

## ACR Covid-19 Imaging Research Registry (CIRR)

Version 3.3  
 5 Nov 2020

### Registry Summary

<b>Title</b>	ACR Covid-19 Imaging Research Registry
<b>Short Title</b>	CIRR
<b>Clinical Phase</b>	Observational Registry
<b>Number of Sites</b>	No cap
<b>IND Sponsor/Number</b>	Not Applicable
<b>Objectives</b>	<p><b>Primary Objective</b></p> <ul style="list-style-type: none"> <li>Describe the clinical characteristics, demographics, diagnostic tests, and outcomes of patients tested for COVID-19</li> </ul> <p><b>Secondary Objectives</b></p> <ul style="list-style-type: none"> <li>Through aggregate information, better understanding, prevention, and treatment of this novel pandemic viral disease</li> </ul>
<b>Design</b>	Observational data registry of hospitalized patients and out-patient treated individuals tested for COVID-19 with imaging exams performed, using both retrospective and prospective methods
<b>Accrual Objective</b>	No cap
<b>Inclusion Criteria</b>	<ol style="list-style-type: none"> <li>Adult and pediatric population in the USA</li> <li>Adult and pediatric patients tested for Covid-19 on or after 01Jan2020</li> <li>Adult and pediatric patients with at least 1 imaging exam dated on or after 01Jan2020</li> </ol>

## Registry Overview and Goals

The American College of Radiology (ACR) Center for Research and Innovation (CRI) and Data Science Institute (DSI) are developing a central COVID-19 Imaging Research Registry of patients who have been tested for COVID and have imaging exam(s). The ACR registry will include data on patients tested for COVID from US institutions, including demographic information, clinical data on signs and symptoms at time of presentation, imaging exams performed laboratory test data and outcomes. These data are extracted from the electronic health records (EHRs) and imaging picture archiving and communication systems (PACS) of the medical centers who will contribute data. The requested data constitutes a HIPAA limited data set in that it will contain dates, zip codes and imaging device identifiers (make, model, serial number). The registry is being constructed harmonizing COVID clinical data to allow for linkage of information to other existing COVID-19 registries and datasets, with development of common data elements.

The ACR Center for Research and Innovation™ (CRI) supports, designs and manages research studies that aim to translate new evidence into clinical practice. We serve as a partner and a resource for ACR members, academia and industry on clinical trial design and management, and on precision diagnostics and treatment. For over 50 years, our office has been engaging with federal and state agencies, industry, research and philanthropic foundations to conduct single/multi-center clinical trials, quality of life studies, cost effectiveness research, comparative effectiveness research and registries. The CRI is the coordinating center for CIRR collaborating with DSI for informatics activities. ACR Leadership requested various ACR programs make expertise appropriate contributions in supporting ACR membership in the Covid-19 pandemic. A central imaging and data registry is CRI's effort contributing enormously to better understanding, prevention, and treatment of this novel pandemic viral disease.

## Registry Rationale

Given the novelty of the coronavirus and its exponential growth and public health impact worldwide, there exists little understanding or consensus in the medical community around vulnerable populations, optimal diagnostic tests, and targeted therapeutics. Aggregating case data across this country is necessary in order to inform care for patients, inform and develop treatments, and predict vulnerable groups.

The COVID-19 Research Registry will provide fertile opportunity for discovery of new information about the clinical presentation and course of the virus in diverse populations across the US. In addition, it will serve as a resource for the development and testing of artificial intelligence (AI) and machine learning algorithms to be used to predict the course and severity of the disease in given populations and sub-populations, to develop early diagnosis models, and potentially even targeted treatments. The NIH Strategic Plan for Data Science includes a far-reaching plan for the use of big data to stimulate new research discoveries and a COVID-19 research registry to which AI can be applied fits well with the NIH strategic plan. Through the ACR Data Science Institute, the ACR has been applying AI algorithms to various applications used at the point of care for disease management and is poised to apply these algorithms to patient registries. DSI already collaborates with radiology professionals, industry leaders, government agencies, patients, and other stakeholders to facilitate the development and implementation of an AI ecosystem that ensures that AI applications go beyond single institutions and enable radiology professionals to provide improved medical care. Besides AI algorithm research objectives, the data in this registry is envisioned to be used for radiomics research and for virtual clinical trials.

This protocol outlines creation of this registry. Future use of data in the registry for research, education, AI, radiomics, virtual clinical trials, or other will be governed by a Data Access Committee proposal and review process. As those secondary research project proposals require cIRB review, they will be submitted for review at that time as separate projects.

### Risk\Benefit Assessment

The proposed registry is retrospective and prospective. The registry will collect images and data performed as part of routine clinical care in diagnosing and treating COVID-19 patients going back to Jan 1 2020. Secure, anonymized, unique case identifiers and study accession numbers will be transmitted, so that follow-up imaging can be linked back to an index text for a patient without knowing the true identity of the patient. This identifier will also support future linkage with other datasets without disclosing identifiers such as name or date of birth.

The registry's dataset constitutes a HIPAA limited data set in that it will contain dates, geographic data (zip codes) and imaging device identifiers, in make and model names and serial numbers. Procedure dates are necessary for the epidemiologic tracking of the COVID pandemic over longitudinal time and zip codes are necessary to assess geographic impact. Eligible case data will be uploaded from contributing sites as frequently as practical. Sites may opt to submit only de-identified data to the registry by way of their Business Associate Agreement and Participation Agreement.

Because only a HIPAA-defined limited data set will be collected and treatment recommendations or findings will not be sent from ACR to clinicians, the risk and impact to patients is no more than minimal. The benefits to individual patients are also expected to be no more than minimal, since the analysis is retrospective. Aggregated data will provide summary statistics, which are expected to benefit future populations of COVID-19 patients and inform populations vulnerable to the virus by facilitating best practice therapeutics, co-morbidity correlations, symptom correlations, and quality improvement efforts related to clinical applications.

## Specific Aims

The objective of this project application is to create an imaging registry on patients tested for Covid-19. The data collected through this registry will describe the clinical characteristics, demographics, diagnostic tests, and outcomes of patients tested for COVID-19.

Strategic aims of this research registry include -

1. setting up a dynamic, multi-institutional data registry that will integrate diagnostic and clinical information, and will provide a real-time integrated data stream that could serve as a public health surveillance tool;
2. cross-disciplinary collaborations outside of radiology with other clinical experts and diagnostic modalities, including clinical medicine, genetics, biomarker discovery, laboratory sciences, and others.

## Study Design and Procedures

### *Sponsorship*

The proposed registry is sponsored by the ACR and the protocol is held by the ACR. ACR will provide data collection tools to centers contributing DICOM and Non-DICOM data to the registry. After a site receives IRB approval and has fully executed agreements (Business Associate Agreement and Participation Agreement at minimum), ACR will provide site users the data ingestion applications and user credentials to access those applications.

### *Single IRB*

To lower site regulatory activities associated with contributing data to CIRR, this protocol is being submitted to an established central IRB. Sites that contribute data to CIRR are not obligated to use the central IRB, and may opt to route through their own institutional IRB.

### *Data Ingestion*

Only authenticated users will be permitted to access the applications and registry platform. A data-contributing site will have view restrictions to only the data they submitted to the registry. Data ingestion will be facilitated by a collection of applications:

- TRIAD (Transfer of Images and Data) Client
- ACR CONNECT
- Medidata RAVE
- HL7 Listener
- sFTP
- Webform with Validation
- API

Each of these applications support the push or pull in of information to the registry, parsing data, validating data, and de-identification of data. Once received at ACR, registry data will be hosted centrally using ACR's proprietary Dart system (1). Dart is a secure web-based platform for registry data collection and analysis, which is actively used by ACR to host many clinical and research registries. With

its web-based analytics component, Dart allows registry data analysis to be performed directly within its secure environment, eliminating the need to download data for analysis and thereby further enhancing data security.

#### *Steering Committee*

The following individuals are physician members of the steering committee for the registry. It is planned that these institutions will be the first set of data contributing sites into the registry. As additional sites join the registry, a representative from that site will be added to the Steering Committee (above a predetermined minimum number of cases). This committee determines the imaging and clinical data elements the registry will collect. The committee also oversees access to the data by populating a CIRR Data Access Committee (DAC) with a subset of its members. More information on DAC below.

<p><b>Sharyn Katz, MD - Chair</b> Society Thoracic Radiology (STR) University of Pennsylvania Director of Research for Thoracic Radiology</p>	<p><b>Matt Lungren, MD, MPH</b> Stanford University Co-Director, AI Medicine and Imaging Chair, RSNA COVID19 Data Committee</p>	<p><b>Carol Wu, MD</b> MD Anderson Cancer Center Thoracic Radiology STR RSNA</p>
<p><b>Michael Chung, MD</b> Mount Sinai Health System Thoracic Radiology</p>	<p><b>Ella Kazerooni, MD, MS</b> University of Michigan Cardiothoracic Imaging</p>	<p><b>Maryellen Giger, PhD</b> University of Chicago American Association of Physicists in Medicine (AAPM)</p>
<p><b>Adam Bernheim, MD</b> Emory Healthcare Radiology Cardiothoracic Imaging</p>	<p><b>Jayashree Kalpathy-Cramer, PhD</b> Massachusetts General Hospital Center for Machine Learning RSNA</p>	<p><b>Paul Kinahan, PhD</b> University of Washington AAPM Quantitative Imaging Network (QIN)</p>
<p><b>Martin Gunn, MB, ChB</b> University of Washington Diagnostic Radiology NHLBI PETAL Network ASER Secretary and Chair of ASER Research Committee</p>	<p><b>Scott Simpson, DO</b> University of Pennsylvania Thoracic Radiology</p>	<p><b>Jane Ko, MD</b> New York University President, STR</p>
<p><b>Leonid Roshkovan, MD</b> University of Pennsylvania HaEmek Medical Center Israel Thoracic Radiology</p>	<p><b>Tessa Cook, MD, PhD</b> University of Pennsylvania Diagnostic Radiology SIIM</p>	<p><b>Engi Attia, MD, MPH</b> University of Washington Pulmonary and Critical Care Pulmonologist NHLBI PETAL Network</p>
<p><b>Caroline Chiles, MD</b> Wake Forest Baptist Health Center Past President and Chair, STR</p>	<p><b>David Smith, MD</b> Louisiana State University Health Sciences Center Thoracic radiology</p>	<p><b>Pamela Woodard, MD</b> Washington University St Louis Cardiothoracic Radiologist Chair, ACR Commission on Research</p>

<i>ECOG-ACRIN Chair Thoracic Imaging Committee</i>		
<b>Karen Ordovas, MD, MAS</b> <i>University of California San Francisco Cardiac Imaging Chair, ACR Cardiovascular Research Committee</i>	<b>Jeffrey Sachs, MD</b> <i>Wake Forest School of Medicine Neuroradiology Neuro Research Working Group</i>	<b>Nancy Pham, MD</b> <i>UC Davis School of Medicine Neuroradiology Neuro Research Working Group</i>

ACR CRI as CIRR’s clinical coordinating center has established committees of expertise to support the Steering Committee’s scientific work and CIRR administration. Support services CRI provides are:

- Data Ingestion and Management
- Project Management
- Regulatory Affairs
- Press/Marketing
- IT Informatics
- Contracting and Legal

*Privacy and confidentiality*

Only a HIPAA-defined limited data set will be included in the registry, and no identifiable data will be shared outside of the ACR. At each participating institution, a unique random identifier will be assigned to each patient case. Separately from the registry, each individual site PI will maintain a key which associates each case identifier with the patient identifier. This key file will be the responsibility of the site PI and maintained within the institutional firewall. Each participating institution will also be assigned a unique random site identification code by the registry.

*Informed consent*

A waiver of informed consent is requested based on two factors. First, because the registry collects data on clinical care which is already performed as part of each participating institution’s routine clinical practice, inclusion in the registry will not influence or change patient care provided. Waiver of consent would therefore not adversely affect patient rights or welfare.

Second, the registry comprises a limited dataset, and the risk of any potential loss of confidentiality is therefore minimal.

[Business Associate Agreement \(BAA\) and Participation Agreement \(PA\)](#)

ACR will draft a BAA and PA to provide to sites interested in contributing data to CIRR. The documents describe data contribution, processing, access terms and conditions. It clarifies confidentiality agreements, intellectual property, warranties and liabilities, and expiration or termination. The BAA contains Data Use Agreement (DUA) terms however, if a given site requires a separate DUA be executed, ACR can generate and provide one to meet the site’s requirements. These documents must be reviewed and signed by the data contributing site prior to ACR creating site user accounts in any data submission

application for the registry. These documents govern data inflows to the registry. Data access applications for use of data in the registry is a separate process governed by a Data Access Committee.

### Data Access Committee

Requests to access and analyze registry data will be reviewed by the CIRR Data Access Committee (DAC). Members of the DAC will include representation from the collaboration agencies and contributing organizations. The DAC will design the application process and requirement, review all data access and project requests, and approve or deny them considering feasibility, merit, potential conflicts, and impact.

### Inclusion Criteria and Data Elements

Inclusion criteria:

- Patients of all ages
- Patients in the USA
- Encounter on or after 1/1/2020
- Had a Covid-19 test and retest(s), if applicable, meeting any of the following criteria:
  - Lab Confirmed and Unconfirmed Negative
  - Lab Confirmed and Unconfirmed Positive
  - Suspected Positive or Negative

Data transmitted:

- Imaging exams, including procedure dates and device identifiers
- Demographics, including zip code
- Laboratory tests and results, including dates
- Medical history, with dates
- Medications, including start and stop dates when available
- Vital signs, with dates
- Diagnoses and symptom presentation
- Outcome information, with dates
  - Including admission, discharge, death, recovered

### References

(1) DART. Accessed 2019 Apr 23. Available from: <https://dart.acr.org/>