Components of an effective QA programme

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Background

IRS
• MPE and RPA for a number of Trusts mainly in North West England

Me
• Scientific Officer & Trainee RPA/MPE
• Worked with IRS for nearly 8 years
• Specialist areas CT, Digital Imaging & Research into large scale audit techniques
Life Cycle of Imaging Systems

Figure 2.1 Life cycle of x-ray imaging systems
What is a QA programme

A quality assurance programme in diagnostic radiology as defined by the WHO is an organized effort by the staff operating a facility to ensure that the diagnostic images produced are of sufficiently high quality so that they consistently provide adequate diagnostic information at the lowest possible cost and with the least possible exposure of the patient to radiation

(IAEA Training Lecture)
Benefits of a QA programme

QA can be of great value in:

• Improving diagnostic content
• Reducing radiation exposure
• Reducing medical costs
• Improving departmental management

(IAEA)
Acceptance & Constancy Testing

X-RAY EQUIPMENT

Image Quality

Patient Dose

Routine QA

Data Collection Management Analysis Reporting

IPEM 91 NHSBSP 0604/0705

Euro Quality Criteria

Patient Dose Protocol IPEM 88

IPEM 2011
Data collection

Routine / Hospital User
• Recommend a database system
• Written protocols
• CONSISTENCY

Constancy / Medical Physics
• Recommend some sort of Template

MEDICAL PHYSICS ↔ HOSPITAL USER
### Tube Output Measurements

**Focus to Chamber Distance:** 70 cm
**Focus To Table Top Distance:** 102 cm

<table>
<thead>
<tr>
<th>Exposure Number</th>
<th>B1: Waveform</th>
<th>B2: Output Variation with kV</th>
<th>B3: Output Variation with mAs</th>
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<tbody>
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<td>Dial Settings</td>
<td>mAs</td>
<td>focus</td>
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<tr>
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<td>20</td>
<td>B</td>
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<tr>
<td>115</td>
<td>81</td>
<td>20</td>
<td>F</td>
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</tbody>
</table>

**Generator Type:**
- mA & time
- mAs
- mAs & time

**Focus Type:**
- Automatic
- Broad Only
- Broad & Fine

**Base Exposure Settings**

<table>
<thead>
<tr>
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<th>mA</th>
<th>Result</th>
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**IPEM 2011**
Management

From Guidance Note PM77
- Written procedures
  - Fault logging
  - Actions taken
  - Return to clinical use tests
- Responsibility
  - QA team
  - Recording
  - Data management
  - Action levels
- Training
  - Test equipment

MEDICAL PHYSICS ←→ HOSPITAL USER

IPEM 2011
So what do you do with the QA data when it has been collected?

- Verification
- Comparison with baselines / tolerances
- Long term analysis
- What if something is highlighted?
- Procedures

MANUFACTURER ⇔ HOSPITAL USER
MEDICAL PHYSICS ⇔ HOSPITAL USER
Normalised output over time for room AED1

Normalised Outputs

mm/yy

02/08 03/08 04/08 05/08 06/08 07/08 08/08 09/08 10/08 11/08 12/08
How is QA reportable?
• Acceptance / Constancy usually written report

What about Routine QA?
• RPC meetings / QA Team debrief
• Posters in department

What about reporting to Manufacturer?

HOSPITAL USER ↔ MEDICAL PHYSICS ↔ MANUFACTURER
Bringing Components Together

• Manufacturers build equipment to give adequate image quality at ALARP dose

• Medical Physicist uses acceptance / tube calibration data to calculate patient dose

• Hospital user verifies tube calibration data by routine constancy checks
Key Components

Effectiveness
• A QA programme should highlight poor performance before it begins to affect patient care in terms of image quality and patient dose

Efficiency
• Equipment complexity, age of equipment, use of equipment & workload should be taken into account
Key Components

Integrated
• All interested parties should be involved in QA program. Hospital User, Medical Physics & Manufacturer

• Cost-effective
• A QA programme is increasingly recognised as helping reduce medical costs