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A Clear Picture

COMPLYING WITH NEW AND REVISED FLUOROSCOPY AND COMPUTED TOMOGRAPHY STANDARDS

As medical technology continues to advance and evolve, The Joint Commission's standards relating to that technology must do the same. To that end, The Joint Commission worked with imaging experts to update the standards to ensure that they address the issues presented by today's imaging technology and the ways in which health care organizations are using it.

In recent years, revisions have been made to the standards that address computed tomography (CT), nuclear medicine, magnetic resonance imaging (MRI), and positron emission tomography (PET) scans. The latest revisions go into effect January 1, 2019, and clarify expectations and address areas of risk associated with imaging. Although most of these standards changes address risks related to fluoroscopy, such as its increasing use in outpatient care and the development of less invasive methods, one of the recent revisions addresses required tests for CT units, and another establishes a requirement for a radiation safety officer. (Please note that these new requirements do not apply to fluoroscopy equipment used for therapeutic radiation treatment planning or delivery.) The changes, applicable to **ambulatory care organizations, office-based surgery practices, hospitals,** and **critical access hospitals,** enhance organizations' provision of safe, high-quality imaging services.

Following are the major changes resulting from these revisions, with some strategies for how your organization can ensure compliance.

STRATEGY **Perform the right equipment checks.** Revisions specify the tests that a diagnostic medical physicist must perform on fluoroscopy and CT equipment annually to ensure that the equipment is functioning properly. For fluoroscopy, these tests must assess the following:

- Beam alignment and collimation
- Tube potential/kilovolt peak (kV/kVp) accuracy
- Beam filtration (half-value layer)
- High-contrast resolution
- Low-contrast detectability
- Maximum exposure rate in all imaging modes
- Displayed air-kerma rate and cumulative-air kerma accuracy (when applicable)

For CT, these tests must include the use of phantoms (a specially designed object for scanning) to evaluate the following:

- Image uniformity
- Scout prescription accuracy
- Alignment light accuracy
- Table travel accuracy
- Radiation beam width
- High-contrast resolution
- Low-contrast detectability
- Geometric or distance accuracy
- CT number accuracy and uniformity
- Artifact evaluation

In addition, slice thickness accuracy is no longer a required test for CT units.

Organizations should take stock of the tests currently conducted on their imaging equipment to ensure that (1) all these tests are done and (2) the appropriate staff conduct the equipment checks. Organizations may find it useful to assess the individuals performing the tests and their credentials.

"Because these tests are required annually, they don't have to have been conducted by the January 1, 2019, effective date," says Joyce Webb, RN, project director, Division of Healthcare Quality Evaluation, The Joint Commission. "Since this is an annual requirement, organizations actually have until January 1, 2020, to conduct the tests and document the results."

Webb adds that organizations should evaluate how much detail is being provided on equipment testing. "Some testers might just leave a one liner to indicate 'everything's fine.' But, it's better to provide detailed information about everything they checked," she says. Details that could be captured include the following:

- What specific imaging equipment they checked and when
- What the results were
- When the equipment will need recalibration
- Whether any parts or equipment will need to be replaced before the next annual test
- Any other needed follow-up

STRATEGY **Conduct the right training.** Any individuals who use fluoroscopy or CT equipment, including physicians, nurses, techs, and ancillary staff, must receive ongoing training on the equipment and on radiation dose management.

This training must include at least 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 operating the types of fluoroscopy or CT equipment they will use

Organizations should check to ensure that the training is fully up-to-date, focusing on the current equipment and the makes and models used in the facility.

STRATEGY **Put the right individual in charge.** Beginning January 1, 2019, organizations must designate an individual as radiation safety officer. This person is responsible for making certain that radiologic services are provided in accordance with law, regulation, and organization policy. In short, the radiation safety officer needs to identify unsafe conditions and issue recommendations to mitigate them. As such, the organization must be sure that the radiation safety officer has the necessary authority and leadership support to accomplish the following:

- Monitor and verify compliance with established radiation safety practices (including oversight of dosimetry monitoring)
- Provide recommendations for improved radiation safety
- Intervene as needed to stop unsafe practices
- Implement corrective action

Webb says that organization leaders should review/revise or create the job description for the radiation safety officer and include responsibilities, expectations, and policies and procedures to provide the appropriate authority, support, and guidance.

"You should also become familiar with your current process for monitoring staff for radiation exposure," Webb adds. "Are the radiation dosimetry monitors consistently used? For example, there may be times when they're stored in a locker or elsewhere, but then people forget or can't access them and as a result they aren't badged and properly monitored during imaging procedures. Also, if a radiation

dosimetry monitor is not stored properly, its readings may be inaccurate. You need to do some checks to make sure correct processes are followed."

STRATEGY **Establish and monitor the right thresholds.** The organization must not only establish radiation exposure and skin dose threshold levels, it must also review and evaluate any instance in which those levels were exceeded. This will identify patterns and trends and possibly performance improvement opportunities to avoid preventable instances in the future.

Radiation exposure can have a significant effect, so to ensure that the patients' exposures are fully understood, caregivers should review patients' prior imaging history and ask patients about any other imaging they may have received and when that exposure occurred. This review can help decrease unnecessary duplication of imaging tests. Knowing a patient's imaging history can help determine whether additional follow-up may be needed.

For example, the National Cancer Institute and The Society of Interventional Radiology recommend that all patients who received a radiation skin dose of 2 Gy or more, or a cumulative dose of 3 Gy or more, schedule a follow-up visit 30 days after the procedure. In addition, they recommend that the fluoroscopy procedure description, procedure notes, doses, and information about possible short-term and long-term effects be sent to the patient's primary care provider and that the patient and primary care physician should be requested to notify the individual who conducted the imaging if observable skin effects occur.[1]

Radiation exposure thresholds may be established based on metrics such as reference-air kerma, cumulative-air kerma, kerma-area product, or fluoroscopy time. Fluoroscopy radiation thresholds can vary depending on the patient, the location of the scan on the patient's body, the length of the exposure, and more, so thresholds should be established using current research and clinical staff expertise.

Prolonged fluoroscopy with cumulative dose greater than 1,500 rads to a single field or any delivery of radiotherapy greater than 25% above the total planned dose should be reported to The Joint Commission as a sentinel event.[2] These numbers are far above an allowable threshold, as they could be associated with death or major permanent loss of function (although these outcomes often do not occur for months or years after the sentinel event). In such a case, the organization must conduct a root cause analysis to learn from the event and develop strategies to prevent a similar event.

A Foundation for Compliance

A good way to prepare for compliance with the new and revised imaging standards, Webb says, is to download the new requirements and use them to conduct a self-assessment. (Table 1 provides some suggested questions to be included in a self-assessment related to the revised requirements.) A thorough assessment now will provide plenty of time to make any necessary adjustments to ensure compliance with the revised standards starting in the new year. TS

Table 1. Self-Assessment Questions for New and Revised Fluoroscopy and Computed Tomography Requirements

The following questions are meant to help you assess whether you are ready to meet the new and revised fluoroscopy and computed tomography (CT) elements of performance (EPs). They do not address existing requirements in these areas. See your E-dition or accreditation manual for more detail.

Standard	EP	F*	CT†	Self-Assessment Questions
EC.02.04.03	EP 21‡		X	Does our annual evaluation of all CT equipment by a diagnostic medical physicist include scout prescription accuracy? Low-contrast detectability?
EC.02.04.03	EP 34	X		Does a diagnostic medical physicist annually evaluate our fluoroscopic imaging equipment? Does the evaluation address all of the following tests: • Beam alignment and collimation • Tube potential/kilovolt peak (kV/kVp) accuracy • Beam filtration (half-value layer) • High-contrast resolution • Low-contrast detectability • Maximum exposure rate in all imaging modes • Displayed air-kerma rate and cumulative-air kerma accuracy (when applicable)
HR.01.05.03	EP 15	X		Do all individuals who use fluoroscopic equipment participate in annual training on the following: • Radiation dose optimization techniques and tools for pediatric and adult patients • Safe procedures for equipment operation
LD.04.01.05	EP 25	X	X	Have we designated a radiation safety officer who is responsible for making certain that radiologic services are provided in accordance with law, regulation, and organizational policy? Does the radiation safety officer have the necessary authority and leadership support to do the following: • Monitor and verify compliance with established radiation safety practices (including oversight of dosimetry monitoring) • Identify unsafe radiation conditions • Provide recommendations for improved radiation safety • Intervene as needed to stop unsafe practices • Implement corrective action
PC.01.02.15	EP 13	X		Are cumulative-air kerma or kerma-area product documented in a retrievable format? Or are the time and number of images acquired documented in a retrievable format?
PC.02.01.01	EP 30	X		Do we identify radiation exposure and skin dose threshold levels that trigger further assessment when exceeded?
PI.02.01.01	EP 20	X		Do we review and analyze instances when radiation exposure and skin dose thresholds are exceeded?

* Applicable to organizations that provide fluoroscopic services.

† Applicable to organizations that provide diagnostic CT services.

‡ EC.02.04.03, EP 21, is not applicable to office-based surgery practices.

References

1. National Cancer Institute and Society of Interventional Radiology. *Interventional Fluoroscopy: Reducing Radiation Risks for Patients and Staff*. NIH Publication No. 05-5286. Mar 2005. Accessed Sep 18, 2018. https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/interventional-fluoroscopy.pdf.
2. The Joint Commission. *Radiation Overdose as a Reviewable Sentinel Event*. (Updated: Mar 7, 2006.) Accessed Sep 18, 2018. https://www.jointcommission.org/assets/1/18/Radiation_Overdose.pdf.

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