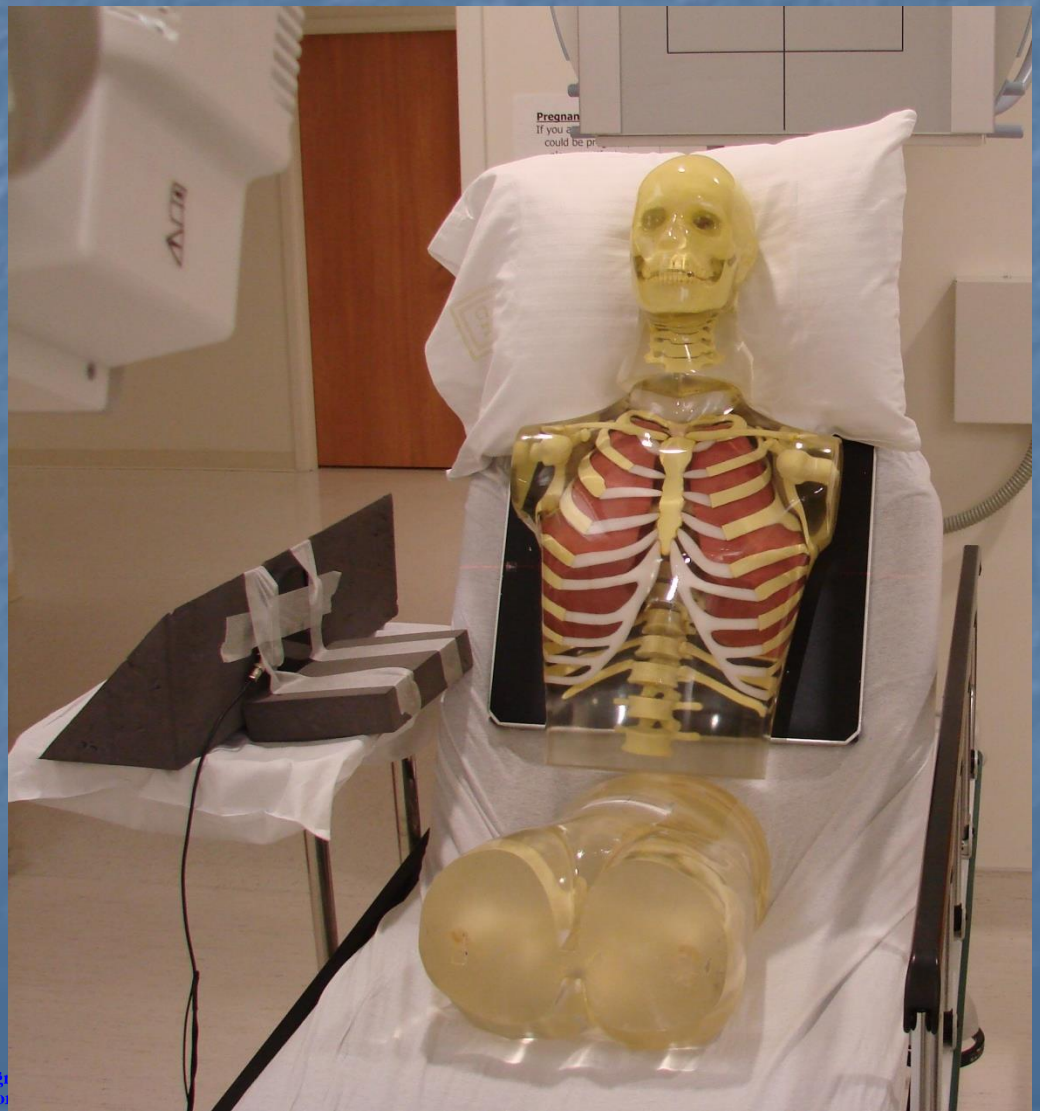
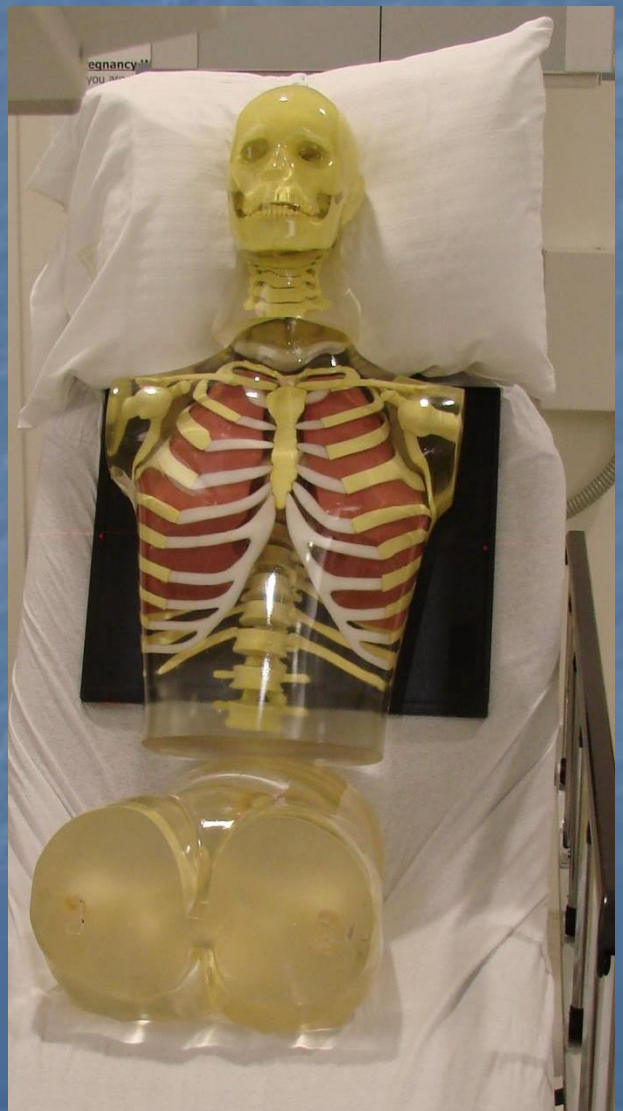
How much dose are you getting from scatter radiation coming out of your patient during an AP chest?

We did this experiment with and without grids, at 115 and 85 kV, and at 3 different angles.
This one is taken at 90 degrees to the patient.





This one is taken at 45 degrees to the patient.

And this one we are calling 0 degrees.

Natural Background Radiation – 2006
(Cosmic, Radon, Potassium 40)

- 1r = 1 rad (in air)
- 1R = 1 Roentgen (radiation has touched the body)
- 1 milliR (mR) = 1/1000 of a rad/Roentgen
- 1 microR (μR) = 1/1000 of a mR
- **Natural Radiation** = 304 milliR/year
- 304 milliR = 304,000 microR
- 304,000 microR/year = **844 microR/day**

Here are all the doses for 0, 45 and 90 degrees (arrows at 6')

85@3.2 and 115@4

Dose exposure due to scatter from Portable Chest Xrays

Angle of Chamber (Deg)	Distance (ft)	Dose #1 (microR)	Dose #2 (microR)	Average Dose (microR)
90	1	96.0	94.6	95.3
90	2	42.7	42.0	42.4
90	3	21.1	22.0	21.6
90	4	13.3	12.7	13.0
90	5	10.6	9.0	9.8
90	6	6.9	6.1	6.5
45	1	195.5	196.2	195.9
45	2	79.3	80.7	80.0
45	3	38.3	39.2	38.8
45	4	24.3	23.8	24.1
45	5	16.2	17.9	17.1
45	6	11.6	12.0	11.8
45	7	9.4	9.1	9.3
45	8	7.1	6.4	6.8
0	6	34.0	33.1	33.6
0	7	24.5	23.0	23.8
0	8	17.4	16.0	16.7
0	9	14.0	14.2	14.1
0	10	10.5	11.6	11.1
0	11	8.4	8.9	8.7
0	12	6.3	7.5	6.9
0	13	5.3	6.4	5.9
0	14	0.0	0.0	0.0
0	15	0.0	0.0	0.0
0	16	0.0	0.0	0.0

Chest technique of 85@3.2 was used for all exposures. Ionization Chamber angle is measured from mid sagittal plane.

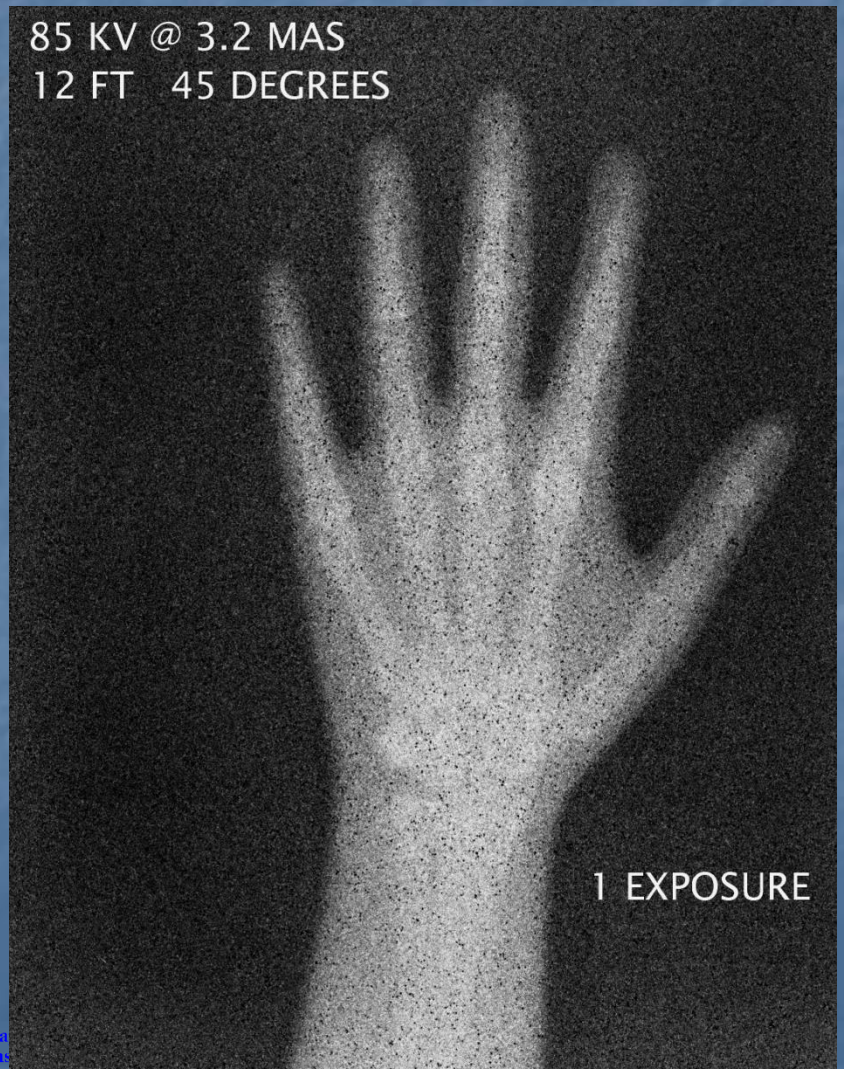
Dose exposure due to scatter from Portable Chest Xrays

Angle of Chamber (Deg)	Distance (ft)	Dose #1 (microR)	Dose #2 (microR)	Average Dose (microR)
90	1	316.0	320.0	318.0
90	2	125.8	127.2	126.5
90	3	68.3	67.6	68.0
90	4	42.2	41.0	41.6
90	5	27.1	28.3	27.7
90	6	19.7	19.7	19.7
45	1	744.0	778.0	761.0
45	2	295.0	295.0	295.0
45	3	150.7	151.2	151.0
45	4	98.3	97.6	98.0
45	5	66.2	65.2	65.7
45	6	48.6	47.4	48.0
45	7	33.6	32.7	33.2
45	8	27.6	27.5	27.6
0	6	76.0	75.1	75.6
0	7	50.5	51.8	51.2
0	8	39.3	39.8	39.6
0	9	32.3	31.9	32.1
0	10	25.4	27.0	26.2
0	11	22.4	21.8	22.1
0	12	17.0	16.9	17.0
0	13	14.3	14.4	14.4
0	14	12.6	12.5	12.6
0	15	10.2	9.9	10.1
0	16	8.3	8.2	8.3

Chest technique of 115@4 was used for all exposures. Ionization Chamber angle is measured from mid sagittal plane.

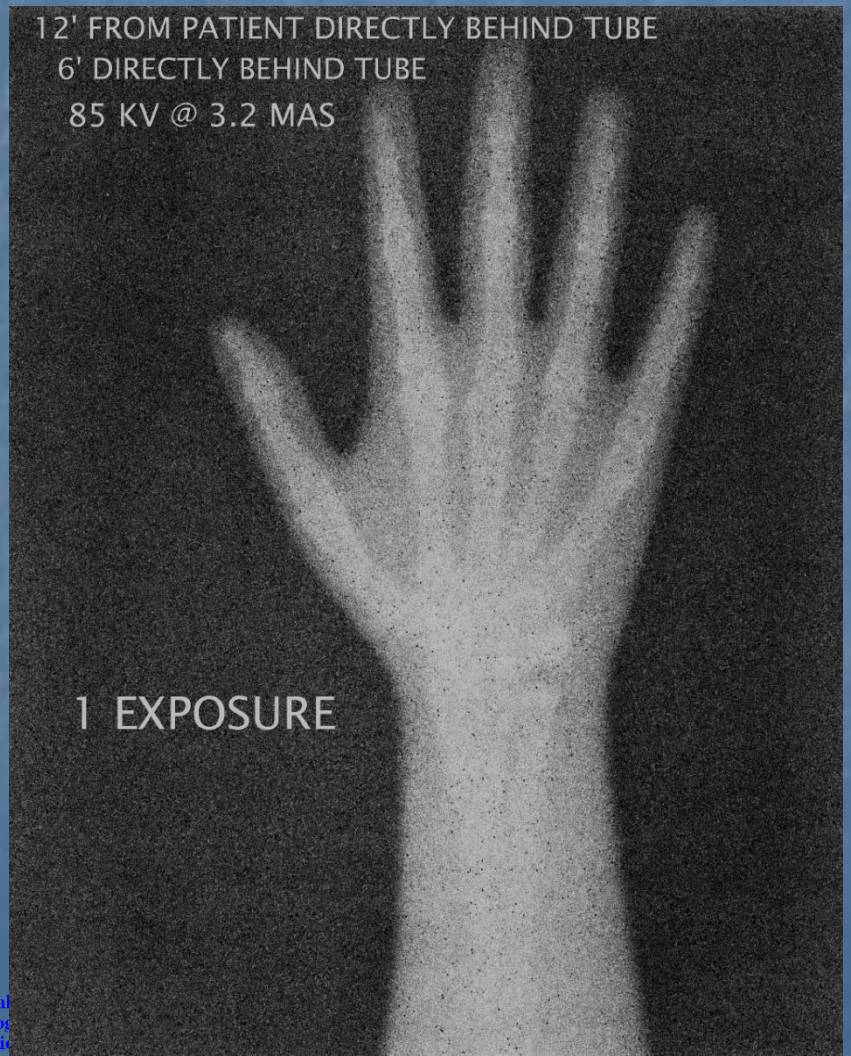
This demonstration used the arm/hand phantom and a 10x12 CR cassette. We set it up where many techs stand when making a PCXR exposure. This photo and the following image have the cassette at: 45 degrees and 12 feet from the patient.

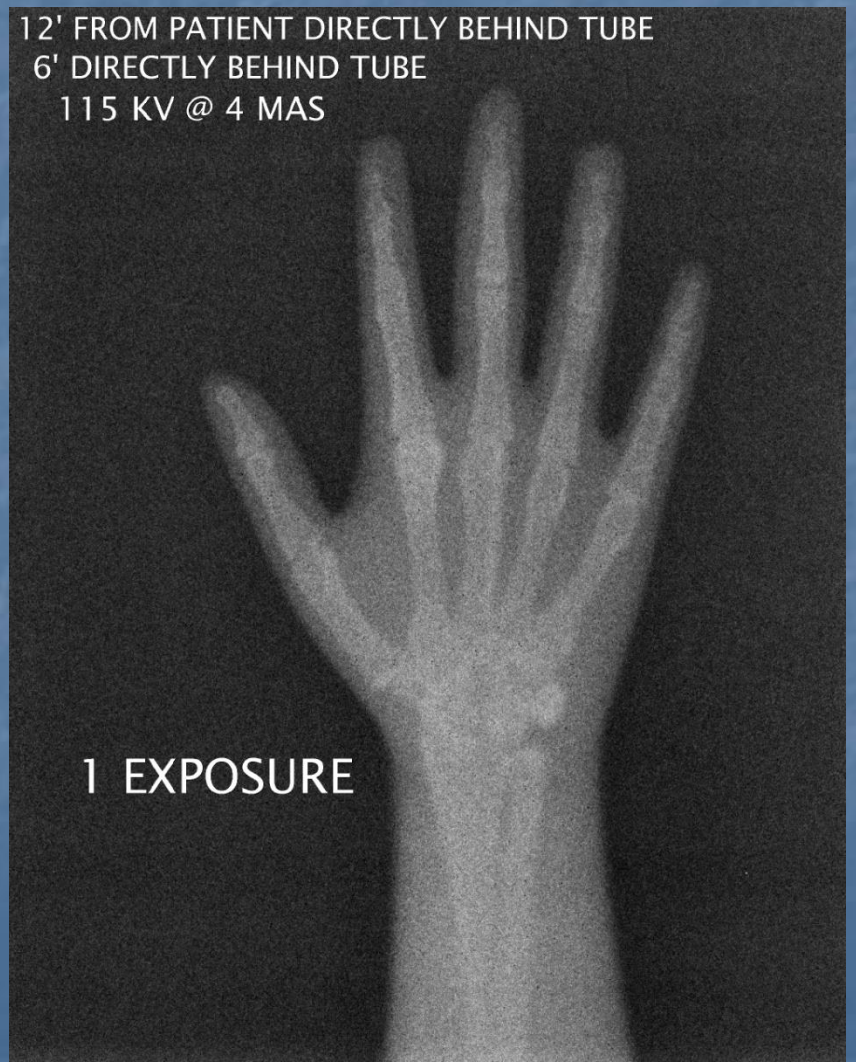
An image cannot lie!! Although the scatter dose is down in the micro R's, there's enough radiation to create this image – with 1 exposure (**read at 1200 speed**).



This photo and the following image were taken with the phantom/cassette 12 feet from the patient directly behind the tube (which is 6 feet from the patient).

The 85 kV image had 6.0 microR and the 115kv image had 17 microR.





If you're thinking like we were, then you're wondering if the scatter came from the back of the tube, not the patient? It turns out that at 12 inches from the backside of the tube the dose was so small that the dosimeter could not read it.

The perfect place to stand when making an exposure is directly behind the tower. You lean your head out while giving the breathing instructions, then move your head back behind the tower while making the exposure.