**Benchmarking Methodology**

**Comparison benchmarks:**
The NRDR quality databases have been in existence since 2008 and provide comparison benchmarks, comparing facilities and physicians to the database as a whole, and to other similar facilities. Some of the measures included on our submission list have been in use since early 2008 (CTC True Positive Rate, and CTC Clinically Significant Extracolonic Findings Rate). Measures ACRad 1 – ACRad 23 have been in use since mid-2011. In early 2017, the Society for Interventional Radiology (SIR) and the American College of Radiology will launch the new Interventional Radiology Registry to promote quality of care for patients undergoing interventional radiology procedures. All our registry reports contain comparisons to all facilities in the registry. Most reports also contain comparisons to similar facilities, such as facilities of the same type, in similar locations, and in the same geographic region. Starting mid-2017, we plan to present comparisons in the form of deciles of performance rates in which a physician falls, to mirror the methodology used by CMS.

**Normative benchmarks:**
Registry data in the Dose Index Registry have been used to develop benchmarks size-specific benchmarks, by CT exam, for radiation exposure. The benchmarks are being published (and the paper has been accepted and is In Press) and will son be available for use by all physician practices, and provide. These benchmarks are being used in the definition of the new registry measures, for example, percent of CT chest exams without contrast that perform at or better than benchmark on Dose Length Product.

**Risk adjustment of quality measures:**
Currently the NRDR does not report risk-adjusted measures. We plan to start developing risk-adjustment models in the next year. However, we use a number of other strategies to ensure comparability:

- We specify the standards fairly narrowly to ensure comparability to peers. For example, for the dose index measures, we map all exam names to a standard lexicon so that exams are compared to similar protocols at peer facilities. All measurements are standardized to the same phantom. Radiation dose indices may be justifiably different for patients of different sizes. For body exams, we report size-specific dose estimates that estimate doses to patient after adjusting the scanner output for patient size. This provides reasonable comparisons across facilities.
- A number of our measures are screening measures, and screen asymptomatic patients. To a large extent, this mitigates the need for risk adjustment because screening populations tend to be similar across patients.

In addition, the feedback reports provide information to help facilities meaningfully compare themselves to peers most similar to them.

- We provide demographic distributions of patients for the mammography measures. The measures are for a screening mammography population that tends to be large, and screening populations (women age 40 and older) tend to not differ too much in distribution across facilities. NRDR feedback reports provide demographic comparisons so that facilities can

examine whether patient characteristics may explain the facility's deviation from registry averages.

- For all registries, we compare facilities to other facilities with similar characteristics, such as same type (academic/community), similar location (metropolitan/rural/suburban), and same geographic region. Patient populations in similar locations may be more similar than patient populations nationwide, and comparisons to narrower peer groups provide better comparisons.

**Examples of comparison benchmarks in use in NRDR:.**
Sample reports illustrating peer comparisons are posted on the NRDR website.
CTC measures:
By facility:
http://www.acr.org/~/media/ACR/Documents/PDF/QualitySafety/NRDR/CTC/CTCSampleReport
By physician:
http://www.acr.org/~/media/ACR/Documents/PDF/QualitySafety/NRDR/CTC/CTCSamplePhysicianReport

Mammography measures:
By facility:
http://www.acr.org/~/media/ACR/Documents/PDF/QualitySafety/NRDR/NMD/NMDSampleFacilityReport
By physician:
http://www.acr.org/~/media/ACR/Documents/PDF/QualitySafety/NRDR/NMD/NMDSamplePhysicianReport

Dose Index measures for CT exams:
http://www.acr.org/~/media/ACR/Documents/PDF/QualitySafety/NRDR/DIR/DIRSampleReport.pdf
At the request of CMS, we are modifying the DIR measures for CMS reporting. We have a paper "In press" in Radiology on size-specific diagnostic reference levels (benchmarks) for radiation doses from common imaging exams. The new DIR measures will measure the percent of exams that are at or better than benchmark. Reports will contain comparisons of each facility's score relative to other peer facilities. CMS reporting will be based on performance of the physician group across all locations at which they practice, and will be benchmarked against other groups.

Lung Cancer Registry measures:
http://www.acr.org/~/media/ACR/Documents/PDF/QualitySafety/NRDR/Lung%20Cancer%20Screening%20Practice%20Registry/LCSR_999999_%20AnnualReport_2015_22DEC15.pdf

General Radiology Improvement Database measures:
http://www.acr.org/~/media/ACR/Documents/PDF/QualitySafety/NRDR/GRID/GRID_999999_2015Q1Q2QCDRExamLevel.pdf

MIPS/QPP Measures:
Physicians and physician groups can view their performance on an interactive portal as they submit data. Prior year benchmark values from CMS are provided in a pdf document on the same page as the performance measures.

Interventional Radiology Registry measures:

Reports and benchmarks are not available for this database yet. Data collection is in pilot phase and we expect facilities to start submitting data in Q1 of 2017. Reports and benchmarks will be posted at https://www.acr.org/Quality-Safety/National-Radiology-Data-Registry/Interventional-Radiology-Registry.