

## Radiology Compliance Branch

### RADIATION PROTECTION SECTION



Division of Health Service Regulation • N.C. Department of Health and Human Services

## DOSE CALCULATORS

Patient exposure from diagnostic X-rays is often reported as the Entrance Skin Exposure (ESE). ESE is the amount of radiation that enters the patient's body closest to the primary source of X-ray radiation. While not directly related to risk, the values can be used to compare patient exposures at different facilities for the same procedures.

Because different tissues and organs have varying sensitivity to radiation exposure, the actual radiation risk to different parts of the body from an X-ray procedure varies. The term effective dose is used when referring to the radiation risk averaged over the entire body.

The effective dose accounts for the relative sensitivities of the different tissues exposed. More importantly, it allows for quantification of risk and comparison to more familiar sources of exposure that range from natural background radiation to radiographic medical procedures.

To explain it in simple terms, we can compare the radiation exposure from one chest X-ray in terms as similar to the amount of radiation exposure one experiences from our natural surroundings in 10 days.

Following are comparisons of effective radiation dose with background radiation exposure for several radiological procedures described within this website:

### Dose calculators for medical procedures

- ❖ [www.xrayrisk.com/calculator/calculator.php](http://www.xrayrisk.com/calculator/calculator.php)
- ❖ [www.doseinfo-radar.com/RADARDoseRiskCalc.html](http://www.doseinfo-radar.com/RADARDoseRiskCalc.html)  
RADAR Medical Procedures Radiation Dose Calculator - includes medical and nuclear medicine procedures
- ❖ <http://www.new.ans.org/pi/resources/dosechart/>
- ❖ [http://ehs.ucsd.edu/Radiation\\_Risk/](http://ehs.ucsd.edu/Radiation_Risk/)

### Common X-ray exams comparing dose and similar background environmental risk

- ❖ [www.radiologyinfo.org/en/safety/index.cfm?pg=sfty\\_xray](http://www.radiologyinfo.org/en/safety/index.cfm?pg=sfty_xray)

### Dose calculators for environmental risk

- ❖ Personal annual dose calculator  
<http://environweb.lanl.gov/newnet/info/interactive.aspx>  
Los Alamos National Laboratory



- ❖ [www.nrc.gov/about-nrc/radiation/around-us/calculator.html](http://www.nrc.gov/about-nrc/radiation/around-us/calculator.html)  
Nuclear Regulatory Commission personal dose calculator
- ❖ [www.epa.gov/rpdweb00/understand/calculate.html](http://www.epa.gov/rpdweb00/understand/calculate.html)  
EPA personal dose calculator

### Dose calculator for ALARA and stay time

- ❖ [www.radprocalculator.com/ALARA.aspx](http://www.radprocalculator.com/ALARA.aspx)  
Dose calculators for medical procedures
- ❖ [www.xrayrisk.com/calculator/calculator.php](http://www.xrayrisk.com/calculator/calculator.php)  
RADAR Medical Procedures Radiation Dose Calculator - includes medical and nuclear medicine procedures
- ❖ [www.doseinfo-radar.com/RADARDoseRiskCalc.html](http://www.doseinfo-radar.com/RADARDoseRiskCalc.html)
- ❖ [www.new.ans.org/pi/resources/dosechart/](http://www.new.ans.org/pi/resources/dosechart/)
- ❖ [http://ehs.ucsd.edu/Radiation\\_Risk/](http://ehs.ucsd.edu/Radiation_Risk/)

