ORGANISING QUALITY IN RADIOTHERAPY
A MULTIDISCIPLINARY APPROACH

P. Scalliet
ICARO 2
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Quality in radiotherapy in the 70’s

- Few patients.
- Few curative RT.
- Few imaging.
- Few quality control.
- Irreproducible results
Variable results in EORTC 10801
No trial quality assurance

Recurrence rate after mastectomy or conservative surgery with radiotherapy

1. No dosimetric audit,
2. Variable beam calibration.
3. No understanding of clinical protocol.
4. No respect of inclusion criteria.
5. Frequent violation in dose and time.

Dispersion of outcome
Recurrence in EORTC 22881 with quality assurance
The RT process: radiotherapy is a *treatment* of cancer

Radiotherapy applies lethal doses that are only tolerated because of a strict framework of application.
Process control is the basis for quality and safety monitoring systems.
Why process control?
Do it well the first time!
Standard-based quality

- Imaging, target definition, clinical guidelines
Standard-based quality

- Imaging, target definition, clinical
- Equipment and quality control, specification, technical guidelines, periodicity, etc…
Standard-based quality

- Imaging, target definition, clinical guidelines
- Equipment and quality control, technical guidelines
- Treatment process, clinical guidelines
Standard-based quality

- Imaging, target definition, clinical guidelines
- Equipment and quality control, technical guidelines
- Treatment process, clinical guidelines
- Treatment delivery, on-line control
Standard-based quality

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- Treatment delivery, on-line control
- Process control
Process control

• Prospective
  • HFMEA
  • Other approaches

• Retrospective
  • Incident registration
  • Incident root-cause analysis
  • Return on experience
  • Communication within the department
  • Communication between departments

• Internal audit
• External audit
Two approaches

- Standard (or process) based quality
- Safety-based quality

An engine failure is **not** a safety issue

An engine failure is **is** a safety issue
Radiotherapy is different

• We are not free to select or define our level of quality…

Rolls Royce

Ford T
Reference document

ISO 9002
Process-based

But patient safety?
Development of a quality system

1. Select standard.
2. Describe procedures or processes (quality assurance).
3. Use FMEA to refine procedures or processes proactively.
4. Run processes.
5. Monitor outcome.
6. Register failures (incidents/accidents).
7. Analyse failures and feed-back to quality system.
Indicators

Incident Management Dashboard for Apr 09

- Incident Management Score
- % Incidents Resolved within Target
  - Critical: 91.18%
  - High: 87.52%
  - Medium: 67.74%
  - Low: 11.47%
- % Incidents Resolved by 1st level
  - 69.61%
- Average Incident Create to Resolve Duration
  - 25.47
- % Incidents Caused by CMDB Issues
  - 99.35%
- % Incidents Caused by Changes
  - 0.05%
- % Incidents Dispatched
  - 49.93%
- % Incidents Misrouted
  - 4.88%
- % Incidents Re-opened
  - 6.68%

Incidents by Priority

- Critical: 308
- High: 152
- Low: 311
- Medium: 640
- None: 70

Incidents by Category

- Database: 426
- Hardware: 372
- Network: 384
- Server: 12
- Software: 4
- Telecoms: 36
Challenge...

Outcome
Relatively uncertain

SAFETY GOALS

Injuries
Events
Outages
Accidents
Etc.

DEFENSIVE FILTERS

DECISION MAKERS

RESSOURCES
- Available money
- Equipment/plant
- Personnel/expertise
- Available time

Outcome
Relatively certain

PRODUCTION GOALS

Rate
Range
Profit
Market share
Etc.

FEEDBACK
- Success indicated negatively
- Traditional measures noisy and deceptive
- Indirect reinforcement value of itself
- Only achieves high salience after accident or near-miss

FEEDBACK
- Success indicated positively
- Readily and reliably gauged
- Direct and continuous
- Obviously reinforcing
- Salient and imperative
The lifespan of a hypothetical organisation through the production-protection space

Better defences converted to increase production

incident

accident

Production

Bankruptcy

Catastrophe
Breast cancer survival in Belgium

- Volume effect measured in Belgium between centres treating over 150 case/year (14 hospitals) and less than 100 case/year (83 hospitals): 84 vs. 77 % 5y survival
- Corrected for age, stage, grading.
Rate of mastectomy depends on the presence of a RT department in the hospital.
What is the next frontier?