What have we learned from RO-ILS: Part 1 - before the patient is on the table

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Outline

- Acknowledgements
- Disclosure
- Concept of smart teams
- Role of a medical physicist
- Breakdown of events
- Examples
- Conclusions

Acknowledgements

- ASTRO & AAPM
- Clarity Group
- Colleagues from Radiation Oncology Healthcare Advisory Council (RO-HAC)
- Gary Ezzell, PhD
  - Heavy lifting for project
  - Brings passion to safety and quality

Disclosure

- I am a member of the RO-ILS event review committee and receive an honorarium for that work

Crowdsourcing Wikipedia

- Crowdsourcing is the process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, especially an online community, rather than from employees or suppliers. It was coined in 2005 as a portmanteau of crowd and outsourcing.
- By definition, crowdsourcing combines the efforts of numerous self-selected volunteers or part-time workers; each person's contribution combines with those of others to achieve a cumulative result.
- Crowdsourcing is distinguished from outsourcing in that the work can come from an undefined public (instead of being commissioned from a specific, named group) and in that crowdsourcing includes a mix of bottom-up and top-down processes.
- Advantages of using crowdsourcing may include improved costs, speed, quality, flexibility, scalability, or diversity.


The New York Times | http://nyti.ms/1xy37MK

SundayReview

Why Some Teams Are Smarter Than Others

JAN. 16, 2015

Gray Matter

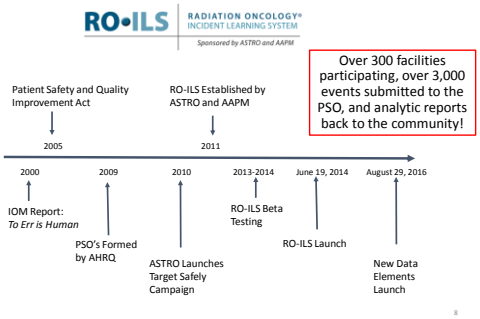
By ANITA WOOLLEY, THOMAS W. MALONE and CHRISTOPHER CHABRIS

of tasks. This "c factor" is not strongly correlated with the average or maximum individual intelligence of group members but is correlated with the average social sensitivity of group members, the equality in distribution of conversational turn-taking, and the proportion of females in the group.

Our goal

"We need to collect both the problems *and the solutions* on a national scale to be able to help one another avoid pitfalls and develop safer practices and protocols"

Credit to Ksenija Kapetanovic, ASTRO



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What is the difference between an:

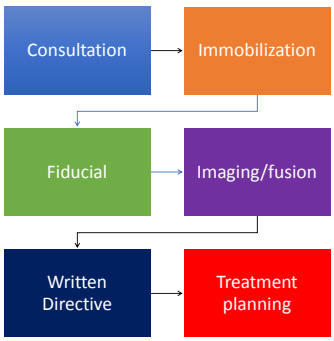
Academic Team
vs.
Athletic Team

Athletic Teams practice!

Summary / Conclusions

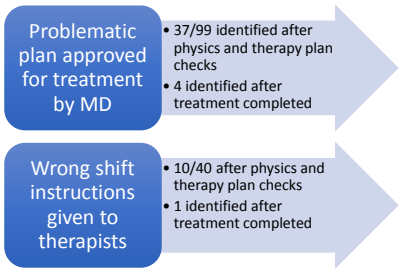
- Volunteer reporting system yields significant amount of information
- Challenges are universal
  - academic / free-standing / community / - events don't discriminate
- Current procedures are imperfect, need to standardize procedures
- Communication and human interface, are enormous areas for improvement
- We did not evaluate **culture-of safety** at time of study
- **All stakeholders benefit**
  - **(hospital, professionals, patient, society, vendors, 3rd party payers)**

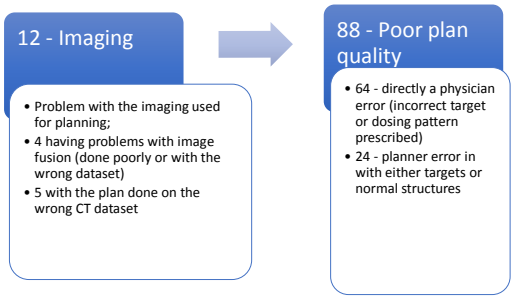
Potential work flow



How we counted….

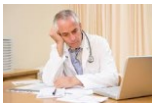
- 400 of the most serious errors from the 2000+ in the time period.
- Note that some of these events could fall into multiple categories.
  - A patient who presented for repeat radiosurgery had a lesion targeted that had been previously treated.
  - Could be a "previous dose" or "wrong target" error.
  - Events were assigned to only one error type to avoid double counting.





"Physician-caused" events





Physician caused events (64/100)

- 29 had a mismatch between the dose and fractionation pattern in the plan and that which the physician intended.
  - 3 cases, it was clear from the narrative that the planner misunderstood the physician's intent and wrote the prescription for the physician to approve.
  - 15 cases, the reason for the difference was unexplained.
  - 8 cases, the physician either slipped in writing the prescription or later changed their mind and that was not communicated.

Physician caused events (64/100)

- 26: wrong target was identified, either in the plan or elsewhere in the documentation.
- 15: issues with laterality.
- 9: the wrong target was chosen from multiple options, as when there were multiple lesions in the brain, lung, liver, breast or skin.
  - 4 were identified after treatment had started but not finished and 1 was identified after the entire course was completed

Physician caused events (64/100)

✓9 cases previous dose **was not** considered

Wrong Shifts

..if the therapists performed the task as described then the isocenter would be in the wrong place, of those **40…**

Wrong Shifts

- 15/40 events involved errors in manually calculating or transcribing the shift instructions. There were a number of variations:
  - directions reversed, **millimeters** / **centimeters** (reverse).
- 2/40 events involved the setup point marked on the patient not corresponding to the origin (or reference point) used in the plan.
  - 7 of those events originated in simulation and 5 in planning.
- 13/40 events involved the reference image(s) prepared for an image-guided treatment being incorrect, thus implicitly directing the therapists to align to an incorrect image and put the isocenter in the wrong place.
  - 7 of those 13 involved systems in which there is a manual step in transferring the reference data from the planning system to the treatment control system.

Serious events determined by RO-HAC

Trigeminal neuralgia

- A patient with bilateral trigeminal neuralgia was to have treatment on one side, but the prescription and plan were both done for the other side.
- The wrong treatment was prevented when the therapist asked the patient which side was to be treated.

Use example - wrong contour

- During a Peer Review Radiosurgery conference, the diagnostic images were reviewed and it was determined that the target had been drawn on the wrong side.

Wrong hepatic lesion treated

- A patient previously treated with SBRT for two liver metastases returned with a new lesion. The attending radiation oncologist and resident reviewed the imaging and made the decision to treat the new metastasis with SBRT.
- A simulation directive was completed by the resident with axial image snapshots from a diagnostic MR scan and a computed tomography (CT) scan illustrating the lesion to be treated. After simulation, the gross tumor volume (GTV) contoured by the resident covered the **wrong** liver lesion.
- Treatment planning and quality assurance (QA) were completed based on that incorrect target. The error was not detected at the time of attending approval or in peer-review rounds. Treatment was delivered to a benign liver hemangioma.
- Follow-up imaging @ four months demonstrated enlargement of the liver metastasis, prompting review and realization that the 5 SBRT fractions had been delivered to the incorrect hepatic target. Adjacent normal organs received doses within acceptable tolerances. The correct liver metastasis was treated with a treatment plan incorporating the contribution from the prior radiation.

Contributing factors

- Failure to accurately correlate target contouring with diagnostic imaging
- Hand-offs and extended workflow with multiple people interacting with the plan
- Safety-critical issue not identified in the review by the attending physician
- Safety-critical issue not identified in peer review, despite the prospective SBRT-specific peer review being performed
- Abbreviated treatment course

Prior RT

- A patient who had received 45 Gy to the supraclavicular region was retreated 11 years later to the same area to 50 Gy before the physician realized he had not taken the prior dose into account.

Verbal communication

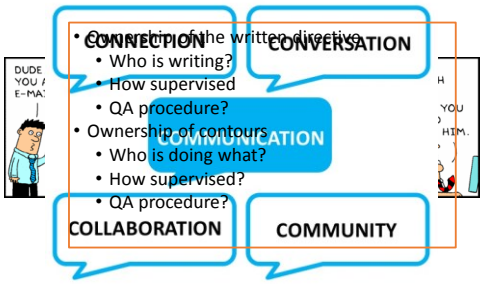
- The planner received a verbal order from the physician for a dose of "12 in 2", which was interpreted to mean 6 fractions of 2 Gy.
- 2 fractions of 6 Gy was the intent.
- The planner prepared the plan and the prescription for the physician to sign.
- After two treatments had been delivered, the error was detected in chart rounds.

Setup DRR

- The setup DRRs used for image guidance were exported from a different plan than the treatment fields, which had a different isocenter.
- This was discovered after the treatment had been completed.

Isocenter

- The isocenter manually entered for the CBCT was 5 cm in error.
- The therapists aligned the patient to the CBCT, assuming that their initial setup was off.
- Because the patient had 3D-planned fields, port films were taken that showed the error.
- Had the patient been treated with IMRT, no port films would have been done.



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We thank you for your current and future participation in RO-ILS

RO-ILS RADIATION ONCOLOGY INCIDENT LEARNING SYSTEM