Delivery Science Grants Program

Prospective Mammography AI Evaluation Improved Cancer Detection and Time-to-Detection

Vignesh A. Arasu, MD, PhD; Andrew L. Avins, MD, MPH; Laurel A. Habel, PhD; Jason D. Balkman, MD; Dorota J. Wisner, MD PhD; Dan Navarro, MD; Catherine Lee, PhD

|  |  |
| --- | --- |
| Challenge | **At KPNC, over 100 radiologists read screening mammograms and demonstrate a 12-fold difference in cancer detection rates, including some below common guideline thresholds. Efficient time-to-exam reading times are challenged by volumes and staffing shortages, potentially inducing diagnostic delays.** |
| Existing Evidence | Retrospectively, we demonstrated that high AI risk scores can identify 25-50% of breast cancers missed at screening. Whether it can achieve similar results prospectively and also help with real-time exam prioritization for diagnosing cancers same-day is unknown. |
| Target Population | Women undergoing mammographic screening  (predominately aged 40–75 years) |
| Intervention or Exposure | AI-based prioritization of mammography screening exam interpretation, including evaluation of 5 available commercial or open-source algorithms. |
| **Outcomes/Key Findings** | **A retrospective evaluation demonstrated that:**  **• KPNC radiologists alone outperform AI algorithms alone (AUC 0.97 vs. AUC 0.83-0.91).**  **• Radiologist PLUS AI augmented cancer detection increased detection vs. radiologist alone, with AI identifying 25-50% of cancers not diagnosed by**  **radiologists. A pilot prospective AI randomized controlled trial (RCT)**  **in the Napa Solano service area found:**  **• Among 72 women diagnosed with breast cancer, AI correctly assigned 58 (80%) a high-risk score**  **• AI prioritization led to many more women with breast cancer potentially receiving same day results than without such prioritization.** |
| **Resulting Action/Change** | **Results led to region-wide trial to evaluate improvements in cancer detection, informed a KP-IT computer vision AI use case for national strategy, and proof-of-concept technology and workflows, and informed data & technology infrastructure needs for atscale AI actions.** |
| Additional Recommendations | The results demonstrated the importance of prospectively evaluating technologies to inform adoption. Operational leaders can consider how results may inform TPMG AI strategy and development of proprietary workflows, as well as AI investments priorities. |
| Implementation Tools | Epic, Radiant |
| Implementation Measurement | Rate of rollout regionally, automated integration in workflow, cancer detection, time from mammogram to cancer diagnosis, cancer outcomes, diagnostic variability between radiologists after AI implementation |
| Reference | <https://pubmed.ncbi.nlm.nih.gov/37278627/>  A graph of a function  Description automatically generated with medium confidence |