EHRs: Strategies for Integrating Diagnostic Devices

BY LESLIE BURLING-PHILLIPS, CONTRIBUTING WRITER
INTERVIEWING MICHAEL V. BOLAND, MD, PHD, MICHAEL F. CHIANG, MD, JEFFREY DAIGREPONT,
AND JEFFREY L. MARX, MD

From OCTs and fundus photography to visual field measurements, a myriad of equipment for imaging and testing is used in ophthalmic practices daily. In order to provide optimal patient care and achieve ideal workflow efficiency, the data obtained from these devices must be fluidly transferred into your electronic health record (EHR) system and, even more specifically, into the correct patient record. Historically, however, EHR and device vendors have designed their hardware and software with proprietary data formats.

"Most ophthalmologists realize that interoperability is a huge problem, but, unfortunately, many do not know that solutions exist," said Michael F. Chiang, MD, chairman of the Academy Medical Information Technology Committee and professor of ophthalmology, medical informatics, and clinical epidemiology at Oregon Health & Science University.

With a few pointers in mind—as well as an understanding of the current industry standards—physicians

and practice managers can take some straightforward approaches to successfully integrate diagnostic devices.

Before You Buy

Seek advice. Go to practices similar in size and configuration to your own to see the technology in use. "I found it very helpful to visit a few practices so I could ask questions about the installation, functionality, benefits, and pitfalls of their configurations," said Jeffrey L. Marx, MD, associate clinical professor of ophthalmology at Tufts University School of Medicine. He has since welcomed others into the Lahey Clinic, where he is the chairman of ophthalmology, to observe its system in operation. Using these firsthand experiences can help to shape your integration process, he said.

Incorporate a statement of work into your EHR contract. Prior to negotiating your EHR contract, create a list of every electronic medical device in your office, including serial number, manufacturer, and description, said Jeffrey Daigrepont, senior vice president at the Coker Group, a nationwide consultancy firm headquartered in Atlanta. Submit it, with any other addendums to your contract, as a "statement of work to an EHR vendor to determine whether or not a standard interface has already been created for each device or if one must be developed." When you negotiate your EHR con-

tract, make sure that the vendor has a financial incentive to demonstrate to your satisfaction that these devices are integrated into your EHR system, he said. "We suggest holding back—at a minimum—50 percent of the payment until you verify interoperability."

Try devices first. Many device vendors will allow practices to use equipment on a trial basis to ensure that it successfully functions with existing hardware and software. Before purchasing it, said Dr. Marx, "test not only the functionality of the equipment with your EHR but also with your image management system to ensure satisfactory interoperability. So far, every attempt we have made to integrate a device has been successful, but not all devices have met our needs." For example, he said that in a few cases the clinic has tried a piece of equipment that allows for transfer of information using the DICOM standard (Digital Imaging and Communications in Medicine; see "The Interoperability Standards"). However, the doctors have preferred the functionality or presentation of data with an existing machine that uses older "capture station technology." (This method of data transfer packages the image with demographic information and delivers it to the image management system.) Instead of forcing doctors to use the newer DICOM device, the clinic has waited for the original

equipment to be upgraded to DICOM capability. But, he said, "There are situations such as with cataract planning and lens selection where we have decided that while functionality of a topographer is important, it is even more critical to avoid any of the mis-associations that can occur with capture station technology. Therefore, we have on occasion moved away from the clinician's 'favorite' topographer to one that offers DICOM capabilities."

Calculate short- and long-term costs. When vendors supply an interface between the device and EHR, some will charge a one-time fee. "Others, however, charge an annual maintenance fee in addition to the initial price," said Mr. Daigrepont. "These future outlays can be as much as 15 to 21 percent of the original interface cost. So, for example, if you spend $10,000 to create the interface, you could be stuck with a recurring annual fee of $2,100. When you estimate a standard three- or five-year cost of ownership, these fees can get rather expensive. Keep in mind, too, that new software releases and hardware upgrades may involve even more 'hidden' fees." He added that "Conversely, some vendors charge a flat rate that covers their entire family of products." Review your contract to determine the total cost of the equipment. Then calculate your return on investment before committing, he said.

What Should You Expect?
Technology is constantly changing. "There has been a progression among vendors toward interoperability over time," said Dr. Marx. "When we first implemented our image management system about three years ago, companies were not adhering to any universal integration guidelines—there were no guidelines. Most vendors were using capture station technology. Now, DICOM capability is quickly becoming the industry standard for the electronic handling, storing, and transmitting of medical imaging information. Most vendors offer DICOM capability for their various pieces of equipment."

Indeed, said Michael V. Boland,

The Interoperability Standards

A few key standards are DICOM, HL7, and IHE. For more, see "AAO EHR Selection Checklist," at www.aao.org/mit, along with a vendor DICOM-conformance list.

DICOM (Digital Imaging and Communications in Medicine) facilitates the integration of diagnostic equipment from multiple manufacturers with your image management system. "DICOM compatibility decreases the potential chance for error in the clinic. It is the most reliable way to confirm a match between the test data and the corresponding patient chart," said Dr. Marx. Dr. Boland added, "Ask vendors for their DICOM conformance statement, which delineates the standards they are adhering to."

HL7 (Health Level Seven International) is the "language" used to communicate between information systems. "There are multiple variations (20+) of HL7. When considering HL7 conformity, confirm that you are comparing compatible versions," said Mr. Daigrepont.

IHE (Integrating the Healthcare Enterprise) is not a standard like DICOM or HL7. Rather, it is a body that specifies the standards necessary to allow communication between different companies' medical software and devices. "Ask vendors for their IHE Integration Statements and see if they are listed in the IHE Product Registry at http://product-registry.ihe.net/PR/home.seam," said Dr. Chiang.

MD, PhD, "We currently have several different vendors' products integrated into a DICOM archive, manufactured by yet another vendor. These advancements in the technology are promising. It was not possible for devices to interoperate at this level just a few years ago." Dr. Boland is a member of the Academy Medical Information Technology Committee and assistant professor of ophthalmology and director of information technology at the Wilmer Eye Institute.

Older devices can be tricky to integrate. For many practices, replacing a piece of equipment before it loses its functionality is not always financially feasible. Most physicians expect to keep their medical equipment for five to 10 years. But some older devices might not have USB ports or network connections, making it impossible to link in to the practice's system, said Mr. Daigrepont.

If you have a device that's relatively old, but you are not ready to upgrade, discuss the options with your vendor, said Dr. Boland. "In many cases, a work-around can be devised so that you can obtain reports from the device, which can be entered into your imaging management system. For example, some vendors make an 'electronic box' that can be attached

to a device's printer port. You can capture the output for each patient and translate it into a DICOM-compatible 'object,' which can then be sent to your image management system."

Integration of every device may not be necessary. In some cases, integration is just not possible. Or, if a work-around is achievable, the costs may not justify the outcome. Before you decide to replace the device, Dr. Boland advised assessing its value to your practice in terms of volume and convenience. "If you use the device once per week or less, for example, it may not be worth integrating. In this case, it may be easier to scan the output reports into your EHR system," he said.

Expect and demand change. Standards for interoperability are voluntary among vendors, and, currently, there are still no requirements for universal compliance among them. "While the trend has been toward simplifying the connectivity between systems and devices, and the Academy has advocated for industry standards, it often comes down to consumer demand," said Dr. Chiang. Physicians should educate themselves about the standards and urge vendors to adopt similar common compliance capabilities as seen in plug-and-play devices.