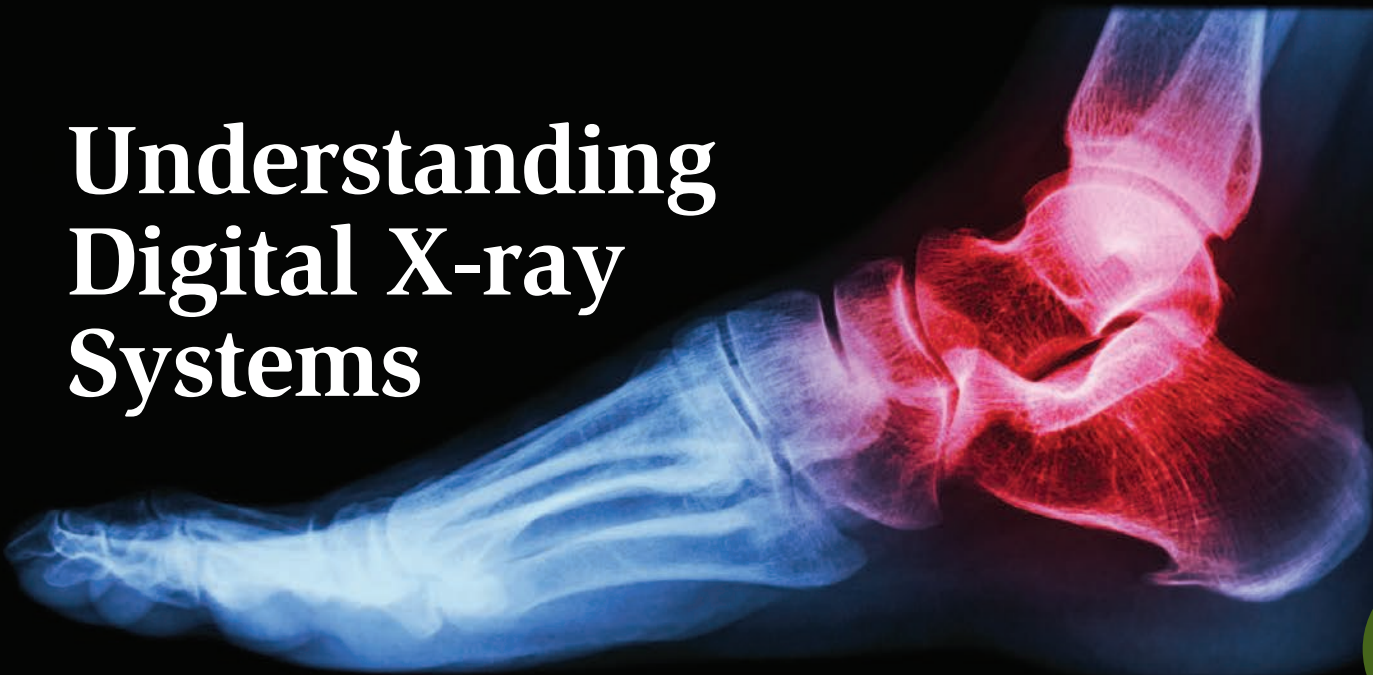


Understanding Digital X-ray Systems



Here are some considerations in deciding which is best for you.

BY MICHAEL L. BRODY, DPM

Does it make sense to install digital x-rays in your practice? Let's look at the costs associated with installing a system, your potential ROI, and finally at the two different types of systems available (CR and DR). At the end of this article, you should be well educated to make the decision that is right for your practice.

Any digital x-ray system has some significant advantages over a conventional x-ray system and these advantages include:

- The costs associated with purchasing and disposing of x-ray chemicals are eliminated.
- A dark room is no longer needed, allowing you to reclaim space in your office.
- Making copies of x-rays to share with other providers is much easier with a digital system.
- The costs associated with x-ray film and duplicating film are elimi-

nated.

- The mess and odor associated with x-ray chemicals are eliminated.
- The occupational health issues associated with x-ray chemicals are eliminated.
- The issues associated with aging chemicals and the impact on

viewing x-rays for diagnostic purposes.

- Digital image viewing software has tools that allow for measuring length, angles, density, as well as other image manipulation tools. These include tools to allow you to change contrast, magnify areas, as

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the quality of images are eliminated.

- All digital images are available much more quickly than conventional images.
- Digital images can be viewed on any computer screen and do not require light boxes.
 - Please note you must use an FDA-approved viewing station when

well as other image manipulation functions.

As you are aware, there are penalties for using conventional film and smaller penalties for using CR. We will look at what these penalties mean for your bottom line when making a decision on whether to

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change to a new system.

The cost-effectiveness of moving from conventional x-ray solutions to digital, or even moving from CR to DR, needs to be based upon a number of factors, including the cost of maintaining a conventional system compared with the costs associated with a digital systems. Generally speaking, a digital system includes a monthly or annual support fee which must be taken into account when considering the total financial cost associated with a digital system.

Part of your consideration in deciding whether or not to move to a digital system should include the ease of use for you. Both DR and CR systems will provide you with images must faster than conventional x-ray systems, with DR being about 20—30 seconds faster than a CR system. Both systems will come with a set of tools that allows you to manipulate the images which can be of use when evaluating the radiographic images. These tools can be extremely useful

in analysis of the images and can provide better visualization of both bone and soft tissue and can aid in your clinical decision-making.

Another factor to take into account when considering a switch to a digital system is patient satisfaction. In many instances, when patients are able to visualize that your office

decision has been made on whether or not to move to digital x-rays, a decision needs to be made on whether to utilize CR or DR. There are many systems available to podiatrists that utilize both technologies, and a comparison of each is appropriate at this time. Each technology has its advantages and disadvantages.

In many instances, when patients are able to visualize that your office is keeping up-to-date with the latest technology, it can improve the stature of your practice in the eyes of your patients.

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When factoring all of the issues discussed so far, a practice needs to take into account how many imaging studies are completed each day as part of their ROI calculations. Once a

CR

CR stands for computed radiography. In many ways, use of CR is very similar to use of your conventional radiography systems. You will have a plate with a 'film' inside the plate. That film is exposed and then the film is developed into a digital

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**TABLE I:
Comparison of X-Ray Systems**

	CR	DR	Conventional
Film	Re-usable film This does wear out but is relatively resistant to damage. Replacement cost is usually a few hundred dollars.	Special Sensor similar to a digital camera. This is sensitive electronic equipment and misuse/dropping can cause damage; and these are very expensive to replace.	Non-re-usable film that is sensitive to light. Each time an image is taken, the film needs to be replaced. Cost is usually about \$1 /film.
Developer	An electronic device that develops the re-usable film. Has motors, moving parts, and requires cleaning and maintenance. Repairs can be expensive.	None	A mechanical device that uses chemicals to produce an image on the film.
Computer	A computer with software and hardware that allows for storage and manipulation of the digital image.	A computer with software and hardware that allows for storage and manipulation of the digital image.	None

TABLE 2:
Reimbursement Parameters for Different X-Ray Systems

	Penalty Avoided	Dollar Value / Study	# of Studies Needed to Amortize Each \$1,000 in Expenses
Upgrade from film to CR or Upgrade from CR to DR	Avoid 10% penalty	\$3.00 / study	333
Upgrade from film to DR	Avoid 20% Penalty	\$6.00 / study	667

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image, the film is erased, and is then able to accept a new exposure. In a manner of speaking, you have re-usable film. The re-usable film does wear out over time and does require replacement after a number of uses, much the

same way that the battery in your cell phone will wear out and stop effectively taking a charge and will need to be replaced.

This re-usable film is developed into a digital image using a digital x-ray processor in a manner that is quite similar to the process of developing conventional images. At this point, you now have a digital image in your computer.

DR

DR stands for digital radiography. It is important to remember that both CR and DR produce digital images. DR is, in many ways, similar to the use of a digital camera. There is a sensor that is exposed to generate a digital image that is stored on the computer. DR does not require that the ‘film’ be developed, which makes it faster than CR.

There are a number of studies published that speak to the diagnostic quality differences of CR and DR. The vendors of the different technologies will be quick to point out studies that talk about the advantages of each. It is important to realize that the quality of your video graphics card and video monitor will have more of an impact on the quality of the image viewed than the method of capturing the image. When considering either system, you should place more emphasis on the hardware you will have to view the images rather than the capture method.

To understand this better, you should visit your local electronics store and look at the wall of TVs. You will find both LCD and plasma TVs. Which is better? As you look at the televisions, you will see that both have 720p, 720i, 1080p, 1080i, with variances in many other technical specs. To say that either CR or DR is better is akin to saying LCD or plasma is better.

The next important item to consider when making a decision is the ergonomics of the system. Both CR and DR systems can have capture devices that are embedded in orthoposers, or capture devices that are free-

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ly mobile, similar to the plates of conventional film. Which works better for your practice? When thinking about this, it is important to remember that a freely mobile DR plate is at greater risk of being dropped than a DR plate that is embedded in an orthoposer. If a DR plate is dropped, it can become damaged and require replacement. Replacing DR plates can be an expensive proposition.

There is no single answer as to whether CR or DR is better. Much depends upon your needs in terms of ergonomics, the likelihood of the plate being dropped, the need for faster images, the inter-operability of a particular

Whether you wish to use CR or DR will depend upon the cost difference between the two systems and the number of films you take annually.

system with your existing EHR and x-ray machine, and of course the cost of each system. Both will produce diagnostic quality images that can enhance many aspects of your practice.

The final aspect of decision-making relates to the penalty for using conventional film or CR vs. DR. It is important to remember that when taking an x-ray, we are being paid for two separate services—the technical component of taking the picture and the professional component of reading the film. Any penalties are ONLY imposed upon the technical component. The penalty for using plain films is 20% and the penalty for CR begins in 2018 at 7% and will escalate to 10%.

Reimbursement

The reimbursement for various images will vary by CPT code and your jurisdiction, but a reasonable reimbursement to work with for the technical component of a study is between \$25 and \$30. Table 2 is based upon a technical component of \$30 for each study.

The best thing to do is to use your practice management system to determine how many studies you do on average for Medicare patients annually. Determine the cost of upgrading your system, and then figure out how many years it will take for you to amortize the cost of the upgrade.

Inter-operability

One final part of the equation that cannot be calculated in terms of reimbursement dollars is inter-operability. A digital system can allow you to:

- Interface your x-ray system with your EHR, allowing easy access to your images through your EHR.
- Easily share your images with other providers who are providing care to a patient.

- Easily share your images with patients who may wish to have copies of their x-rays.

The intrinsic value of each of these features is huge. If you are currently using a film system, one option may be to look for a used CR system to allow you to take advantage of the advantages of digital systems and have a much lower cost of entry into the world of digital imaging.

The best way to proceed is to evaluate your needs, evaluate what type of systems you are comfortable with, and speak to your colleagues who have digital systems to learn about the advantages and disadvantages of each system. Whether you wish to use CR or DR will depend upon the cost difference between the two systems and the number of films you take annually. If you are still using film, you should consider switching to digital now. **PM**



Dr. Michael Brody has presented webinars for the e-Health initiative, (www.ehealthinitiative.org/) and is active in the EMR workgroup of the New York E Health Collaborative (www.nyehealth.org/). He has provided consulting services to physicians for the implementation of EHR software and to EHR vendors to assist in making their products more compatible with CCHIT and HIPAA guidelines. Dr. Brody is a member of AAPP.