Guidelines for Contributing Imaging and Data to the National COVID-19 Chest Imaging Database

This document is intended to outline the processes required to collect and submit clinical data and images to the National COVID-19 Chest Imaging Database (NCCID).

Introduction

The NCCID is the result of a joint partnership of NHSX and the British Society of Thoracic Imaging (BSTI). Its aim is to enable the validation and development of automated analysis technologies, and to promote research projects in response to the COVID-19 pandemic. Further to the creation of a database, NHSX can accelerate the adoption of technologies that may prove effective in supporting COVID-19 care pathways.

The decision to form a collective effort has been driven by the motivation to consolidate individual data collection activities that are happening across the country into a single project, the NCCID. This is to reduce duplication of effort at a time when efficiency is vital, and ensure that solutions can be executed quickly and at scale.

The benefits of collecting chest imaging data are extensive. X-ray imaging (and potentially CT imaging) are central to the care pathway for suspected cases of COVID-19, and in particular BSTI recommends that: *"imaging (X-ray and CT) may guide individual patient management decisions, deal with complications or look for an alternative diagnosis"*.

Some experts also propose to use image analysis software, including Artificial Intelligence (AI), to speed up triage processes, ease the burden on A&E front line staff, free up Radiologist time, and provide rapid stratification and cohorting to limit within-hospital transmission. It is also hoped that through appropriate linking with other databases, NCCID will underpin statistical models to determine which patients in A&E will need a ventilator during their subsequent hospital stay.

We have worked closely with Royal Surrey NHS Foundation Trust to ensure the data collection process creates the least disruption to clinical practice, and requires the least amount of time and effort from an already heavily pressed workforce. Our solution is based on a successful data collection process for mammography data pioneered by Royal Surrey, and makes use of an existing clinical system, namely the Image Exchange Portal (IEP).

With the aim of speeding up the creation of NCCID, NHSX will provide all the expertise needed to ensure that data sharing agreements can be put in place rapidly and that Information Governance standards are met in full.

We highly appreciate any support that will be offered towards this important national initiative.

How to Participate

If your centre would like to participate, then please contact imaging@nhsx.nhs.uk

What if our centre already collects data for BSTI?

If your centre already collects data for the COVID-19 BSTI Imaging Database, there will be some minor changes to the data collection process.

1. The pseudonymised number is no longer being used. Data will be entered using NHS numbers AND Hospital numbers.
2. The Excel form you will be using going forward has changed slightly with some extra fields (troponin and NHS/Hosp no). Please check carefully when migrating your data to the new spreadsheet.
3. There is a new DPIA to be used which has central NHSX sign-off. We expect this to dramatically speed up local IG clearance at your institution.
4. We want to receive imaging for **all** patients that underwent a Covid PCR swab at your institution regardless of result - so PCR-**positive** and PCR-**negative** cases. The data collection and upload processes will differ for PCR-**positive** and PCR-**negative** cases as outlined below. Identifying all patients undergoing PCR will significantly expand the patient population: for example it would include hospital-acquired covid cases. In this scenario, we would use their imaging and clinical parameters at initial work-up for Covid as the baseline time-point.

We have outlined suggestions for how to identify the new patient population elsewhere in this document. This will essentially be through your virology department who can inform a R&D nurse of the PCR-**positive** and PCR-**negative** patient lists. The R&D nurse can then send PACS the details of the patients whose imaging needs uploading. The R&D nurse themselves will be responsible for uploading two spreadsheets: one for PCR-**positive** and one for PCR-**negative** patients. If you have any further questions, please contact imaging@nhsx.nhs.uk

Data De-identification

Clinical data and images are de-identified at the point of upload. This means that no patient identifiable information will leave your site. Upon upload, a pseudonym will be assigned to the patient. This will be created by a lossful encoding algorithm and complex salt which will produce an encoded pseudonym that allows the linking of the clinical data with the images. In addition, the NHS/CHI number will also be encrypted using an AES encryption algorithm and a complex salt to allow linking with national datasets. **No patient identifiable information will leave your site.** Our DPIA is available on the NCCID web portal (https://medphys.royalsurrey.nhs.uk/nccid/guidance).

Which Patients to Include

Please submit data for patients suspected of COVID-19 that have had a PCR test (**positive** or **negative**), but please note the different upload processes for the two groups (PCR-**positive** and PCR-**negative**).

Which staff should be involved

The processes in place have been designed to be undertaken by non-clinical staff where possible. Our recommendation is that the clinical data collection process can be undertaken by a re-deployed R&D nurse if available. Given that we are requesting that all patients that have received a PCR test are included, we recommend that virology would be able to share a list of NHS/CHI numbers (or hospital numbers) with the R&D nurse. The R&D nurse can then convey the relevant patient numbers to the PACS team in order that they deal with the transfer of the images for these patients via IEP.

To make the process efficient it might be beneficial to get regular lists from virology of patients (PCR-**positive** and PCR-**negative**) who presented over two weeks ago, as they would have outcome data available at the point of data entry.

Data Collection and Submission

For patients who are PCR-**positive,** we are asking that you collect a small number of clinical data points into an excel spreadsheet. In case collecting data throughout the day is easier, prior to transcription into the excel sheet at the end of the day, we have produced a worksheet which may be useful. This can be downloaded from here: https://medphys.royalsurrey.nhs.uk/nccid/guidance

The PCR-**positive** patients can be identified from lists held in your virology department and sent to an R&D nurse. Again, for efficiency and to obtain outcome data, it may be useful to collect data using virology patient PCR lists that are over two weeks old. The R&D nurse can enter the relevant data into a spreadsheet which we would ask you to upload to the NCCID web portal twice a week (Tuesday and Friday if possible). For the same PCR-**positive** patients, the R&D nurse can send the hospital numbers to the PACS department. The PACS department will then send on the relevant chest imaging (all CXRs and chest CTs) to a dedicated NCCID Node on the IEP.

To identify PCR-**negative** patients we would ask that the R&D nurse identify 50 patients twice a week (Tuesday and Friday if possible) that have never had a positive PCR swab on the virology PCR list. After filling in 4 fields in a spreadsheet for the 50 patients, they can send the spreadsheet to PACS, so that PACS can upload the relevant imaging. The R&D nurse will also upload the PCR-**negative** spreadsheet to the NCCID web portal twice a week (Tuesday and Friday if possible).

Extremely Important:
The hospital number (in most cases, unless NHS numbers are used by PACS) is used to link the imaging to the spreadsheet data – hence it is absolutely vital that the hospital number (2ⁿᵈ column) in the spreadsheets are completely accurate and match the ID that Radiology/PACS use as their primary identifier

For example:
- **If Radiology use RR12345678 and the hospital use 12345678, then the spreadsheet Hospital Number (2ⁿᵈ column) must use the Radiology representation (RR12345678)**
- **If Radiology use XX0123456 and the hospital use 123456, then the spreadsheet Hospital Number (2ⁿᵈ Column) must use the Radiology representation (XX0123456)**
- **If Radiology use NHS numbers as their primary identifier and the hospital use X123456, then the spreadsheet Hospital Number (2ⁿᵈ Column) can use the hospital number (X123456)**

The processes for collection and submission are detailed below.

PCR-**positive** Clinical Data Collection and Submission

A spreadsheet is used to collect the list of PCR-**positive** patients and some associated clinical data. This template can be downloaded here:
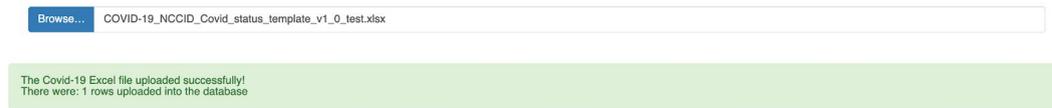https://medphys.royalsurrey.nhs.uk/nccid/guidance

The spreadsheet contains a column for the NHS/CHI number and another for the Hospital number. These identifiable data points will be converted to an encoded pseudonym at the point of upload, hence no identifiable information will leave the site.

Important: It is vital to ensure that only the most up-to-date version of the spreadsheet is uploaded to the website. It is suggested that if any copies are made for backup purposes, these are stored in a separate location to prevent confusion.

Important: it is vital you do not add or remove columns from this spreadsheet as this could affect the automatic data loaders accuracy.

This spreadsheet should be uploaded to the following NCCID web portal twice a week (Tuesday and Friday if possible):
https://medphys.royalsurrey.nhs.uk/nccid (Upload Covid Data (Positive) Section)

You will be given a site account to the NCCID web portal. This login should be used to access the site. The submission process is illustrated below.

1. Login to the web portal (https://medphys.royalsurrey.nhs.uk/nccid). You will need a site account which will be provided for you separately

2. Once logged in, select "Upload Covid (Positive) Data" in the top navigation menu bar

3. Click "Browse…". This will open a file-selection window. Select the Covid-19 Excel spreadsheet to upload into the system. **Important:** always upload spreadsheets based on the most recent template

4. Once you have selected the spreadsheet, the web portal will check to make sure it is correct, and then proceed to upload the data to the collection server. Wait for the

blue bar at the bottom of the page to turn green.

5. If an error occurs the bar will turn red and display an error message. If this occurs please ensure you are using the correct NCCID spreadsheet. If problems continue to occur please contact imaging@nhsx.nhs.uk

PCR-**negative** Clinical Data Collection and Submission

A smaller 4-column spreadsheet is used to collect the list of PCR-**negative** patients. This template can be downloaded here:https://medphys.royalsurrey.nhs.uk/nccid/guidance

The spreadsheet contains a column for the NHS/CHI number and another for the Hospital number. These identifiable data points will be converted to an encoded pseudonym at the point of upload, hence no identifiable information will leave the site.

We would ask for a spreadsheet with 50 PCR-**negative** patients to be uploaded twice a week (Tuesday and Friday if possible) to the following NCCID web portal:https://medphys.royalsurrey.nhs.uk/nccid (Upload Covid Status (Negative) Section)

1. Login to the web portal (https://medphys.royalsurrey.nhs.uk/nccid). You will need a site account which will be provided for you separately

2. Once logged in, select "Upload Covid Status (Negative) Data" in the top navigation menu bar

3. Click "Browse…". This will open a file-selection window. Select the Covid-19 Status spreadsheet to upload into the system. **Important:** always upload spreadsheets based on the most recent template

4. Once you have selected the spreadsheet, the web portal will check to make sure it is correct, and then proceed to upload the data to the collection server. Wait for the blue bar at the bottom of the page to turn green.

5. If an error occurs the bar will turn red and display an error message. If this occurs please ensure you are using the correct NCCID spreadsheet. If problems continue to occur please contact imaging@nhsx.nhs.uk

Image Transfer

NCCID collects images using the Image Exchange Portal (IEP). This is advantageous as the processes for transferring images via IEP are well known and robust. NCCID has a dedicated node on IEP for receiving images that are to be de-identified. The node has been set up such that the images are de-identified as they transition from IEP, meaning that no patient identifiable information is received outside the IEP network. A pseudonym is generated using the same technique as described in the section above (*Data De-identification*). This results in a common pseudonym between the images and clinical data that allows linking of the two datasets.

Important: Many sites have internal processes for requesting image transfers. Where possible, these processes should be utilised.

Once the PACS department has received the lists of PCR-**positive** and PCR-**negative** patients, the images for this patient should be sent to the NCCID IEP node as illustrated below:

1. Visit https://nww.iepservice.nhs.uk/IEP/Home/ (or the standard link you use for IEP)
2. Login

3. In the Top toolbar, click on "Create"
4. Select "Transfer data to".
5. In the Destination Institution, Select "Medical Physics – Royal Surrey County Hospital". **Note:** Royal Surrey County Hospital is the technology provider of NCCID. The controller of data being uploaded is NHS England.
6. Click on Continue

7. Populate the patient details
8. For PCR-**positive patients,** locate any chest X-Ray and chest CT studies **performed within the last three years for this patient**. PCR-**negative** patients locate any chest X-Ray and chest CT studies performed within the last 4 weeks.

9. In the Additional Information Section, Change the Destination Node to "**RESEARCH STUDIES**"
10. Leave the Priority as "Normal" or switch to "Overnight Download"

11. Confirm all information is correct, and click on "Send Transaction". If you want to send another case after this one, then click on "Send and Create Transaction" instead.

Checking if a Case has been Uploaded

The NCCID web portal offers the functionality to check if a patient has already been collected and whether data and images have been transferred. This is accessible here: https://medphys.royalsurrey.nhs.uk/nccid/ (click on NHS/CHI Checker). It is important to note that all NHS/CHI numbers entered are encoded before being submitted, hence no identifiable information will leave the site.

FAQs

What if our centre already collects data for BSTI?

If your centre already collects data for the [COVID-19 BSTI Imaging Database](#), there will be some minor changes to the data collection process, which have been outlined above. If there remain any questions, please contact imaging@nhsx.nhs.uk

What studies should I send?

Send all chest X-rays and CTs for patients suspected of COVID-19 that have had a PCR test.
For PCR-**positive** patients**,** we would ask you to direct your PACS department to send any chest X-Ray and chest CT studies **performed within the last three years for this patient**.
For PCR-**negative**, we would ask you to direct your PACS department to send any chest X-Ray and chest CT performed within the last 4 weeks.
The lists of patients for whom studies need to be sent should be provided to the PACS department by the R&D nurse who themselves will get the lists from the virology department.

Who should send the images?

If your site has internal processes for requesting an image transfer via IEP, then these processes should be adhered to. Given that a large number of cases may be sent over the next few weeks, it would be prudent to liaise with your PACS team. If your site does not have a set procedure for requesting an image transfer, then the above guide illustrates the steps required to transfer images via IEP.

Who do I contact if I have any issues or need help?

You can contact us on imaging@nhsx.nhs.uk