


Medical Resident and Fellow Radiation Safety

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An Educational Resource on Exposure Settings and Exposure Management



Introduction

This presentation covers the following topics:

- Settings in which x-ray exposures may occur
 - How to minimize your radiation exposure
 - How to manage patient radiation exposure
 - Typical radiation doses and regulatory limits
 - Instructions for personnel in the radiation monitoring program
 - Pregnancy & radiation exposure
 - Potential biological effects from radiation exposure, and
 - Radiation Safety Office contact information
-



UTHSC-H Residency and Fellowship Programs

- Anesthesiology
 - Cardiovascular & Thoracic Surgery
 - Dermatology
 - Diagnostic & Interventional Imaging (Radiology)
 - Emergency Medicine
 - Internal Medicine
 - Neurological Surgery
 - Neurology
 - Obstetrics & Gynecology
 - Ophthalmology
 - Orthopedic Surgery
 - Otolaryngology
 - Pathology
 - Pediatrics
 - Physical Medicine & Rehab
 - Preventive Medicine
 - Psychiatry
 - Surgery
 - Transitional Year
-



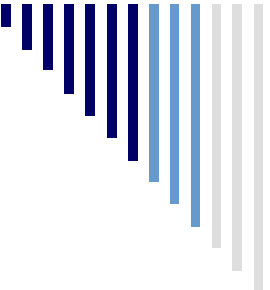
UTHSC-H Programs Where Residents and Fellows Work in Radiation-Producing Environments (**in bold**)

- Anesthesiology**
 - Cardiovascular & Thoracic Surgery**
 - Dermatology
 - Diagnostic & Interventional Imaging (Radiology)**
 - Emergency Medicine**
 - Family Medicine
 - Internal Medicine**
 - Neurological Surgery**
 - Neurology
 - Obstetrics & Gynecology
 - Ophthalmology**
 - Orthopedic Surgery**
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-



Radiation Monitoring

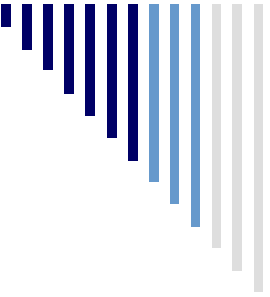
- In settings where radiation sources may be encountered and historical data indicate that occupational doses are not likely to exceed 10% of the regulatory limit, periodic monitoring is performed to ensure that these trends continue.
 - Personal radiation monitoring is required in settings where x-ray exposures are likely to be in excess of 10% of the annual limit, as determined by the nature of an individual's working conditions.
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UTHSC-H Residency and Fellowship Programs With Possible X-ray Exposures in Excess of 10% of the Limit (in purple)

- Anesthesiology
- Cardiovascular & Thoracic Surgery
- Dermatology
- Diagnostic & Interventional Imaging**
- Emergency Medicine**
- Family Medicine
- Internal Medicine⁽¹⁾**
- Neurological Surgery**
- Neurology
- Obstetrics & Gynecology
- Ophthalmology**
- Orthopedic Surgery**
- Otolaryngology
- Pathology
- Pediatrics
- Physical Medicine & Rehab
- Preventive Medicine
- Psychiatry
- Surgery
- Transitional Year

⁽¹⁾ Specifically cardiology catheterization and nuclear cardiology

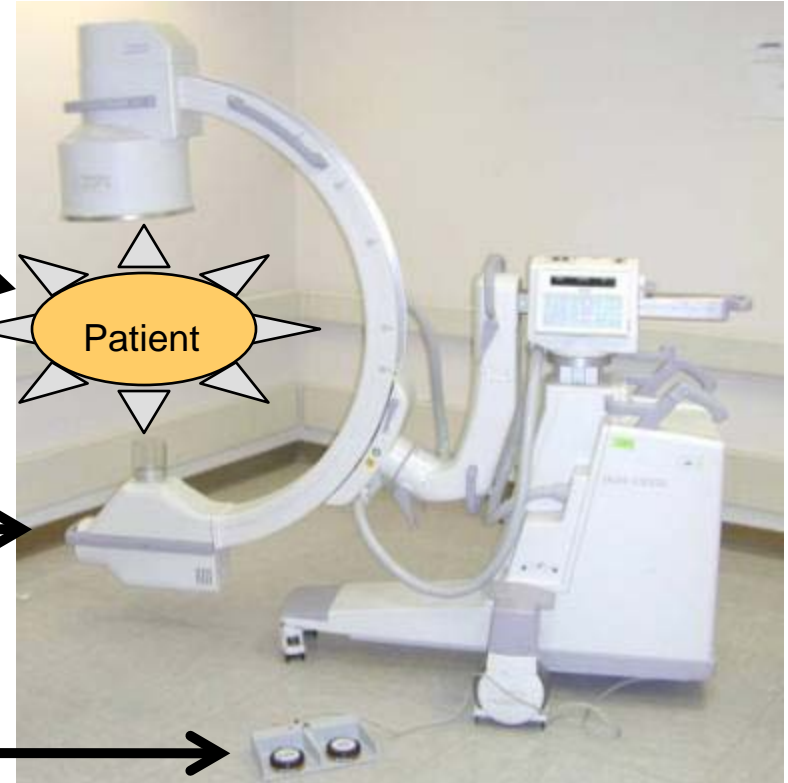


Many UTHSC-H Residency and Fellowship Programs Will Place You in Settings Where You Will Be Exposed to Radiation

- Radiation use is very prevalent throughout hospitals
 - Many steps have been taken to keep exposures to personnel at a minimum
 - You are required to understand the nature of this use, how to keep exposures under limits, and how to maximize a healthy working environment.
 - For all personnel the rule is to keep exposures ALARA: i.e., keep exposures As Low As Reasonably Achievable.
 - ALARA means that you must learn how to professionally execute your duties while responsibly managing yours and minimizing others' radiation exposures.
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Remember These Key Points To Keep Machine-Produced Exposures To a Minimum

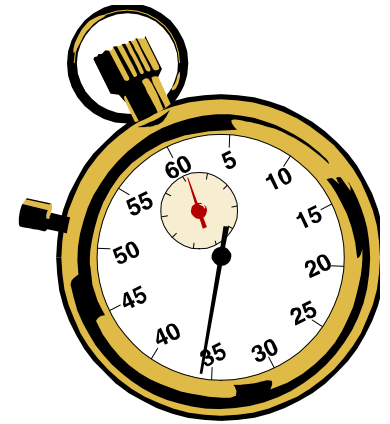
- For machine-produced X rays, radiation emanates primarily from the area of the patient that is undergoing examination
- A secondary source of much lower intensity is radiation escaping through the x-ray tube housing.
- Machine-produced X-ray radiation exists **only** when the exposure switch is activated



Remember These Key Points To Keep Exposure To Everyone at a Minimum

□ Time

- Physicians operating x-ray equipment should keep the x-ray “beam-on time” to the minimum necessary.
- Personnel should limit the time they spend in unshielded environments to that which is necessary to complete their job properly.



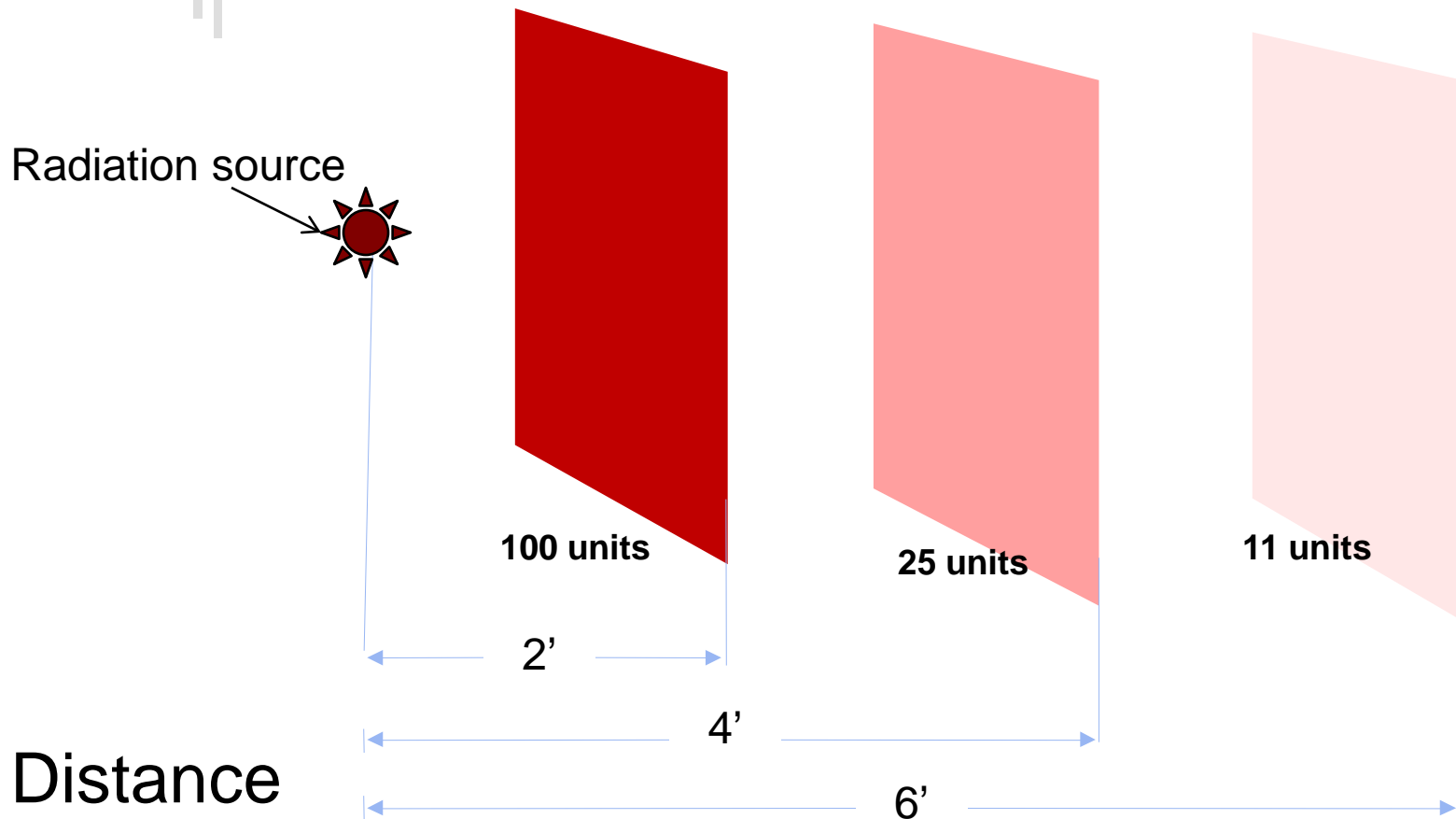


Minimizing Radiation Exposure

□ Distance

- To the extent consistent with appropriate medical care, maximize the distance between you and the area of the patient that is actively being x rayed.
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Minimizing Radiation Exposure

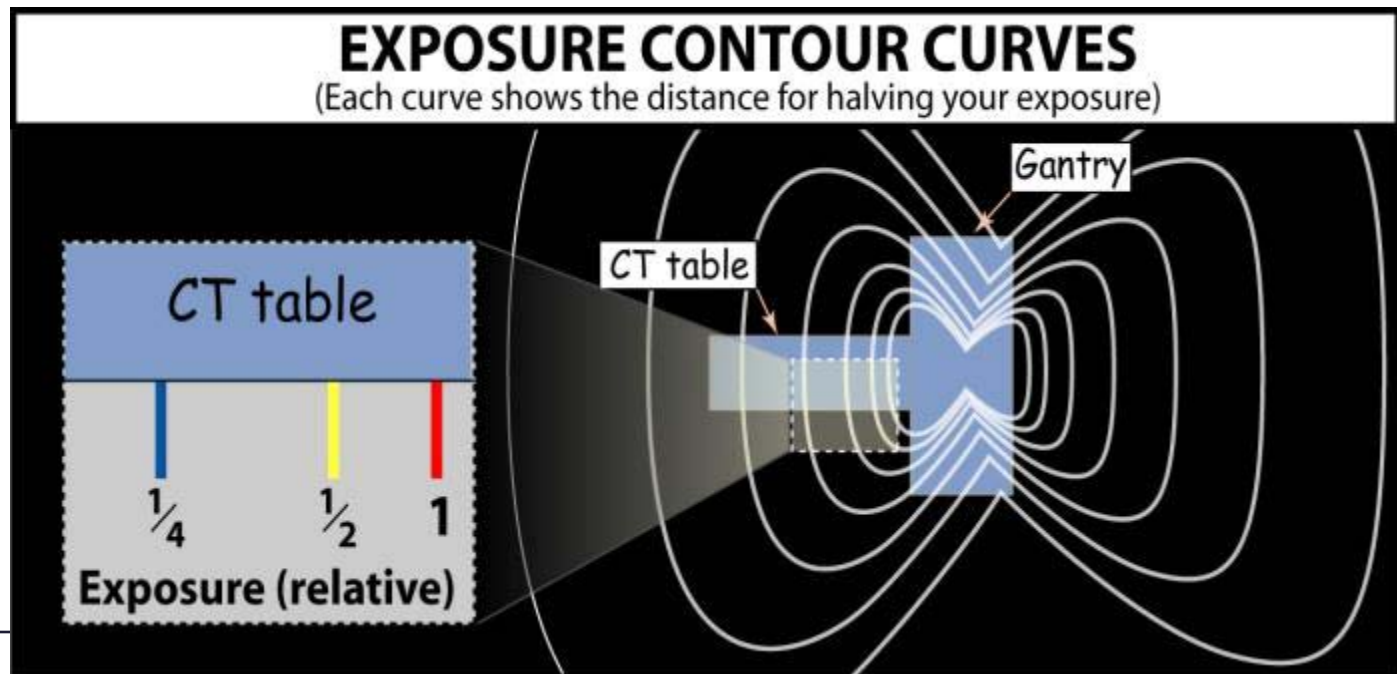


How distance from source corresponds to drop off in radiation exposure intensity

Minimizing Radiation Exposure

Distance in a CT Room

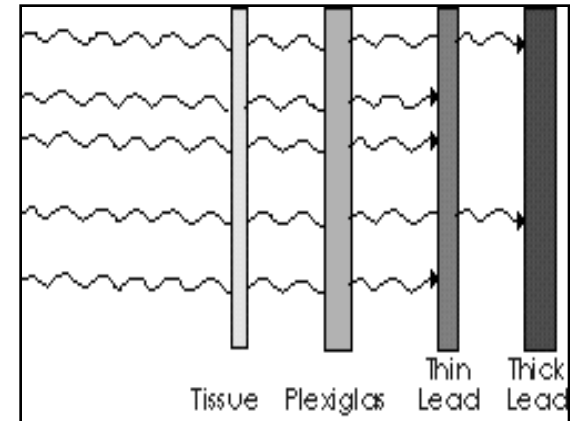
Reduce your radiation exposure by stepping back from the scanning ring. The lines below show how distance can minimize radiation exposure.



Minimizing Radiation Exposure

□ Shielding

- X rays are easily shielded by a thin layer of dense material, like lead.
- Protective aprons and leaded glass barriers in diagnostic radiology block most (~90% - 99%) of the radiation.



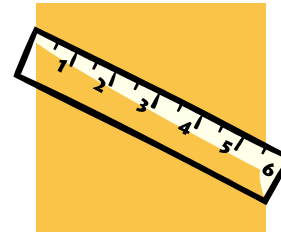
Minimizing Exposure

□ Combining the use of

■ Least Time



■ Greatest distance



■ Good shielding



= ALARA



Radiation Dose - Regulatory Limits

The Texas Department of State Health Services requires that **occupational** radiation exposures not exceed the following:

<u>Target Tissue</u>	<u>Annual Limit (millirem*)</u>
Whole Body	5,000
Extremity	50,000
Individual Organ	50,000
Lens of the eye	15,000
Embryo / Fetus	500 for gestation

*A millirem is a small unit of radiation exposure, about what everyone gets everyday from naturally existing radiation in the environment.



Sample Dosimeter Readings (Average Annual Employee Exposures)

Work Group	Collar Badge (radiation monitor) Reading (millirem)	Assigned Whole Body Radiation Dose (millirem)
Interventional Radiologists or Cardiologists	2000	600*
OR X-ray Technologists	500	500
ER Nurses	100	100
Anesthesiologists	<100	<100

*Assigned whole-body dose is lower than dose measured at collar for these workers because they wear a lead apron during procedures and dosimeter only monitors dose to unprotected area.



Patient Dose

- Medical X-rays require a prescription from a physician
 - All medically ordered X-rays must be justified by medical need
 - No regulatory dose limits exist for patients (physicians are expected to use only what is necessary for medical purposes)
 - Order only those x-ray studies necessary to achieve clinical benefit
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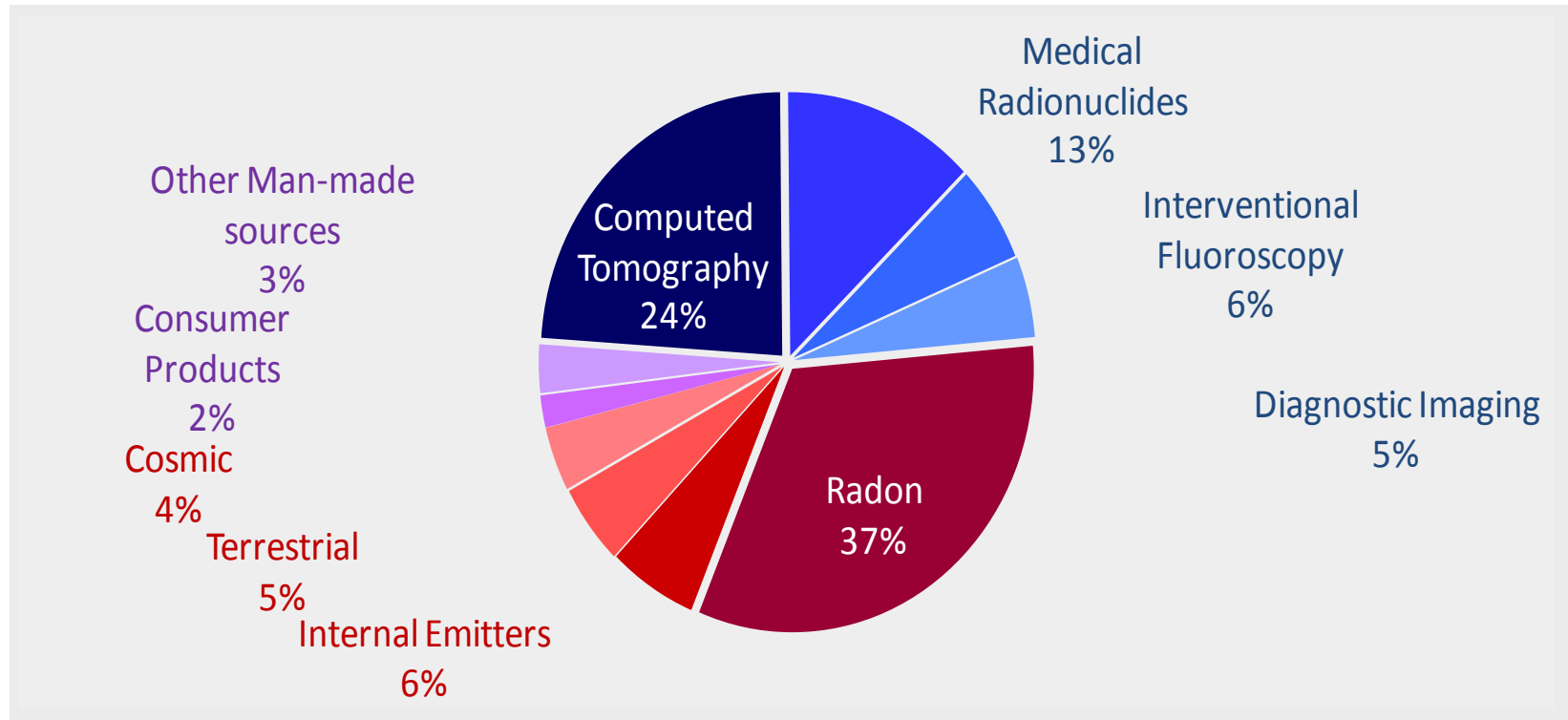


Range of Patient Effective Doses

Examination	Dose (millirem) from Radiography	Dose (millirem) from Computed Tomography
Chest	10	700
Abdomen	150	800
Chest/Abdomen/Pelvis	220	1800
Head	10	200

Natural and Manmade “Background” Radiation

National Annual Average Exposure is 625 mrem



Note: Medical procedures are not occupational but exposures as a patient.

Personnel Monitoring

- Radiation dosimetry (e.g., whole body badge and/or finger ring) is provided to individuals who are **likely to receive an exposure greater than 10% of the annual limit**.
- The badge results are reviewed by Radiation Safety to ensure that radiation exposures are as low as reasonably achievable (ALARA).





Personnel Monitoring Collar & Waist Badges



“Single Badging”

Wear a single badge (**red**) at the collar level, outside your shielding apron or thyroid shield.

Personnel Monitoring Collar & Waist Badges

Sample Icons Show
Dosimeter Placement



Whole Body



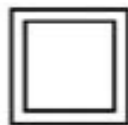
Collar



Waist



Fetal



Area

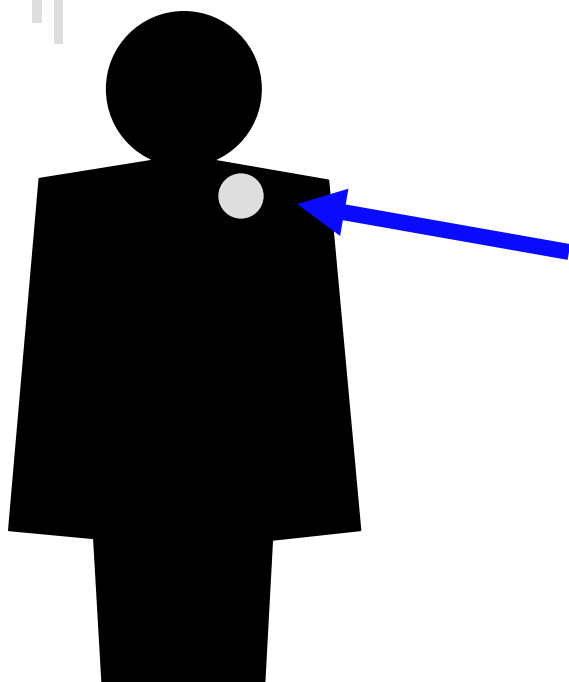


“Double-Badging

Wear one badge (**red**) at the collar, outside of the apron (or any other lead PPE). Wear the second badge (**yellow**) underneath the lead apron.

Personnel Monitoring

If you are enrolled in the personnel monitoring program, you must:



1. Wear your collar badge near the neck outside any protective apron
2. Wear any specially assigned abdomen badge at the waist under any protective apron
3. Store your badge away from radiation sources when not in use.
4. If something happens to your badge (lost, the dog ate it), contact Radiation Safety 713-500-5840

Where should you wear your collar badge?

At the collar
&
outside a lead apron



Personnel Monitoring

- The **timely return** of radiation dosimeters assures prompt processing
 - Dosimetry results are reviewed frequently by Radiation Safety staff to monitor trends and work practices. If dose anomalies or abnormal readings are found, you will be contacted
 - You can review your dosimetry results personally by contacting Radiation Safety at 713 500 5840
 - If you are not in the program and believe you should be, contact Radiation Safety
-



Dose Records Example

UT - HOUSTON HEALTH
SCIENCE CENTER
ATTN TRAVIS HALPHEN
6431 FANNIN/CYF G.102
HOUSTON TX 77030

LANLAUER®

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (708) 755-7000 Facsimile: (708) 755-7016
Customer Service: (800) 323-8830 Customer Service Technical: (800) 438-3241
www.landauerinc.com

Handwritten: 5-14-10



RADIATION DOSIMETRY REPORT

ACCOUNT NO.	SERIES CODE	ANALYTICAL WORK ORDER	REPORT DATE	DOSIMETER RECEIVED	REPORT TIME IN WORK DAYS	PAGE NO.
40000	PDR	1010250103	04/19/10	04/12/10	5	1 OF 1

PARTICIPANT NUMBER	NAME			DOSIMETER	USE	RADIATION QUALITY	DOSE EQUIVALENT (MREM) FOR PERIODS SHOWN BELOW			QUARTERLY ACCUMULATED DOSE EQUIVALENT (MREM)			YEAR TO DATE DOSE EQUIVALENT (MREM)			LIFETIME DOSE EQUIVALENT (MREM)			RECORDS FOR YEAR	INCEPTION DATE (MM/YY)	
	ID NUMBER	BIRTH DATE	SEX				DEEP DDE	EYE LDE	SHALLOW SDE	DEEP DDE	EYE LDE	SHALLOW SDE	DEEP DDE	EYE LDE	SHALLOW SDE	DEEP DDE	EYE LDE	SHALLOW SDE			
FOR MONITORING PERIOD:							03/01/10 - 03/31/10			QTR 1			2010								
	Pa	CNTRL					M	M	M										4	10/81	
	J	CNTRL							M												01/91
	Pa	WHBODY	P				2	3	6	3	5	10	3	5	10	1642	1716	1783	3	08/83	
	Pa	WHBODY	P				M	M	1	M	M	1	M	M	1	1102	1132	1189	3	06/85	
	Pa	WHBODY	P				18	18	18	60	109	163	60	109	163	13167	14462	22326	3	10/88	
	J	RFINGR							110			210			210			248070			10/88
	Pa	WHBODY	P				3	3	3	11	11	13	11	11	13	151	166	173	3	03/06	
	Pa	WHBODY	PB				24	42	64	77	144	233	77	144	233	712	1257	1955	3	04/07	
			P				24	42	24												
	J	RFINGR	BH						40			230			230			1320			05/07
Pa	WHBODY					M	M	M	5	5	7	5	5	7	34	36	44	3	06/08		

M: MINIMAL REPORTING SERVICE OF 1 MREM
ELECTRONIC MEDIA TO FOLLOW THIS REPORT

QUALITY CONTROL RELEASE: RCH

1S - PR 9488 - RPT1308- N1 CI

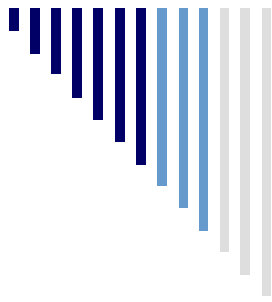
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Texas Radioactive Material
License L02774

Texas Certificate of
Registration R10908



NVLAP LAB CODE 102518-01

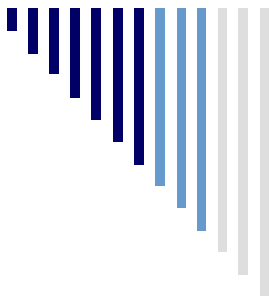


ALARA Program Review for Residents, Fellows & Faculty at Hermann Hospital

UTHSC-H levels to initiate **ALARA investigation** to ensure doses as low as reasonably achievable (ALARA), doses in mrem

	Deep Dose (DDE)	Eye Dose (LDE)	Shallow Dose (SDE)
General ALARA Level	125 per month	375 per month	1,250 per month
Cardiology & Diagnostic Faculty, Fellows & Residents Using X-rays[‡] ALARA Level	500 per month	1,500 per month	5,000 per month

[‡]Cardiology & Diagnostic faculty, fellows, and residents have 0.3 “EDE2” correction applied for dosimeter worn outside of lead apron



How to Obtain a Badge...

Fill out form (RS-03)

RS-03 (Rev July 2007)

The University of Texas Health Science Center at Houston
Environmental Health & Safety
Radiation Safety Program

Series: _____
Part. Number: _____
Account: _____

DOSIMETRY SERVICE ASSESSMENT AND EXPOSURE HISTORY FORM

Section 1: Participant Data

As required in the *Texas Administrative Code*, Chapter 25, §289.202, the following information regarding your radiation exposure history for this calendar year is necessary for assessment of dosimetry service. Please complete the following items, then sign and return this form to: *Radiation Safety Program, CYF G102*.

Full Name: _____
Last First Middle

Social Security Number: (optional) _____ **Date of Birth:** _____ **Gender:** Female Male

List any other name(s) under which you have been monitored: _____

¹The University of Texas Health Science Center at Houston (UTHSC-H) is requesting your Social Security Number (SSN) in order to more readily provide the most complete record of radiation exposure. This information will be shared with a third party dosimetry vendor for the sole purpose of radiation dosimetry services. Providing your SSN may minimize administrative delays associated with radiation dosimetry services. The UTHSC-H is working to minimize the use of Social Security Numbers within its business processes. If you feel that a third party has misused your SSN please relay the matter to the SSN policy coordinator at Marsha.D.Brody-Silva@uth.tmc.edu as well as the party in question.

Please check the box(es) most appropriate to your type of radiation work:

Dosimeter Required	Dosimeter Optional – Section 1
<input type="checkbox"/> More than 10 mCi per protocol of ³² P or ³⁶ Cl.	<input type="checkbox"/> Less than 10 mCi per protocol of ³² P or ³⁶ Cl.
<input type="checkbox"/> More than 5 mCi per protocol of ⁸⁶ Rb, ²² Na, ⁵¹ Cr or ¹³¹ I.	<input type="checkbox"/> Less than 5 mCi per protocol of ⁸⁶ Rb, ²² Na, ⁵¹ Cr or ¹³¹ I.
<input type="checkbox"/> X-ray fluoroscopy equipment at UTHSC-H.	<input type="checkbox"/> ³ H, ¹⁴ C, ³⁵ S, ³³ P or ¹²⁵ I only.
<input type="checkbox"/> PET and/or PET/CT Imaging.	<input type="checkbox"/> Dental X-ray Machines only.
<input type="checkbox"/> Environmental Health & Safety.	<input type="checkbox"/> Other – please describe: _____

Under any of the conditions described above in this column, you are **REQUIRED** to wear a dosimeter.

⇒ If none of the conditions described above apply to you, go to **Dosimeter Optional** Column.

I would like to talk with a Radiation Safety Representative regarding the Declared Pregnancy Program

Dosimeter Optional – Section 2

I am not required to wear a dosimeter and

I do not want to wear a dosimeter

I want to wear a dosimeter

Classification: Faculty Laboratory Staff Student Resident Other-Specify: _____

With which Authorized User or Principle Investigator will you be working?

Authorized User: _____ **Dates:** _____ through _____

Section 2: Employment(s) at other institutions involving radiation exposure this calendar year

Have you worn a dosimetry badge this calendar year at another institution? Yes No

Do you have any other current employment that includes radiation sources? Yes No

If answered yes to both or either of the above questions, please provide that information below.

Facility Name / Dep.: _____ Facility Name / Dep.: _____

Mailing Address: _____ Mailing Address: _____

Dates: _____ through _____ Dates: _____ through _____

Section 3: Signature

I authorize the release of my radiation exposure history to The University of Texas Health Science Center at Houston and will notify Environmental Health & Safety in the event of changes to the above information.

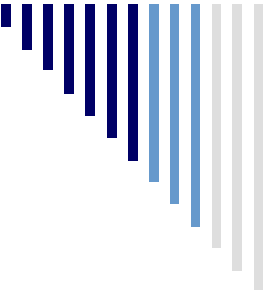
Applicant Signature: _____ Date: _____

Return the completed form to: *Radiation Safety Program, 6431 Fannin St., CYF G102, Houston, TX 77030*
Fax # 713-500-5841



Biological Effects

- **Stochastic effects** are the principal hazard from diagnostic x-rays.
 - With a stochastic effect, the probability that the effect will occur increases with dose (more dose, higher risk). Minimizing dose minimizes the risk of occurrence of stochastic effects.
 - Examples of stochastic effects are cancer and genetic defects.
 - Cancer risk is $\sim 0.00008\%$ per millirem effective dose.
-



If I receive a radiation dose that is within occupational limits, will it cause me to get cancer?

Unlikely. The risk of cancer from doses at or below the occupational limits is considered acceptably low and can be minimized only by professionally keeping your exposure ALARA.

The risk at low doses is so low that scientific investigation has never conclusively demonstrated that there is or is not a slight risk. For the sake of safety, common practice is to assume that even small doses have some chance of causing cancer – thus ALARA is our theme.



Biological Effects

- **Deterministic effects** are effects where there is a threshold or minimum dose necessary before the effect occurs.
 - Once the threshold is achieved, the severity of the injury increases as the dose increases.
 - Thresholds for occurrence in millirem:
 - Cataracts 100000 (to lens of eye only)
 - Hair loss 300000 (to scalp only)
 - Skin erythema 600000 (local to skin only)
 - Death ~200000 (whole body to a few folks who are very sensitive)
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Pregnancy & Radiation Exposure

- The State of Texas requires exposure to the embryo/fetus of a **declared pregnant worker** be kept below 500 millirem.
 - Early disclosure of pregnancy to the supervisor is encouraged, but not required.
 - After a pregnant employee officially **declares** her pregnancy in writing to the Radiation Safety Office, an exposure history is conducted and extra precautions may be implemented.
 - If the pregnant employee wishes to informally notify the Radiation Safety Office, the same safety review and necessary added precautions will be implemented.

 - <http://www.uthouston.edu/safety/radiation-safety/Pregnant%20Employees%20Guide%20to%20Radiation.htm>
-

environments. For these women, our goal is to restrict any gestational irradiation to less than 100 millirem above background. Call the Radiation Safety Program if you have any questions about your working environment. Women who are designated radiation workers, and thus fall under the 500 millirem limit, must voluntarily declare their pregnancy to the Radiation Safety Program in order to ensure implementation of any special precautions that might be necessary to monitor or to restrict their radiation exposure. A declared pregnant worker is a woman who voluntarily informs her employer, in writing, of her pregnancy and gives the estimated date of conception. An employee can declare her pregnancy by filling out a Pregnancy Declaration form available from the Radiation Safety Program. If a pregnancy remains undeclared, the radiation worker and her baby are only restricted to the much higher occupational exposure allowed for a radiation worker.

Advice for Employee and Employer

Although the radiation risks to an unborn child of a radiation worker are not appreciable under normal working conditions, it is a regulatory requirement to limit the radiation dose from occupational exposure to not more than 500 mrem for the entire gestation and to not more than 50 mrem in any month. The employee and employer should work together to decide the best method for accomplishing this goal. Some methods that might be used include: reducing the time spent in radiation areas, wearing some shielding over the abdominal area, and keeping an extra distance from radiation sources when possible. The Radiation Safety Officer will be able to estimate the probable dose to the unborn child during the normal nine-month pregnancy period based on the exposure history. If the predicted dose approaches the limit, the employee and employer should work out schedules or procedures to confine the dose to less than the 500 mrem required limit

External Hazards

External exposure to radiation can occur from a variety of sources in an academic or medical workplace, either radioactive materials or x-rays may be used in research or medical applications. In any of these workplace situations there is a potential for external exposure to radiation.

It should be remembered that the medical effects of any radiation exposure are due to several factors: the type of radiation (alpha, beta, gamma or x-ray), the amount of radiation, the duration, and the part of the body exposed.

Internal Hazards

Workers should be aware that radiation exposure to the fetus could be from internal sources as well as from external sources. In workplaces such as nuclear medicine clinics and research laboratories where unsealed radioactive materials are routinely used, there is a potential risk of radioactive material entering the body. Pertinent standard radiation precautions include the following:

1. *Never smoke, eat, drink, or apply cosmetics where radioactive materials are used.*
2. *Never pipette by mouth.*
3. *Use disposable gloves while handling radioactive materials.*
4. *Wash hands and monitor for radioactive contamination frequently.*
5. *Wear lab coats or other protective clothing around loose radioactive material.*
6. *Use certified ventilation hoods when handling volatile or potentially volatile radionuclides.*

References:

National Council on Radiation Protection and Measurements. Exposure of the population in the United States and Canada from natural background radiation. NCRP Report No. 94., (1987)

N.B. All other references available upon request.



THE UNIVERSITY of TEXAS
HEALTH SCIENCE CENTER AT HOUSTON

Environmental Health & Safety



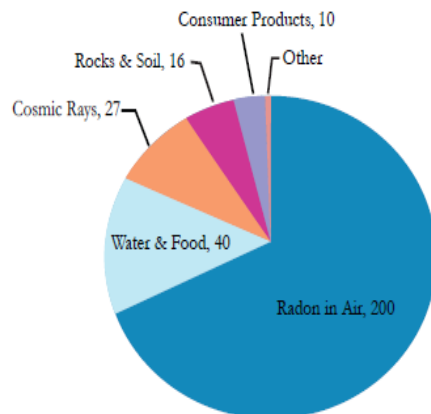
Radiation Safety Program's Pregnant Employee's Guide to Radiation

Questions? Please call 500-5840 or come by the Radiation Safety Laboratory, CYF G102

Pregnant Employee's Guide to Radiation

This document discusses risks that have been associated with radiation and pregnancy. During the course of employment, the informed pregnant employee, who either works with radiation or who works in environments where she might be incidentally exposed to radiation, will be better prepared to protect herself and her child against potential risks. Methods to minimize radiation risks are explained. Our goal is to manage radiation exposures to levels that are as low as reasonably achievable while not compromising the conduct of duties in the workplace.

Radiation has many forms: heat, light, ultraviolet, microwave, ionizing, and so on. We protect ourselves from overexposure to all these radiations. However, humans have no physical sensation to potentially dangerous levels of ionizing radiation and thus can potentially be exposed to harmful levels without knowing it. Therefore, ionizing radiation (x rays, gamma rays, beta rays etc.) requires special consideration for safety and management.



Average Background Radiation in Houston
294 mrem

Sources of Radiation

All day long, everyone is exposed to ionizing radiation from naturally existing sources that include the earth, the sky, the air and even the food we eat. People in Houston are exposed to approximately 294 millirems per year from these background sources of ionizing radiation while folks in Denver are exposed to about 400 millirem due to their higher altitude and the Rocky Mountain environment. These are de facto safe levels of radiation exposure.

Dose rates from medical exposures that one receives in one's lifetime will be in the same range as one's lifetime dosage of background radiation, but medical exposures occur only when prescribed by a healthcare practitioner when it is judged that the medical benefit will outweigh the risks. The average annual dose from diagnostic x-rays to the U.S. population is 40 mrem, while the average contribution by fluoroscopy, CT scans, radiation therapy, and other nuclear medicine procedures is about 270 mrem per year. It should be remembered that only sick people and people at risk of serious illness principally contribute to these numbers.

Effects on the Embryo/Fetus of Exposure to Radiation and Other Environmental Hazards

Exact risks are not known for low dose radiation. The approximate natural risks for birth defects are as follows: 3 -5% of all births have some type of abnormality detectable at birth and an additional 3-5% of all births have some type of condition or disease that develops later in life (not detectable at birth). The risk of a pregnancy ending in a miscarriage or stillbirth is 10 - 30%, depending on many factors.

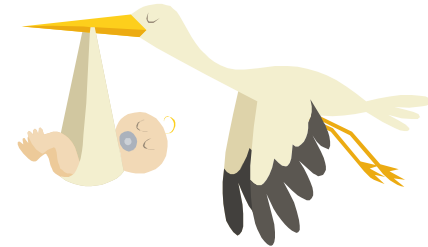
Regulatory and the Texas Department of State Health Service Radiation Control

Regulations and guidance are based on the conservative assumption that any amount of radiation, no matter how small, can have a harmful effect on an adult, child, or unborn child. Thus, the risk by this theory is never zero. We can only reasonably restrict the risk to very low levels. Even after more than 100 years of research into this topic, it still is not possible to state that the theory of risk at any level is actually true. This is because at low levels the risks are so small that no increase in adverse health effects above the non-radiation related incidence can be definitely identified. Because it is known that the unborn child is more sensitive to radiation than adults, particularly during certain stages of development, a special dose limit for protection of the unborn child has been established. These limits eliminate risk for birth defects and minimize the risk of induced disease to rates in large populations that cannot be detected even if they exist. For women who do not work in occupational radiation environments the limit is 100 millirem to the embryo/fetus during the entire gestation. For women who work in radiation environments, the limit is 500 millirem per gestation. The former conservatively minimizes risks for the general population, for example persons who visit hospitals or ride on buses. The higher limit is established to assure adequate protection of the child while having minimal effect on employment opportunities for women of childbearing age who seek work in radiation environments. If the limit were unnecessarily low for these persons, many radiation-environment jobs would have to be restricted to men or to women incapable of having children.

Women who do not work with radiation but who are incidentally exposed to radiation during their work should follow the advice of radiation professionals in how to avoid unnecessary exposure to radiation while performing their duties. Special monitoring and protection are available for any pregnant woman who works around such



Declared Pregnancy



- When you contact RSP regarding your pregnancy, RSP will schedule a **confidential** meeting to:
 - Review the risks associated with prenatal exposures and methods to minimize risks
 - Review previous personnel monitoring results
 - Review exposure limits
 - Discuss the NRC Regulatory Guide 8.13
 - Provide an opportunity for questions
 - Provide additional monitoring if appropriate
 - Assist you in completing the written declaration
-



Probability of Radiation Effects for the Embryo/Fetus*

Embryo/Fetus Dose (millirem) above natural background	Estimated probability of no malformation	Estimated probability of no childhood cancer
0	97	99.7
100	97	99.7
500 (embryo/fetus limit)	97	99.7
1000	97	99.6
5000 (occupational limit)	97	99.4

*Source: International Commission on Radiological Protection. Publication 84: Pregnancy and Medical Radiation, p38, 2000.



Radiation Safety Permits in Texas

- Permits for radioactive material or x-rays are with Texas Department of State Health Services Radiation Control
 - Applicable Rules - 25 TAC §289
<http://www.dshs.state.tx.us/radiation/rules.shtm>
 - Notice to Employees 25§289.203
 - Each institution maintains applicable radiation safety manuals, operating & safety procedures, etc.
-



Radiation Safety Office UTHSC-H

- Radiation Safety Website
 - **Forms** is the repository for standard forms (e.g., pregnancy declaration, training & experience)
 - **Policies** lists the basic radiation safety policies
 - Office Phone Number: 713 500 5840
 - Radiation Emergency: 713 500 8100 or 911
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For more information:

- Radiation Answers by the Health Physics Society
 - <http://www.radiationanswers.org/>

- Image Gently Campaign
 - <http://www.asrt.org/patients/image-gently>

- American College of Radiology
 - <http://www.acr.org/>

