



THE IMPACT OF HUMAN CAPITAL DEPRECIATION ON RECALL RATES IN SCREENING MAMMOGRAPHY

RESULTS OF A PILOT STUDY OF 50,000 EXAMINATIONS

DISCLOSURES

- This work was supported by a Robert W. Woodruff Health Sciences Center Fund Synergy Award from Emory University

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HUMAN CAPITAL DEPRECIATION: DEFINED

- ***In economics:*** worker performance begins to wane in a relatively short time away from the task, even for routine tasks
- ***In healthcare:*** evidence suggests that the number of days between surgeons' cases is associated with increased operative time and blood loss in patients undergoing robotic-assisted laparoscopic prostatectomy



A LITTLE MORE BACKGROUND: BREAST CANCER SCREENING

- **Breast cancer:** the most common cancer in women
- **Large randomized trials:** 20-30% reduction in breast cancer mortality with screening
- **However:** perceived risks of mammography are viewed as a limitation to its usefulness
 - Challenges have largely focused on very variable and relatively high recall rates (3.5% to 13.6% worldwide)
 - These challenges have led to recent screening guidelines revisions by the United States Preventive Services Task Force and the American Cancer Society

SCREENING MAMMOGRAPHY: THE HYPOTHESIS

- **Rationale:** Role of human capital depreciation on recall rates in screening mammography has not been explored
- **Hypothesis:** Increasing temporal distance between a reader's screening mammography interpretation sessions will negatively impact (i.e., increase) radiologist recall rates
- **Goal:** Evaluate the impact of time between screen reading sessions on recall rates



METHODS



- **Materials:** Reports and metadata for all 50,444 breast imaging studies performed over the course of a year in a large academic health system
- **Methods:** Extracted BI-RADS (Breast Imaging Reporting And Data System) score, rationale for recall, and date and time of all screening and all other breast imaging examinations
- **Analyses:** For each screening examination, calculated the time from the last breast imaging examination of any type interpreted by that radiologist, and categorized recall rates by time intervals

WHAT DID WE DISCOVER?: THE RESULTS

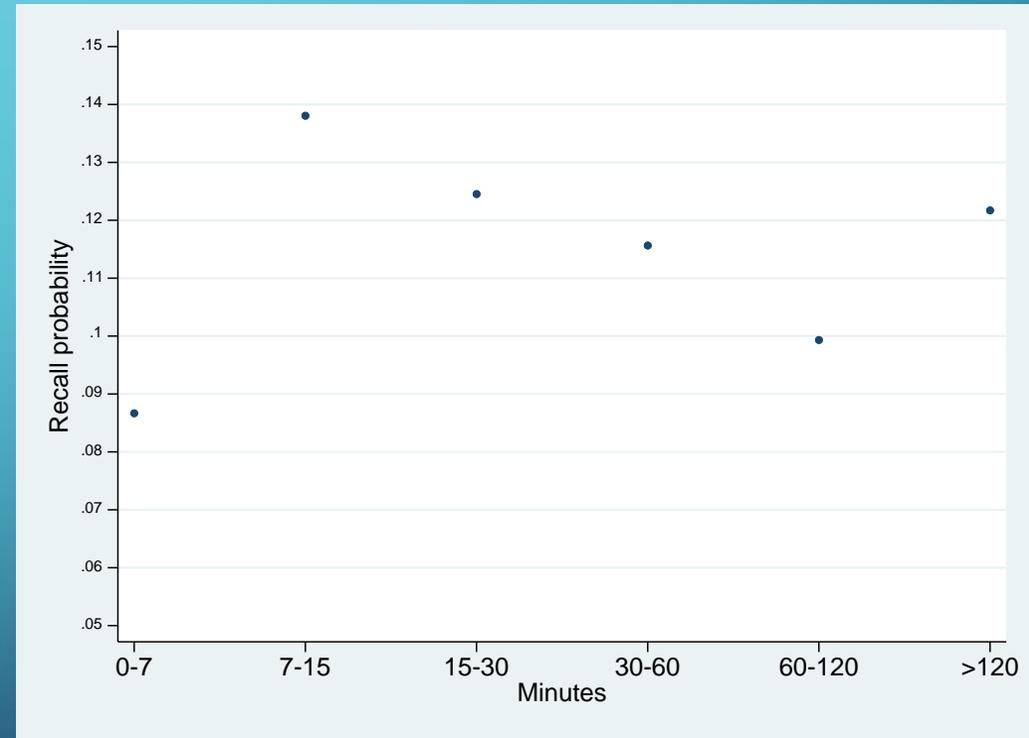
- As a function of time since last interpretation, recall rates varied 8.7 to 13.8%
- Lowest recall rate (8.7%) was for exams in which time from last interpretation was the shortest (< 7 minutes)

Table 1. Association between time since radiologist's last read and patient recall rate

Minutes since radiologist's last read	Recall rate	N	Percent of reads
<7	8.7%	18,073	63%
7-15	13.8%	4,123	14%
15-30	12.4%	2,720	10%
30-60	11.6%	1,717	6%
60-120	9.9%	1,038	4%
>120	12.5%	842	3%
Overall	10.1%	28,513	100%

RESULTS...CONTINUED

- Highest recall rates (13.8%) were for exams with 7-15 minutes since the last interpretation
- When time-since-last-interpretation was greater than 15 minutes, the recall rate never returned to the recall rates expected at peak performance



LOOKING FORWARD: IMPLICATIONS



- Persistence of higher recall rates at longer time intervals since last examination interpretation suggests that human capital depreciation may explain some variation in screening mammography recall rates
- Given that high recall rates have been cited by screening mammography opponents as an argument against breast cancer screening, a better understanding of the drivers of human capital depreciation in breast imaging may reduce recall rates and expand wider acceptance of breast cancer screening