



MARSHALL UNIVERSITY SURGERY RESIDENT RADIATION SAFETY

Ruth P. Gerola, MD, Jenalee Corsello, MD, Jordyn Thiel, MD,
Jessica Hale, MD, Andrew Weaver, MD, David Denning, MD

Financial Disclaimer



■ None

Background



- Radiation exposure in the form of ionizing radiation leads to cellular damage via the induction of DNA lesions and production of reactive oxygen species
- Lifetime exposure of 1Sv increases the cancer risk by 10% and cancer mortality by 5%

Background



- Reduce **TIME** of exposure
- Increase **DISTANCE** from the source
 - *Keep at least 10 ft from the source of radiation*
- Use **SHIELDING**
 - *Lead aprons of at least 3-5mm provide up to 90% shielding*
 - *Thyroid/eye shielding during fluoroscopy*
 - *Lead glove of at least 5 mm if hands are likely to be in the beam*
 - *Lead glass/acrylic for windows, lead sheets on the doors, brick walls*
 - *Do not direct primary beam at the windows/doors*
- **DOSE** reduction
 - *Pulsed and low-dosed mode decrease average radiation exposure time by 56%*

Background



Surg Endosc. 2009 Aug;23(8):1845-8. doi: 10.1007/s00464-008-0279-0. Epub 2009 Jan 1.

Radiation exposure during laparoscopic cholecystectomy with routine intraoperative cholangiography.

Karthikesalingam A¹, Markar SR, Weerakkody R, Walsh SR, Carroll N, Praseedom RK.

World J Gastroenterol. 2015 Feb 14; 21(6): 1900–1906.

PMCID: PMC4323469

Published online 2015 Feb 14. doi: [10.3748/wjg.v21.i6.1900](https://doi.org/10.3748/wjg.v21.i6.1900)

PMID: [25684958](https://pubmed.ncbi.nlm.nih.gov/25684958/)

Measures of patient radiation exposure during endoscopic retrograde cholangiography: Beyond fluoroscopy time

Toufic Kachaamy, Edwyn Harrison, Rahul Pannala, William Pavlicek, Michael D Crowell, and Douglas O Faigel

Background



- MU General Surgery residents participate in cases using fluoroscopy
- MU General Surgery residents do not have dosimeters
- MU General Surgery residents do not have formal education on radiation safety

Purpose



- To determine how much knowledge and radiation exposure general surgery residents have at Marshall University
- Determine areas of improvement regarding radiation safety
- To increase overall radiation safety

Method



- Hospital database search number of cases: angiograms and cholecystectomy with intraoperative cholangiograms from January 2016-December 2018
- 8 item questionnaire given to 20 MU general surgery residents (4 residents were excluded) prior/after presentation of radiation safety
 - *determine basic knowledge of general surgery residents*
 - *rate of compliance*
 - *barriers of compliance to standard radiation safety measures*

Results



- 357 mediport insertions under fluoroscopy
- 125 angiograms
- Average of 82 cholecystectomy with IOC

Results



- 90% of the participants did not have formal education on radiation exposure
- 70% are concerned about the amount of radiation exposure at work

Results: Prior to education

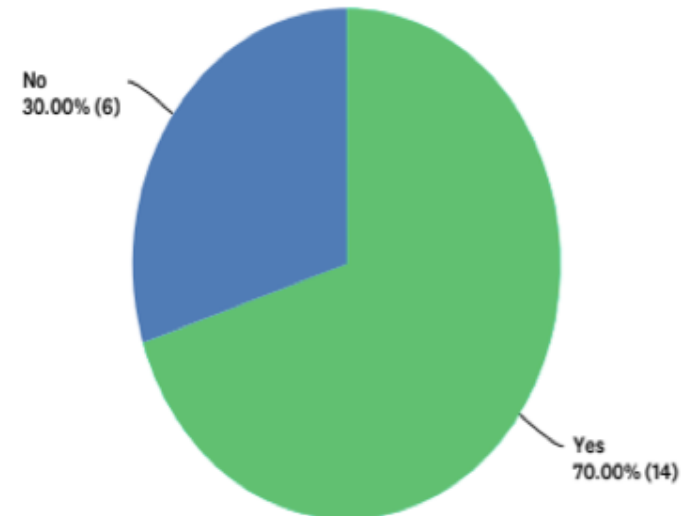


Q3 Have you ever had any formal education on radiation exposure? Q4 Are you concerned about the amount of radiation exposure you get at work?

Answered: 20 Skipped: 0



Answered: 20 Skipped: 0

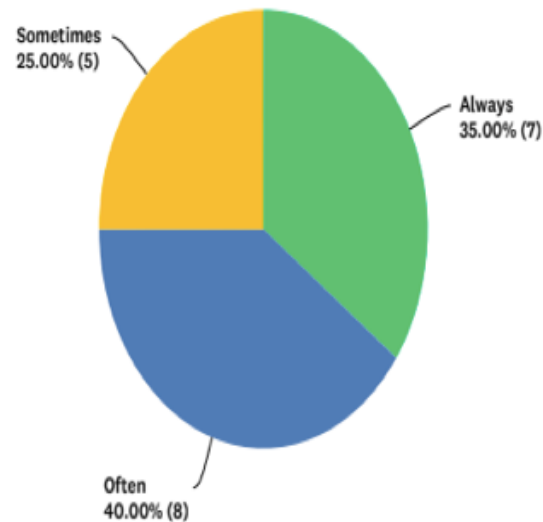


Results: Prior to education



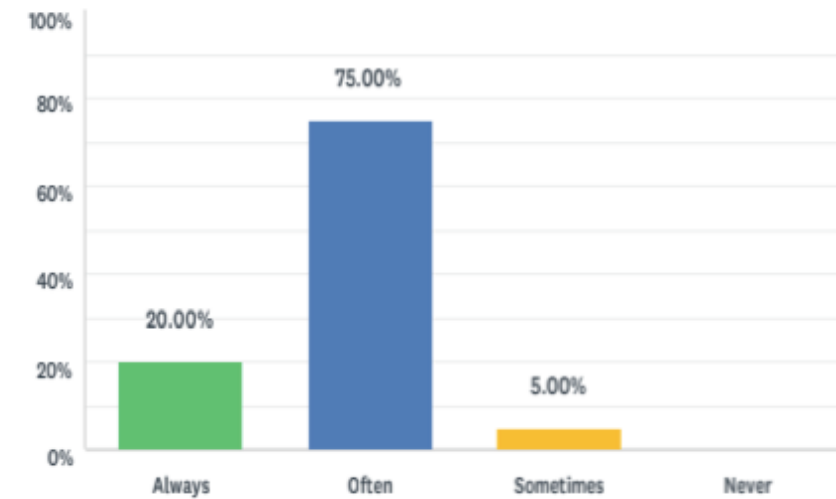
Q13 How often do you wear lead apron during cases that use Xrays and Fluoroscopy?

Answered: 20 Skipped: 0



Q15 How often do you see other hospital employees wear lead apron during a case with fluoroscopy?

Answered: 20 Skipped: 0

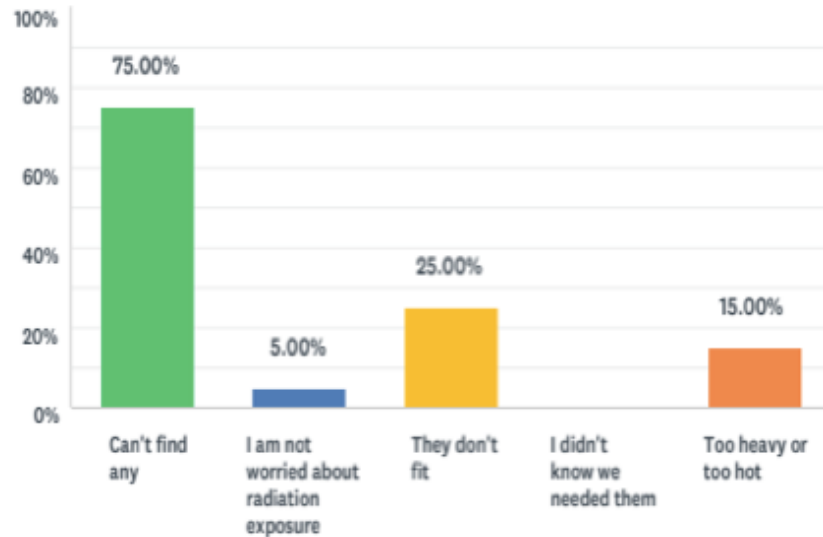


Results: After education



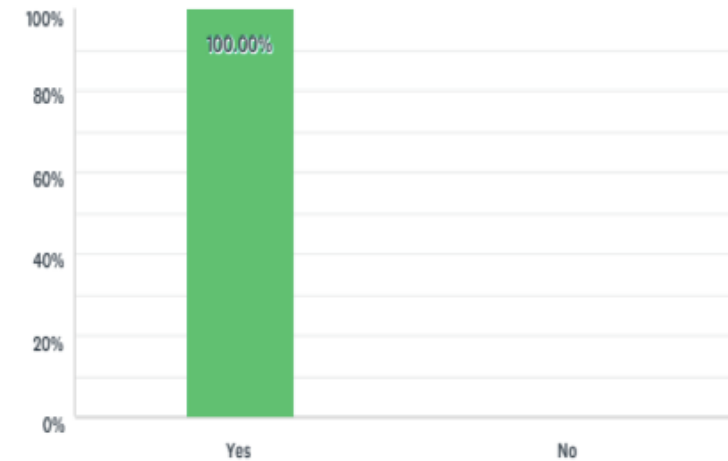
Q14 What are some of the barriers from using lead aprons?

Answered: 20 Skipped: 0



Q14 Are you more likely to use lead aprons if you had your personal lead aprons that fit and maintained regularly?

Answered: 20 Skipped: 0



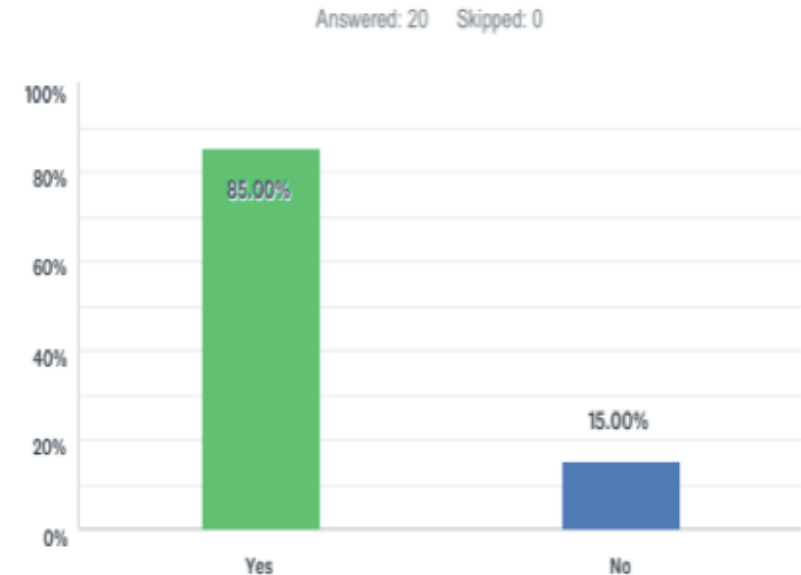
Results: After education



Q11 Are you more likely to observe dose reduction precautions such as keeping distance, reducing fluoroscopy time, and wearing lead aprons?



Q13 If you were given a dosimeter/film badge, would you wear it?



Results



- Average of 54% correct on 8 basic knowledge questions regarding radiation safety
- Improved to 91% correct after education

Conclusion



- Lack of basic knowledge on the effects and level of exposure to radiation at our institution
- Likely due to the lack of formal education on this issue
- No consistent use of radiation reduction principles
- Need availability of shielding equipment in the operative areas including the trauma bays
- MU General Surgery residents need monitoring badges

Questions?



Thank you!



**Marshall University General Surgery
Residency Class of 2022**