Leveraging Incident Learning for Newer Techniques and Process Improvement

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Disclosures:

- Member of the Radiation Oncology Healthcare Advisory Council (RO-HAC) for RO-ILS.

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Disclosures:

- ASTRO employee

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Outline

- RO-ILS Basics
  - Program Overview
  - Event Process
  - Analysis Tools
- RO-ILS Case Examples
  - SGRT
  - Online Adaptive
- Newer Technology Mitigation Strategies

Learner Objectives

1. Understand the nature and benefits of the RO-ILS system and how to leverage incident learning for practical improvements.
2. Appreciate new and unique error pathways that may be associated with newer technologies.
3. Identify error mitigation strategies with the use of new technologies.

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Goals of Incident Learning

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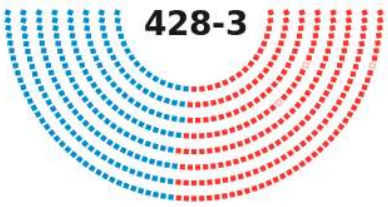
Patient **S**afety **O**rganization



- 2005 federal law created PSOs
- Data is confidential and privileged
- RO-ILS PSO vendor provides the associated services

CLARITY PSO
A Patient Safety Organization

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RO-ILS®
RADIATION ONCOLOGY INCIDENT LEARNING SYSTEM
Sponsored by ASTRO and AAPM

AAMD
American Association of Medical Dosimetrists
SUPPORTED

The mission of RO-ILS is to facilitate safer and higher quality care in radiation oncology by providing a mechanism for shared learning in a secure and non-punitive environment.

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Enrollment Process

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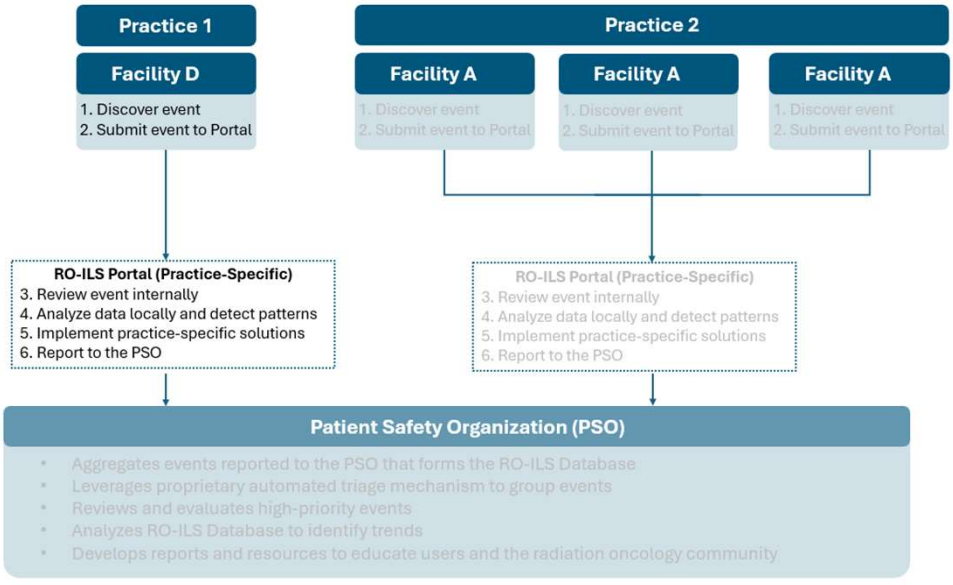
Anonymously submit events

Practice maintains control of data

Aggregate data across multiple facilities



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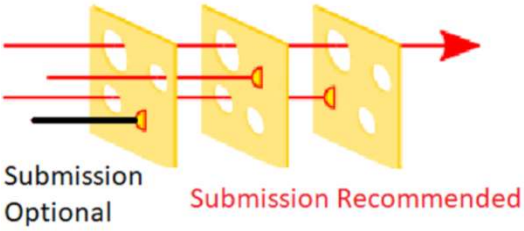
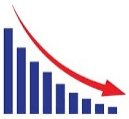
All events are worth submitting



Any deviation, discrepancy, or error is a learning opportunity

Increase in total submission

Decrease in severity



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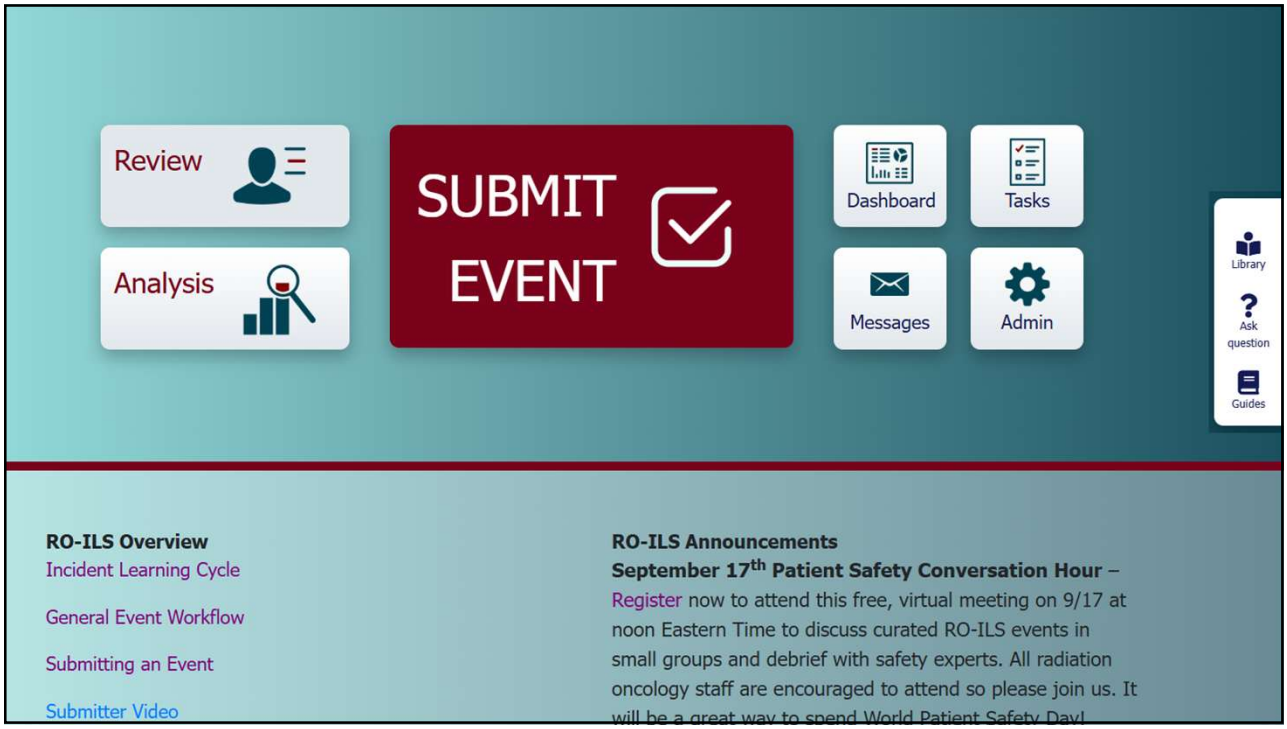

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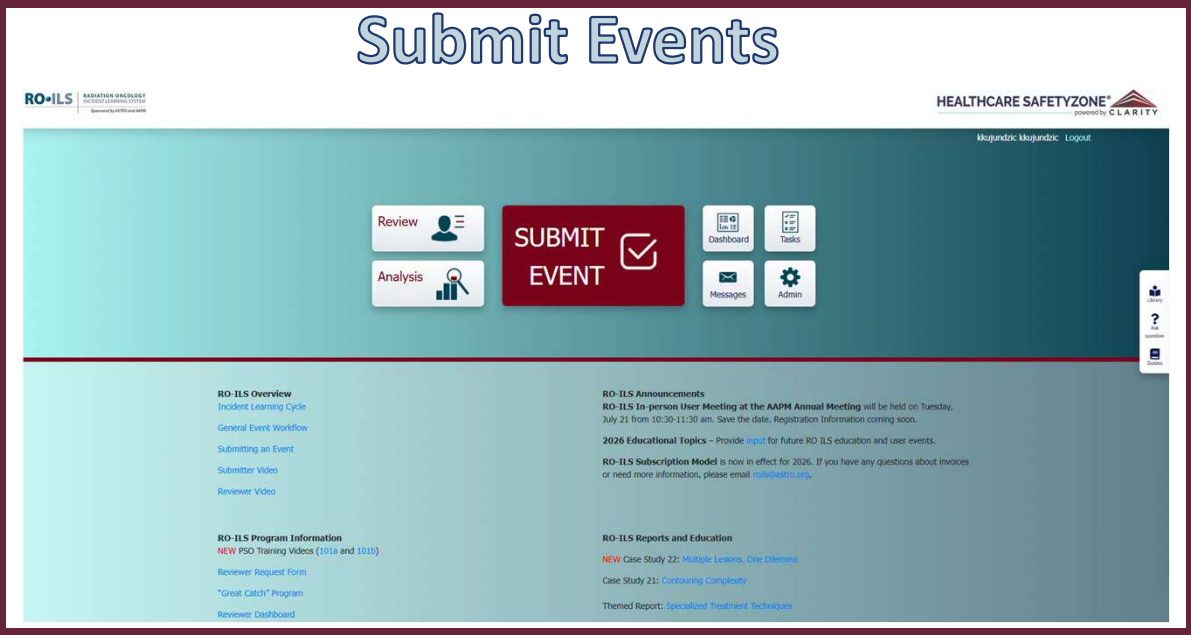
Submit Events



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Portal tools: Dashboard

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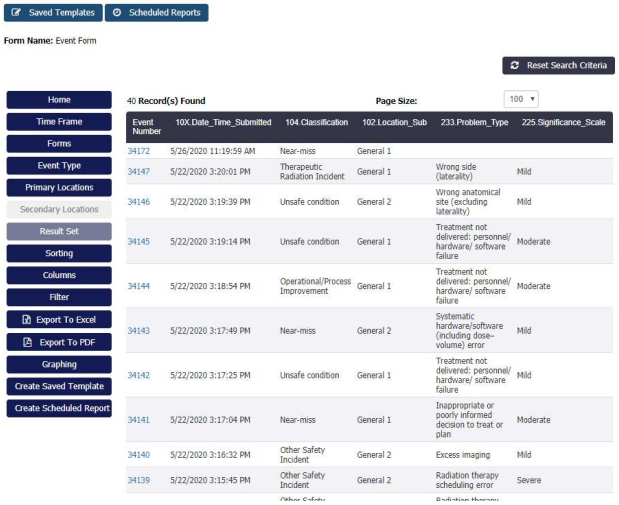
Portal tools: Analysis wizard

Run reports and trend events

Create convenient templates

Schedule and export reports

Built-in graphing capacities



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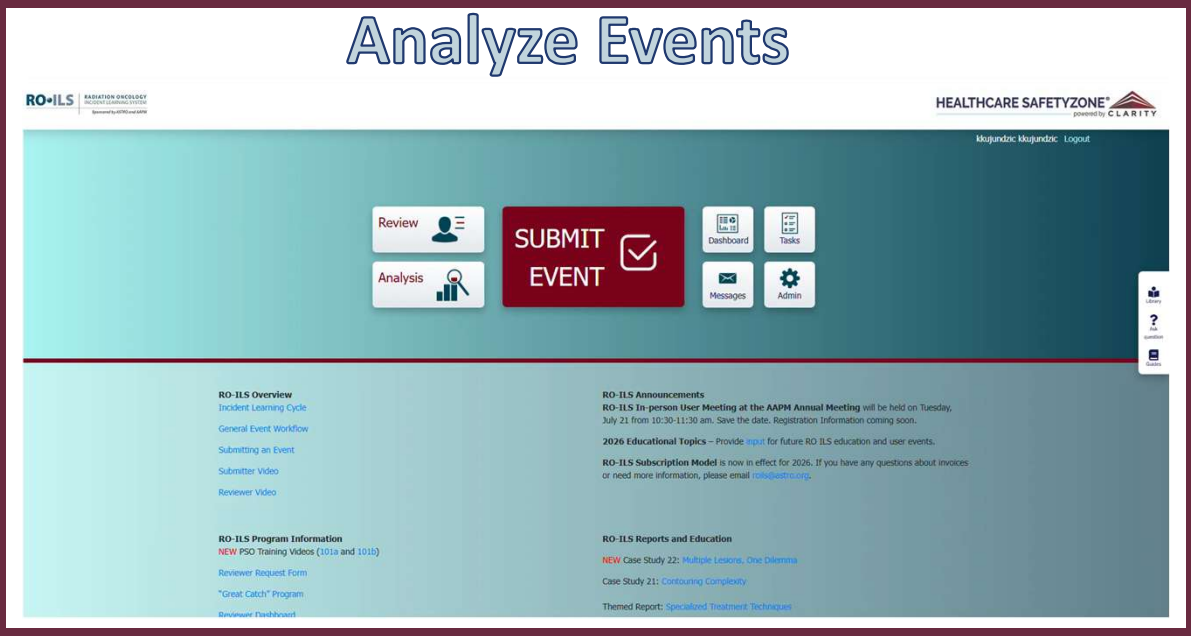
Analyze Events



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Call for applications coming this fall

RO-ILS

RO-HAC: Radiation Oncology Healthcare Advisory Council

Patient Safety Organization (PSO)

- Aggregates events reported to the PSO that forms the RO-ILS Database
- Leverages proprietary automated triage mechanism to group events
- Reviews and evaluates high-priority events
- Analyzes RO-ILS Database to identify trends
- Develops reports and resources to educate users and the radiation oncology community

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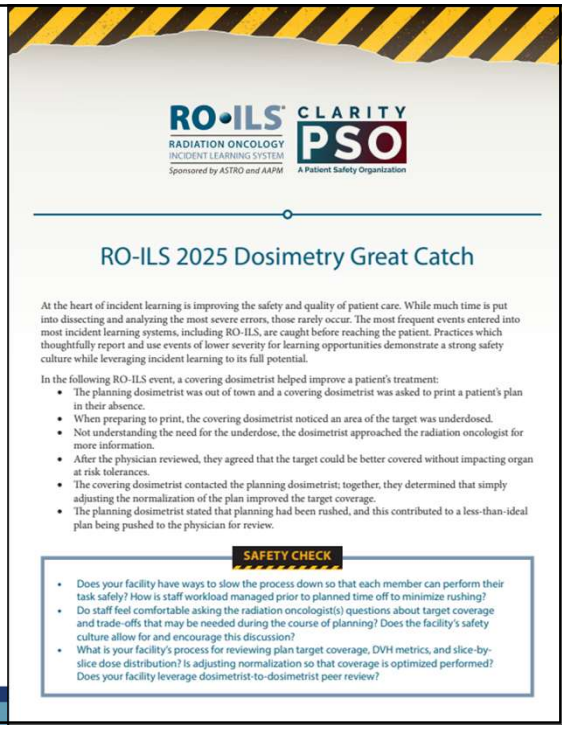
RO-ILS Education

- Conversation Hours
- Case Studies
- Themed Reports
- Great Catches
- Aggregate Data Reports
- Safety Notice
- More!

Access RO-ILS public education!

www.astro.org/roilsreports



RO-ILS RADIATION ONCOLOGY INCIDENT LEARNING SYSTEM Sponsored by ASTRO and AAPM

CLARITY PSO A Patient Safety Organization

RO-ILS 2025 Dosimetry Great Catch

At the heart of incident learning is improving the safety and quality of patient care. While much time is put into dissecting and analyzing the most severe errors, those rarely occur. The most frequent events entered into most incident learning systems, including RO-ILS, are caught before reaching the patient. Practices which thoughtfully report and use events of lower severity for learning opportunities demonstrate a strong safety culture while leveraging incident learning to its full potential.

In the following RO-ILS event, a covering dosimetrist helped improve a patient's treatment:

- The planning dosimetrist was out of town and a covering dosimetrist was asked to print a patient's plan in their absence.
- When preparing to print, the covering dosimetrist noticed an area of the target was underdosed.
- Not understanding the need for the underdose, the dosimetrist approached the radiation oncologist for more information.
- After the physician reviewed, they agreed that the target could be better covered without impacting organ at risk tolerances.
- The covering dosimetrist contacted the planning dosimetrist; together, they determined that simply adjusting the normalization of the plan improved the target coverage.
- The planning dosimetrist stated that planning had been rushed, and this contributed to a less-than-ideal plan being pushed to the physician for review.

SAFETY CHECK

- Does your facility have ways to slow the process down so that each member can perform their task safely? How is staff workload managed prior to planned time off to minimize rushing?
- Do staff feel comfortable asking the radiation oncologist(s) questions about target coverage and trade-offs that may be needed during the course of planning? Does the facility's safety culture allow for and encourage this discussion?
- What is your facility's process for reviewing plan target coverage, DVH metrics, and slice-by-slice dose distribution? Is adjusting normalization so that coverage is optimized performed? Does your facility leverage dosimetrist-to-dosimetrist peer review?

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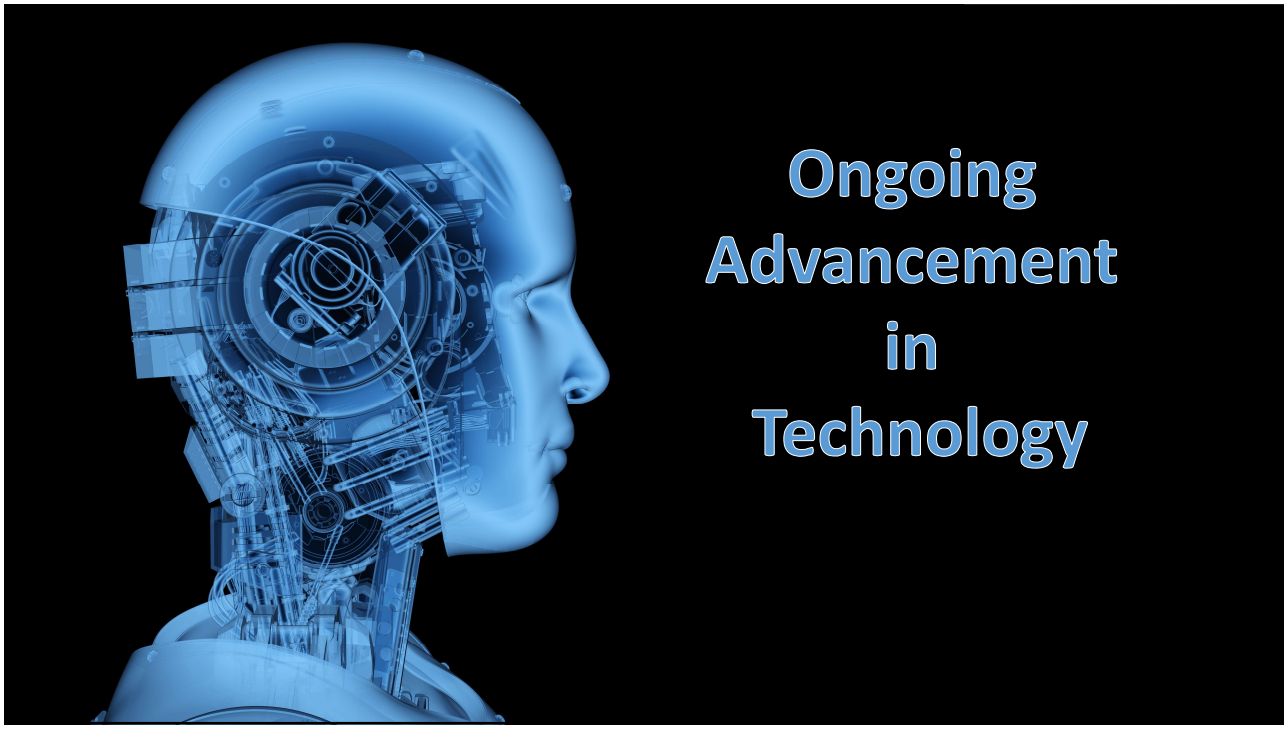

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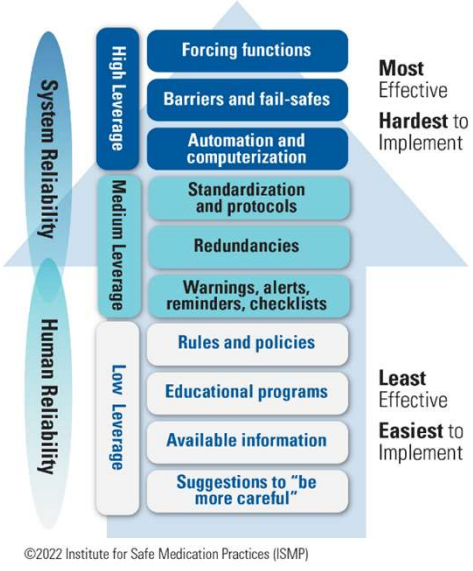
Balancing Innovation with Patient Safety

Celebrate New Technology Benefits

- **Improve treatment accuracy**
  - SGRT enables real-time patient monitoring and motion management
  - Online ART allows daily plan adjustments to account for anatomical changes
- **Reduce effort/time**
- **Reduced human error**
- Potential to **catch errors** through built-in verification tools



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Manage Possible Safety Concerns

- **New error pathways** unique to each technology that may not be anticipated
- **Over-reliance** on technology at the expense of fundamental safety practices
- **Staff training gaps** when deploying too quickly without adequate preparation and experience
- **Added complexity** in workflows may not always make practices safer
- **Technology limitations** and software quirks that may introduce unforeseen issues

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Surface Guided Radiation Therapy

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Case 1: Body Contour Bolus with Density

- A patient with breast cancer was being planned for VMAT.
- Dosimetrist was testing a new method to create flash.
- Dosimetrist incorporated an 8mm bolus structure in the body contour and assigned it a density during planning.
- Bolus structures will not allow SGRT to recognize the surface contour and dosimetrist did not remove structures prior to tx.
- The error was caught by automated plan check reviewing for HU overrides.

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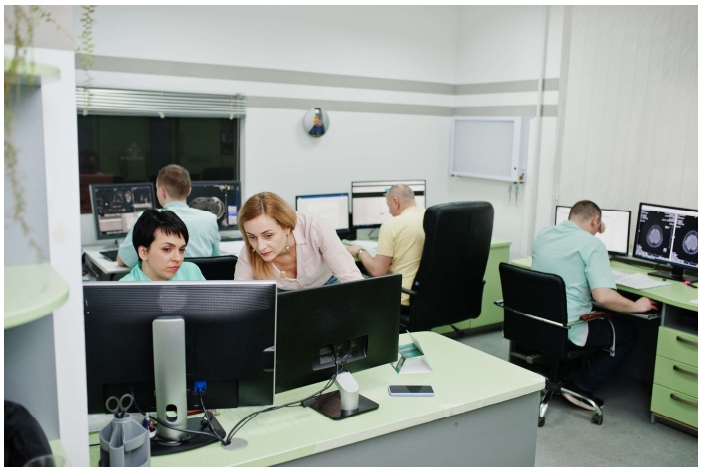
Case 1: Take Home Lessons

- Review new procedures
- Peer review
- Documentation



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Case 2: Historical SGRT Used

- Patient with prior radiation therapy returned for tx.
- Therapist set up the patient for treatment and used SGRT.
- The patient was 8 cm off after the first CBCT.
- Therapist discovered that surface imaging used for alignment was from prior tx.

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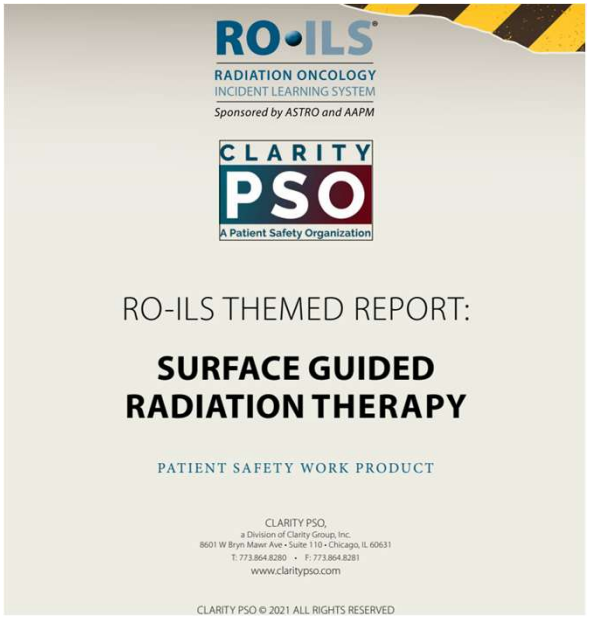

Incomplete Plan Transfer

- A patient with breast cancer was to be treated with 4-fields.
- Dosimetrist only sent the tangent plan.
- Error not caught at SGRT setup field import but during patient setup.
- Correcting error took significant time resulting in delayed tx.

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Case 2: Take Home Lessons

- Identify new error pathways, especially with increase in re-treatments
- Implement process to archive prior plans
- Review of data transfer processes
  - Confirm all plans/isocenters are transferred
  - Confirm historical surfaces are not accidentally attached to current treatment plans
- Highlight the importance of robust pre-treatment QA

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Adaptive Radiation Therapy

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Case 3: Stray ITV Contour

- Patient with lung cancer was planned for online adaptive MRgRT SBRT tx; prescription 10 Gy x 5 fxs for 50 Gy.
- During fx 2 adaptation, there was a stray ITV contour which resulted in 10 Gy being delivered to lung outside the PTV.
- Error coincidentally noticed during post-tx review after fx 4.
- Contributing factors included rushing given time pressures inherent to ART.

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Case 4: Incorrect Reference Plan Used

- Patient with prostate cancer was planned for online adaptive MRgRT SBRT tx.
- Per the tx directives, the therapists manually switch to the correct reference plan for each treatment – step verified by physicist.
- The wrong reference plan was used for 1 fx.
- Two reference plans had a small difference in electronic density value assigned to the external contour.

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Case 3 and 4: Take Home Lessons

- Review fundamentals
- Redundant checks needed especially for manual processes
- If possible, disable reference plans or suggest improvement to vendors, if not currently feasible

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Case 5: Cropped Body Contour

- Patient was being treated with online ART using a lateralized isocenter.
- The CBCT cropped the body contour and this was used for planning.
- The error was not discovered until after all 3 txs were completed, resulting in underdosing to the target.

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Case 5: Take Home Lessons

- Lateralized isocenters introduce unique risk
- Review fundamentals before treatment
- Use standardized checklist (e.g., to confirm imaging FOV sufficient to capture anatomy)
- Use standardized contouring references and planning templates
- Implement robust pre-treatment checks for ART

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Online ART RO-ILS Themes

- Online ART safety events are often not unique to the adaptive workflow, but stem from time pressures inherent to online ART
- "Rushing" is often observed in RO-ILS events
- Robust chart/contour/plan check policies take on even greater importance in online ART setting
- ART cross coverage requires standardized communication – another common RO-ILS contributing factor

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Quality and Safety Considerations for Adaptive Radiation Therapy: An ASTRO White Paper

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AAMD American Association of Medical Dosimetrists ENDORSED

23 key recommendations in 6 areas:

infrastructure, staffing, training, pretreatment processes, communication, and treatment delivery

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Mitigation Strategies for New Technologies

- Process Development and Update
  - Establish protocols; develop and **test** SOPs **prior** to clinical use.
  - Complete a FMEA analysis and leverage RO-ILS resources.
  - Reassess and regularly revise processes with increased experience.
- Speed of Deployment
  - Start with select cases and initiate a slow ramp-up when ready.
  - Use simpler cases/plans before expanding to more complicated treatments.
  - If feasible, use established processes and use new technologies as additive *during initial enrollment*.
  - Be mindful of overall additive vs. subtractive processes.

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Mitigation Strategies for New Technologies

- Staff Training and Comfort
  - Consider initially training a smaller, specialized group of staff before expanding to a broader cohort of staff.
  - Advocate for lead staff to attend external trainings.
- Safety Fundamentals
  - Staff need to trust their instinct if something doesn't feel right.
  - Staff need to be empowered to "stop the line" whether to question a colleague or equipment.
  - Technology is not a substitute for fundamentals like peer review and timeouts.

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Supports Continuous Quality Improvement

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Leverage RO-ILS for Sustained QI

- **Instill a positive safety culture**
- **Discover Events**
  - Being aware
  - Voicing concerns
  - Stopping the line
- **Report Events**
  - Normalizing event reporting
- **Investigate/analyze data**
  - Serving as a RO-ILS Reviewer
  - Tracking error trends
  - Participating in local Quality and Safety committee/meetings
- **Develop/implement solutions**
  - Identifying mitigation strategies
  - Getting staff buy-in and track effects

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