

# Understanding Digital X-Ray Systems for Podiatry

Here's how to pick the best system for your office.

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**D**oes it make sense to install digital x-rays in your practice? We will look at the current status of Meaningful Use, the costs associated with installing a system, your potential ROI, and finally the two different types of systems available (CR and DR). At the end of this article, you should be well-ed-

ucated to make the decision that is right for your practice.

Let's start by looking at Meaningful Use and what the current and near-term requirements are for it. For 2014, your practice may be in Stage 1 or Stage 2 of Meaningful Use. Each of these stages has different requirements. The important take-away point is that Stage 1 has no require-

ment for images; Stage 2 does have a requirement for medical images. Please note that the term used here is images. Stage 2 does NOT require you to have a digital x-ray system.

For Stage 2 of Meaningful Use, there is a menu measure that relates to images. There are a total of six menu measures and you must meet three of these. The imaging measure

guidance sheet can be found at [http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/Stage2\\_EPMenu\\_3\\_ImagingResults.pdf](http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/Stage2_EPMenu_3_ImagingResults.pdf)

To meet this measure, your images must be accessible through your EHR Technology. The CMS tip sheet has details on this requirement. Some interesting aspects of this measure include the following:

- There is no limitation on the resolution of the image.

- Any image produced by ionizing or non-ionizing electromagnetic or particulate radiation, or any sonic, infrasonic, or ultrasonic wave that is emitted from an

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TABLE I:  
**Comparison of CR and DR Systems**

|                  | CR  | DR  | Conventional   |
|------------------|---|---|--|
| <b>Film</b>      | Re-usable film. This does wear out, but is relatively resistant to damage. Replacement Cost: 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-reusable film that is sensitive to light. Each time an image is taken, the film needs to be replaced. Cost: usually about \$1/film |
| <b>Developer</b> | 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.   |
| <b>Computer</b>  | 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   |

## *Digital X-Ray (from page 89)*

electronic product as a result of the operation of an electronic circuit in such product would be considered an image for the purposes of this measure.

- If the provider desires to include other types of imaging services that do not rely on electronic product radiation, they may do so as long as the policy is consistent across all patients and for the entire reporting period.

This means that many of the images produced by orthotic scanners would be included as an image for this Meaningful Use measure. This also means that a provider can elect to include photographic images of patients in this measure. That can include photographic images of radiographs.

Delving a little deeper into this, the threshold for this measure is only 10%. To get 10% of the im-

ages of a patient into an EHR product should not require that a provider install digital x-ray equipment to meet Stage 2 of Meaningful Use. So, to answer the question, “Do I need to have a digital x-rays to meet Meaningful Use?” the answer is a loud and clear **NO**. Will having dig-

Use, but that will not be until 2016 or later.

The writing is on the wall, and eventually we will need to be using digital x-ray equipment, but that day is not today. If you have a processor that develops standard or legacy x-rays, and that processor is working

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**It is quite possible, and even probable, that digital x-ray equipment may be needed to pass Stage 3 of Meaningful Use, but that will not be until 2016 or later.**

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ital x-rays make it easier for me to meet Meaningful Use? The answer is **Yes**.

It is also important to understand that for each successive stage of Meaningful Use, the bar is raised. It is quite possible, and even probable, that digital x-ray equipment may be needed to pass Stage 3 of Meaningful

just fine, you may not be able to justify the expense of converting to digital x-ray. If you need to replace your x-ray processor, then the wise decision is to take the money you would spend on that processor and use it towards the costs of upgrading to a digital x-ray system. Any

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## *Digital X-Ray (from page 90)*

digital x-ray system has some significant advantages over a conventional x-ray system. These advantages include:

- The costs associated with purchasing and disposing of x-ray chemicals is 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 eliminated.
- The mess and odor associated with x-ray chemicals are eliminated.
- The occupational health issues associated with x-ray chemicals is eliminated.
- The issues associated with aging chemicals, and the impact on 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

well as other image manipulation functions.

The cost-effectiveness of moving from conventional x-ray to digital needs to be based upon a number of

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**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.**

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require light boxes. (Please note you must use a FDA-approved viewing station when viewing x-rays for diagnostic purposes.)

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

factors, including the cost of maintaining a conventional system compared with the costs associated with 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.

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## Digital X-Ray (from page 91)

Part of your consideration in deciding whether or not to move to a digital system should include the ease of use. Both DR and CR systems will provide you with images much 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 allow 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 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 is keeping up-to-date with the latest technology, it can improve the stature of your practice in the eyes of your patient.

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 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.

### Computed Radiography (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 image. The film is erased and then able to accept a new exposure. In a manner of speaking, you have reusable film. The reusable film does wear out over time and does require replacement after a number of uses, much the same way the battery in your cell phone will wear out and

stop effectively taking a charge and will need to be replaced.

This reusable 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.

### Digital Radiography (DR)

DR stands for digital radiography. It is important to remember that both CR and DR produce digital images.

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 freely 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

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## There are a number of studies published that speak to the diagnostic quality differences of CR and DR.

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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 resolutions, with variances in many other technical specs. To say that either CR or DR is better is akin to saying an LCD or plasma TV is better (Table 1).

### Ergonomics

The next important item to con-

sideration. Replacing DR plates can be an expensive proposition.

There is no single answer 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 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 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. **PM**



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