

## Exams where fetus is NOT in x-ray beam

- Fetal exposure is from scattered radiation.<sup>3</sup>
- For exams above the diaphragms or below the pelvis, patient should be reassured that there is no scientific evidence that the exam will result in any detectable harm to the fetus<sup>12</sup>.
- Doses are cumulative.
- CTA (PE) versus V/Q scan: slightly higher fetal dose with V/Q scan (CT dose increases during pregnancy due to size of fetus and its proximity to the chest), but significantly higher dose to breast tissue with CTA chest.<sup>13,14</sup>

<b>Radiography<sup>3</sup></b>	Estimated Fetal Dose (mGy)
Extremity radiographs (Skull, C-spine, ankle, shoulder, femur, etc.)	<0.001
Thoracic Spine (AP, Lateral)	<0.003
Chest X-ray (PA and Lateral)	0.002
<b>CT<sup>3</sup></b>	Estimated Fetal Dose (mGy)
Head/Neck	0
Chest	0.02-0.2
Chest (PE study)*	0.02-0.2
<b>Other<sup>13,14</sup></b>	Estimated Fetal Dose (mGy)
V/Q scan	0.1-1

\*Algorithm for the workup of suspected PE in a pregnant patient should include a PA CXR and Doppler US for DVT prior to CTA or V/Q scan<sup>10</sup>

## Exams where fetus is IN the x-ray beam

- For radiography exam where fetus is in the x-ray beam estimated fetal dose is generally <3 mGy.<sup>3</sup>
- For CT exam where fetus is in the x-ray beam, estimated fetal dose is generally 10-34 mGy.<sup>3</sup> Always use dose reduction techniques.
- Doses are cumulative.

<b>Radiography<sup>3</sup></b>	Estimated Fetal Dose (mGy)
Lumbar Spine	<1
KUB (Lateral)	<1
KUB (Upright)	<1
Pelvis (AP)	1-3
<b>CT<sup>3</sup></b>	Estimated Fetal Dose (mGy)
Abdomen	1.3-4
Abdomen/Pelvis	13-34
Abdomen/Pelvis (stone)	10

Note: Radiation dose to the fetus increases with increasing patient thickness (i.e., increasing gestational age, obesity)

<b>Patient Thickness (cm)</b>	<b>AP view (mGy)</b>	<b>Lateral view (mGy)</b>
14-15	1.0	0.7
20-23	2.1	1.5
27-30	4.3	3.0

## References:

1. ACOG Committee on Obstetric Practice. Guidelines for Diagnostic Imaging During Pregnancy. ACOG Committee Opinion No. 299, September 2004 (Replaces No. 158, September 1995). *Obstet Gynecol.* 2004;104:647-651.
2. National Council on Radiation Protection and Measurements. Medical radiation exposure of pregnant and potentially pregnant women. NCRP report no. 54. Bethesda, Md: National Council on Radiation Protections and Measurements, 1977.
3. McCollough CH, Schueler BA, Atwell TD, et al. Radiation exposure and pregnancy: When should we be concerned? *Radiographics.* 2007;27:909-917; discussion 917-908.
4. Wagner LK, Lester RG, Saldana LR. Exposure of the pregnant patient to diagnostic radiations. *A guide to Medical Manangement.* Madison, Wis: Medical Physics Publishing; 1997.
5. Centers for Disease Control and Prevention. Emergency Preparedness and Response. Radiation and Pregnancy: A Fact Sheet for Clinicians. <http://bt.cdc.gov/radiation/prenatalphysician.asp>. Reviewed 11/29/2011.
6. International Commission on Radiological Protection. Pregnancy and medical radiation. *Ann ICRP* 2000;30:1-43.
7. United Nations Scientific Committee of the Effects of Atomic Radiation, Sources and Effects of Ionizing Radiation, United Nations Scientific Committee on the Effects of Atomic Radiation 2000 Report to the General Assembly with Scientific Annexes. New York: United Nations Publications; 2000.
8. Wagner LK, Hayman LA. Pregnancy and women radiologists. *Radiology* 1982;145:559-562.
9. Brent RL. Utilization of developmental basic science principles in the evaluation of reproductive risks from pre- and postconception environmental radiation exposure. *Teratology* 59:182; 1999.
10. Wieseler KM, Bhargava P, Kanal KM, et al. Imaging in pregnant patients: Examination appropriateness. *Radiographics.* 2010; 30:1215-1229; discussion 1230-1213.
11. ACR-SPR Practice Guidelines for Imaging Pregnant or Potentially Pregnant Adolescents and Women with Ionizing

Radiation. American College of Radiology Website:

[http://www.acr.org/~media/ACR/Documents/PGTS/guidelines/Pregnant\\_Patients.pdf](http://www.acr.org/~media/ACR/Documents/PGTS/guidelines/Pregnant_Patients.pdf). Published 2008 (resolution 26).

Revised 2013 (resolution 48).

12. Tremblay E, Therasse E, Thomassin-Naggara I, et al. Guidelines for Use of Medical Imaging during Pregnancy and Lactation. *Radiographics.* 2012;32:897-911.
13. Pahade JK, Litmanovich D, Pedrosa I, et al. Imaging Pregnant Patients with Suspected Pulmonary Embolism: What the Radiologist Needs to Know. *Radiographics.* 2009;29:639-654.
14. Schembri GP, Miller AE, Smart R. Radiation Dosimetry and Safety Issues in the Investigation of Pulmonary Embolism. *Semin Nucl Med.* 2010;40:442-454.
15. American College of Radiology. ACR committee on drugs and contrast media. ACR Manual on Contrast Media. 9<sup>th</sup> ed. Reston, VA: American College of Radiology, 2013.