

TRAINING MANUAL: SPRED INTRODUCTION

GETTING STARTED WITH SPRED

Training Prerequisites:

- *Brain-CODE Portal Introduction and Security Guidelines Training Module*
- *Brain-CODE Subject ID Naming Convention Training Module*

What is SPReD/XNAT?

XNAT (www.xnat.org) facilitates common management, productivity, and quality assurance tasks for imaging and associated data. XNAT can be utilized to support a wide range of imaging-based projects.

The original Stroke Patient Recovery Research Database (SPReD) was developed by the Centre for Stroke Recovery and the Rotman Research Institute, Baycrest, as a tool for storing, searching and accessing neuroimaging data based on the open source XNAT neuroimaging database. A revised version of this SPReD database structure now forms part of several larger databases, including Brain-CODE, The Virtual Brain and PURE-MIND. The current version of the Brain-CODE SPReD is based on XNAT.

SPReD/XNAT is a comprehensive database for the storage, management, and analysis of imaging data including MRI, PET, EEG, CT, as well as other types of binary data such as gait measures and pathology

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SPRED ACCESS

How to Access SPReD From the Portal:

1. Visit www.braincode.ca and login with your Brain-CODE Portal credentials
 - a. Please see the *Brain-CODE Portal Introduction and Security Guidelines Training Module* for more information
2. Click the “Data Capture Tools” tab

The screenshot displays the Brain-CODE portal interface. At the top, the Brain-CODE logo is visible. Below the logo is a navigation bar with the following items: Dashboard, Data Capture Tools (circled in red), File Repository, Need Help?, Terms of Use, and My Account. The main content area is titled "Data Capture Tools" and contains four panels:

- Brain-CODE Subject Registry:** Features an icon of two people and an "Enter Data" button.
- REDCap:** Features the REDCap logo and two buttons: "Enter Data" and "Training Site".
- SPReD Neuroimaging Database:** Features the SPReD logo (Powered by XNAT) and two buttons: "Enter Data" and "Training Site".
- LabKey Molecular Data Management System:** Features the LabKey Software logo and two buttons: "Sign In" and "Test Site".

3. To access the SPReD Production instance select “Enter Data”

The screenshot shows the Brain-CODE Data Capture Tools dashboard. The navigation bar includes 'Dashboard', 'Data Capture Tools', 'File Repository', 'Need Help?', 'Terms of Use', and 'My Account'. The main content area is titled 'Data Capture Tools' and contains four tool cards:

- Brain-CODE Subject Registry**: Includes an 'Enter Data' button.
- REDCap**: Includes 'Enter Data' and 'Training Site' buttons.
- SPReD Neuroimaging Database** (Powered by XNAT): Includes 'Enter Data' and 'Training Site' buttons. The 'Enter Data' button is circled in red.
- LabKey Molecular Data Management System**: Includes 'Sign In' and 'Test Site' buttons.

Brain-CODE SPReD Production Instance: <https://spred.braincode.ca/spred>

4. To access the SPReD Training instance select “Training Site”

The screenshot shows the Brain-CODE Data Capture Tools dashboard. The navigation bar includes Dashboard, Data Capture Tools, File Repository, Need Help?, Terms of Use, and My Account. The main content area is titled 'Data Capture Tools' and contains four tool cards:

- Brain-CODE Subject Registry:** Includes an 'Enter Data' button.
- REDCap:** Includes 'Enter Data' and 'Training Site' buttons.
- SPReD Neuroimaging Database (Powered by XNAT):** Includes 'Enter Data' and 'Training Site' buttons. The 'Training Site' button is circled in red.
- LabKey Molecular Data Management System (LabKey Software):** Includes 'Sign In' and 'Test Site' buttons.

Brain-CODE SPReD Test Instance: <https://spreddev.braincode.ca/spred>

- **Never upload real research data to this instance**
- **All data uploaded to this database will be deleted within one month (probably sooner)**
- **For the tutorials within this Training Manual use the Test Instance of SPReD**
- Please email spred@braincode.ca to arrange to have a temporary account and a test project created for you to practice with, on a separate SPReD database that is just for testing. If you are in a training session this may already have been created for you.

OVERVIEW OF SPRED

Data Upload to Brain-CODE via SPReD:

There are three possible routes to upload project data into Brain-CODE from SPReD:

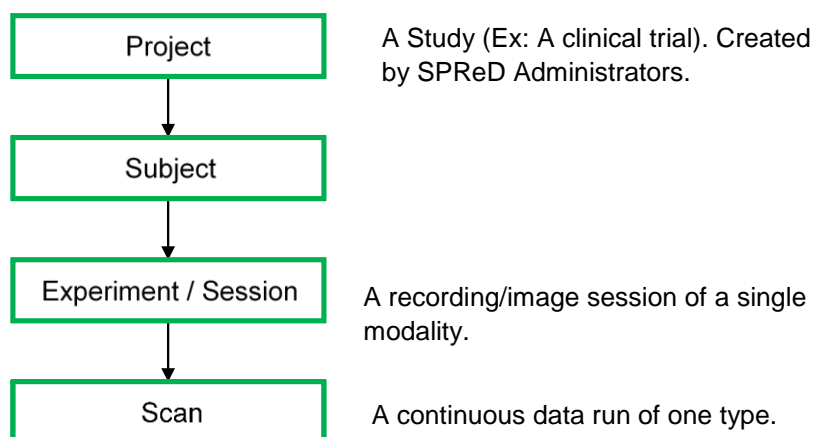
1. **Manually upload data directly into Brain-CODE via the web interface.**
2. **Manually upload data into a local SPReD via the web interface, from which it can subsequently be automatically transferred to Brain-CODE.**
3. **Arrange for an automatic upload from a flat file system into a local SPReD, which can subsequently be automatically transferred to Brain-CODE.**

This training manual will cover how to perform (1) and (2). Option (3) will require custom script development, which you may request instructions for. (See Appendix B)

De-identification:

All data uploaded to Brain-CODE should currently be de-identified, unless you have confirmed with your ID Program coordinator that your program and project are exempt from this requirement. De-identification means that all textual data, including DICOM fields, that could possibly identify the subject are removed, and all images that could possibly allow visual identification of the subject are de-faced. See Appendix A for information regarding the defacing pipeline.

SPReD Central Hierarchy:



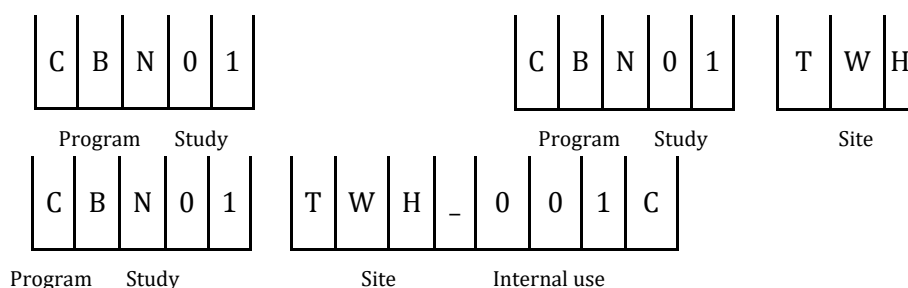
SPReD projects can only be created by database administrators. This ensures that projects have approval and follow the naming convention. Projects are classed as either public, protected or private. Public projects are completely visible and usable by all users. Private projects are only visible to users who have been nominated as owners, members or collaborators. Protected projects are in between: their title and description are visible, but nothing more.

Overview of SPReD Naming Conventions

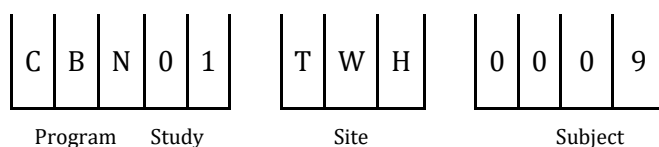
The naming conventions for SPReD data structures are given in Appendix F and summarized here. A SPReD Project ID always begins with a Program and Study code assigned by OBI. These are followed by optional suffixes, separated by underscores:

A 3-character Site code, assigned by OBI (e.g. “TWH”); and

A 4-character suffix reserved for internal use by SPReD Administration. See Appendix F for details. Here are three examples:



Within an OBI research program (“ID Program”), each subject must have a unique Subject ID assigned by the project coordinator, using Program, Study and Site IDs assigned by OBI. An example of a Subject ID is:



Note that with a few exceptions, the majority of IDP projects use 4 digits to record their subject identification number. A handful of studies (e.g., OND03, PND12, etc) use a 5-digit subject identification number. Without the correct subject IDs Brain-CODE cannot associate other data sets (e.g., demographic and clinical measures, genomics, etc.) with the correct imaging data sets. Putting in the correct Subject IDs for your research program is essential. Appendix C outlines what must be done if errors are made when entering filenames or uploading data, as well as tips on how to avoid potentially serious errors such as sharing a subject's data among different platforms.

A SPReD Session ID, e.g. CBN01_TWH_0009_02_SE01_MR, usually consists of the Subject ID followed by: an underscore, a 2-digit Visit ID, “_SE” and a 2-digit session number, another underscore and a Modality code from the list in Appendix F. A multi-modal recording/imaging session is assigned a single 2-digit session number, but corresponds to two or more SPReD sessions, each with a different Modality code. See Appendix F for the complete session naming convention.

Within sessions, each scan has a number and a type. These are assigned automatically during DICOM data uploads (see below), otherwise they are entered manually. When they are entered manually, the scans should usually be numbered consecutively from 1. Scan types begin with the Modality code that appears in the session name, but have an optional suffix that begins with an underscore but is otherwise unrestricted. See Appendix F.

FILE FORMATS

DICOM:

MR and CT scanners typically produce files in DICOM format. This format is understood by SPReD, so that certain metadata, including date and operator, are automatically extracted and displayed once the file is uploaded.

Other Formats:

After processing, MR and CT data files may be in different formats, e.g. NIfTI. Other modalities, including EEG and MEG, have their own, non-DICOM formats. Non-DICOM formats are *not* interpreted by SPReD. They can be uploaded, however their contents will not be interpreted automatically, so any labels such as a recording date must be manually entered. The uploading method is different for DICOM and non-DICOM files.

There are several software tools available to remove PHI from DICOM. All require some human verification. To remove PHI in DICOM fields, we recommend Dicom Browser with a customized tag list based on the supplied base.das . Note that the DICOM standard allows custom (“user-optional”) fields, so each project must review all fields being used.

POSSIBLE EDITS (INCLUDING DELETION) ON SPRED

File and folder names cannot be edited in SPReD, even by SPReD Admin. Thus, the only way to fix an incorrectly named file or folder is to delete it and then re-upload or re-create it. To request a deletion, first make sure that you have a local copy of all data to be deleted (i.e. a copy of the data on your own computer). Then complete the following form and email it to spred@braincode.ca :

DELETION REQUEST

Project:

Subject:

Session:

Item(s) to be deleted (scans, folders, or files):

Do you have local copies of all data to be deleted (Yes/No)?

For files or sub-folders, be sure to fully specify the location of the item to be deleted. A separate request should be submitted for each session. Note that the request will only be fulfilled if you answer “Yes” to the last question.

The request will be granted if one of the following conditions is satisfied:

1. The request is being made by the creator of the session, within 4 weeks of its creation
2. The request is from the relevant ID Program Manager or delegate (or, in a QC project, an IDP Manager or MRI platform lead of any IDP that uses the relevant scanner).

Once the deletion request is fulfilled, which will be confirmed in an email from spred@braincode.ca, you should re-upload or re-create the item(S) with the correct name(s). For example, if a file is misnamed, you should locate it on your local computer, rename it there, and then re-upload it.

Sharing Data

Please note that although it is possible to do so, an individual subject's data should never be shared between their different projects. For example, when on the Subject Page, there is the option of clicking on the “Projects” tab and selecting an option under the heading “Share info”. This is an unintended feature of the XNAT system that SPReD is based upon, and it should not be used; under no circumstances may users share data.

CONTACT INFORMATION

SPReD Administrator: spred@braincode.ca

General Help: help@braincode.ca

RESOURCES

Brain-CODE Portal:

<https://www.braincode.ca>

Introduction to SPReD Training Video:

https://www.youtube.com/watch?v=eIY5_6vmFSs