

# RIDER

**Note:** These collections have been migrated to [The Cancer Imaging Archive \(TCIA\)](#) with the exception of RIDER Pilot. Visit the [TCIA RIDER Collections](#) wiki page to learn more.

## Summary

The Reference Image Database to Evaluate Therapy Response (RIDER) database is a targeted data collection for the purpose of generating an initial consensus on how to harmonize data collection and analysis for quantitative imaging methods as applied to measure the response to drug or radiation therapy. The long term goal is to provide a resource to permit harmonized methods for data collection and analysis across different commercial imaging platforms, as required to support multi-site clinical trials, using imaging as a biomarker for therapy response. Thus the database should permit an objective comparison of methods for data collection and analysis as a national and international resource as described in the first RIDER white paper report (2006):

- [RIDER White Paper: Executive Summary](#)
- [RIDER White Paper: Editorial in Nature.com](#)

All the image data are DICOM compliant and the image, annotations and meta data formats meets all the requirements for caBIG and the NBIA. The data collection has two phases as described below, which have resulted in several distinct image Collections.

## RIDER Pilot (2005-2007)

This data collection was originally supported under supplemental funding for the LIDC U01 project and focused on the collection of longitudinal studies using X-ray CT for monitoring the response to therapy. The data came primarily from MDACC and several of the LIDC academic sites. The data is not annotated.

Pilot Statistics	Value
Modalities	CT, DX
Number of Patients	322
Number of Studies	1,779
Number of Series	4,930
Number of Images	384,535

## RIDER Contracts (2007-Beyond)

NCI has exercised a series of contracts with specific academic sites for collection of repeat "coffee break" and longitudinal phantom and patient data for a range of imaging modalities (currently CT, PET CT, DCE MRI, DW MRI) and organ sites (currently lung, breast, and neuro). The goals are as follows:

1. Develop a consensus on requirements for quantity assurance methods for longitudinal studies using phantom data as applied to each modality above,
2. Develop a consensus on the stability of imaging platforms using repeat and longitudinal phantom measurements over the time period that therapy would be exercised,
3. Develop a consensus on methods to measure the minimum change that can be measured using repeat and longitudinal patient or volunteer studies
4. Provide access to results of measurements performed on these databases by each academic site to encourage a comparison on methodologies,
5. Provide consensus-based juried publications to encourage a broad acceptance of the methods described above.
6. Provide a resource for NCI research networks that address quantitative imaging such as the Quantitative Imaging Network QIN): <http://grants.nih.gov/grants/guide/pa-files/PAR-11.150.html>

The databases are being provided with a timely goal of 18 months time frame, namely from the time the contract was initiated and the published results within less than 2 years. The methods for data collection and analysis including results are described in the new Combined RIDER white Paper Report (Sept 2008): [RIDER White Paper: Combined contracts report \( Sept 2008\)](#)

The RIDER project will be replaced when the QIN initiative is fully implemented as this research network will be tasked to create database resources collected from phase 1-3 clinical trials, where clinical outcomes will be included in the meta data: <http://grants.nih.gov/grants/guide/pa-files/PAR-11-150.html>

## ACADEMIC SITE COLLECTIONS: Focus on methods for data analysis

### MSKCC

- Images contained in "RIDER Lung CT" Collection
- Repeat CT Measurements: Human subjects: Lung
- Download the related lesion notes: [MSKCC RepeatCT Lesion notes for RIDER](#)
- Download the related publication: [Zhaob-RepeatCT Radiology2009.pdf](#)

Lung CT Statistics	Value
Modalities	CT
Number of Patients	32
Number of Studies	46
Number of Series	64
Number of Images	15,716

## UNIVERSITY OF WASHINGTON

- Images contained in "Phantom" Collection
- Repeat measurements: PET/CT phantoms

Collection Statistics	Value
Modalities	CT, PT
Number of Patients	20
Number of Studies	20
Number of Series	60
Number of Images	2,231

- Images contained in "RIDER Lung PET CT" Collection
- Longitudinal PET/CT human studies: Lung

Lung PET CT Statistics	Value
Modalities	CT, PT
Number of Patients	244
Number of Studies	275
Number of Series	1349
Number of Images	269,522

## DUKE UNIVERSITY

- Images contained in "RIDER Neuro MRI" Collection
- Repeat human subject studies: Neuro
- Dynamic Contrast Enhanced studies: DCE MRI:
- Diffusion weighted imaging: DWI MR
- Diffusion tensor imaging: DT MRI.

Neuro MRI Statistics	Value
Modalities	MR
Number of Patients	19
Number of Studies	108
Number of Series	368
Number of Images	70,220

## UNIVERSITY OF MICHIGAN

- Images contained in "RIDER Breast MRI" Collection
- Repeat measurements: Human subjects: Breast
- DCE MRI
- [ISMRM 2009](#) poster demonstrates how each of the "coffee break" exams were used as an estimate of each patient's null hypothesis, i.e. distribution associated with no change, and thus supports the estimate of the null's 97.5 percentile for subsequent estimation of early response to neoadjuvant chemotherapy on an individual patient basis.

Breast MRI Statistics	Value
Modalities	MR
Number of Patients	5
Number of Studies	10
Number of Series	40
Number of Images	2,400

## MDACC

- Images contained in "RIDER Phantom MRI" Collection
- Repeat measurement: Phantom studies
- DCE MRI
- [RIDER\\_MR\\_Phantom\\_Data\\_Summary](#) provides a summary of the images in this collection.
- [RIDER\\_PhantomMR\\_Key](#) provides a key for understanding their presentation in NBIA.

Phantom MRI Statistics	Value
Modalities	MR
Number of Patients	10
Number of Studies	13
Number of Series	45
Number of Images	7,061

## ACADEMIC SITE COLLECTIONS: Focus on harmonized methods for data collection

**MULTI SITE STUDY (Total of 20 sites): Organized under a contract with the University of Michigan ( Under development: 2009)**

- Repeat measurements
- Diffusion Weighted Imaging (DWI)
- Phantom measurements
- Human subjects
- White Paper: <http://www.neoplasia.com/pdf/manuscript/v11i02/neo081328.pdf>

## SOCIETY DATA COLLECTIONS

**RSNA QIBA AND NCI (RIDER and IRAT) (2009-beyond: under development)**

- Multi Site DCE MRI phantom studies using a modified ADNI phantom (<http://www.loni.ucla.edu/ADNI/> )
- <http://www.rsna.org/Research/qiba.cfm>

## OTHER FEDERAL AGENCIES

**FDA CDRH: Partly funded by NCI and NIBIB**

- [Phantom FDA](#)

## NIST

- NIST has NCI NBIA data and data from other data sources
- See Biochange 2008
- <http://www.itl.nist.gov/iad/894.05/biochange2008/Biochange2008-webpage.htm>



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