

HERCA: Heads of the European Radiological protection Competent Authorities

INSPECTING OPTIMIZATION

HERCA WGMA Inspector Workshop 2015
Brussels

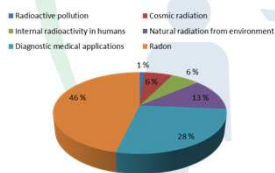
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Content

- Introduction
- Definition of optimization
- Factors influencing optimization
- Inspections
- How to inspect optimization
- Summary and conclusions

Introduction – Doses from medical applications Norwegian numbers

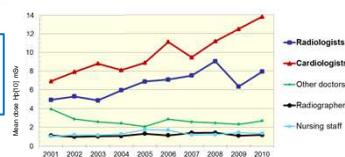
Contribution to collective dose - 2008



FACTS: Diagnostic medical applications biggest contribution to collective dose from man-made sources

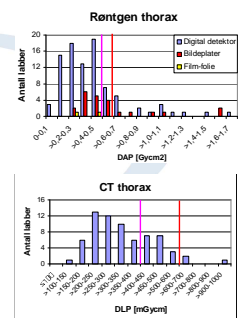
FACTS: Staff performing interventional procedures receives the highest occupational doses

Doses to medical staff



Urgent need for optimization (Norway)

- Significant variation in dose to patients from the same examination
 - X-ray thorax: max/min-ratio: 21
 - CT thorax: max/min-ratio: 8
- Huge potential for optimization of X-ray and CT examinations
- Proper optimization can reduce
 - contribution to collective dose from medical applications
 - radiation risk for chronically ill patients (frequently CT)
 - radiation risk for staff performing interventional procedures



Optimization – core stone in RP

Dose to patient and staff as low as reasonable achievable (ALARA)

BUT

High enough to ensure adequate image quality to answer the clinical question

DOSE

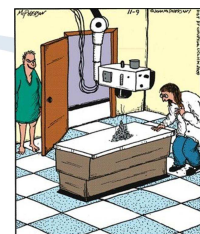
IMAGE QUALITY



Premise: Multidisciplinary team with sufficient competence in RP

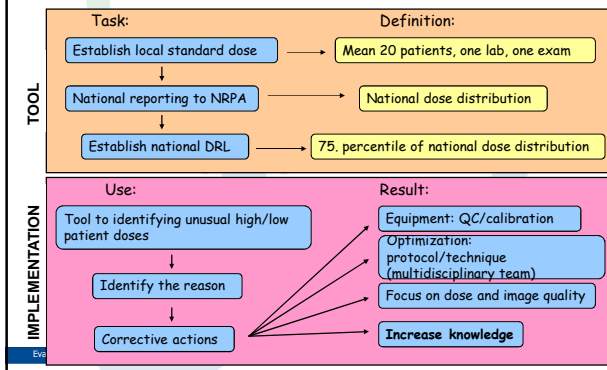
Optimization – Important factors

- Awareness, **attitude** and RP culture
- Optimization implemented in QA-system
- Type of equipment and QC / maintenance
- Standard exposure protocol and individual adjustment of scan parameters
- Working technique
- Available staff and **E&T** in RP
- Knowledge of dose and **identification** of high/low doses



Need for:
A tool to identify examinations with high/low doses

Tool for optimization: Standard dose and national DRLs



Inspections – A tool for increased implementation

Definition

- Verifying compliance with national Act and regulations
- Identify non-conformities
- Administrative reactions
 - Compulsory fine, withdrawal of authorization, shut down, prison, etc.

Not to be mixed up with audits

- Audits are made by peers
- Evaluate compliance with guidelines (“gold standard”)
- Not associated with administrative reactions by an authority
- Up to hospital to implement non-conformities

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8



Different levels in the verification process

REVIEW OF SYSTEM

- RP organization, RPO, MPE
- Quality system, notification system and documents
 - Procedures / instructions
 - Responsibilities / tasks
 - Approval, revision, traceability
 - Easily available / user friendly
- Internal audits
- Staff and E&T
- Interviews of hospital management and responsible persons
- Demonstration of QS, etc.

LEVEL OF IMPLEMENTATION

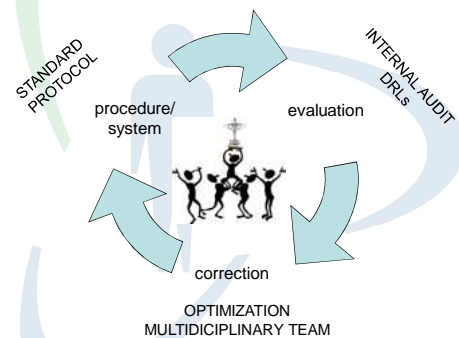
- Verify compliance with QS
 - Procedures and instructions known and in use
- Interviews of staff
- Observations / demonstrations
 - Procedures and room / areas
 - Working techniques
 - Equipment
- On-site spot checks
 - Verify documentation

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9



Internal control – The circle for quality improvement



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10



Inspecting optimization of protocols

- Verify if standard protocols are available at equipment
- Procedure for revision standard protocols, multidisciplinary team, last revised
- Procedure for establishing local standard doses
- Verify if dose parameters on equipment is calibrated, calibration date
- Overview of established local standard doses and comparison with national DRLs and other benchmarking (departments, labs)
- Reason to high/low doses analyzed and corrective actions taken
- Interviews to verify if procedures are known and followed
- Documentation of optimization activities

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11



Inspecting equipment and QC (1)

- Observation of equipment – intended use?
- Procedure for purchase – right staff involved (MP, radiologist, etc.)
- System for maintenance and QC (in QA-system?)
 - Service contracts or maintenance by local medical engineers
 - Responsible staff for QC, MP involved at appropriate level
 - Coordination between maintenance and QC
 - Yearly plan – verify if followed
 - Procedure for calibration of measuring instrument
 - Method books for QC, acceptability criteria, action criteria, etc.
 - Actions when deviations from QC

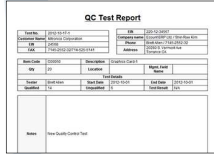
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12



Inspecting equipment and QC (2)

- Interviews to verify if procedures are known and followed
- Verifications (spot checks)
 - Verify calibration certificate, date
 - QC report for CT lab 2
 - Follow up of deviations



Inspecting education and training

- Qualification requirements of staff (education)
- System for local E&T in RP and use of equipment (scope, content)
- Verify documentation – All staff received appropriate E&T?
- Interviews and demonstrations to verify level of competence and knowledge in RP



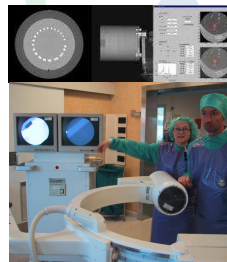
Observations / demonstrations

- Room layout
- Equipment and dose indicator in room
- Personal protective equipment (availability/use)
- Dose reducing tools/techniques/parameters
 - Filtration, pulse rate, etc.
 - Use of automatic contrast injector
- Working technique
 - Geometry
 - Staff placement
 - Compression, grid (pediatric), etc.



Measurements

- Quality of equipment and viewing stations
- Calibration of instruments
- Shielding of room
- Dosimetric audits



Inspector competence

Basic knowledge:

- System review technique
- Interview technique
- Knowledge of quality systems and internal control systems
- National RP legislation
- How to behave in a clinical environment

Preferred additional knowledge:

- Clinical experience with medical applications
- Knowledge on factor influencing dose and image quality
- Measurement techniques



Summary and conclusions

- Huge optimization potential in medical applications
- Standard dose and DRLs an effective tool for optimization
- Inspection of both system and level of implementation
- Level of inspector competence affect the outcome

ATTITUDE and CULTURE



Inspections – A powerful tool for implementation and identifying areas for improvements!!!

