

WAVELENGTHS

American Chiropractic Registry of Radiologic Technologists

ACRRT

FALL 2012

PRESIDENT'S MESSAGE:

Radiology workers are acutely aware of overexposure to patients. This issue presents ways in which the chiropractic radiology technologist can best be protected against harmful radiation.

John Miller DC DACBR

ACRRT Board President

Am I in Danger ? How Far Away Should I Stand During an X-ray Exam ?

IONIZATION

X-ray radiation is an ionizing type of radiation potentially harmful to living tissue because the energy level is high enough to ionize atoms and molecules, creating free radicals that can damage cells.

BACKGROUND RADIATION

Annually, the average person receives approximately 350 millirems, or 3.5 mSv, of radiation exposure from background sources such as cosmic rays, natural isotopes in our food and water, terrestrial isotopes, second-hand smoke, and Radon.

INCREASED EXPOSURE

The National Council on Radiation Protection & Measurements (NCRP) has reported that radiation exposure to the general population has increased since the 1980s.

It is not uncommon for someone to receive more than the background radiation dose due to environmental conditions or medical procedures.

DIAGNOSTIC RADIATION

Exams and procedures that use radiation are necessary for accurate diagnosis of disease and injury. They provide important information to the chiropractic physician about the patient's health to help ensure that the patient receives appropriate care. Table I lists radiation doses for certain conventional X-ray studies.

ANNUAL RADIATION DOSE

The United States Nuclear Regulatory Commission provides an online Personal Annual Radiation Dose calculator so one can estimate their own exposure. Go to: www.nrc.gov/about-nrc/radiation/around-us/calculator.html.

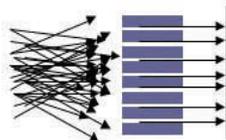
OCUPATIONAL EXPOSURE

Compton Scatter Radiation - Most of the technologist's occupational exposure comes from the scatter caused when a photon in the primary X-ray beam is deflected from its primary path or another photon of reduced energy is released in a different direction than the original. The most significant object producing scattered radiation in an X-ray procedure is the patient's body.

HOW DO WE PROTECT THE RADIATION TECHNOLOGIST?

Ways to protect yourself from scatter radiation include:

- **collimate** to the area of interest - the larger the area being exposed, the greater the amount of scatter;
- **time** - high kVp and low mAs techniques produce less exposure;
- **distance** - scatter radiation is reduced to 1/1000 of the exposure that the patient receives if you stand approximately 3 feet away from the patient; (**Inverse Square Law**)



Meet the Board Members!



from left to right ...

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Study Guides Available

Study guides can be purchased for \$65.00 (including shipping and handling) through the ACRRT office.

Please send a check or money order to:

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You can order your Study Guide online using Paypal.
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Any questions?
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Inside this issue:

HOW FAR?	1-2
STRESS REDUCTION	2
DIGITAL CORNER	3
RECERTIFICATION	3
ACRRT	3
2012 MEMBERSHIP	3

Table I - Conventional Diagnostic X-ray
Single Exposure Radiation Dose

Exam	Effective Dose (millirems)
Cervical - AP	.12 mSv
Cervical - Lat	.20 mSv
Lumbar - AP	2.20 mSv
Lumbar - Lat.	1.50 mSv

Please keep in mind these are exposure rates to the patient, not the technologist. (Simpson 2008)

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Am I in Danger?

How Far Away Should I Stand During an X-ray Exam? (cont.)

Ways to protect yourself from scatter radiation include:
(cont.)

- **shielding** – take advantage of lead-lined walls and protective glass window.



MONITORING

Whenever a radiation worker is likely to receive 10% or more of the annual occupation dose of 5 rem, or 50 mSv, in a year's time, radiation exposure monitoring is required.

DOSIMETER

A personal dosimeter should be worn on the collar to accurately reflect thyroid gland dose and exposure to the lens of the eye.

A worker's record of exposure becomes part of the permanent employment record. These reports must be maintained in compliance with state and federal statutes.

The report generated will show doses received during a reporting period as well as running totals from prior past reports. The report will list deep, eye and shallow occupational dose for each radiation worker assigned a badge.

Two commonly used personal dosimeters include:

1. **Film Badge** - contains a small piece of X-ray film that monitors X-radiation.



2. **Thermoluminescent Dosimeters (TLD)** - contain a crystal form of lithium fluoride that provides a more accurate reading and can be reused.



SUMMARY:

- Use Principles of **Time**, **Distance** and **Shielding** to protect you - the radiation worker.
- Use cardinal principles of radiation safety with common sense to minimize radiation exposure.
- Invest in a monitoring device (**dosimeter**). You won't regret the money spent!

REFERENCES

1. www.nrc.gov/about-ncr/radiation/health-effects.html#dose
2. British Journal of Radiology, 79(2006), 285-294
3. J Spinal DisorderTech 2008 Aug; 21(6) 409-12
4. [hps.org/medial/documents/NCRP_Report—People Exposed to More Radiation from Medical Exams 9 Mar.pdf](http://hps.org/medial/documents/NCRP_Report_People_Exposed_to_More_Radiation_from_Medical_Exams_9_Mar.pdf).
5. maricopa.edu/radiation-protection-for-the-x-ray-technologist/...monitoring.
6. [maricopa.edu/radiation-protection-for-the-x-ray-technologist/...scatter radiation](http://maricopa.edu/radiation-protection-for-the-x-ray-technologist/...scatter%20radiation).

TIPS FOR REDUCING STRESS IN THE WORKPLACE

- **Strive for balance.** Structure your break times so recovery time is feasible.
- **Respect the need for personal control.** Remember, there is more than one solution to a problem.
- **Know the difference between giving in and giving away.** Work with your doctor to create positive conflict resolution skills.
- **Be realistic about you and your co-workers' output levels.** Ask for help when you need it.
- **Accept support when you get it and give support when asked.**
- **Be open to doing something new.** Versatility is invigorating.
- **Accept change as inevitable and necessary, and realize you have the power to influence it.**
- **Respect your chiropractic physician's position.** Sometimes management has no choice.

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DIGITAL CORNER

Digital Imaging Acquisition Systems (DIAS)

The healthcare industry is under tremendous economic pressure to improve patient care, and as a result, new digital technologies are available in the radiology world to produce advanced diagnostic images and increase clinical efficiency.

Consider the following when making a digital X-ray equipment purchase:

- Will this equipment improve workflow?
- Will it achieve the goals of my chiropractic practice?
- Will it provide top-quality images?
- Will it provide consistent image quality?
- Will it be user friendly for the radiological technician?
- Will it improve patient diagnosis?
- What maintenance will the system require?
- How responsive is the manufacturer to problems?
- How much will this system cost?
- Is my **Picture Archiving and Communication Systems (PACS)** ready for DIAS?

Two Major DIAS Types

Computed Radiography (CR) *	Direct Radiology (DR) **
<p>This system uses a special imaging cassette that requires a digital reader to extract the image from the internal plate and then erases the imaging plate for reuse.</p> <p>The technician must remove the imaging cassette, like with conventional X-ray film processing, and instead of using a chemical developer, the image transfer is done electronically by the cassette reader.</p>	<p>This cassette-less system captures images directly with an electronic imaging device, similar to digital photography, except that the photon receptor is behind the patient.</p> <p>There is no need to remove cassettes or manually process images with a reader. The two types of capture devices are:</p> <ol style="list-style-type: none"> 1. direct conversion; electronics that convert X-rays to pixels, 2. indirect conversion; photo-sensors detecting X-ray-to-light conversion to produce pixels (picture elements).
<p>*less expensive ** more expensive</p>	

Note: A discussion of pixels, DIAS, CR, DR and PACS will be included in the next ACRRT Study Guide revision.

RECERTIFICATION PROGRAMS—2012

While prior approval of all programs is required, it is impossible for us to maintain all dates, places and faculty of all program presentations. It is suggested that you contact your state chiropractic association or nearest chiropractic college for information on programs available in your area.



Applications for program approval are being received on nearly daily basis.

All dates of presentations are subject to change.

X-ray Recertification (6 hours) June & Dec. 2012

Charlotte, NC

Contact: NCCA Heather Wrenn, Education Director

Phone (919) 832 . 0611

You will need to send a check for

Membership Dues

and continuing education certificate prior to

December 31, 2012.

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EXECUTIVE DIRECTOR'S MESSAGE ...

Dear members,

I can't stress how important it is to protect yourself from occupational hazards by following the simple guidelines presented in this newsletter. Take time to review your general safety procedures and also determine whether your office is equipped with essential shielding to protect you, your staff, and your clients. "An ounce of prevention ... "

Also, the stress reduction tips ... essential for keeping your work environment immune from the external uncertainties of life that can spoil a great day at your profession. As one fellow said in response to someone's request for weather status, "It doesn't matter how dismal it is out there, as long as we keep it out there." Don't forget that abundant office lighting is essential for good health and morale.

Speaking of weather, as cold weather progresses keep your equipment, film stock and archives free from moisture and condensation, 24/7. Then, as outdoor humidity drops along with the overall temperature, keep your office environment temperature-stable, dust free and not too dry, as static build-up with consequent discharge from personnel to electronic devices can cause irreversible equipment damage. With following the proper ventilation and cleaning techniques mentioned in the last newsletter, this can save a maintenance call to your equipment repairman, prevent unnecessary delay and loss of business, and will add longevity to your office systems.

As always, while a certificate of attendance for a course that you attended for CE's is helpful, please include an outline of the subject matter and topics that were presented. The subject matter for the courses that you attend has to directly deal with your position and function as an X-ray technologist. Without an outline or syllabus of the course material, your CE's will be pended until additional information is received.

Have a joyous and prosperous holiday season!

Dr. L. Pyzik

ACRRT Executive Director