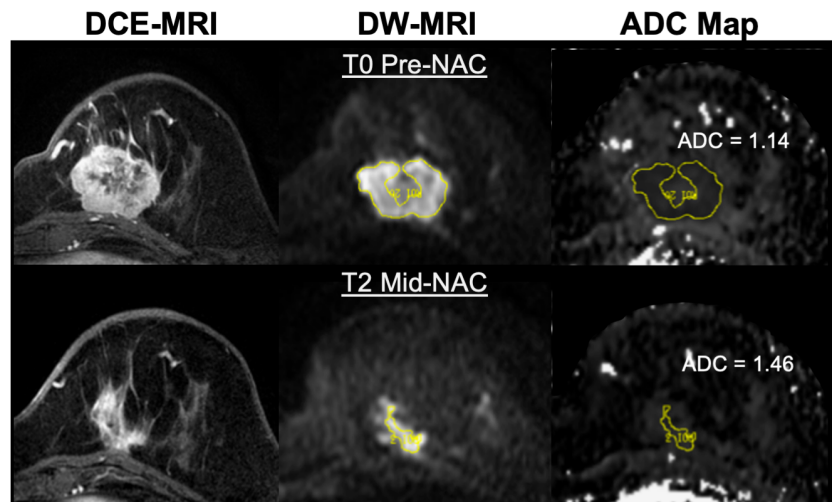


# Breast Multiparametric MRI for prediction of NAC Response Challenge (BMMR2 Challenge)

The goal of the BMMR2 challenge was to identify image-based markers derived from DW-MRI, alone or in combination with DCE-MRI, with improved performance over whole-tumor mean ADC for predicting pCR following neoadjuvant chemotherapy (NAC) for invasive breast cancer. The challenge was run by the Breast Imaging Research Program of UCSF through the NCI Quantitative Imaging Network (QIN). The challenge opened on June 1, 2021 and closed on December 1, 2021.



Data for the challenge consisted of a subset of the TCIA breast MRI collection from the *American College of Radiology Imaging Network* (ACRIN) trial 6698. 573 breast MRI studies from 191 subjects undergoing NAC for invasive breast cancer were provided, with the patient cohort split 60%/40% into training and test groups. pCR outcome data was provided for the training set. A brief description of the data set is provided below. For more information on the ACRIN 6698 collection see the TCIA collection description at [ACRIN 6698/I-SPY2 Breast DWI \(ACRIN 6698\)](#). The challenge was hosted by [MedICI Challenges](#).

## ACRIN 6698

The primary aim of ACRIN 6698 was the evaluation of quantitative breast diffusion weighted imaging (DWI) for the prediction of response to neoadjuvant chemotherapy (NAC) for invasive breast cancer. For this purpose, serial MRI studies were acquired over the course of NAC in patients with locally advanced breast cancer. The study schema for the ACRIN 6698 Trial is shown in Figure 1 below. ACRIN 6698 was performed at 10 imaging centers as a sub-study of the ongoing I-SPY 2 TRIAL (Investigation of Serial studies to Predict Your Therapeutic Response with Imaging And moLecular Analysis 2); an adaptive, multi-agent phase II trial designed to quickly identify new agents for breast cancer. I-SPY 2 utilizes serial MRI studies to monitor treatment response during NAC and to inform the adaptive randomization engine assigning patients to one of multiple control or experimental drug arms.

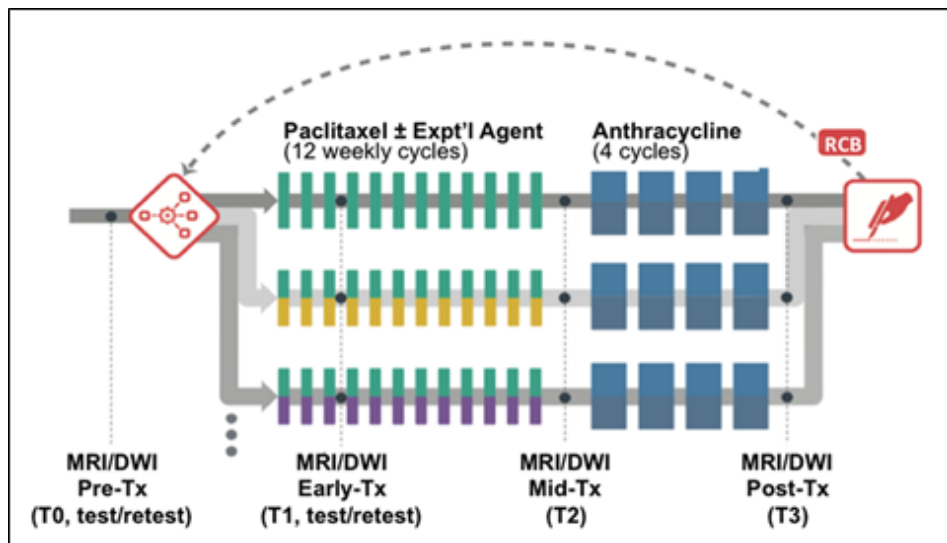


Figure 1. ACRIN 6698 study schema.

## BMMR2 challenge time points for MRI studies

MRI studies performed during the course of NAC at three of the standard I-SPY 2 imaging time points were available for the challenge:

1. Pre-treatment (T0)  
Prior to randomization patients received an MRI study including T2w, 4 bvalue DWI, and dynamic contrast-enhanced (DCE) acquisitions.
2. Early-treatment (T1)  
After 3 weeks of regimen 1 treatment (Paclitaxel with or without an experimental agent).
3. Mid-treatment (T2)  
Between Paclitaxel and Anthracycline (AC) treatment regimens.

## MRI scans included

MR imaging was performed on 1.5 or 3.0 Tesla scanners. All studies include a localization scan plus three required bilateral axial acquisitions:

1. T2<sub>weighted</sub> sequence
2. Diffusion weighted imaging (DWI) sequence (b=0, 100, 600, 800 s/mm<sup>2</sup>, 3-direction)
3. T1<sub>weighted</sub> dynamic contrast enhanced (DCE) sequence (phase duration between 80 and 100sec; at least 8 minutes continuous post-injection acquisition)

Both original images and derived maps and segmentations from the DWI and DCE acquisitions are included in the collection

## Links

Information for the BMMR2 challenge: [MedICI Challenges](#)

Information on the ACRIN 6698 data collection: [ACRIN 6698/I-SPY2 Breast DWI \(ACRIN-6698\)](#)

Information on I-SPY 2 TRIAL: [I-SPY 2 TRIAL](#)

ACRIN 6698 Primary Aim Results: [Diffusion-weighted MRI Findings Predict Pathologic CR](#)

