

# Increases in patient doses need to be avoided when upgrading interventional cardiology systems to flat detectors

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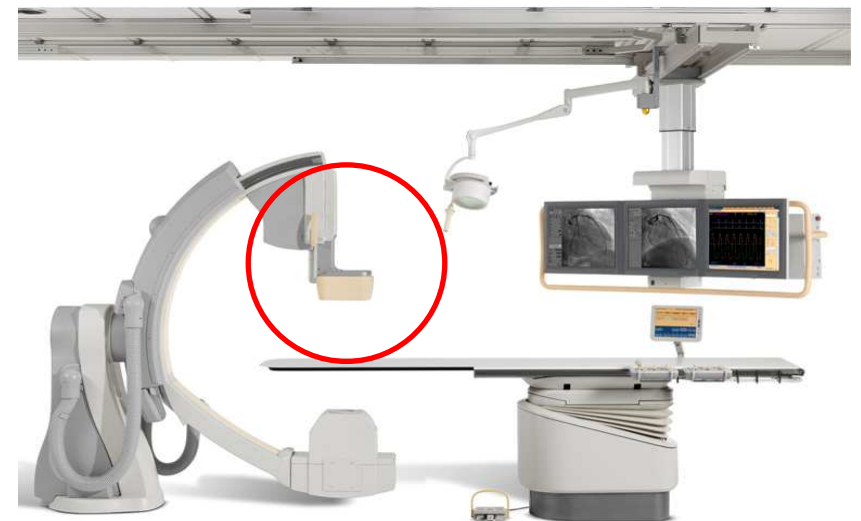
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# Objective

To evaluate patient doses in two Interventional Cardiology (IC) laboratories along a period of one year in which the imaging devices were changed from image intensifier (II) to flat-panel detector (FD).



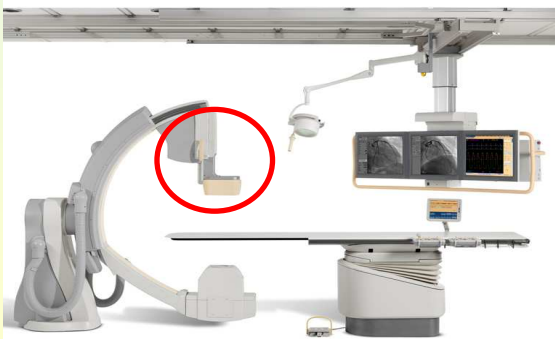
# Material and Methods

- ✓ Dose Area Product (DAP)
- ✓ Fluoroscopy Time (FT)
- ✓ Number of cine frames (NF)



- March 2009 to September 2009  
698 CA procedures  
376 PTCAs
- September 2009 to March 2010  
342 CA procedures  
709 PTCAs

# Results (CA procedures)



	DAP (Gy×cm <sup>2</sup> )	FT (minutes)	NF
number	698	372	697
min	1,6	1,1	34
max	322,3	61,1	2545
mean	33,7	11,4	843,0
median	28,2	8,2	820,0
3 <sup>rd</sup> quartile	39,5	13,4	957,0

	DAP (Gy×cm <sup>2</sup> )	FT (minutes)	NF
number	342	342	342
min	5,7	0,5	88
max	65,8	46,4	1895
mean	35,8	7,6	790,5
median	37,2	6,4	782,5
3 <sup>rd</sup> quartile	44,9	10,2	960,8

# Results (CA procedures)

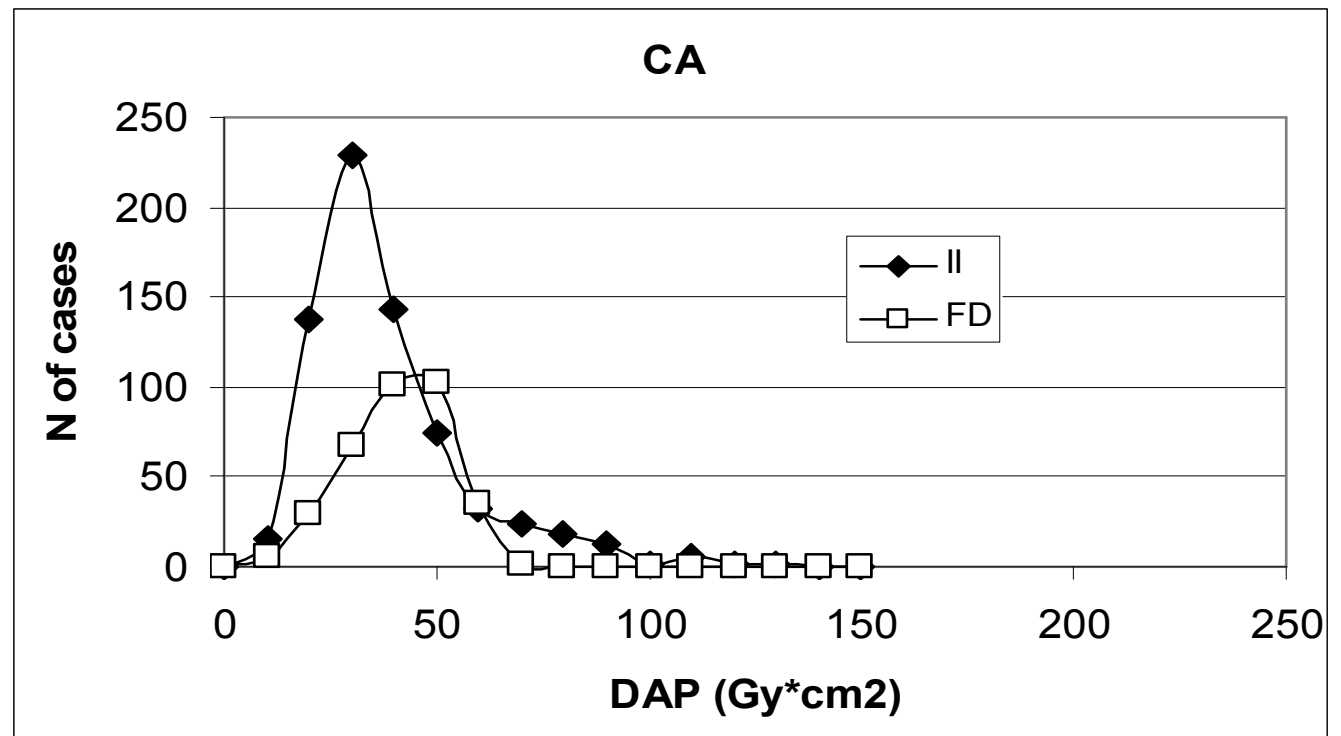
Median DAP:  $\uparrow$  32%

Median FT: -1.3 minutes

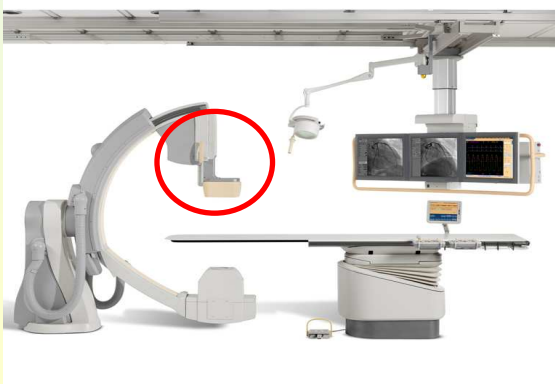
Median NF: -5%

Increment of DAP is statistically significant

( $p < 0.001$ , Mann-Whitney U test).



# Results (PTCA procedures)



	DAP (Gy×cm <sup>2</sup> )	FT (minutes)	NF
number	376	190	376
min	10,0	3,4	343
max	226,2	110,2	4064
mean	65,7	23,7	1297,4
median	57,0	19,2	1219,0
3 <sup>rd</sup> quartile	78,5	27,3	1542,8

	DAP (Gy×cm <sup>2</sup> )	FT (minutes)	NF
number	709	710	713
min	28,5	2,3	37
max	492,1	161,2	5533
mean	112,6	20,2	1475,9
median	89,4	17,1	1313,0
3 <sup>rd</sup> quartile	135,3	25,5	1734,0

# Results (PTCA procedures)

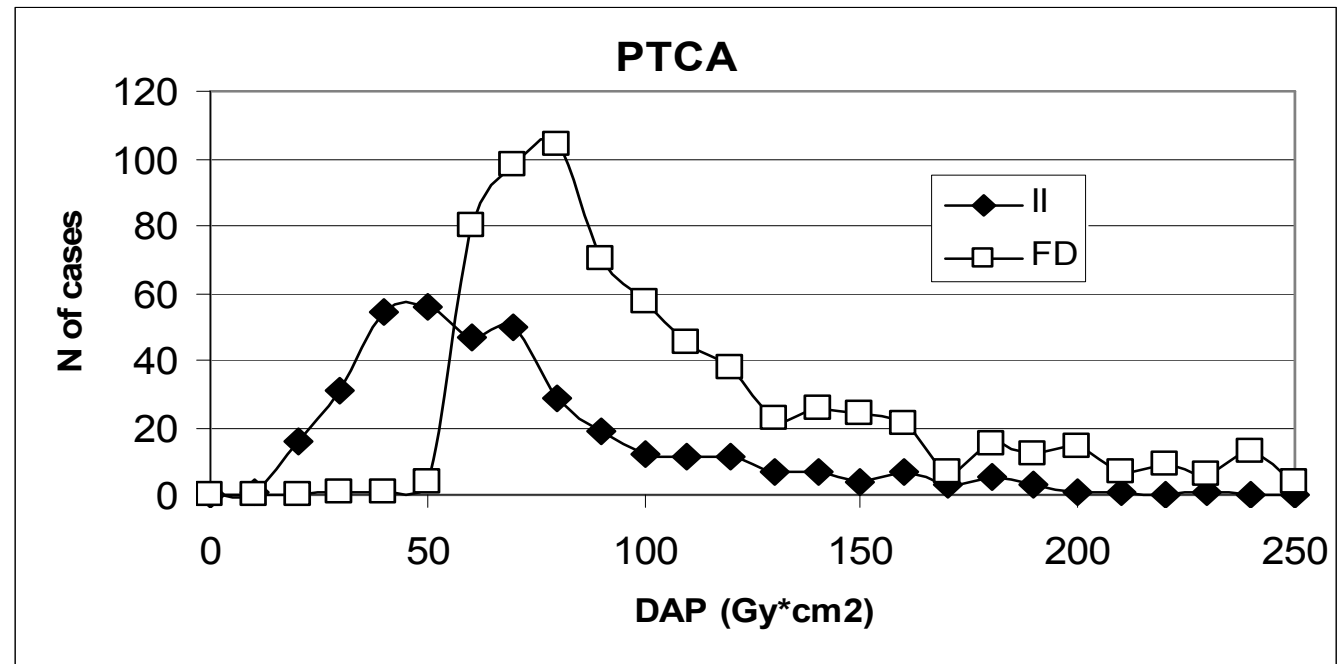
Median DAP:  $\uparrow$  57 %

Median FT: -2.1 minutes

Median NF: -8%

Increment of DAP is statistically significant

( $p < 0.001$ , Mann-Whitney U test).



# Conclusions

- 1. A significant increase in patient doses has been noticed in the early stages of use of FD technology for imaging IC procedures while fluoroscopy time and number of images have kept similar.**
- 2. The update of technology does not imply a straightforward improvement on image quality or dose. A careful setting of the X-ray systems and clinical protocols when their IIs are upgraded to FDs is essential to avoid unjustified increases in patient doses.**



# Most relevant references

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