

Educating Residents in Root Cause Analysis: Why, Why, Why

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AAPM 2018, Nashville, TN. Thur 8:30-9:30 am. 15 min talk. TH-B-KDBRA2-0 : [An Interactive Session to Share Education Ideas: How Do You Teach Quality and Safety to Residents?](#)

Disclosures

- R18 HS022204-01

Learning Objectives

- Participate in an interactive forum for the sharing of education ideas
- Adapt techniques shared in this session into your own medical physics residency or graduate program
- Become aware of various techniques for teaching patient safety and quality improvement

State of Safety Training in Residencies (circa 2016)

Survey of residents in therapy programs in North American.
n=56 (of 248, 23%) in physics

	<u>No exposure or informal</u>	<u>Formal Training</u>
Experience with incident learning	64%	36%
Root-cause analysis	77%	23%
FMEA	72%	27%

Safety training in residency is adequate: 40%

Spraker et al. Prac Radiat Oncol, 7, e253-259, (2017)

Note: numbers are not much different for MD residents. Maybe you expect this. Would this be acceptable for another core clinical competency such as linac QA or IGRT?

The program directors perspective

Survey of therapy program directors in North American.
n=31 (32%) in physics

	<u>Agree</u>	<u>Do not agree</u>
Safety & QI education is important	95%	5%
Residents are enthusiastic	75%	25%
Residents are prepared	90%	10%

Spraker et al. Prac Radiat Oncol, accepted (2018)

There is a disconnect here. 60% of residents think their program is NOT adequate, 90% of directors think resident are prepared for practice.

Requirements



- CAMPEP requirements
- AAPM Report No. 249 (guidance for training residencies)
- TG100: Safety and quality “need to be incorporated in training programs for all radiation oncology disciplines”



Clinical Learning Environment Review (CLER)
“Pathways to Excellence” Guide

<https://www.campep.org/ResidencyStandards.pdf>. Both report No 249 and CAMPEP requirements note safety education – including FMEA & RCA.

ACGME CLER pathway since 2006: 2 of 6 focus areas are safety & QI, Pathway to Excellence guide advocates Q&S education and that it should be experience-based

Safety Education in a Residency

			"Resident 1"		"Resident 2"	
2018	July	Day 1-15	Intro	Kristi/Minsun	Intro	Kristi/Minsun
		Day 16-30				
	Aug	Day 1-15	TP1&2	Alexei-Patty	Equipment	Matt
		Day 16-30				
	Sep	Day 1-15				
		Day 16-30			QA/QC	Kristi
	Oct	Day 1-15	Equipment	Matt		
		Day 16-30				
	Nov	Day 1-15			TP 1&2	Alexei-Patty
		Day 16-30	QA/QC	Kristi		
	Dec	Day 1-15				
		Day 16-30				
2019	Jan	Day 1-15	Clinical Dev	TBD	Clinical Dev	TBD
		Day 16-30				
	Feb	Day 1-15	TP 3&4	Minsun-Patty	Image Guidance	Sarah
		Day 16-30				
	Mar	Day 1-15				
		Day 16-30				
	Apr	Day 1-15	Safety	Eric	TP 3&4	Minsun-Patty
		Day 16-30				
	May	Day 1-15				
		Day 16-30	Image Guidance	Sarah		
	Jun	Day 1-15			Safety	Eric
		Day 16-30				

Rotation schedule

Residency at UW consists of 16 rotations. Quality and safety is once of them.

This is NOT radiation protection

- Exposure
- Effective dose, dose equivalent
- Annual limits
- Shielding
- Surveys

These are part of a separate “Radiation Protection” rotation

Key components

- Failure mode and effects analysis (FMEA)
- Incident learning
- Root-cause analysis
- Safety culture
- QA and error proofing

Safety Program for Residents

EDUCATION

WILEY

A patient safety education program in a medical physics residency

Eric C. Ford | Matthew Nyflot | Matthew B. Spraker | Gabrielle Kane |
Kristi R. G. Hendrickson

J Appl Clin Med Phys 2017; 18:6: 268–274

Safety Program for Residents

- Goal: Broad education in safety and quality
- Attend ILS meetings thru all 2 years
- 6 week rotation
- Readings and lectures, 2 projects, evaluation
- Progress
 - Began 2014 (5 years), 10 residents so far
 - Well received

Incident learning in radiation oncology: A review

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Med. Phys. 45 (5), May 2018

1. INTRODUCTION*

- 1.A Error and outcomes
- 1.B Recommendations for incident learning and current practice
- 1.C Definitions and terms
- 1.D Summary of incident learning studies in radiation oncology
- 1.E National and international voluntary ILS

2. INSTITUTIONAL INCIDENT LEARNING SYSTEMS

- 2.A Structure of a departmental incident learning system
- 2.B Identifying events for inclusion in the ILS
- 2.C Performing a root-cause analysis
- 2.D Developing and implementing action plans or process improvements
- 2.E Attitudes and barriers toward ILS participation
- 2.F Importance of feedback

3. PRACTICAL ADVICE FOR DEVELOPING AND MAINTAINING AN ILS PROGRAM

4. A SYSTEMS VIEW OF ERROR

- 4.A Safety culture and just culture
- 4.B Teamwork and communications
- 4.C Cognitive bias
- 4.D Addressing cognitive bias

5. RESPONDING TO INCIDENTS OF HARM

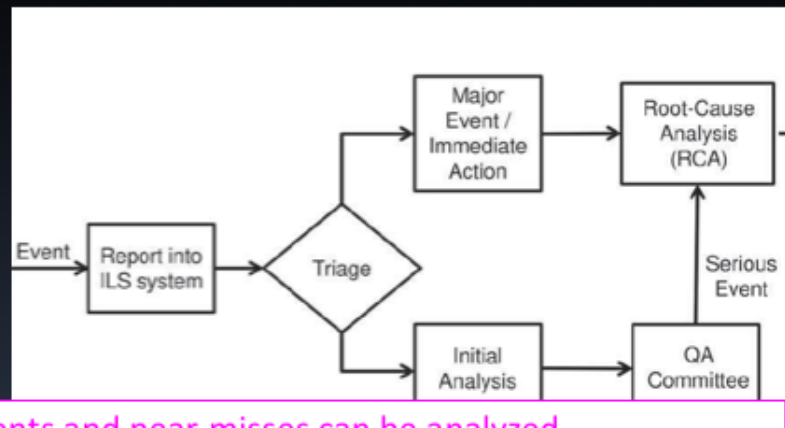
- 5.A Medical error disclosure
- 5.B The patient experience
- 5.C The impact of incidents on the professional

6. CONCLUSIONS

*Complete, expanded version of the introduction available in online supplementary materials.

Incident learning is one key component of the program. I do not have time in this talk to delve into incident learning in any depth, but here is a comprehensive review published recently. 19 pages. This is a key resource for us for teaching.

Pathway of an event



Note: both incidents and near-misses can be analyzed.
We are typically doing RCA on the more serious near- miss events

Note – every resident is expected to DO a root-cause-analysis (not just read about it)

Root Cause Analysis (RCA)

The “London Protocol” (2000)

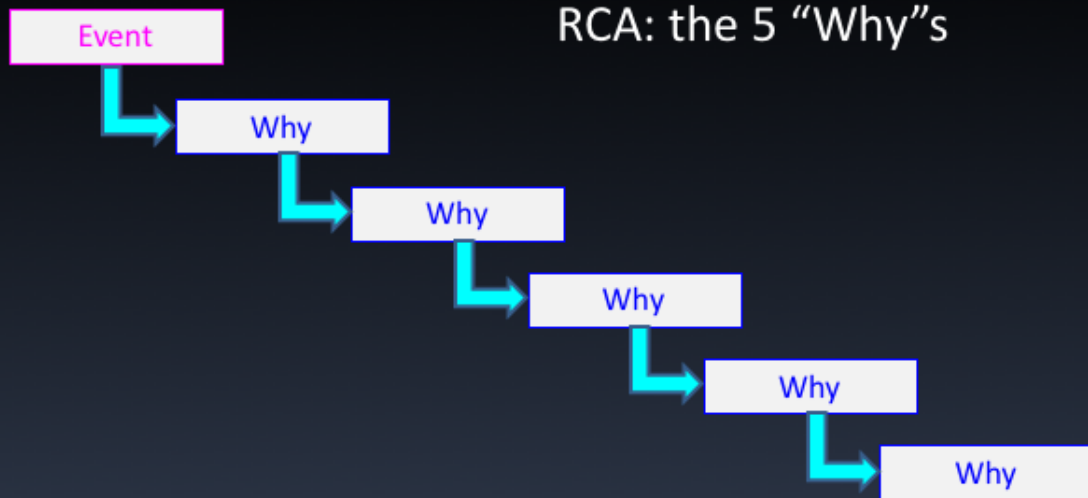
Taylor-Adams S, Vincent C. Systems Analysis of Clinical Incidents: The London Protocol. London, UK: Imperial College London; 2017.
<https://www.imperial.ac.uk/patient-safety-translational-research-centre/education/training-materials-for-use-in-research-and-clinical-practice/the-london-protocol/>

From Imperial college London (note there are others e.g. Cntr of pt safety, VA), Handy 20-page document with tables, easy to digest

Figure 4: Chronological Mapping of CDPs and Associated Contributory Factors

CHRONOLOGY	
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	TIME
CDPs	Care Delivery Problems (what)
Contributory Factors	Contributory Factors (why)

RCA: the 5 “Why”s



Example RCA

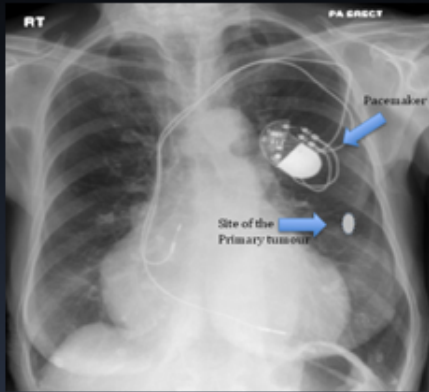


Image: Keshtgar et al. R&O, 7, 128, (2012)

Unclear communications
Management of patient with pacemaker

Slide: courtesy Ryan Price, PhD UWMC

Chronology (What)

- Pacemaker not on consult document (dropped, document update)
- Patient simulated
- Husband mentions pacemaker to nurse and sim staff.
- Note made in OIS (Mosaik). Urgent plan.
- Dosimetry looks at document (not note). Plans for 18MV.
- Physics initial chart review: notes pacemaker note and 18MV plan.
- Replanned with 6MV.

Slide: courtesy Ryan Price, PhD UWMC

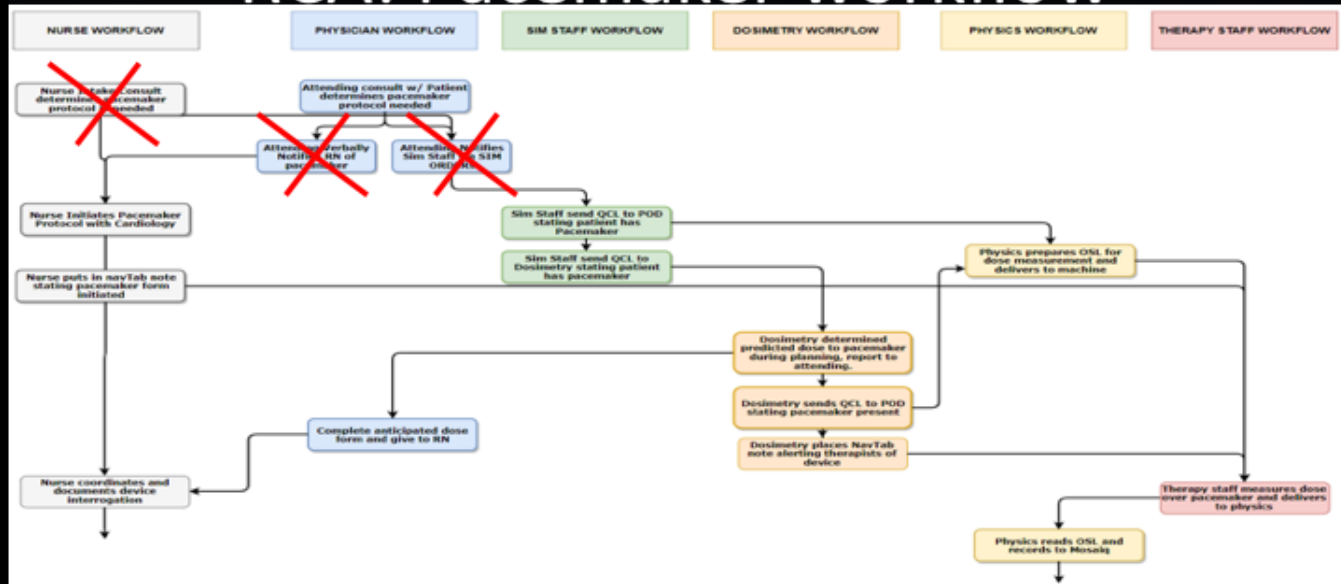
At this phase we focus on the 'what' not why. Timestamps in EMR are useful, also detailed interviews with people.

RCA: Contributory factors

- Urgent work
- Incomplete communication
- Workflow does not have consistent modes of communication

Slide: courtesy Ryan Price, PhD UWMC

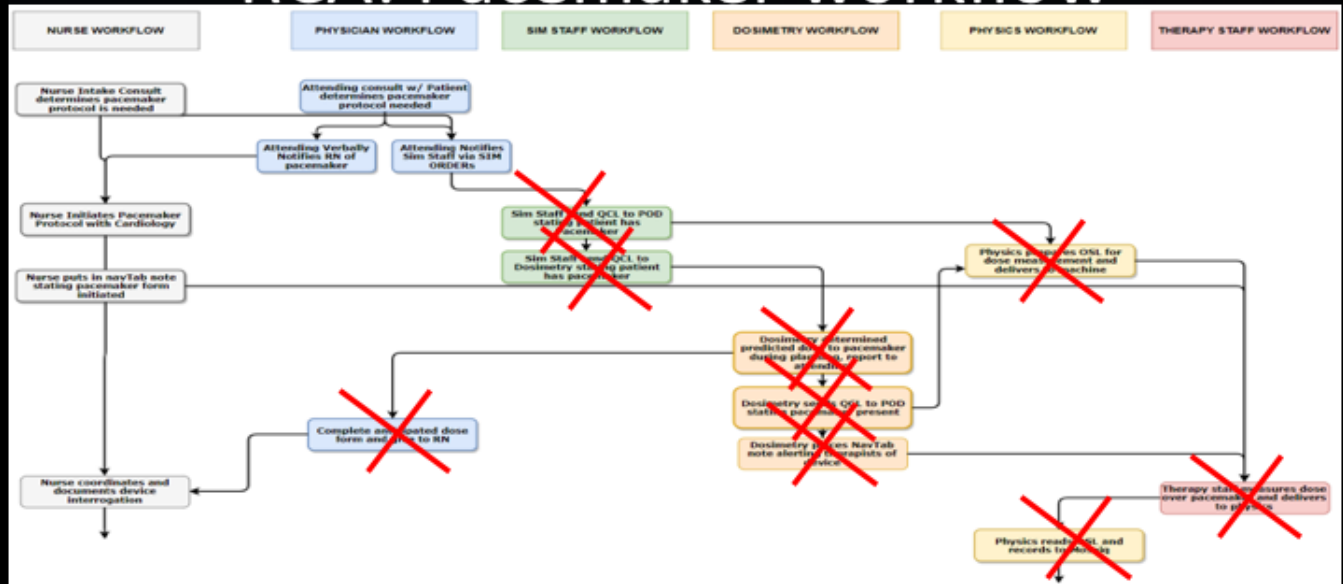
RCA: Pacemaker workflow



Slide: courtesy Ryan Price, PhD UWMC

This event

RCA: Pacemaker workflow



Slide: courtesy Ryan Price, PhD UWMC

If sim doesn't send QCLs.

RCA follow-up

- Presented at department-wide meeting
- New workflow and communications methods



Conclusions

- Safety education: Key need in residency
- Experiential learning
- Benefits to program

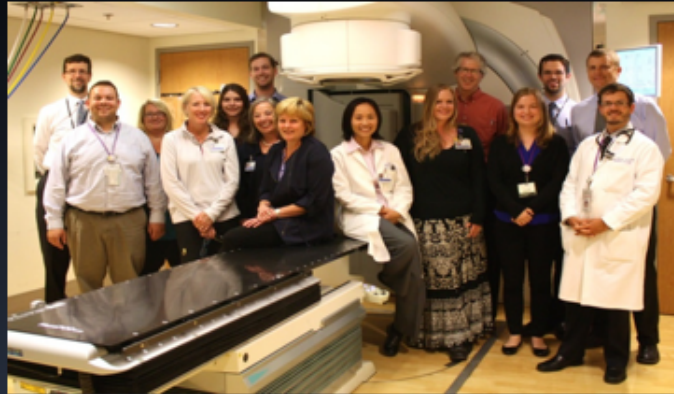
Imagine what your program will look like when you do two RCAs every year.

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Medical Physics Residents!

UW RAD ONC QUALITY TEAM



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