Information Overhaul

CLOUD COMPUTING

INSTRUMENT INTEGRATION

IMAGE MANAGEMENT SYSTEMS

HEALTH INFORMATION EXCHANGES

Electronic Medical Records: Are you ready for what's next?

BY JOHN SAILER / SENIOR EDITOR

Any eyecare professional who is not already aware that the government is offering financial incentives for installing electronic medical records (EMR) in their practices is dangerously behind the times. While ECPs have been bombarded for the past few years with information about the possibility of receiving as much as $44,000 for the "meaningful use" of certified software, this is only the beginning, a means to an end of what the implementation of EMR is really about.

Ultimately, EMR reaches well beyond these basics of incentive payments. The paramount goal is improving the efficiency with which all health care professionals store, access and share informa-tion, thereby resulting in better patient care and overall health. And this overhaul will be driving practice success for years to come.

Of course, the incentives established when Congress passed the Health Information Technology for Economic and Clinical Health (HITECH) Act in 2009 have proven very effective at getting the ball rolling, encouraging ECPs to install EMR in their offices. According to the American Optometric Association, through September 2012, 3,089 optometrists have been paid $48,297,933 in the Medicare EMR incentive program, which includes, collectively, $38,793,993 for meaningful use in 2011 and $9,504,000 for meaningful use in 2012.

The results of *Review of Optometry's* 35th Annual Diagnostic Technology Survey (Sept. 15, 2012) also illustrate EMR's rapid implementation. EMR software was the number one choice, at 41 percent, for optometrists who were asked, "What type of new technology are you now considering purchasing (or have purchased in the past three years)?" In addition, as many as 64 percent of respondent ODs now use an EMR compared with only 39 percent in 2009, the year the HITECH Act was passed.

An even larger percentage of physicians in the overall health care community are embracing EMR, according to a study continuing through 2013 by the U.S. Centers for Disease Control and Prevention's National Center for Health Statistics. It found that 55 percent of U.S. doctors have insti-tuted some type of EMR.
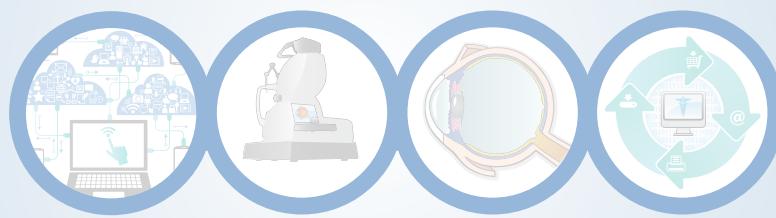
EMR: More Than Just Stimulus Money

Those who have begun using EMR in their day-to-day practices are already realizing the benefits. Practitioners are no longer chained to their desks or diagnostic equipment when reviewing patient data but rather can access it from anywhere they have a computer, tablet or smartphone with an internet connection. Similarly, information can also be electronically accessed by other practitioners as well as by patients themselves. EMR can prove to be a benefit to the bottom line as well. Just some examples of this are that improved efficiencies can help reduce staffing needs while freeing up time to see more patients, and electronic storage requires far less space than paper records, resulting in the possibility of reducing necessary real estate.

"The push wasn't just to get people on electronic health records and get everyone using iPads and laptops," said Steve Baker, president, Eyefinity. "It was done to share data and seek to lower the cost of health care, which won't happen until the health care community goes electronic."

Vision Monday has explored some of the ways that EMR goes beyond just stimulus money, helping to make ECPs more efficient and ultimately, hopefully, make patients healthier:

- **Cloud computing** enables practices to store their data offsite, accessing it from anywhere and eliminating the need to maintain and update in-house servers.

- **Integrating instruments** with EMR software saves time and eliminates human data entry errors by electronically transferring information from the diagnostic device directly into the patient record.

- **Image management systems** do the same, but on a bigger scale, for the large-file digital pictures these devices take when monitoring patients' health.

- **Health information exchanges** share all of this information via secure encrypted portals, allowing all those involved in the patient's care as well as the patients themselves to access the information whenever and wherever necessary.

Electronic medical records are quickly becoming the status quo. Are you ready for what's next? ∎

For the EMR Uninitiated

In 2009, Congress passed the Health Information Technology for Economic and Clinical Health (HITECH) Act to promote the adoption and "meaningful use" of health information technology. The Act not only provided financial incentives for practitioners who implemented the "meaningful use" of certified electronic medical record (EMR) software in their practices between its passing and 2014, but it also reduces Medicare and Medicaid reimbursements for those who cannot document "meaningful use" of such a system by 2015.

The bottom line is to implement EMR now and receive financial incentives (see chart below), or wait until after 2015 to do so and suffer penalties every year. As the chart illustrates, ECPs who haven't installed an EMR yet have already missed out on receiving the full $44,000 worth of available incentive payments, but there's still time to receive $39,000 by implementing EMR in 2013 or $24,000 by starting in 2014.

The U.S. Department of Health and Human Services Office of the National Coordinator for Health Information Technology has authorized five organizations to certify EMR software. They are the Certification Commission for Health Information Technology, the Drummond Group, ICSA Labs, InfoGuard Laboratories and Orion Register.

In addition to using a certified EMR system, ECPs must demonstrate "meaningful use." All providers begin participating by meeting the Stage 1 requirements for a 90-day period in their first year of meaningful use and a full year in their second year of meaningful use. After meeting the Stage 1 requirements, providers will then have to meet Stage 2 requirements for two full years. A complete description of all of the Stage 1 and Stage 2 meaningful use requirements can be found on the Centers for Medicare & Medicaid Services website at www.cms.gov.

Calendar Year	Maximum incentive payments based on the first calendar year in which an ECP participates			
Year	2011	2012	2013	2014
2011	$18,000			
2012	$12,000	$18,000		
2013	$8,000	$12,000	$15,000	
2014	$4,000	$8,000	$12,000	$12,000
2015	$2,000	$4,000	$8,000	$8,000
2016		$2,000	$4,000	$4,000
Total	**$44,000**	**$44,000**	**$39,000**	**$24,000**

Source: Centers for Medicare & Medicaid Services

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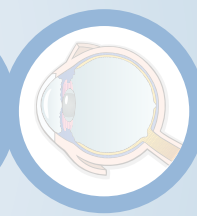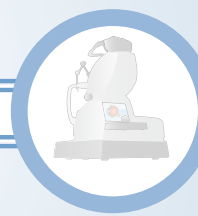
Computing in the Cloud for Virtual Data Storage

One of the major benefits of using EMR is the potential for eliminating all the storage space previously required by paper records, and now that many software programs are offering the option of storing information "in the cloud," even more space can be freed up by eliminating a lot of the computer hardware previously required.

In simplest terms, cloud computing means storing information on a remote bank of servers and virtually accessing it via the internet, as opposed to housing data on servers maintained by the optometrist in or near the practice.

This can be disconcerting to some ECPs who might worry about whether they still retain ownership of their data when it's stored somewhere remotely or who may also be concerned about security and the fact that they no longer actually have possession of their information. According to Floyd Webb, vice president of Eyecom3, who said his software company was drawn into cloud computing more than four years ago, these worries are unfounded. "Whether hosted internally on a local network or on the cloud, most software offers a function to export data, and most databases are encrypted," he said, thus ensuring that the ECP's data is both available and protected.

Robert A. Hoffman, OD, in private practice in Folsom, Calif., addressed this concern by adding backup storage in his own office. His software vendor, OfficeMate, works with ThinkSmart, Inc. for data storage, and even though the system backs up in three places, Hoffman requested a fourth backup in his office for extra security. "Knock wood, we haven't had to use it yet," he said.

In addition to offering cloud computing for OfficeMate, Eyefinity's Acuity Logic also features this capability. Eyefinity acquired Acuity Logic about two years ago. Currently running in about 300 locations, Acuity Logic is scheduled for a major launch in the near future.

"Cloud computing is becoming much more normal than when we launched it in 2006 when peo-ple worried where their information was," added Scott Jens, OD, FAAO, CEO of software company RevolutionEHR.

However, one important consideration is where your data is actually hosted. It's important to be sure the servers that compose the cloud your software vendor is using are safe and secure and managed by a reputable company. Webb suggested choosing a software company that utilizes a professional facility such as the one operated by General Dynamics, which not only features built-in redundancies in the case of lost data but which is also bunkered to protect it from disasters and prevent it from losing data in the first place. Another example is Amazon's cloud, which is where the software company Practice Director stores the information its EMR users generate.

"You still need to know what's behind the curtain," agreed Nitin Rai, president/CEO of software company First Insight, developers of MaximEyes software. "You need to know who's hosting the cloud." He said that ECPs need to be educated about what the software company they have selected is using as their cloud. "What if something shuts down or if the company goes bankrupt?" he asked.

Another question to ask, is how far away the server site is from your office, according to David H. Hettler, OD, of May & Hettler in Alexandria, Va. He began using MyVisionExpress from Insight Software in his seven-unit practice four years ago "because it was one of the first programs to allow for cloud computing," he said. The cloud "needs to be somewhat close to you otherwise there's a lag after your request for information, irrespective of the speed of the server or your connections," he said. "It needs to be in the same half of the country that you're in and you need to test it."

Benefits of Cloud Computing

Still, even with all the caveats, the trend continues toward computing in the cloud because the benefits tend to outweigh the negatives. Hettler compared the efficiency of practices going to centralized server farms to the days of the industrial
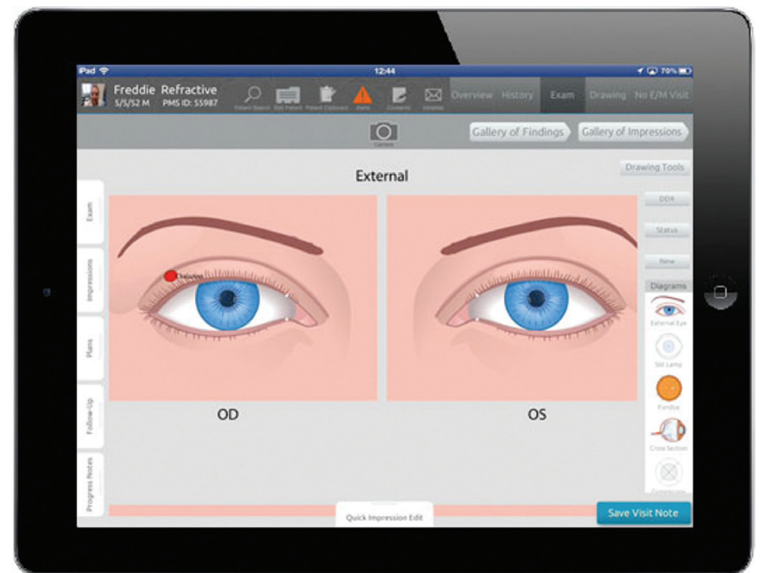

Modernizing Medicine's Electronic Medical Assistant is a cloud-based EMR available as a native iPad application or from any web-enabled Mac or PC.

revolution when factories switched from producing their own energy to accessing it from a single power plant. The economies of scale are simply more efficient, and the ECP is freed from managing the maintenance and updates of an in-house server.

"With the cloud, system updates and backups are automatic," said Brad Rourke, president/CEO, Wil-
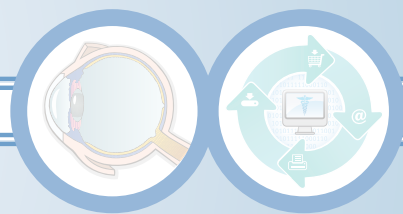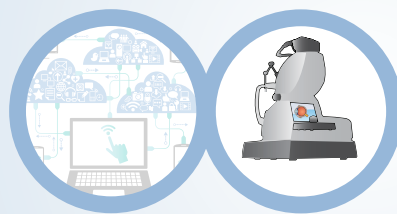
Directly Integrating Diagnostic Instruments With EMR

When implementing EMR, accuracy and efficiency are improved, in part from the ability to integrate diagnostic instruments. By having your lensometer, autorefractor, keratometer and/or other devices automatically transfer information directly into your patient's electronic record, not only do you save inputting time, but you also eliminate human error.

There are extensive examples of EMR systems integrating with diagnostic instruments. For example, Vmax recently introduced a new interface that allows MaximEyes users to launch a PSF refraction exam directly from the program. There are plenty more. For those software companies listed on the EHRcompare.com website (see sidebar), which

Through cloud-based integration, RevolutionEHR collects data directly from Marco refractive equipment.

offers side-by-side comparisons of available software, a quick glance at the profile for each program indicates which equipment manufacturer that software partners with.

However, experts advise users to beware. While human error may be eliminated, in some cases

there is still the potential for mistakes resulting from miscommunication between the device and the software. For example, Parker of Drs. Robinson & Parker, said, "A lot of people tell me that instrument integration doesn't always work the way you think." He explained that sometimes incorrect formatting can result in errors. He cited one instance when a plano prescription transferred incorrectly into the patient's record simply due to a formatting error. This could result in the ECP spending more time manually re-entering the correct information. "When the formatting is not correct, the hardware company blames the EMR company, the EMR company blames the hardware company and the doc is stuck in the middle," he said.

Digital Imaging and Communications in Medicine (DICOM) is emerging as a standard protocol for diagnostic instruments to communicate with EMR. "Some EMR are and some are not DICOM compatible. Some devices are DICOM capable and some are not," said Chris Moore, CEO, Integrity EMR. "You really want a system that can be flexible with integrating diagnostic devices, whether DICOM or not."

"The complete electronic experience works best when everything comes together, such as OfficeMate or AcuityLogic for practice management and our electronic health record solution, ExamWriter," said Steve Baker, president, Eyefinity, whose ExamWriter program integrates with diagnostic equipment.

Some device manufacturers are being proactive about communicating with EMR systems. For example, to help improve connectivity between diagnostic instruments and software programs, equipment manufacturer Topcon has introduced its EMR Portal at emr.topconmedical.com. It allows EMR vendors to download connectivity information for all of Topcon's devices and software, enabling EMR software developers to quickly access the latest communication data and track the integration for each device or software system.

One glitch software developers and diagnostic instrument manufacturers are currently addressing and beginning to offer solutions for is the way in which diagnostic equipment can integrate with EMR via the cloud. For example, software developer RevolutionEHR recently introduced an interface that enables Marco diagnostic equipment to communicate with its software over the cloud. ∎

How to 'Find the Best'

The EHRCompare.com website was designed especially for those who still haven't installed electronic health records (also known as electronic medical records) but are planning to do so. A self-described resource to "Find the Best EHR," the website compares and reviews "405 of the most popular EHRs." While it lists software for a wide variety of specialties, including optometry and ophthalmology, a search box enables users to narrow their review to the specific one in which they are interested. Other search criteria allow users to also choose the setting in which they practice as well as how the software is hosted, whether "in the cloud" or "locally maintained." In addition, for each software program featured, the website includes a checklist indicating all of the features of each product, such as practice management and eyecare-specific features and more.
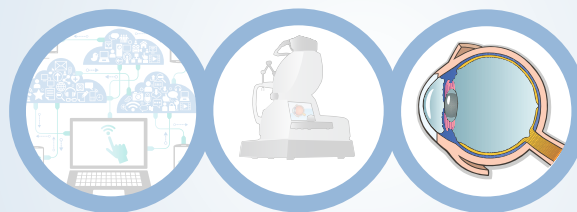
Image Management Systems Store Pictures and More in One Place

Similar to instrument integration, image management systems also transfer data to EMRs but are more highly specialized. Specifically designed to handle digital images, these independent software programs run outside of the EMR, bringing all diagnostic imaging together, even from instruments of different companies. Any computer screen, tablet or other device in the office can view the image, freeing up the diagnostic instrument itself for use by another practitioner. Benefits include improved office efficiency, overall time savings for both patient and doctor and better patient education.

There are a multitude of examples of the variety of ways optometrists are electronically managing images. (See chart below for a list of available image management systems.) Carl Zeiss Meditec recently received FDA clearance for version 3.0 of its Forum Eye Care Data Management system, which enables eyecare practitioners to centrally store diagnostic data from various ophthalmic DICOM instruments, including the new family of Cirrus HD-OCT and Cirrus photo instruments, and integrate with other DICOM software systems.

Topcon's Synergy Ophthalmic Data Management System integrates images and reports from Topcon and more than 135 other manufacturers' systems into a single, secure, digital environment.

To integrate his diagnostic imagery, such as retinal photography, Robert A. Hoffman, OD, uses iScape, which stores pictures on a computer for easy access by the OfficeMate program he uses. He's in the process of setting up a system that will store the images directly in the program. "When I get it set up I can access them from anywhere," he said.

Merge Eye Care PACS is a standalone application that supports the DICOM OPT (OCT) standard and video and works with an EMR to integrate all diagnostic devices and clinical applications, enabling ECPs to review all of their patient's images and diagnostic reports side-by-side from anywhere.

Vision Care of Maine linked its NextGen EMR to Cabinet NG's CNG-SAFE (Shared Access Filing Environment) to store all patient images and related documents. With six doctors, 41 staff members, seven locations and two surgical centers, Vision Care of Maine can access any image from any of its locations within a 250-mile radius, according to Andrew Durkovich, CFO, CIO, CMO.

While the benefits can be substantial, there are some concerns regarding image management systems, and cost is one of them. "Regarding instru-
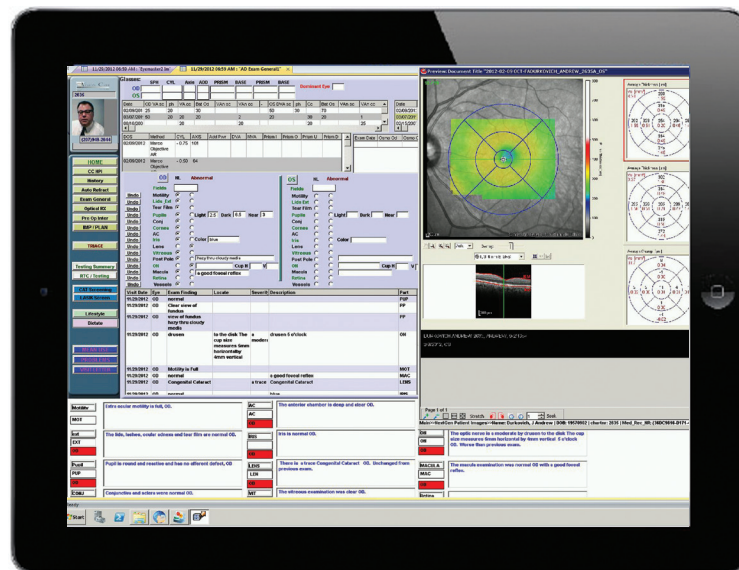
Vision Care of Maine linked six doctors, 41 staff members, seven locations and two surgical centers to its NextGen EMR using Cabinet NG's CNG-SAFE.

Image Management Systems on the Market

System	Vendor	For More Information
Forum Eye Care Data Management	Carl Zeiss Meditec	www.meditec.zeiss.com/forum
iViews Imaging System	Chase & Associates	www.iviewsimaging.net
IMS/CL Clinical Image Management System	HAI Laboratories	http://hailabs.com/software/image-management
DigiVersal	Kowa	www.kowa-usa.com/kowanewweb/medical/solutions.html
Medflow Imaging	Medflow	www.medflow.com/imaging.php
Axis Image Management	Sonomed Escalon	www.sonomedescalon.com/axisimagemanagement.html
Synergy Ophthalmic Data Management	Topcon Medical Systems	www.topconmedical.com/products/synergy.htm

Source: Review of Optometry, September 15, 2012
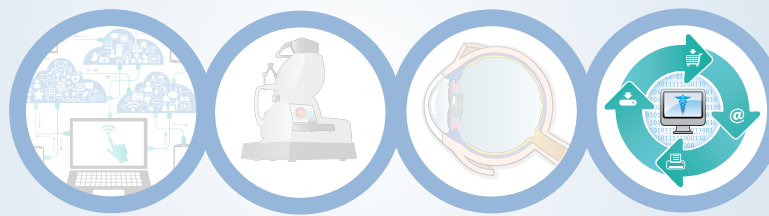
HIEs Will Allow Patients and Practitioners to Share Data

To qualify for the incentive payments established by the HITECH Act, users of electronic medical records must demonstrate "meaningful use," which is being implemented in three stages. Stage 2 Meaningful Use standards, which will go into effect in 2014, require connectivity among all care providers and with patients themselves. This will be achieved by electronically transmitting patient health records (PHRs) and continuity of care documents (CCDs) via the internet through health information exchanges (HIE).

However, many of those involved in both the development and use of EMR observe that the use of HIEs hasn't quite caught on…yet. However, because it is a requirement of the HITECH Act, eventually it will.

To achieve Stage 2 Meaningful Use, ECPs will be required to transmit patient health records and continuity of care documents through health information exchanges.

"The ability is out there for health information exchanges, but in our profession, not many people are using them," said Adam P. Parker, OD, of Drs. Robinson & Parker in Midlothian, Va.

"There's s still a lot to be figured out with health information exchanges. For example, the government requires that you send the CCD, but it doesn't even include glasses or contact lenses prescriptions, so it's somewhat inefficient for optical doctors," said David H. Hettler, OD, of May & Hettler of Alexandria, Va.

Patients are also slow to adopt HIEs. "We're not seeing great demand for patient access," said Anthony S. Diecidue, OD, president/CEO of Mountain Computer Systems, makers of Eyebase software.

Still, it's coming, and just as once cutting-edge EMRs are now becoming commonplace, so too will HIEs. "HIE is something that's starting to happen, but it's slow going because it's on a state-by-state basis, and each state has different protocols…but it is happening," said Korry Petterson, president of software developer Fox-FireSystems Group in Sioux Falls, S.D.

Because the ability to communicate via an HIE is required of certified EMRs, some say that this is something ECPs don't have to concern themselves with. "Optometrists should not worry too much about HIE," said Chris Moore, CEO, Integrity EMR. "Any system they choose has to be certified, and in order to be certified it has to communicate with HIE."

Still, the ability to share information among all of the doctors responsible for a patient's care as well as with the patients themselves is one of the primary goals of the implementation of EMR, so it's already starting to catch on among general practitioners. According to CapSite's 4th Annual U.S. Ambulatory Electronic Health Record & Practice Management Study published in September and focusing on assessing the impact of the HITECH Act, 43 percent of U.S. physician groups plan to join an HIE.

For patients, online access to medical records and secure e-mail communication leads to increased office visits, according to a five-year study concluded in 2010 by Ted E. Palen, MD, PhD, MSPH, of the Institute for Health Research, Kaiser Permanente Colorado, Denver.

A staunch proponent of the implementation of HIEs is Alistair Jackson, VP, business development, EMRlogic Systems Inc. He predicts that in order for optometrists to be able to participate on the care team it will be necessary for them to share information over HIEs. "Optometrists need to be proactive, otherwise they'll lose access to their own patients," he said. On his blog at emrlogic.com, which explains the core tenets of meaningful use and details his views regarding the ultimate purposes of EMR, he encourages optometrists to, "Get informed, engaged and empowered as a provider before your patients start asking you for things they expect you should know about well ahead of them."

He also described the Direct protocol for communicating via HIEs: "As you learn more about your state Health Information Exchange, you'll uncover a whole new network of regulations and protocols akin to what we've all gone through thus far to achieve certification and meaningful use attestation. Since the HIE is all about exchanging health information, you'd expect—and indeed find—an approved encrypted transmission protocol. That's ONC Direct. And that's what Health Information Service Providers must use."

AOAExcel XNetwork

As an alternative to HIEs, the American Optometric Association's wholly owned subsidiary AOAExcel will launch the AOAExcel XNetwork in the first quarter of 2013. It will enable ECPs to connect
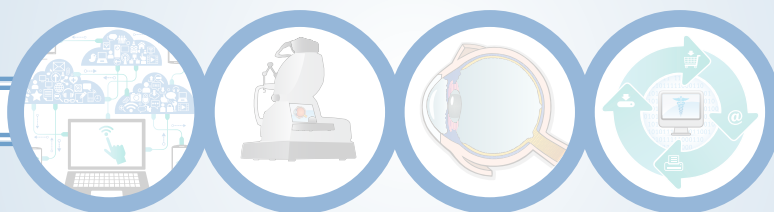
electronically to physicians, hospitals and their ancillaries, pharmacies, payers, benefit managers, optical labs, medical labs, imaging and radiology services, employer human resource departments, home care providers, and with patients themselves.

Primarily for practitioners who are not members of health information exchanges (HIE), the AOAExcel XNetwork will offer health information technology (HIT) networking, connectivity and secure patient communications services for optometric practices. The XNetwork services are being developed in conjunction with AT&T as part of its Healthcare Community Online program. AT&T already offers similar services for medical doctors and hospitals.

"The XNetwork is not an EHR software program but rather a network that can be used to connect the EHR in an optometrist's office with EHRs in other health care practices or facilities and thereby allow for the exchange of patient information among them," said Ian Lane, OD, AOAExcel chief medical information officer. According to the AOA, it can be used with virtually any commonly available EHR software program.

"It will effectively ensure that optometrists who wish to meet Stage 2 standards and thereby qualify for federal incentive bonuses will be able to have the required connectivity," said Joe Ellis, OD, AOA Excel chair and past president of the AOA. While the XNetwork is being developed largely to ensure interoperability and connectivity for practitioners who are not HIE members, or for those who may not have access to HIE services by the time Stage 2 compliance is required under federal incentive programs in 2014, Ellis believes even many ECPs with HIE access will subscribe to the XNetwork to ensure connectivity with health care practitioners and institutions that cannot be accessed through their HIEs.

Even for optometrists using EMR systems that may have achieved Meaningful Use Stage 1 but are unable to achieve Meaningful Use Stage 2, those that Lane described as "certified for meaningful use but not meaningfully useful," the XNetwork will enable them to have the connectivity necessary to achieve Meaningful Use Stage 2.

Whether optometrists are ready or not, electronic medical records are quickly becoming the norm and the health information exchanges that enable them to electronically share information are following close behind. Those ODs who are proactive will surely reap the benefits sooner than those that lag behind and need to catch up later. ■

The Benefits of Cloud Computing

liams Group/Practice Director, which recently released a cloud-based option.

Adam P. Parker, OD, of Drs. Robinson & Parker in Midlothian, Va., who's been using OfficeMate for more than seven years, agreed, "Everyone is going to the cloud, because it's easier for everyone involved. Every time you open up the program you download the latest version. It's always updated, support is easier and it's less of a headache to maintain."

Hettler switched to cloud computing about four years ago after trying for years to integrate multiple locations. He's described the improvements since then as "logarithmically better," explaining that the data speed has dramatically increased while the costs have gone way down. To prevent downtime due to internet outages, Hettler maintains two connections at every location, cable with a Verizon 4G LTE backup. "If one goes down, it automatically kicks over," he said.

By computing in the cloud, you can now access your entire database from anywhere, or at least anywhere that you can connect to the internet via your laptop, tablet, smartphone or other device. "You can use any computer anywhere that has internet access," said Anthony S. Diecidue, OD, president/CEO of Mountain Computer Systems, makers of Eyebase software. "Cloud systems have come of age." ■

Image Management Systems

ment integration, and most applicable with images, ask the EMR vendor if there are any additional charges to integrate with devices or if there's third party software that's required," said Chris Moore, CEO, Integrity EMR. "Many EMR vendors market that they can integrate with diagnostic devices but only offer that interface through certain third-party software solutions."

Moore also warned that as with basic instrument integration, image management is also challenged when communicating with the cloud. "One of the challenges that EMR companies have not figured out is how to get particular imaging data up and down off the cloud in an efficient manner, so optometrists need to ask their EMR vendor if they are storing those images on the cloud or if they are storing them somewhere else," he said. "You need to be concerned with how much bandwidth is required and how fast the images will come down off the cloud. Some EMR systems compress the image to deliver more quickly, but the image isn't high quality."

One system that links with the cloud is the EMA Ophthalmology EMR system from Modernizing Medicine, Inc., which recently integrated Sonomed Escalon's AXIS image management software to provide cloud-based image management. ■