



EURADOS Skin Dose Webinar

The EFOMP Skin Dose Protocol
Andy Rogers, Interventional MPE

Outline

- Background to EFOMP WG Protocol
- Acceptance v. Commissioning
- Skin dose and the EFOMP Protocol
- Clinical context for skin dose

**NO CONFLICTS OF INTEREST
JUST INTERESTED!**

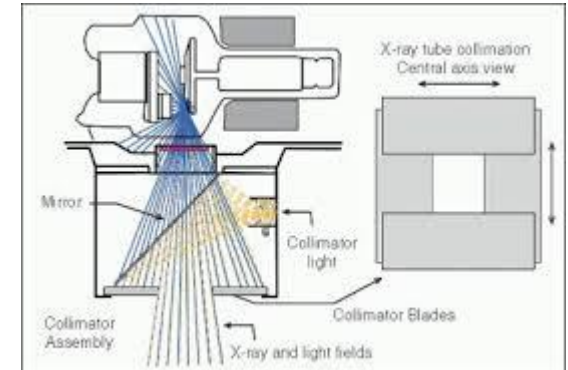


EFOMP WG

- Angiographic & Fluoroscopic Systems – QC Protocol
 - Led by Annalisa Trianni [IT]
 - Final draft for wide consultation early 2022
 - Includes;
 - Mechanical & Geometrical Aspects
 - X-ray Tubes & Generator Aspects
 - Dose indicators [inc discussion on skin dose]
 - Detector aspects
 - Technical Image Quality
 - Some radiation protection discussion

EFOMP WG

- Angiographic & Fluoroscopic Systems – QC Protocol
 - Some sections prescriptive [must do this]
 - Some sections more discursive [where state of the art not well-defined]
 - Does not attempt to say how to optimise
 - Skin Dose [also includes RDSR tests separately]



**Includes x-ray systems
and offline systems**

Acceptance Test v. Commissioning Test

- Acceptance
 - A test designed to show meets **specification**
 - Need to know manufacturer's model for skin dose!
 - Jérémie already shown many different models
 - **YOU MUST KNOW YOUR MODEL**
 - **EASY – JUST TEST AGAINST THE MODEL 😊**



Acceptance Test v. Commissioning Test

- Commissioning
 - A test designed to show how your device performs **clinically**
 - May not actually need to know manufacturer's model for skin dose!
 - **BUT IT REALLY HELPS 😊**



EFOMP Protocol & Skin Dose Assessment

- General stuff!
 - Introduction
 - Explains some of the technicalities and background
 - e.g. definitions [absorbed dose to skin v. cumulative air kerma at PERP]
 - Discusses regulatory requirements [almost non-existent ☹️] & equipment standards
 - Explains modelling of skin dose & relevant factors required



EFOMP Protocol & Skin Dose Assessment

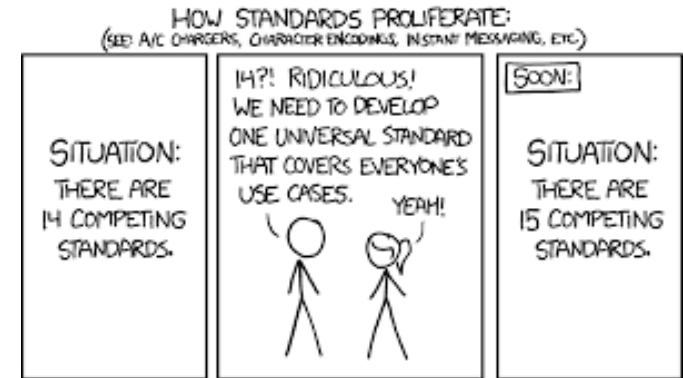
- Standards

- IEC 60601-2-43 [2020 version]

- Says ‘**should** have a dose map’
 - Says prefers ‘skin dose’ map where ‘skin dose’ is absorbed dose to skin
 - Mustn’t say ‘skin dose map’ unless it really is [otherwise say ‘dose map’]

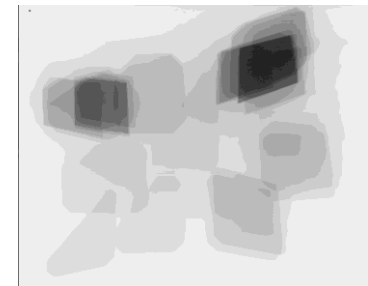
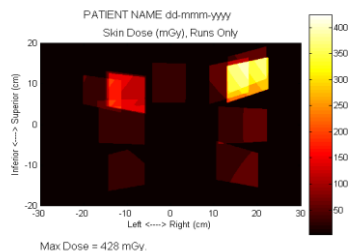
- IEC 61233-3-8 [CD2 draft]

- Acceptance and constancy testing
 - Will **NOT** address skin dose map testing in main text – no agreed consensus



EFOMP Protocol & Skin Dose Assessment

- Standards
 - IEC 60601-2-54 [2018 version]
 - Says ‘ACCOMPANYING DOCUMENTS **shall** contain certain instructions for MANUFACTURER-recommended QUALITY CONTROL PROCEDURES and tests to be performed on the X-RAY EQUIPMENT by the RESPONSIBLE ORGANIZATION. These shall include acceptance criteria for each test and frequency for that test.
 - Applies to interventional as well
 - Intention is for simple tests requiring only usual local equipment/expertise



EFOMP Protocol & Acceptance Testing

- Acceptance [RDSR tested]

- Manufacturer protocol

- If it exists follow it!



- Otherwise

- Easy for PA – have a block of something on table – known irradiation – compare your **predicted** results **OF MODEL** to that displayed
- For overlap/oblique projections options are;
 - Same phantom + more involved predictions
 - Phantom that mimics model and use point dosimeter
 - If model employs varying phantoms, change phantom to mimic varying patient size

EFOMP Protocol & Commissioning

- Commissioning [assumes RDSR tested]



- What does our system do on real patients?
- Difficult without serious resources
- GaF chromic film?
 - Calibration issues – film, filtⁿ, scanner
 - Where on patient? – back v. wrap around



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EFOMP Protocol & Commissioning

- Commissioning [assumes RDSR tested]

- Patient-modelling

- Like acceptance testing but now ...
- Predict for real patients
- Note differences

- Beware – most models likely to UNDERESTIMATE for large patients

[these are the 'at risk' patients ☹️]


- Beware – most models likely to UNDERESTIMATE for oblique/lat projections



Clinical Context

- What's it all for?
 - IR equipment-based system
 - For mitigating skin dose effects during a case
 - Overlap is important – can you test?
 - Dose accuracy not a big deal
 - [*personally happy to within 1 Gy*]
 - PDMS-based systems
 - Normally used for follow-up post 'trigger' in lab
 - If available could validate with in-lab system
 - Trigger leads to patient info [normally leaflet]
 - Again, dose accuracy not a big deal
 - Trivial v. Serious [$>5\text{Gy}$?]
 - Serious should have positive follow-up




REALLY?

MPE Judgement

- Doing what's right NOT a PhD thesis!
 - What resources do you have?
 - What is the x-ray unit used for [high dose v. low dose]
 - Understand your current doses and the protocol angulations
 - How do clinicians use in-lab systems?
 - Maybe require directed training?
 - Us [by the supplier]
 - Clinicians [by us?]



THE END!

