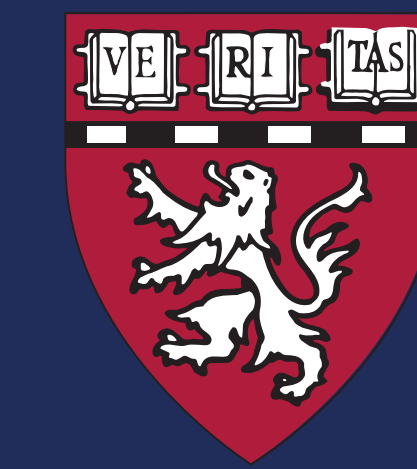# Interactive Web-based Imaging Response Assessment Training Application for Cancer Clinical Trials

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PRECISION Imaging Metrics

Background

There are over two dozen imaging assessment criteria used to evaluate tumor response for cancer clinical trials but there is no standardized training available to teach radiologists how to apply these criteria. While image reviewers are often familiar with RECIST, most are not well versed in the other response criteria, which contributes to increased errors and inconsistencies across radiologists.

The interactive, web-based training application will help radiologists:
1. Recognize the importance of imaging response criteria in cancer clinical trials
2. Categorize metastatic lesions at baseline according to target and non-target definitions
3. Determine overall response for follow-up based on targets, non-targets, and new lesions
4. Demonstrate response criteria knowledge through interactive review of baseline and follow-up cases
5. Reduce variability across reviewers and clinical trial sites to better capture tumor response to therapy
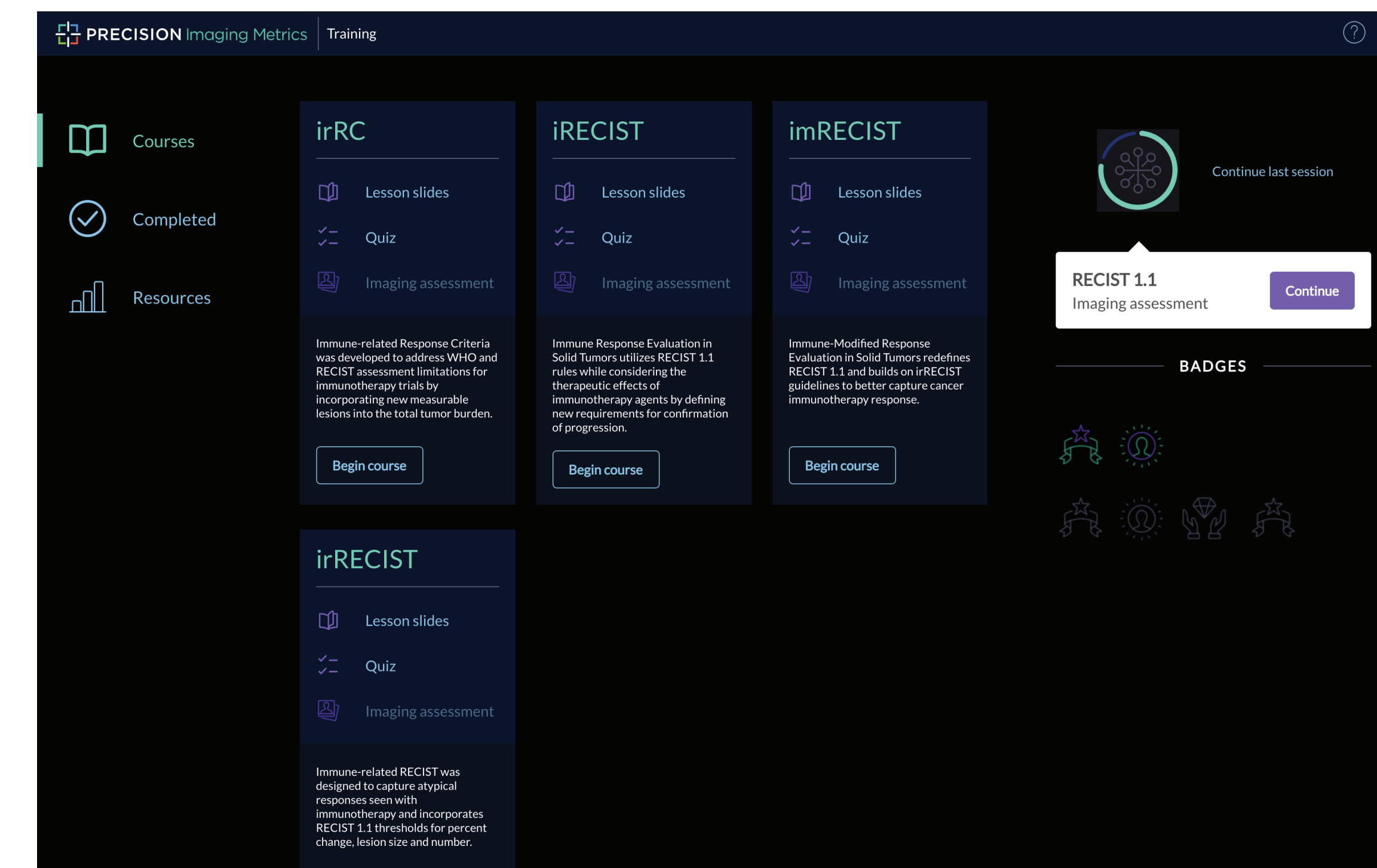

Figure 1: The dashboard provides easy access to response criteria training courses and related references.
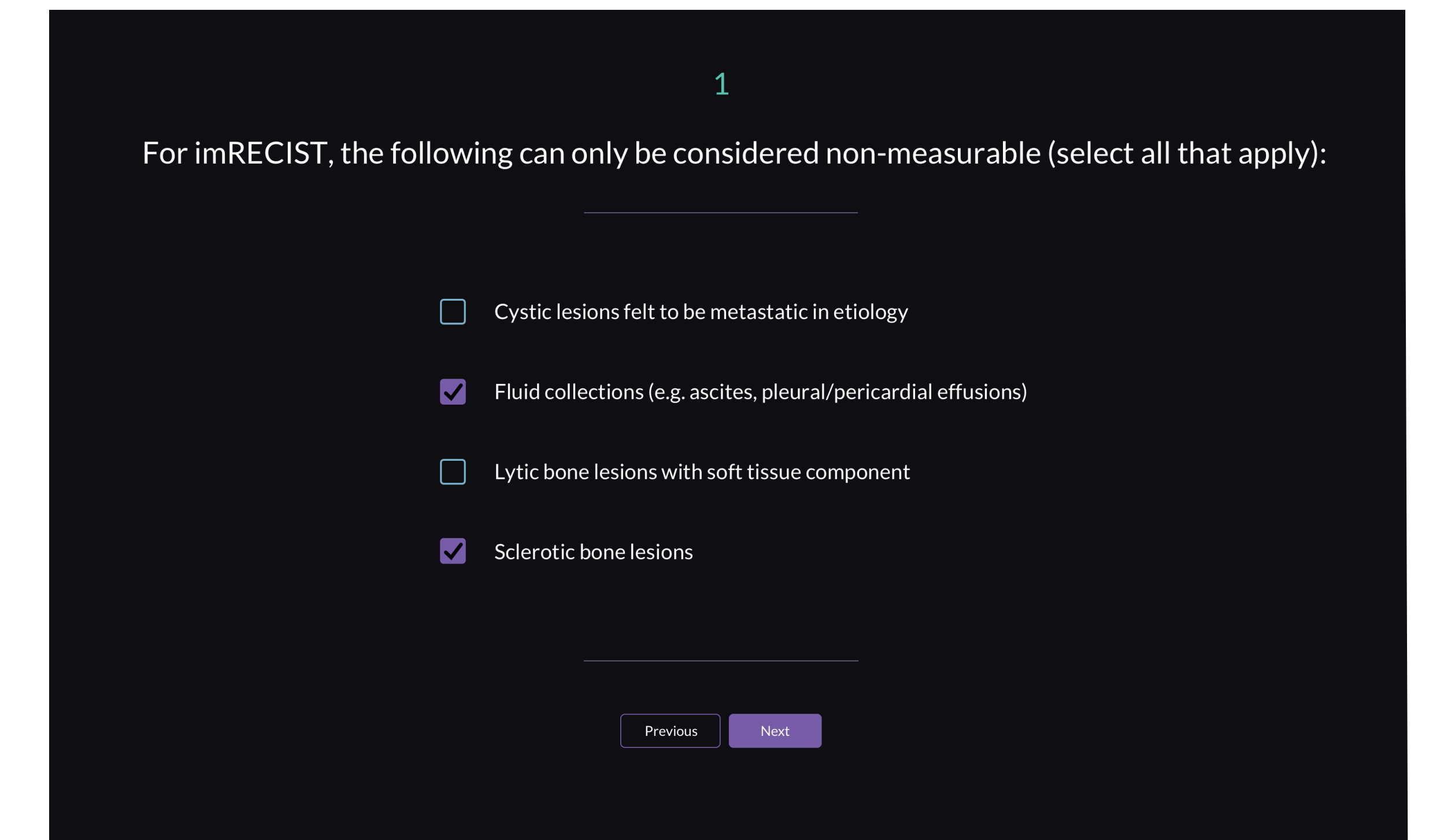

Figure 2: The quiz tests the image reviewers' knowledge of response criteria for both baseline and follow-up to ensure they understand the rules.
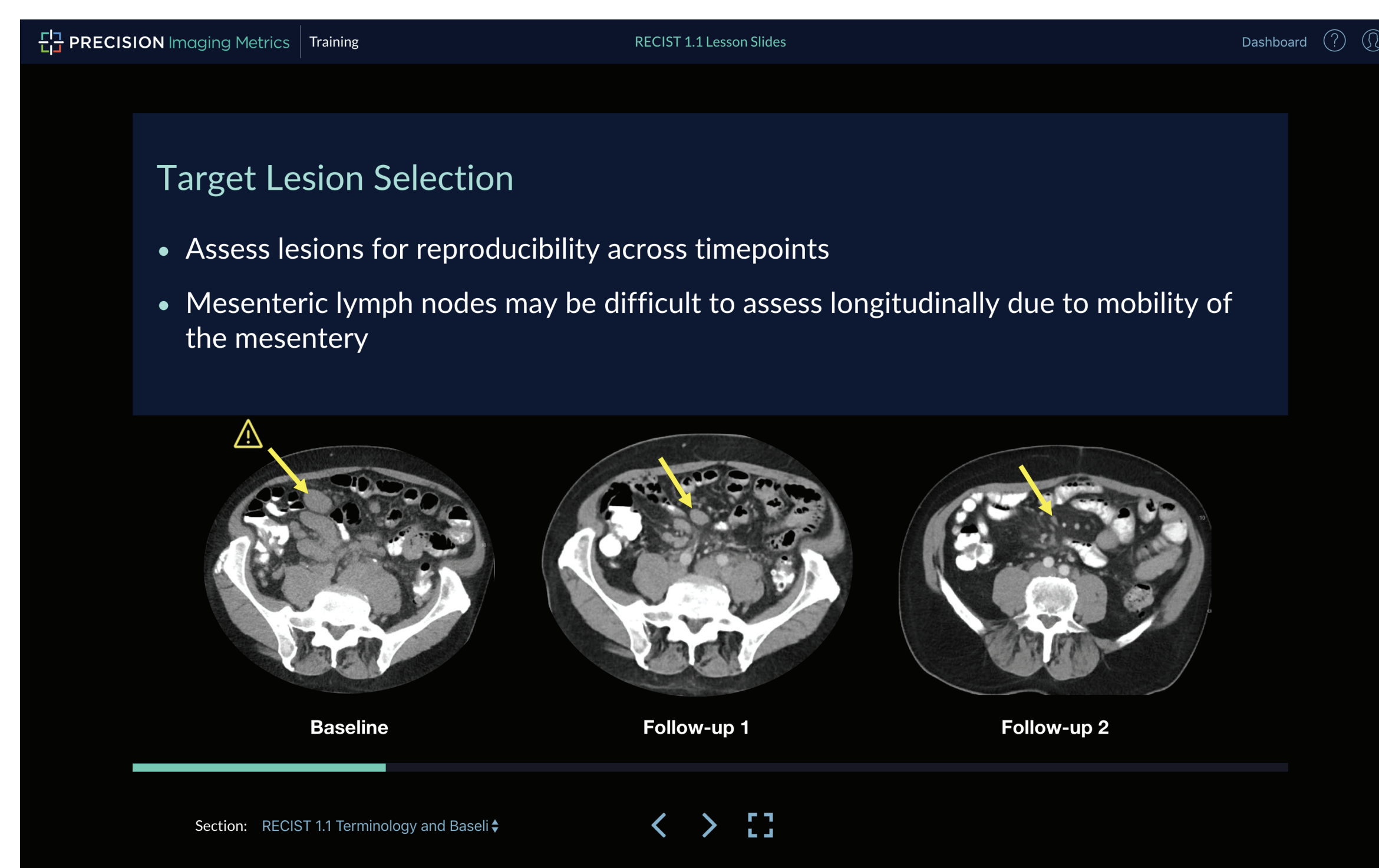

Figure 3: The lesson slides educate image reviewers on response criteria guidelines and provide examples for each response type.
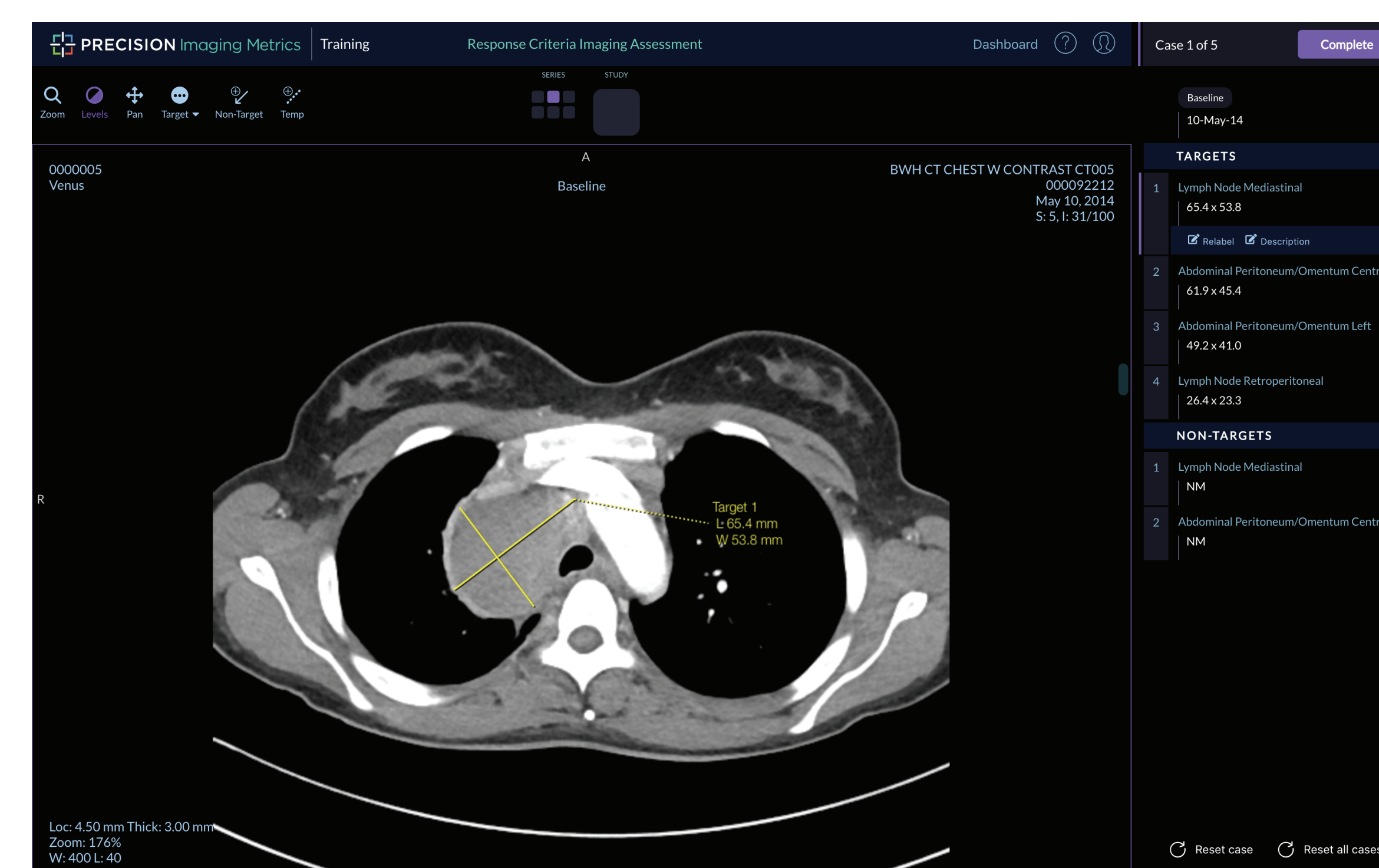

Figure 4: Image reviewers identify, measure, and label tumors at baseline and track and categorize response for tumors at follow-up.

Methods

The training application is made up of three components:
1. Lesson slides which explain the rules of each criteria in detail and provide examples of potential areas of confusion
2. A quiz to test the image reviewer's knowledge of assessment guidelines such as target criteria for baseline and overall response evaluation for follow-up
3. Interactive cases to confirm that the radiologist can appropriately apply these rules during image review

The training materials are tailored to each response criteria. The image reviewer will receive a certificate after they 'pass' each response criteria course. Measurements will be compared across reviewers to determine inter-rater reliability for reviewers in each cancer center as well as across participating cancer centers.

Results, Conclusions, and Future Directions

The Tumor Imaging Metrics Core (TIMC) at the Dana-Farber/Harvard Cancer Center has implemented a standardized training program which has been shown to increase reliability of image assessments (r(ICC)≥0.90) but currently this process is manual and time-consuming for both the trainer and trainee. The web-based platform will give radiologists the opportunity to compare their response criteria knowledge to a 'gold standard,' based on a consensus of a panel of expert imaging reviewers, and allow them to access these training materials at anytime, from anywhere.

As treatment options have evolved and increased in number, response criteria to characterize activity during clinical trials have become progressively more varied and complex. A standardized training platform is needed to ensure response criteria compliant imaging assessments and reduce inconsistencies across cancer centers. The interactive, web-based platform will be made available late 2019 to help radiologists better understand and apply imaging response criteria. In the future, we plan to obtain Continuing Medical Education (CME) credits for each response criteria course.
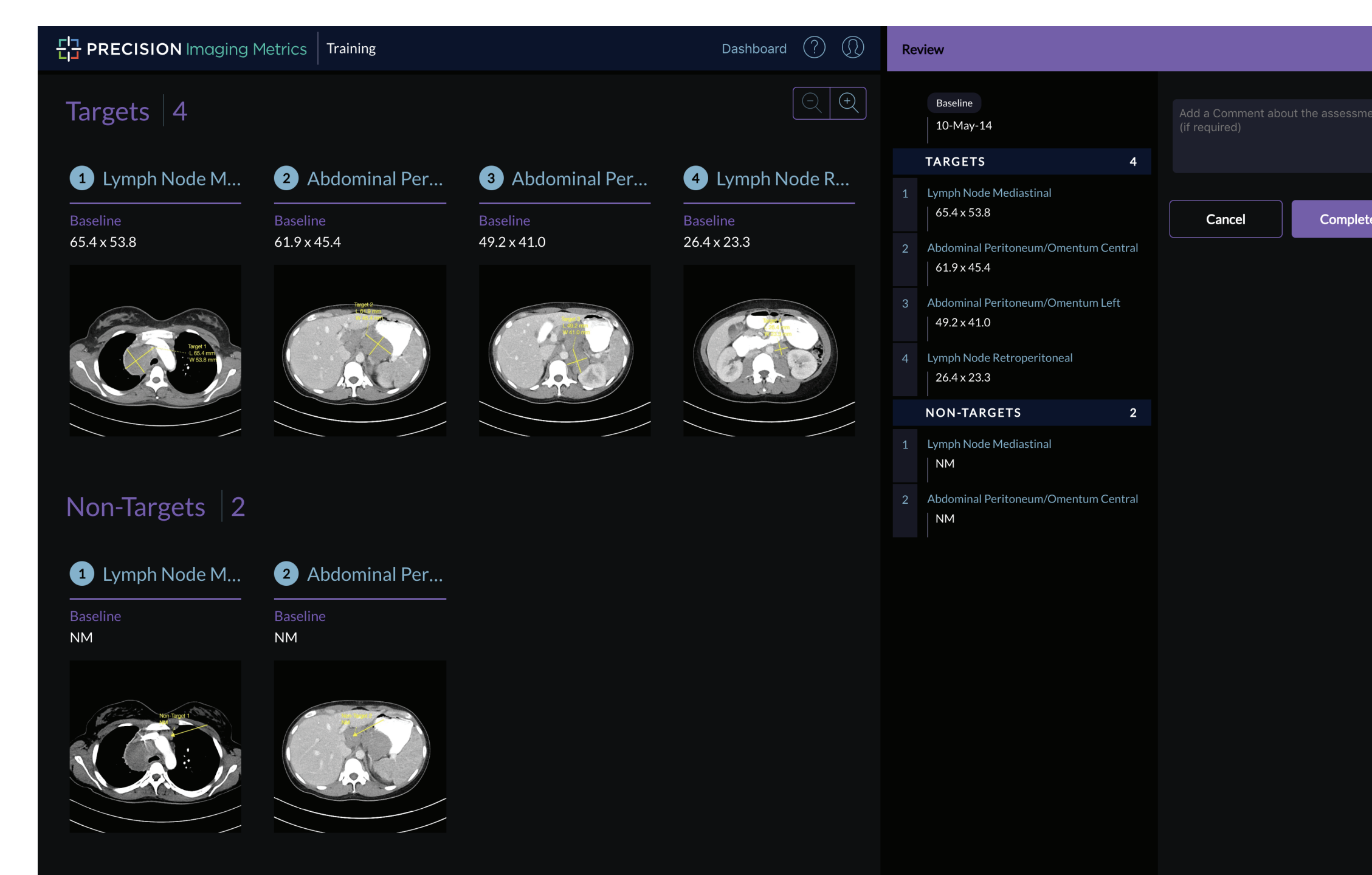

Figure 5: Image reviewers review their measurements and document the time point assessment, as appropriate, for baseline and follow-up.
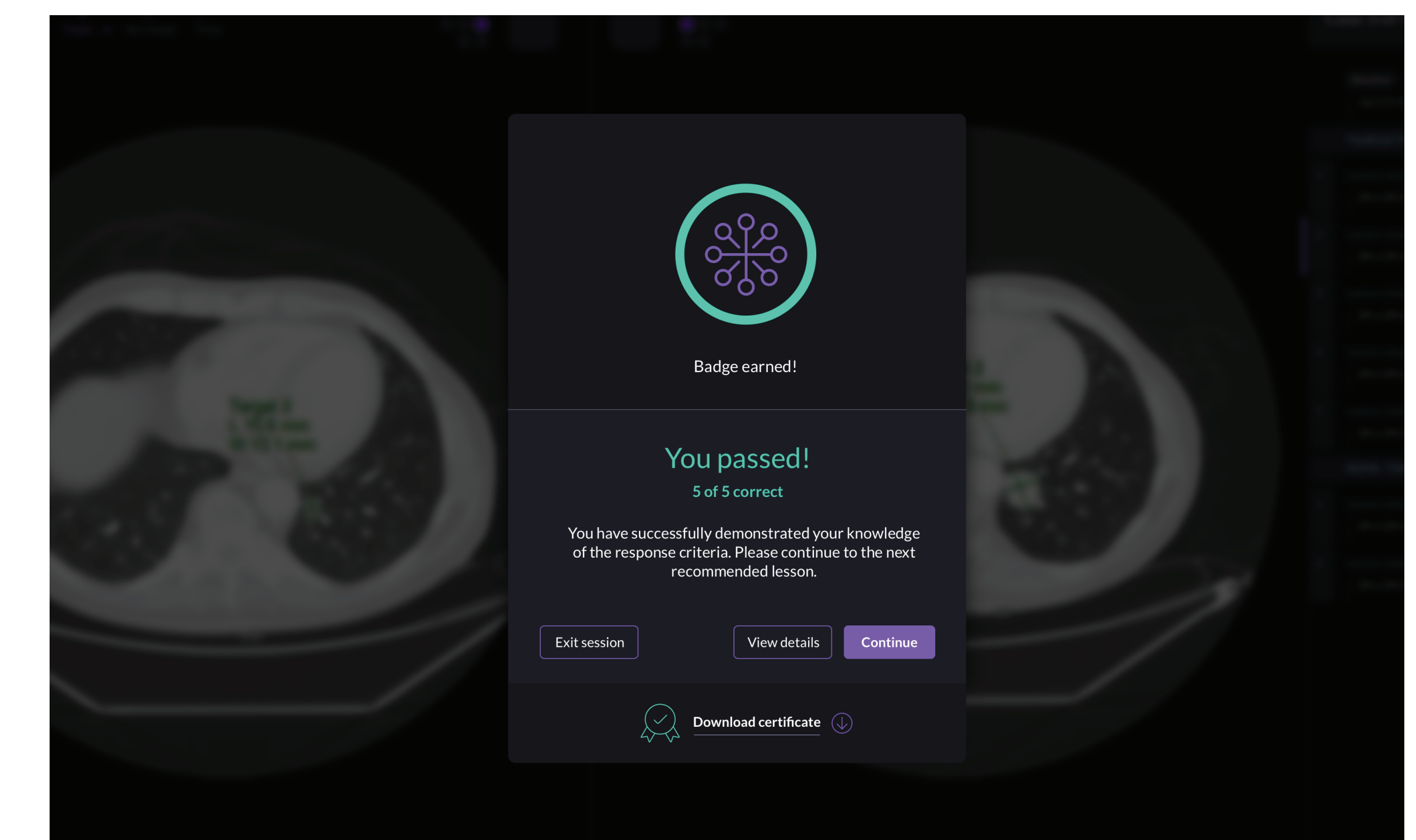

Figure 6: Image reviewers will receive a summary of their performance and will be given a certificate upon successful completion of the training course.