

Radiology Safety Educational Module: An Online Interactive Experience

Megan Marine, MD

Richard Gunderman, MD, PhD

Mark Frank, MD

Boaz Karmazyn, MD

IU Health Riley Hospital for Children
Indiana University School of Medicine



Riley Hospital for Children
Indiana University Health

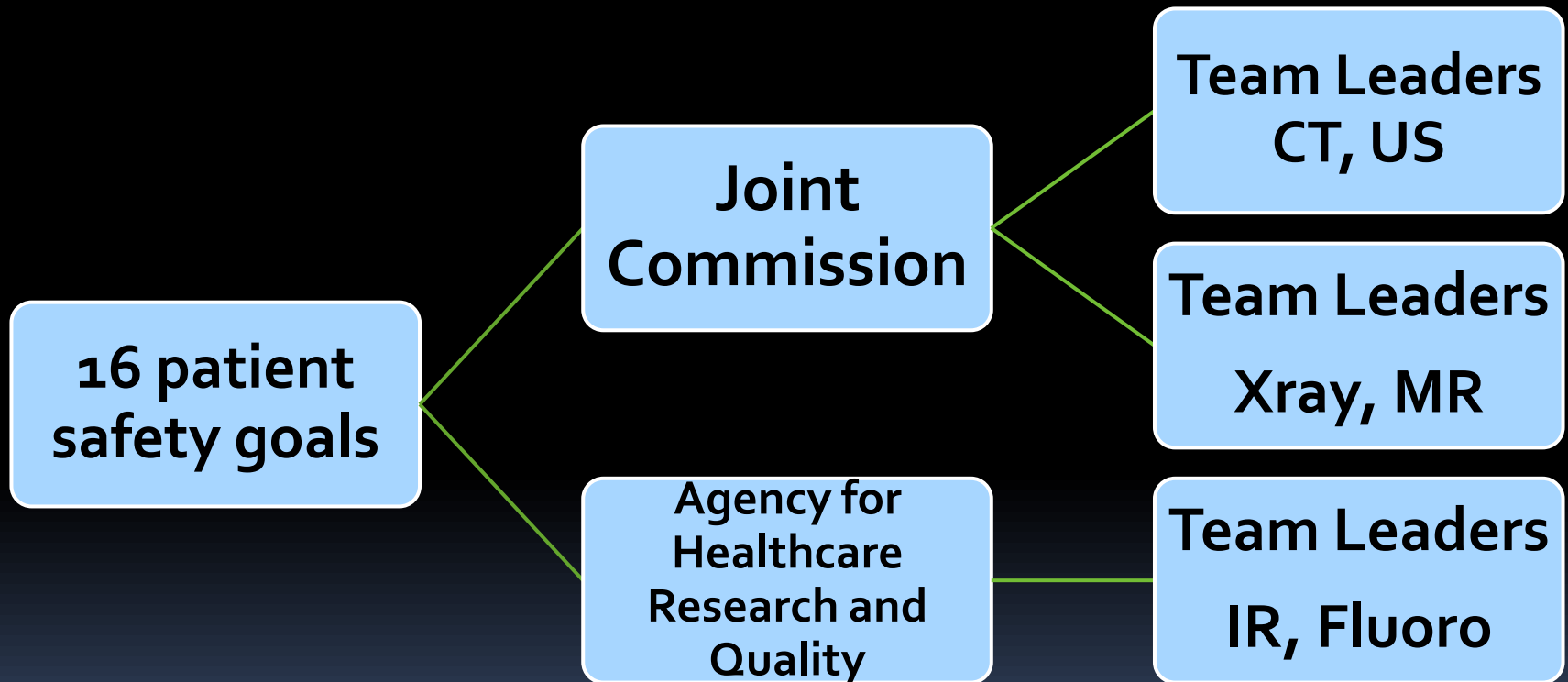
Culture Of Safety In Radiology

- Commitment to safety at all levels
 - Radiologists, technologists, nurses
- Safety is a core value
- Everyone in the team is responsible for safety
- Effective Communication
- Transparency
- System focus vs individual blame

Implementation Steps

- Engage all employees
- Monthly safety meetings
- Encouragement to communicate safety issues
- Monthly summary of incident reports
 - Opportunity to learn and improve
 - Avoid punitive actions
- Education: Creation of Radiology Safety Education Module

Creation of Safety Goals: Process involved entire department



Radiology Education Safety Module

- 16 patient safety goals = 16 case scenarios
 - imbedded images and questions
 - immediate feedback
- Exempt IRB approval
- Online with Edactic software
 - Anonymous usernames, passwords
- Multiple Choice Post test
- Optional survey at end for feedback



Department of Radiology
Indiana University School of Medicine

Welcome!

[\(Click here to log off\)](#)

The Riley Radiology Department presents an interactive, case-based learning module on patient safety. Our goal is to help foster a culture of patient safety.

The following tutorial will guide you through cases demonstrating serious and precursor safety events as well as near miss safety events so that we can recognize and prevent these events on a daily basis and keep our patients safe! At the end, there will be a short 16 question post test to emphasize the important safe practices.

Serious Safety Event:

Reaches patient. Results in severe harm or death.

Precursor Safety Event:

Reaches patient. Results in minimal harm or no detectable harm.

Near Miss Safety Event:

Does not reach patient. Error is caught by detection barrier or by chance.



Department of Radiology Indiana University School of Medicine

Curriculum

[Click here to return to top-level home page.](#)

Guidelines and suggestions:

- **This is a single-session curriculum.** Complete the cases and the post-test. If you restart or walk away for more than 20 minutes, you'll need to start over at the beginning.
- Typical time required: 15-30 minutes.
- Do the cases in order, then do the post test. You cannot access the post test until you have completed the cases.

Case 1	View	Falls Prevention
Case 2	View	Informed Consent
Case 3	View	Disclosure
Case 4	View	Patient care information
Case 5	View	Labeling of diagnostic studies
Case 6	View	Influenza prevention
Case 7	View	Wrong site wrong procedure
Case 8	View	Contrast induced renal failure
Case 9	View	Vomiting Child
Case 10	View	Hand hygiene
Case 11	View	Multidrug-Resistant Organism
Case 12	View	Pediatric Imaging
Case 13	View	MRI Safety
Case 14	View	Contrast allergy
Case 15	View	Conscious Sedation
Case 16	View	Teamwork and communication

View	Summary
View	Post test

Sample Case 1:

Case 5 of 16: Labeling of diagnostic studies

An order is placed for a portable chest xray on Baby A in the PICU. The chest xray is obtained, verifying it is the correct patient by identifying the bed number and verifying the hanging bedside paper stating "Baby A". The chest xray is below:



Chest xray demonstrates tracheostomy, sternotomy wires, surgical clips, pulmonary edema, and bilateral pleural effusions.

The nurse states that the patient has never had surgery and is recovered from an asthma exacerbation, expecting discharge today. This compares to yesterday's chest xray:



Normal chest xray.

Please click to the left of the screen to select the best choice:

Case 5, Question 1 of 3 in this case

? **What has most likely occurred?**

- A The patient has become very ill overnight.
- B The xray was taken of the wrong patient.
- C The xray was ordered on the wrong patient.



This is page 2 of 4

GoTo: [Top](#) || [Prev\(1\)](#) || [Pg 2](#) || [Next\(3\)](#) || [Pg 4](#)

[Answer All Questions](#)

A
B
C

Incorrect, please try again:

- Click to go back to *Labeling Diagnostic Studies* case:
 - [Question #1](#)
 - [Question #2](#)
 - [Question #3](#)
- Click to go back *Hand Hygiene* case:
 - [Question #1](#)
 - [Question #2](#)

Case 5, Question 1 of 3 in this case

? **What has most likely occurred?**

A The patient has become very ill overnight.

B The xray was taken of the wrong patient.

C

(Click/Drag to Move. Double-Click Panel to Close)



Correct, the xray was taken of the wrong patient. (Nice job! You gave the correct answer on the first try).

[Close Popup](#)

||

[All Scoring](#)

[Home Page](#)

Case 5 Question 1 (Completed)

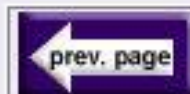
? **What has most likely occurred?** ✓

- A The patient has become very ill overnight.
- B* The xray was taken of the wrong patient.**
- C The xray was ordered on the wrong patient.

Case 5, Question 2 of 3 in this case

? **What step is most responsible for the error in taking the xray on the wrong patient?**

- A The image was labeled incorrectly.
- B The clinical instability of the patient.
- C The incorrect manner in which the patient was identified prior to performing the xray, using the bed number and hanging bedside paper.
- D The order was placed incorrectly.



This is page **2** of **4**

Go To: [Top](#) || [Prev\(1\)](#) || [Pg 2](#) || [Next\(3\)](#) || [Pg 4](#)

[Answer All Questions](#)

Case 5 Question 1 (Completed)

? What has most likely occurred? ✓

- A The patient has become very ill overnight.
- *B* The xray was taken of the wrong patient.
- C The xray was ordered on the wrong patient.

Case 5, Question 2 of 3 in this case

? What step is most responsible for the error in taking the xray on the wrong patient?

- A The image was labeled incorrectly.
- B The clinical instability of the patient.
- *C* The incorrect manner in which the patient was identified prior to performing the xray, using the

(Click/Drag to Move. Double-Click Panel to Close)



Correct, the patient had been moved to a new bed in the interim and the bedside hanging paper was not moved with the patient. Inpatients should never be identified using a room number and should always be identified using two patient identifiers, preferably from the patient's armband, including name and medical record number. (Nice job! You gave the correct answer on the first try).

Close Popup || All Scoring

All content on this Website is copyright © by Indiana University or the hosted party.
Images may be reused for *educational purposes only*. All copyright watermarks must be left intact.

Case 5 Question 1 (Completed)

? What has most likely occurred? ✓

A The patient has become very ill overnight.

B The xray was taken of the wrong patient.

C The xray was ordered on the wrong patient.

Case 5 Question 2 (Completed)

? What step is most responsible for the error in taking the xray on the wrong patient? ✓

A The image was labeled incorrectly.

B The clinical instability of the patient.

C The incorrect manner in which the patient was identified prior to performing the xray, using the bed number and hanging bedside paper.

D The order was placed incorrectly.

Case 5, Question 3 of 3 in this case

? Are there any problems you can anticipate if this is not corrected?

A Potential future imaging error.

B Potential wrong-site procedure.

C Harm to the patient.

D All of the above.

Case 5 Question 1 (Completed)

? What has most likely occurred? ✓

- A The patient has become very ill overnight.
- *B* The xray was taken of the wrong patient.
- C The xray was ordered on the wrong patient.

Case 5 Question 2 (Completed)

? What step is most responsible for the error in taking the xray on the wrong patient? ✓


- A The image was labeled incorrectly.
- B The clinical instability of the patient.
- *C* The incorrect manner in which the patient was identified prior to performing the xray, using the bed number and hanging bedside paper.
- D The order was placed incorrectly.

Case 5, Question 3 of 3 in this case

? Are there any problems you can anticipate if this is not corrected?

- A Potential future imaging error.
- B Potential wrong-site procedure.
- C Harm to the patient.
- *D* All of the above.

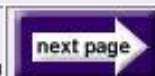
(Click/Drag to Move, Double-Click Panel to Close) ✕

 **Correct, all of the above.** (Nice job! You gave the correct answer on the first try).

[Close Popup](#) || [All Scoring](#)

Labeling of Diagnostic Studies:

1. Use at least two patient identifiers when providing any treatments and procedures.
 - a. Outpatients: name, date of birth
 - b. Inpatients: name, medical record number
 - c. Premature newborns: card on the bed listing name, medical record number, and date of birth
2. When performing portable exams outside the NICU, it is especially essential to confirm patient identity with armband and do not rely on signs overhanging the beds and/or room numbers as patients are frequently moved.
3. Label x-ray imaging studies with the correct patient information while close to the imaging device.
4. Mark "left" or "right" on each radiographic image to prevent misinterpretation.
5. Monitor and report errors and harm related to mislabeling to the organization-wide risk-assessment activity as part of a performance improvement program that addresses mislabeling of specimens or diagnostic studies.



Sample Case 2:

A
B
C
D

Case 10 of 16: Hand hygiene

Case 10, Question 1 of 2 in this case

? **5 year old male from the ER is brought to the department for xray of his right hip, knee, and ankle. When is it appropriate to wash your hands?**

- A Prior to interacting with the patient.
- B Before and after interacting with the patient.
- C After patient interaction.
- D Because you wear gloves, there is no need to wash hands.



Case 10, Question 2 of 2 in this case

? **What is the proper hand washing technique?**

- A Soap and water for at least 15 seconds.
- B Alcohol-based hand sanitizer.
- C Either A or B are appropriate.
- D None of the above.


Case 10 of 16: Hand hygiene

Case 10, Question 1 of 2 in this case

? **5 year old male from the ER is brought to the department for xray of his right hip, knee, and ankle. When is it appropriate to wash your hands?**

- A Prior to interacting with the patient.
- B Before and after interacting with the patient.

(Click/Drag to Move. Double-Click Panel to Close)

 **Correct, handwashing is recommended before and after patient interaction.** (Nice job! You gave the correct answer on the first try).

[Close Popup](#) || [All Scoring](#)



Case 10, Question 2 of 2 in this case

? **What is the proper hand washing technique?**

- A Soap and water for at least 15 seconds.
- B Alcohol-based hand sanitizer.
- C Either A or B are appropriate.
- D None of the above.

Case 10 Question 1 (Completed)

? **5 year old male from the ER is brought to the department for xray of his right hip, knee, and ankle. When is it appropriate to wash your hands? ✓**

- A Prior to interacting with the patient.
- *B* Before and after interacting with the patient.**
- C After patient interaction.
- D Because you wear gloves, there is no need to wash hands.



Case 10, Question 2 of 2 in this case

? **What is the proper hand washing technique?**

(Click/Drag to Move. Double-Click Panel to Close) X

✓ **Correct, either alcohol-based hand sanitizer or soap and water for at least 15 seconds are appropriate options.** (Nice job! You gave the correct answer on the first try).

[Close Popup](#) || [All Scoring](#)

Hand Hygiene:

1. CDC cited hand washing as single most effective way to prevent transmission of disease.
2. At a minimum, this practice should include all Centers for Disease Control and Prevention (CDC) guidelines:
 - a. Alcohol-based hand sanitizer: apply product to palm of one hand and rub hands together, covering all surfaces of hands and fingers, until hands are dry.
 - b. Soap and water: wet hands first with water, apply soap, and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water and dry thoroughly with a disposable towel. Use towel to turn off the faucet. Avoid using hot water, because repeated exposure to hot water may increase the risk of dermatitis.
 - c. Liquid, bar, leaflet or powdered forms of plain soap: acceptable when washing hands with a non-antimicrobial soap and water.
 - d. Multiple-use cloth towels of the hanging or roll type are not recommended for use in health-care settings.

Post Test Example:

Question 6 of 16 (Completed)

? 6. Which is the single best way to prevent influenza? ✓

- A Avoid contact with those with flu-like symptoms.
- B Droplet mask.
- C Handwashing.
- *D* Influenza vaccine.

Question 7 of 16 (Completed)

? 7. When caring for a patient who is on "contact isolation" for a multidrug-resistant organism, what is the proper use of contact precautions? ✓

- *A* Wear gown and gloves into the patient's room; prior to exiting the room, remove and dispose of contaminated items; wash hands.
- B Wear gown and gloves into the patient's room; immediately after exiting, remove and dispose of contaminated items; wash hands.
- C Wash hands upon entry into room; put on gown and gloves; immediately after exiting, remove and dispose of contaminated items.
- D Continually wear gown while caring for the patient, changing gloves and washing hands as you come in and out of the room.

Question 8 of 16 (Completed)

? 8. Regarding formal time-outs, which of the following is correct procedure? ✓

- *A* The patient and/or staff is to verify patient's full name, date of birth, planned procedure, and correct site of procedure prior to start of procedure.
- B The time-out is to ensure only that the procedure is being performed on the correct patient.
- C The time-out should be performed during the planned procedure.
- D Time-outs are optional and at the discretion of the physician.

Question 9 of 16 (Completed)

? 9. Which of the following is false regarding contrast media induced renal failure? ✓

- A Risk factors include renal insufficiency, diabetes, and dehydration.
- *B* Serum creatinine is a more reliable predictor of renal function than estimated glomerular filtration rate.
- C Normal serum creatinine concentrations are quite variable in the pediatric population.
- D Avoid repeating intravenous contrast dosing within 24 hours if the exam is not urgent.

Question 10 of 16 (Completed)

? 10. Please respond to the following with TRUE or FALSE.

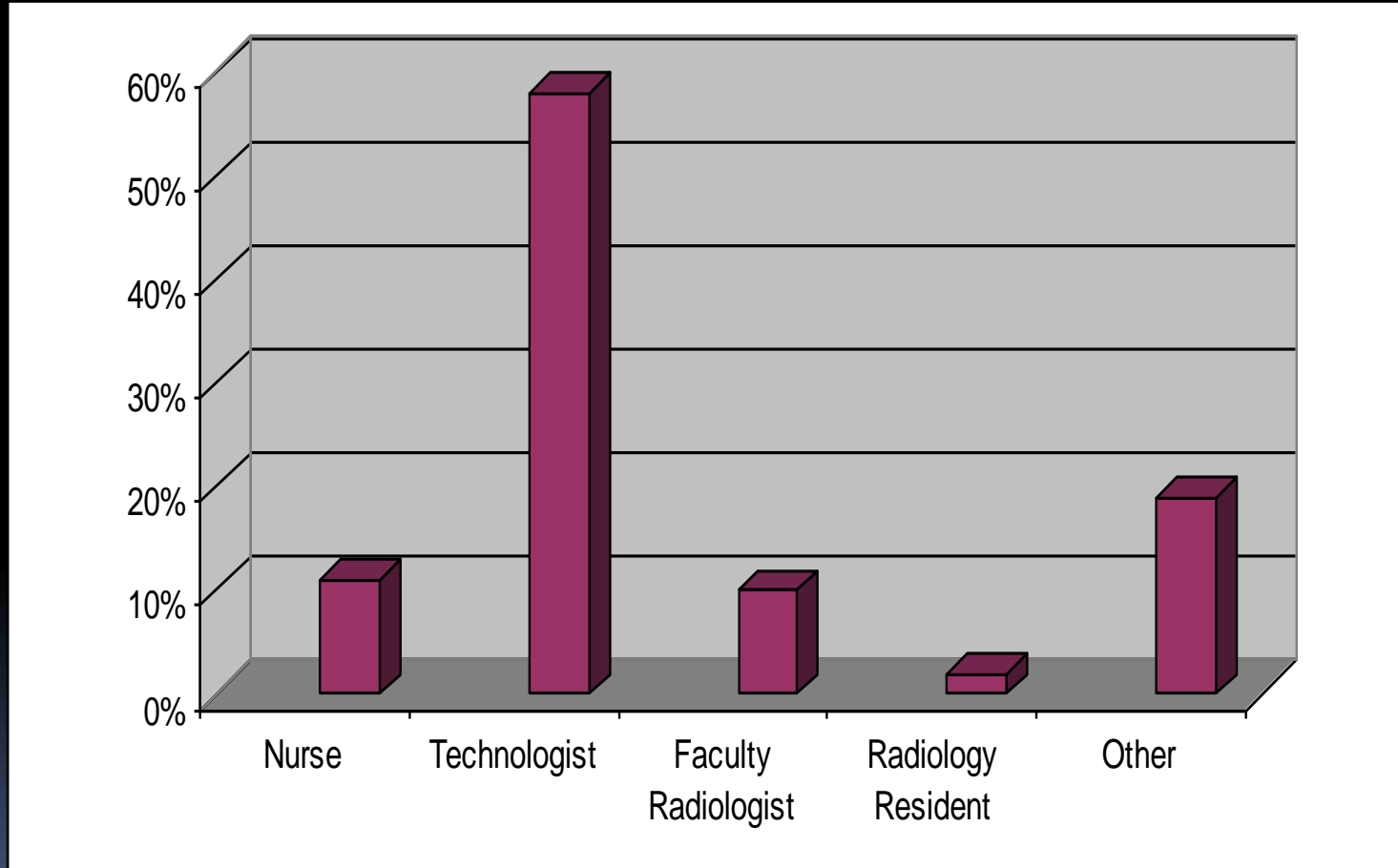
- T Most falls occur when patients try to get in and out of bed without assistance from hospital staff. ✓

This page is completed. Go to [Next Page](#).

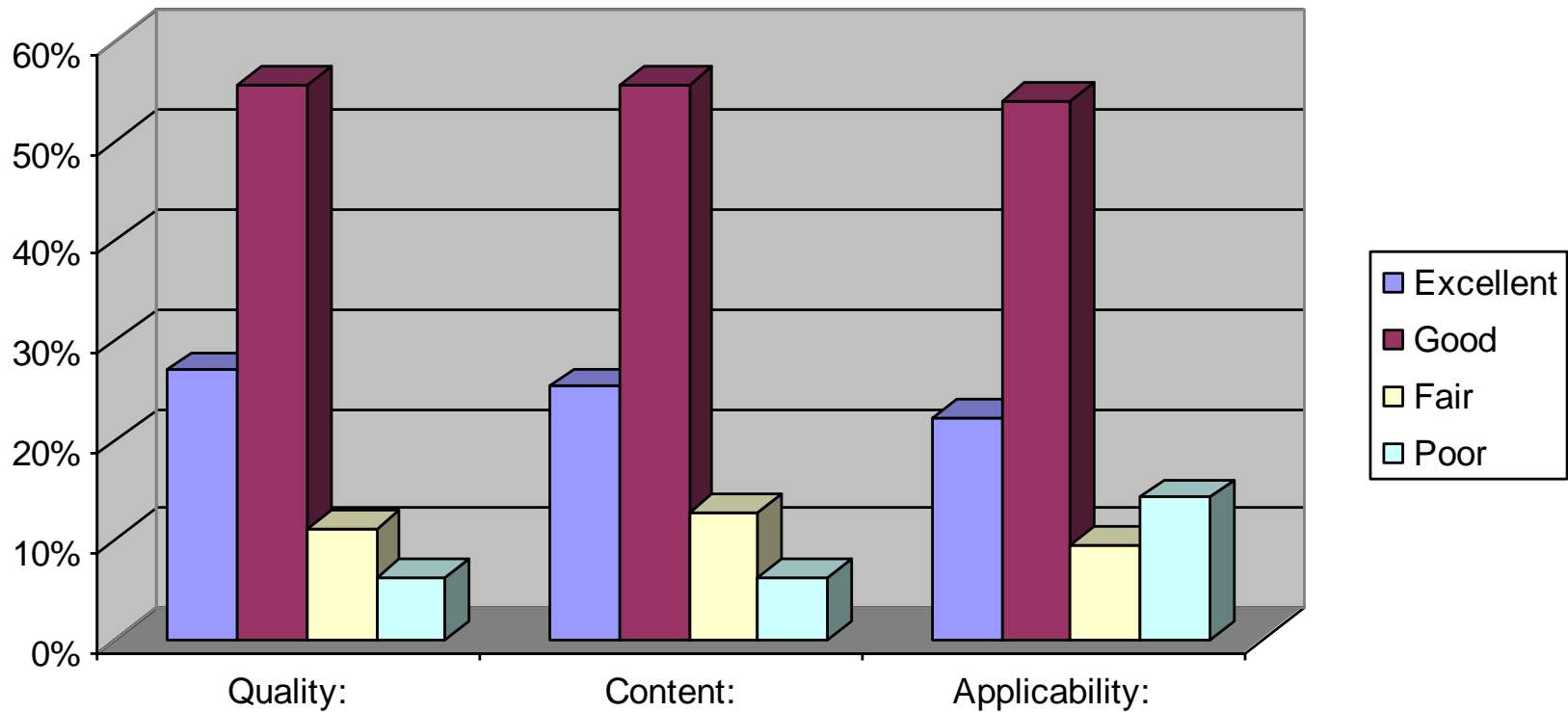
End of Study Survey Results

- Questions Posed:
 - Designate profession
 - Rate quality, content, and applicability
 - Did the module meet expectations?
 - Would you recommend this module to colleagues?
 - Will this module change your practice?
 - What did you like most/least?
 - Suggestions for improvement?

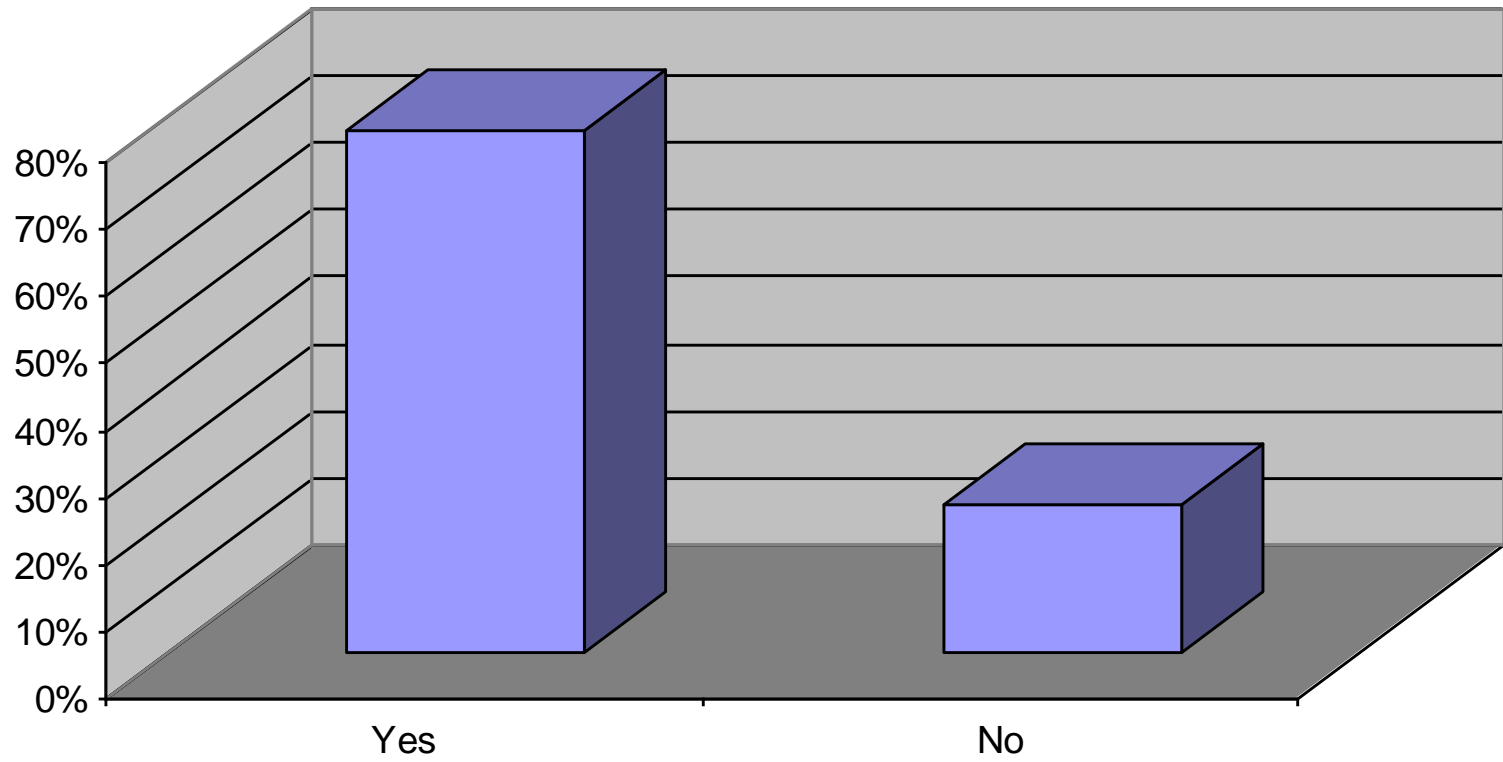
Respondents



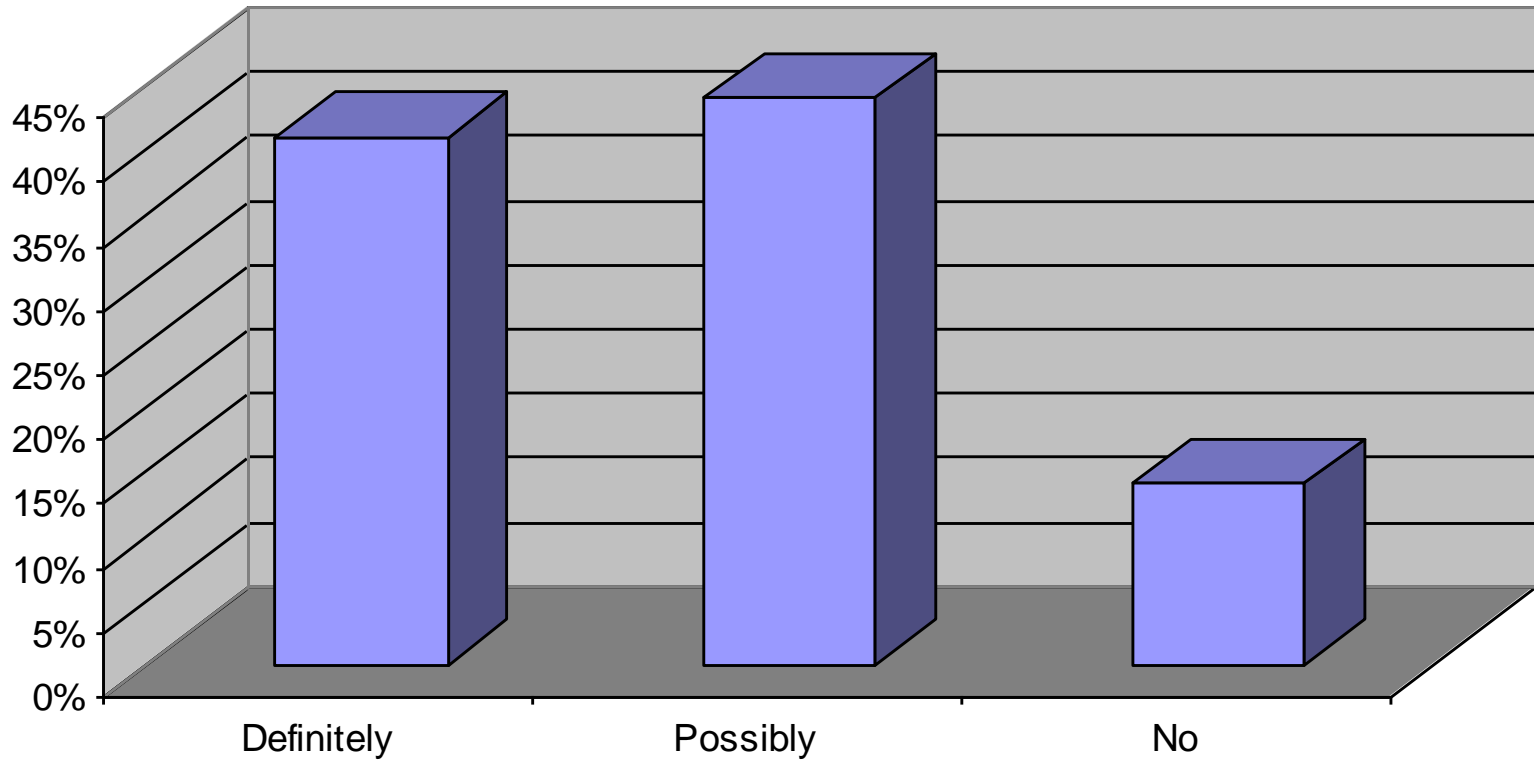
Rate Quality, Content, And Applicability



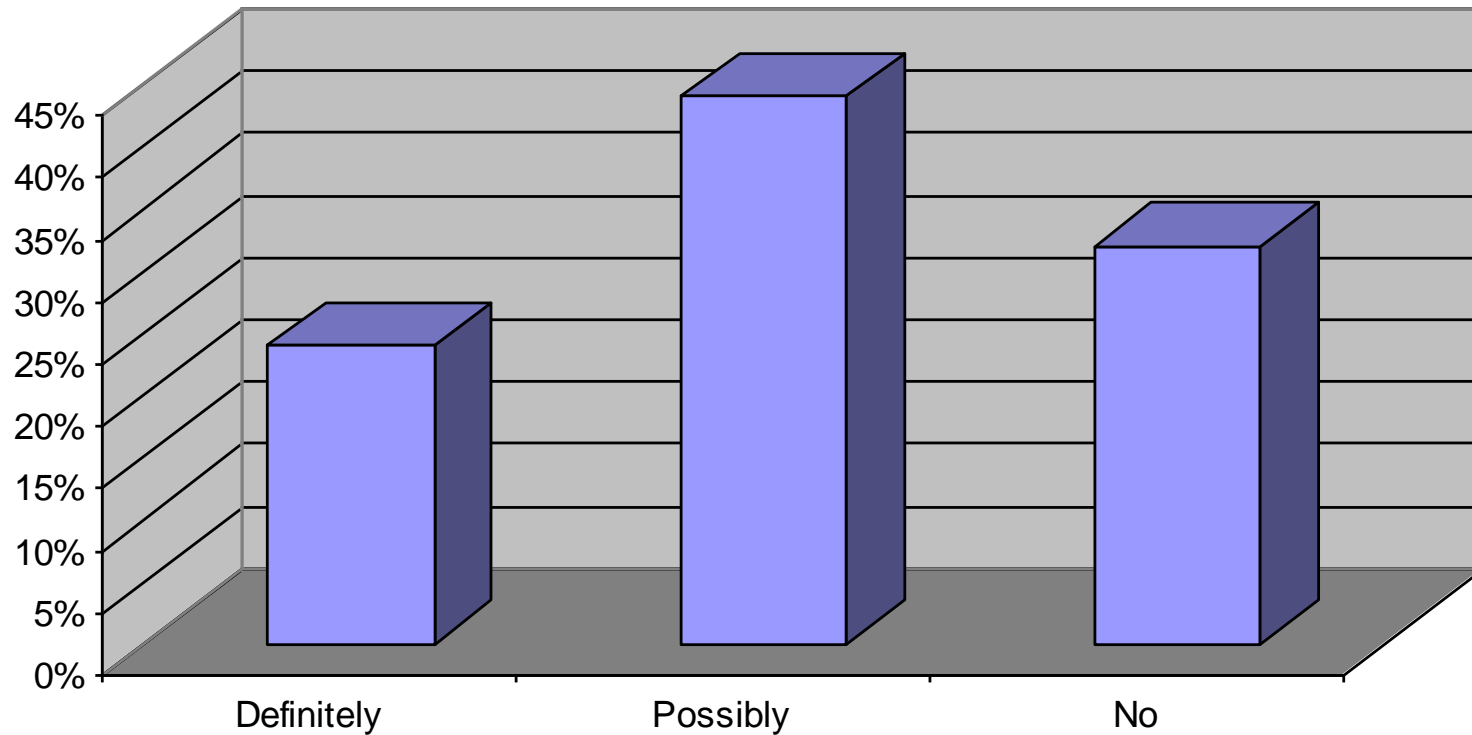
Meet Expectations



Would You Recommend This Module To Colleagues?



Will This Module Change Your Practice?



Open-end Responses

▪ Like most about module?

- Online
- Visual aids with the scenarios
- Immediate feedback
- Covered many different safety topics
- Interesting
- Taught me things I didn't know
- Think process involved
- Examples used happen frequently- program seemed very real

▪ Like least about module?

- Hard to navigate
- Had to do in one sitting
- Too lengthy
- Educational content should have been presented first then tested
- Some questions unclear
- Discrepancies in policies
- Not modality specific
- Content was not always in my field or training level

A Success: Next Steps

- Incorporating into new employee training
- New Direction
 - Generalize to all professions and practices within radiology with the addition of more safety goals
- In the Future
 - Specify modules to profession and particular practices:
 - Physician, Technologist, etc.
 - Ultrasound, Interventional Radiology, etc.

References

- http://books.nap.edu/html/to_err_is_human/reportbrief.pdf. Institute of Medicine, November 1999.
- Donnelly LF, Dickerson JM, Goodfriend MA, Muething SE. Improving Patient Safety: Effects of a Safety Program on Performance and Culture in a Department of Radiology. *AJR*: 193, 165-171, July 2009.
- Frush KS, Alton M, Frush DP. Development and implementation of a hospital-based safety program. *Pediatric Radiol* 2006; 36:291-298.
- Delaney LR, Gunderman RB. Hand Hygiene. *Radiology* 2008; 246:15-19.
- http://www.mrisafety.com/safety_article.asp?subject=170. MRIsafety.com. 2009/2010 by Shellock R & D Services, Inc. and Frank G. Shellock, Ph.D.
- <http://www.jointcommission.org/patientsafety/nationalpatientsafetygoals/>. The Joint Commission. 2010 National Patient Safety Goals.
- <http://www.mrc.wayne.edu/safety.htm#part3>. Copyright 2007. MR Research Facility.
- <http://www.ahrq.gov/qual/hospbuilt/hospenv2.htm>. Agency for Healthcare Research and Quality. U.S. Department of Health & Human Services.
- <http://www.cdc.gov/flu/about/disease/symptoms.htm>. Centers for Disease Control and Prevention.
- <http://www.chop.edu/>. The Children's Hospital of Philadelphia.
- <http://www.hpireresults.com/files/PatientSafetyMeasurementSystem.pdf>. The HPI SEC & SSER Patient Safety Measurement System for Healthcare. Published by Healthcare Performance Improvement, LLC. Revision 1-Dec 2009.
- http://www.radiologyinfo.org/en/safety/index.cfm?pg=sfty_xray#part3. RadiologyInfo.org. Copyright 2010 Radiological Society of North America, Inc.
- Brody AS, Frush DP, Huda W, Brent RL and the Section on Radiology. Radiation Risk to Children From Computed Tomography. *Pediatrics* 2007;120;677-682. DOI: 10.1542/peds.2007-1910.
- http://www.acr.org/SecondaryMainMenuCategories/quality_safety/contrast_manual/Children.aspx. 2004-2010 American College of Radiology.
- http://www.acr.org/SecondaryMainMenuCategories/quality_safety/contrast_manual/Nephrotoxicity.aspx. 2004-2010 American College of Radiology.