

# Dose Reduction in Digital Imaging

## A Team Approach: Reduce the Risk, Keep the Benefit

### Radiologists

- Establish and implement reference exposure index levels - may be used as action levels
- Provide training and require annual sign-off that operators have been educated in safe usage of this radiographic unit
- Ensure interpreting physicians receive and review the dose information available on the images
- Verify the exam ordered is appropriate for the required diagnosis
- Discuss the dose and image quality with your vendor and medical physicist. Test the image quality After calibrating and adjusting the imaging system
- Educate referring physicians on the use of non-ionizing exams to obtain diagnostic information
- Check for collimation. Preferably use unmasked images and review processed images



### Physicist

- Assist in developing a protocol manual using optimal technique settings
- Develop technique charts and protocols with technologists and radiologists
- Monitor and evaluate equipment performance to ensure units are performing with the lowest possible dose
- Evaluate calibration and testing of acquisition and reading monitors
- Verify that exposure index levels are appropriate. If necessary, work with the vendor to adjust the sensitivity of the photo timer

### Technologists

- Review patient imaging histories for recent duplicate exams. Report duplication to the radiologist prior to performing the exam
- Screen for pregnancy if the fetus would be in the image
- Use appropriate protective clothing. Ensure that lead is not placed over photocell, as this will increase exposure
- Do not repeat exams simply because the exposure index appears to show a high exposure. Attempt to adjust the image and discuss with you radiologist whether to repeat the exam.
- Clearly indicate patient information and use appropriate Left and Right lead marks

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- Collimate to the area of interest as closely as possible – masking is not collimation. X-ray only the required area
- Consider the image quality needed for the patient specific diagnosis, you may be able to use a higher kVp with a reduction in mAs
- Ensure that the index number is forwarded with the images to your radiologists for review
- Record exposure index number. Depending on the manufacturer, these may be obtained either at the operator console or from the image
- Clearly indicate patient information and use appropriate Left and Right lead marks
- For *children and smaller patients*, reduce the overall techniques (kVp and mA) used

## Quality Control

- Create a log for exam repeats including: date, exam, reason for repeat, and user
- Perform daily or weekly calibration testing
- Collaborate with team members to review protocols and minimize errors
- Follow the manufacturer’s requirement for quality control on digital detectors, CR readers, and CR plates
- Perform preventative maintenance as recommended by the manufacturer
- Annually perform quality control testing on the X-ray unit

## For More Information

American College of Radiology - [www.acr.org](http://www.acr.org)

Conference of Radiation Control Program Directors - [www.crcpd.org](http://www.crcpd.org)

American Registry of Radiologic Technologists - [www.arrt.org](http://www.arrt.org)

Impact CT Scanner Evaluation Group - [www.impactscan.org](http://www.impactscan.org)

American Society of Radiologic Technologists - [www.asrt.org](http://www.asrt.org)

Image Gently - [www.imagegently.org](http://www.imagegently.org)

American Association of Physicists in Medicine - [www.aapm.org](http://www.aapm.org)

Federal Drug Administration - [www.fda.org](http://www.fda.org)

California Department of Public Health - [www.cdph.ca.gov/rhb](http://www.cdph.ca.gov/rhb)

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*California Code of Regulations, title 17, sec.30305(b) – The user shall assure that all X-ray equipment under his jurisdiction is operated only by persons adequately instructed in safe operating procedures and competent in safe use of the equipment.*

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