August 8th 2019

WHAT IS REALLY REQUIRED TO MEET THE JOINT COMMISSION REQUIREMENTS FOR FLUOROSCOPY

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Panelist

Olav Christianson, MS, DABR

Senior Medical Physicist
OPTIMIZE Manager

Q&A via chat

A common story

A hospital is wants to meet The Joint Commission standards for patient dose

Purchase dose monitoring software

After several months…

- Staff has more burden
- Little improvement in patient dose
- Still unhappy with how they meet the standards

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There is a better solution

Less staff burden

Less time spent managing data and more time to focus on patients

Improved patient care

Recommendations from experts of how to improve your practice

Stress-free compliance

Everything you need available at a glance

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Steps for success

Define your goals

- Deterministic risks
- TJC standards
- Sentinel events

Step 1

Implement the basics

- Meeting the standards
- SOPs
- Staff education

Step 2

OPTIMIZE patient dose

- A new way to manage patient dose

Step 3

Reduce staff dose

- Risks to staff
- Tools for ALARA

Step 4

Deterministic effects

$D_{skin,max}$ (Gy)	Prompt	Early	Mid-term	Long-term
0-2	-	-	-	-
2-5	Transient erythema	Epilation	Recovery	-
5-10	Transient erythema	Erythema, epilation	Recovery	Recovery
10-15	Transient erythema	Erythema, epilation	Prolonged erythema, permanent epilation	Telangiectasia, dermal atrophy
>15	Transient erythema, edema, acute ulceration	Erythema, epilation, moist desquamation	Dermal atrophy, ulceration, dermal necrosis	Telangiectasia, dermal atrophy, late skin breakdown

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Am I missing something?

1. Tsapaki, V., & Rehani, M. M. (2014). I Perform More Than 100 Interventional Procedures Every Year but Have Never Seen Radiation-Induced Skin Injury: Am I Missing Something? *American Journal of Roentgenology*, *203*(5), W462–W463. https://doi.org/10.2214/AJR.13.11765

1700

Expected skin injuries from fluoroscopy each year[1]

9

Reported skin injuries from fluoroscopy each year[1]

13

Cases filed in US court for skin injuries from fluoroscopy each year[1]

PC.01.02.15 EP 13

For hospitals that provide fluoroscopic services: The cumulative-air kerma or kerma-area product are documented in a retrievable format. For fluoroscopy equipment that cannot display or provide cumulative-air kerma or kerma-area product, fluoroscopy time and number of images acquired are documented in a retrievable format, such as a picture archiving and communication system.

Notes:

This element of performance does not apply to fluoroscopy equipment used for therapeutic radiation treatment planning or delivery **or fluoroscopy equipment classified as a mini C-arm**.

PC.02.01.01 EP 30

For hospitals that provide fluoroscopic services: The hospital identifies radiation exposure and skin dose threshold levels, that if exceeded, trigger further review and/or patient evaluation to assess for adverse radiation effects.

Notes:

Information on radiation exposure thresholds can be found in the National Council on Radiation Protection (NCRP)'s report number 168 and on the Food and Drug Administration's (FDA) Center for Devices for Radiological Health (CDRH) website.

Radiation exposure thresholds may be established based on metrics such as reference-air kerma, cumulative-air kerma, kerma-area product, or fluoroscopy time.

PI.02.01.01 EP 20

For hospitals that provide fluoroscopic services: The hospital reviews and analyzes instances where the radiation exposure and skin dose threshold levels identified by the organization are exceeded.

Notes:

Radiation exposure thresholds may be established based on metrics such as reference-air kerma, cumulative-air kerma, kerma-area product, or fluoroscopy time. (See also PC.02.01.01, EP 30)

HR.01.05.03 EP 15

The hospital verifies and documents that individuals (including physicians, non-physicians, and ancillary personnel) who use fluoroscopic equipment participate in ongoing education that includes annual training on the following:

- Radiation dose optimization techniques and tools for pediatric and adult patients addressed in the Image Gently; and Image Wisely; campaigns
- Safe procedures for operation of the types of fluoroscopy equipment they will use

HR.01.05.03 EP 15

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~~- Radiation dose optimization techniques and tools for pediatric and adult patients addressed in the Image Gently; and Image Wisely; campaigns~~
~~- Safe procedures for operation of the types of fluoroscopy equipment they will use~~

Notes:

Effective immediately, The Joint Commission is **deleting** Standard HR.01.05.03, element of performance (EP) 15 from the Ambulatory Care, Critical Access Hospital, Hospital, and Office-Based Surgery programs.

HR.01.06.01 EP 6 (2005)

Staff competence is assessed and documented once every three years, or more frequently as required by hospital policy or in accordance with law and regulation.

Notes:

Human Resources (HR) standard HR.01.06.01 leads the list of 10 requirements identified most frequently as “not compliant” during laboratory surveys from Jan. 1, 2017, through Dec. 31, 2017.

Sentinel Events

- Prolonged fluoroscopy with cumulative dose >1500 rads (15 Gy) to a single field within 6 – 12 months
- Could be associated with death or major permanent loss of function
- Considered to be preventable
- Required to conduct a root cause analysis
- Voluntary reporting is encouraged

Common Goals

- Establish policies for high risk procedures
- Ensure highly trained staff
- Inform patients of the risks and benefits
- Reduce rates of skin injury
- Manage unavoidable skin injuries
- Reduce staff dose

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Steps for success

Step 1	Step 2	Step 3	Step 4
Define your goals	**Implement the basics**	**OPTIMIZE patient dose**	**Reduce staff dose**
• Deterministic risks • TJC standards • Sentinel events	• Meeting the standards • SOPs • Staff education	• A new way to manage patient dose	• Risks to staff • Tools for ALARA

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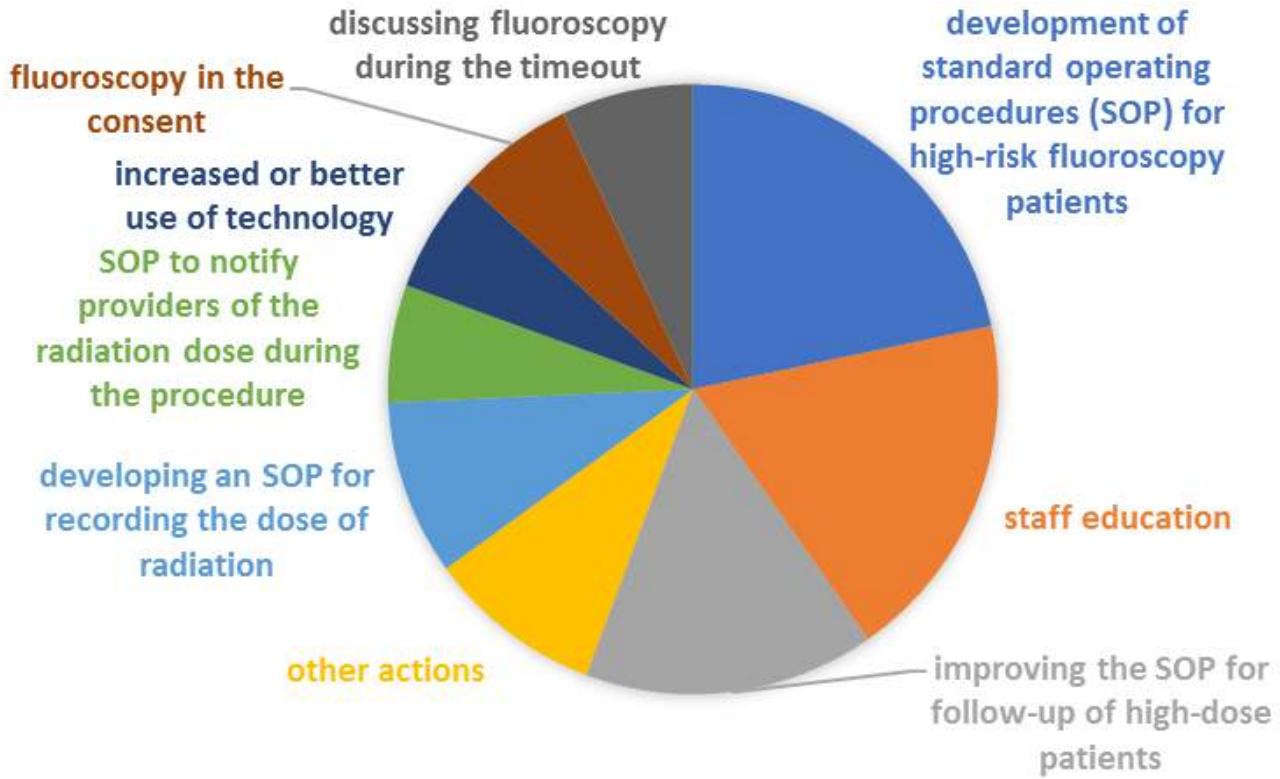
Actions from root cause analysis

23% Developing to policies for high-risk procedures

20% Staff education

16% Improving policies for high-risk procedures



Neily et al., Fluoroscopy-Associated Skin Reactions: Lessons From the VHA Root Cause Analysis Database, PSQH February 2019

Document fluoroscopy dose

1. Send the Radiation Dose Structured Report (RDSR) to PACS
2. Send a dose summary page to PACS
3. Manually record the dose
   - Record in PACS
   - Dictate into the patient's record
   - Record in logbook

Past exposures

- Check studies in the last 6-12 months for patients undergoing high-risk procedures
- Notify physicians of previous high dose procedures
- Consider past exposures when assessing for sentinel events

Notification levels

Dose Metric	First notification	Subsequent notifications
$D_{skin,max}$	2 Gy	0.5 Gy
$K_{a,r}$	3 Gy	1 Gy
P_{KA}	300 Gy-cm^2	100 Gy-cm^2
Fluoroscopy Time	30 min	15 min

- Used to raise awareness during a procedure
- Never stop a procedure only because a notification level was exceeded

Substantial radiation dose level

Dose Metric	SRDL
$D_{skin,max}$	3 Gy
$K_{a,r}$	5 Gy
P_{KA}	500 Gy-cm^2
Fluoroscopy Time	60 min

- Triggers organization's patient follow-up process
- Never stop a procedure only because a SRDL was exceeded

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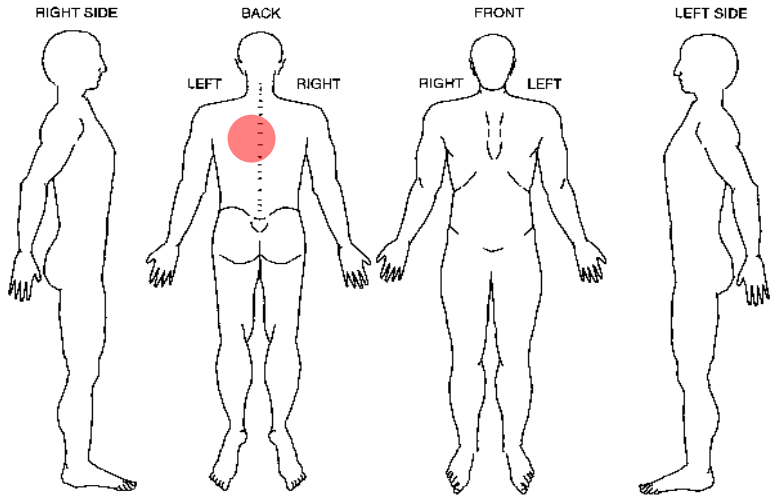
Patient follow-up process



- Notify patient that a SRDL was used
- Inform them what skin reactions are possible
- Indicate what to look for and where to look
- Emphasize that effects can be minimized with proper treatment
- Schedule 4-week follow-up

Peak skin dose estimates

- Peak skin dose estimates are recommended when cumulative air kerma exceeds 10 Gy
- The peak skin dose could be higher or lower than the cumulative air kerma
- Consult with a qualified medical physicist
  - Evaluate whether a sentinel event has occurred
  - Inform the physician of possible skin effects

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Physician risk awareness

Train providers and staff who use fluoroscopy

- should be trained for the type and complexity of procedures they are privileged to perform
- educated on radiation safety and their roles in the patient safety program

1. Ricketts, Perception of Radiation Exposure and Risk Among Patients, Medical Students, and Referring Physicians at a Tertiary Care Community Hospital., Canadian Association of Radiologists Journal, 2013

25%

Physicians unaware that interventional procedures use ionizing radiation[1]

43%

Physicians unaware that interventional procedures use ionizing radiation[1]

Staff education programs

- LANDAUER Academy
- Association of vascular and Interventional Radiographers (AVIR)
- AAPM educators resource guide
- Image Gently: Enhancing Radiation Protection in Pediatric Fluoroscopy

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ACADEMY

https://www.landaueracademy.com/

Public perception of risk

1. Ricketts, Perception of Radiation Exposure and Risk Among Patients, Medical Students, and Referring Physicians at a Tertiary Care Community Hospital., Canadian Association of Radiologists Journal, 2013

92%

Were not informed of the radiation risks[1]

25%

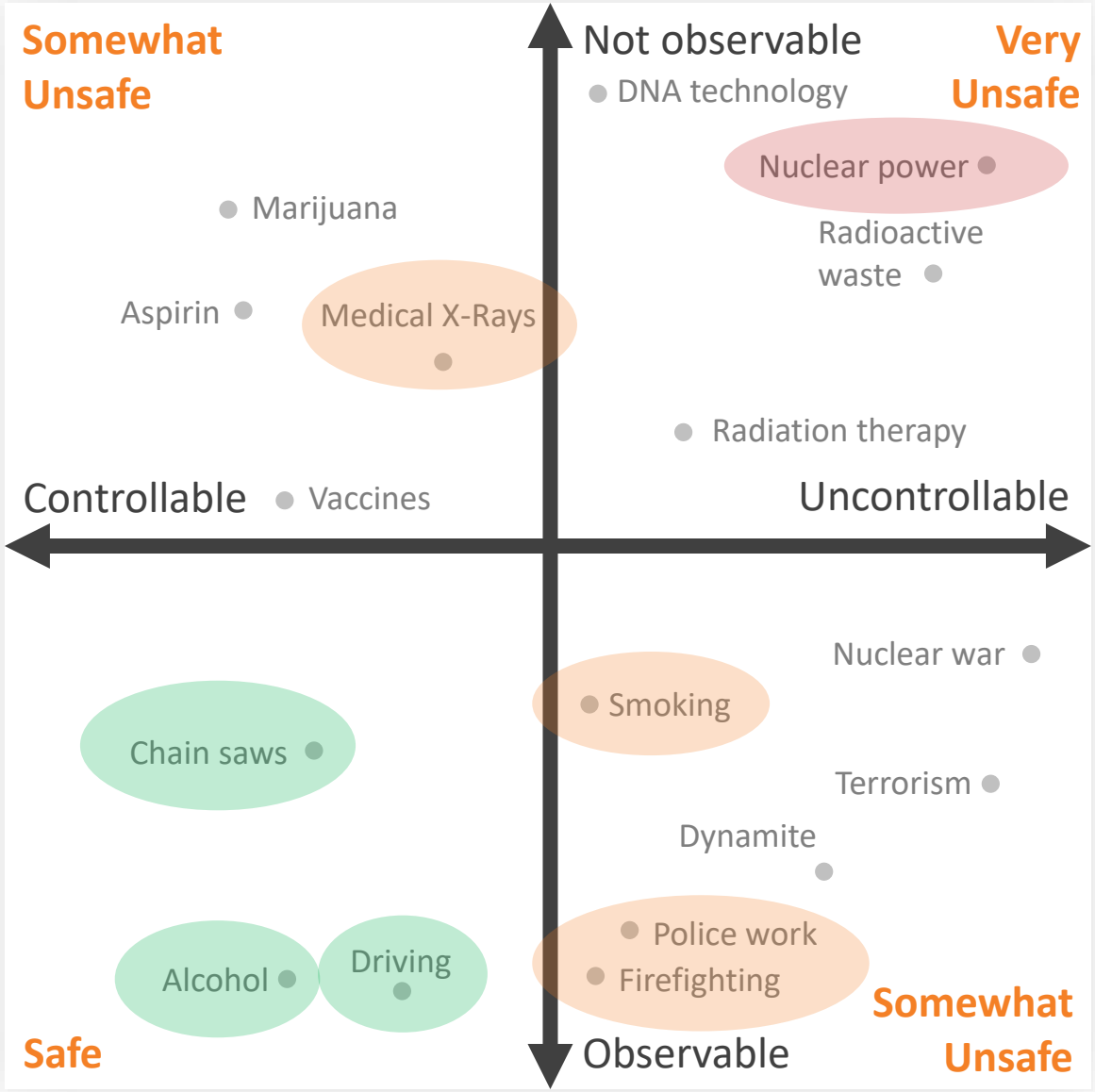
Believed there was a risk of cancer from CTs[1]

56%

Believed there was a risk of cancer from MRIs[1]

Psychology of perceived risk

- Informed consent is recommended for high-risk fluoroscopy procedures
- Informed consent includes
  - Information on this risks
  - Information on the benefits
  - Alternative treatment options
  - Patient approval to proceed



Slovic, 1982

Implement the Basics

- Before
  - Train providers
  - Perform informed consent
  - Identify patients at increased risk for skin injury
- During
  - Implement notification levels
  - Reduce dose rate as reasonable
- After
  - Record the dose
  - Implement SRDL
  - Follow-up when necessary
  - Perform a dose estimate

Steps for success

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What is OPTIMIZE?

Automated data collection

We collect the data and manage it so you can focus on patients

Unlimited physics support

Recommendations from experts of how to improve your practice

Stress-free compliance

Everything you need available at a glance in the online portal

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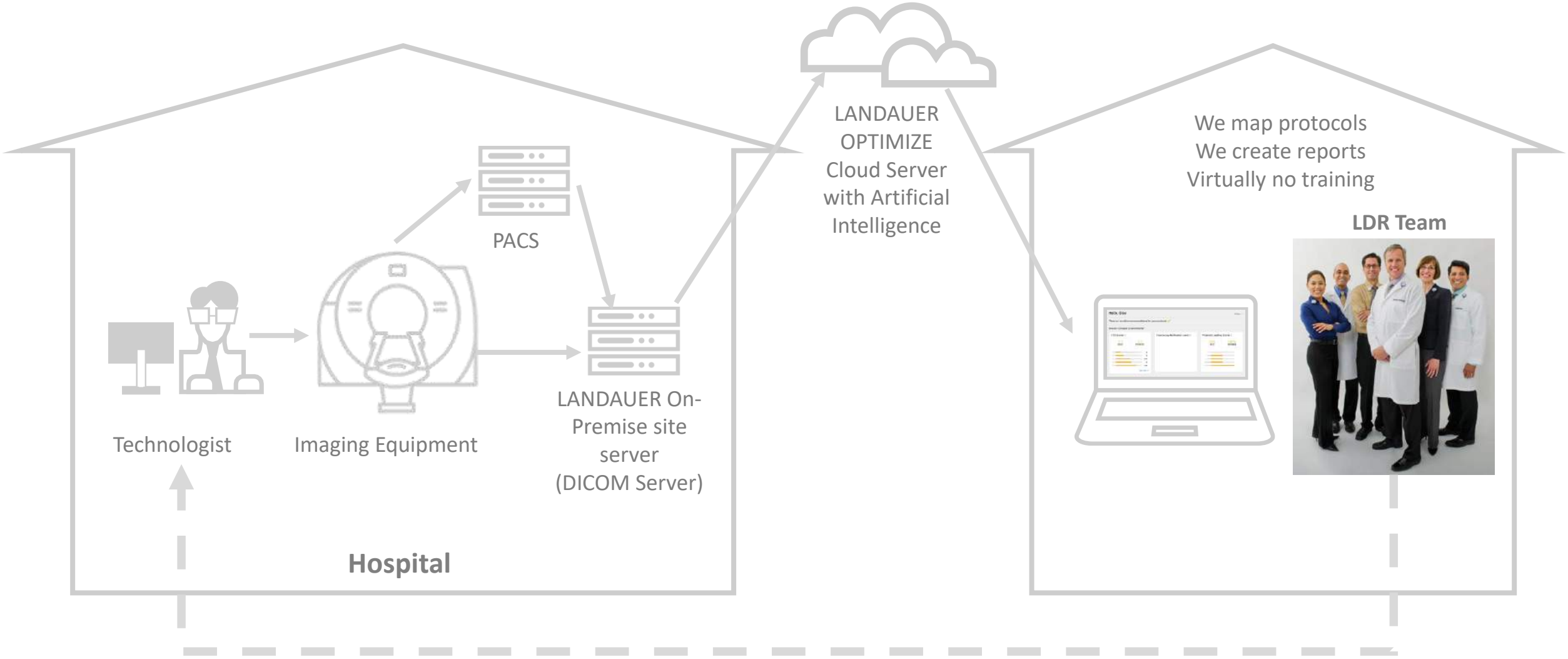
What makes OPTIMIZE different?

- We make setup and implantation pain free
  - Validate data
  - Map CT protocols to common nomenclature
  - Help setting expected dose ranges
- We monitor your patient doses
  - Notify you of any equipment downtime
  - Review dose incidents
  - Review CT protocols
- We advise you
  - CT protocol recommendations based on our extensive protocol library
  - Provide dose estimates to manage patient care
  - Suggestions to reduce frequency of dose incidents
- Resolve issues as a team
  - Unlimited support



Online portal

- Access to dashboards
  - Everything you need for compliance
- Access to reports
  - Protocol review
  - Leapfrog
  - Health system standardization
- Physicist recommendations
  - See open recommendations
  - View of all past recommendations
- Ability to ask questions or schedule meetings
  - Open a ticket
  - Schedule a meeting
  - Live chat (currently being explored)

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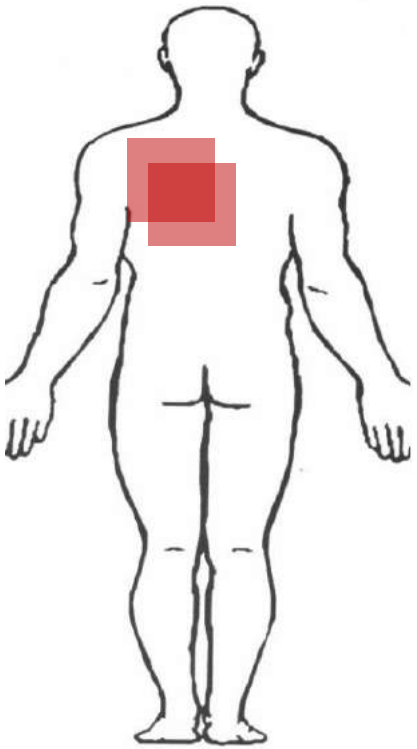
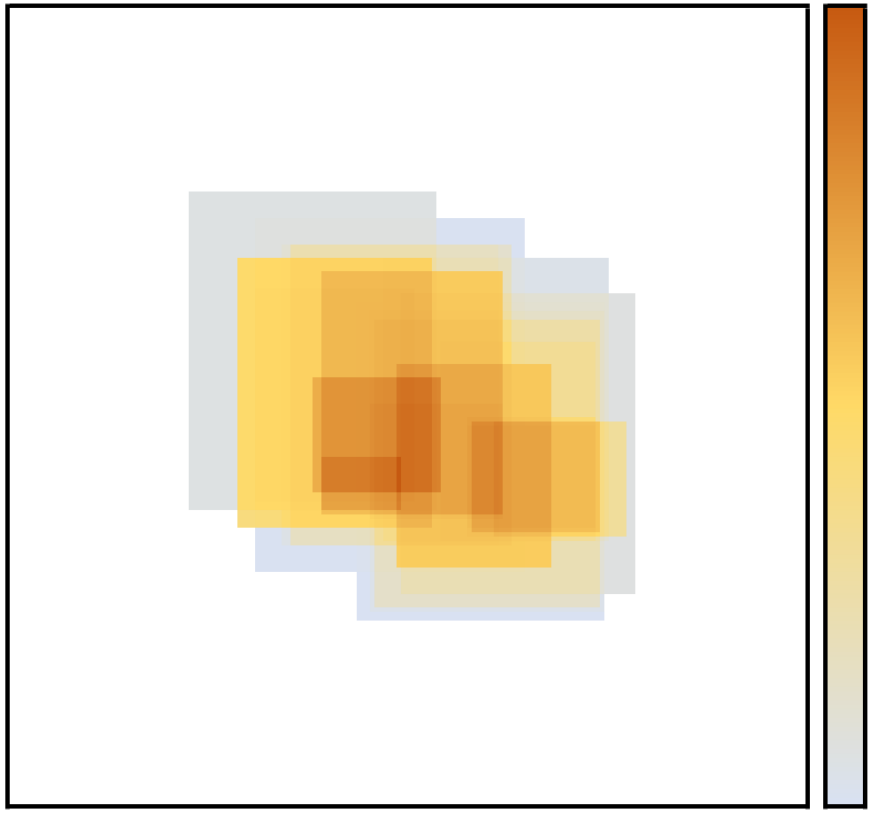
Peak skin dose





"LANDAUER takes the time to teach and brings the experience of other hospitals to bear. With his help, we keep up with regulatory issues, including being ready for The Joint Commission survey. I'm excited to put new protocols in place and teach my colleagues – and continue to rely on Olav's expertise."

- Tamara Ingle

CT Quality Assurance Lead Technologist, UnityPoint Health Methodist

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Staff radiation risks

- Increased risk of cancer
- Increased risk of cataracts
- 67% All cancers on the left side of the body
- 85% Head and neck cancers on the left side of the body

Orthopedic concerns

1. Goldstein JA, Balter S, Cowley M et al. Occupational hazards of interventional cardiologists: prevalence of orthopedic health problems in contemporary practice. Catheter Cardiovasc Interv 2004; 63:407-211. 15558765
2. Gregory Dehmer et al., Occupational Hazards for Interventional Cardiologists, The Society for Cardiovascular Angiography and Interventions, 68 Catheterization and Cardiovascular Interventions 974, 975 (2006), http://www.scai.org/asset.axd?id=c01541b7-66c2-46a4-940e-e2a55e71e5bc&t=633945866505100000

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RaySafe i3 real-time dosimeter

"The improvement in radiation protection has been more than dramatic at the URMC. There is no substitute for a constant and real-time reminder of the dose being received."

-Labib H. Syed, M.D., M.P.H.
University of Rochester Medical Center

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RaySafe i3 results

"We feel better about our work and our safety. Now that we see what RaySafe real-time dosimetry does for us, we wouldn't want to work at a place that doesn't have it."

-Dawn Dowling, Technologist
Lawrence General Hospital

45%
Dose reduction among technologists

66%
Dose reduction among radiologists

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Q&A

USE THE Q&A SECTION TO TYPE IN YOUR QUESTION

Contact Us

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www.landauer.com/optimize