

RO•ILS®

**RADIATION ONCOLOGY
INCIDENT LEARNING SYSTEM**

Sponsored by ASTRO and AAPM



QUARTERLY REPORT

PATIENT SAFETY WORK PRODUCT

Q2 2015

APRIL 1, 2015 – JUNE 30, 2015

CLARITY PSO,

a Division of Clarity Group, Inc.

8725 West Higgins Road • Suite 810 • Chicago, IL 60631

T: 773.864.8280 • F: 773.864.8281

www.claritypso.com

AGGREGATE REPORT CARD –
Q2 2015
 April 1, 2015 – June 30, 2015

Metric	Aggregate Current Quarter	Aggregate Previous Quarter	Aggregate Historical Sum
Total Number of Events	173	152	620
Patient Incident	71	60	242
Near Miss	64	45	206
Unsafe Conditions	38	47	171
Not patient related	0	1	1
Most Commonly Identified Characterization of Event	Desired Procedure Omitted: 44% (76/173) Unanswered/Not Sure: 34% (59/173)	Not Sure How to Characterize: 41% (63/152) Unanswered/Not Sure: 48% (73/152)	Desired Procedure Omitted: 38% (235/620) Unanswered/Not Sure: 44% (271/620)
Most Commonly Identified Workflow Step Where Event Occurred	Treatment Planning: 38% (65/173) Unanswered: 10% (18/173)	Treatment Delivery: 36% (54/152) Unanswered: 9% (13/152)	Treatment Planning: 28% (171/620) Unanswered: 25% (156/620)
Most Commonly Identified Treatment Technique	3D: 23% (39/173) Unanswered: 46% (79/173)	3D: 32% (48/152) Unanswered: 22% (33/152)	3D: 29% (181/620) Unanswered: 32% (200/620)
Characterization of Events with Dosimetric Severity for Events That Reached the Patient	Desired Procedure Omitted: 39% (11/28)	Incorrect Dose to All or Part of Body: 41% (12/29)	Incorrect Dose to All or Part of Body: 35% (33/94)
Potential Future Toxicity Within Events That Reached the Patient	None or mild: 66% (47/71) Unanswered: 32% (23/71)	None or mild: 73% (44/60) Unanswered: 18% (11/60)	None or mild: 61% (148/242) Unanswered: 32% (77/242)

ANALYSIS AND COMMENTARY

173 events were reported during the Quarter 2 2015 period. The following is a breakdown of those events into their respective categories: unsafe condition, near miss or incident that reached the patient. Below, please find a summary of this quarter's submitted events.

UNSAFE CONDITIONS (any condition increasing the probability of a safety event):

Total events categorized as Unsafe Conditions: **64**

- **Common themes identified include:**
 - 14 cases involved incomplete or inaccurate documentation.
 - 7 cases detailed lengthy patient waits related to inefficient departmental processes.
 - One case included a complex simulation undertaken despite the attending physician being physically absent, yet he attempted to direct the procedure remotely via a resident.
 - 4 cases related directly to quality assurance (QA) omissions.
 - 2 cases involved inadequate communications.
- **Other unsafe conditions reported:**
 - Checklists either omitted or incomplete.
 - Monitor unit (MU) calculation spreadsheet errors.
 - Record and verify software deficiencies.
 - Treatment delivery prior to physician review and approval of the plan.
 - Unneeded IV placement related to confusion about the need for IV contrast for simulation.
 - Access of the incorrect patient's chart.
 - Hallway clutter.

NEAR MISSES (a safety event that did not reach the patient)

Total events categorized as near misses: **38**

- **Common themes identified include:**
 - 25 cases reported inaccurate, incorrect, or incomplete treatment prescriptions, including wrong setup parameters, wrong beam labeling, wrong beam energy, wrong laterality, wrong site and wrong dose.
 - 6 cases described discrepancies between imaging orders and execution.
 - 3 cases described inadequate communication of treatment plan changes.
- **Other near misses reported:**
 - Incorrect isocenter.
 - Incorrect patient images incorporated into a fusion.
 - Incorrect inpatient brought to the treatment room.
 - Pregnancy test ordered but not performed.

ANALYSIS & COMMENTARY | continued

Reported recovery interventions which intercepted these potential incidents included:

- Double checks.
- QA procedures.
- Checklists.
- Chart rounds.

INCIDENT THAT REACHED THE PATIENT (a safety event that reached the patient, with or without harm):

Total events categorized as incident that reached the patient: **71**

- A common theme identified: **6** cases of patients with pacemakers, defibrillators or insulin pumps who were treated without following existing policy for such situations.
- Other incidents reported:
 - Incorrect dose calculations.
 - Incorrect placement of treatment fields.
 - Requested shifts from port films not applied to the next day's treatment.
 - Machine malfunction allowing treatment with graticule in place.
 - Prescribed reductions in electron field not communicated to dosimetry/physics, resulting in 6 fractions without appropriate dose corrections.
 - Omitted intensity modulated radiation therapy (IMRT) QA.
 - Omitted image guided radiation therapy (IGRT).
 - Omitted or incorrect treatment bolus.
 - Omitted field shaping block.
 - Incorrect electron cone insert.
 - Incorrect field size in an emergency case resulting in wrong dose and possible overdose.
 - Simulation and treatment completed in an emergency case with incorrect machine time/calculation.

ANALYSIS OF RECURRING THEMES

This quarter's events exhibited many of the typical themes that have been identified as recurring throughout radiation oncology.

1. Many events are related not to the lack of appropriate policies or procedures, but rather to the *failure to follow existing policies or procedures*. This reality suggests a need for further emphasis on staff training with a review of policies and competencies.
2. The root cause of many incidents is *hastiness to commence patient treatments* (often in emergency cases), leading to near misses or patient incidents.
3. Many *QA processes are effective* in catching near misses.
4. *Many scheduling issues have been reported*; although they may not reach the patient, they may delay treatment or cause re-work.
5. *Omitted treatment bolus* continues to be a *recurring theme*.
6. *Wrong site or dose* is a *recurring theme* meriting root cause analysis.

CASE REVIEWS

Case reviews offer an opportunity to learn about patient safety through sharing of actual events. The following event descriptions, slightly edited for clarity, illustrate situations that have and can occur.

CASE 1:

What is being reported: Incident that reached the patient: A safety event that reached the patient, with or without harm.

Problem: The limited field of view provided by cone beam computed tomography (CBCT) at certain sites may lead to delivery of an incorrect isocenter treatment if there is insufficient anatomic differentiation longitudinally to ensure correct placement of the treatment volume.

Event: The following event description (slightly edited for clarity) illustrates incorrect isocenter situations that can occur. A patient's thigh treatment position was off by 5 cm superior-inferior (sup-inf) for 1 fraction. This was discovered during the weekly physics review as the physicist reviewed the limitations of the CBCT for extremities. The attending physician was notified that CBCT was not valid for sup-inf positioning of the thigh treatment region, and orthogonal images were suggested for the remainder of the patient's treatments.

Safe Practice Recommendations:

1. Review use of CBCT for positional accuracy of extremities with physician team. It is recommended to utilize orthogonal images for extremities in conjunction with CBCT.
2. Weekly physics review serves as an effective QA practice.

CASE 2:

What is being reported: Incident that reached the patient: A safety event that reached the patient, with or without harm.

Problem: Patient was setup on a freckle rather than the tattoo.

Event: The following event description (slightly edited for clarity) illustrates the need to consistently check student therapists and report misapplications when identified without continuing treatment. A student therapist set up a 3-field breast patient's supraclavicular field on a freckle rather than the tattoo; other staff therapists failed to recheck the setup point. Being within the 5 cm longitudinal tolerance setting for the linac couch, no table interlock warning arose, and the incorrectly positioned supraclavicular field was treated. While setting the patient up for the remaining tangential fields, staff

CASE REVIEWS | continued

therapists noticed the already-treated supraclavicular field had been incorrectly positioned 2.4 cm inferior from the tattoo. The tangential fields were then treated to the correct isocenter but with no adjustment in field size, resulting in a 2.4 cm area of overlapping treatment. The event was reported and dosimetric analysis showed a 2.4 cm strip which received double the intended dose.

Safe Practice Recommendations:

1. Students require careful and constant supervision.
2. Safe practice dictates that multiple therapists working on the linac translates into multiple individuals independently verifying correct treatment setup parameters.
3. Mistakes happen, but completing this treatment without adjusting to account for the impact of the mistake transforms this event from a harmless error to an avoidable overdose to the patient's upper chest wall or breast.
4. When in doubt, stop treatment and consult the physician and physicist before proceeding.
5. Photos taken during planning and reviewed during set-up are invaluable to clarify tattoo locations.
6. Review supervision policies and procedures for students; roles of instructors and staff should address the process for double checking the students' work.

CASE 3:

What is being reported: Incident that reached the patient: A safety event that reached the patient, with or without harm.

Problem: The patient received mispositioned spine treatment.

Event: The following event description (slightly edited for clarity) illustrates another incorrect isocenter situation that can occur. A single fraction of a patient's palliative treatment to the thoracic spine was incorrectly delivered to the previously irradiated lumbar spine based on old tattoos located in the lumbar region. The superior shift from the old tattoos to the new treatment volume planned in dosimetry was approved by physics and the radiation oncologist but did not occur correctly when it came time for the patient's treatment delivery. Poor quality portal images in an area without readily visible anatomic landmarks were approved by the physician and the treatment was delivered before the error was appreciated.

Safe Practice Recommendations:

1. Planning and safe delivery of treatment to a target shifted from skin landmarks requires careful communication and documentation among team members.
2. Lean staffing and busyness in simulation were contributing factors to this event.
3. CBCT may in certain cases offer a more reliable tool than portal imaging for confirmation of correct field placement.

HAVE YOU THOUGHT OF UTILIZING EACH QUARTERLY REPORT AS A TRAINING TOOL?

The following is an example of how one RO-ILS participant utilized the Q1 2015 report as a training tool. The report was reviewed and shared at a department morning safety conference. It was broken down exhibiting data from the report, review of the analysis, and commentary of recurring themes. Examples from their local institution were then shown for each recurring theme. Several of the graphs were also shared with staff. The meeting created helpful discussions and awareness. Below we have shared some of the slides that were utilized for the safety conference. RO-ILS quarterly reports are a great tool for safety awareness.

Analysis & Commentary – Recurring Themes

- One of the issues which showed up in more than a dozen events this quarter can be described as **communication problems**.
- A very brief summary of a number of these issues shows the breadth of this kind of problem:

Recurring Theme - Communication

- **Physician instructions via email:**
 - RO-ILS:
 - A patient with a complicated course of events led to an email (during the evening) from the physician to therapy and dosimetry to modify treatment fields for the next day. The plan was to adjust the plan early in the afternoon before treatment. However, the therapists did not see the email, and the patient was treated in the morning, with the old fields. Given the concern about overlap of previous treatment of the involved vertebral body, the lack of response to the email was potentially important.
 - Local Example:
 - None. Has it happened and we have not reported?

Recurring Theme - Communication

- **Hand-offs within Rad Onc:**
 - RO-ILS:
 - Several events describe the “doctor of the day” being called to the machine to review a start, an SBRT treatment, or set a boost field, without having any handoff or description of important aspects of the case from the attending physician.
 - Local Example: A CTCL patient for whom we performed a sim-on-set yesterday and treated with his first 2 Gy fraction, called today to inform me that he believes we may have treated the wrong skin lesion.
 - Reported by covering attending physician who performed the sim-on-set
 - One of the root causes: Lack of consultation between the Attending Physician & the covering Prescribing Physician during the planning process

Analysis & Commentary – Recurring Themes

- During the past three quarters, there have been seven events reported in RO-ILS in which there was a **mismatch** between the total dose, dose/fraction, and/or number of fractions in the physician's written **prescription** and the numbers used in the **treatment plan** that were used to initiate treatment.
- In each of these cases, the error was caught within the first week of treatment but nevertheless had made it through several layers of quality assurance.
- None of the differences were large enough to trigger regulatory reporting.
- **"Does the plan match the prescription"** is a fundamental plan check question, and one would expect (or hope) that such a basic error would be recognized.

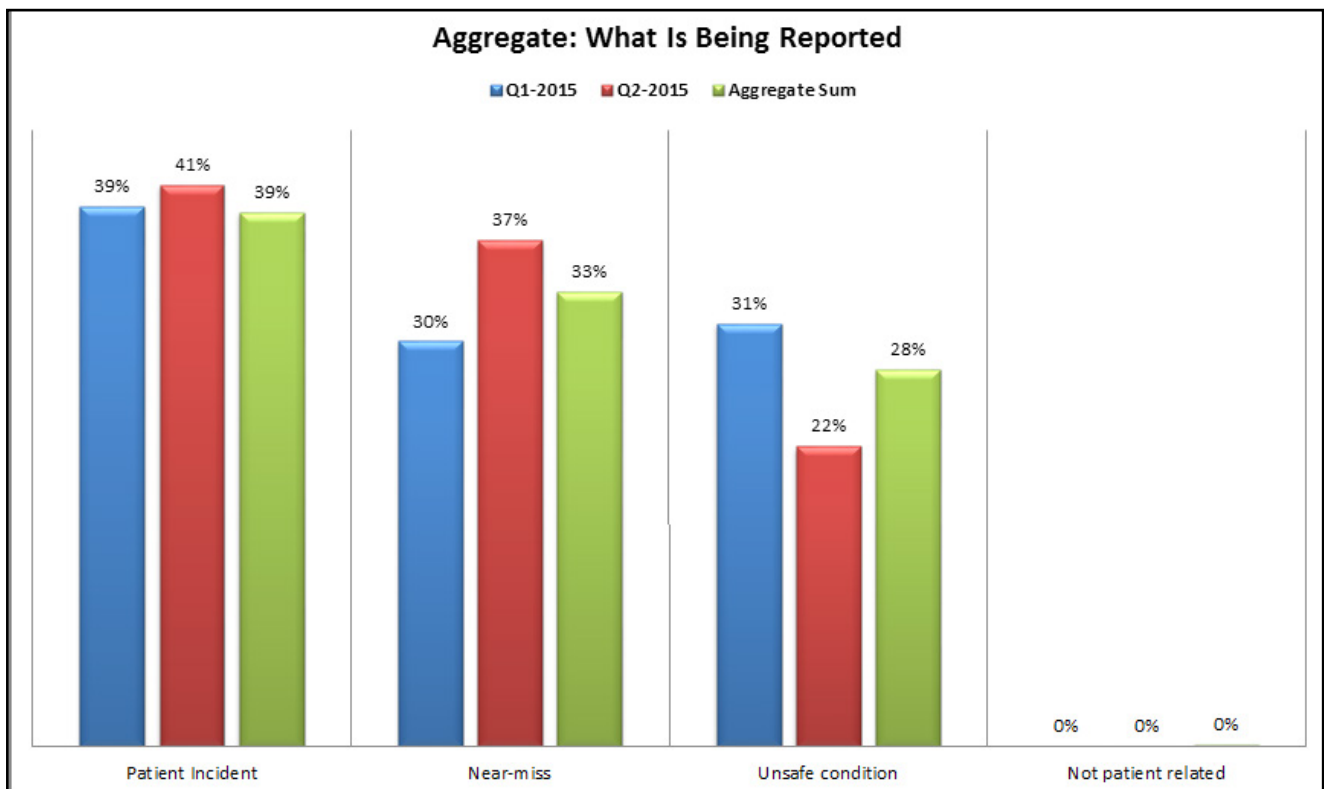
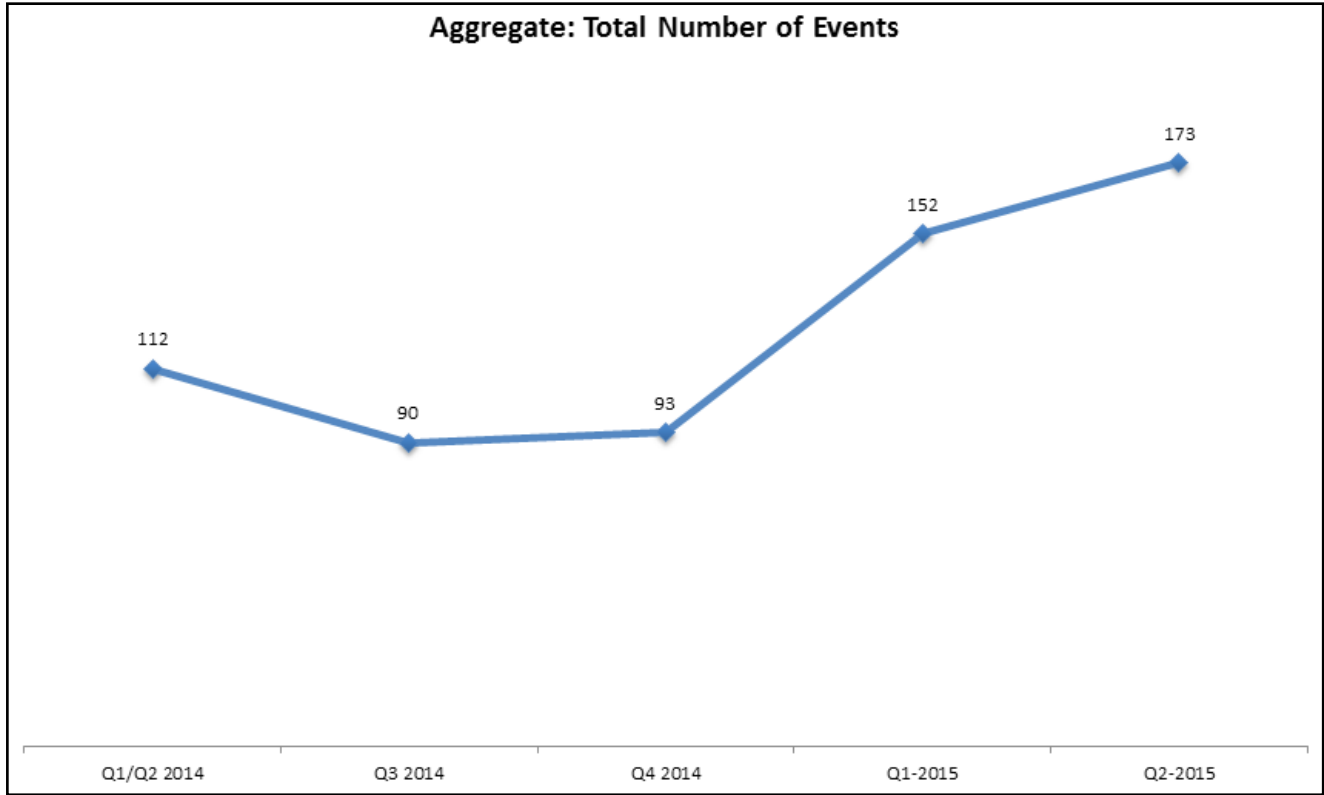
Recurring Theme – Rx Mismatch

- Local Examples:
 - Event : Treatment planning directive indicated plan was to deliver 5 fractions of 4 Gy each to total 20 Gy. Plan and prescription was created with 4 fractions of 5 Gy to total 20 Gy. This was not discovered when the prescription was signed or when the plan was checked but during weekly chart rounds.
 - **GREAT CATCH** at chart rounds.
 - Event: Pt was to be treated with a 4 Gy x 5 fx plan. She was actually planned for a 2 Gy x 10 fx plan. (There was a misunderstanding in regards to the planning directive) The physician reviewed and signed the plan, physics checked it, and it also went through chart rounds. The patient was treated 4 times. The discrepancy was noted by the physician when the patient was not going to be completed with tx after 5 fractions.
 - Not reportable

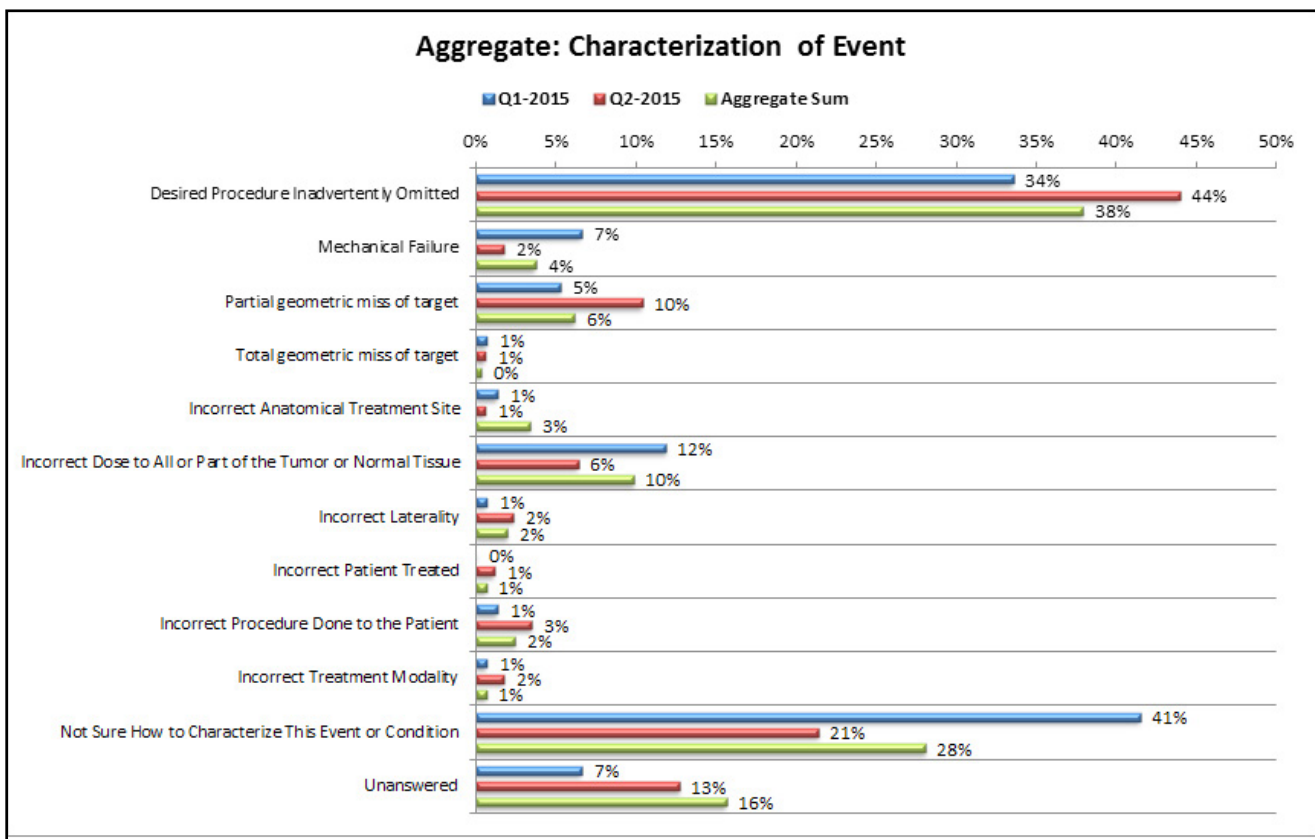
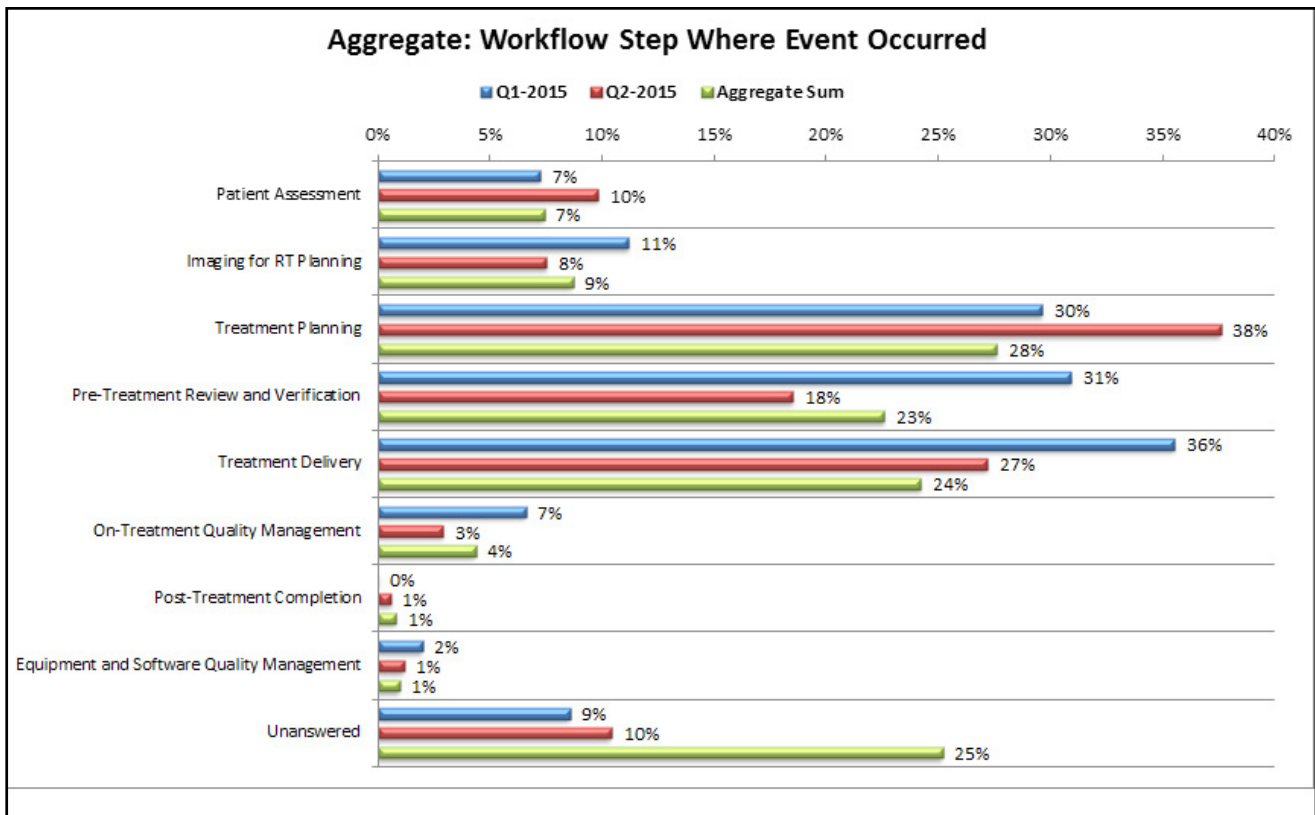
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While this is only a portion of the presentation that was shared with staff, it is a good example of how the RO-ILS quarterly reports may be utilized as a tool at individual facilities to improve radiation oncology practice at the local level.

AGGREGATE ANALYSIS GRAPHS

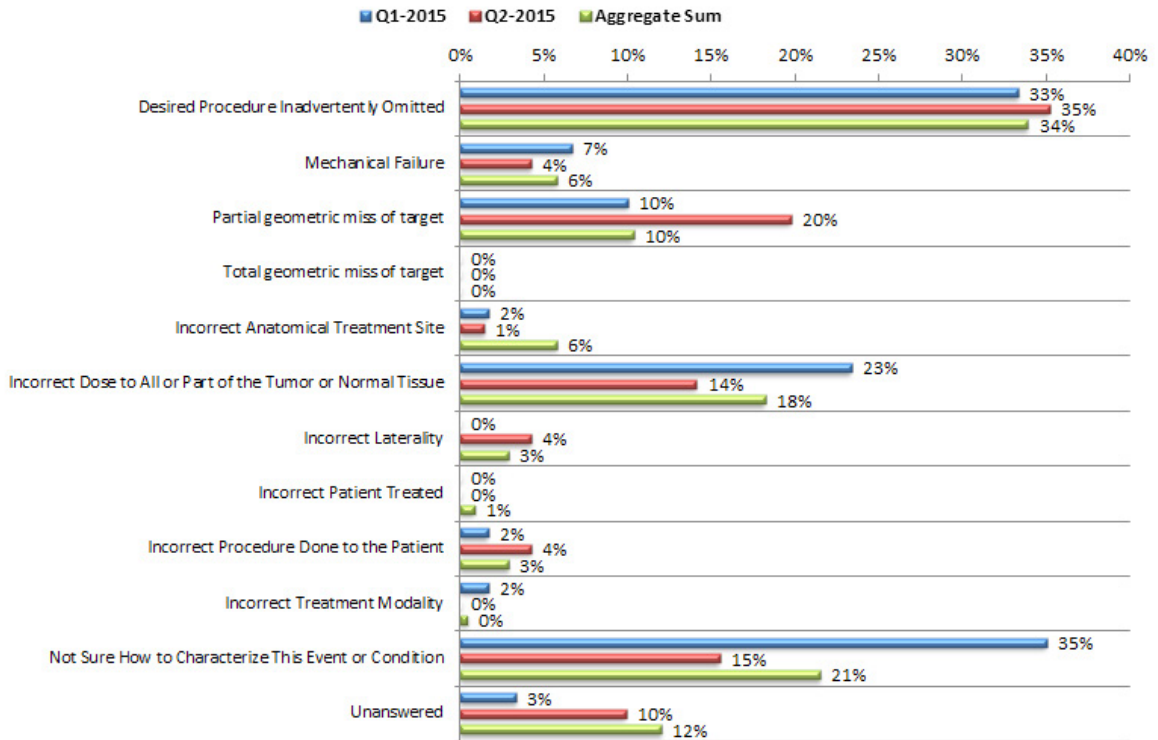


AGGREGATE ANALYSIS GRAPHS | Continued

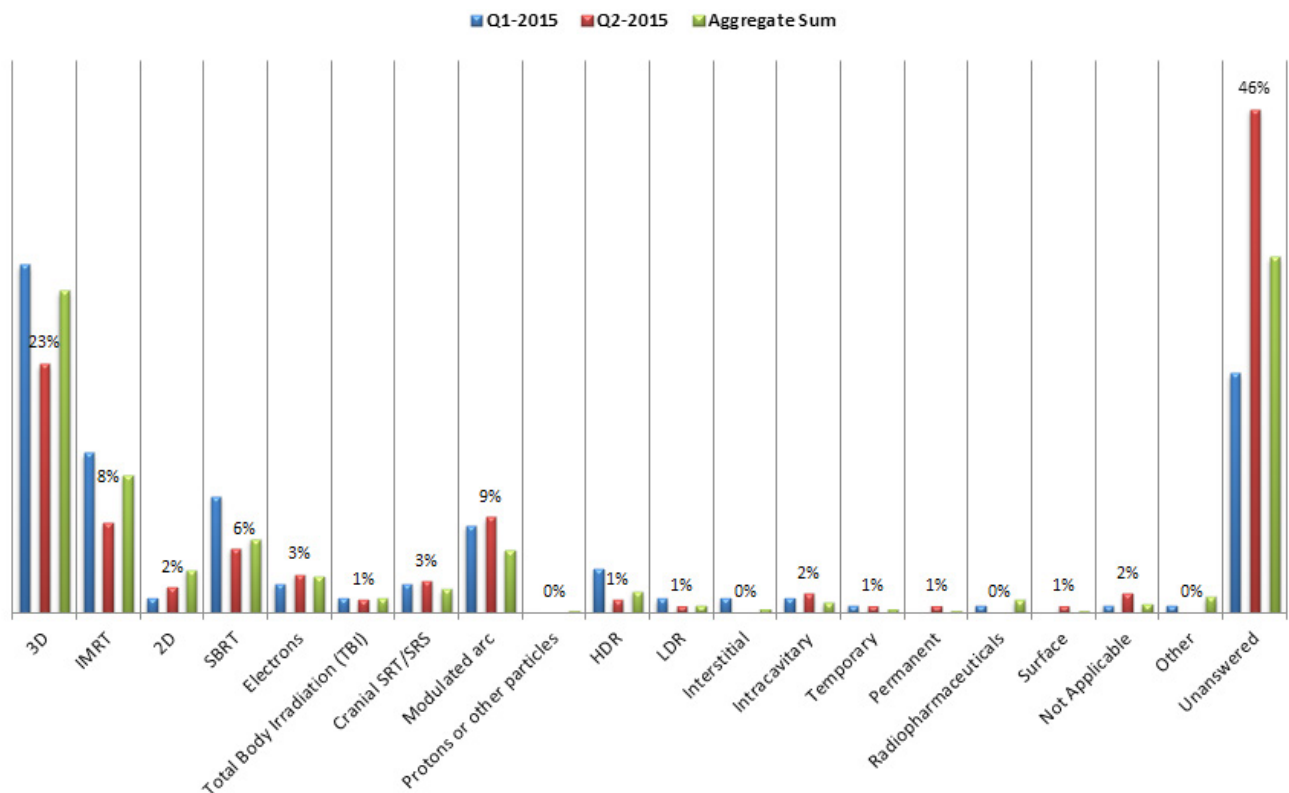


AGGREGATE ANALYSIS GRAPHS | Continued

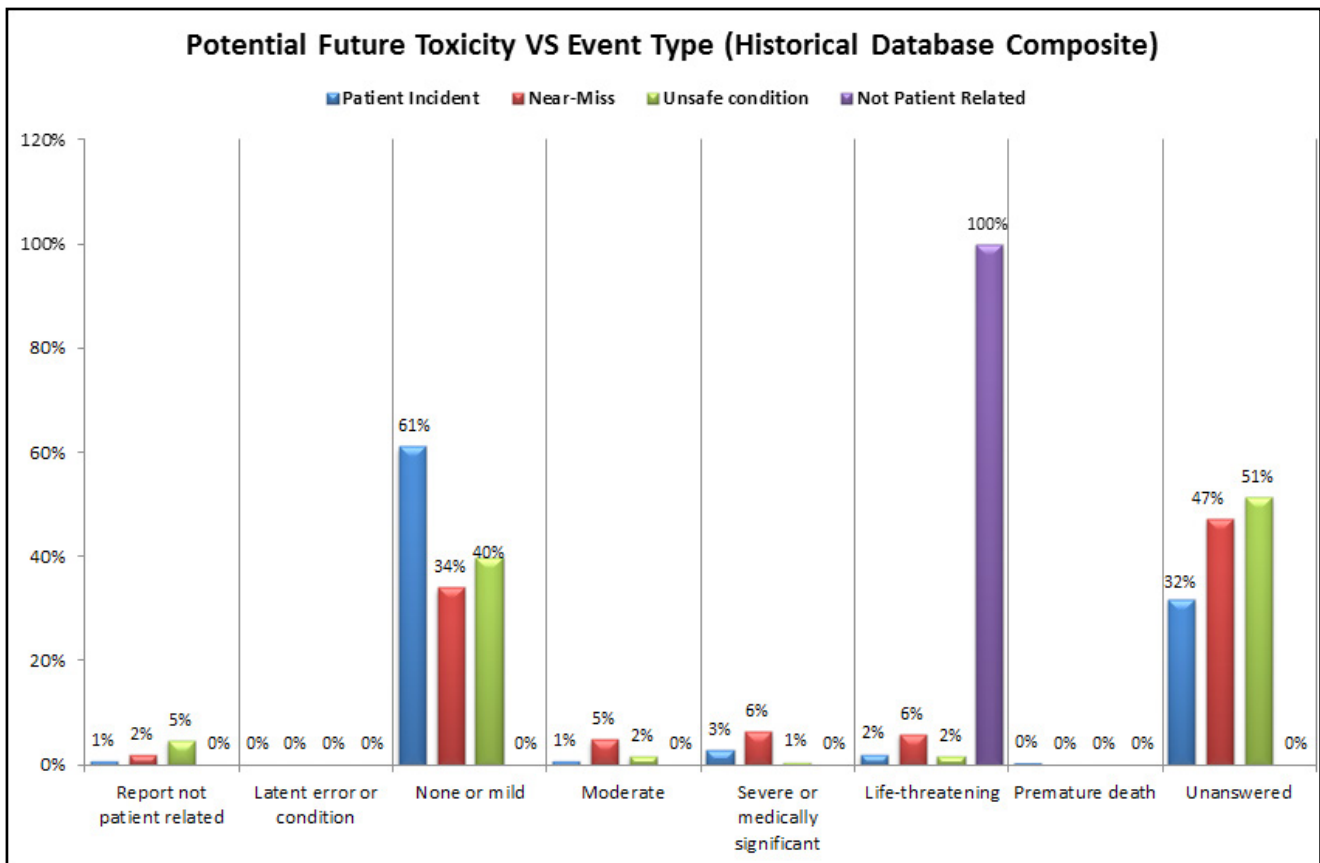
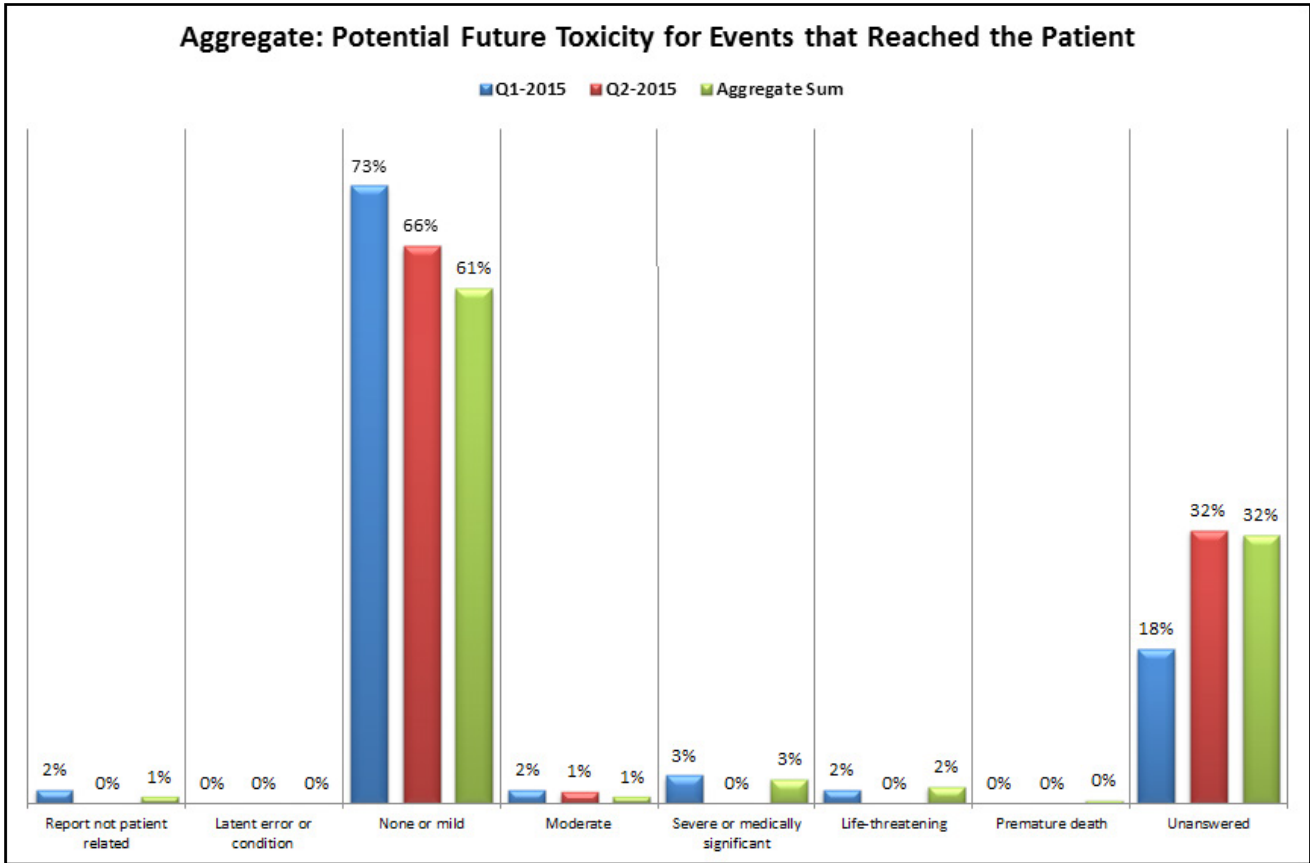
Aggregate: Characterization of Events that Reached the Patient



Aggregate: Treatment Techniques



AGGREGATE ANALYSIS GRAPHS | Continued



AGGREGATE ANALYSIS GRAPHS | Continued

