

# AI-Assisted Decision Support and Radiologist Efficiency in CT lung Cancer Screening

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## Introduction

- Prior AI lung nodule studies are largely limited to academic or controlled settings.
- Real-world performance in hybrid private practice is unclear.
- CT lung cancer screening requires efficient nodule characterization, comparison, and structured reporting.
- A commercial AI lung nodule characterization tool was implemented across selected practice sites.
- This study evaluates the impact of AI-assisted nodule characterization on dictation time, variability, and AI agreement before and after implementation.
- Efficiency gains were assessed by training completion & volume

## Methods

- Retrospective pre–post implementation analysis of CT lung cancer screening reports in a large hybrid private practice.
- Study periods:
  - Pre-implementation: Nov 1, 2024–Mar 3, 2025
  - Phase 1 agreement/trust period: Mar 4–May 25, 2025
  - Phase 2 efficiency period: May 26–July 31, 2025
- AI-based lung nodule characterization software was integrated into routine CT lung screening workflow.
- Primary outcome: median dictation time, measured from dictation start to close in reporting software.
- Secondary outcomes: month-to-month variability, radiologist agreement with AI output, effect of training completion, and reader-volume effects.
- Downtime period from June 23–July 3, 2025 was excluded from analysis.
- Outliers (>30 mins) excluded; brief system downtime excluded from analysis.

## Results

- 2,860 CT lung screening studies analyzed.
- Overall AI agreement improved from 88% to 96% by week 12.

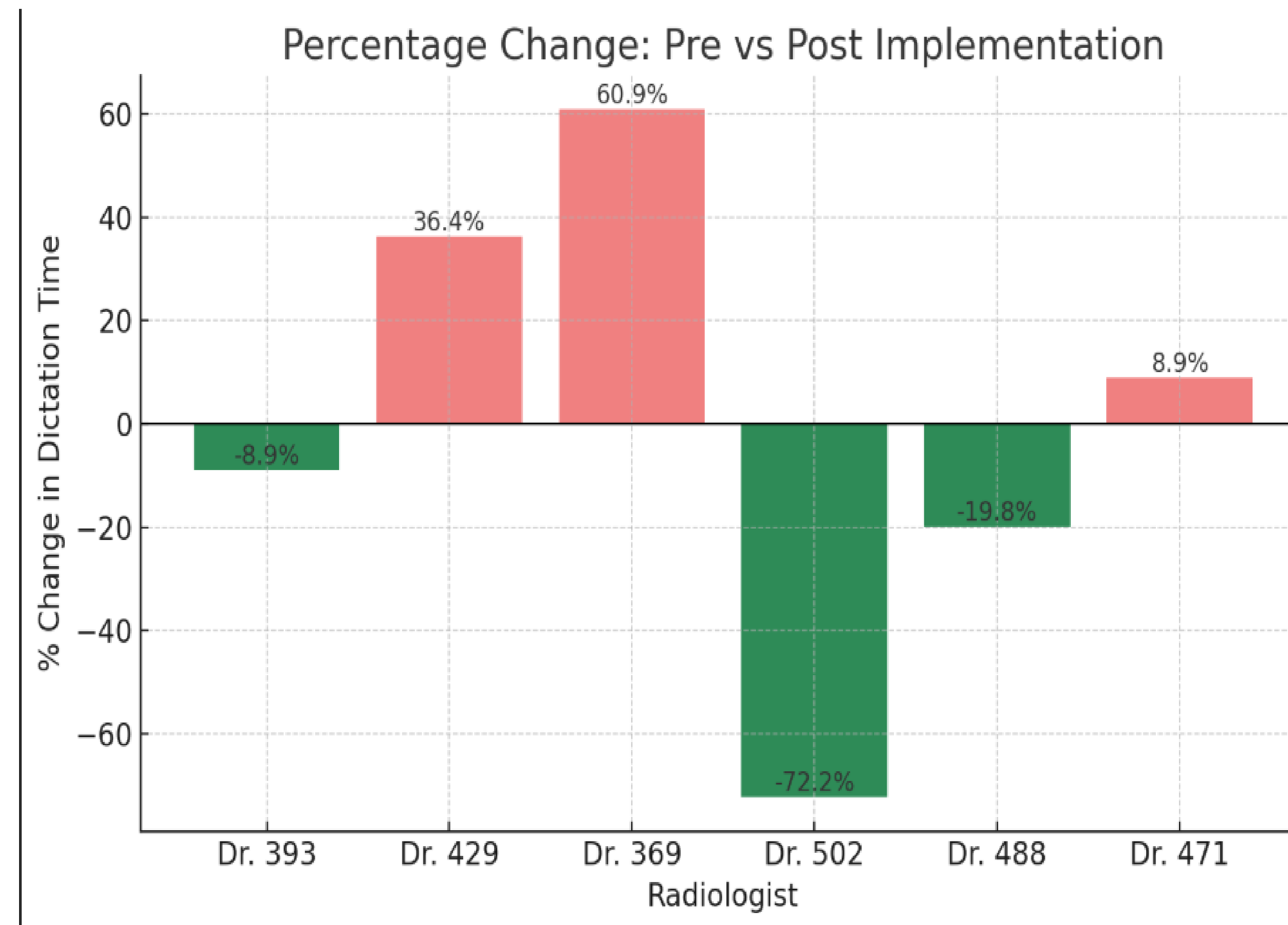


Figure 1. Percent change in median dictation time from January 2025 to July 2025 by radiologist. Negative values indicate shorter dictation times after implementation, while positive values indicate longer dictation times.

Shift Dates: 11/01/2024-05/26/2025

Radiologist <sup>1</sup>	Total	Agree %	Disagree %
Dr. 13	43	65.1%	34.9%
Dr. 331*	64	75.0%	25.0%
Dr. 334	34	35.3%	64.7%
Dr. 369	130	84.6%	15.4%
Dr. 393*	1086	94.4%	5.6%
Dr. 396	46	84.8%	15.2%
Dr. 429*	165	88.5%	11.5%
Dr. 471*	99	67.7%	32.3%
Dr. 488	128	77.3%	22.7%
Dr. 502	145	91.7%	8.3%
Total	1940	88.0%	12.0%

<sup>1</sup> Radiologist with \* did not complete training.

Figure 2. Radiologist agreement with AI output during the 12-week implementation evaluation. Across 1,940 CT lung screening examinations, overall agreement with the AI output was 88.0%, with agreement improving to 96% by the final week.

\*Adjustment of the nodule detection threshold from 5 mm to 4 mm on March 18 to align with Lung-RADS criteria was associated with improved physician agreement.

- Most Phase 2 radiologists showed reduced median dictation time post-implementation.
- Greatest efficiency gains were among high volume and high workflow adaptation users
- Dictation times clustered more tightly after implementation, suggesting improved consistency.
- Variability decreased overall but remained higher in low-volume users.
- AI Disagreement associated with longer dictation times, likely due to added reconciliation and documentation burden.

## Discussion

- AI-assisted lung nodule characterization improved efficiency with user dependent variability.
- AI Agreement output was high and improved over time, suggesting increasing trust and workflow familiarity.
- Higher-volume readers showed the greatest efficiency gains, supporting a learning curve or “burn-in” effect.
- Training completion influenced agreement, confidence and efficiency.
- AI disagreement may increase dictation time due to added review and reconciliation.
- Low-volume users showed more variable results, limiting interpretation of individual-level changes.
- Successful AI implementation depends on workflow integration, training, reader volume, and sustained use.

## Conclusion

- AI-assisted lung nodule characterization can improve dictation efficiency in a hybrid private practice setting.
- Benefits were greatest among higher-volume, trained users.
- Real-world efficiency gains depend on workflow integration, training, and sustained adoption.