

# Working with Encrypted Data

In ODK Aggregate

# Install Java and Cryptography extensions

In the LSHTM Application Window,  
Select "Utilities"  
and double click on the "Java x32"  
icon





# Obtain a pair of encryption keys

- You can create a pair of keys for encryption using the open source openssl software
  - <https://www.openssl.org>
- We can also provide keys and will keep a copy of your keys in our locked safe.
- Email [odk@lshtm.ac.uk](mailto:odk@lshtm.ac.uk)
- We will send you a pair of asymmetric encryption keys (either via whatsapp or face to face, not by email)
- The Public Key is used for encryption and is included in your ODK forms
- The Private Key is used for decryption
  - It should be kept on a USB thumb drive in a locked room, safe or filing cabinet.

# Copy the public key in to your ODK form

- The Public Key is a text file that looks something like this if you open it in textedit or similar
- To use the public key with ODK, you first need to remove the line breaks in this file to get the key on one line
- Copy the single-line version of the key to your clipboard

```
~/Dropbox/SHARED_FOLDERS/ODK/Encryption_Stuff/ODK.PUBLIC.KEY.11111.pem
1  -----BEGIN PUBLIC KEY-----
2  MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEA1DXk7dbAI89DscB5M+aB
3  lbvtIUcelkwdYX+CBV9uHdvkCm6g0CJM0nrzjRrhKyty0hSgIRfhIBozIfEJYSwR
4  usz/ClGeNiL8Fz3JGYfnFWLw4ZmNKQwAz2CS/zoI4Mu7QRjmeWPIBohdjHo1hJNI
5  jogme0Iip4GDn+3DgsuvFYXxjkWlXN7opEkxAeBQukQzAxCiWbwdhKwKQzwgzmsu
6  5HqClDkkQQ1Q5Zd/KsdmejWQa/5xDd/g0J0ql+AVzZC1Z9fE0+2HLEEQca8pgWUP
7  XAnPEK2BdNI/ltfPhgK0CE1inXAZxIrDSybePUIyYbIj14aQ30osMpp4EMFFU1rY
8  bQIDAQAB
9  -----END PUBLIC KEY-----
10
```



```
~/Dropbox/SHARED_FOLDERS/ODK/Encryption_Stuff/ODK.PUBLIC.KEY.11111.pem
1  -----BEGIN PUBLIC KEY-----
2  MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEA1DXk7dbAI89DscB5M+aBlbvtIUcelkwdYX+CBV9uHdvkCm6g0CJM0nrzjRrhKyty0hSgIRfhIBozIfEJYSwRusz/ClGeNiL8Fz3JGYfnFWLw4ZmNKQwA:
3  -----END PUBLIC KEY-----
4
```

# Copy the public key in to your ODK form

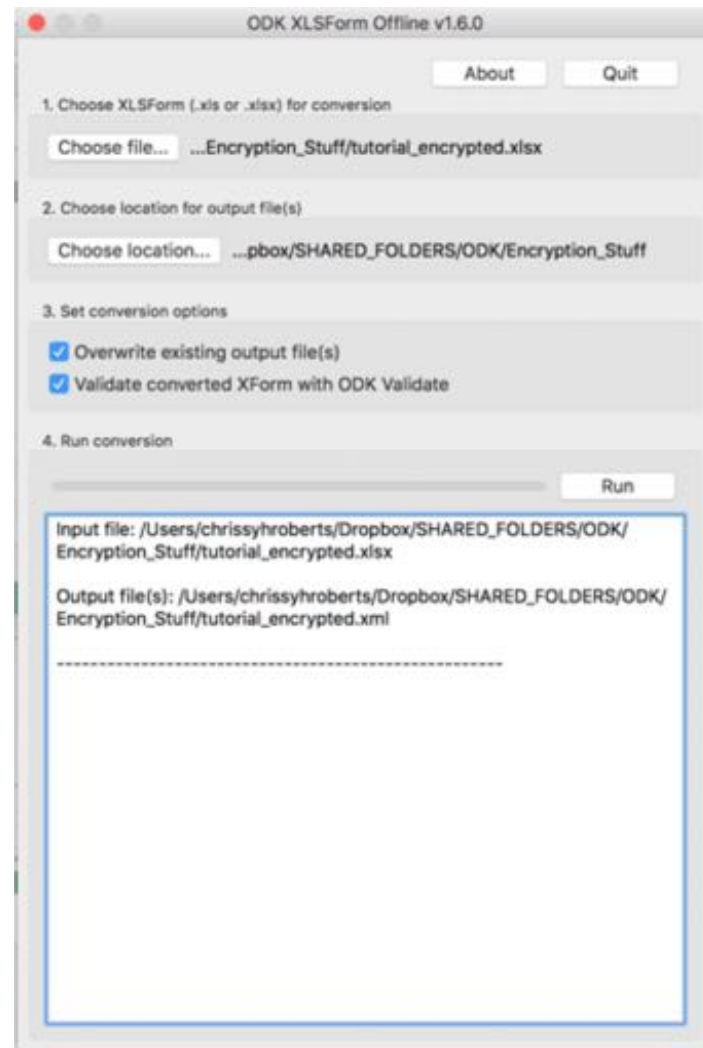
- Paste the single-line version of the key in to your ODK form Excel file
- The key needs to go on a tab called 'settings' and in a column called 'public\_key'
- Both names are case sensitive and should be lower case.

The image shows a screenshot of an Excel spreadsheet with the following details:

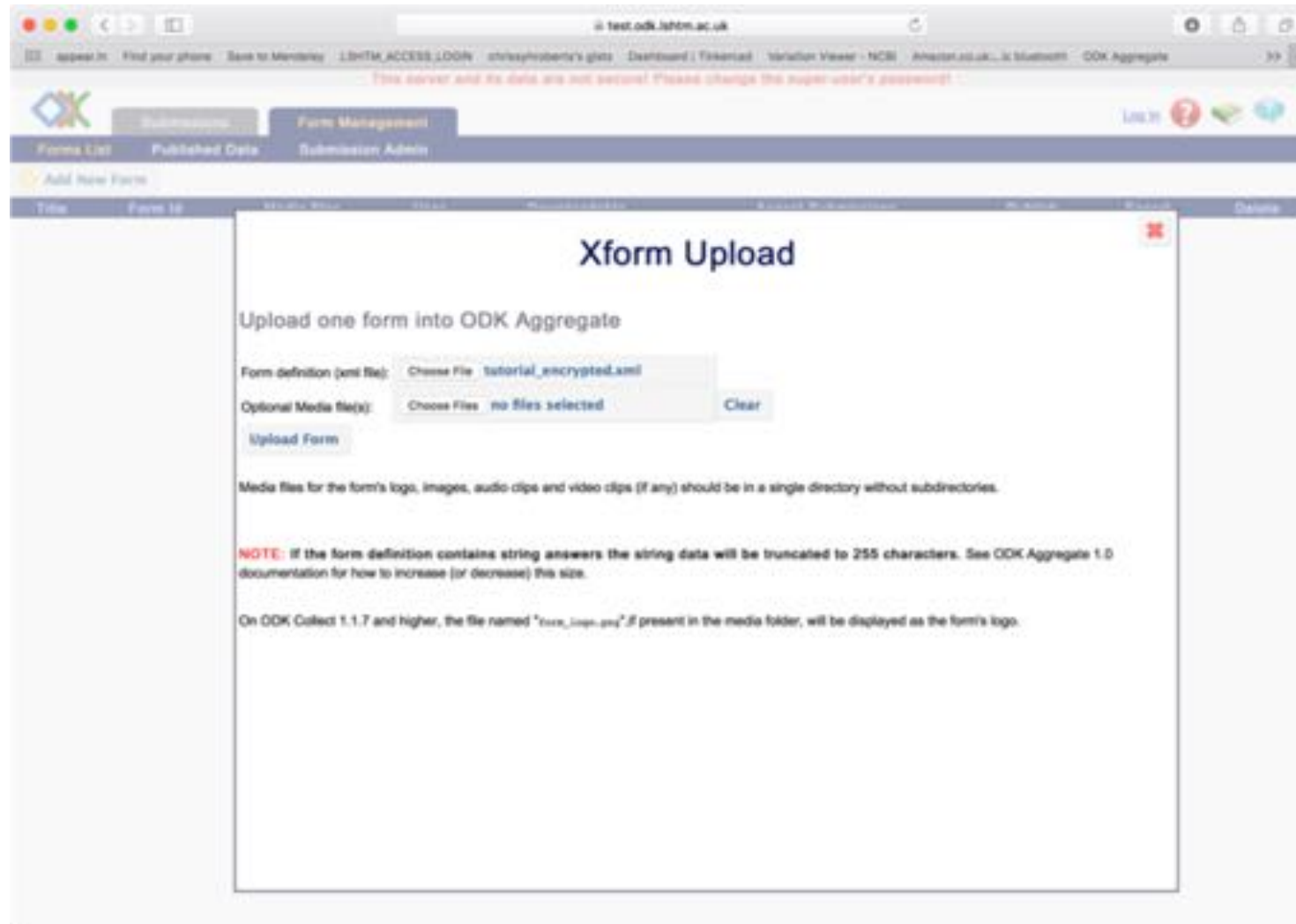
- Worksheet Name:** settings
- Columns:** A (form\_title), B (form\_id), C (public\_key), D (empty)
- Row 1:** Headers for form\_title, form\_id, and public\_key.
- Row 2:** Contains a long alphanumeric string representing the public key.
- Formulas Bar:** Shows the formula for cell C2: `=MII8jANBqkqhkiO9w0BAQEFAAOCAQ8AMIIBCgKCAQEAlDXX7dbAI89DscB5M+aB1vtIUcelkwdYX+CBV9uHdvkCm6g0CJM0nrzRrhK...`
- Annotations:**
  - A blue arrow points from the text "'public\_key' column" to the header of column C.
  - A blue arrow points from the text "'settings' tab" to the 'settings' tab in the bottom sheet navigation bar.
  - A blue arrow points from the text "Public key" to the long alphanumeric string in cell C2.

# Convert your form to XML

- Use ODK XLSForm Offline, available here : <https://github.com/opendatakit/xlsform-offline/releases>



# Upload the XML file to your server



The screenshot shows a web browser window at the URL `test.odk.lshfm.ac.uk`. The page title is "Xform Upload". The interface includes a navigation bar with "Forms List", "Published Data", and "Submission Admin". Below the navigation bar, there is a section for uploading a form. The "Form definition (xml file)" field contains the filename "tutorial\_encrypted.xml". The "Optional Media file(s)" field is currently empty, showing "no files selected". A "Upload Form" button is visible below the form definition field. A note at the bottom of the form states: "NOTE: If the form definition contains string answers the string data will be truncated to 255 characters. See ODK Aggregate 1.0 documentation for how to increase (or decrease) this size." Another note below that states: "On ODK Collect 1.1.7 and higher, the file named 'form\_logo.png' if present in the media folder, will be displayed as the form's logo."

**Xform Upload**

Upload one form into ODK Aggregate

Form definition (xml file):

Optional Media file(s):

Media files for the form's logo, images, audio clips and video clips (if any) should be in a single directory without subdirectories.

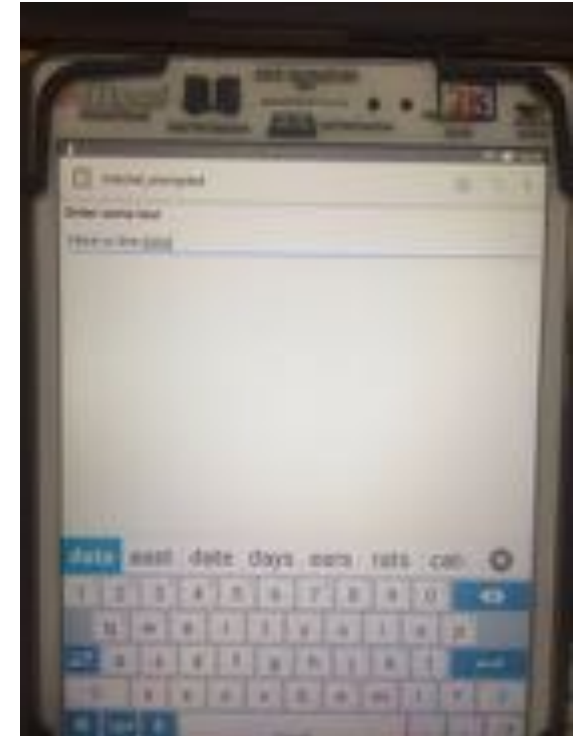
**NOTE:** If the form definition contains string answers the string data will be truncated to 255 characters. See ODK Aggregate 1.0 documentation for how to increase (or decrease) this size.

On ODK Collect 1.1.7 and higher, the file named "form\_logo.png" if present in the media folder, will be displayed as the form's logo.



# Connect your Android device to the server

Get the blank form from the server, then fill and submit a test form



# The data in the submissions view is now encrypted

The screenshot shows a web browser window with the URL `test.odk.lshtm.ac.uk`. A red warning banner at the top reads: "This server and its data are not secure! Please change the super-user's password!". The application interface includes a navigation bar with "Submissions", "Form Management", and "Site Admin" buttons. Below this, there are tabs for "Filter Submissions" and "Exported Submissions". The main content area displays a form titled "tutorial\_encrypted" with a "Filter" set to "none". On the left, there are buttons for "Save", "Save As", and "Delete", along with a "Submissions per page" dropdown set to "100" and a "Filters Applied" section with an "Add Filter" button. The main table shows a single submission with a red error icon and a long string of encrypted data: `ApEcy9OcbZ3cZnqY3RlshKCAZ6HweQHLY7ax1kpARpGHje11NEJw5cLUORicZYyyaq2NuzEUHOtbU+0b7E11pNpAQHsfDySbCoZP6opJ3pRxdUQxdluOvO0TXC70`. A blue arrow points from the text "Here is the encrypted data" to this string.

Here is the encrypted data

# Download ODK Briefcase

<https://opendatakit.org/download/4476/>

Copy the "ODK Briefcase vx.x.x Production.jar" file to a folder on your hard drive

Double click to open the ODK Briefcase Software.

You may have to allow security privileges on some computers.

On Mac OS you may need to go to "system preferences > security & privacy" then unlock the preference pane and click 'Anywhere' under the "Allow apps downloaded from" section.

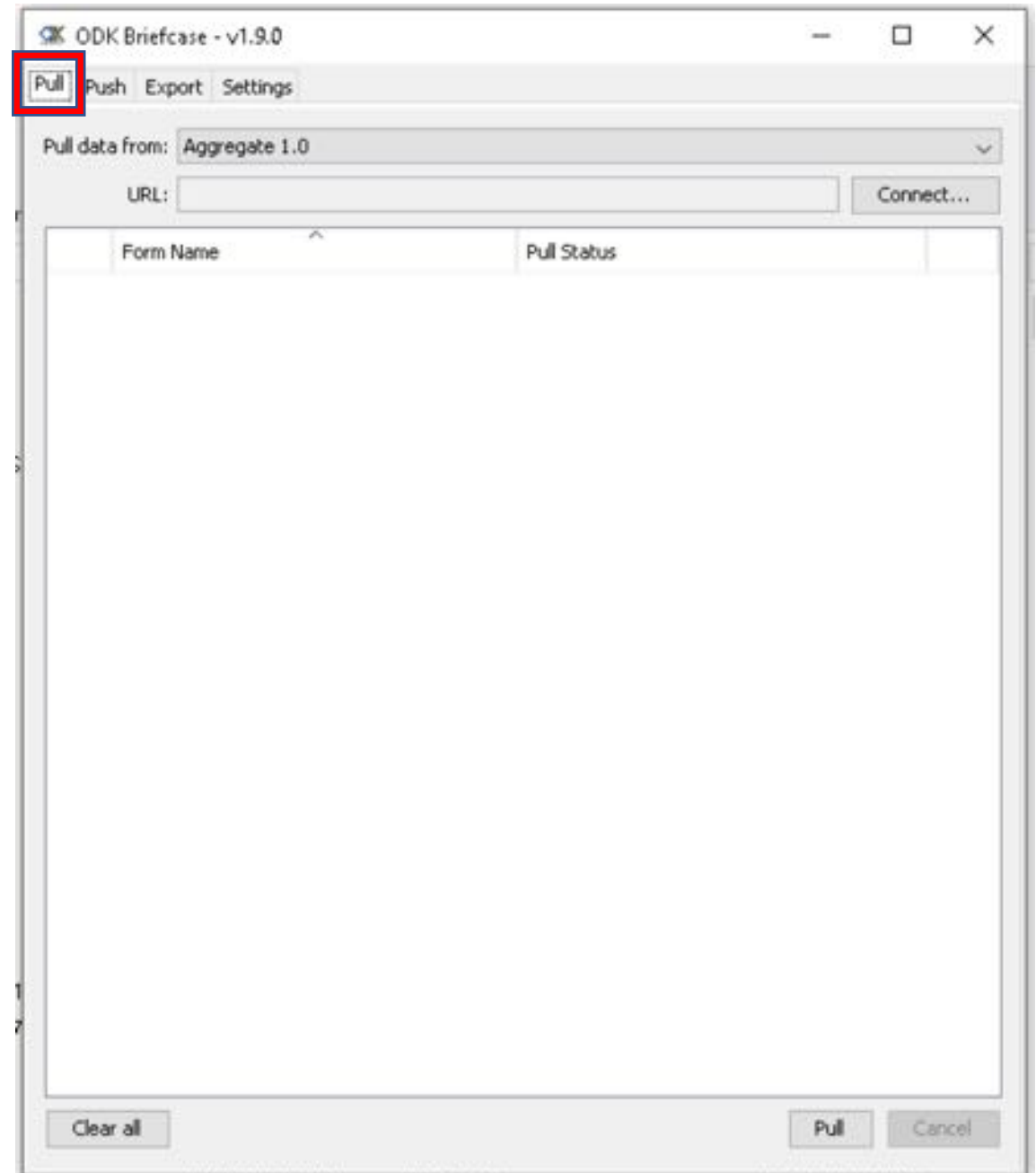


ODK Briefcase

# Set the download folder

This is the folder in which all of your data will be saved and decrypted

It should not be a folder on a filesharing system such as Dropbox, nor a folder which is automatically backed up to an unsecured drive.



# Connect to the ODK aggregate server

Click the 'connect' button



# Connect to the ODK aggregate server

Change the url to match the location of your server

Enter the user name and password of an administrator account and press the 'Connect' button.

## IMPORTANT

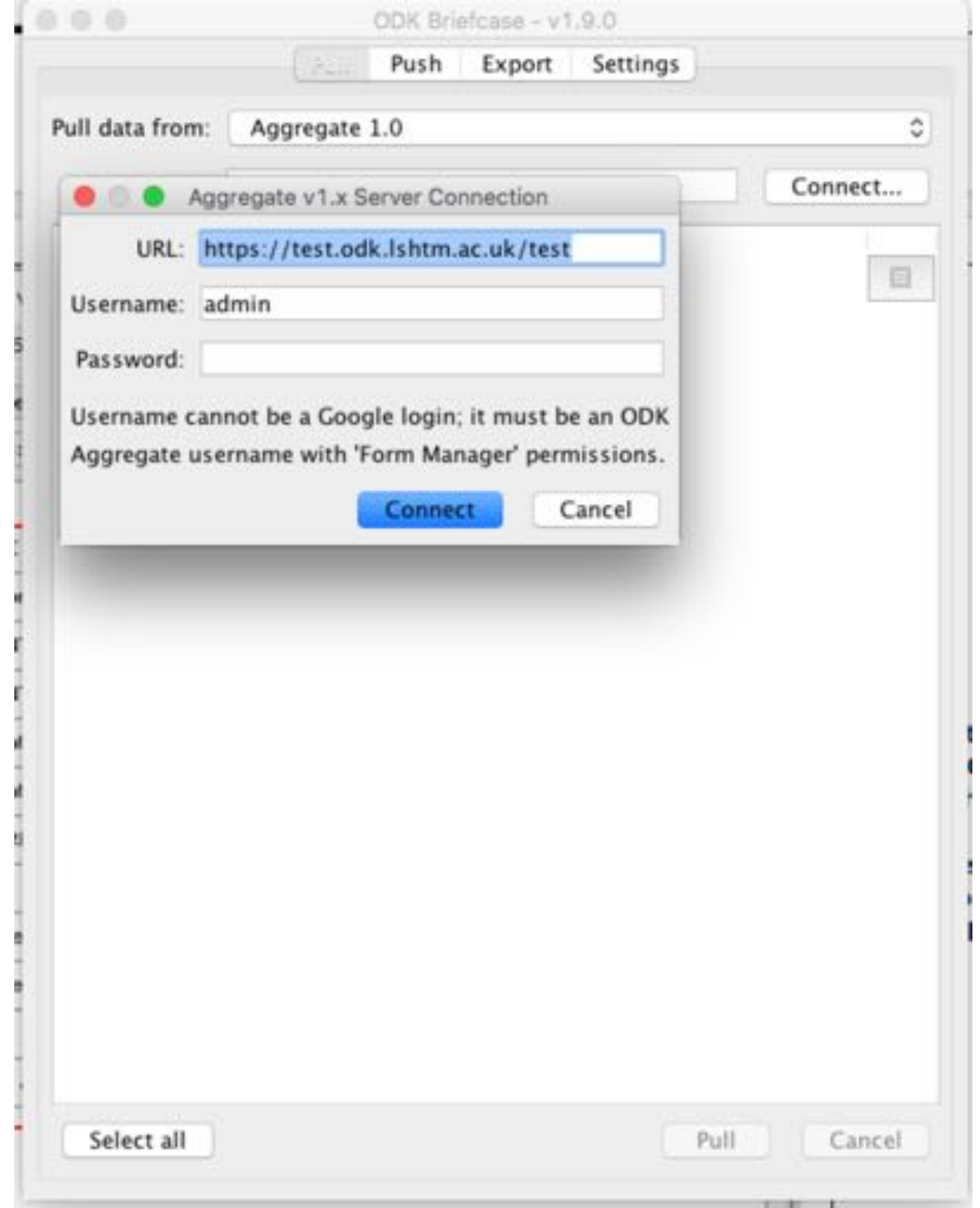
The URL needs to include the main folder for the data. This folder's name is the same as your server's name

i.e. if your url is

`https://test.odk.lshtm.ac.uk`

then the url you enter in ODK Briefcase should be

**`https://test.odk.lshtm.ac.uk/test`**

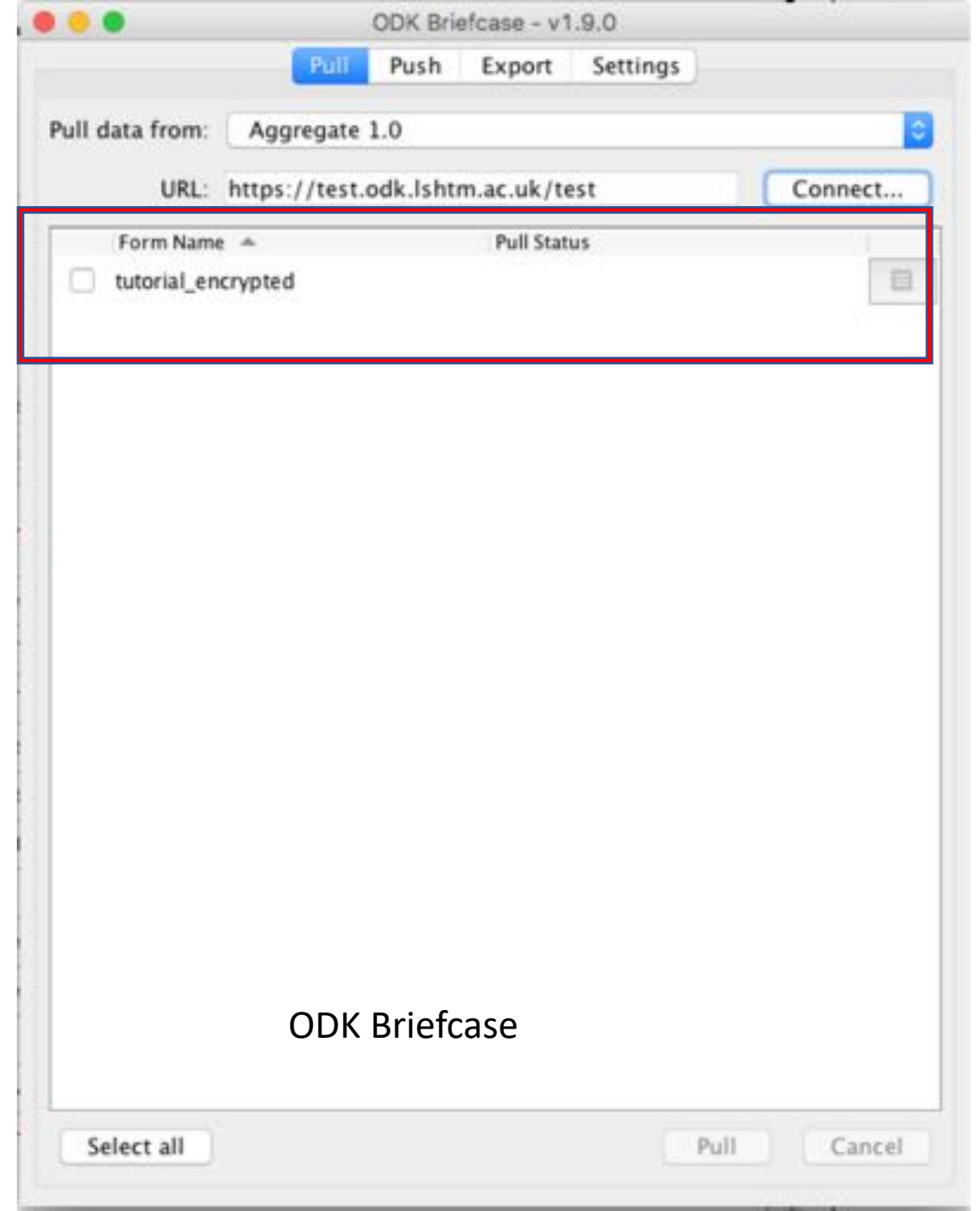


# Pull data from the ODK aggregate server

ODK Briefcase will now list all the forms that you can copy from the server on to your machine. This action is called a 'pull'.

Tick the box next to the forms you want to pull or press the 'select all' button

Press the 'Pull' button to pull your data in to the folder you specified earlier.



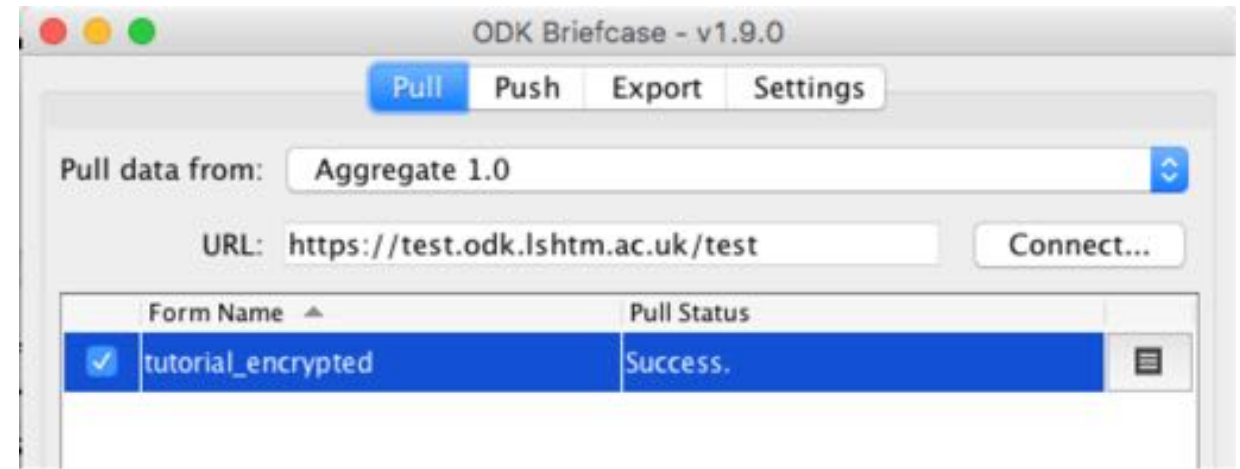
# Pull data from the ODK aggregate server

All successful pulls will be flagged 'success' in the "Pull Status" column.

In your download folder you will now find this directory structure

There will be one uuid folder for each form you submitted to the server.

Inside each of these folders you will find encrypted files



## Download Folder

- > ODK Briefcase Storage
  - >forms
    - >tutorial\_encrypted
      - >instances
      - >uuid....

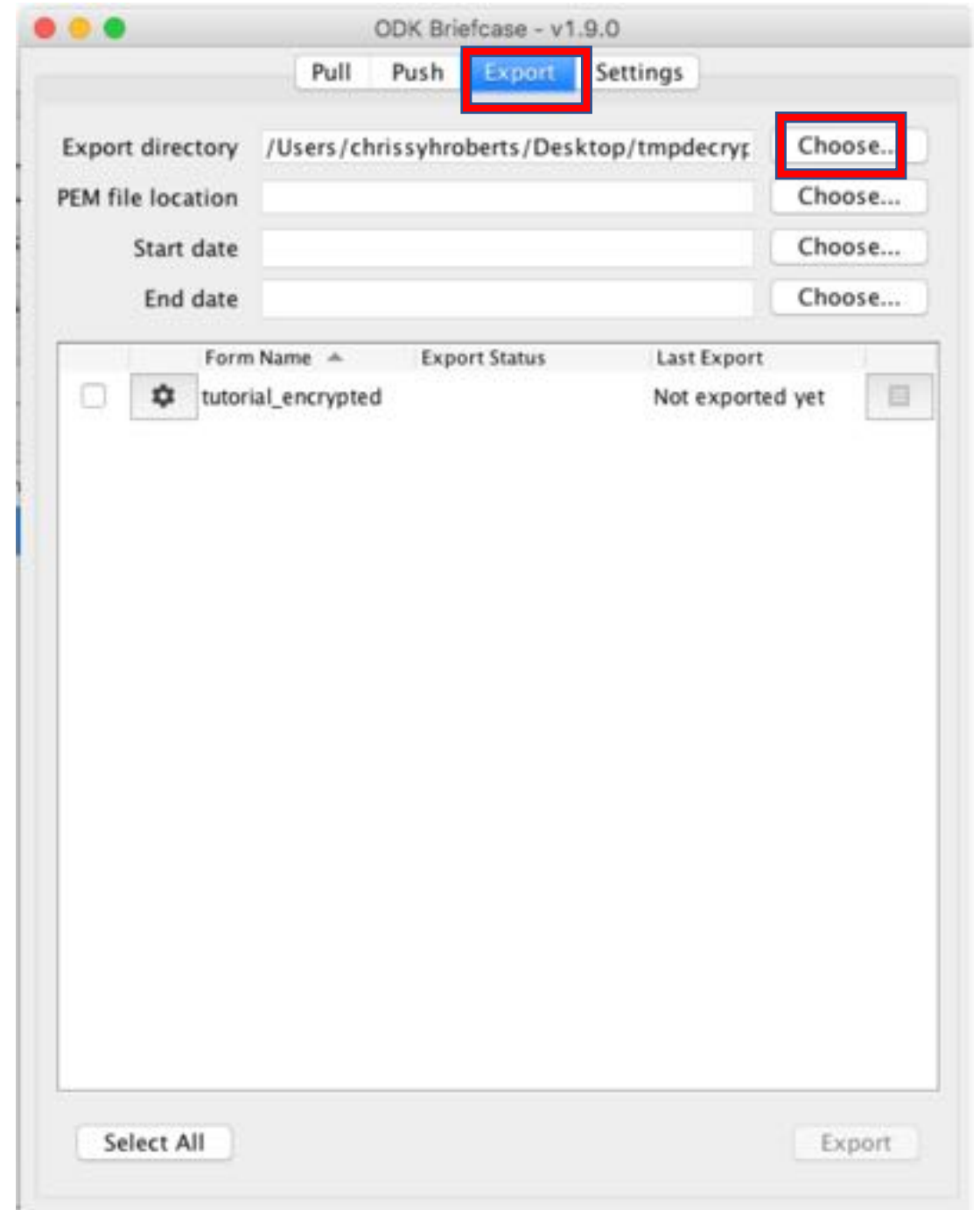


# Export and decrypt the data from Briefcase

Click the 'export' tab

Click the 'choose' button next to "Export Directory" and choose a directory in which to export the decrypted data

This folder should not be on Dropbox etc., nor on folder backed up to encrypted media.



# Select the location of the private key

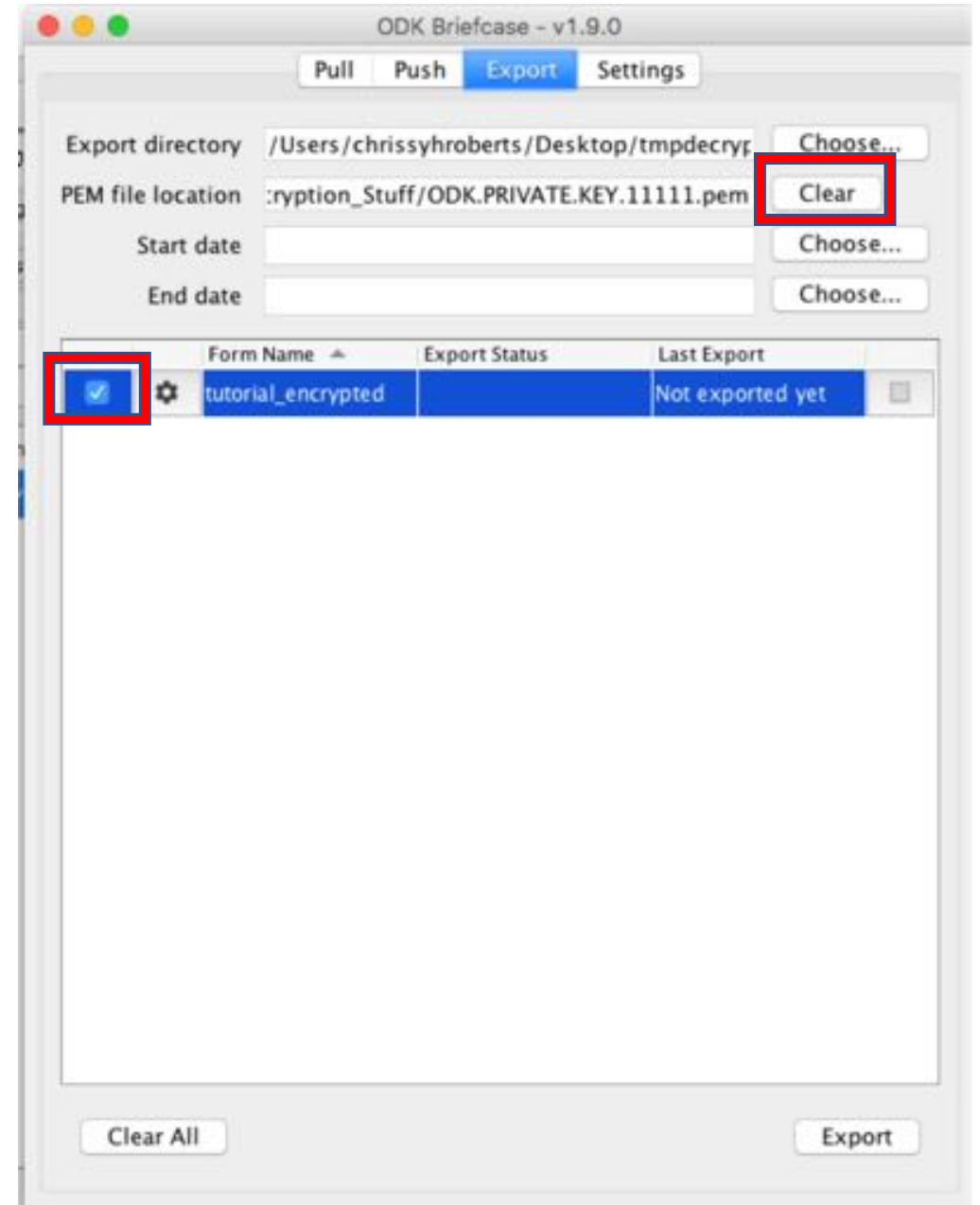
Click the 'export' tab

Click the 'choose' button next to "PEM File location"

Find the private decryption key

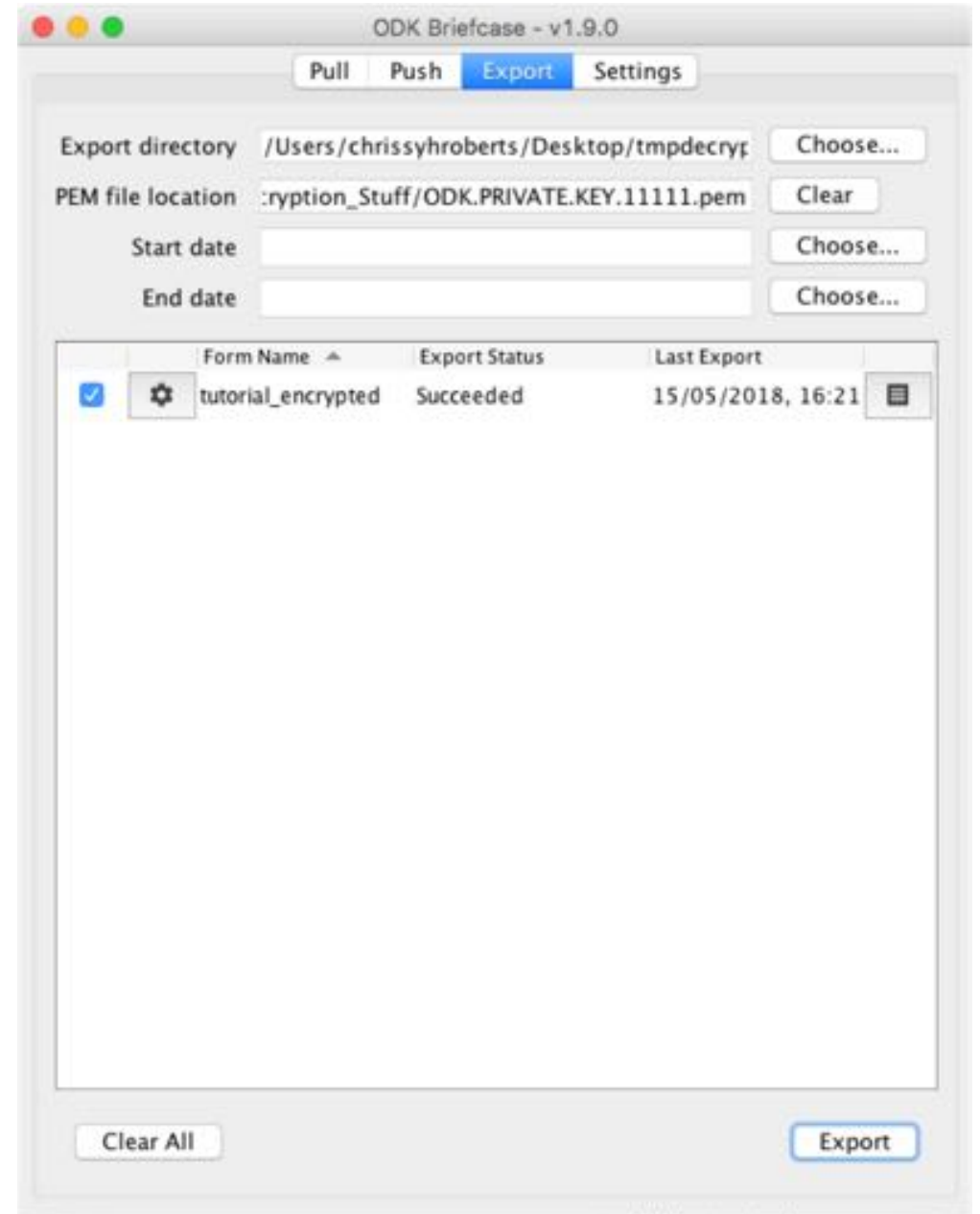
Select the forms you wish to decrypt

Press 'Export'



# Export and decrypt the data from Briefcase

Export Status will change to 'Succeeded' if everything went well.

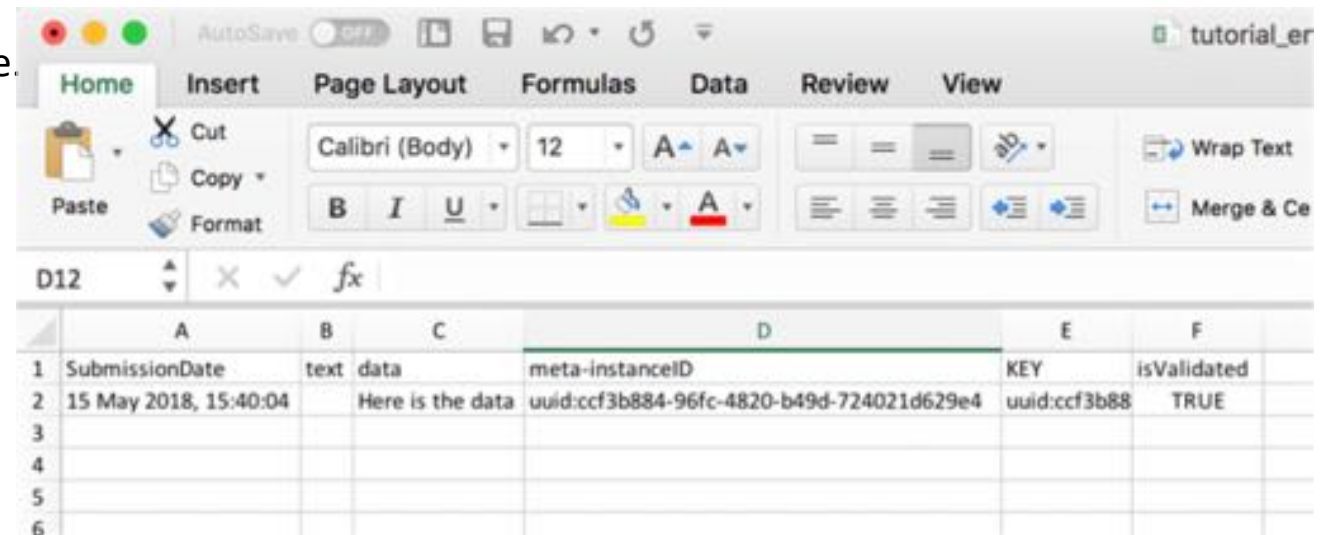
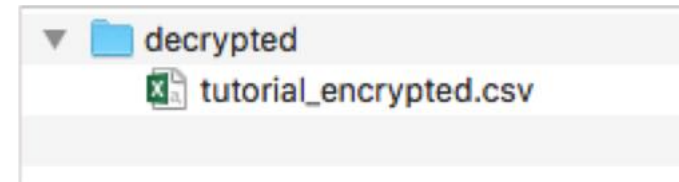


# Export and decrypt the data from Briefcase

In the export directory you will find a new folder called 'decrypted'

Inside should be a csv file, which can be opened by R, STATA, Excel or text editors.

If there are photos, videos or sound recordings in your form, there will be a 'media' folder which contains these. The file paths to these media files will be updated automatically in the CSV document.



The screenshot shows the Microsoft Excel interface with the 'Home' tab selected. The file name 'tutorial\_er' is visible in the top right corner. The spreadsheet contains the following data:

	A	B	C	D	E	F
1	SubmissionDate	text	data	meta-instanceID	KEY	isValidated
2	15 May 2018, 15:40:04		Here is the data	uuid:ccf3b884-96fc-4820-b49d-724021d629e4	uuid:ccf3b88	TRUE
3						
4						
5						
6						