

Radiation Therapy Dose Maps Effects on Radiologists' Interpretation of Thoracic Malignancy Surveillance Imaging

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BACKGROUND

- The radiation therapy dose visualizations used by radiation oncologists are often inaccessible to diagnostic radiologists¹⁻².
- Interpretation of surveillance imaging for oncology patients treated with radiation therapy can be challenging because³:
 - Imaging order may not adequately describe radiation fields
 - Radiation treatment effect and tumor progression can appear similar²

Hypothesis: The addition of radiation therapy dose maps will increase diagnostic radiologists' accuracy and confidence in the interpretation of post-radiation treatment surveillance imaging.

METHODS

Patient Inclusion Criteria:

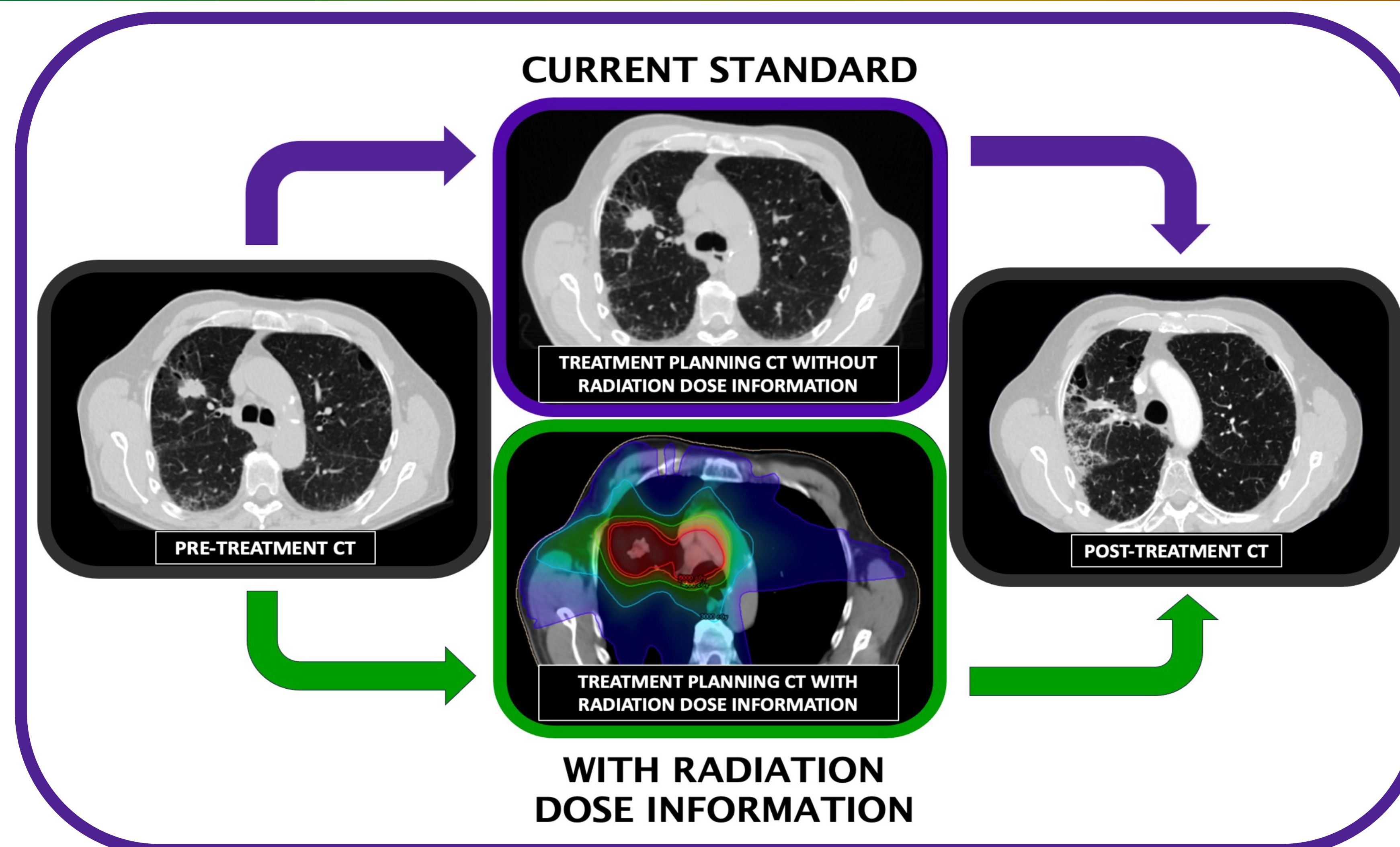
- 32 patients who received radiotherapy to 1-5 lesion(s) for a primary or metastatic thoracic malignancy at University of Washington affiliated hospitals between 1/1/19-12/31/21 were identified using retrospective chart review.

Procedure:

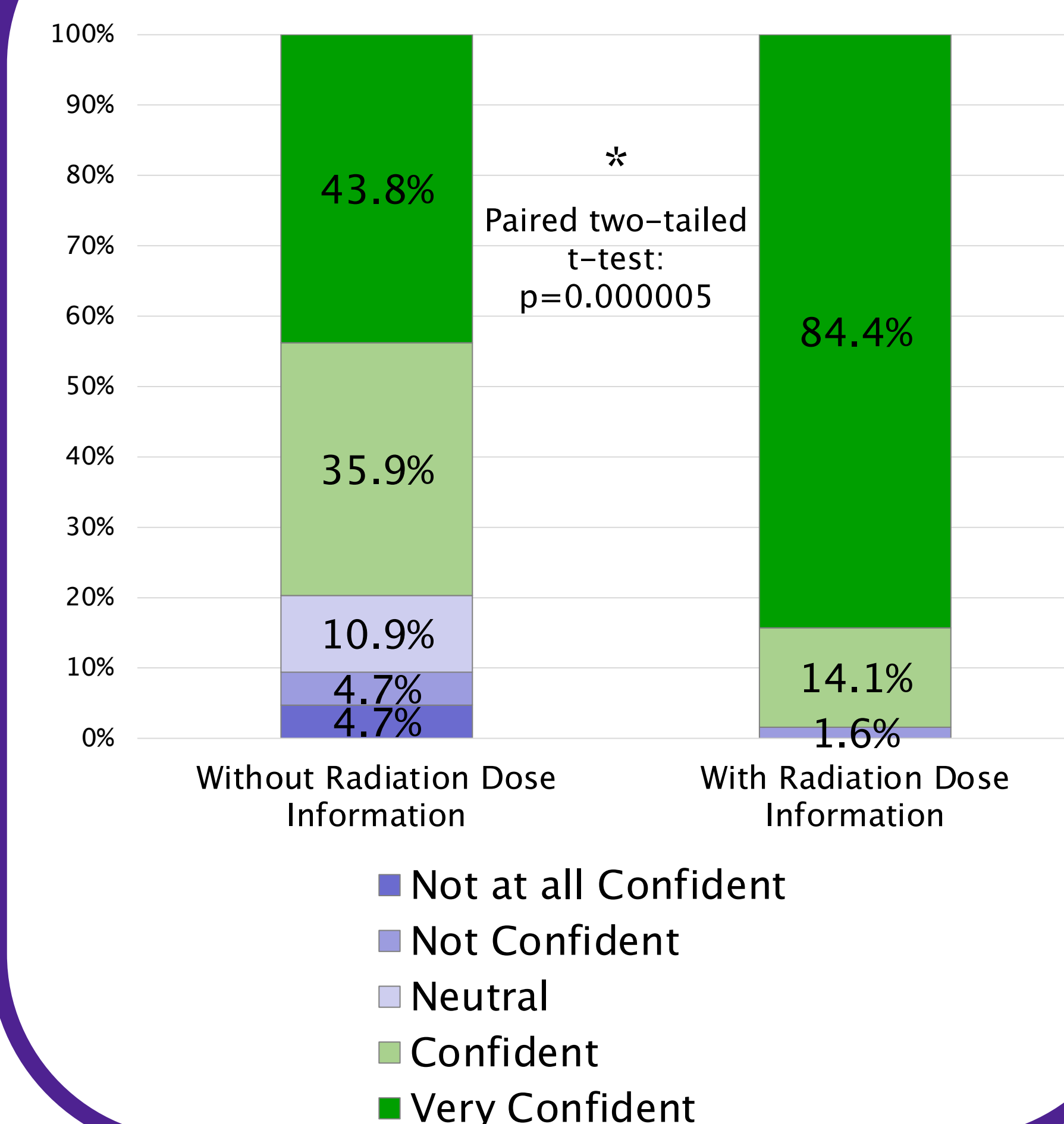
- One PGY-3 radiology resident and one board-certified thoracic radiologist were given an anonymized brief clinical history, pre- and post-treatment CT images and treatment planning CT.
- Readers were asked to identify the treated lesion(s) and radiation treatment effect(s), record their confidence using a Likert scale of 1-5, and answer dichotomous yes/no questions.
- After a washout period of at least 1 month, they were given the same task, but now with radiation dose information overlaid on the treatment planning CT.

RESULTS

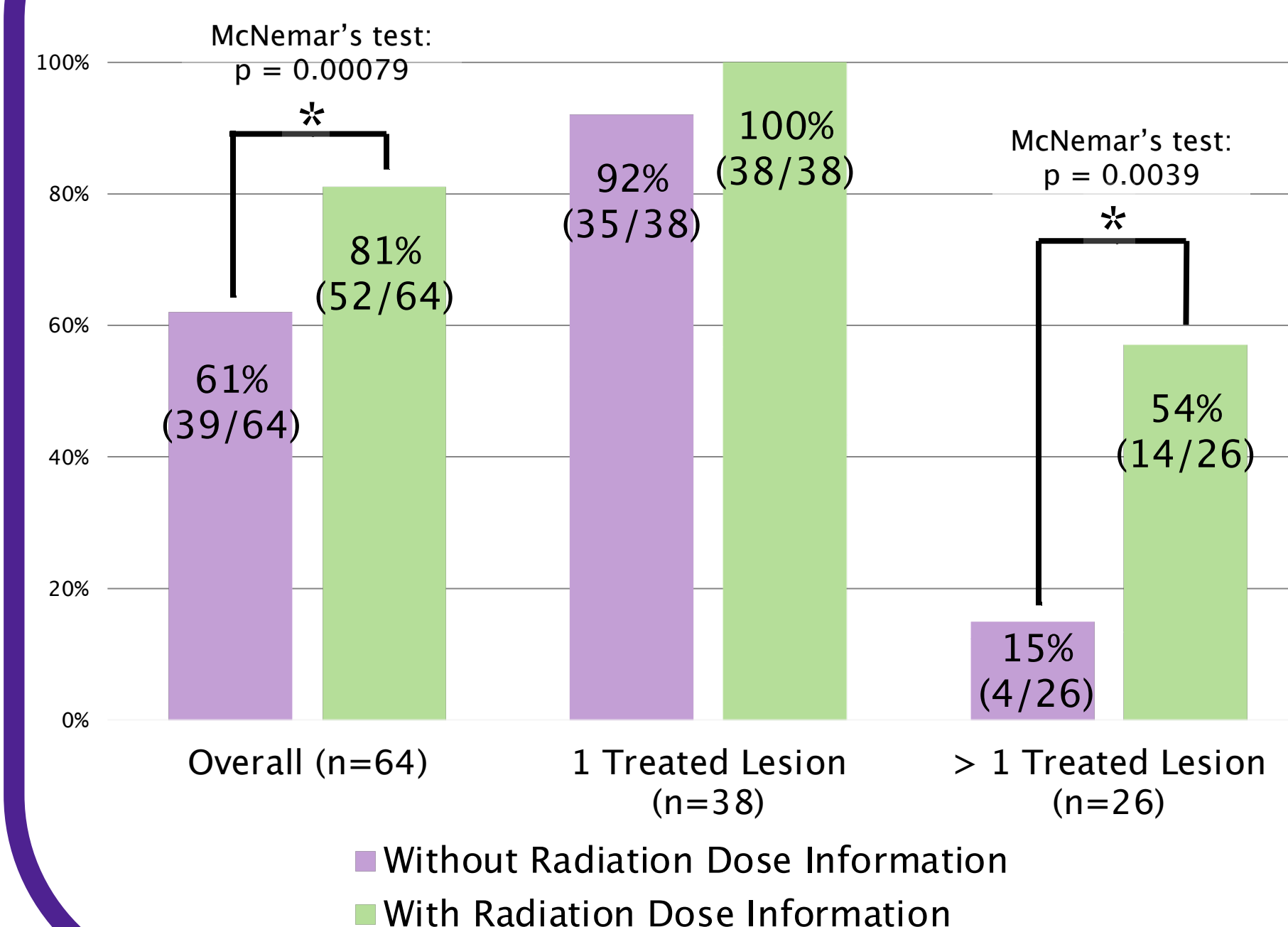
- Correct identification rate of all treated lesions significantly increased** with the addition of radiation dose information.
- Without radiation dose information, 11% of labeled lesions and 13% of labeled treatment effects fell outside of irradiated areas. **With dose information, both values fell below 2%.**
- When asked if radiation dose information would improve their confidence in identifying treated lesions, **agreement increased from 55% to 97%.**
- The readers' **confidence that they had identified treated lesions increased from a rating of 4.1 to 4.8** on a scale of 1-5.



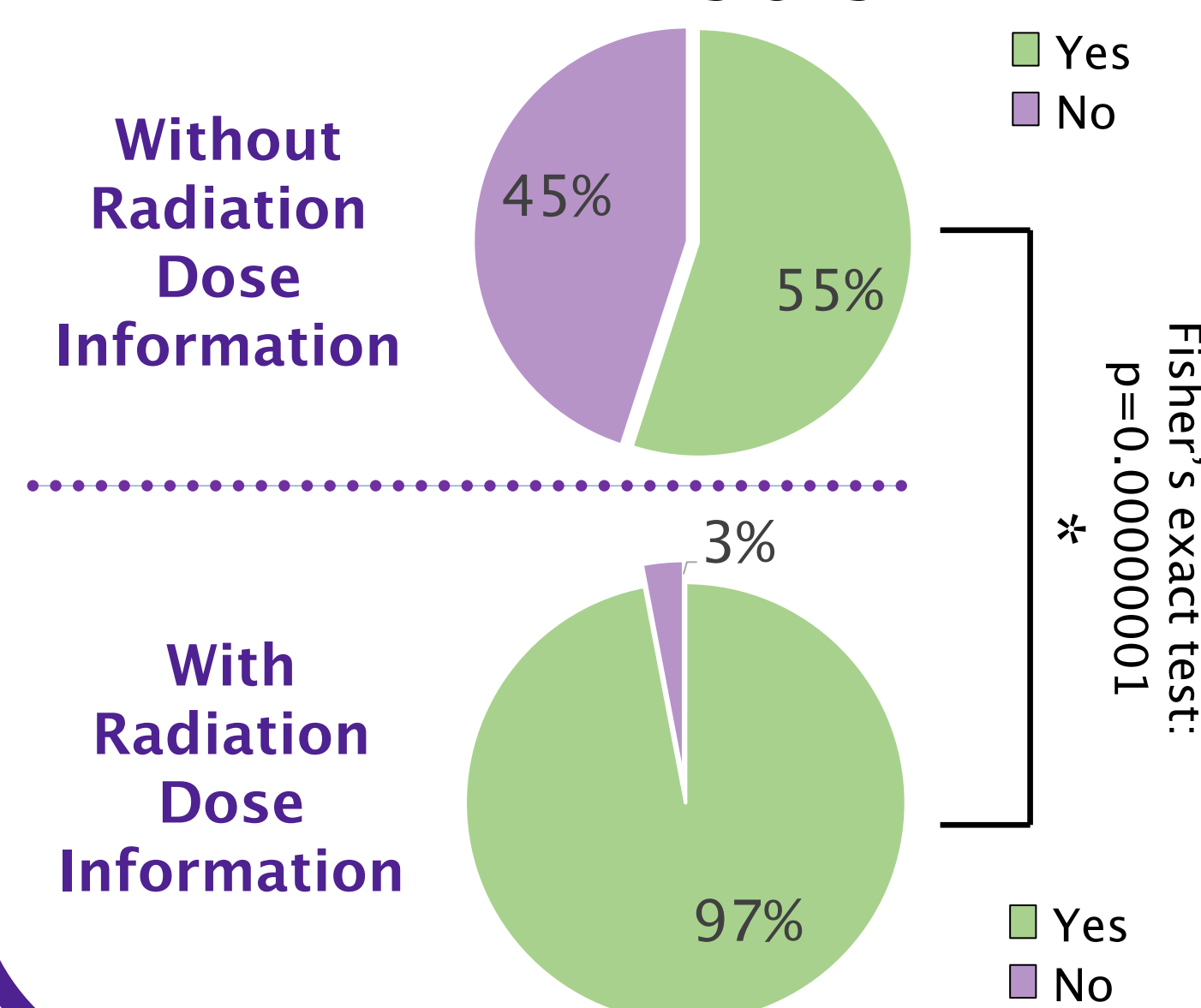
READERS' CONFIDENCE THAT THEY HAD IDENTIFIED TREATED LESIONS



READERS' ABILITY TO IDENTIFY ALL TREATED LESIONS



ACCESS TO RADIATION THERAPY DOSE MAPS WOULD IMPROVE MY CONFIDENCE IN IDENTIFICATION OF TREATED LESIONS



CONCLUSIONS

- When diagnostic radiologists have access to radiation dose information, correct identification rate of irradiated lesions and treatment effects, as well as confidence in these identifications significantly increased.
- The decrease in missed tumors could reduce potential missed identification of tumor progression or recurrence.
- The decrease in false identification of non-treated tumors could reduce inaccurate identification of treatment failure in a new or stable lesion.
- Our results demonstrate that adding radiation dose information to radiologists' workflow could improve quality of surveillance care for patients with irradiated thoracic malignancies.**