

PICOT Question

In post-anesthesia care unit (PACU) nurses with exposure to radiation, does education on radiation safety versus MedStar Georgetown University Hospital (MGUH) current practice increase nurses' confidence in safe radiation practices as determined by a self-reporting survey?

Objectives

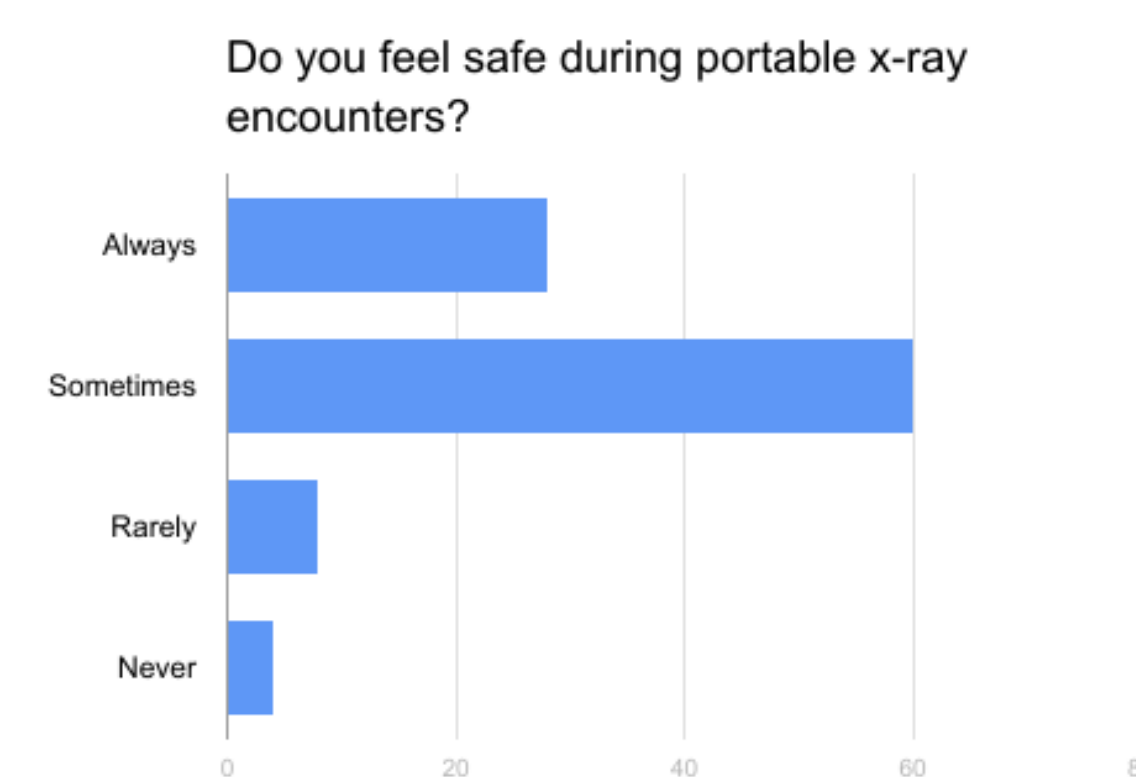
- Identify radiation safety guidelines to keep exposure as low as reasonably achievable (ALARA)
- Use evidence including survey results and research articles to justify refining educational resources for PACU staff

Introduction/Background

- According to the survey given to PACU nurses, there is a lack of knowledge on safe radiation protocol
- In the survey, nurses responded feeling unsafe towards portable x-ray encounters
- Education is critical to nurses working safely and professionally in their role
- Per reporting survey PACU nurses encounter portable x-ray radiation exposure often exceeding 7 times per shift
- Many nurses are of childbearing age and have concerns about their personal health and safety
- Nursing staff have expressed difficulty in finding educational resources regarding radiation safety

Methods

- 8 articles were chosen from 16 articles that were found using CINAHL, MedLine, and PubMed databases
- Those 8 articles had levels of evidence ranging from I to VII and strengths from very low to high
- Key words used: "portable x-ray," "radiation," "safety," "nursing," "perioperative nursing," "exposure," "ALARA," "ionizing radiation"
- Limitation on research: articles within 2010-present time period
- Self-reporting survey sent to 55 PACU RNs; 26 responses



Results

- Analyzed research articles with level of evidence (see table below) as well as comparison of current practice with current research

Study Citation	Level of Evidence	Strength
Chianga et al., 2015	III	Moderate
Ganapathy, Adhikari, Spiegelman, & Scales, 2012	I	High
Johnston, Killion, Veale, & Comello 2011	VI	Low
Kim et al, 2016	IV	Moderate
Phillips & Monaghan, 2011	VII	High
Richardson, 2010	V	Moderate
Watts, 2016	VI	Very low
Xie, Liao, Kang, Zhang, and Jia, 2016	II	Moderate

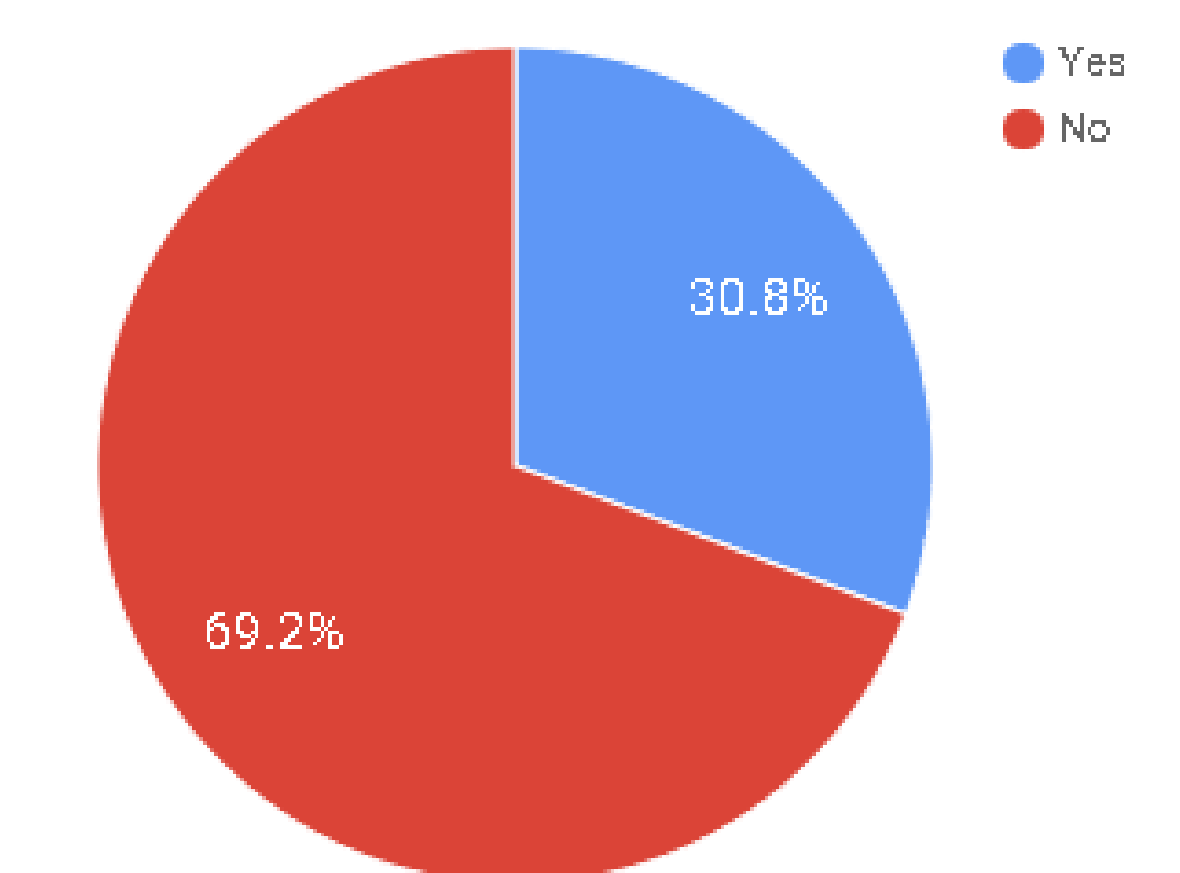
Discussion

- There is no evidence necessitating a change in radiation safety policy at MGUH
- There is sufficient evidence for the need of easily accessible educational resources on radiation safety due to staff concerns shown in survey
- Low doses of ionizing radiation do not impair fertility (Phillips & Monaghan, 2011)
- Standing two meters (approximately 6.5 feet) away from the central exposure is a safe distance according to the principal of keeping radiation exposure as low as reasonably achievable (Chianga et al, 2015)
- Tripling one's distance from x-ray source decreases exposure to 1/9 of original dose, following the ALARA principle. The ALARA principle involves maximizing distance from source, minimizing time around source, and utilizing radiation shielding equipment (Phillips, & Monaghan, 2011)
- Limitations include a lack of data regarding amount of radiation exposure specifically in PACU staff, small sample size for the survey, and embedded fear of cancer and/or infertility risk

Next Steps

- Edit the hospital-wide computer training module required for PACU nursing staff to include specifics on portable x-ray radiation safety
- Include education in required PACU nurse-specific class
- Follow-up survey to evaluate PACU nurses' improved understanding on radiation safety

Do you know where to find MGUH portable x-ray protocol?



References

Chianga, H. W., Liu, Y. L., Chend, T. R., Chena, C. L., Chianga, H. J., & Chao, S. Y. (2015). Scattered radiation doses absorbed by technicians at different distances from x-ray exposure: Experiments on prosthesis. *Bio-Medical Materials and Engineering*, 26(2015) S1641-S1650. DOI 10.3233/BME-151463

Ganapathy, A., Adhikari, N., Spiegelman, J., & Scales, D. (2012). Routine chest x-rays in intensive care units: a systematic review and meta-analysis. *Critical Care* 16:R68. doi:10.1186/cc11321

Johnston, J., Killion, J. B., Veale, B., & Comello, R. (2011). U.S. Technologists' Radiation Exposure Perceptions and Practices. *Radiologic Technology*

Kim, J., Yoon, Y., Seo, D., Kwon, S., Shim, J., & Kim, J. (2016). Real-Time Patient Radiation Dose Monitoring System Used in a Large University Hospital. *Journal of Digital Imaging*, 29(5), 627-634. doi:10.1007/s10278-016-9880-2

Phillips, G., & Monaghan, W. P. (2011). Radiation Safety for Anesthesia Providers. *AANA Journal*, 79(3)

Richardson, L. (2010). Radiation exposure and diagnostic imaging. *Journal of the American Academy of Nurse Practitioners*, 22(4), 178-185. doi:10.1111/j.1745-7599.2010.00494.x

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Xie, Z., Liao, X., Kang, Y., Zhang, J., & Jia, L. (2016). Radiation exposure to staff in intensive care unit with portable CT scanner. *BioMed Research International*, 2016. <http://dx.doi.org/10.1155/2016/5656480>