Session 2: The Role of Specialist Radiology Technologists

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Overview

- Role of the technologist
- American Registry of Radiologic Technologists
- Mammography technologist training, education, certification
- Technologist impact on mammography performance
  - Pre- or second- readers
  - Impact on radiologists
- Summary / Next Steps

Background / Role of Technologists

- Over 38 million mammograms performed annually at MQSA accredited facilities
  - Interpreted by radiologists
  - Performed by mammography technologists
    - Responsible for quality of image
      - Correct positioning
      - Sufficient compression
      - Image sharpness
- Often the technologist is the sole point of contact for the patient during her breast screening experience
- Radiologic technologists are the 3rd largest category of healthcare professionals in the U.S.

American Registry of Radiologic Technologists (ARRT)

- Test, certify, and register >250K radiologic technologists to promote high standards of patient care
- Award the Registered Technologist (RT) designation
- Ensure continuing education
- Require annual registration of ARRT certificate
- Certification is voluntary
  - Employers, state licensing agencies and federal regulators view ARRT credentials as a plus

Source: https://www.arrt.org/

ARRT Mammography Certification

- Education requirements
  - Complete 25 supervised mammography exams
  - Perform another 75 mammography exams focusing on patient preparation/education, mammographic procedure
  - Participate in the performance, evaluation and recording of all quality control tests
  - Review ≥10 mammography exams with a MQSA qualified interpreting physician to evaluate radiographic technique, positioning, breast anatomy & pathology
  - Observe, assist with or participate in ≥4 of the following: needle localization, breast MRI, breast US (imaging, biopsy or FNA), stereotactic procedure, breast implant imaging, ductography, or diagnostic work-up
- Ethics requirements
  - "be a person of good moral character and must not have engaged in conduct that is inconsistent with the ARRT Rules of Ethics"
- Pass examination

Technologist Certification vs. Licensing

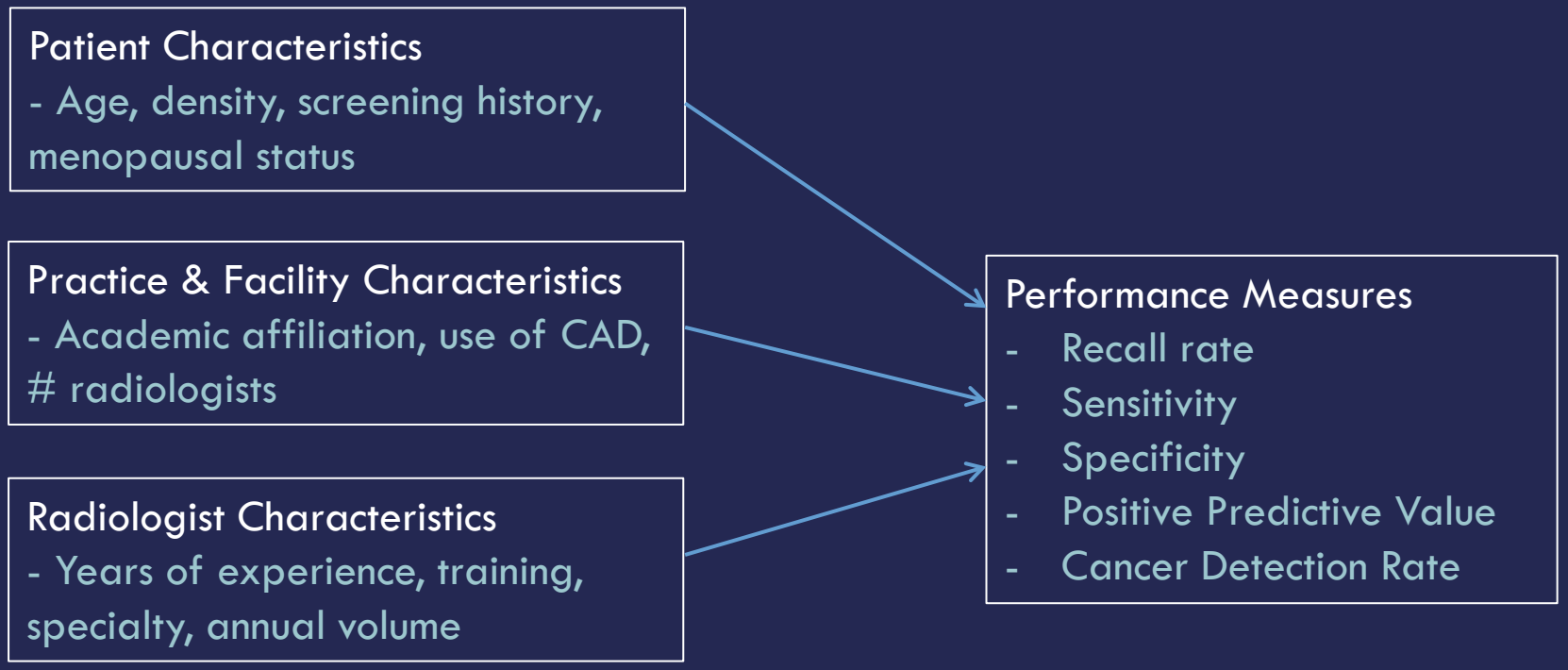
- Certification by ARRT indicates technologist has met initial eligibility requirements and maintains credentials by renewing annually and reporting CE credits every 2 years
- Licensing refers to state laws
  - Each state is the authority that administers the license and grants an individual permission to practice radiologic technology within that state
- 35 states use ARRT exam scores in licensing decisions

FDA/MQSA - Radiologic Technologist Mammography Specific Training

- Hold state licensure and/or certification from FDA approved certifying agency
- Completed ≥40 contact hours of documented training specific to mammography under the supervision of a qualified instructor
  - Training in breast anatomy and physiology, positioning and compression, quality assurance/quality control techniques, imaging of patients with breast implants
  - Perform ≥ 25 examinations under direct supervision
  - Have ≥ 8 hours of training in each mammography modality to be used
- Minimum volume of 200 mammograms performed in 24 months prior to facility's annual MQSA inspection

How could technologists impact mammography performance?

Technologists' Impact on Mammography Performance: Conceptual Framework



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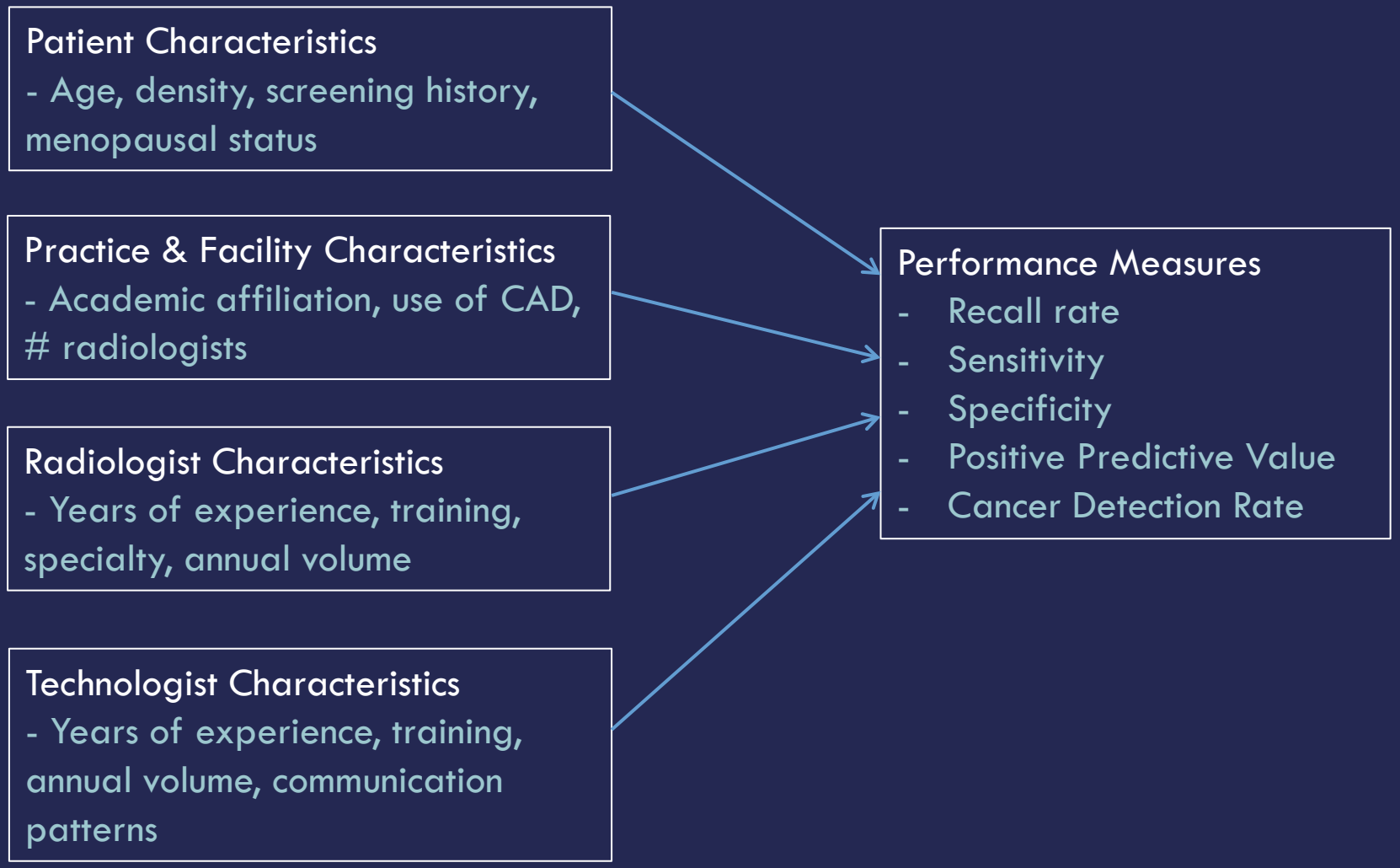

Mammography Technologists as Pre- or Double- Readers

- Majority of studies conducted in Europe where recall rates are lower than in the US

- Technologists as pre- or double- readers for screening mammograms led to increased cancer detection rates without significantly increased recall or false positive rates

Impact of mammography technologist on radiologists' interpretative performance

- Possible that radiologists' ability to interpret mammograms is affected by technologists
  - Interface between the radiologist and technologist
  - Ability of technologist to obtain high quality image
    - positioning, compression, sharpness
- Two studies assessed if mammographic technologists influenced radiologists' performance
  - Film versus digital
  - Screening and diagnostic mammography

Henderson LM et al. *AJR* 2015 Apr;204(4):903-8.
Henderson LM et al. *Acad Radiol* 2015 Mar;22(3):278-89.

Results: Technologists impact on radiologist performance

- Utilized data from North Carolina from 1994-2009
- 1,003,276 screening mammograms
  - 394 technologists
  - 372 radiologists
  - 4,892 cancers
- 162,755 diagnostic mammograms
  - 303 technologists
  - 286 radiologists
  - 5,554 cancers

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Screening Mammography: Sensitivity

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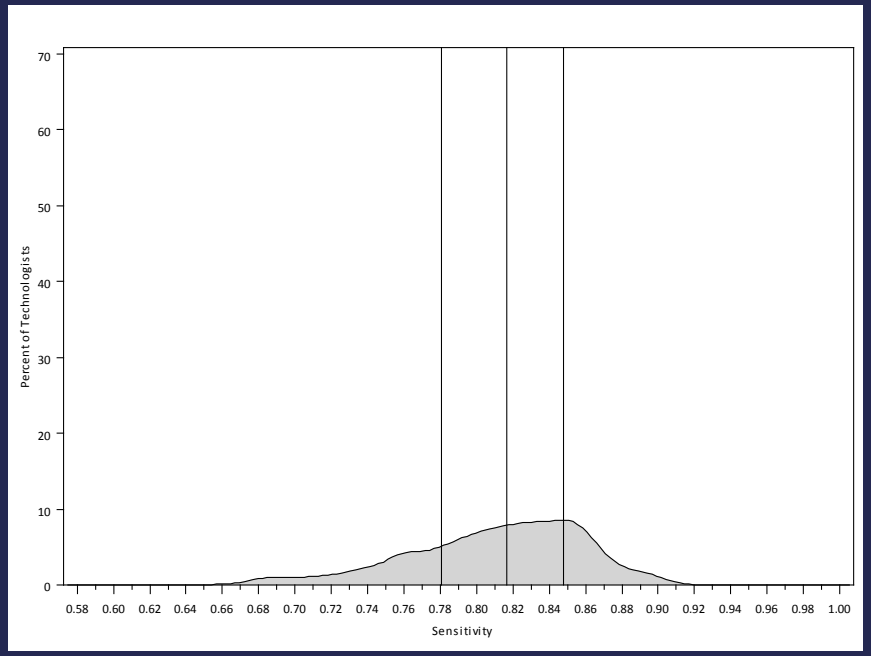

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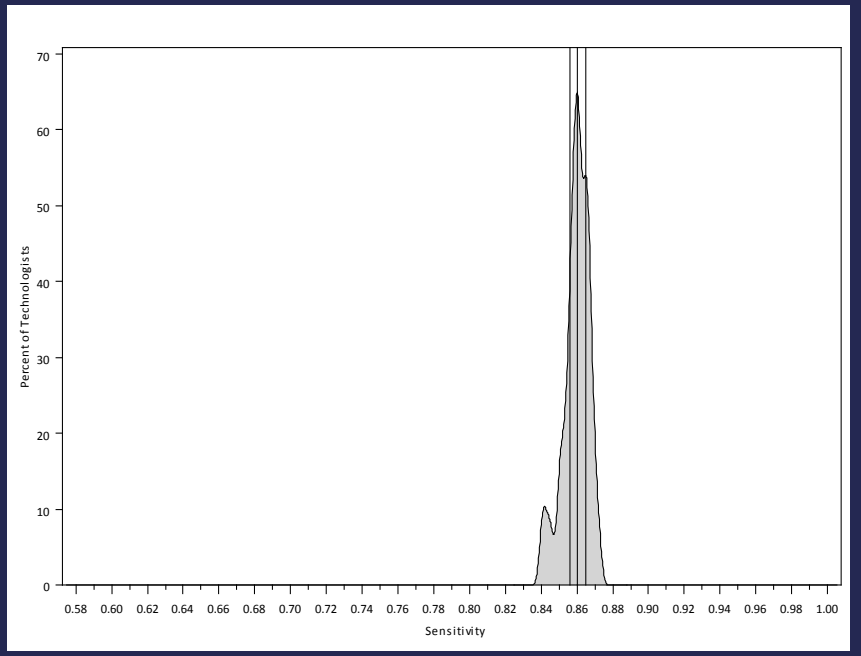

Model-based smoothed histograms of screening mammography sensitivity for the 356 technologists by modality with solid vertical lines at 25th, 50th, and 75th quartiles

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Screening Mammography: Specificity

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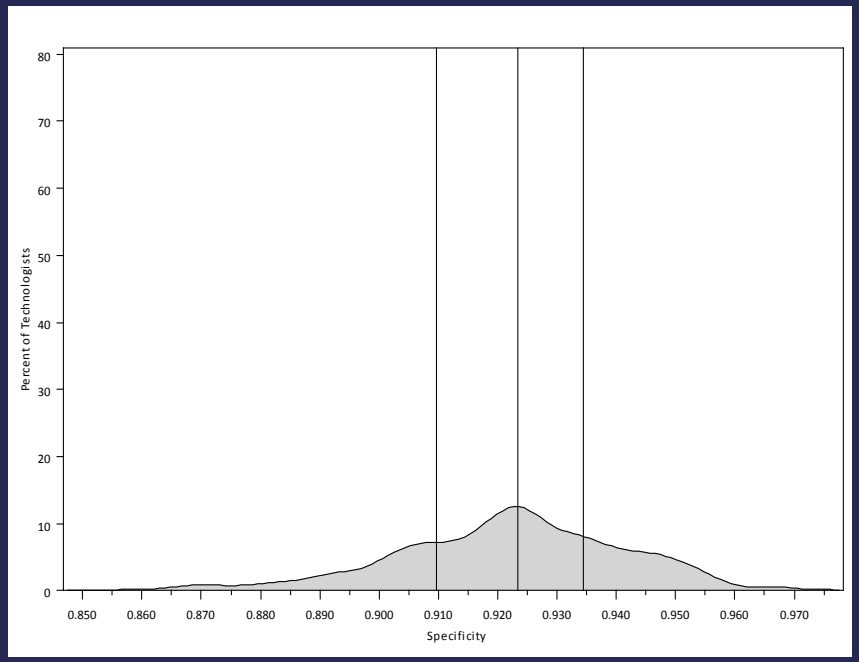

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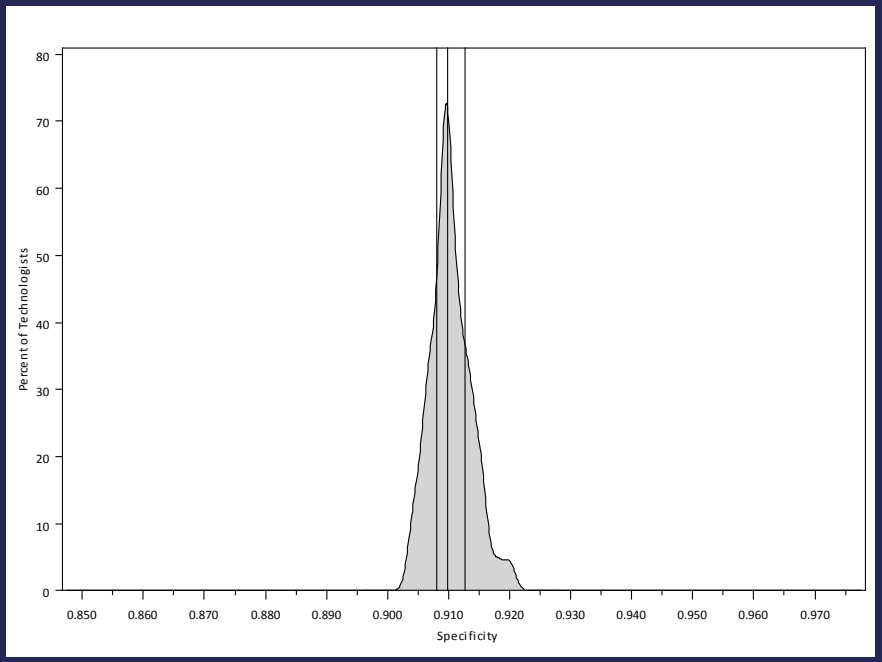

Model-based smoothed histograms of screening mammography specificity for the 356 technologists by modality with solid vertical lines at 25th, 50th, and 75th quartiles

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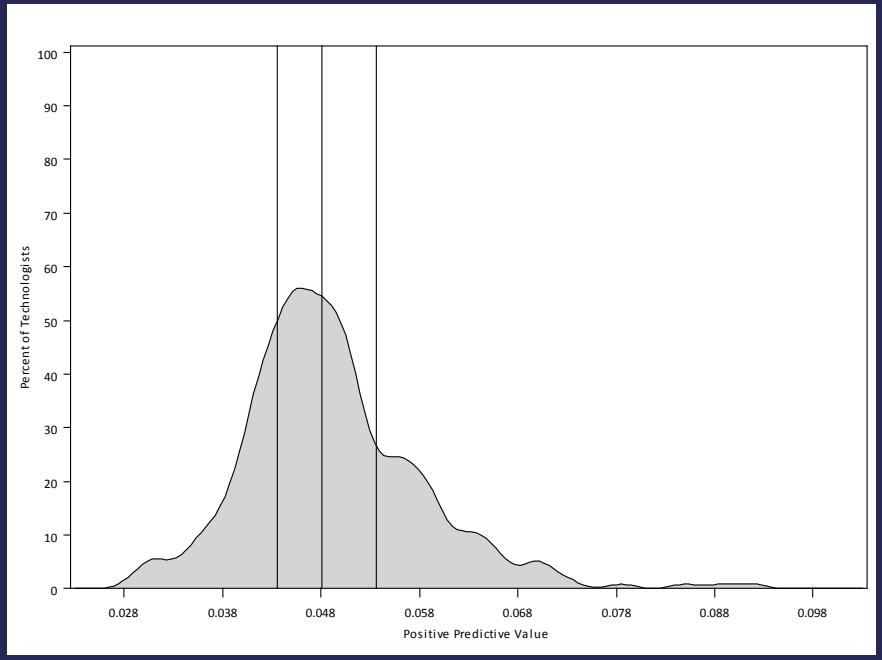
Screening Mammography: PPV

FILM



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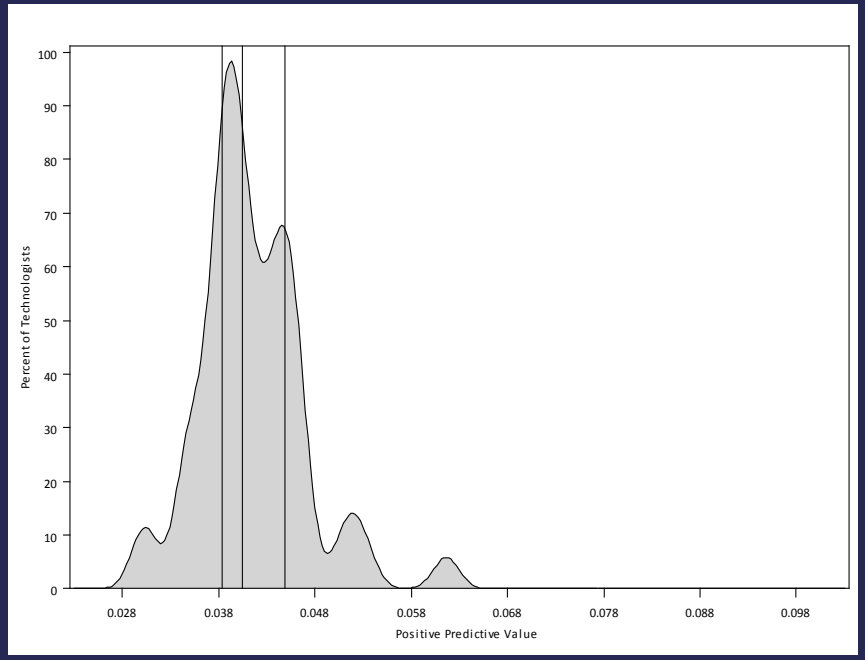

Model-based smoothed histograms of screening mammography PPV for the 356 technologists by modality with solid vertical lines at 25th, 50th, and 75th quartiles

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Screening Mammography: Recall Rate

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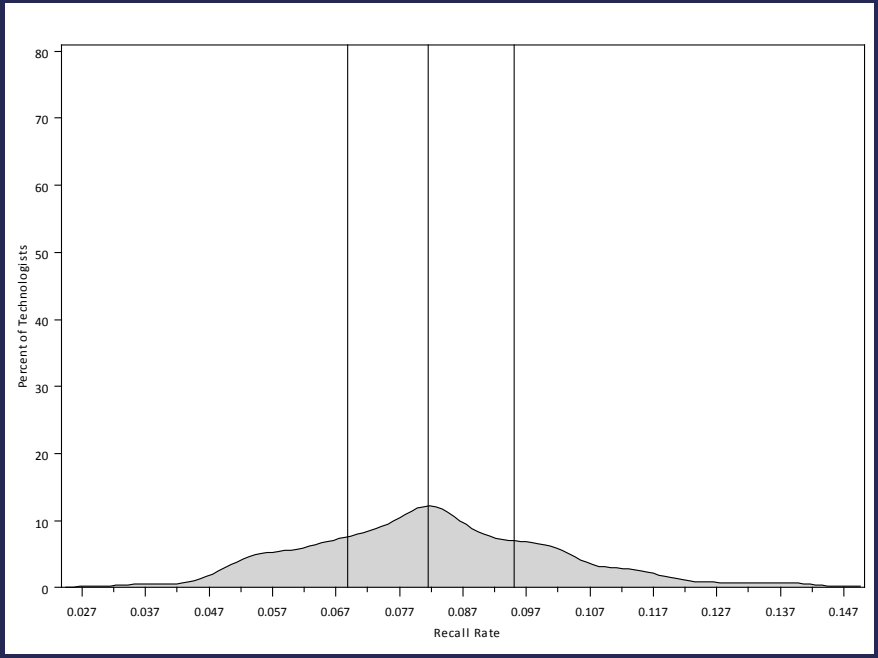

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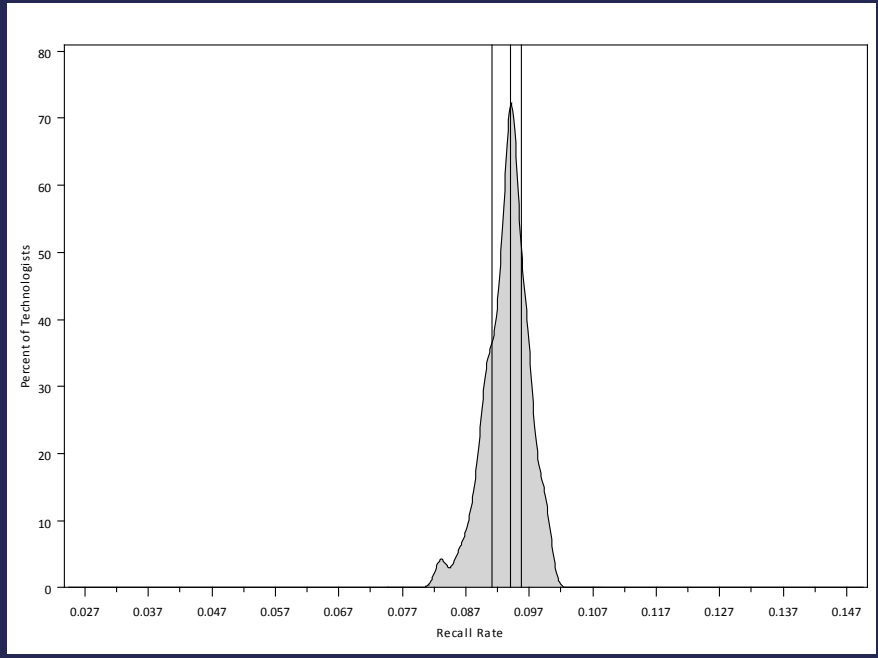

Model-based smoothed histograms of screening mammography recall rate for the 356 technologists by modality with solid vertical lines at 25th, 50th, and 75th quartiles

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Screening Mammography: Cancer Detection Rate

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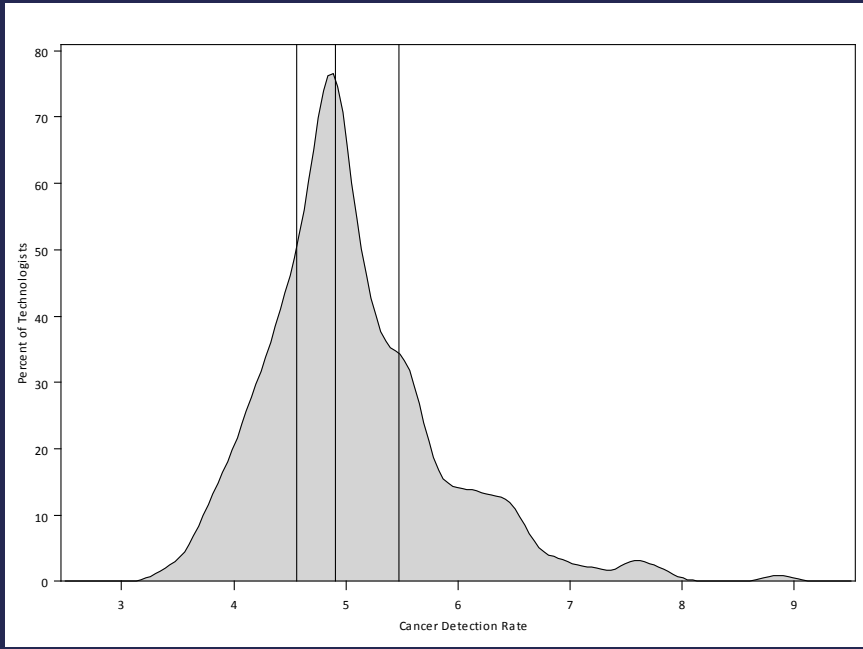

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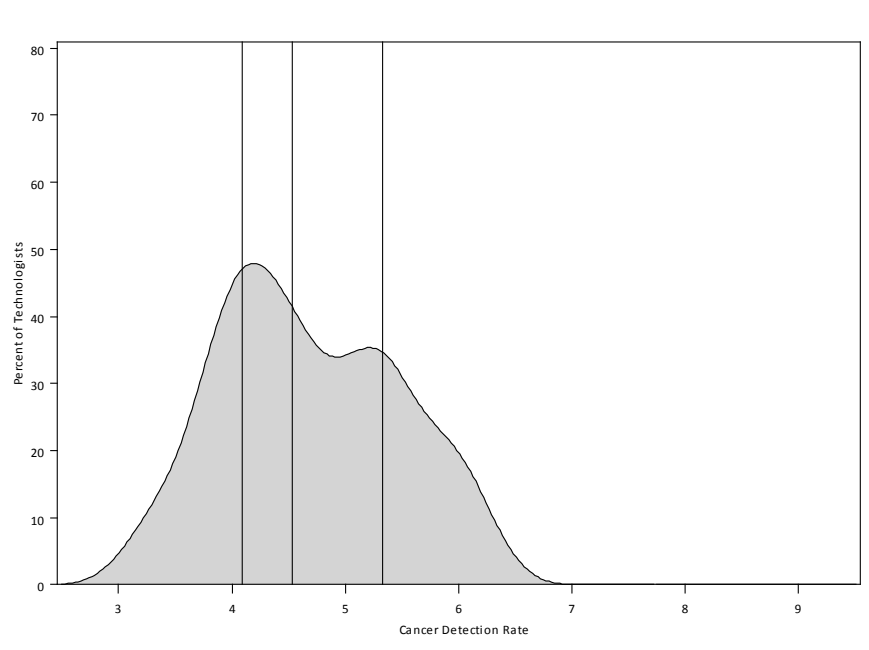

Model-based smoothed histograms of screening mammography CDR for the 356 technologists by modality with solid vertical lines at 25th, 50th, and 75th quartiles

Henderson LM et al. *Acad Radiol* 2015 Mar;22(3):278-89.

Summary: Technologists impact on radiologist performance

- Screening mammography
  - Interpretative performance of radiologists varies by the technologist performing the exam
- Diagnostic mammography
  - Technologist has an impact on radiologists' interpretive performance for film but not digital mammography

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- Screening mammography
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- Are there specific technologist characteristics that impact the observed variability?

Technologist characteristics that may impact observed variability

- Education
- Training
- Experience
  - Years
  - Volume
  - Imaging modalities
- Interactions with radiologists and peers
- Job satisfaction

Summary / Next Steps

- Importance of technologists in mammography screening
- Use of technologists as pre-/second- readers
- Impact of technologists on radiologists' performance
  - Future work aimed at identifying technologist characteristics that may explain variation in radiologists performance

Thank you