The UCLA Experience, with Focus on Developing Metrics and using RO-ILS

Phillip Beron, MD
Chief Medical Quality Officer
Radiation Oncology UCLA
Introduction to the Department

- 15 Faculty Physicians
- 13 Medical Physicists
- 1 PhD Computer Scientist and 1 PhD Statistician
- 12 Residents, 2 Physics Residents and 2 Fellows
- 6 DMCO Research Faculty
- Animal Colony
- Irradiation Core
Introduction to the Department

• Brachytherapy
  • 2 brachytherapists
  • 2 fellows
  • 1 PA
  • 2 Dedicated procedure rooms
  • Large Bore Ct Scanner
  • Shielded Treatment room
  • Nucletron HDR remote afterloader
Westwood campus

• 4 treatment machines
  • Tomotherapy
  • Novalis Tx with ExacTrac
  • TrueBeam
  • ViewRay
Clinical services offered

• IMRT
• Rapid arc
• Tomotherapy
• MRI guided therapy- ViewRay
• SRS
• SBRT
• IORT
• Eye plaque
• TBI
• Brachytherapy
Santa Monica campus

- Varian true beam accelerator
- GE large bore simulator
- Treatment planning equipment and staff
Both campuses combined

- 110 daily external beam treatments
- 4 – 5 SBRT daily
- 2-3 SRS daily
- 3 – 4 brachytherapy treatments daily
Historic Paper Based Incident Reporting System

- Rigorous assessment of whether reportable event had occurred
- Designed for rapid review of events reaching the patient
- Quality team review and sign off within 24 hours
RO-ILS at UCLA

- 6 months duration till Clarity PSO contract finalized.
- Mainly back and forth between attorneys
- Began using RO-ILS in June 2014
- Paper-based method was abandoned
RO-ILS at UCLA

• Introduced in Faculty Meetings
• Education to staff
  • Nursing
  • Front office
  • Therapists
  • Physics
  • MD’s
  • Administration
Weekly Quality Meeting

• Established a voting mechanism to determine if a reportable event occurred within 24 hours of incident.
  • No mechanism in RO-ILS RE: reportable events

• Reviews all new incidents
• Assigns Champions to all incidents
• Reviews Champion Input
• Good Catch of the Month assigned
# incidents per year

<table>
<thead>
<tr>
<th>Paper</th>
<th>RO-ILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>140</td>
</tr>
</tbody>
</table>
Category/Location of Incidents

Event Type and Location

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Santa Monica</th>
<th>Westwood</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Beam</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Brachytherapy</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

No. of Events
Who is reporting?

![Reporters Role](image-url)
Person reporting and role

Event Summary

No. of Events

- Administrator
- Manager
- Physicist
- Other Physician
- Attending Radiation Oncologist
- Nurse, NP, or PA
- Radiation Therapist

Names of individuals mentioned:
- Lauren Plon
- Ruben Gomez
- Dawn Sachinvala
- damien holman
- Justin Sillara
- Mark Selia
- W. Todd Walker
- Jenny Takakura
- Patti Anne Latimer RN
- Kayla Kikka
- Deborah Huddleston
- A. Valenzuela RN
- D. Jeffrey Demaranes
- Byron Lee
- Dr. Phil Berzin
- Dr. Philip Chow
- James M. Lamb, Ph.D.
- Sang-June Park
- Ning-Chieh Agazaryan
- Yingli Yang
- Chul Lee
- Tenn
- Minsong Cao
- Patricia Locklear
- PATTIE LOVELOCK
- H. Emma Wang
- Phillip Chow / Ning-Chieh Agazaryan
- Phillip Chow
Physicist Reporting

# Incidents Reported

- Tenn
- NZ
- PC
- CL
- JL
- YL
- SJP
- MC
Most common Incidents
<table>
<thead>
<tr>
<th>Event occurred</th>
<th>Event discovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment-Software Quality Management</td>
<td>1</td>
</tr>
<tr>
<td>Imaging for RT Planning</td>
<td>22</td>
</tr>
<tr>
<td>Patient Assessment</td>
<td>23</td>
</tr>
<tr>
<td>Treatment Planning</td>
<td>38</td>
</tr>
<tr>
<td>Pretreatment Review/Verification</td>
<td>50</td>
</tr>
<tr>
<td>Treatment Delivery</td>
<td>36</td>
</tr>
<tr>
<td>On treatment Quality Management</td>
<td>11</td>
</tr>
<tr>
<td>Post Treatment Completion</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>114</td>
</tr>
</tbody>
</table>
Type of Incident

- Incident that reached the patient: A safety event that reached the patient, with or without harm.
- Near-miss event: A safety event that did not reach the patient.
- Unsafe condition: Any condition that increases the probability of a safety event.
Dosimetric Severity

- >100% absolute dose deviation from the total prescription for any structure
- >25%-100% absolute dose deviation from the total prescription for any structure
- >5%-25% absolute dose deviation from the total prescription for any structure
- 5% or <5% absolute dose deviation from the total prescription for any structure
- No dosimetric effect
Anatomical Site v Treatment Technique
Did Event Occur in Multiple Patients?
Occurred in Others Vs Type of Incident

Type of Incident Vs Occurred in Others

- Near-miss event: A safety event that did not reach the patient
- Incident that reached the patient
- A safety event that reached the patient, with or without harm
Suggestions for improvement

• 96 suggestions for improvement
  • Documentation
  • Communication
  • Time out process
  • Changed policy and procedure
  • Initiation of A3 projects
Suggestions for improvement
A3 report

**Problem Area:** Focus on the problem, not the solution.

**WHAT IS THE PROBLEM?**

**BACKGROUND:** Why is this problem important?

**Current Condition:** Draw a diagram that shows how the current system operates and where problems occur.

**Diagram of the Current Condition**

**Target Condition:** Draw a diagram that shows the future system where the problem is solved.

**Diagram of the Target Condition**

**Countermeasures:** What are the exact changes you will introduce in the system?

**What Changes Will You Make?**

**Implementation Plan:**

<table>
<thead>
<tr>
<th>Who</th>
<th>What</th>
<th>When</th>
<th>Outcome</th>
</tr>
</thead>
</table>

**Implementation Plan Who/What/When?**

**Problem Analysis:** Identify the root cause, not the effect. Use the 5 Whys.

**What Are the Root Causes (5 Whys)?**

**Cost:** Cost Benefit / Waste Recognition:

**How Will You Measure Success?**

Date:
A3 projects from RO-ILS

- 7 similar Exac trac incidents- resolved
- 4 naming convention- resolved
- 4 Time out incidents- in progress
- 2 email communication- in progress
- Scheduling
- Shift
Naming Convention

• Pre Task Force
  • No Consistency
  • Prost vs Beron_Prostate vs Final Plan Beron

• Initiated Local Task Force
  • Only Active plans in Tx course of Eclipse
  • All Trials in Separate Course
  • Standardized Plan names
Plan Name Standardization

Plan Name: \( I/B/S\# + L/R + Md + \text{Name} + BI/NB + Blk/NBlk + R\# \)

- **L/R**, **Md**, **BI/NB**, **Blk/NBlk**, **R#** used only when applicable

<table>
<thead>
<tr>
<th>I# = Initial#</th>
<th>L = Left</th>
<th>Name = 4 character Name</th>
<th>BI = Bolus</th>
<th>Block = Blk</th>
</tr>
</thead>
<tbody>
<tr>
<td>B# = Boost#</td>
<td>R = Right</td>
<td>R# = Revision#</td>
<td>NB = No Bolus</td>
<td>No Block = NBlk</td>
</tr>
<tr>
<td>S# = SIB#</td>
<td>Md = 2 Char Location Modifier</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Examples:

<table>
<thead>
<tr>
<th>Plan Name</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1LAcNe</td>
<td>I1WBrnR1</td>
</tr>
<tr>
<td>B1LBrsrBlR1</td>
<td>I1Prst</td>
</tr>
<tr>
<td></td>
<td>B2BOTR1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name - Long form</th>
<th>Proposed 4 (or less) abbreviation</th>
<th>Location Modifiers - Long Form</th>
<th>Proposed 2 abbreviation (Md)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetabulum</td>
<td>Actb</td>
<td>Ant</td>
<td>At</td>
</tr>
<tr>
<td>Acoustic Schwanoma / Neuroma</td>
<td>AcNe</td>
<td>Bed</td>
<td>Bd</td>
</tr>
<tr>
<td>Adrenal</td>
<td>Adrl</td>
<td>Body</td>
<td>By</td>
</tr>
<tr>
<td>Anal Verge</td>
<td>AVrg</td>
<td>C1 spine</td>
<td>C1</td>
</tr>
<tr>
<td>Anus</td>
<td>Anus</td>
<td>Central</td>
<td>Ct</td>
</tr>
<tr>
<td>Antra</td>
<td>Antra</td>
<td>Corpus</td>
<td>Cp</td>
</tr>
</tbody>
</table>
Naming Convention

• Post Task Force Incidents
  • Errors in using Standardized Naming Template
  • Type and “Quality” of incident has changed
Exac Trac incidents

- 7 Exac Trac incidents identified-SRS and SBRT
- Radiation Therapists abandoned infrared markers after the first tx day
- Faster to set up to lasers
- Very large and unusual shifts encountered
- Discovered a protocol breach
- 3 month period of time
Pattern Analysis (similar incidents) with the Electronic Incident Learning System – Exac Trac
Conclusions

• Potentially serious errors occur in all aspects of workflow

• Potentially serious errors occur in all dz sites

• Potentially serious errors occur in all treatment techniques
Conclusions

- In Depth Analysis Of Incidents thru RO-ILS
- Barriers to overall reporting exist
- Barriers to physician reporting
  - 32/34 reports from 2 physicians
Conclusions

• Recognition of clusters of similar events

• Quality Improvement initiatives performed in several areas identified in RO-ILS

• No mechanism to evaluate if Reportable Medical Event occurred and track them
Incidents do not occur in which part of the radiation workflow…

0% 1. Simulation
0% 2. Pre Treatment Imaging
0% 3. Treatment Delivery
3% 4. Patient Assessment
97% 5. Incidents occur in all parts of the workflow
Incidents do not occur in which part of the radiation workflow…

1. Simulation
2. Pre Treatment Imaging
3. Treatment Delivery
4. Patient Assessment
5. Incidents occur in all parts of the workflow

Implementation of the RO-ILS system requires...

1. Application to AAPM and ASTRO (13%)
2. A contract with the PSO (48%)
3. An agreement to release patient information to other participants (5%)
4. An agreement to submit all incidents to the PSO (32%)
5. A Pre-Paid Fee (2%)
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2. A contract with the PSO
3. An agreement to release patient information to other participants
4. An agreement to submit all incidents to the PSO
5. A Pre-Paid Fee

https://www.astro.org/Clinical-Practice/Patient-Safety/ROILS/Index.aspx
RO-ILS participants **must comply** with state or federal reporting requirements.

ROI-ILs has a robust process for determining if a radiation event reportable to State or Federal agencies has occurred within what time frame?

- 1. 12 hours  
- 2. 24 hours  
- 3. One week  
- 4. Two weeks  
- 5. No process exists for determining whether a reportable event has occurred
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