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## Introduction

In the past few years, medical radiation risk awareness has significantly increased for both adults and children including neonates [1]. Diagnostic x-ray utilizing ionizing radiation is done regularly to critically ill infants in NICU where incubators are usually kept close to each other with no fixed distance in-between, which can result in a significant radiation dose to some neonates [2]. The application of ALARA and inverse square law is mandatory to reduce backscattered radiation. [3].

## Objective

To measure the backscattered radiation reaching an adjacent neonate during a radiographic procedure at different distances in a NICU of the University Hospital Sharjah.

## Materials and methods

- 1- Portable x-ray machine
- 2- SVLD probe
- 3- RadEye G probe
- 4- Incubator

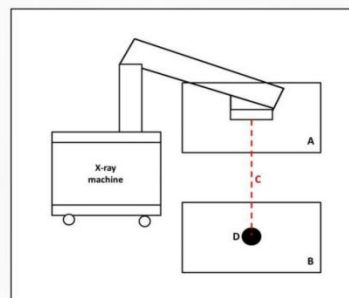


Fig 1: Demonstrates the experiment: (A) incubator under examination, (B) adjacent incubator receiving scattered radiation, (C) distance between the center of the x-ray tube to the center of the adjacent incubator, (D) Dose rate probe.

## Results

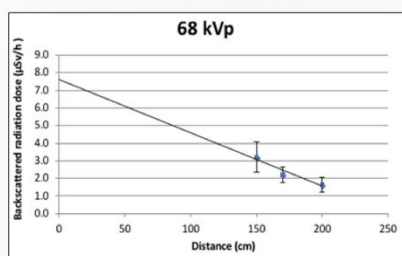


Fig 2: A strong negative correlation between backscattered radiation generated with 68 kVp and distance ( $r = -0.9621$ ) using Pearson coefficient correlation.

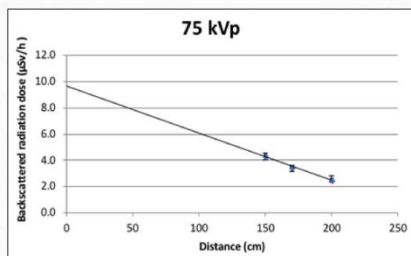


Fig 3: A strong negative correlation between backscattered radiation generated with 68 kVp and distance ( $r = -0.9964$ ) using Pearson coefficient correlation.

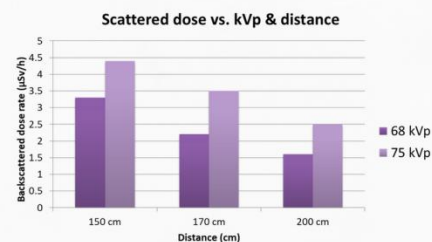


Fig 4: Demonstrate a significant statistical difference ( $p < 0.05$ ) using t-test between scattered dose rate and distance using 68 & 75 kVp.

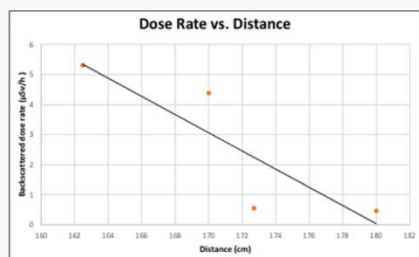


Fig 5: A strong negative correlation between backscattered radiation generated with different distance ( $r = -0.8394$ ) using Pearson coefficient correlation.

## Conclusion

Backscattered radiation decreases with increasing the distance from the primary X-ray beam. Further, backscattered radiation seems to increase with increasing the operating kVp.

## Acknowledgment

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## Selected references

- [1] Charles et al. (2005). American journal of roentgenology, 184:373-374.
- [2] Cheng-Chung et al. (2010). Elsevier, 51(6):311-319.
- [3] Fazel et al. (2009). N Eng J Med, 361:849-857.