PROCESS IMPROVEMENT: HOW CAN WE REDUCE RADIATION EXPOSURE TO THE FEMALE BREAST DURING ROUTINE CT EXAMINATIONS OF THE ABDOMEN AND PELVIS?

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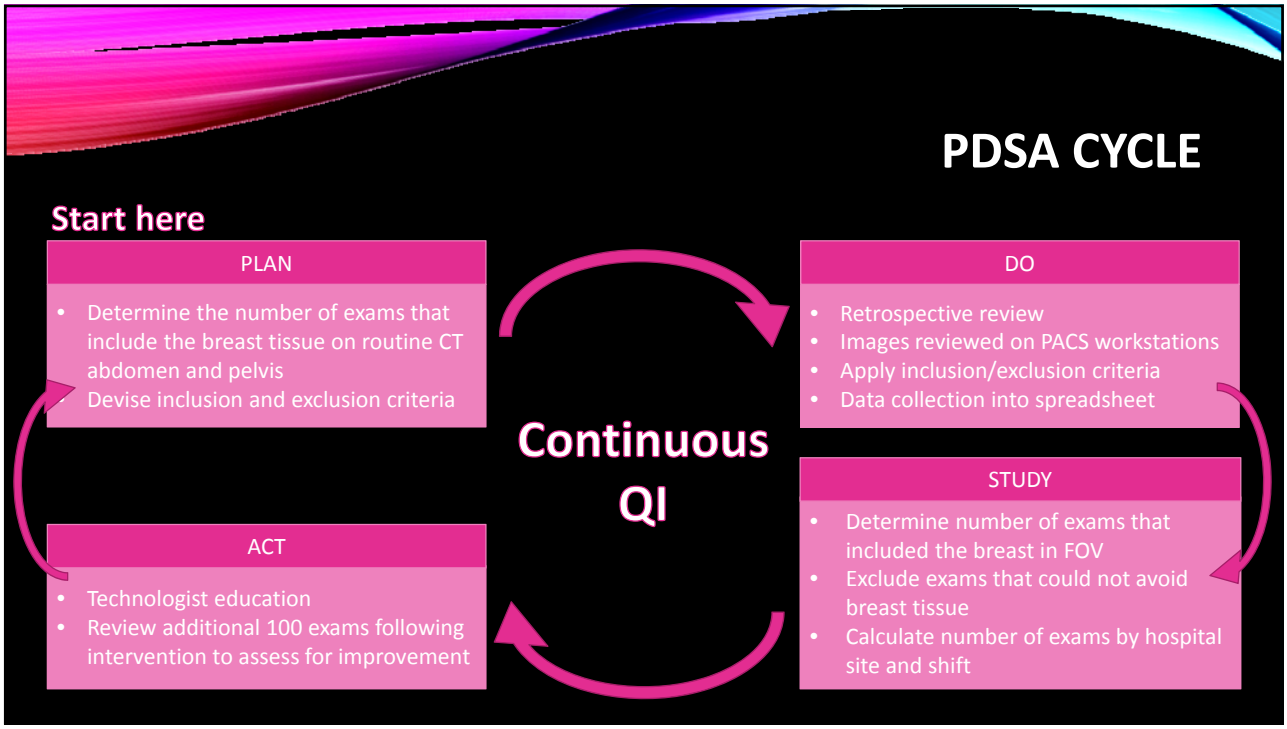
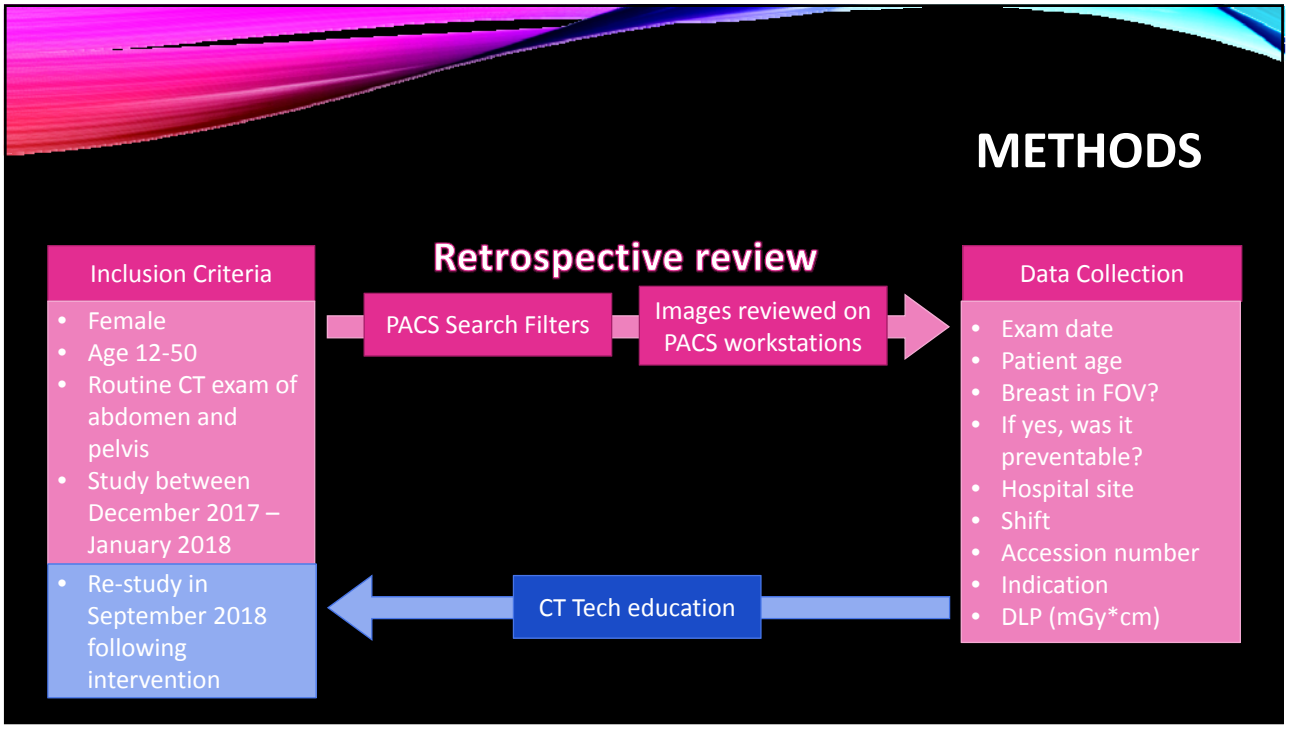
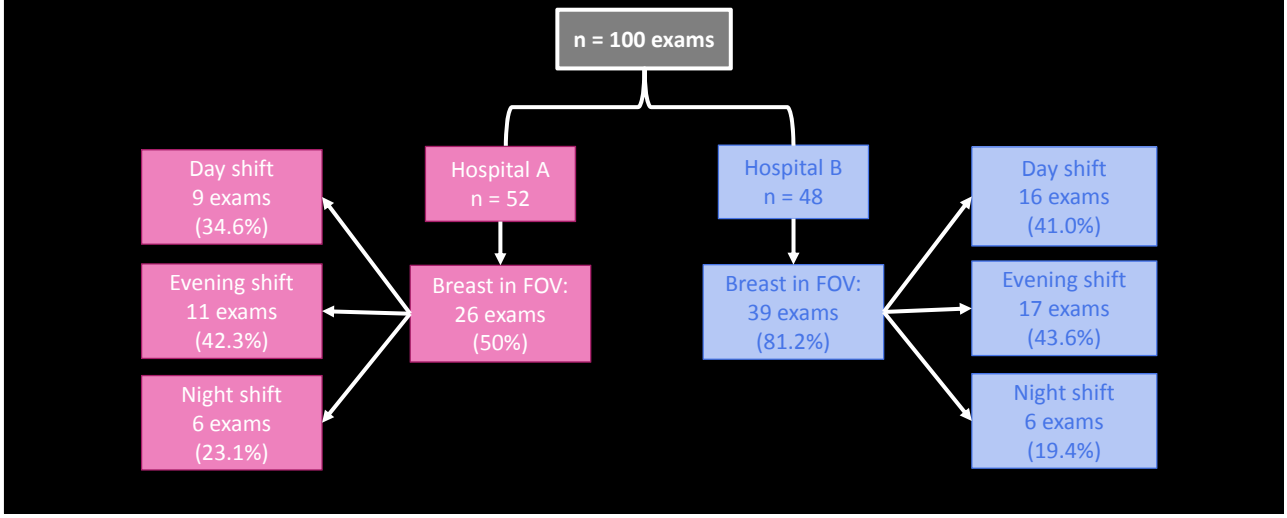
PURPOSE

- To determine the number of examinations that included breast tissue on routine CT abdomen and pelvis examinations for quality improvement purposes.
- The scan range of a standard CT exam of the abdomen and pelvis extends from the **dome of the diaphragm to below the ischial tuberosities**.
  - However, this varies by technologist and the lower chest may be included in the examination.
  - This poses a problem, as glandular breast tissue is particularly sensitive to the effects of ionizing radiation.
- As proponents of ALARA, we must **ensure the CT tomogram is used to reduce scanning coverage**, thereby resulting in CT dose reduction, especially to the radiosensitive breast.

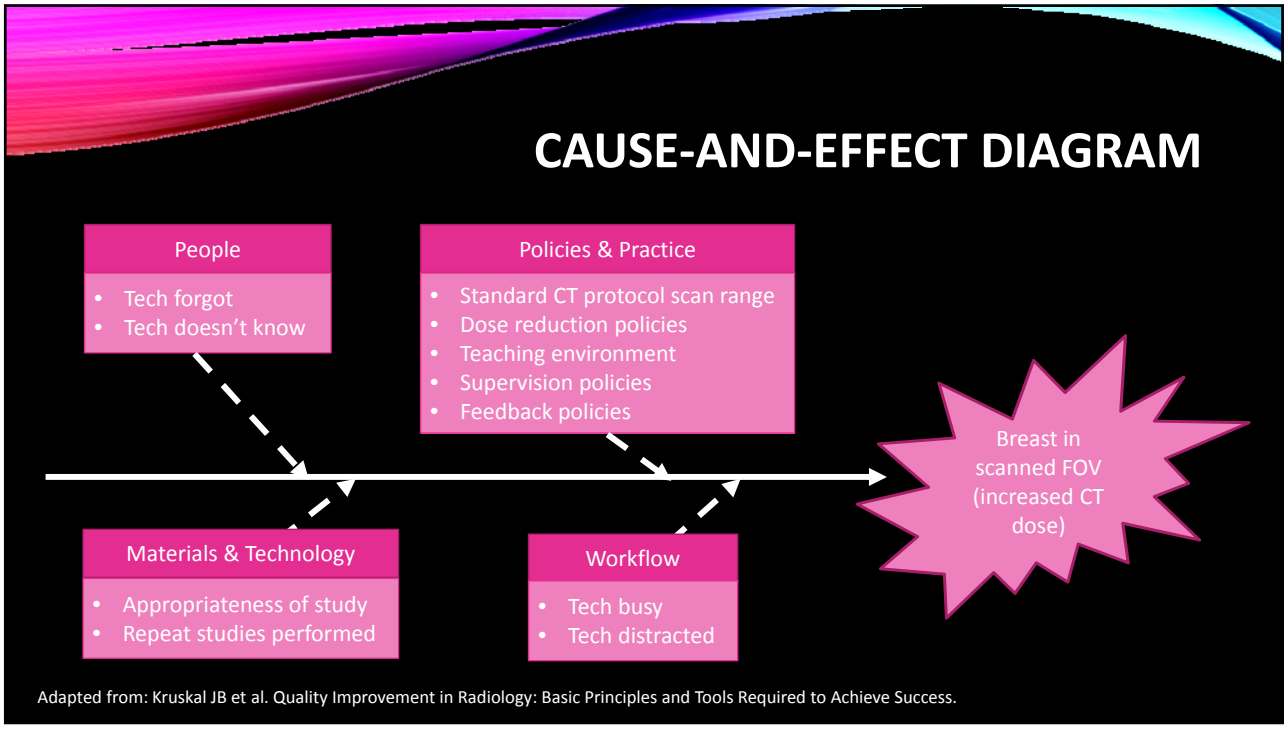

PDSA CYCLE
Start here
PLAN
Determine the number of exams that include the breast tissue on routine CT abdomen and pelvis
Devise inclusion and exclusion criteria
DO
Retrospective review
Images reviewed on PACS workstations
Apply inclusion/exclusion criteria
Data collection into spreadsheet
Continuous QI
STUDY
Determine number of exams that included the breast in FOV
Exclude exams that could not avoid breast tissue
Calculate number of exams by hospital site and shift
ACT
Technologist education
Review additional 100 exams following intervention to assess for improvement


METHODS
Retrospective review
Inclusion Criteria
Female
Age 12-50
Routine CT exam of abdomen and pelvis
Study between December 2017 – January 2018
Re-study in September 2018 following intervention
PACS Search Filters
Images reviewed on PACS workstations
Data Collection
Exam date
Patient age
Breast in FOV?
If yes, was it preventable?
Hospital site
Shift
Accession number
Indication
DLP (mGy*cm)
CT Tech education

RESULTS, PART 1

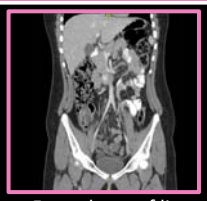
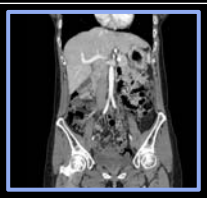


CAUSE-AND-EFFECT DIAGRAM

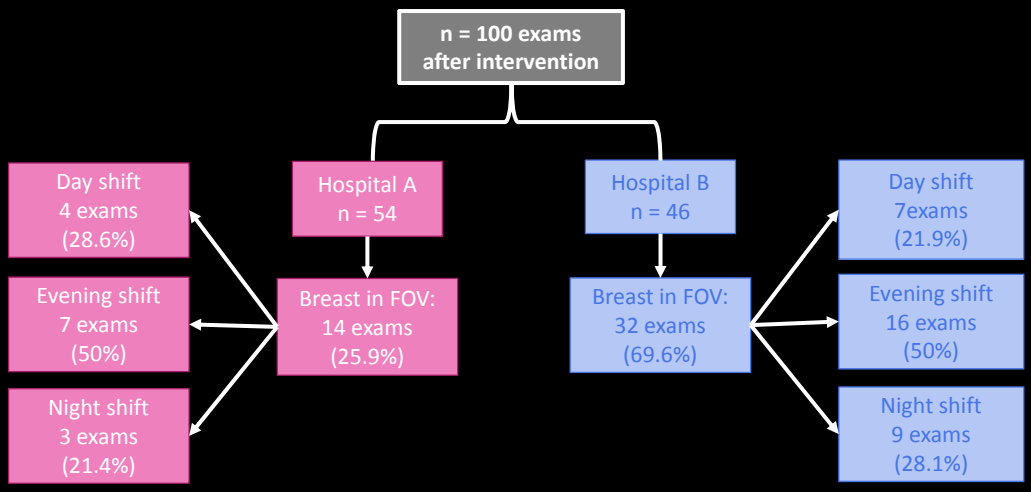


Adapted from: Kruskal JB et al. Quality Improvement in Radiology: Basic Principles and Tools Required to Achieve Success.

TECHNOLOGIST EDUCATION: COLLIMATION EXAMPLES

Collimation	Topogram	Coronal plane	Axial plane
Adequate		 From dome of liver	 Minimal breast tissue in FOV
Inadequate		 Includes too much of lower chest	 Excessive breast tissue in FOV

RESULTS, PART 2



CONCLUSION

- From our preliminary data, CT technologists overnight did better at scan collimation than their counterparts during the day and evening shifts.
- Following technologist education, there was an overall decrease in cases including the breasts within the FOV at both hospitals.

	Hospital A	Hospital B
Prior to intervention	26 (50%)	39 (81.2%)
Following intervention	14 (25.9%)	32 (69.6%)
% change	46.1%	17.9%

- In conclusion, the principles of ALARA, continuous QI, technologist education and routine surveillance can help to decrease radiation dose to the female breast.

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