



Know and Control your X-ray exposure

Bart Leclou
Personal Dosimetry



Interventional X-ray procedures cause majority of dose to medical staff

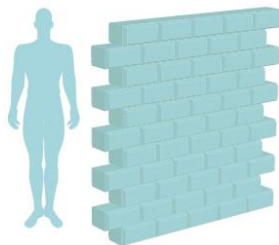
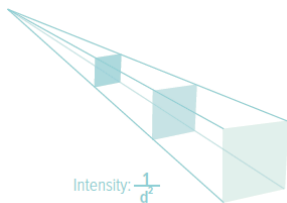
Medical staff are exposed day after day, week after week

Scattered radiation can be minimized, but not completely eliminated

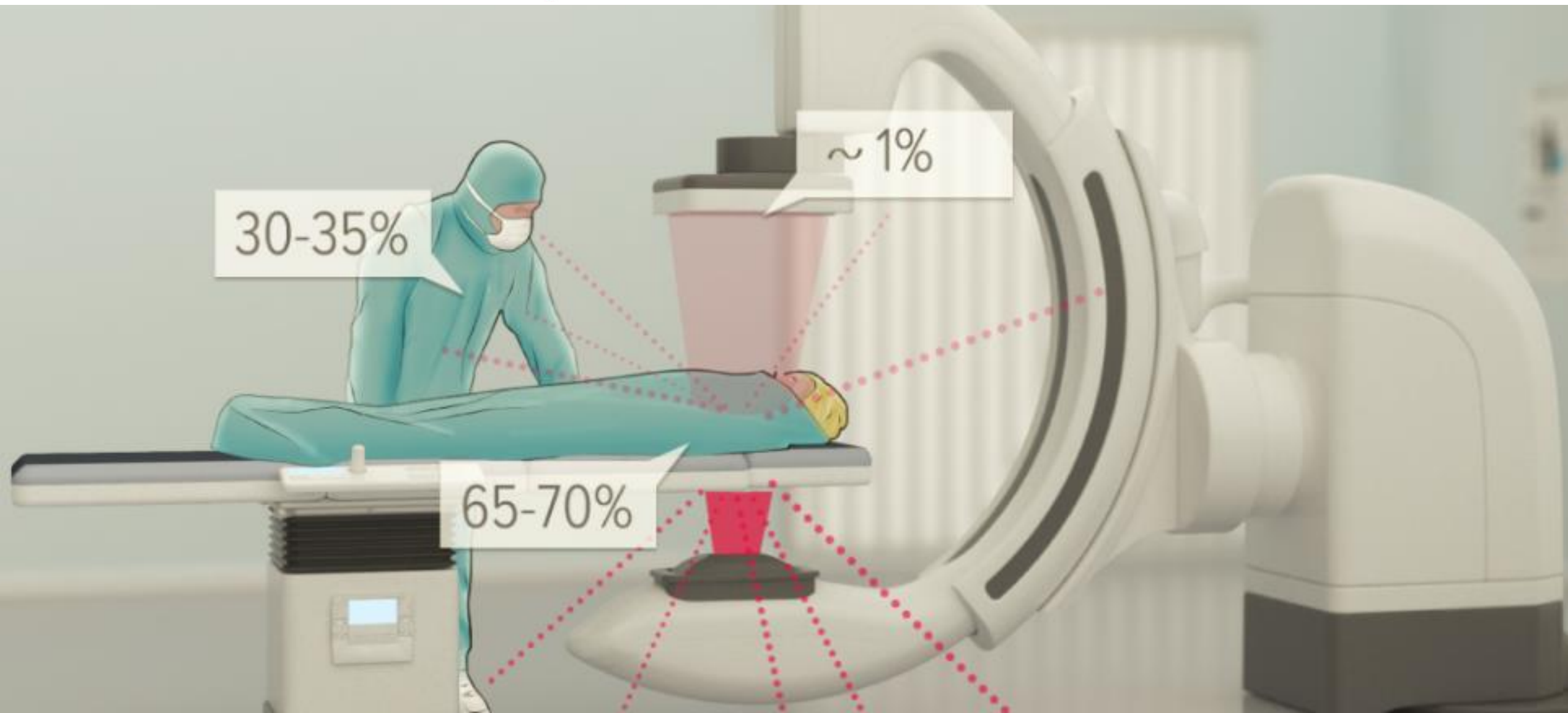
There is a lot of protection devices and low dose functions on new modern technology/X-ray machines

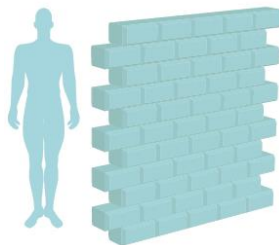
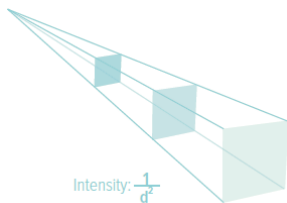
Staff may forget to use it

Work behaviour still influences the dose, even if radiation protection devices are used



A proximately 1% of radiation contributes to image generation!

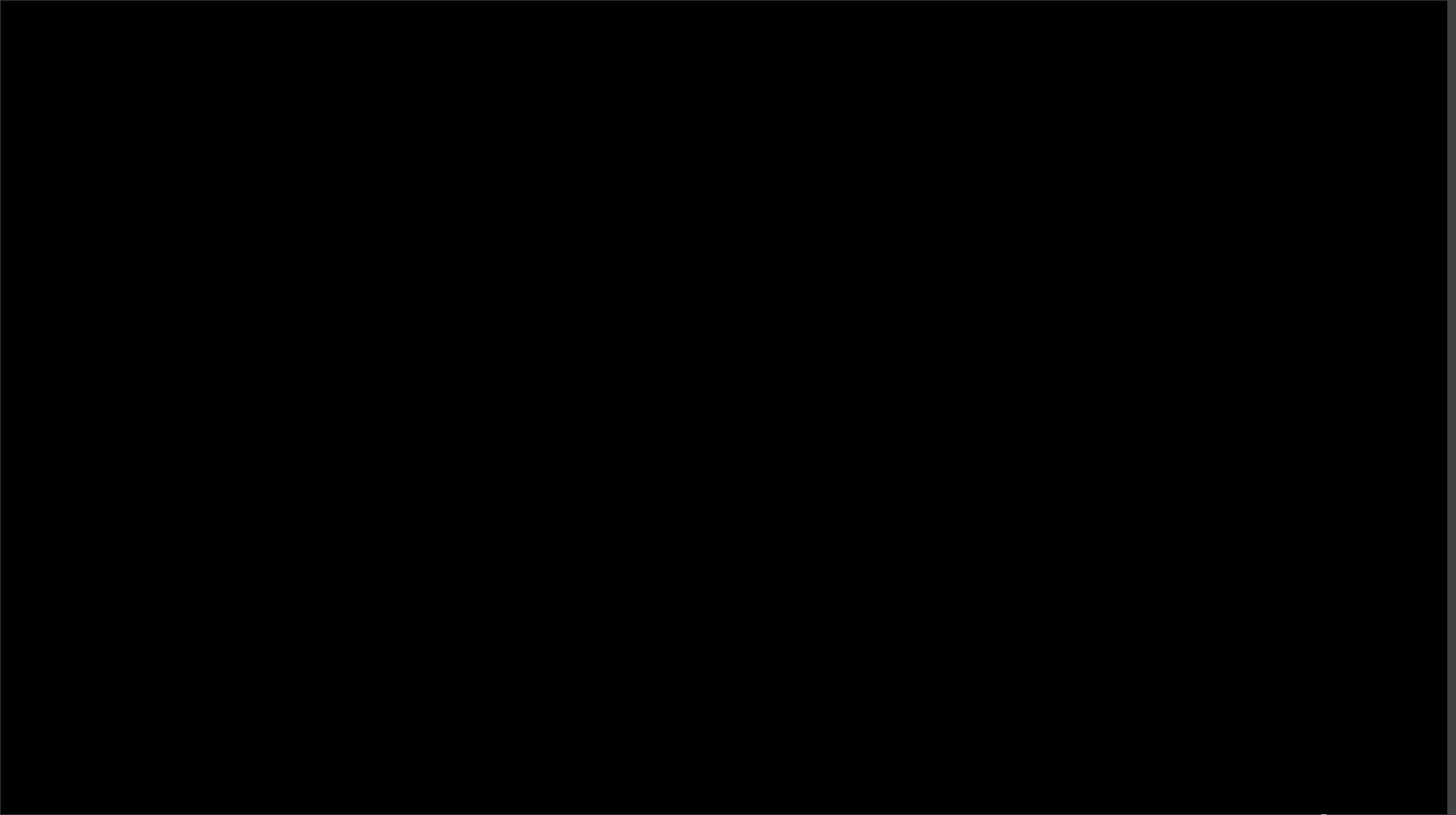




How can we remember all this while taking care of the patient?

How do we know what works and doesn't work?



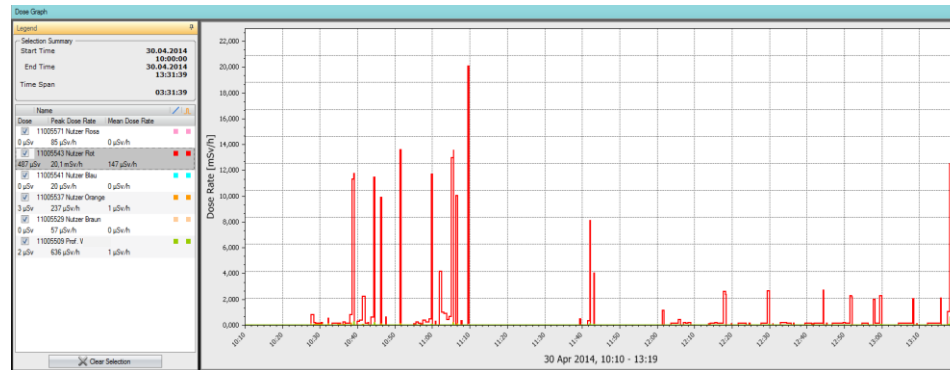




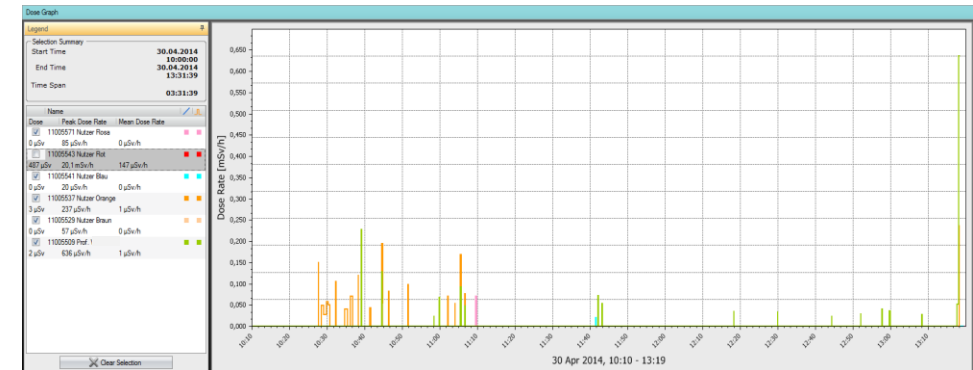
1 – AN EXPLICIT PICTURE

Exposure picture without radiation protection

Red is reference dosimeter fixed at 45° from c-arm iso-center



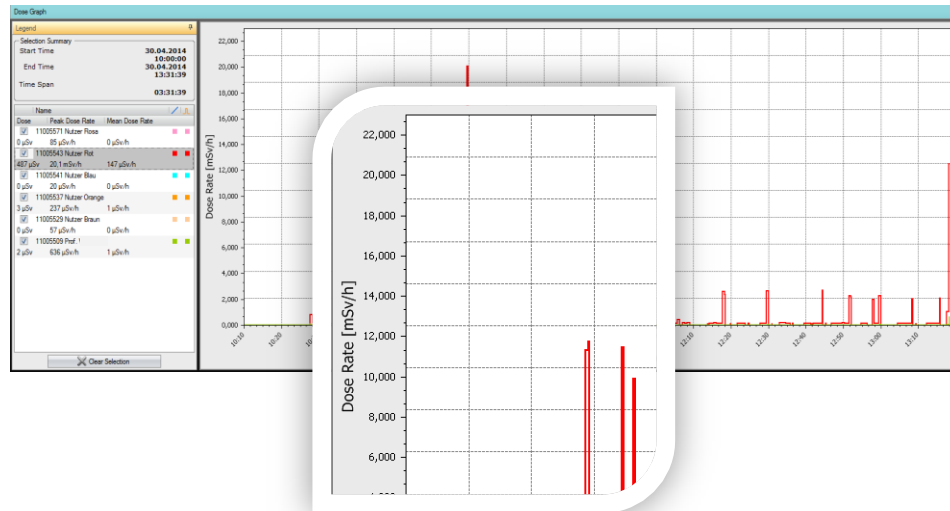
Exposure picture with radiation protection



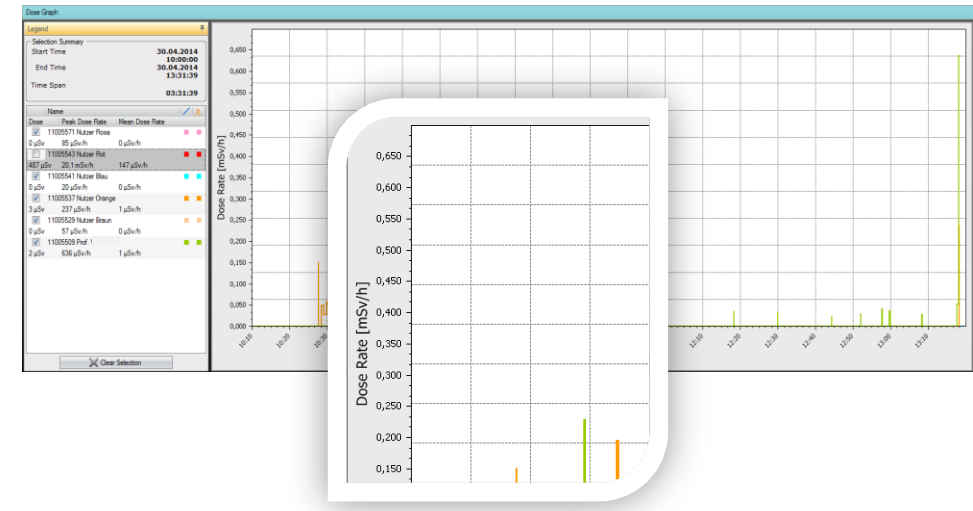
1 – AN EXPLICIT PICTURE

Exposure picture without radiation protection

Red is reference dosimeter fixed at 45° from c-arm iso-center



Exposure picture with radiation protection

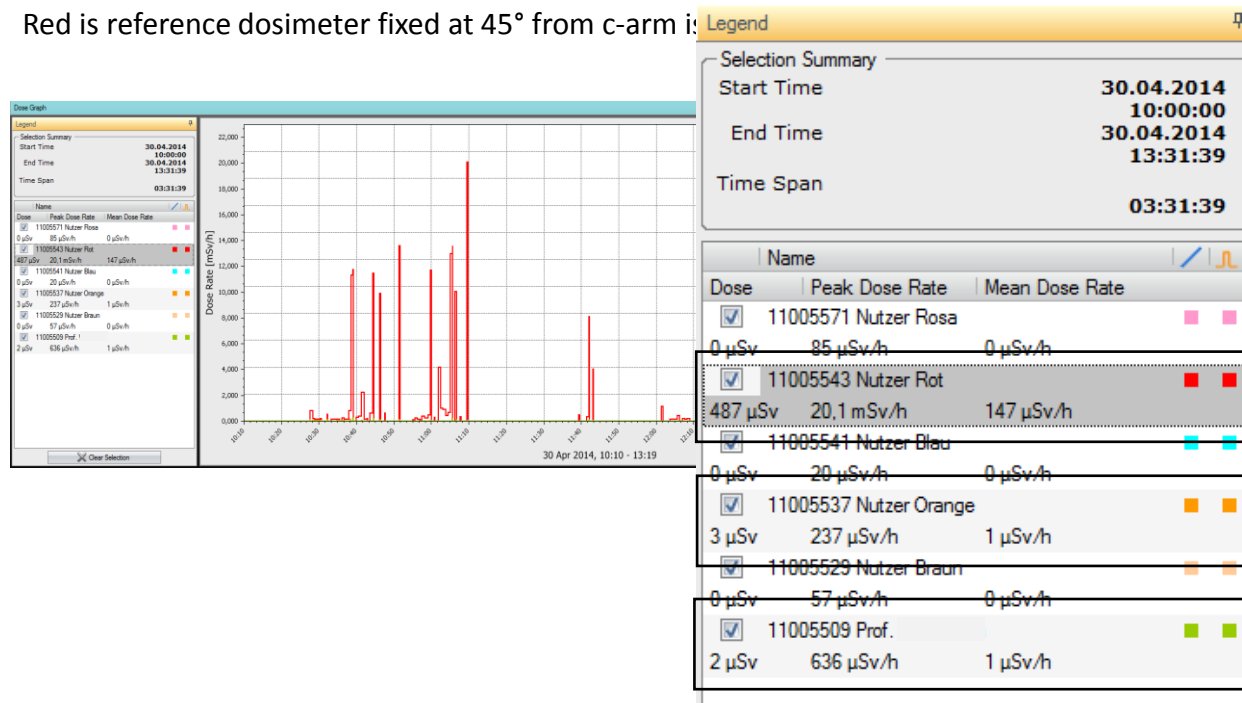


!!! NOTE THE SCALE !!!

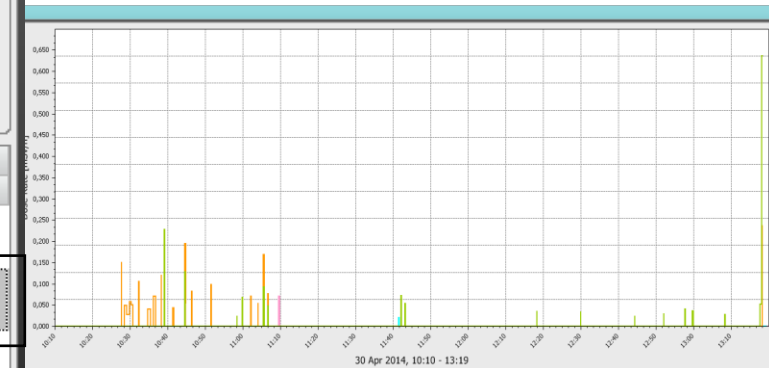
1 – AN EXPLICIT PICTURE

Exposure picture without radiation protection

Red is reference dosimeter fixed at 45° from c-arm is



Exposure picture with radiation protection



←examining assistant

NOTE TOTAL DOSES & PEAK DOSE RATES DURING EXAM

1 – AN EXPLICIT PICTURE

Legend

Selection Summary

Start Time

30.04.2014

10:00:00

End Time

30.04.2014

13:31:39

Time Span

03:31:39

Name

Dose	Peak Dose Rate	Mean Dose Rate
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<input checked="" type="checkbox"/> 11005571 Nutzer Rosa		
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0 μ Sv	85 μ Sv/h	0 μ Sv/h
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<input checked="" type="checkbox"/> 11005543 Nutzer Rot		
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487 μ Sv	20.1 mSv/h	147 μ Sv/h
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<input checked="" type="checkbox"/> 11005541 Nutzer Blau		
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0 μ Sv	20 μ Sv/h	0 μ Sv/h
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<input checked="" type="checkbox"/> 11005537 Nutzer Orange		
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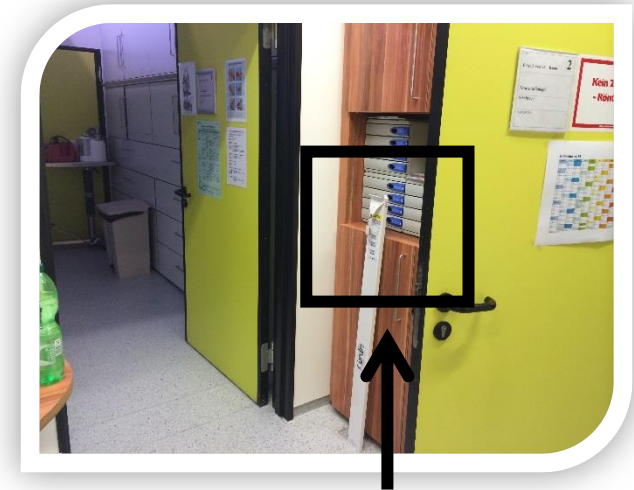
3 μ Sv	237 μ Sv/h	1 μ Sv/h
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<input checked="" type="checkbox"/> 11005529 Nutzer Braun		
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0 μ Sv	57 μ Sv/h	0 μ Sv/h
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<input checked="" type="checkbox"/> 11005509 Prof. 1		
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2 μ Sv	636 μ Sv/h	1 μ Sv/h
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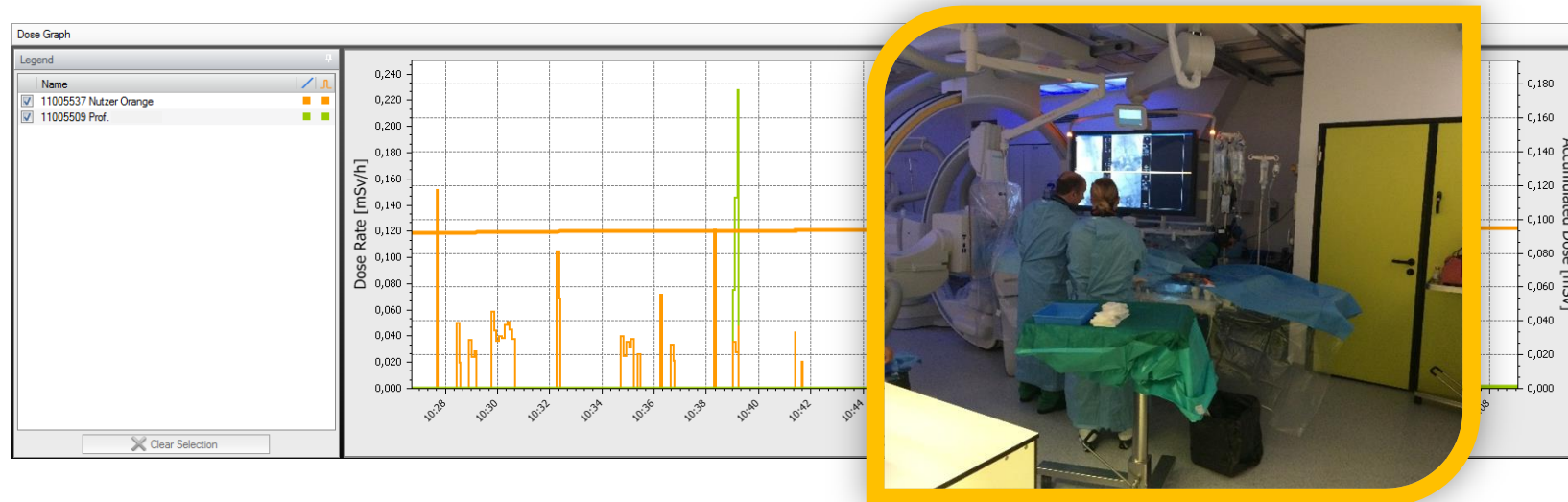
← IN THE CONTROL ROOM – OPEN DOOR!

← RUNNING NURSE

← PROF BELOW LEAD APRON?!?

ALSO VERY INTERESTING TO NOTE!

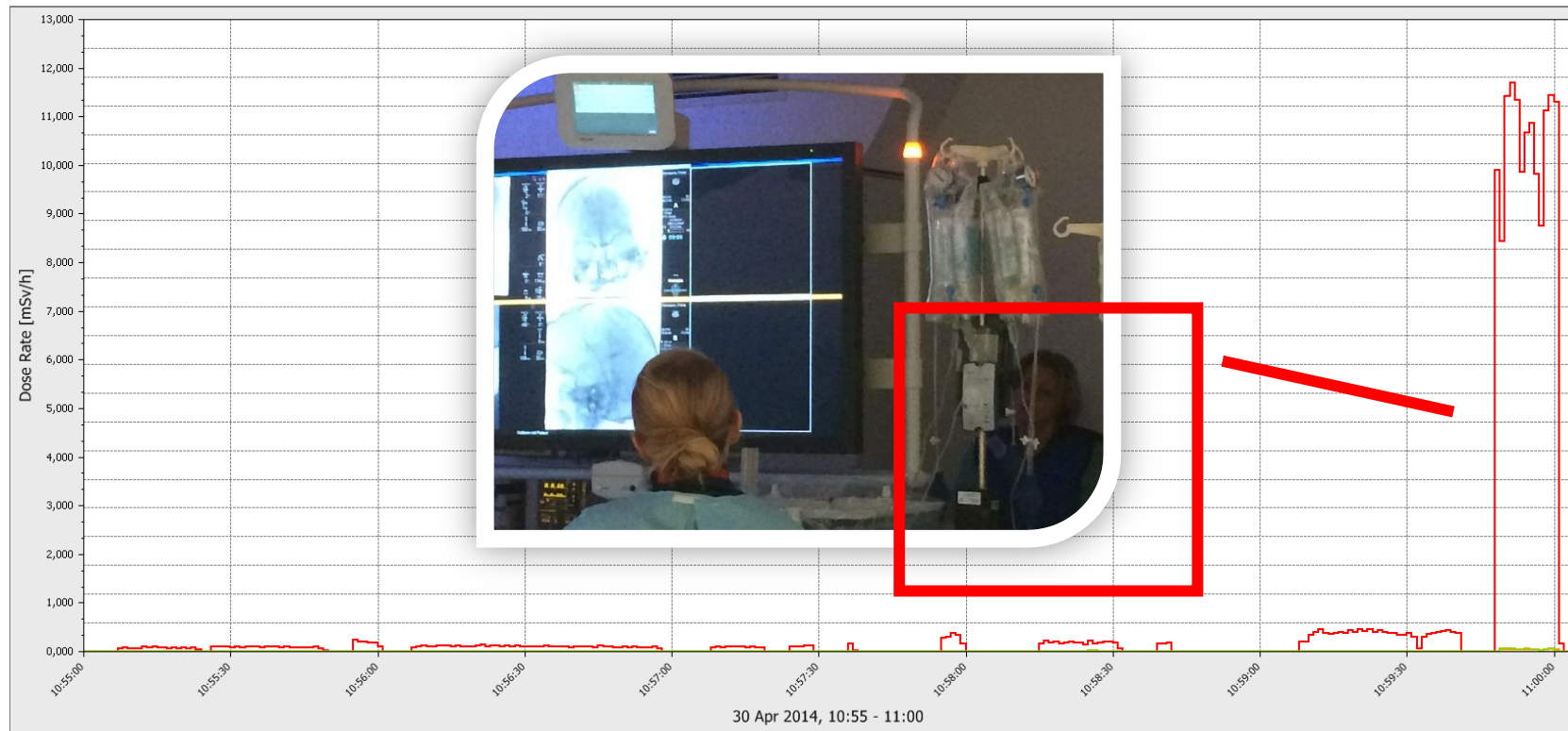
2 – ASSISTANT IN THE EXAM



NOTE: MANY TIMES POSITION DIRECTLY BEHIND LEAD SHIELD BETTER PROTECTED
SUGGESTION: USE RAYSafe TO EFFECTIVELY POSITION (E.G. BEHIND OPERATOR)

Reaction to visualised exposure: „I will ask for lead goggles!“

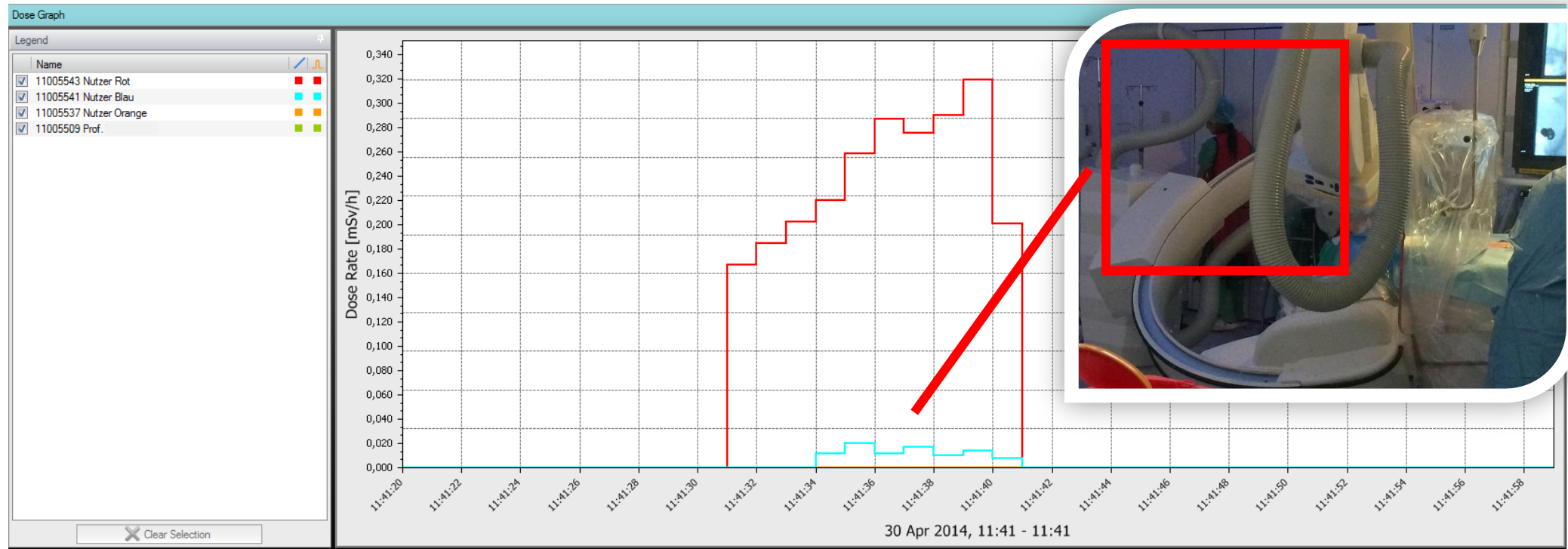
4 – NOTEWORTHY MOMENTS



ANESTHESIA IN LAB DURING XRAY BEHIND TABLE FROM 10:55 - 10:59

SHE WAS NOT WEARING A RAYSAFE DOSIMETER

4 – NOTEWORTHY MOMENTS



NURSE IN LAB DURING XRAY BEHIND TABLE FROM 10:41:30 - 10:41:42



Understanding

+

Behaviour

+

Control

=

Dose
reduction



