Accident Reporting System: The ROSIS Experience

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Versailles, France
December 2 - 4, 2009

ROSIS – Incident Reporting

- Incidents can have serious consequences in radiotherapy
- Information about incidents is generally not shared between radiotherapy departments
- Lost opportunities to learn from incidents and prevent injury to future patients
- To be proactive rather than reactive

ROSIS - Original Objectives

To establish an Internet-based system whereby:

- radiotherapy incidents can be analysed in a systematic and objective way.
- the information shared through web-access to a centralised database.
- radiotherapy clinics can address safety issues before an accidental exposure occurs.
- A general culture of safety awareness can be by making information available on details of incidents, near-incidents and corrective actions, submitted on-line by other radiotherapy clinics.

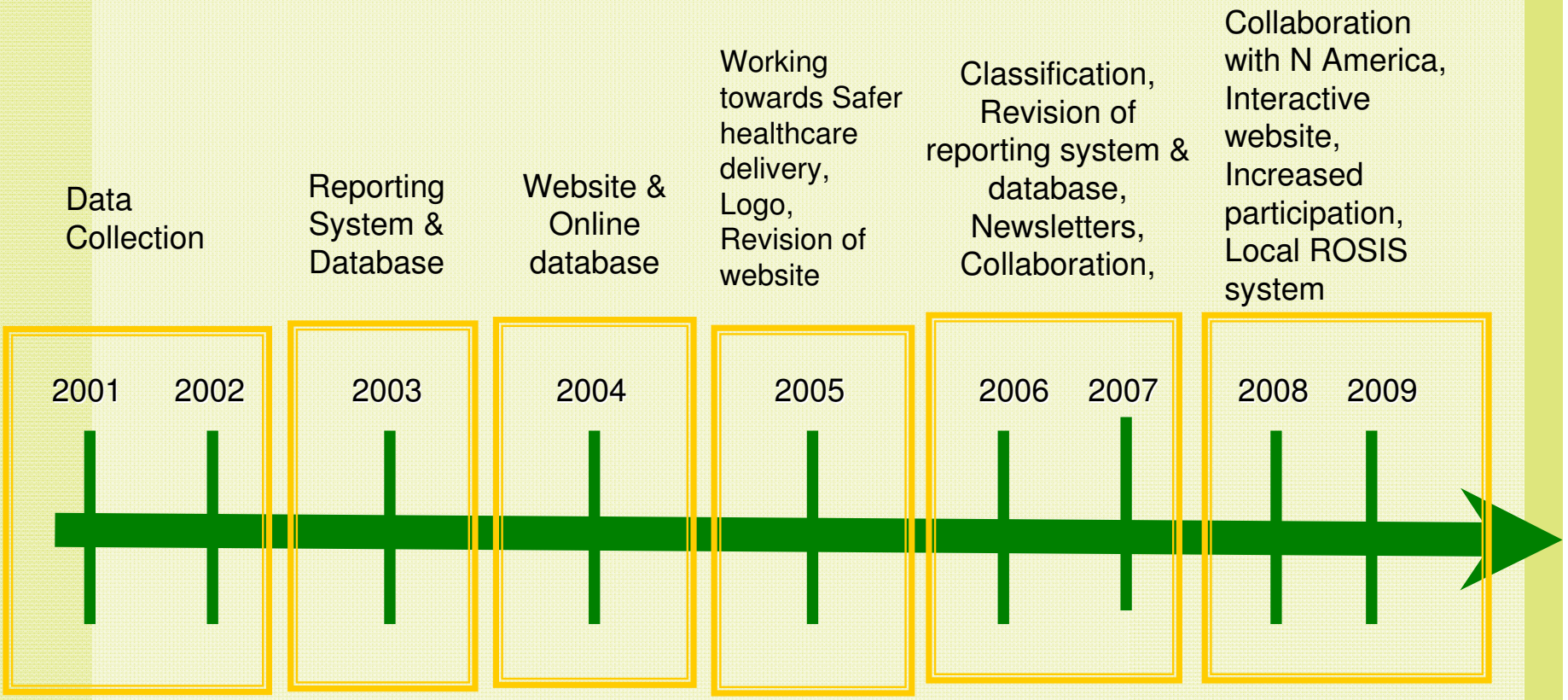
ROSIS - Original Objectives

To investigate ways in which:

- a hazard classification system can be defined
- frequency analysis can be performed
  - together leading to the identification of safety-critical steps in the radiotherapy treatment process where errors are likely to occur or be detected.
- current best practice in incident reporting within medical as well as non-medical settings can be used in radiotherapy by identifying high-reliability organisations outside radiotherapy and the methods used within these organisations for incident and near-incident reporting, evaluation and feedback.

ROSIS Past, Present & Future

Established under the auspices of ESTRO in 2001



ROSIS - Data Collection

Department Form

- Dept name and location; contact person
- Type and number of machines
- No of patients treated/year
- *% Patients that are treated using CT Plans **
- Record and verify
- Integration of network/areas
- Staff
- Service
- QA

Incident Form

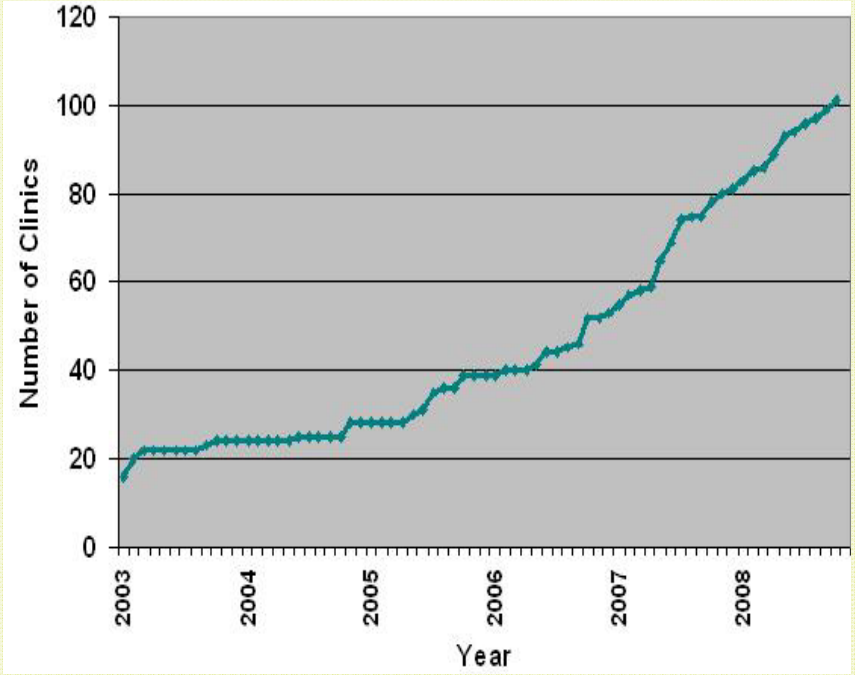
- Modality
- Who Discovered
- *Where in process discovered **
- Who and how many involved
- How discovered
- *Treatment delivered incorrectly **
  - *No. of fractions incorrect*
  - *Total fractions prescribed*
- Outcome / potential outcome
- Description, Cause, Suggestion, Comments

** Modification added later*

ROSIS: Department Statistics

- 101 Departments registered worldwide
  - Europe
    - 70+ departments representing

      16 countries
  - Africa, Asia, Australia, North America/Canada, South/Central America
    - 3-12 departments per region



ROSIS Clinics (101)

- Clinic demographics
  - 309 Linear Accelerators (average 3 per dept)
  - 34 Cobalt Machines (average 0.3 per dept)
  - 114 Brachytherapy machines (average 1.1 per dept)
  - and a Patient population of over 150,000 new patients per year (average 1497 per dept)

ROSIS Clinics (101): Number of patients per member of staff

Discipline	***Average***
Oncologists	281
Physicists	387
Radiation Therapists at trt units	159
Radiation Therapists at sim/CT	546
Dosimetrists	549
Technical Maintenance	833

ROSIS Clinics (101) : QA Activities

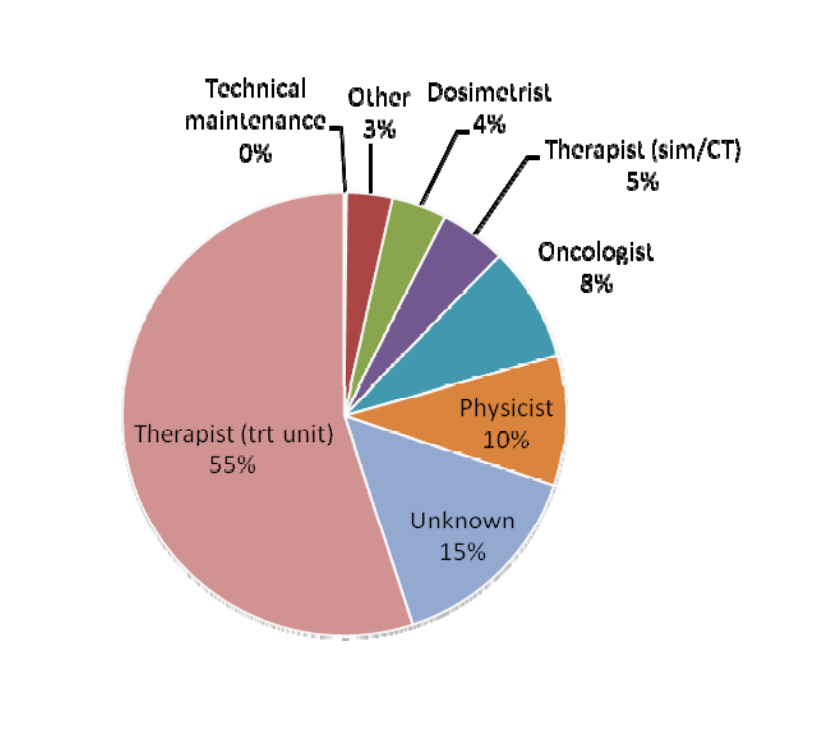
QA Activity	***Total (%)***
Chart Check	90 (89)
In-vivo dosimetry	34 (34)
Peer review	56 (55)
Portal images	94 (93)
Regular clinical review	73 (72)
Quality control procedures	91 (90)
Procedures for clinical processes	69 (68)
Formal Quality Management System	35 (35)
Regular QA of treatment units	98 (97)
Audit programme	69 (68)
Other QA	28 (28)

ROSIS Clinics (101):External Audit

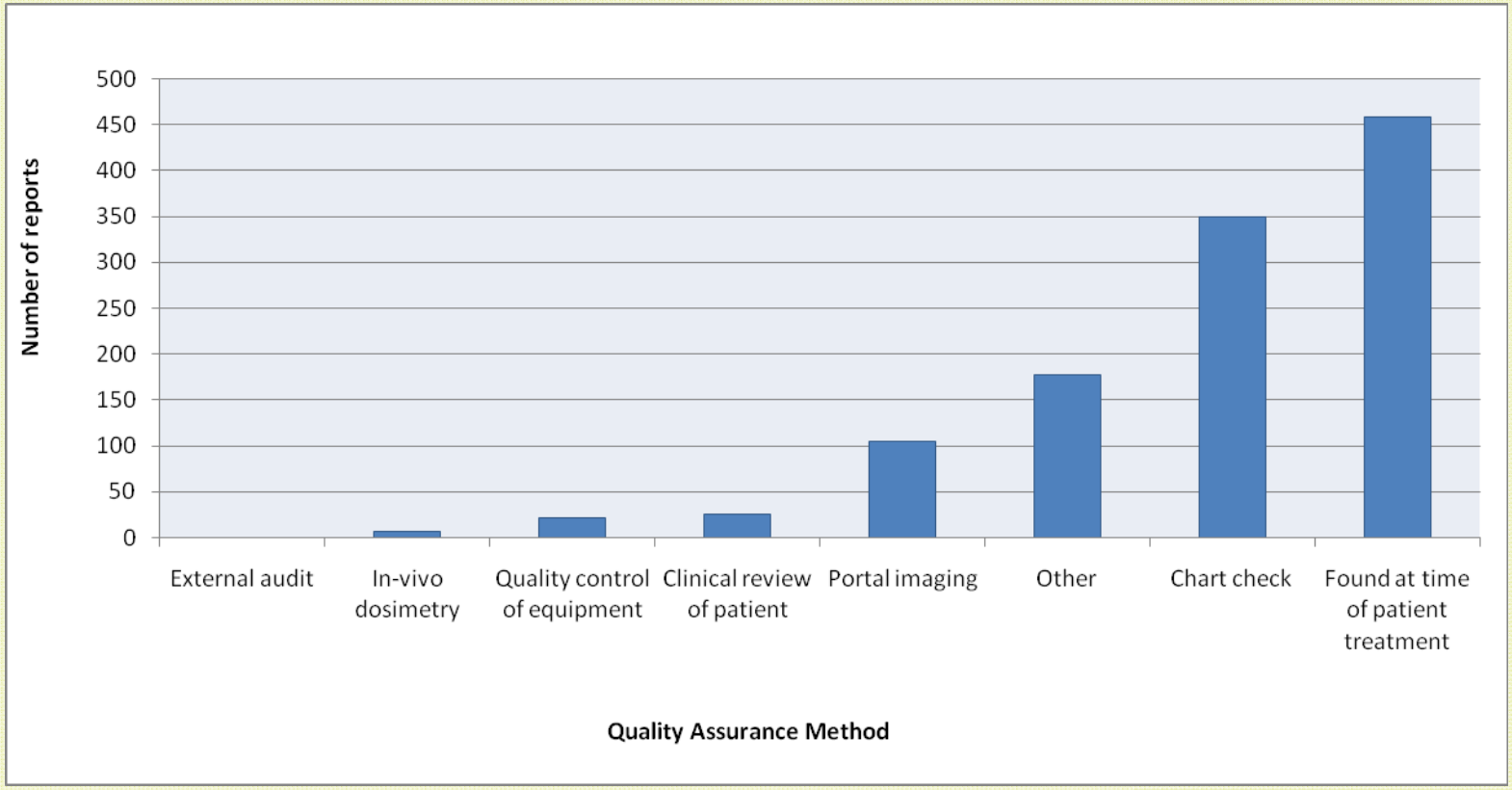
- The majority of departments (68%) participate in an audit programme:
  - IAEA – 10 departments
  - EQUAL (ESTRO) - 18 departments
  - RPC (Radiological Physics Center at MD Anderson) – 7 departments
  - Other Regional/National - 23 departments
  - Audit programme not specified - 24 departments

ROSIS Data: Who discovered

1074 reports
- External Beam RT - 97.7% (1049)
- Brachytherapy - 1.9% (20)
- Other modalities - 0.5% (5) (mainly non-process).



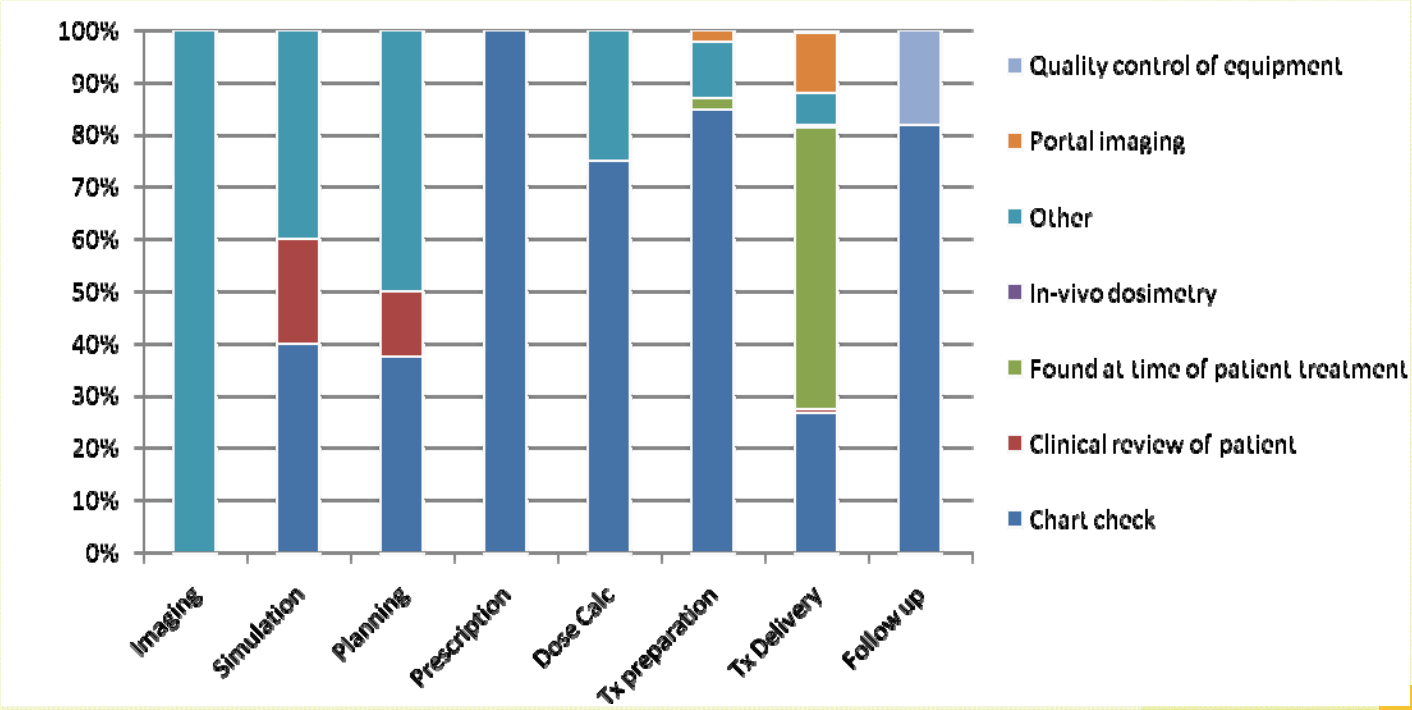
ROSIS Data: How discovered



ROSIS Data: When and how discovered

When:

Treatment stage - 73% Pre-treatment – 25% Follow-up – 2%



Accident Reporting System: The ROSIS Experience (Part II)

ROSIS Classification

Versailles, France
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Revision of the System

Three main requirements:

1. Effective tool for analysis and learning
2. Flexible
    1. Applied to different departments and processes
    2. Translated into different languages
3. Incorporated into the reporting system

ROSIS Classification

- Radiation Oncology Specific
- Method
  - Literature review
  - RT incident-types from ROSIS database
- Purpose
  - Organise reports
  - Facilitate analysis
  - Improve safety

ROSIS Classification

- Scope
  - All incidents and near-incidents relevant to an RO dept
  - Preventative & corrective factors
- Intent
  - Maximise learning - Collect detailed information
- Feasibility
  - Incorporated into online Reporting System
- To be evaluated:
  - Analysis
  - Sensitivity
  - Reliability and Validity

OVERVIEW OF CLASSIFICATION

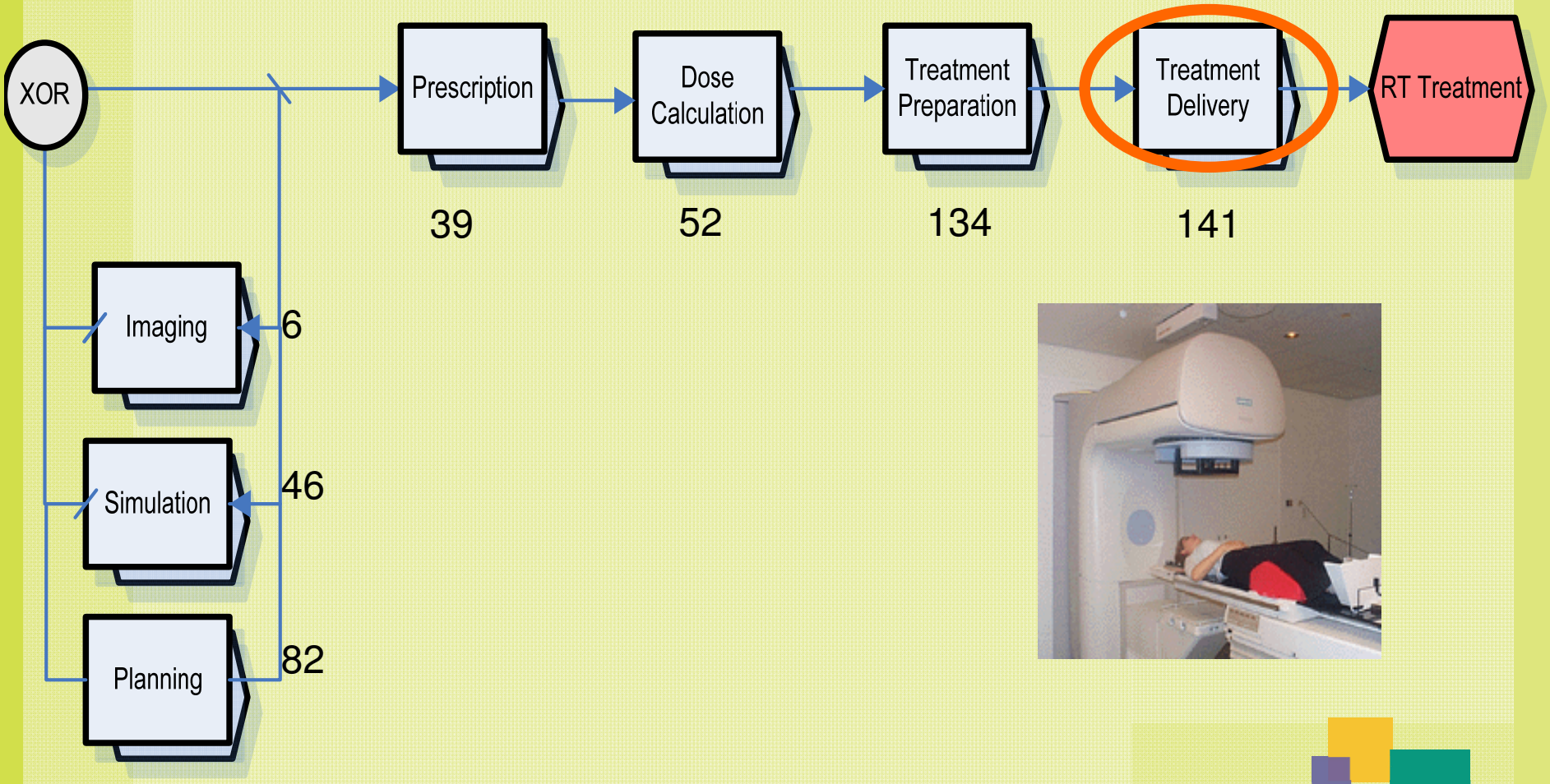
Title	Element addressed	Addressed through category/categories
1. Event	1.1 Who affected	Who - Patient / Staff / Visitor
	1.2 Where/When occurred	Process classification
	1.3 How occurred	Event Description
	1.4 What occurred	Process classification
		Description
		RT Technique
2. Causes / Contributing factors	2. Why occurred	Causes / Contributing factors
3. Detection	3.1 How Discovered	Method of discovery
	3.2 Where/When Discovered	Stage of process of discovery
	3.3 Who Discovered	Discipline who discovered
4. Severity	4.1 Incident/Near Incident	Treatment delivered incorrectly& no. of fractions
	4.2 Actual harm & potential harm	Dose or volume discrepancy

Process Classification

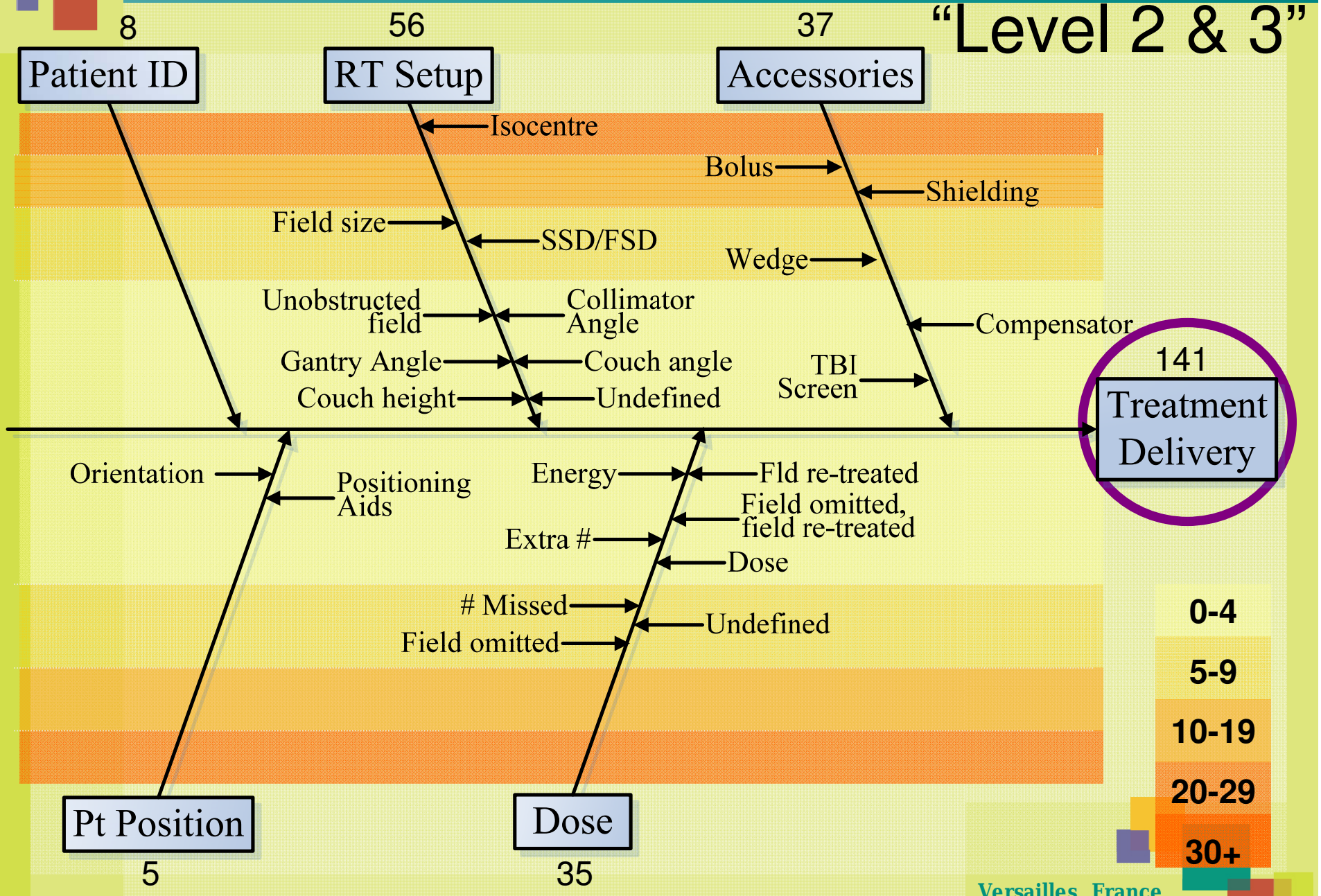
- Where in process did it originate?
- What element was affected?
- 4 “levels”

Level of Process Classification	Number of items
Level 1	7
Level 2	20
Level 3	58
Level 4	18

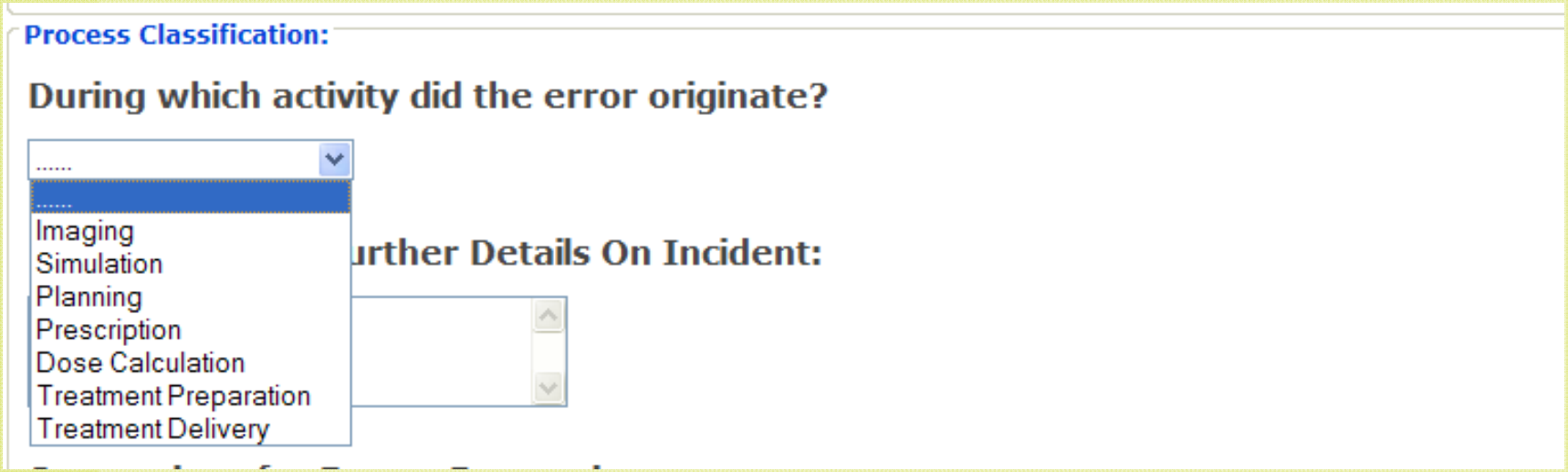
ROSIS Process Classification "Level 1"



"Level 2 & 3"


8
Patient ID
56
RT Setup
Isocentre
Field size
SSD/FSD
Unobstructed field
Collimator Angle
Gantry Angle
Couch angle
Couch height
Undefined
37
Accessories
Bolus
Shielding
Wedge
Compensator
TBI Screen
141
Treatment Delivery
Orientation
Positioning Aids
Pt Position
5
Energy
Fld re-treated
Field omitted, field re-treated
Extra #
Dose
Missed
Field omitted
Undefined
Dose
35
0-4
5-9
10-19
20-29
30+

Dynamic questions on process



Dynamic questions on process

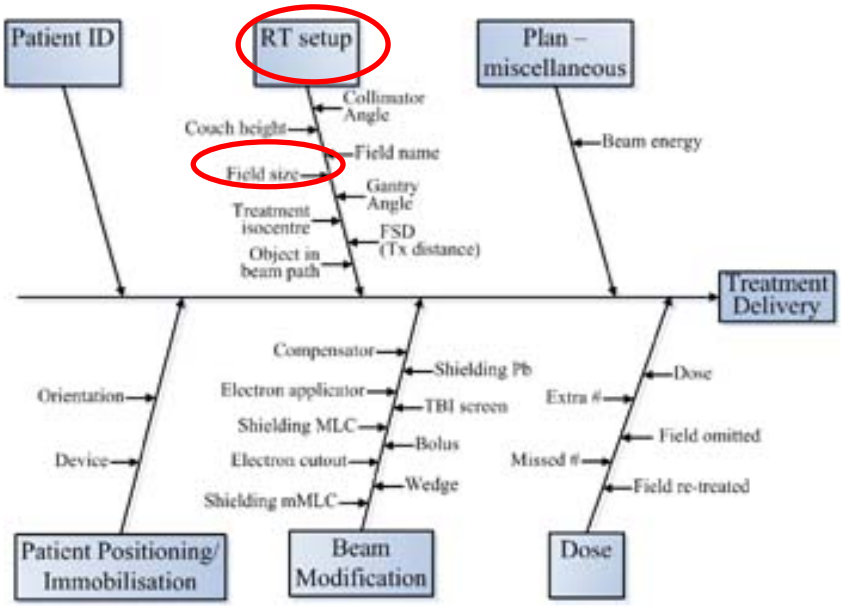
Process Classification:

During which activity did the error originate?

Treatment Delivery

What activity of treatment delivery was affected?

RT Set-Up



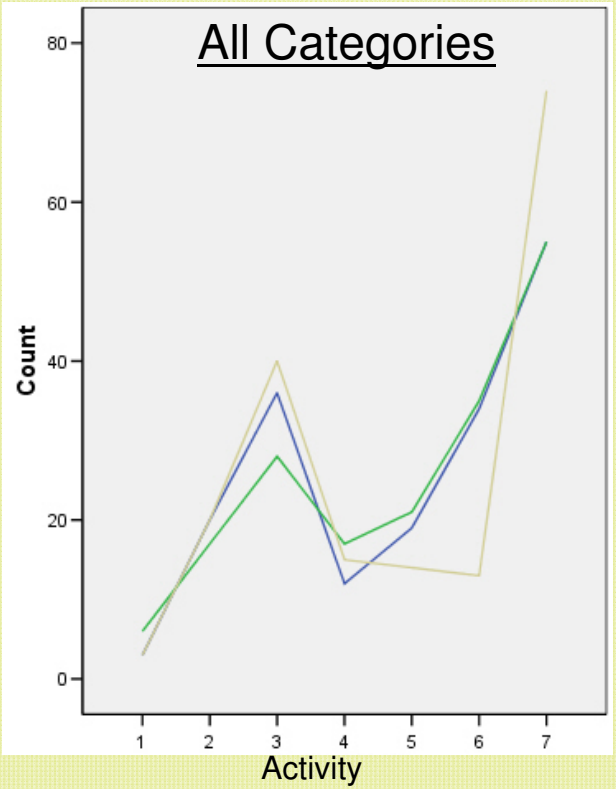
Please Give Any Further Details On Incident:

Enter here...

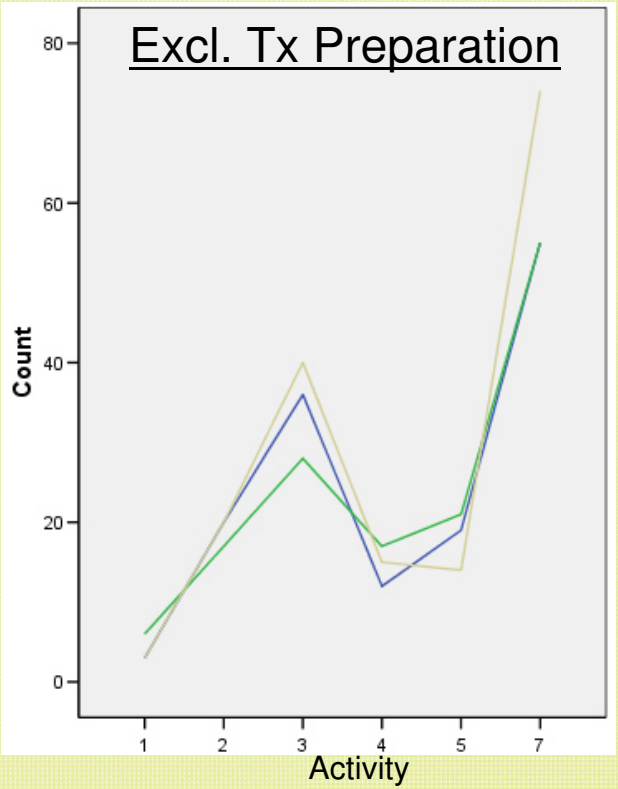
Analysis of Process Classification

- Retrospective Analysis of Process Classification
  - 3 persons
  - Each classified 1st 200 ROSIS reports
  - MS Access Database
  - Excluded (n=21):
    - Non-process reports (n=16)
    - Non-RT specific reports (n=2)
    - Not completed at Level 1 (n=3)
  - 179 reports for comparison
    - Frequency of use of categories
    - Agreement between persons

Frequency of Categories – Level 1

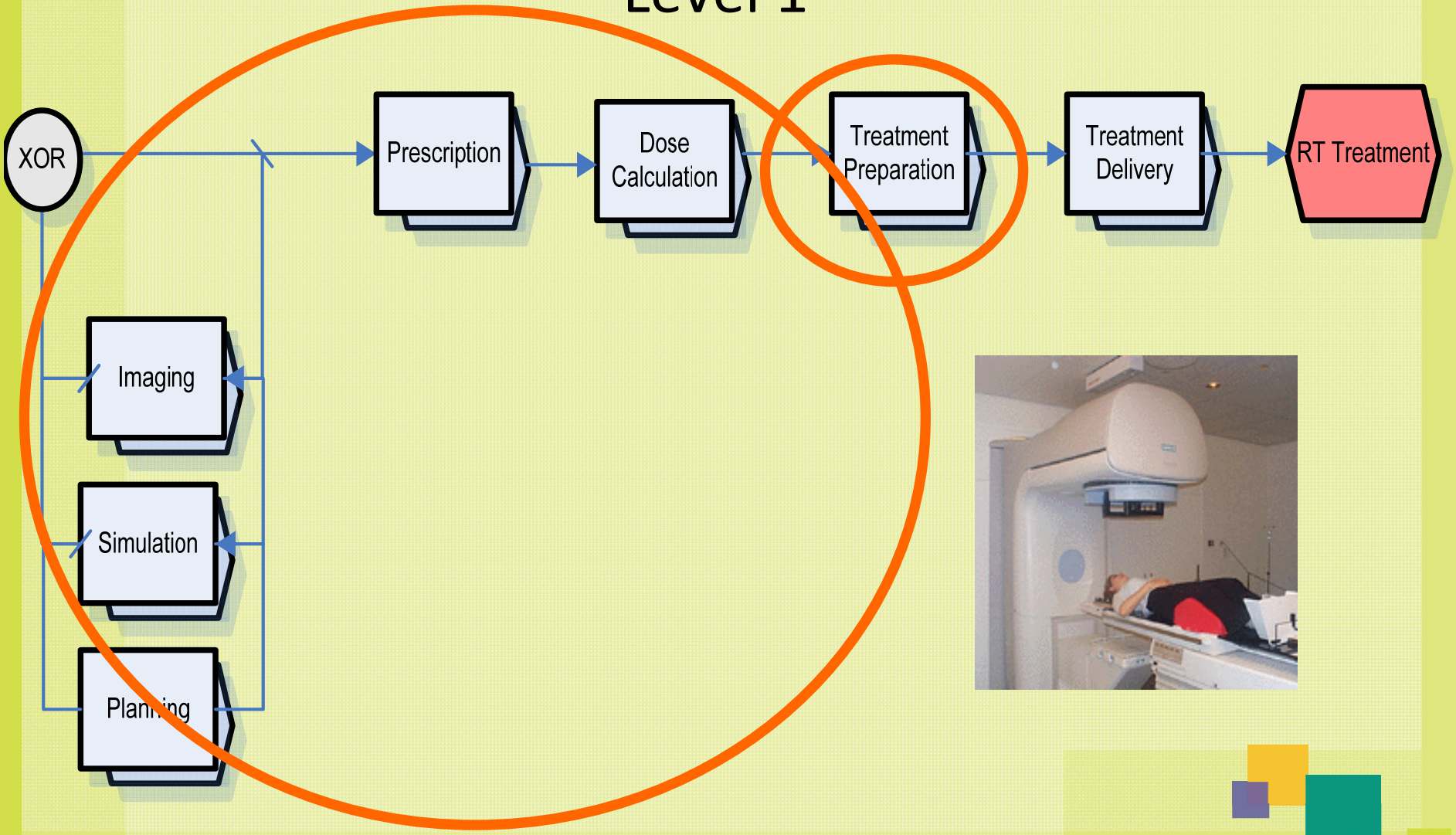


Pearson Chi-Square 21.494
p<0.05

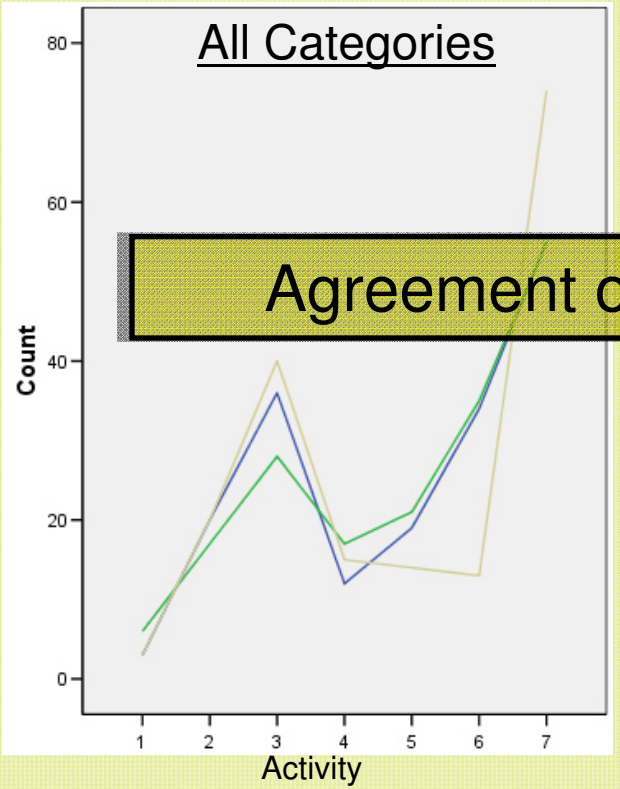


Pearson Chi-Square 8.134
p=.616

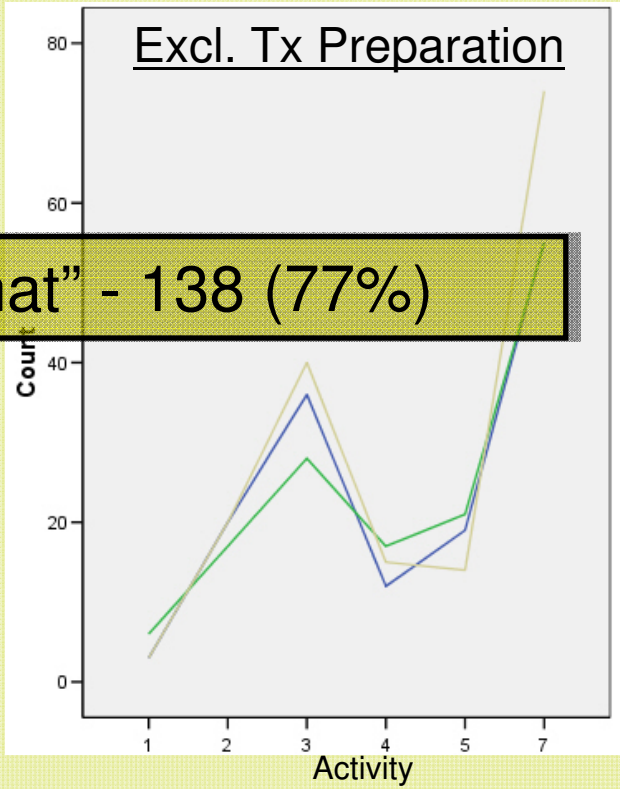
ROSIS Process Classification "Level 1"



Frequency of Categories – Level 1



Agreement on "what" - 138 (77%)



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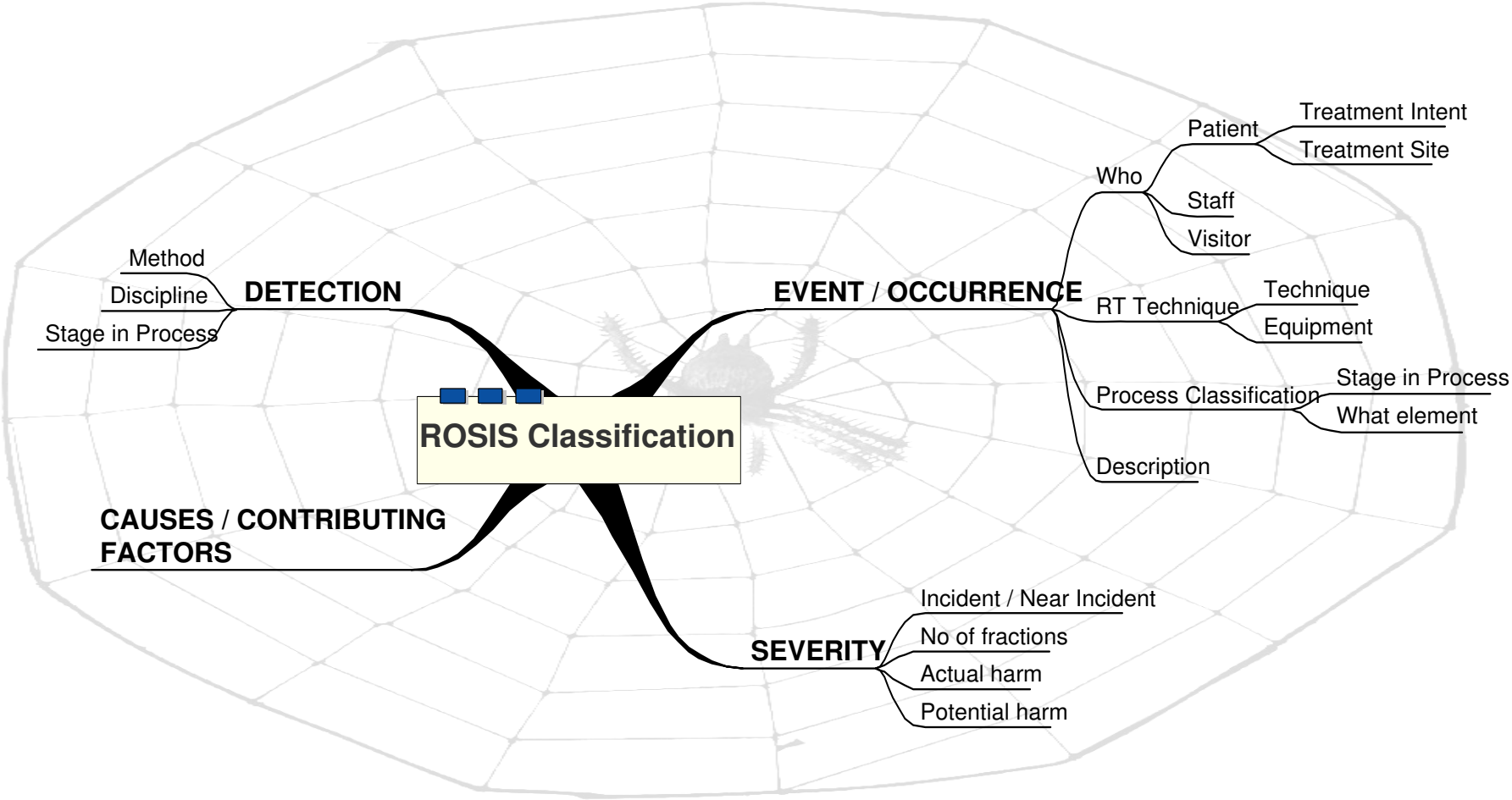
Analysis


ROSIS Classification
DETECTION
Method
Discipline
Stage in Process
EVENT / OCCURRENCE
Who
Patient
Treatment Intent
Treatment Site
Staff
Visitor
RT Technique
Technique
Equipment
Process Classification
Stage in Process
What element
Description
CAUSES / CONTRIBUTING FACTORS
SEVERITY
Incident / Near Incident
No of fractions
Actual harm
Potential harm

Summary

Short term – further evaluate ROSIS classification system

– implement revised reporting system

Future:

Analysis of ROSIS reporting system using reliable & valid classification system

Highlight both hazards and safe practice

Prospective methods

Thank you:

- ROSIS Departments
- ROSIS Group
  - Ola Holmberg
  - Tommy Knöös
  - Mary Coffey
  - Joanne Cunningham
- Web Development
  - Graham Woods

Further Information

Visit us: www.rosis.info
Contact us: rosis@rosis.info

ROSIS
Radiation Oncology Safety Information System