HOW AI COULD IMPACT CANCER RESEARCH

The perspective of a clinical trialist,
breast cancer screening researcher
and the Chief Research Officer of the ACR

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GEOFFREY HINTON
NOBEL LAUREATE IN PHYSICS 2024
”GODFATHER OF AI”

”People should stop training radiologists now.”

It is “completely obvious” that AI would outperform radiologists within 5 years.

2016

WHY AI HAS NOT REPLACED RADIOLOGISTS DESPITE EXCELLENT PEER-REVIEWED EVIDENCE

E.G. LOUIS ET AL. NATURE HEALTH.2025.HTTPS://DOI.ORG/10.1038/S44360-025-00001-0

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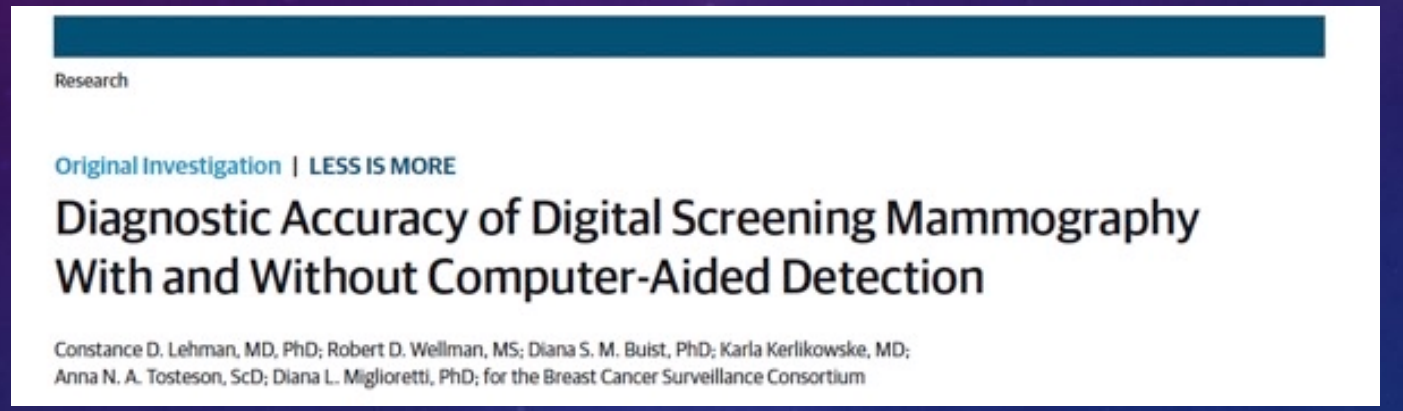

Research

Original Investigation | LESS IS MORE

Diagnostic Accuracy of Digital Screening Mammography With and Without Computer-Aided Detection

Constance D. Lehman, MD, PhD; Robert D. Wellman, MS; Diana S. M. Buist, PhD; Karla Kerlikowske, MD; Anna N. A. Tosteson, ScD; Diana L. Miglioretti, PhD; for the Breast Cancer Surveillance Consortium

Lehman et al. JAMA Internal Medicine 2015:175;(11):1828-37.doi 10.1001/jamainternmed.2015.5231

Laboratory Studies and even Human Reader Studies do not necessarily reflect real world performance

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Medicare and Private Insurers are unwilling to pay EXTRA for image interpretation using AI algorithms

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Fee splitting with AI vendors?
Sharing in Liability?
Integration into hardware?
New Capabilities - e.g.risk prediction?

Medicare and Private Insurers are unwilling to pay EXTRA for image interpretation using AI algorithms

AUTONOMOUS AI IN IMAGE INTERPRETATION

- Adoption requires high level of trust in patient outcomes – by patients, clinicians, radiologists, which likely necessitates Real World Evidence without human-in-the-loop.
- Not permitted for breast cancer screening under the US Mammography Quality Standards Act.
- Removing cases from review by humans creates a more challenging case mix for humans. How will that impact performance and training?

LESSONS FROM MY TIME AT ARPA-H LEADING THEIR CLINICAL TRIAL REFORM EFFORT

Too Expensive and Inefficient

Take Too Long

Not available to most Americans

(1% patients, 2% doctors)

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Every Question cannot be answered through randomized trials. Pragmatic designs that use combined randomization and RW data will become more common and will use AI.

WAYS AI COULD IMPROVE TRIAL EFFICIENCY

- Identifying Eligible People
- Recruitment and Consenting
- Building Data Forms
- Extracting Data from EHRs
- Automatically identifying and flagging or correcting data errors
- Continuous engagement of trial participants to improve retention
- Flagging cross-over and other trial deviations and interrogating registries for those lost-to-follow-up
- Monitoring and Auditing

ASSESS-AI

Algorithms drift. Staff and patients change

Monitoring performance in clinical practice by capturing clinical data

First national registry for monitoring AI performance