The increasing utilization of fluoroscopy for visualization during image guided procedures has brought renewed interest in dose management. The geometry of fluoroscopic imaging systems is too often ignored in equipment design and use. Geometry can be as important as pulsed flulorоscopy and spectral filtration. This paper systematically reviews the effects of geometry on dose.

The three major geometries in use are fixed Source Skin Distance (conventional fluoroscope), fixed Source Image Receptor Distance (mobile C-arms) and fixed Source Isocenter Distance (angiographic systems). Patient entrance dose has a different functional dependency on patient thickness and patient to image intensifier spacing for each of these geometries.

In all cases, patient entrance dose is minimized when source to image receptor distance is increased and patient exit surface to image receptor distance is minimized. The small mobile fluoroscope (SID 40 - 70 cm) is the least favorable configuration when it is used to examine thick body parts; or used with a large air gap. For angiographic systems, reducing the spacing between the patient between the patient and image receptor by 10 cm can reduce patient entrance dose by 10 - 20 %.

This paper will present a quantatative analysis of the geometric effects on dose for each of the three major fluoroscopic designs. This often forgotten aspect of equipment construction and use remains as important as it ever was.