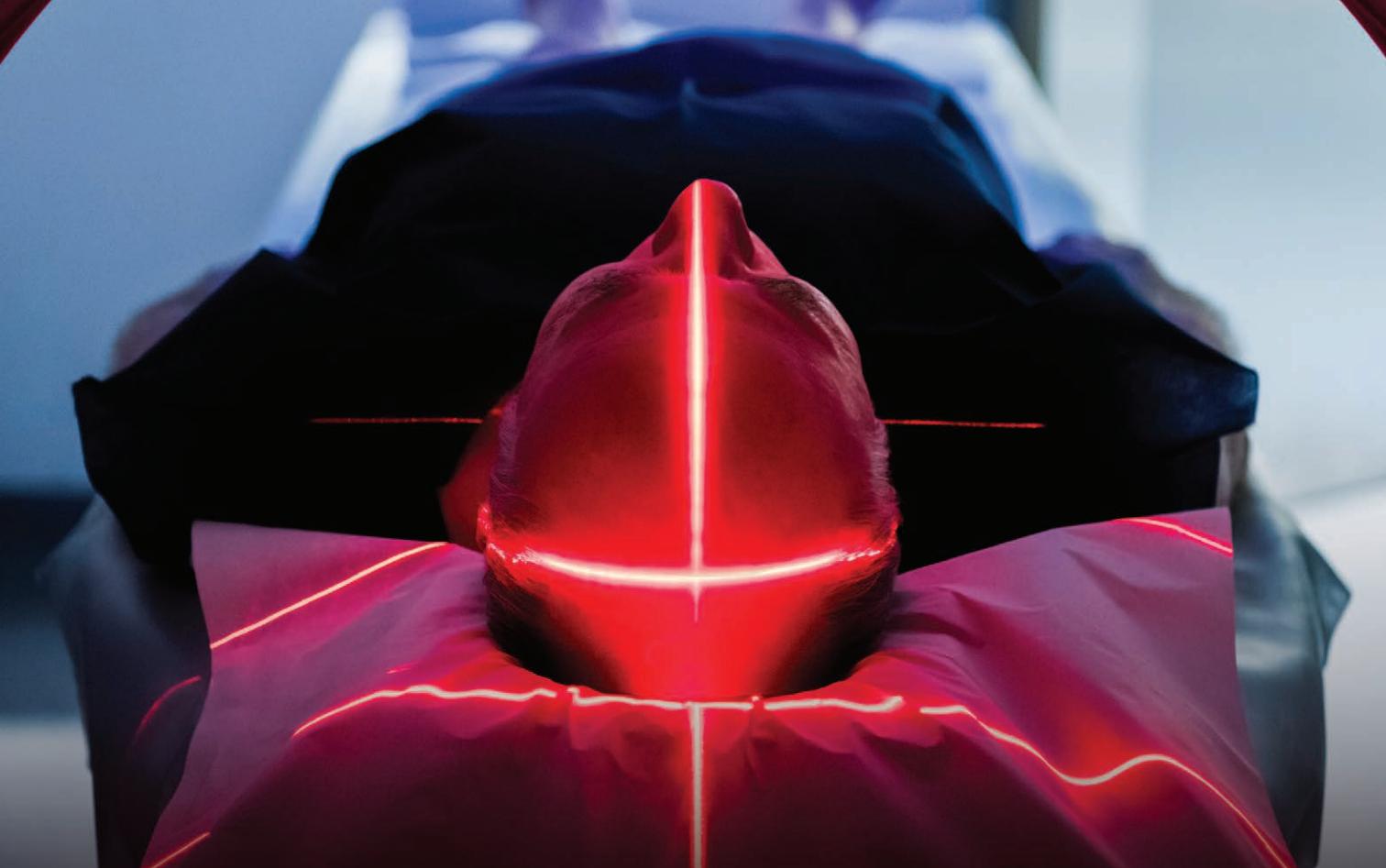
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A NEW FOCUS FOR IMAGING

IT is powering rising emphasis on value and cost savings.

By Maggie Van Dyke

During the worst of Hurricane Harvey, the University of Texas MD Anderson Cancer Center was “an island surrounded by flood waters,” according to hospital executives. A team of staff rode out the storm at the Houston hospital with more than 500 inpatients; radiologists who could not get to the cancer center because of wind, rain and flooding assisted electronically, using the integrated electronic health record and picture archiving and communication system.

“Although there were two radiologists

on site, most of the interpretation was done remotely by radiologists who still had electricity and Internet connections at their homes,” says Kevin McEnery, MD, director of innovation in imaging informatics for the facility. Images could be examined from the PACS via a secure connection between the system and radiologists’ homes.

That offsite assistance from radiologists would have been impossible only a few years ago, when CT, MRI and other radiological images were stored on film or CDs and transported with patients between providers. While radiologists are still dealing with CDs more often than they’d like,

a fully electronic, integrated approach to diagnostic imaging is quickly becoming the norm.

This is just one example of the evolution of imaging, which is occurring rapidly as the radiology profession faces profound new challenges from changing economics, reimbursement schemes and organizational strategies. In sum, radiologists are looking to new information technology approaches to cope with the rising pressure.

Improving the integration of radiology systems and other clinical information systems is one of the ways in which radiology can improve cost savings and improve

efficiency, which will become increasingly important as healthcare shifts from a fee-for-service approach to one centered on value-based care.

Improving value means providing “the best level of care to the patient at a reasonable cost and in a reasonable timeframe to obtain the best outcome,” says McEnery. Achieving that vision in radiology means addressing a number of challenges, including confirming that orders are clinically appropriate, accurately interpreting scans, and developing easy-to-read reports for physicians and patients.

Tech-savvy radiologists have started using data analytics, machine learning and artificial intelligence to help them achieve these and other value-based care goals. However, additional building blocks are needed—including structured reports, standardized data lexicons and clinical decision support systems—to fully enable these tools.

Gregory Nicola, MD, vice president of Hackensack (N.J.) Radiology Group, believes that radiology will serve as a trailblazer for other medical professions. “We’ve been a technology-driven profession for a long time. Some things have hit us, including machine learning, before most other medical professions. There are going to be a lot of lessons learned from radiology.”

Radiology is emerging as a key proving ground for testing the use of artificial intelligence in healthcare. Industry watchers believe that this advanced technology may improve image interpretation and assist radiologists with mundane tasks and readings, perhaps enabling them to focus efforts on images that need closer examination by professionals.

For instance, University of Virginia (UVA) Health System is collaborating with Zebra Medical Vision to test the effectiveness of machine learning algorithms in identifying the presence of five medical conditions or abnormalities on scans: emphysema, coronary artery calcification, fatty liver, spinal fractures and low bone

density in the spine.

“These apps run in the background and provide us with alerts if the algorithm identifies an abnormality,” says Arun Krishnaraj, MD, associate professor of radiology and medical imaging at UVA. “As a subspecialty abdominal radiologist, I can’t say that the algorithms have made any findings that I overlooked. But since I work in an academic hospital with a lot of trainees, I think it is useful as another set of eyes to double check that we acknowledge abnormalities that are present.”

Of the five algorithms, the one used for bone density offers information that radiologists do not routinely look for in abdominal scans. This algorithm computationally determines a bone density score. “There are subtle things that the algorithm identifies that are not visually easy to see,” Krishnaraj says. “For instance, it calculates bone mineral density based on a standard deviation.”



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While the use of artificial intelligence is only beginning in radiology, Krishnaraj believes it will eventually usher in a major shift in the value proposition that radiologists offer patients and other clinicians.

“Up until now, the best radiologists were those with the keenest eyes, or the ability to consistently identify abnormalities on imaging studies without mistakes. But I think that will be supplanted by machine learning algorithms that will become more consistent and more accurate than our eyes.”

The new value proposition for radiologists will be as diagnosticians who can synthesize all available information about a patient’s case into an easy-to-digest report with recommendations for next steps.

“Radiologists are sitting in the middle of an information storm,” Krishnaraj says. “We may be the only clinicians who can see inside the body, noninvasively, while also being able to look in the EHR to review the patient’s clinical history, laboratory values, tumor markers, etc. Our job as radiologists is to synthesize all this information into something actionable.”

A key step to using artificial intelligence and data analytics to improve value in radiology will be the development of structured reports and lexicons, according to Nicola.

“Machine learning algorithms have a much easier time if the exact same words are used by everyone,” he says. “Some people think that natural language processing can be used to address this problem. But being very consistent in the language you use is a more effective strategy. We’re laying the groundwork first by standardizing and structuring so that, when machine learning is universally applicable, we’re already there to use it.”

Standardizing nomenclature also can result in near-term benefits that can bring efficiency to how radiologists work and support overall care delivery.

The radiologist’s primary end product is the interpretative report for each imaging study. “People may not even see us in many cases,” says Cree Gaskin, MD, professor and vice chair, operations and informatics at UVA. “We read a study and produce a report. That’s why many improvements in radiology need to revolve around ensuring that our reports are timely, accurate and relevant, and that they convey information efficiently for whoever is consuming that report downstream.”

To this end, Hackensack Radiology Group is working with ordering physicians to standardize the structure of their reports. “We talked to the referring physicians and asked, ‘What do you need to know when you treat this patient?’” says Mohit Naik, MD, director of quality.

The radiology reports are divided by specialty or body part. For instance, an ab-

dominal CT report has separate sections for liver, pancreas and other organs. This enables a pancreatic cancer surgeon to go straight to the pancreas section rather than having to search through the entire report for relevant information.

Hackensack Radiology Group is also working to incorporate standardized nomenclatures to reduce variation in how radiologists share key findings. To explain the concept, Naik points to the Breast Imaging Reporting and Data System (BI-RAD) tool. Developed by the American College of Radiology, BI-RAD divides mammography findings into six standardized categories along with recommended follow-up steps. These range from “negative” (or no significant abnormality found on the scan) to “highly suggestive of a malignancy” (biopsy strongly recommended).

“These standardized nomenclatures help clinicians understand the radiologist’s level of suspicion about a malignancy or pathology,” Naik says. “This, in turn, helps guide the appropriate management for that patient.”

Hackensack Radiology Group has implemented other reporting tools that have been developed by medical societies, such as PI-RADS for prostate cancer screening. However, there are not yet nationally accepted reporting and data systems for many conditions. In these situations, Hackensack Radiology Group works with referring physicians to standardize their own nomenclatures.

For instance, its radiologists worked with gastroenterologists and surgeons to develop a lexicon for pancreatic cancer staging so that physicians can easily find out whether a tumor can be surgically resected, or removed, depending on the location of the tumor. “Our surgeons have been very happy with the structured template,” Naik says. “Most radiologists already knew what needed to be reported, but they weren’t necessarily reporting in a coherent, structured way.”

One challenge in redesigning radiology reports is to avoid increasing documenta-

tion time. Hackensack Radiology Group worked with IT staff to automatically populate portions of the reports by linking reports to associated CPT codes.

When radiologists click on a report template for a certain imaging scenario, the template knows that the scenario is associated with a specific CPT code and automatically fills in information that must be documented for that test, such as how the study was performed. Previously, radiologists would have to dictate all that information for each image. Now, for the most part, they only have to dictate their findings.

“Physicians often feel that these initiatives position them as data entry personnel,” Nicola says. “But you can actually save physicians an enormous amount of time if you approach these initiatives correctly.”

Improving access and integration

Before radiologists can accurately interpret a scan and issue a report that effectively guides clinical decision making, they need access to all relevant images and patient information. Toward this end, better integration is key.

For example, to accurately interpret a scan and issue a report, radiologists first need access to the imaging in question, as well as to other relevant scans and patient information. A group of Level I and II trauma centers in North Carolina, including Duke University Medical Center, agreed to purchase the same platform for image sharing to ensure rapid exchange of scans. While North Carolina has a statewide health information exchange, it does not currently allow sharing of images.

Almost all hospitals in the state had signed onto the commercial platform as well, and the number of images being stored on CDs has gone down dramatically. “It spread virally throughout the state,” says Christopher Roth, MD, director of imaging informatics strategy and vice chairman of radiology, Duke Health. “Care is faster and more reliable

because of this electronic sharing.”

One goal was to ensure that trauma patients across the state could get urgent images rapidly reviewed by expert radiologists at Duke Health and other tertiary care hospitals. Some research indicates that these secondary reviews often turn up key findings that are missed on the initial review by local physicians.

The cloud-based platform enables participating organizations to connect their scanners or PACs to a central repository to post and download images. “Because of the way we architected the workflow, it’s very straightforward for physicians to put in an order for an outside interpretation,” says Roth. “We have set up the data-flow and people workflow to support very smooth and effective patient care.”

In addition to being able to quickly obtain needed images, radiologists often require easy access to key patient information in the EHR to help them interpret scans as precisely as possible. Often, radiologists only know the reason for the exam, such as “rule out fracture.” But additional information is often needed, such as the associated diagnosis, surgical history, laboratory results, prior radiology reports and images, and pathology results.

To address that issue, UVH Health System developed a radiologist dashboard in its EHR that displays key patient information that radiologists typically like to refer to when reading a scan. In addition, the organization’s EHR and PACS were integrated. Via the dashboard, radiologists can easily view relevant patient information and images they need at the same time they are reviewing new scans.

“Radiologists sometimes complain that the EHR wasn’t made for them, but that’s not really true,” says Gaskin. “It’s just a matter of telling the EHR what information you want on a dashboard display.”

Appropriate imaging

Other forces are pushing healthcare organizations, and radiology departments in particular, to reduce the number of

unnecessary imaging studies they do. That will become particularly important in value-based care approaches, which leave providers at risk for patient care costs.

Industry studies suggest that 20 percent to 50 percent of imaging tests are unnecessary, exposing patients to needless radiation and contributing to high costs. Recognizing this, Hackensack Radiology Group is participating in the American College of Radiology's R-SCAN Initiative, which aims to improve imaging appropriateness through the use of criteria.

The radiology practice is collaborating with emergency department physicians at an affiliated hospital to reduce ordering of imaging tests for certain patient conditions, such as CT scans for minor head trauma. Various specialty societies have identified 12 questionable imaging scenarios for the Choosing Wisely campaign, which is encouraging dialogue around the necessity of tests and treatments.

A key step in R-SCAN is identifying patient cases where imaging was inappropriately ordered so that specific education or feedback can be provided to physicians. "This turned out to be labor intensive because we have to do manual chart extraction," Nicola says. "Sorting by ICD-10 code is not good enough. We had to have a clinician read the clinical note to find out what the indication for the study was."

To automate the process, Hackensack Radiology Group is asking emergency department physicians to use standard terms in their reports, such as "minor head trauma, no risk factors," Nicola says. "By using a lexicon, we will be able to have the computer mine those reports and determine if the imaging ordered was appropriate."

In addition, radiologists are working with hospital IT staff to build a home-grown CDS tool in the EHR to query physicians when they order imaging deemed inappropriate by Choosing Wisely, Nicola explains. "For example, before they can

place an order for a head CT, the EHR lists questions: 'Did the patient have minor head trauma?' 'Is he or she on anticoagulation therapy?' Then the CDS-EHR tool would warn the ordering provider that, "The Choosing Wisely campaign says this patient does not need head CT. Do you still want a head CT?"

Using CDS to guide orders is becoming a priority for radiologists looking to comply with a Medicare requirement that ties payment for advanced imaging (such as CT, MRI and PET scans) to the use of Medicare-recognized CDS tools that incorporate appropriate use criteria. The requirement, which this summer was delayed until January 2019, only applies to outpatient imaging studies.

The UVA Health System is all set to comply with this Medicare rule. The Charlottesville-based system uses a CDS system that incorporates appropriate use criteria from the American College of Radiology and other medical societies.

The UVA Health System is working with its CDS vendor to proactively address preauthorization requests from commercial insurers, beginning with a pilot project with Aetna. When providers order a head CT, for example, they are prompted to choose the reason for the study, such as "severe headache." Then, the CDS system issues an appropriateness score from 1 to 9, with the numeric scores ranging in meaning from "low utility" to "indicated." The system also lists alternative imaging for the same clinical scenario with appropriateness scores, relative cost and relative radiation dose.

"The providers know in an instant if their orders are appropriate or not and can see scores for other exams that could be ordered instead," says Gaskin.

For the Aetna pilot, imaging orders for Aetna members that receive good appropriateness scores can be performed right away, eliminating the delay and often-tedious manual steps involved in seeking a preauthorization.

Better use of information technology

also can help radiology departments meet rising demand for improved efficiency throughout an organization.

Prioritizing scans

For example, when patients arrive at MD Anderson for initial consultations or post-treatment follow-up visits, they often require new imaging studies performed before they meet with their physicians. To improve value for patients, MD Anderson has put electronic processes in place to help coordinate the imaging schedule—both the scan appointment and the radiologist's interpretation—to coincide with the patient's doctor appointments.

"We want to minimize the amount of downtime for the patient, meaning that patients get the appropriate imaging performed in the appropriate sequence, see their physician, and get their care plan arranged in a short period of time rather than having to stay in Houston for several days," McEnery says.

Prior to the visit, computer-based algorithms screen each patient's schedule to identify imaging that isn't optimally scheduled or inappropriate. The algorithms also check for redundant imaging, such as scans being repeated too soon or orders for similar imaging tests by different physicians. When issues are identified, the algorithm alerts scheduling staff, who work to resolve the issues. "It allows our scheduling coordinators to focus on those patients where the schedule needs to be optimized," says McEnery.

Another key goal is to ensure the radiologist's report is completed before scheduled physician appointments so the physician and patient can discuss next steps. Radiologists access a work list via the EHR that automatically prioritizes which scans should be read first, based on the time of the patient's appointment.

Radiologists at UVA Health System have improved turnaround times—between 23 and 70 percent for particularly time-sensitive scans—thanks to a home-grown priority reading system. ■

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TOP INNOVATORS IN IMAGING INFORMATICS

Radiology is facing rapid change on many fronts—technology is more complex than ever, more IT tools are being developed to support radiologists and new economic forces are changing the financial dynamics for those working in this important branch of medicine. Despite the challenges, Health Data Management has identified several leaders in the field who are finding ways to exploit new technology to improve the effectiveness and efficiency of the radiology department.



Leonard Berlin, MD

Title: Professor of radiology

Organization: University of Illinois at Chicago

Berlin has been a radiologist for 57 years. A specialist in malpractice and risk management, Berlin has spent the last several years studying how information systems will impact risk and workflow for the radiological profession. He has served on many committees and task forces for professional associations working on issues to improve the profession. At various organizations in the Chicago area, he has served as an assistant professor, a professor, department chairman, a vice chairman and a member of the emeritus staff. Through it all, he has been an educator, having written about 330 scientific articles and conducted about the same number of lectures.



Tessa Cook, MD

Title: Assistant professor of radiology Perelman School of Medicine

Organization: Perelman School of Medicine, University of Pennsylvania

Cook is an assistant professor of radiology at the Hospital of the University of Pennsylvania, specializing in radiology informatics, radiation dose monitoring, radiation dose reduction, advanced image processing and app-based radiology education. She also serves at the Philadelphia Veterans Affairs Medical Center. Cook was the principal developer of RADIANCE, which is a free, open-source dose monitoring software for CT, released in 2010. Cook is a thought leader and visionary on future uses of IT in imaging and radiological education.



Keith Dreyer, DO

Title: Vice Chairman of Radiology

Organization: Massachusetts General Hospital

For most of his career, Dreyer hasn't just been a radiologist, but a teacher to peers across the industry. He received a Doctorate of Osteopathic Medicine with high honors in 1983; six years later, he had earned a Masters of Science in computer science and neural networks, and a decade later, he received a Doctorate of Philosophy for computer science and medical informatics. Dreyer has not only embraced artificial intelligence and machine learning, but is working to ease the fears that other colleagues may have about the newer technologies. During the 2017 academic year, for instance, he made 24 presentations on artificial intelligence.



Bradley Erickson, MD

Title: Associate chair for research in radiology

Organization: Mayo Clinic

Erickson is advancing efforts in quantitative imaging networks, which apply quantitative methods to better characterize and treat cancer. He also is leading efforts in computer-aided diagnosis, incorporating computer technologies to extract information from medical images for diagnostic, prognostic and therapeutic purposes. This involves developing and validating algorithms that can detect the progression or regression of brain cancer or other nonneurologic diseases. He's also actively developing a system to promote team science, initially concentrating on imaging-focused research, but with connections to genomics, pathology and clinical data.



Christopher Gaskin, MD

Title: Professor and vice chair of operations and informatics

Organization: University of Virginia Health System

Gaskin specializes in musculoskeletal imaging and intervention at the University of Virginia Health System, where he has been involved in helping radiologists improve turnaround times on radiology reports. He additionally is working with his organization to help radiologists maximize their efficiency in reading imaging studies and reporting on results, as well as better interfacing with electronic health records.



Marta Heilbrun, MD

Title: Acting associate professor of radiology and imaging science

Organization: Emory University Hospital

Heilbrun is also vice chair for quality at Emory University Hospital. She has served as an assistant professor in the department of radiology at the University of Utah as well, with practice time at the University of Utah Healthcare. Her clinical expertise is in abdominal imaging. In the IT realm, her research has been in developing decision support tools through data mining, natural language processing and analysis of cost-effectiveness. She is also vice chair of the structured reporting subcommittee of the Radiological Society of North America, which promotes structured reporting as a vital tool for radiologists to demonstrate value-based care through data-rich, comprehensive and consistent structured reports.



Kevin McEnery, MD

Title: Director of innovation in imaging informatics

Organization: University of Texas MD Anderson Cancer Center

As director of innovation in Imaging Informatics, McEnery collaborates with industry partners as well as internal stakeholders to optimize and improve informatics support for diagnostic imaging technology and related IT. In the MD Anderson transition to Epic, he helped to optimize the system after it was deployed. His research interests include work on informatics applications in support of the value-based transition of diagnostic imaging. He's also worked on predictive analytics in support of diagnostic imaging operations, including schedule optimization, staffing models and interpretation.



Geraldine McGinty, MD

Title: Assistant professor of radiology at Weill Cornell Medical College and assistant attending radiologist at NewYork-Presbyterian Hospital-Weill Cornell Campus

Organization: Weill Cornell Medicine

A recognized expert in healthcare economics, McGinty holds leadership positions in several national organizations including vice chair of the American College of Radiology's Board of Chancellors. She is also a member of WCM's digital health strategy team. She is a board-certified radiologist who specializes in the detection and diagnosis of breast cancer, interpreting a variety of studies including mammography, breast ultrasound and breast MRI.



Paul Nagy, MD

Title: Deputy director, Johns Hopkins Medicine Technology Innovation Center, and associate professor of radiology and radiological science

Organization: Johns Hopkins Medicine

Nagy is an associate professor in the Johns Hopkins University School of Medicine's Russell H. Morgan Department of Radiology. He also serves as deputy director of the Johns Hopkins Medicine Technology Innovation Center with the goal of partnering with clinical inventors to create novel IT solutions that improve the quality of patient care. Among his other positions, Nagy is chair of the Society of Imaging Informatics in Medicine and serves on the board of the American College of Medical Quality.



Rasu Shrestha, MD

Title: Chief innovation officer

Organization: University of Pittsburgh Medical Center

Shrestha has been a key architect of an innovative unified approach to image viewing across 20 UPMC hospitals and 30 imaging centers. He also serves as executive vice president of UPMC Enterprises, the innovation and commercialization arm of UPMC, and leads a team of more than 200 technology professionals. UPMC Enterprises funds incubators and leads efforts to commercialize technology products and services developed at UPMC. Shrestha says UPMC is looking for ways to commercialize its data governance best practices and information management models.



Eliot Siegel, MD

Title: Professor and vice chair of the department of diagnostic radiology

Organization: University of Maryland School of Medicine

In addition to his role at the University of Maryland School of Medicine, Siegel is chief of radiology and nuclear medicine for the Veterans Affairs Maryland Healthcare System and director of the Maryland Imaging Research Technologies Laboratory. Under his leadership, the VA Maryland Healthcare System became the first filmless health-care enterprise in the world. He has made more than 1,000 presentations internationally on a broad range of topics involving computer applications in imaging and medicine. He currently serves on the board of directors of the Society of Computer Applications in Radiology.



HELPING MEDICINE GET **PERSONAL**

PMI's lofty goal—make medical breakthroughs.

By Greg Slabodkin

From the start of the Precision Medicine Initiative, an ambitious research effort designed to take into account individual differences in people's genes, environments and lifestyles, the success of the PMI has been predicated on the collection of data from volunteers on a massive scale across the United States.

Launched in 2015 by President Obama, the PMI's goal is to generate medical breakthroughs by personalizing how the U.S. healthcare system treats disease and improves health. Building one of the world's

largest and most diverse biomedical datasets is foundational to the initiative, which will heavily leverage genomics and health information technology.

The National Institutes of Health's All of Us research program, cornerstone of the PMI, seeks to recruit a million or more Americans to contribute their health data over many years to a national cohort. This landmark longitudinal study is where the rubber meets the road for precision medicine research.

The program has just begun enrolling participants on an invitation-only basis; as of mid-September, about 2,500 people have

agreed to participate during its beta phase. Testing of IT systems with these first enrollees is scheduled to begin in early fall.

The nascent program, still in its beta phase, is one of the leading initiatives in the country looking to assimilate data from a wide variety of sources to improve patient care. Analysis of the PMI offers an in-depth look at how these efforts will be structured and their potential to achieve tangible results.

Treasure trove of data

Participants in the study will be encouraged to contribute their physical, genomic

Image from gettyimages

and electronic health record data. In addition to providing blood and urine samples as well as access to EHRs, information will be collected from volunteers in the program through mobile technology, physical measurements and surveys.

According to Chris Lunt, chief technology officer for the All of Us research program, the objective is to collect as much data as possible that gives any indication about people's health that could lead to more tailored disease treatments and prevention strategies.

"If we can get their electronic health records, that's the best place to start and then layering on information that we're able to glean from taking biosamples," says Lunt. "There's also data that doesn't exist already but that we're going to have to specifically curate, both patient-volunteered information through surveys and the collection of data about heart rate through fitness monitors—and anything else that people are willing to volunteer."

The passive collection of information through wearable technology is something the All of Us program is looking to utilize as much as possible. "It's the kind of data that has been missing from a lot of research in the past," observes Lunt. "If someone comes in every six months and you take their pulse, that doesn't tell you a lot. You really need to see their pulse and specific heart rhythm over the course of a day after they've eaten or exercised."

In addition, Lunt is working with partners nationwide to develop technologies that securely gather and integrate data for broad research use, as well as analytic approaches and visualization methods enabling researchers to understand and exploit the diverse datasets.

"What we're really looking to do is to get such a rich dataset that we're going to find patterns in the data that we've never seen before," he adds.

Using the data, researchers are hoping to measure risk for a range of diseases based on environmental exposures and

genetic factors, as well as interactions between the two. They also are interested in using mobile health technologies to correlate activity, physiological measures and environmental exposures with health outcomes.

"One of the biosamples we're collecting is urine, and that provides us with the capacity to run heavy metal screening for environmental exposure, which is a function of location," Lunt says. "We're talking about not just the location of people in the

"We're looking to find patterns in the data that we've never seen before."

—Chris Lunt

country but locations within a community, such as individuals living close to the freeway and refineries."

Partnering with academia, industry

The daunting task of acquiring, organizing and securing what will be one of the world's largest and most diverse datasets for precision medicine research falls squarely on the shoulders of Vanderbilt University Medical Center in Nashville, Tenn., which was awarded a five-year, \$71.6 million grant from NIH to establish and operate a Data and Research Support Center for the All of Us program.

"They need to collect all of the data, curate it, normalize it, clean it up, de-identify it and put it into the curated data repository that ultimately the researchers will have access to—all of that falls under the purview of Vanderbilt," says Lunt.

The role of the center will be to provide research support and analysis tools to the scientists who will mine the enormous database of health data working to better understand the factors that influence health and disease. In addition, VUMC's Data and Research Support Center will be working with the Broad Institute in Cambridge, Mass., and Ver-

ily Life Sciences (formerly Google Life Sciences) of Mountain View, Calif.

"In the beginning, we'll be getting EHR data, which is voluminous but not that bad compared to when we get the genomics data in—and, then, there's a huge jump up in terms of the amount of data," notes Lunt. "This is why we sought out partners who had proven experience in managing data at that scale. That's the advantage of working, for example, with the Broad Institute and Verily."

At the same time, a biobank at the Mayo Clinic in Rochester, Minn., will oversee the collection, storage and analyses of blood and urine samples. Under the \$142 million award, Mayo's Minnesota biobank is anticipated to contain more than 35 million biospecimens and associated data, while a separate Florida facility will serve as a backup site for about eight million to 10 million samples.

"Those go into the deep freeze, and then we can pull those samples out based on researcher requests," says Lunt.

For its part, The Scripps Research Institute in La Jolla, Calif., is playing a pivotal role in the All of Us research program. Under a five-year, \$207 million NIH award, TSRI is charged with establishing a participant center to develop, test, maintain and upgrade the mobile apps and web-based platform that will be used to enroll, communicate with and collect data from—and share data with—all one million volunteers.

"We're responsible for everything that the participants see, including the website, the app, the data flow from the participants and data sharing back to the participants, as well as data security and privacy," says Eric Topol, MD, professor of genomics and the Gary and Mary West Endowed Chair of

Innovative Medicine at TSRI.

Volunteers will enroll, consent and donate their data through vendor Vibrent Health's technology platform using mobile apps, web interfaces, interactive voice response, feature phones and wearable sensors. At the same time, TSRI's Participant Center will need to develop parallel platforms to deliver these functions to those who don't have smartphones. TSRI is also overseeing the direct enrollment of 350,000 volunteers, more than a third of the goal of one million participants.

Representing diversity

However, Lunt acknowledges that getting a million or more Americans to share their health information is no small feat. In particular, NIH is looking to recruit volunteers for the cohort from underserved populations—including lower-income, Hispanic and Latino, African American, American Indian and rural communities.

"We want this program to reflect the rich diversity of our country," says Eric Dishman, director of the All of Us program. "Expanding our national network of healthcare provider organizations enhances our ability to reach communities traditionally underrepresented in medical research."

The All of Us program is leveraging a national network of healthcare provider organizations—including regional medical centers, community health centers and Department of Veterans Affairs' medical centers—to get the consent of participants and to gather health information from sources such as EHRs.

"Provider organizations such as large hospital systems are helping us to onboard participants," says Lunt. "They are bringing in people who are already patients in their health system, so they have access to the electronic health records. They get consent from the participants, and then they deliver the data directly to us."

Ultimately, for those direct volunteers who want to participate in the program, a project directed by the Office of the Na-

"We want this program to reflect the rich diversity of our country."

—Eric Dishman

tional Coordinator for Health IT is working on leveraging HL7's emerging Fast Healthcare Interoperability Resources (FHIR) standard and OAuth 2.0 security profiles to enable individuals to access their health data and share it with researchers. The aim of Sync for Science is to put people at the center of deciding when and how data should flow.

Critical to this effort is the participation of major EHR vendors who are piloting the use of open, standardized applications to give individuals the ability to easily and securely contribute their data to research studies. By connecting a research app to their electronic health data, Sync for Science will help ensure patients' rights to access their own information under HIPAA requirements.

"We're working with the Sync for Science project, which is part of ONC, to put together a reference architecture and guidelines for how hospital systems could provide consumers access to their own data to be able to pass that to research organizations," says Lunt.

Among the core values guiding the development and implementation of the All of Us program are that participants have access to their information, that the data be accessed broadly for research purposes, and that security and privacy will be of highest importance.

"The care we must take in making sure that we really strongly de-identify the data is something we take seriously," adds Lunt.

Toward that end, program leaders say they are engaging teams of experts to conduct rigorous security testing and establishing safeguards against unintended release of data while setting penalties for the unauthorized re-identification of participants. At the same time, education ma-

terials are being developed for volunteers regarding potential privacy risks and the program's response plans in the case of a privacy breach.

Beta testing phase

In June, NIH announced that it had begun enrolling the All of Us program's first participants as beta testers and that the agency was "starting small with enrollment and scaling up carefully" from one site to more than 100 sites nationally during the beta phase.

"Our partners will begin testing on a staggered schedule through early fall, each enrolling a handful of participants a day to start, and inviting more when ready—eventually totaling at least 10,000 people across the country," according to NIH. "Before we open enrollment nationally, we want to make certain that all systems are successfully up and running, and our processes are well in place to ensure a good experience for participants."

Lunt notes that one of the biggest challenges for the All of Us program's beta testing phase is creating an "equitable consent system that's clear and understandable and participants can feel good about." In addition, he reveals that surveys used during the beta period to gather information are all electronic—an approach that is being evaluated.

"One of the things we're discussing is the question of whether we need to provide a paper capacity for people who are less digitally engaged," Lunt adds.

Overall, he is optimistic that the enrollment for All of Us will open nationwide early next year. "We really want to make sure that we launch when we're ready and that it's right for the broadest possible audience," Lunt says. ■

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athenahealth Population Health aggregates multiple clinical and payer data sources to give clients a holistic view of their patient population to help them identify ways to optimize care. HCOs should seek out a Population Health solution that includes data from EMRs, but not just EMRs.

Kevin Ban, MD, Executive Director Managed Care and Population Health, athenahealth

What are the most challenging aspects associated with implementing successful population health management programs?

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What specific technologies will be used to help support population health initiatives?

The capabilities needed to succeed are data management, quality management, patient outreach, care management, and patient self-management. All Population Health journeys start with Data Management. By aggregating and normalizing data sources, HCOs generate insights about a population, identify patients in

“Having a set of agreed upon goals, a defined population, buy-in from key internal stakeholders and a vendor that shares your vision are critical to success.”

need of care, and recommend a care plan. An integrated quality management engine helps providers address care gaps. At athenahealth, we also provide in-house Performance Management experts that help providers achieve quality performance goals. A robust Patient Outreach service allows providers to conduct targeted patient outreach at scale with automated, clinically-relevant messaging using patient-centric calls to action. Care managers on the front lines can easily coordinate care across multiple providers and close care gaps. Finally, the patient must play a role and a Patient Self-Management tool enables providers to engage patients as active partners in managing their health. Our feature, athenaWell, offers task tracking, gamification, patient-reported data, and secure messaging.

How can healthcare organizations best leverage electronic health records to meet population health goals?

HCOs should leverage data not only from the EMR but also outside their network. EMRs and Population Health solutions were built for very different purposes. EMRs were created to document, and help providers get paid for, each patient encounter. Consequently, EMR data are oriented around individual transactions and aggregate only the clinical data. They do not pull in information about the cost of treating a patient, such as claims data, and may not include all information about the care a patient receives outside of that provider’s office. EMRs do not allow you to look at a population holistically and understand how to better allocate resources. ■

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Population health is now a popular care delivery model. In fact, according to the *HIMSS Analytics 2016 Essentials Brief: Population Health Study*, 76 percent of healthcare organizations had a population health program in place in 2016, compared to just 67 percent in 2015. Among survey respondents, nearly half reported that their organizations have up to three population health initiatives in place.

The big question, though: What will it take to make these clinical care management initiatives go beyond simply being the “in thing” to actually achieving their intended results?

To successfully support population health programs, healthcare organizations need to rely on population health management systems that can identify “a plethora of patient groups and predict where, when and how to best engage them. In addition, they should have the ability to coordinate care across the entire healthcare continuum, support care team collaboration and measure the activities, outcomes and overall performance of providers with the network,” according to a Black Book research report based on a survey of 140 CIOs, 159 CFOs and 448 hospital managers.

Certainly, a plethora of healthcare organizations across the country are looking to launch and sustain population health initiatives with such systems. And, as they do so, many of these organizations are quickly discovering that advanced data analytics is a must-have tool.

“Given limited resources for most organizations data and analytics should be used to help prioritize potential patient targets for intervention. Rather than initiating a program for all patients, analytics should help predict

which patient has a higher likelihood of regressing or becoming a patient with chronic care needs,” said Joe Welfeld, president of the Welfeld Group, a consulting company based in Teaneck, NJ.

For example, Community Care of North Carolina (CCNC), a Raleigh, N.C.-based organization that creates and implements innovative population health programs for vulnerable populations, is leveraging advanced data analytics to determine how to best manage care for 1.3 million Medicaid patients.

“With pregnancy, for example, there are 27,000 patients that we are trying to manage. We need to know how to prioritize our resources and also to be more sophisticated about how we identify those people, what we call the impactable population, the people who really benefit from our interventions,” said Kate Berrien, vice president of clinical programs at CCNC.

To accomplish this, CCNC’s program evaluation department uses a data modeling application that produces “impactability” scores that are used to predict how likely it is for certain members of the population to respond to various interventions.

“This analytic capacity really allows us to direct our resources much more intelligently and efficiently. Otherwise, we are just shooting in the dark in terms of which patients need to be served or need intensive services,” Berrien said. “Scores are ranked from zero to 1,000 by degree of impactability. Patients who have scores of between 200 and 1,000 are candidates for intensive care management.”

For example, a pregnant woman with hypertension who smokes is likely to have a high impactability score

because those are highly synergistic problems – and smoking cessation intervention could be quite effective. On the other hand, a woman who is pregnant with twins is at a much higher risk than other women to have a low birth weight baby, yet “being pregnant with twins is not highly impactable. There’s not much we can do about the fact that you are pregnant with twins,” Berrien said.

In addition to identifying impactable patients, CCNC also leverages data analytics to determine which interventions are most effective.

“At a simple level, we try to find two women who are as similar as possible clinically with respect to chronic conditions and social determinants. Then, one person gets an intervention and the other doesn’t. What was the difference in their outcomes? When they had different interventions and their outcomes are different, you can make some claims about what worked and what didn’t,” said Carlos Jackson, director of program evaluation.

In the know

Similarly, identifying which populations to target is a main tenant of the population health initiatives at CHOC Children’s, a pediatric healthcare system based in Orange, Calif., according to Michael Weiss, DO, a pediatrician and CHOC’s vice president of population health.

“You have to identify your population. If you don’t know who you are caring for, you can’t care for them,” Dr. Weiss said.

“We are able to look at the entire population by practice, by physician and by diseases and identify where we are succeeding and where we need to improve.”

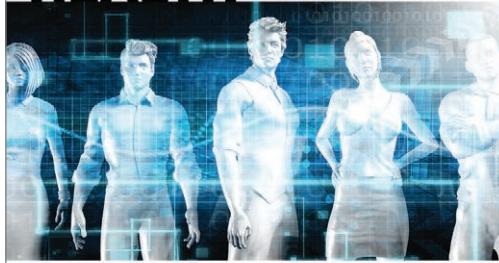
Step one, then, involves identifying patients who are at high risk – the “children with cancer, cystic fibrosis, hemophilia, inflammatory bowel disease, diabetes and other diseases,” according to Dr. Weiss. CHOC takes it a step further and also analyzes data to identify patients who could be considered part of “rising risk” populations – or the people who are likely to be sick in the future.

CHOC also relies on dashboards that enable staff members to assess population health program progress – and quickly take action to make needed improvements.

“We are able to look at the entire population by practice, by physician and by diseases and identify where we are succeeding and where we need to improve,” Dr. Weiss said. “For instance, I could see that Dr. X’s asthma patients are visiting the emergency department three times more frequently than Dr. Y’s. So, I can go out and visit with Dr. X and provide some clinical guidance that will help reduce the emergency visits.”

For example, when reviewing results presented via the dashboard, leaders identified one pediatric practice that was not providing asthma action plans to its patients. “So, we went to the practice and gave them templates for asthmatic action plans and then helped them operationally implement those into their processes,” Dr. Weiss said. “Over the course of a 12-month period, we were able to reduce emergency department visits for 27,000 kids by 18 percent, which equated to a savings of a little over a million dollars that year.” ■

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LEARNING HOW TO SHARE DATA

Value-based care leads to payer-provider partnerships.

By John Morrissey

Healthcare providers and payers have long had contentious relationships, and some of those battles over claims and reimbursement for care have been bitter.

After years of opposition, providers and payers are finding themselves as necessary bedfellows, prodded along by the shifting reimbursement incentives posed by value-based care.

For payers and providers to succeed under value-based care, they need each other's data and cooperation, as they see their financial incentives begin to align around the need to provide high-quality, cost-effective care.

Close collaborative efforts between providers and payers are only beginning to emerge, as pioneers begin to wrestle with some of the technical challenges of sharing data, both for individual patients and for larger populations. Early efforts focus on becoming more transparent in sharing patient data, but they're finding a growing need for sophisticated IT, especially by providers.

These early initiatives are harbingers of future cooperation between providers and payers, but they also show that other issues—including legal and operational obstacles—still need to be overcome. Success in these collaborations are crucial to making a successful shift to value-based care.

Limited data sharing

Problems with data sharing are one of the biggest barriers to future provider-payer cooperation in value-based care. Lack of

willingness to share information needs to be overcome.

Two healthcare industry surveys conducted in late 2016 found that the lack of data sharing was impeding provider-payer risk-sharing initiatives. One study by Premier, a group purchasing and quality consulting firm, found that only 22 percent of commercial payers shared claims data with providers to better manage cost, quality and coordination of care. The second, by the American Medical Group Association (AMGA), reported that the transition to value-based care actually slowed between 2015 and 2016, in part because of the lack of payer data.

Health plans generally balk at sharing their patient information with providers, says Chester Speed, AMGA's vice president of public policy. That's important information for providers to access, because payers' claims and health information can provide a more complete view of patients' health issues and provider interactions.

However, some payers believe that providers are not technologically ready to manage payer data. That puts unprepared providers at a disadvantage, because the inability to take in and manage payer data limits their ability to succeed with value-based care contracts.

"Not every provider is set up well to take risk," says Catherine Field, market president of the four-state Intermountain region of Humana. A risk-based arrangement involving only a small volume of health plan membership puts a provider at an extreme disadvantage, often because the provider is not able to pay for the associated technology and care management overhead.

It's too much risk for many payers to tolerate, because working more closely with providers in these arrangements could increase the risk for both, Field says. "We have to be confident that they'll be successful at it, and it does take some infrastructure investment to become successful." After a health system achieves proper scale, "the challenge today is getting data

in a format that is easy to access, that's accurate and is actionable."

What's more, she says, every provider is at a different level of readiness to receive and use the claims data.

Transitional challenges

Even though providers and payers see the logic in sharing data for value-based care contracts, there's reluctance because the industry is in transition on this form of reimbursement—most coverage plans still involve fee-for-service approaches, which

"Not every provider is set up well to take risk."

—Catherine Field

often means payers and providers are still adversaries in settling claims.

For the most part, payers and providers still have "different sets of business interests," says William Bernstein, chair of consulting firm Manatt Health.

Conflicts also arise when an initiative starts setting up sharing arrangements. "There's collaboration," he says, "but people want to control the terms of the collaboration through being the data repository and the source of truth" in the relationship.

Gradually, payers are realizing that they can't dictate how providers should run the new joint programs and that they have to establish true partnerships for value-based approaches to succeed, says Mitchell Morris, executive vice president of OptumInsight, an analytics business that merges claims and clinical data into a useful form for such partnerships.

Providers that typically are protective of their clinical data must be as willing as payers to intermingle vital ongoing details of patient information, Morris says.

However, some examples are showing that providers and payers can weather this challenge and achieve joint benefits.

For example, an evolving relationship between healthcare systems and payers in Minnesota demonstrates the gains in quality and efficiency that follow from the free flow of data.

About 10 years ago, payer contracts with Allina Health included incentives structured around the total cost of care to health plan members; under those deals, the health system was eligible to receive bonuses for meeting performance targets, says Duncan Gallagher, Allina's recently retired chief financial and ad-

ministrative officer who oversaw those service contracts.

Achieving results that merited bonuses was difficult, Gallagher says. For example, it was especially frustrating when Allina found out after a performance period that it didn't hit its target, based on the claims system from which payers reported the results. "That engendered some distrust and lack of faith in that process," he says.

Some of those challenges were eased about seven years ago, when Allina linked with HealthPartners, a combined healthcare system and insurance plan, to launch the Northwest Alliance, an accountable care organization. Clinical data from participating care sites and claims data on 30,000 health plan members attributed to the ACO have been leveraged to identify improvement opportunities and measure success against targets, Gallagher says.

The effort yielded improved cost trends and care outcomes, compared with Allina's efforts in the rest of the Twin Cities market. "The parties trust the data, trust the process and have worked together to the benefit of the members," he says. "If you can get the economic alignment between the parties, other things will fall

in place. And that contentiousness, while it won't disappear, will at least be diminished somewhat."

For a provider-payer collaboration to make use of merged data feeds, the partners need economic alignment with shared incentives, and a measurement and improvement system that offers analytics capabilities, says Kyle Salyers, senior vice president of corporate development for Health Catalyst, a vendor that develops and operates analytical databases for both health plans and integrated delivery systems.

"An analytics platform and expertise is required to bring together claims and clinical data," Salyers contends. That requires a technology base that takes financial, clinical and operational information from

very different points of origin to inform current care for patients and longer-term care management.

Allina began building that base 10 years ago, adding data warehouse and analytics capacity through in-house development, Gallagher says. The analytics initiative turned into a separate division of Allina. In January 2015, Allina outsourced that division to Health Catalyst in a 10-year, \$100 million agreement, realizing it could not continue internal technology investments.

Handling risk

Similar sharing initiatives have helped both providers and payers manage risk contracts. Humana has experience working with providers, in ways that take into account their technical acumen.

For example, in Washington, Oregon and Des Moines, Iowa, collaborative payers have furnished multispecialty clinic organizations with claims data and the analytical tools, enabling them to combine those tools with internal clinical data and better assume varying degrees of risk for contractual performance targets that match providers' technical and operational readiness.

Throughout Humana's region of Washington, Oregon, Utah and Idaho, 75 percent of its membership in Medicare Advantage plans are covered by "path to value" contractual relationships with provider entities, which can be anything from shared savings to full risk for improvement targets, says Field, the regional market president.



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Three years ago, Vancouver (Wash.) Clinic was not prepared to enter into such a relationship, but it had just hired a new CEO, Mark Mantei, who had experience in managing risk and was charged with putting Vancouver in a position to participate. Field says contractual terms allowed the clinic “to walk into risk over a number of years, so they could get good at building systems and processes to help them manage care well.”

Humana has a team that works with Vancouver Clinic to customize reporting to its needs, leveraging a self-service reporting tool called CareBook, from DataLink, to produce more than 50 types of reports on Humana members. The clinic, which operates on an Epic IT platform, uses that vendor’s Healthy Planet population management module to isolate information on all Humana members.

Wellmark, the Blue Cross Blue Shield plan for Iowa, started five years ago to develop ACOs initially with the most able integrated health systems, and Iowa Clinic was invited aboard in the second year, says Edward Brown, the clinic’s CEO.

“Wellmark went about this in a very progressive, incremental manner to bring the providers along and allow them to morph into a situation to begin to take on risk,” Brown said.

A software system from Treo Solutions contains all of Wellmark’s claims data on attributed members, and each participating healthcare provider organization has access to its own data. Iowa Clinic also invested in analytical tools to evaluate its performance, including tools from Optum and Lightbeam Health Solutions.

Claims hesitancy

Wellmark’s data-sharing does not extend to letting providers download and combine claims data; it’s still proprietary, kept inside the Treo warehouse for read-only viewing by providers. In the future, providers will need more than just a glimpse of payer information, Brown says.

“I don’t see how we move from fee-for-

service to pay-for-value without being more transparent about the data,” he contends. “It can occur incrementally, but [these relationships] can’t reach their full potential” with such openness.

However, Wellmark is concerned about too freely sharing its data with providers;

“These relationships can’t reach their potential without openness.”

—Edward Brown

Brown says the company fears competing payers might access its data if it is put into the hands of providers.

Antitrust issues also loom. For example, the potential for collusion is a significant issue for Wellmark, because it has a 73 percent share of the Iowa commercial market, Brown adds. But all provider organizations have the same contract with Wellmark, and all get paid the same way.

Wide access to claims data in a market also can create antitrust concerns among providers. For example, if competing entities see the whole claim from a payer, they can find out the pricing the payer is using for competitors, says Robert Belfort, a partner with Manatt Health.

In another example, an enterprise operated by a hospital that is taking risk and to which its participating doctors are making referrals may use payers’ claims data to compare its rates with those of other competing institutions—it then could use that information to negotiate its own rates to nearly match providers that charge higher rates, netting more income, Belfort explains.

Or one provider organization might use a payer’s claims information as the basis for contacting another provider organization with which it competes to make a deal. “Once competitors know what their respective pricing is, they can collude with one another: Hospital A can go to Hospital B and say, ‘I see you’re getting 15 percent

more than me—we should both agree to negotiate something in between what we’re getting, and we won’t undercut you that much.’”

It’s simple enough, however, to strip out pricing, share only the encounter, and use per-claim data to measure quality of care

and effectiveness, he says. Cost information also can be aggregated into meaningful statistics without disclosing individual payment amounts.

Data sharing results

That’s what effective provider-payer collaborations are doing, and the resulting clearer picture of individual and population health has been paying off in fewer hospital admissions and readmissions, higher quality scores and lower total cost of care.

For example, Iowa Clinic reduced per-member, per-month costs of Wellmark members by \$29 in 2014, another \$29 in 2015, and \$55 in 2016, with the savings shared between the two partners, says CEO Brown.

Vancouver Clinic’s admission rate has declined to fewer than 180 per 1,000 population, reflecting a high degree of sophistication in managing people’s health problems, and its rate of 30-day all-cause readmissions is below 9 percent, thanks in part to effective post-hospital follow-up care. Its overall Medicare Advantage rating, which was below 3 on a 1- to 5-point rating scale when it began collaborating with payers, stood at 4.7 in 2016.

“That is tremendous improvement in their quality metrics,” says Field of Humana, “and a lot of that had to do with very close partnership and alignment of our organizations, and sharing of data.” ■



VALUE-BASED CARE

As Value-Based Care Sticks Its Landing, Healthcare Organizations Jump to Action

The fate of the Affordable Care Act might be in a state of political flux but value-based care, as a concept, appears to have staying power. In fact, healthcare organizations are increasingly adopting this care delivery and reimbursement model that ties payments to the quality of care provided and rewards providers for both efficiency and effectiveness. The Centers for Medicare & Medicaid Services (CMS) has introduced an array of value-based care models, such as the Medicare Shared Savings Program and Pioneer Accountable Care Organization (ACO) Model while private payers have also adopted similar models of accountable, value-based care.

Indeed, a variety of studies show that value-based care is gaining momentum:

- Half of healthcare systems are getting some or most of their reimbursement as part of value-based payments that put providers at risk for the cost and quality of care, according to a survey of healthcare payer and provider leaders conducted by KPMG, a global consulting firm. Based on the response of 86 participants, 36% said they receive some reimbursement from value-based contracts, while 14% said they get most of their reimbursement that way while another 26% said they are planning to enter value-based payment arrangements in the next one to three years.

Continued on B4

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William D. Kirsh, DO, MPH
Chief Medical Officer
Sentry Data Systems

What are the most prominent challenges that healthcare organizations face when delivering care under value-based models?

Most critical in attempting to deliver value-based care is the honesty and self-awareness of a healthcare organization's own baseline costs, utilization, and capabilities—and a realistic comparison to their peer group. There is just tremendous pressure on our clients to show improvement on quality metrics and patient outcomes, while at the same time reducing the total cost of care. And to move the needle on metrics like admissions, readmissions, length of hospital stay, costs of drug utilization and total cost of care per beneficiary, they must address complex clinical and financial issues that expand across the continuum of siloed departments. Most health systems have already gotten pretty good at driving out costs within their individual departments, but now they need to be able to look beyond specific budgetary issues and understand variations of care between providers—and focus on those variations that produce a consistent quality outcome. In addition, their focus must include a vision outside the four walls of their institution to be effective in managing care delivered after discharge. That includes challenges like ensuring medication adherence for patients who don't have good support networks, for example.

What technologies are likely to come into play under value-based care models?

Data! The one with the most data wins. Value-based care assumes that health delivery systems understand their drivers of costs and utilization. In addition, the institutions must objectively understand the landscape of providers providing services for their institution. Without comparison populations to line up the institution's services and understand the drivers of its cost and quality, the goal of profitable value-based care cannot be achieved. Although most experts may say it is analytics, that isn't the whole story—but it is important for all health systems.

Under value-based care, you need longitudinal patient databases that track everything that happens to the patient, from before admission through months after discharge. That includes everything from the costs of pharmaceuticals and other supplies to diagnosis codes for chronic conditions and other risk factors, as well as outcomes like patient satisfaction. We are seeing that when our clients use the correct data depositories to apply the right kind of analytics, it is only then that they start to understand the links between all those factors and manage the care of their patients to established goals. This makes the difference and produces value, satisfaction and profitability.

What specific challenges will healthcare organizations face as they support a mix of fee-for-service and value-based payment models in the current healthcare environment?

The most important factor that will make a healthcare organization successful in this mix of fee-for-service and value-based payment models is changing the culture of their organization. This usual concept of myopically and glaucomically looking within the organization to make changes needs to stop! Organizations must realize that they are just one component of a much larger network of delivery structures, not an island of their own. They must work together within geographically defined regions to focus on their own expertise. Not all delivery organizations need to deliver all health care services all the time. For example, we work with our 340B clients to expand into the local pharmacy community, maximize financial performance under traditional payment models and make sure their pharmacy operations are both optimized and fully compliant under the rules of various buying programs.

In the world of value-based care, there remain a lot of unknowns, but one thing that can really help is the use of comparative databases, like Sentry has, allowing health systems to see how their performance compares to others. Under value-based payment, performance is relative and the bar for success is

constantly rising. Comparative data is key to seeing where you have opportunities to improve your performance and achieve the best outcomes, both clinical and financial.

The common thread among these challenges is the very high level of expertise and specialized resources required to address them. Changing the culture of an organization to allow itself to be compared to others will bring out new expertise and highlight the uniqueness that their organization provides to the community.

How can healthcare organizations confidently move forward with value-based programs and the technologies that support them in this era of legislative uncertainty?

Health delivery organizations must commit to delivering value that is perceived to be worthy of reimbursement by the intended buyer. It's true that we don't know exactly how value-based programs will evolve, but it's clear the days of the blank check are gone. To be successful, organizations will have to deliver quality care at a price point perceived as acceptable by the market place. Health systems that focus on the fundamentals of measuring and managing cost and quality, and on constantly improving their outcomes, despite the details of government programs yet to be implemented, will be the winners. Putting in place an analytics infrastructure that provides a comprehensive longitudinal view of patient care is a strategy that will serve a health system well under any scenario.

How can payers and providers leverage technology to work together toward success under value-based care models?

Value-based care is fundamentally about aligning incentives so payers and providers are pulling in the same direction. Data converted to information about the population being served is the universal language to assure that providers and payers work together. Technology can help that become a reality by bringing a new level of transparency to the process of patient care. Having aligned quality metrics is great, but too often there are significant delays in getting feedback on those metrics and that makes it difficult for providers to adjust in time to make a difference. Getting our analytics as close to real-time as possible is key to being able to work effectively towards achieving the best outcomes. If we can get to that point of full transparency where payers and providers are working with the same numbers in real-time, a lot of friction will be taken out of the system. ■

Value-based care is fundamentally about aligning incentives so payers and providers are pulling in the same direction.

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Continued from B1

- The rapid pace of change in healthcare payment continues unabated, with payers reporting they are 58% along the continuum towards full value-based reimbursement, a 10% leap since 2014 and hospitals reporting they're now 50% along the value continuum, up 4% in the past two years, according to Journey to Value: The State of Value-Based Reimbursement in 2016, a national study of 465 payers and hospitals conducted by ORC International and commissioned by McKesson.
- About one third of responding hospitals and health systems are participating in voluntary value-based payment models, such as bundled payment for major surgeries or accountable care organizations that offer bonus payments for meeting cost and quality targets, according to a Washington Post BrandStudio/Philips survey of 346 hospital executives.

Preparing to succeed

With value-based care taking hold, healthcare organizations across the country are diving into initiatives that will help them succeed under the emerging model. For example, Providence St. Joseph Health is laying the groundwork to succeed under new value-based reimbursement models. The large West coast-based health system has established a payer contracting business unit that is addressing the move to value-based contracting models – and is specifically creating contracts for value-based populations health.

“Our value based care team is able to track outcomes by population or payer type. We can track our progress via contract and by population as well as by community,” said Rhonda M. Medows, MD, executive vice president of population health.

Under this initiative, clinicians rely heavily on data to develop effective care management programs and ultimately improve outcomes. “We use informatics to inform the strategy. We can actually measure the cost of care and outcomes and then work on improvements,” Dr. Medows said. “Traditionally, you used to just see this with the health plans but now providers are starting to use data to manage health and improve outcomes as well.”

In fact, the key to succeeding under value based models, according to Dr. Medows, is zeroing in on specific quality metrics. “There are about 400 to 600 different clinical quality metrics out there but it’s important to get everyone to focus on the same metrics and get rolling in the same direction,” she said.

To focus its efforts, Providence St. Joseph has chosen to concentrate on several key metrics. “Each year, we pick eight to ten of the core quality metrics that we want to improve and that impacts both ambulatory and inpatient settings. Just basic stuff what I call bread and better illnesses such as hypertension, diabetes and heart disease. We also included some prevention measures for depression and mental health as well as immunizations for children,” Dr. Medows said.

After getting buy-in from the medical groups, Dr. Medows then works closely with health plans to make sure that they agree on focusing on these metrics as well. “We tell them that these are the eight to ten measures that we want to focus on and we want those baked into a risk-sharing agreement,” Dr. Medows said. “So, when our physician services, our medical group, our payer contracting, our value-based care team, our informatics team, are all using the same core metrics, they are all rolling in the same direction and it becomes possible to make the care improvements needed to succeed under

the value-based contracts.”

Keith Mankin, MD, principal of All Peer Consulting, agrees that data collection and reporting are keys to success under value based models. “The good news is that any good doctor is already doing all the things they should be doing anyways. Any good doctor is giving people statins or recording blood pressures and cholesterols. The real challenge is the collection of the data in a way that it can actually be reported so that they will get credit for it,” Mankin said. “Physician groups need to get every care provider to sit down and in a very organized fashion decide exactly what they want to collect. If they can anticipate the data that they will need under value based contracts, they can stay ahead of the game.”

Fortunately, most electronic medical records (EMRs) are capable of collecting data – and then producing the needed reports. “The good EMRS can scan documents for operative notes, surgical times and length of stay and then import these metrics into reports,” Mankin pointed out. “Providers typically can rely on their EMRs to tease out all the data and then get a report on every single one of their patients with a specific diagnosis. And, that gives them something that they can file with their payers.”

To succeed in this endeavor, however, healthcare organizations need to make sure that there is someone within their organization that is dedicated to leading the value-based charge.

“You need to pick a person, no matter how big or small the size of the organization, who will act as the compliance manager. There has to be one person who is absolutely, positively in charge of it because it’s such an important matter, and, tens of thousands or hundreds of thousands of dollars will be at stake. So, you can’t leave it to chance,” Mankin said. ■

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Michael Jarjour, President and CEO, ODH, Inc.

1. What are the most prominent challenges that healthcare organizations face when delivering care under value-based models?

Access to reliable information is a major challenge. Value-based models can help drive the alignment of interests between payers and providers, which in turn drives better outcomes. But this requires shared visibility into all the data that support care decisions. Payers' claims data must be shared with providers' clinical data through portals and other dedicated initiatives.

Breaking down the barriers between physical health and behavioral health data is another challenge. Current approaches often segregate these data which is a huge problem because interdependency between comorbidities drives higher utilization and costs. A longitudinal view into the patient's health is needed so that care managers have a complete picture when coordinating physical and behavioral health care.

2. What technologies are likely to come into play under value-based care models?

We need to make it easier to normalize, process, and consume many different types of data including demographics, biometrics, patient engagement profiles, clinical activities, social determinants, member satisfaction and outcomes. True interoperability will not happen until all players adopt standards for exchanging healthcare information electronically, such as HL7's FHIR specification.

Machine learning is another technology that continues to drive insights, decisions, and resource allocations that are at the core of value-based care. FHIR and Blockchain can help break down the data-access problem, thereby freeing data scientists, working hand-in-hand with physical health and behavioral health experts, to leverage that data to continually teach their learning engines.

3. What specific challenges will healthcare organizations face as they support a mix of fee-for-service and value-based payment models in the current healthcare environment?

They must integrate systems and provide data and tools to manage patients, predict those who may need more resources,

measure and improve outcomes, identify well- performing and poor-performing providers and address deficiencies. Rigor must be applied to assess patients' physical, behavioral, and social determinants to identify those at risk, track interventions and continuously monitor the effectiveness of those interventions.

4. How can healthcare organizations confidently move forward with value-based programs and the technologies that support them in this era of legislative uncertainty?

We have entered an outcomes-based era, with the first step being value-based alignment between payers and providers. Adding a third leg to that alignment – the patient – is next. This requires adding "patient goals" to the data sources included in analytics models and longitudinal visualizations, which reinforces the importance of integrated care and interoperability technologies that make it possible to gather and share data.

Moving forward, organizations' clinical care, care management and finance teams must align by using the same information to guide their efforts.

5. How can payers and provider leverage technology to work together toward success under value-based care models?

To promote meaningful use of data, a data-repository compiling all information, such as a data warehouse, is critical. Further, that data needs to be accurate and usable. Software is increasingly evolving to integrate various data, apply logic to facilitate effective patient management, manage cost, quality and efficiency, and predict cash-flow.

Products offered by ODH are on the forefront of taking data from many sources and organizing it in ways designed to support value-based compensation models. Mentrics, for example, offers a longitudinal view of a patient's utilization and assessment data to support appropriate interventions. By integrating behavioral, physical, and social determinants data and applying advanced analytics, Mentrics identifies pre-super utilizers of health care resources. ■

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MIPS RAISES THE BAR ON SECURITY

Risk assessment requirement could cut into reimbursement.

By John Morrissey

During a consulting engagement with an eight-physician practice getting ready for new payment models enacted in the Medicare Access and CHIP Reauthorization Act, Liz Hansen, a consultant specializing in information security, asked to see the practice's risk assessment, a requirement the practice claimed it had met in attesting for the meaningful use program in the past.

"They asked me, 'What's a risk assessment?'" Hansen says. From the response, she knew they had attested to having done an assessment, but had not actually done it.

That's not just forgetfulness or an oversight. Under MACRA reimbursement schemes, failing to perform and maintain a valid information security risk assessment will reduce reimbursements to physician group practices by 25 percent.

That's because part of the Merit-based

Incentive Payment System (MIPS)—one of the payment approaches under MACRA—mandates that physician group practices do an assessment to measure security risks and then document steps to prevent data losses.

Failure to conduct a risk assessment could cost practices 25 percent of their payment under the MIPS program. Practices that say they have done the assessment but are later audited and found to have been untruthful may face

stiff penalties for misleading the government on attestations.

The security assessment requirement in MIPS, in effect this year, is empowering federal agencies to require strong security practices in medical groups. That's important, particularly as healthcare organizations have reported an average of at least one breach per day so far in 2017, according to data from the Ponemon Institute.

The purpose of making the security assessment a required part of MIPS is to finally "prove beyond the shadow of a doubt that you did the best you could" to prevent security breaches, says Joseph Meyer, regional director of risk management and governance for NCC Group, a consultancy.

Until now, many physician practices have done the minimum to secure healthcare information, and many either don't conduct or don't update security risk assessments. Many experts say federal pressure will force lax practices to change.

Getting serious

Federal regulations have required healthcare providers to conduct risk assessments for nearly 12 years, and it was one of the many checklist requirements for the Electronic Health Record Meaningful Use program.

But experts in the field say that many group practices were likely to say they had conducted risk assessments when, in reality, they had not. In some cases, many believed they were attesting to the fact that they met HIPAA requirements; in other cases, they were checking the box to merely get through the application process, thus leaving themselves open to penalties for filing incorrect information.

But failing to have proper security policies and procedures in place has been consequential for many practices, Hansen contends, adding that federal data shows it's been the single biggest

cause of failing an audit of attested meaningful use performance and having to return Medicare payments. "It amazes me that so many years into the program, folks who had been participating in meaningful use never did understand what the requirement was for the risk assessment and did not do it properly," says Hansen, who advises practices on such assessments.

Going forward, the MIPS reimbursement approach will include meaningful use program requirements into the payment methodology, incorporating them into a category entitled advancing care information (ACI), which will represent 25 percent of the MIPS payment. ACI includes a short list of mandated activities,

"It amazes me that folks never did understand the requirement."

—Liz Hansen

one of which is the requirement to perform and maintain a valid information security risk assessment.

Practices that haven't done such an assessment—which also assumes a basic security-assurance capacity—either won't meet the base score requirement or will have to attest hoping not to get audited. If the security risk assessment isn't attested as completed and in place, the practice loses out on the entire 25 percent of the ACI component, says Rob Tennant, health information technology policy director for the Medical Group Management Association.

That's not all. Missing out on a good MIPS score can translate into Medicare payment penalties or a lost opportunity to qualify for bonuses. Beyond that, noncompliant practices might face a bigger consequence—fines that could range into tens of thousands of dollars for noncompliance with HIPAA security regulations in the wake of a MIPS audit.

Renewed emphasis

Until now, risk assessment provisions had received little attention from providers. For the past several years, the focus of meaningful use was on all the clinical and operational uses of IT and not so much on requirements that a provider organization be HIPAA-compliant. Applicants did the bare minimum just to say they were complying, but often weren't rising to the level of the compliance required, Meyer says.

The demands of implementing an effective security risk assessment are the most difficult for smaller urban or rural practices, which typically have tight margins, Tennant says.

He distinguishes HIPAA security

from the related HIPAA privacy protection rules, which have been easier to comply with. That's because practices now routinely assure privacy in how they work with patients, exchange information and handle patient access to records. Security practices, such as encryption and user authentication, are "complicated and outside the typical area of expertise for the practice," Tennant adds.

The rapid increase in security and privacy breaches in recent years has raised agency awareness that providers had routinely attested to security provisions in MU, but were not truly in compliance with HIPAA security rules, and they clearly didn't meet HIPAA standards, says Michael Ebert, cyber healthcare and life sciences leader at KPMG. "CMS has just started figuring out, after years and billions and billions of dollars in meaningful use [incentive payments], that they haven't done anything with their cyber program."

Time to act

Part of the government's effort to highlight better security practices in the healthcare industry is the inclusion of the stronger, more meaningful provisions in the ACI portion of the MIPS program.

While the task is not insurmountable, physician groups that want to avoid losing the ACI portion of their MIPS payments need to act, and quickly.

Practices must formalize a risk analysis that hits the marks for government scrutiny and then schedule ongoing reassessments to ensure the assessment is consistently up to date and has been followed.

A variety of resources are available, from guides on websites of the Office for Civil Rights and Office of National Coordinator to a variety of IT threat-assessment scans, as well as education and guidance from industry associations such as MGMA.

ONC guidance could be particularly useful. Early in the meaningful use program, the agency provided a downloadable simple spreadsheet version of a risk assessment guide, which could give advance warning of where a practice was meeting or failing requirements in areas of administrative, physical and technical security, says Hansen, who used the free tool to help clients pass "hundreds of audits." ONC now has an online version of the tool, which can be used for security demands of MIPS, she adds.

Tennant advises practices to seek help from their IT vendors but not to rely on them as a substitute for taking responsibility internally. Practices that say they have a risk analysis on file often contend that "my EHR vendor handled that for me," he says. "But it's rare that the EHR vendor will know your particular policies and procedures when it comes to employee passwords and physical security and all of the administrative requirements that HIPAA security demands."

An EHR vendor may provide rock-solid encryption on the server, but HIPAA requirements go beyond using encryption

for only the EHR. "That has been the leading challenge when it comes to meaningful use audits," says Tennant. Practices believe that the risk analysis is focused on the EHR because that's the focus of meaningful use, he notes.

But when it comes to electronically held protected health information (PHI),

"How can you say, 'I didn't know'? The time for that is well past."

—Michael Ebert

a prime focus of HIPAA's Title II, EHR vendors are a valuable source of expertise, as are vendors of practice management information systems and whichever claims clearinghouse is transmitting PHI-laced transactions, Tennant advises. Even physicians without an EHR still have to conduct a risk analysis if they do any business using HIPAA-standard electronic transactions such as claims, remittances or claims status, he adds.

Formal actions to take include employing scans of IT infrastructure for vulnerabilities such as the Non-listed Encryption Solution Assessment (NESA) or other available frameworks: NIST 830, ISO 27005, OCTAVE (Operationally Critical Threat, Asset, and Vulnerability Evaluation), says Chris Gida, NCC Group's principal security consultant for risk management and governance.

But practices need more security awareness than just conducting technical activities. Meyer of NCC Group says a practice has to understand, for example, who is hosting the patient portal, who is responsible for it, and where the responsibilities lie in other places where PHI is present in practice-based or cloud-based data storage and transmission.

MIPS: no excuses

The transition to the MIPS program doesn't change anything from a security risk perspective except that the penalties will be

steeper for noncompliance, Gida says. "Whether you're looking at meaningful use or ACI or wherever they create the future from a MIPS standpoint, it's just, 'Do a risk assessment.'"

Enforcement of security requirements has evolved, and federal agencies have been ramping up the pressure on provid-

ers. It's only now with MIPS and its specific consequences for lack of security that providers are beginning to take heed, because they're beginning to realize they could take a big financial hit if they don't have a security risk assessment and lose the entire ACI portion of their payment as a result, Gida says.

To tackle the security task and other challenges of the MIPS program, "most everyone qualifies for some kind of support" from CMS as well as within professional groups, says Hansen. For example, CMS has separate contracts, for either small or large practices, to pay consulting firms such as still-viable regional extension centers to offer free assistance.

Hansen is a contractor for the Small, Underserved and Rural Support (SURS) program for practices of 15 or fewer eligible providers. Support for practices of 16 or more providers also is available through one of 14 quality improvement organizations making up the Quality Improvement Network.

With the assistance and materials available, physician practices can get their security risk assessment duties accomplished and proceed to the portions of the ACI that rack up points for payment, says Ebert.

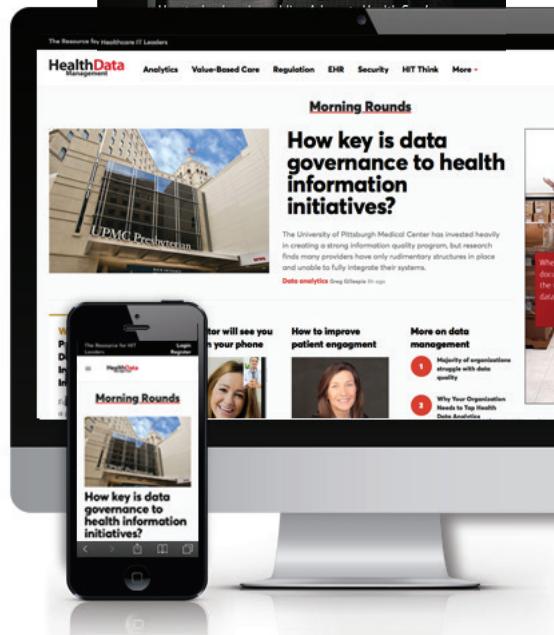
"It's not hard," he asserts. "The information is out there. Your ability to do that is out there. The knowledge is out there. How can you say, 'I didn't know'? The time for that is well past." ■

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MODERATOR

Danielle Fugazy
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While questions loom regarding the fate of the Affordable Care Act, one thing is certain. Value-based care has staying power. As such, healthcare organizations are moving toward the adoption of models that base payments on care outcomes, not on the volume of services delivered. In fact, 50% of healthcare systems already are getting some or most of their reimbursement as part of value-based payments that put providers at risk for the cost and quality of care, according to a survey of healthcare payer and provider leaders conducted by KPMG, a global consulting firm.

As a result, healthcare organizations, now more than ever before, are being asked to measure performance. Indeed, a variety of organizations – from payers to quality groups to government regulators – are requiring healthcare

organizations to evaluate performance and care outcomes as part of the value-based payment process. As such, care providers need to collect, analyze and report on various performance metrics. Challenges associated with operating under this new model abound – as healthcare organizations try to ascertain what measures are most meaningful; how to engage physician in the development and use of quality measures; how to engage consumers in quality initiatives; and how to best leverage technology to best support value-based care initiatives. To gain insight into these challenges, Health Data Management recently hosted variety of thought leaders together to offer their perspectives. 3M Health Information Systems, Inc., sponsored the event. Highlights from the roundtable discussion, which was held in New York City in early September, are presented here.

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Fugazy: What metrics should healthcare organizations be using to measure performance under emerging value-based care models?

Schneider: The metrics an organization uses depends on what purpose they are trying to serve. The metrics an organization picks, how they pick them and how they set thresholds should be directly tied to what they are trying to accomplish. Sometimes, as with many ACOs, metrics are used to make sure an organization is passing some sort of quality standard to get access to savings from a payor. That's very different from using metrics to support performance improvement. And, then, there's the third use case of trying to differentiate high from low performers.

Moore: The challenge is that healthcare organizations can only measure so many things because it's exhausting to look at everything for every clinician all the time. Therefore, the metrics are often honed down. Then, providers are judged on 12 metrics – and that seems absurd because it doesn't provide a full picture. For example, the value of reporting on the delivery of an A1C or even an aggregate for the diabetic population doesn't seem as valuable as reporting on more comprehensive

outcomes such as the rate of hospitalization or emergency room department visit rates for people with chronic conditions.

Fugazy: What is stopping or discouraging physicians from buying into performance metrics?



“The challenge is that healthcare organizations can only measure so many things because it's exhausting to look at everything for every clinician all the time.”

Gordon Moore

McGill: The frustration from frontline clinicians stems from the fact that they are often graded on moving targets and evaluated on process measures, not outcomes. To increase buy-in, we have to get away from grading or rating each individual provider because we really should be looking at how the system performs and overall patient outcomes.

Steinberg: Doctors also feel that they're being asked to do things that are pretty much outside of their control. For example, giving a patient a prescription to get a mammogram doesn't necessarily mean the patient will follow through. It's also pretty easy to disenfranchise doctors from the process when they feel that they are part of a team but yet they're the ones who are being judged and they are responsible for delivering the outcome, which is really out of their control. And, they're feeling really trod upon—when they are being asked to embrace 50 different measures.

Grennan: My system's physician practices deal with a multitude of payers and each payer has its own set of metrics and targets. Even if a given metric is shared by a couple of payers, the targets can differ. This presents a major operational and data management challenge.

Bodine: Some metrics, such as the electronic clinical quality measures are undervalued by clinicians due to something as simple as a naming convention. While the eQMs are retooled versions of the chart abstracted measures, the results will not fully align with the parallel versions of the metric with the same name. As a result, there is a high level of distrust in the outcomes, since clinicians do not understand how the differences in data sources, allowable medications and timing of care provided, can impact performance rates.

Fugazy: What strategies can organizations take to get physicians more engaged with the performance measures that support value-based care?

Steinberg: To help get physicians on board with quality measures, don't ask them to do multiple things at the same time. At our organization, we don't really ask our doctors to meet several measures. Instead, we support them in their practice in an embedded care management model. So the doctor is not really running after the measures but the doctor is learning about each measure, one after another, in a way that makes it meaningful and important.

Grennan: For many years, I have provided the inpatient physicians with whom I work scorecards that communicate broad metrics such as length-of-stay, readmission rates, and mortality rates. And what I've learned is that physicians have a tremendous capacity for self-correction if they're approached respectfully and with a clear explanation of the sources and relevance of the data in such reports. Also, when I share these reports with the medical staffs I emphasize that the individual physicians should focus on his or her group's performance given the nature of contemporary medical practice. It's very important that the doctors understand these metrics are a tool to improve patient care and clinical outcomes and are not intended to be punitive.



“The frustration from frontline clinicians stems from the fact that they are often graded on moving targets and evaluated on process measures, not outcomes.”

Patrick McGill

Schneider: To get physicians excited about performance measurement, you need to offer them transformative tools to do a better job and not just tell them to beat their horse harder and it'll run faster—because I think they're at the point where they really can't go any faster. It's hard to get clinicians excited about initiatives that focus on documentation but aren't perceived as truly impacting care of the patient. But if you go with a care-transformation model, then they will engage. For example, your organization can get colonoscopy rates up not by just chasing people down and sending them more prescriptions but by actually having a collaborative model that enables a primary care group to make direct colonoscopy referrals to a gastro-intestinal group.

Bodine: Physicians are also more likely to become engaged with quality measures if they have a say in their development. The measure stewards need to involve clinicians

in the measure development process and determine the best way to compensate us for taking the time to assist in the creation of metrics that actually capture the quality of care that is being provided. This could be something as simple as a reduction in the number of measures that are reported for organizations that participate in the measure development process.

Fugazy: What makes physicians/providers continue to hold onto measures. In other words, what can make performance measures “stick?”

Steinberg: You need to ensure that the providers embrace the measures as meaningful in terms of outcomes. For example, physicians need to see the connection between performance on hemoglobin A1C measures and hospital admissions.

Schneider: The whack-a-mole effect emerges when performance measures are very tactical and simply require providers to go after various items on a checklist. What's needed are measures that truly tie to system improvements. As such, care providers are more likely to see the purpose and won't feel like they are just chasing down random measures.

McGill: The measures need to be related to the work that providers should be doing, based on their clinical role. There are certain things that staff members with

minimal medical training can do. For example, staff members with minimal clinical background can take vital signs or record allergies. When you get to the really complex measures, that's where you need your physicians, nurse practitioners and surgeons – because these professionals can understand the necessary clinical variation. Actually, in my opinion, if a physician has to order an A1C, an eye exam or colon cancer screening, the system has failed.

Fugazy: How can organizations make sure that quality measures are actually performing as intended – and improving care outcomes?

Grennan: You always have to ask: Do these quality measures really matter? That's the elephant in the room. I know of physician organizations that have 150 measures running in the background and I have to wonder how much of this measurement positively affects clinical quality, patient, safety, and the economics of care.

Bodine: Organizations do need to continue to evaluate the quality metrics being collected, as well as assess validity of the clinical registries in which they are participating. While registries can provide insight into the effectiveness of interventions or the quality of care provided, data collection is time intensive and may not yield quality data. As a result, all metrics need to be reevaluated to ensure they have the expected impact on care outcomes.

Moore: There was a study in the National Service in the United Kingdom, which has a unified health record. They had about 150 measures that they were applied to the general practice of their primary care. Years later, however, when they focused on cardiovascular care, they realized improvements in metrics around lipid prescribing and other related measures. At the same time, other measures would stay the same or drift down.

Steinberg: Doctors are competitive creatures and everybody wants to know what the test questions are and wants to get an "A" on the exam. And that's just who providers are. So it's important to make these measures visible. So you roll out a manageable number of measures and keep performance a top of mind issue. But you focus sequentially on the "measure of the month" or the clinical program that's most important.



“Physicians are also more likely to become engaged with quality measures if they have a say in their development.”

Kimberly Bodine

Fugazy: What are the challenges associated with accounting for patient behavior or the patient's response with respect to performance measures?

McGill: Many metrics are not patient centric. So a provider might have a conversation with a patient but for whatever reason, the patient still doesn't want to close the "quality care" gap. The physician might be providing patient-centric care but the performance measures don't recognize this.

Schneider: Pediatric immunization is a good example. It's a touchy subject, but providers are being held accountable to ensure that a high percentage of their patient population is fully vaccinated, for good evidence-based reasons including public health. But they have patients who just refuse. So, do they just dismiss those patients

from the practice altogether because they are being penalized for non-adherence, which in this case is by explicit choice? This issue is about more than just performance incentives, but they complicate it further and even erode trust in the relationship.

Bodine: Part of the issue relates to measures that are seemingly created in a vacuum. While some measure stewards may use a sampling of patients in the development process, the metrics are rarely patient-centric. As a result, measures involving patient behavior are rarely created to illustrate the factors that are important to a patient, that signal the successful management of their acute or chronic illnesses. Instead they focus on clinician actions and disregard the healthcare goals that are most important to an individual patient.

Steinberg: It's also about what happens between visits. So we try to hang all of the ornaments on the Christmas tree during the visit—but the optimal time to address some of these health issues is between visits. At our organization, we try to expose the status of the measure to the members or patients. If you let people know what they're supposed to be doing and give them the opportunity to do it, then you are more likely to close care gaps and meet the quality performance metrics.

Grennan: There's another unanticipated consequence of improved patient engagement —



“You need to ensure that the providers embrace the measures as meaningful in terms of outcomes.”

Terri Steinberg

the cost of care can increase. Good care is expensive. For example, earlier in my career, I served as a medical director with a major health plan. I helped the sales teams convince big employers to pay an incremental \$2.50 per member per month for a health coaching program. These initiatives actually increased the rates of mammography and colonoscopy, which was great, but this also raised the company’s health care costs for

that year. From the perspective of the private and public sector organizations paying the bills, another problem is the lag between investment and return as it can be years before there’s any clinical or financial benefit from these efforts — diabetics can do just fine for a long time until their eyes and kidneys deteriorate. So, with the current state of health care performance measurement it is hard to justify with the payers and employers who are paying the bills that these interventions are worthwhile because outcomes, which are what count, can take years to manifest.

Fugazy: Healthcare providers are now being held to multiple sets of standards from multiple organizations. Will the industry ever reach a point where providers are held to one common set of standards?

McGill: Different payers have different metrics, different targets for those metrics and different reasons for capturing. So will we ever get there? Probably not if healthcare providers do not take an active role in determining the metrics and targets. It needs to be a collaborative partnership between the payer and the entity about what are the quality metrics and the targets. If a provider is at 20%, and the payer sets a target at 80%, the chances that the provider will hit that are slim to none. So let’s put a target at 30%. That’s achievable and could show progress in the right way instead of continuously hitting providers with the 80% that they are never going to achieve. It is also a good idea to have an

improvement bonus as well. Look, everybody wins if you take the clinician or the group at the bottom quartile and find a way to move them up.

Steinberg: I’ll play the devil’s advocate. If I’m the payer, I want to get to the point that I identify my centers of excellence. I’m not interested in funding the 20%. And I think that’s a real payer perspective.

Schneider: Payers are coming around, though. It has changed a lot from every payer coming in with completely different standards. Standards are much more open now. There might be 150 measures, but providers are allowed to pick one, pick three, pick seven, and giving us much more latitude.

Bodine: For the sake of this discussion, I would take this to the next step. There isn’t just a disparity among the metrics provided by payers, accreditation organizations and registries. There is also disagreement among providers on what the industry standard should be to address specific healthcare concerns. Until the involved stakeholders begin working together, a common set of standards may remain out of reach.

Fugazy: Are performance metrics and the use of technology actually translating into better care outcomes?

Grennan: Not yet, we are moving too fast. We are building the airplane while trying to fly it. All these performance measures are being pushed out from the payers, consultants, and regulatory and government agencies at an unsustainable pace. While almost all these measures are plausible, most have not been properly vetted, “pressure tested” in the real world. So, we need to hit the reset button. Ideally, a coalition



“What I’ve learned is that physicians have a tremendous capacity for self-correction if they’re approached respectfully and with a clear explanation of the sources and relevance of the data in such reports.”

M. Joseph Grennan Jr.

of providers, insurers, and regulators need to develop a prioritized list of bona fide patient care issues that need to be addressed and can be addressed with current technology and knowledge. This probably will mean agreeing on one set of metrics and holding it up as the standard because there are too many choices out there now, particularly in the health plan world.

Bodine: At this point the technology is still in its infancy stage. Most clinicians have higher expectations for their on-line search engine than from their certified electronic health record technology. However, that does not mean that the CEHRT cannot be utilized to track improvement, such as the avoidance of duplicate testing, medication errors and improved interdisciplinary collaboration. These are foundational expectations of a CEHRT that we can all track toward improved outcomes.

Fugazy: What role can technology play in the increased adoption of quality measures – and ultimately in improving outcomes?

Moore: Technology can help to create a supportive environment. For example, natural language processing engines can assist with coding, eliminating the need for surgeons to have to point and click and use pull-down menus which drive them nuts. They really don't want to be doing those things; they want to be doing surgery. Fortunately, organizations can make life so much easier for clinicians with good technology. It's important, however, for the technology, the processes and the workflow to be embedded into a provider's system to make it easy to support quality reporting and performance improvement with the goal of better outcomes for patients.

Steinberg: Process redesign is very important. I struggle with my own organization looking at process re-design activities, we're implementing a new ambulatory EMR. Every healthcare system needs one to redesign care around the new models and it's just, where the rubber hits the road is the difference between strategy and execution.



“To get physicians excited about performance measurement, you need to offer them transformative tools to do a better job and not just tell them to beat their horse harder and it'll run faster—because I think they're at the point where they really can't go any faster.”

Katherine Schneider

Grennan: Process redesign is nothing new. I think where we've gone off the tracks is that the technology integral to many clinical processes has been oversold as being more of solution than it really is. In the physician's office, the effect of a new measure is that the IT folks jury-rig the existing EMR with yet another dropdown screen and this invariably leads to a further impairment in workflow. Truly comprehensive process redesign, in which EMR effectively supports the doctors and nurses caring for patients, is needed.

McGill: We spend a lot of time gearing up and building up to install an EMR, but what we should be doing is changing the workflows. Organizations need to look at workflows and decide how to best register the patient, room the patient, who can enter orders and document care. Then, the technology needs to be designed to support that workflow.

Moore: I have maybe a Pollyannaish take on it but I think technology can play a powerful role in that if it's well-designed and flexible enough to enable better workflow. With technology, there's a capacity for understanding that's beyond human nature. When you think about the oceans of information in healthcare and there's so much chaff to the wheat that we have difficulty first defining what's important and second

recognizing how to go after it. For example, a study in Canada that looked at appropriate management of congestive heart failure but researchers couldn't find echo cardiograms in 50% of the patients with CHF, which begs credulity. But then you realize that documentation of the echo cardiograms was dictated in the note and undiscoverable because computers were not able to extract it. Now, however, we're on the cusp of being able to solve some of these problems with artificial intelligence. Consider some of the work that Kaiser Permanente has done. They have an immense analytics shop, in a single instance of their EMR and that have the ability to look within and see with large denominators what's happening and come to conclusions that have terrific scientific validity. That is fascinating to me and it's possible because you're able to extract and glean some conclusions from data.

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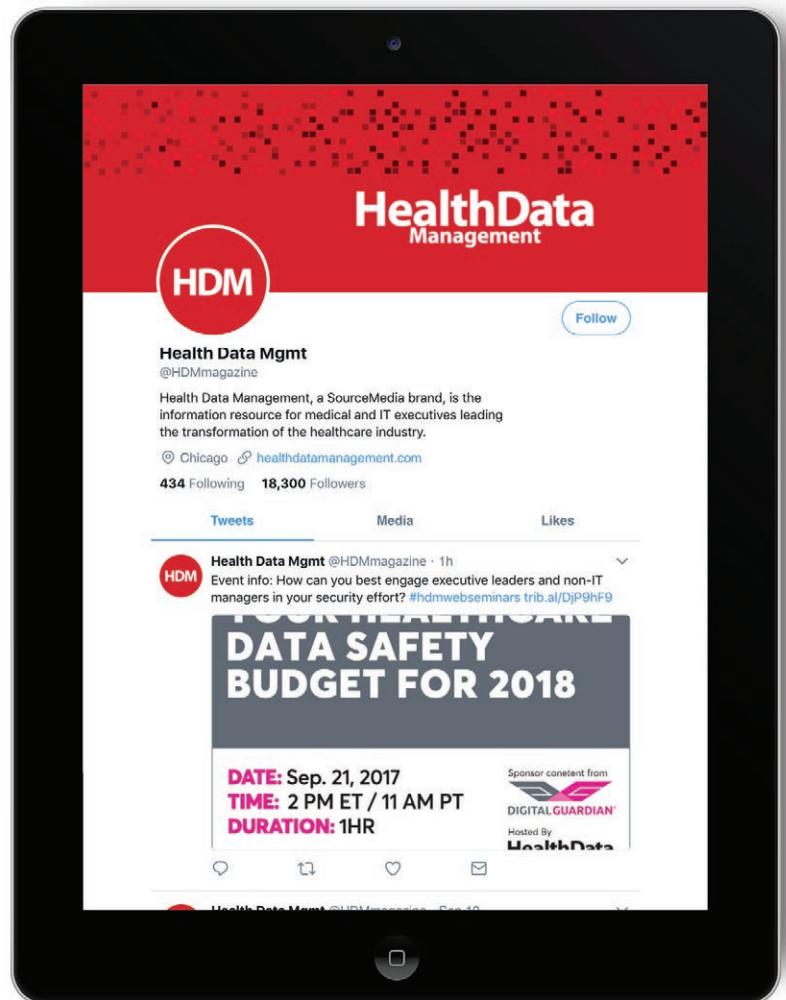




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EXPANDING THE VISION **FOR CARE**

Providers incorporate more data from outside sources.

By Joseph Goedert

When Mental Health Center of Denver first launched an illness management program, it began by sending treatment data back to the patients, detailing their progress toward recovery, using as a basis the information contained on patient and therapist surveys. Patients received reports

every three months, and the therapy center hoped the additional information would spark new conversations between patients and therapists.

Later, the center added a harm reduction initiative—it included questions intended to assess patients' risk for suicide. Their answers would alert therapists if a patient might require intervention. Over time, other behavior risk factors were add-

ed to the exercise, such as whether a patient was arrested, lost a job, had substance abuse issues, committed a violent assault, attempted suicide or was hospitalized.

Now, the center is further expanding its efforts to use such "nonclinical" information to improve care for patients, says Wesley Williams, vice president and CIO.

Healthcare organizations of all stripes are beginning to take steps to incorpo-

Image from gettyimages

rate social determinants of health into patient assessments. It's an acknowledgment that a variety of factors feed into the physical health of a patient. Clinicians see mounting evidence that a holistic view of patients is needed to first make them healthy and then to keep them that way.

Capturing and sharing such patient-specific, nonclinical information is new to providers, and current information technology is slowly adapting to new calls for clinicians to have access to this information. Many believe such patient-specific information will help improve treatment and achieve cost-effective results.

Behavioral impact

Historically, behavioral health providers have had little integration of their records with those of medical providers. That is changing, but progress is slow, says Mike Valentine, CEO at Netsmart Technology, a company that develops IT solutions for behavioral health providers.

Five years ago, the only communication of patient data between mental health and medical providers was achieved through faxes and phone calls to administer referrals. Now, thousands of mental health providers are electronically communicating with medical providers via continuity of care documents, he adds.

Some are striving to do more, and Mental Health Center of Denver is a case in point. After its initial foray into collecting data on patients, the next step was to gather the data in an electronic health record system, which was the start of moving toward the use of behavioral analytics to change patient behavior. "We are stratifying the populations that we serve to be able to play closer attention to them," Williams says.

Over time, the Mental Health Center of Denver started licensing its recovery measure tools to other mental health centers. Then, it used in-house data analytics to develop tools to aid therapists and case managers in assessing a patient's progress in mental health recovery

by rating patient self-assessments.

Netsmart learned of the work that Mental Health Center of Denver has done and two years ago contracted to resell the center's products, which now are part of the vendor's portfolio. "Analytics offer the radar that providers need to track gaps in care," Williams says. "We need to work with other providers and create a longitudinal view of patients. Prior to this, we had no visibility in the outside world."

Rise of connectivity

Interoperability of electronic health records systems is improving, giving rise to increased incorporation of social determinants of health with electronic health records, and there's growing hope that such exchange will improve in the coming years.

For example, Netsmart has its own health information exchange that connects to the Sequoia Project's CareQual-

"Prior to this, we had no visibility in the outside world."

—Wesley Williams

ity HIE, enabling data exchange among providers using EHRs from Epic, Cerner and Allscripts, and building out to more trading partners, helping to enable more behavioral information to be included in providers' EHRs.

Better connectivity between mental health and medical health providers is critical to improving the lives of at-risk patients, Valentine contends, adding that while analytics better enable providers to track gaps in care, it is up to providers to work with each other and create longitudinal views of patient records.

Valentine notes that a study several years ago found that those with a serious mental illness die 20 years earlier than they might otherwise because of physical illnesses, and when a patient has a men-

tal health issue and a chronic medical condition, treatment costs are two to five times higher than for patients having just a chronic condition, because of the lack of coordination between mental health and medical providers.

Winds of change

In large part, pervasive use of health information technology has been the exception in mental health care. Change is coming, as data analytics capabilities are maturing, enabling deep-dive looks into patient lives using social determinants of health, and structured and unstructured data, says Elizabeth Marshall, director of clinical analytics at Linguamatics. The vendor sells natural language processing software to life sciences and healthcare providers.

Social determinants of health are factors that contribute to a person's current state of health, according to the Centers

for Disease Control and Prevention. These factors may be biological, socioeconomic, psychosocial, behavioral or social in nature. The CDC classifies social determinants into these categories—biology and genetics; individual behavior; social environment; physical environment; and health services.

Analyzing data using natural language processing helps to use social determinants of health to identify the core factor affecting a patient and prospects for a better outcome, Marshall explains. A patient may have diabetes and be taking medications, but physicians often don't know important social determinants of health that could inform the level of support a patient will need for a successful outcome.

For instance, if the patient's income is at the poverty level, he or she may eat frequently at fast-food restaurants, which may indicate that the patient needs to see a dietician or receive social services to afford healthier meals.

"The concept of nature vs. nurture has been around since the late 1600s, yet the use of social determinants is just coming into play now," Marshall says. "Everyone is concerned with capturing data, but we need to use the data to optimally improve patient outcomes."

Rating patients

Data and analytics can help improve care for patients and spot those at risk for life-threatening events. For example, the Mental Health Center of Denver has adopted the Columbia-Suicide Severity Rating Scale of Columbia University, a free product that uses a series of simple plain-language questions to identify those who are at risk of suicide, measuring the severity of risk and the level of help that person needs. Answers given by patients are compared with the answers they gave when they were last assessed, generating a new score and enabling trending over time to see how a patient is faring.

To incent patients to participate in the Columbia project, the mental health center offered a \$5 grocery store coupon for those who signed up for a personal health record account and completed a self-assessment; about 1,500 patients got accounts. PHRs have not been overly useful to patients, Williams says, so the participation level was a pleasant surprise, and it enabled the center to get more data to support analytics and provide more feedback on recovery progress to participating patients.

Still, there is unfinished work for the health center.

With help from Netsmart, Mental Health Center of Denver is using natural language processing technology to sift through years of progress notes and treatment plans to find and capture "phrases

of relevance," Williams explains. For instance, a patient may have told a physician about suicidal thoughts, but that information may be buried in notes in the patient's records, and may not be communicated to other clinicians who take on the case. NLP technology can find key phrases of suicidal tendency in the patient's records and facilitate communication of that risk to the care team.

Williams hopes to be able to expand to use of predictive modeling analytics to better pinpoint patients at highest risk and alert clinicians.

Accelerating care

Social determinants of health, and the use of IT to enable behavioral health, are gaining wider attention from new treatment approaches.

"We need to use the data to optimally improve patient outcomes."

—Elizabeth Marshall

For example, TelaCare, a telemedicine vendor, recently added behavioral health services that enable individuals to speak to a U.S. -licensed counselor.

The consultations can be done through videoconferencing, text messaging or mobile apps. The behavioral health services were made available this September at no additional charge to clients and with no out-of-pocket expense for an individual receiving a consultation.

Services are offered for such issues as depression, anxiety, relationship challenges and other stresses of life. "Every year, one in four people will deal with a mental health disorder, yet less than half of these individuals will actually receive treatment," says Larry Jones, CEO at TelaCare.

And there's growing recognition of the need to improve IT offerings to better support behavioral health and nonclinical influences on a patient's well-being.

For example, the Massachusetts eHealth Institute at the Massachusetts Technology Collaborative in August awarded nearly \$200,000 to four electronic health record vendors to aid behavioral health providers in electronically submitting reportable data to the state's Children's Behavioral Health Initiative, which works to ensure children with mental health challenges get treatment.

The funding will enable vendors to build new electronic interfaces connecting 12 behavioral health providers that will submit reports electronically, replacing a manual process currently used for about 40,000 reports that they submit to the state each year.

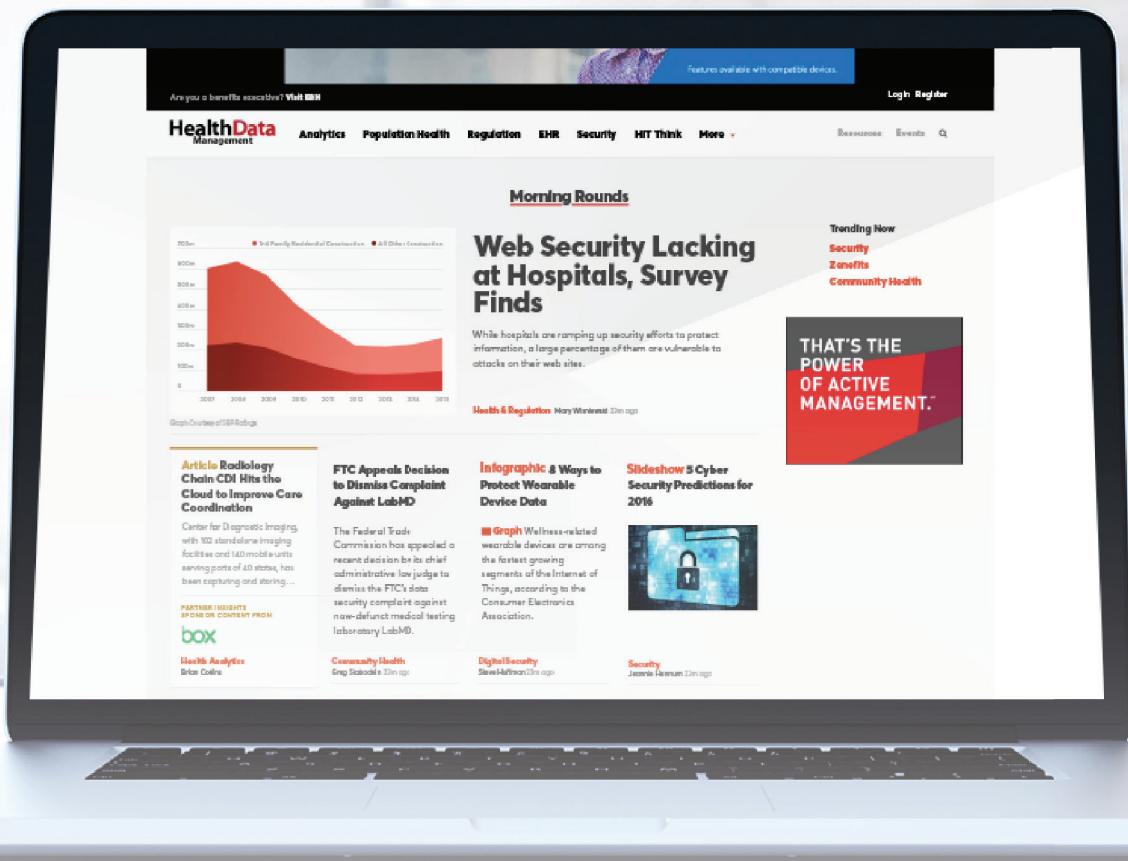
The Children's Behavioral Health Initiative is a court-mandated program requiring behavioral health providers serving

children younger than age 21 to submit patient data so the state can better assess the needs of the patients.

In Massachusetts, behavioral health providers have had to gather patient data via an assessment tool that was tracked in their electronic health record system, but providers then had to manually reenter the data into a state information system, a process that takes two hours of staff time per patient per quarter and is vulnerable to data submission errors.

"From what I can see already, this upgrade will have a tremendous benefit to how we handle patient records," says Scott Turton, director of health information systems at Gosnold on Cape Cod, an addiction treatment center. "This new interface is much more streamlined, as the data is pulled directly from the patient's existing electronic record, compiled by this new interface, and then submitted from the new interface directly to the state." ■

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Paul J. Chang, MD

Professor and vice chairman of radiology informatics
University of Chicago School of Medicine

The Chang File

- Harvard University, BA
- Stanford University, MD
- Stanford University, MS, engineering-economic systems
- Co-founder, Stentor (acquired by Philips), an enterprise image delivery solution
- Gold medal recipient, RSNA, 2016

Interview by Fred Bazzoli

Aiding radiology's value shift

Paul Chang, MD, assesses how information technology should be used in healthcare with a unique perspective—that of an engineer. He has spent his career examining how IT can be used in healthcare, specializing in bringing benefits to radiology. His engineering background has sensitized him to solutions that won't deliver real-world benefits. "In medical school, I got my engineering degree to develop a good BS meter," he says. The industry gets too easily enamored with fancy technology and esoteric capabilities that don't provide sufficient benefits. Chang has emphasized how IT can be used to answer specific needs. For example, at the University of Iowa, he created a teleradiology network to provide primary interpretation of images. And he's been a long-time advocate for deep and granular IT system interoperability to support data-driven informatics workflow in radiology.

Where IT has gone wrong

Healthcare IT is being driven by capability rather than by use cases. I believe we're a good 10 to 15 years behind other industries in leveraging IT. I think too many people in our space love technology when, in reality, I think that's an incorrect focus. For example, now there's a lot of hype about the cloud, and CIOs are saying, "We have to do something in the cloud." Well, what is the prob-

lem we're trying to solve and how would the cloud fit into that?

On technology and radiologists

At the University of Chicago, I have operational responsibilities for IT in radiology; I don't have time for technology that's nice to have. For example, with deep learning technology, emerging applications are exciting radiologists, but these early use cases are not very compelling: they are "nice to have," but not yet "must haves" that will truly add demonstrative value.

On changes in radiology

When providers were paid under fee-for-service, radiologists got big toys and we were decision makers. As the industry moves to shared risk and capitation, that's changed. We are quickly becoming a cost center. The fundamental challenge in radiology is that when it comes to IT, we don't have to be radiology-centric—we have to have an enterprise perspective; in other words, what are we in radiology going to do to improve the efficiency or quality of care for the entire organization?

The impact of value-based care

Radiology has to improve the entire cycle of a patient's treatment. We need to understand the value proposition of the radiologist and reengineer how we use IT to support the entire enterprise.



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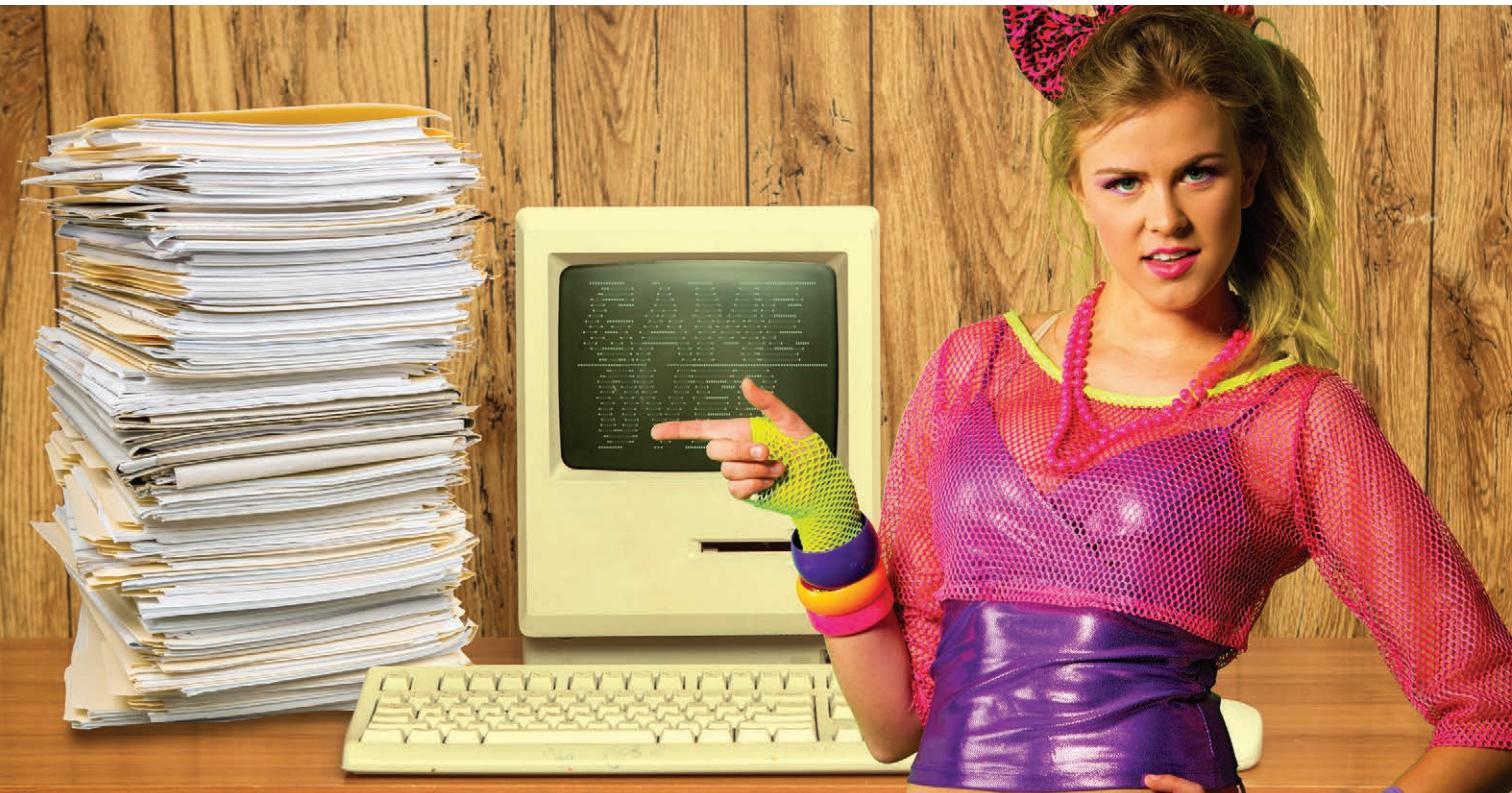
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