

# Community Health Maps Lab Series:

## Lab 1B—Field Data Collection With Android Devices

**Objective: Understand Field Data Collection**

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**OpenDataKit**  
magnifying human resources through technology



**ANDROID**

This course is a collaborative effort between the National Library of Medicine, the Center for Public Service Communications, and Bird's Eye View.

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## 1. Introduction

Rather than focusing on the use of expensive GPS receivers, we envision the use of smartphones and tablets for these reasons:

- Most community-based organizations already have them
- Many know how to use them
- They're intuitive
- They're portable
- They come with an onboard GPS receiver (iPhone 5 uses GPS + GLONASS)
- Have onboard cameras
- Can connect to wireless networks
- Access to the Internet
- Email is available
- "There's an app for that!"

Equally as important, they are accurate enough for most public health community mapping needs. For a discussion on their accuracy, read this Community Health Maps [blog post](#) on smartphone accuracy.

There are a myriad of data collection apps available. Part of choosing one comes down to the operating system you are using. In this lab, students will explore field data collection using Android phones and tablets. You will learn how to use the free app ODK Collect.

This lab includes the following tasks:

- Task 1 – Create an account on FormHub.com
- Task 2 – Develop a data collection form
- Task 3 – Install the ODK Collect app on your mobile device
- Task 4 – Collect field data
- Task 5 – Download data from the server

## 2. Objective: Explore and Understand Field Data Collection

In this lab exercise, you will learn how to set up an iPad or iPhone to collect health care facility locations, including the name, facility type, facility contact information, collector's name, the date, and photographs of each. You will then go outside with your configured Android device and collect some field data.

## 3. Lab Tasks

### Task 1. Create an Account on FormHub.com

The mobile ODK Collect app you will be using for field data collection has a [companion website](#): <http://www.formhub.org/>. Here you can establish a free account. Later you will be using this site to develop your data collection form.

- 1) To begin you will establish a free online account at the [FormHub website](#).
  - a) Open this web page.
  - b) Click **Sign Up**.
  - c) Register for an account.



Figure 1. FormHub website

- d) You will receive an email asking you to activate your account.
- e) Follow the instructions in the email to activate your account.

## Task 2. Develop a Data Collection Form

Now that you have a FormHub account, you will learn how to design a data collection form.

In this task, you will identify the data you will collect in the field. The FormBuilder site allows you to design a custom questionnaire form using Microsoft Excel. There are many different data elements to choose from while designing your form, such as text, integer, date, time, select\_one, pick list, geopoint (coordinates), and photo.

It is important to think about your data collection project goals prior to developing your form. The table below shows an example of a data collection form for public health facility locations. The input name is on the left. The field collector will see that question on the mobile device. On the right is the iForm input type. This is the type of data collected. Below we will walk through how to build this form. After walking through this example, you will be ready to design your own form!

Input Label	Input Type	Field Name
What is the site name?	text	site_name
What is the facility type?	select_one	facility
What is the phone number?	phonenumber	phone
Take a photo	photo	photo
Record the location	geopoint	location
Data Collector Name	text	collector
Today's Date	date	date

Table 1. Sample form

### Getting Started

- 1) Open a web browser and navigate to the [FormHub website](#).
- 2) Click **Sign in** (upper right) and log into your account with your email and password.
- 3) You will begin by studying the FormHub tutorial spreadsheet.

- 4) Download the [tutorial Excel spreadsheet](#) from the link in the upper right corner. (In case the website is slow or unavailable, the form has been provided in the lab data folder.)
- 5) Open the spreadsheet in MS Excel or Open Office Calc.

	A	B	C	D	E	F	G	H	I	J	K	L
1	type	name	label	hint	required	constraint	constraint_message	relevant	default	appearance	calculation	
2	text	name	What's your name?		yes							
3	integer	age	How old are you?		yes	\$(age) > 0 and \$(age) < 120	That's not a valid age!					
4	select_one	gender	Gender									
5	photo	photo	Take a picture									
6	date	date	Date									
7	geopoint	location	Where are you?	You need to be outside for your GPS to work.								
8	select_one	yes_no	Do you like pizza?									
9	note	pizza_hater	That's weird!									
10	select_one	pizza_types	Best pie?									
11	select_multiple	pizza_toppings	Favorite toppings									
12	note	thanks	Thanks for your time \${name}!									
13												
14	start	start_time										
15	end	end_time										
16	today	today										
17	imei	imei										
18	phonenumber	phonenumber										
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

Figure 2. Tutorial.xls form – survey tab

- 6) This tutorial spreadsheet has 11 columns on the **survey** tab and 4 on the **choices** tab. This spreadsheet can be used as a starting place for new forms. The sheet names must stay as **survey** and **choices**.
- 7) Starting with the **survey** tab there are three main columns:
  - **type** contains the data column format (text, integer, photo, geopoint, etc.). If the type is **select\_one** or **select\_multiple** it will be followed by the option list name. The option list name is found in the **list\_name** column of the **choices** tab (described below).
  - **name** contains the field column name. Use lower-case letters. There should not be any spaces or special characters in column names. Use underscores in place of spaces.
  - **label** contains the question to be answered by the data collector.

There are an additional eight columns for more advanced forms:

- **hint** is a hint for the field data collector.
- **required** specifies whether a particular question is required or not.
- **constraint** provides a means of constraining the values to values that are valid or expected. In tutorial.xls there is a constraint for the **age** column. It reads:  $\$(age) > 0$  and  $\$(age) < 120$ . This means that you will only be able to enter an age value between 0 and 120.
- **constraint\_message** provides a message to the field data collector when an invalid value is entered.
- **relevant** allows you to enter an expression that must return true for the question to appear to the data collector. In tutorial.xls there are values entered as  $\$(pizza\_fan) = 'no'$  and  $\$(pizza\_fan) = 'yes'$ . These questions will only be presented if the person answers no or yes to being a pizza fan.
- **default** provides a means of entering a default value for a question.
- **appearance** allows you to change the appearance of questions on the form.
- **calculation** allows for more advanced calculations to be integrated with the values.

8) The **choices** tab contains four columns described below. These are for use in multiple choice option lists.

- **list\_name** is the name of the choice list.
- **name** is used for listing the values associated with each list.
- **label** is how the option will be presented to the data collector.
- **image** can be used to point to an image that will be associated with a question.

	A	B	C	D
1	<b>list name</b>	<b>name</b>	<b>label</b>	<b>image</b>
2	yes_no	yes	Yes	
3	yes_no	no	No	
4				
5	gender	male	Male	
6	gender	female	Female	
7				
8	pizza_types	nyc	New York think crust!	
9	pizza_types	chitown	Chicago deep dish!	
10				
11	pizza_topping s	cheese	Cheese	
12	pizza_topping s	pepperoni	Pepperoni	
13	pizza_topping s	sausage	Sausage	
14	pizza_topping s	green_pepper s	Green Peppers	
15	pizza_topping s	mushrooms	Mushrooms	
16	pizza_topping s	anchovies	Anchovies :)	

**Figure 3. Tutorial.xls form – choices tab**

9) The spreadsheet tabs and the column headers must not be changed. The other contents can be modified to create your custom form.

### Creating a New Blank Form

- 1) The tutorial.xls spreadsheet can be used as a template for a new form. Save tutorial.xls to the lab folder and name it **health\_care\_facilities.xls**. (**Note:** The spreadsheet must be in .xls format! Do not save it as an xlsx or ods file.)
- 2) On the **survey** tab select and delete all the values but leave the field names intact.

	A	B	C	D	E
1	<b>type</b>	<b>name</b>	<b>label</b>	<b>hint</b>	<b>required</b>
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Figure 4. health\_care\_facilities.xls with cleared survey tab

- 3) Repeat this procedure for the **choices** tab.
- 4) Now you will begin to design the health care facilities survey form. Enter the parameters for it:
  - **type** = *text*
  - **name** = *site\_name*
  - **label** = What is the site name?

	A	B	C
1	<b>type</b>	<b>name</b>	<b>label</b>
2	text	site_name	What is the site name?
3			
4			

Figure 5. health\_care\_facilities.xls with the first survey question completed

- 5) The next question will be of type select one. Click on the **choices** tab. Complete as shown in Table 2 and in Figure 6.

List Name	Name	Label
facility_types	hospital	Hospital
facility_types	clinic	Clinic
facility_types	community health center	Community health center
facility_types	urgent care	Urgent care
facility_types	nursing home	Nursing home
facility_types	hospice	Hospice
facility_types	laboratory	Laboratory
facility_types	other	Other

Table 2. Choices tab option list items

	A	B	C	D
1	<b>list name</b>	<b>name</b>	<b>label</b>	<b>image</b>
2	facility_types	hospital	Hospital	
3	facility_types	clinic	Clinic	
4	facility_types	community health center	Community health center	
5	facility_types	urgent care	Urgent care	
6	facility_types	nursing home	Nursing home	
7	facility_types	hospice	Hospice	
8	facility_types	laboratory	Laboratory	
9	facility_types	other	Other	
10				

Figure 6. health\_care\_facilities.xls choices tab with the option list completed

- 6) Switch back to the **survey** tab.
  - **type** = select\_one facility\_types
  - **name** = facility
  - **label** = What is the facility type?
- 7) The remainder of the form is straightforward. Complete it. You can reference Table 3 and Figure 7 if need be.

Type	Name	Label
text	site_name	What is the site name?
select_one facility_types	facility	What is the facility type?
phonenummer	phone	What is the phone number?
photo	photo	Take a photograph
geopoint	location	Record the location
text	collector	Data collectors name.
date	date	Today's date.

Table 3. Survey tab items

	A	B	C	hint
1	<b>type</b>	<b>name</b>	<b>label</b>	<b>hint</b>
2	text	site_name	What is the site name?	
3	select_one facility_types	facility	What is the facility type?	
4	phonenummer	phone	What is the phone number?	
5	photo	photo	Take a photograph	
6	geopoint	location	Record the location	
7	text	collector	Data collectors name.	
8	date	date	Today's date.	
9				

Figure 7. health\_care\_facilities.xls completed survey tab

- 8) Save your form and close Excel when you are finished.

## Uploading Your Form to FormHub

- 1) Now that you have completed your form, you will upload it to your FormHub account.
- 2) Open a web browser and navigate to the [FormHub website](#).
- 3) Click **Sign in** (upper right) and log into your account with your email and password.
- 4) On the **Upload** tab in the upper left corner click the **Choose file** button, navigate to your lab folder, and select **health\_care\_facilities.xls**. Click **Open**.
- 5) Click **Publish**.

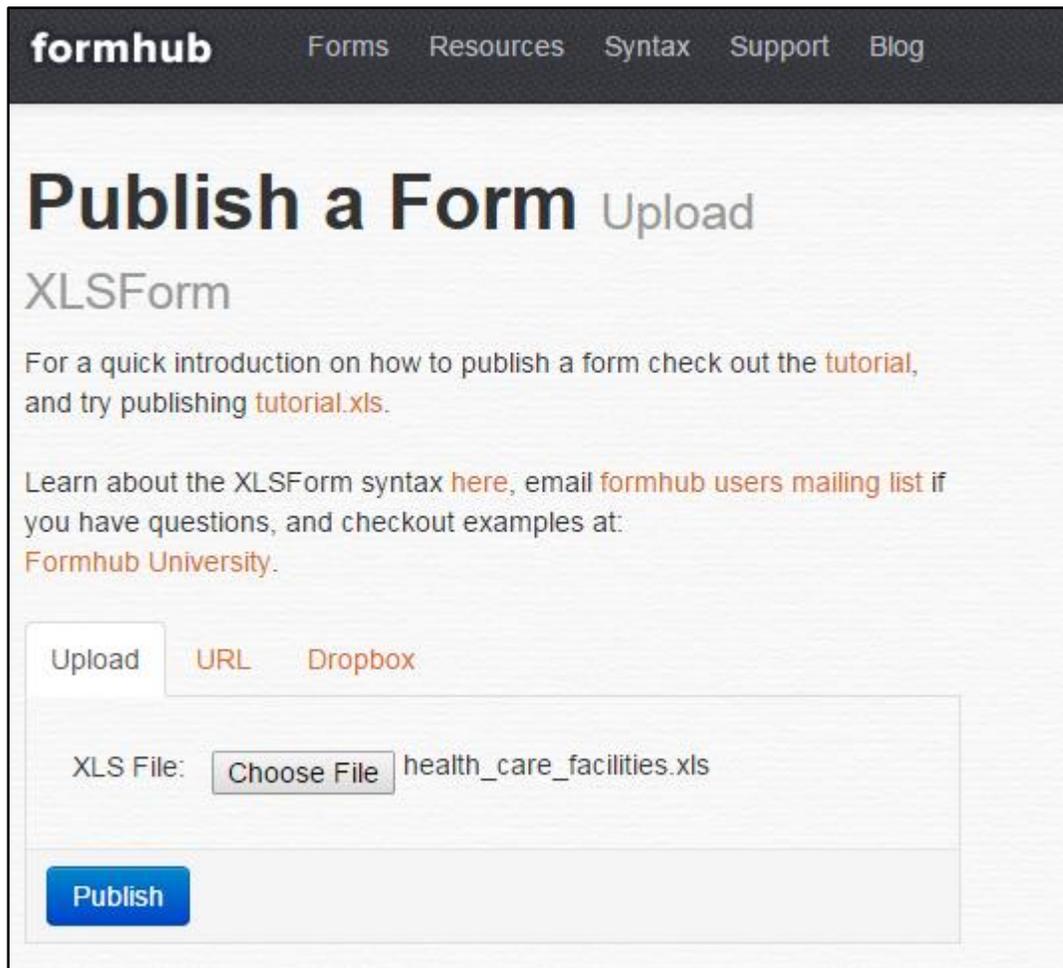


Figure 8. FormHub page with health\_care\_facilities.xls selected

- 6) FormHub does a syntax check as it imports the file. You should see a light green banner telling you it has been successfully uploaded. **Note:** If you have any syntax errors, the top of the page will display a pink banner with an indication of the error. Go back to the spreadsheet, fix the errors, save it, and try to upload it again.

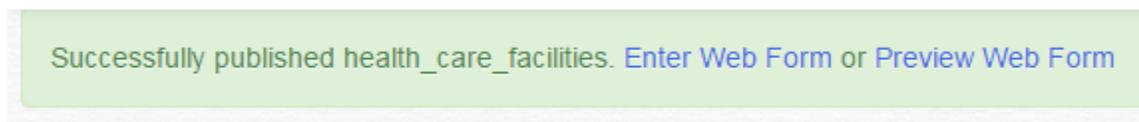


Figure 9. The FormHub message that the form was successfully uploaded

- 7) Your form will now appear under the **Published Forms** heading. Click the link to the form to open the form page. Click the **Preview form** button to see a preview of the completed form.

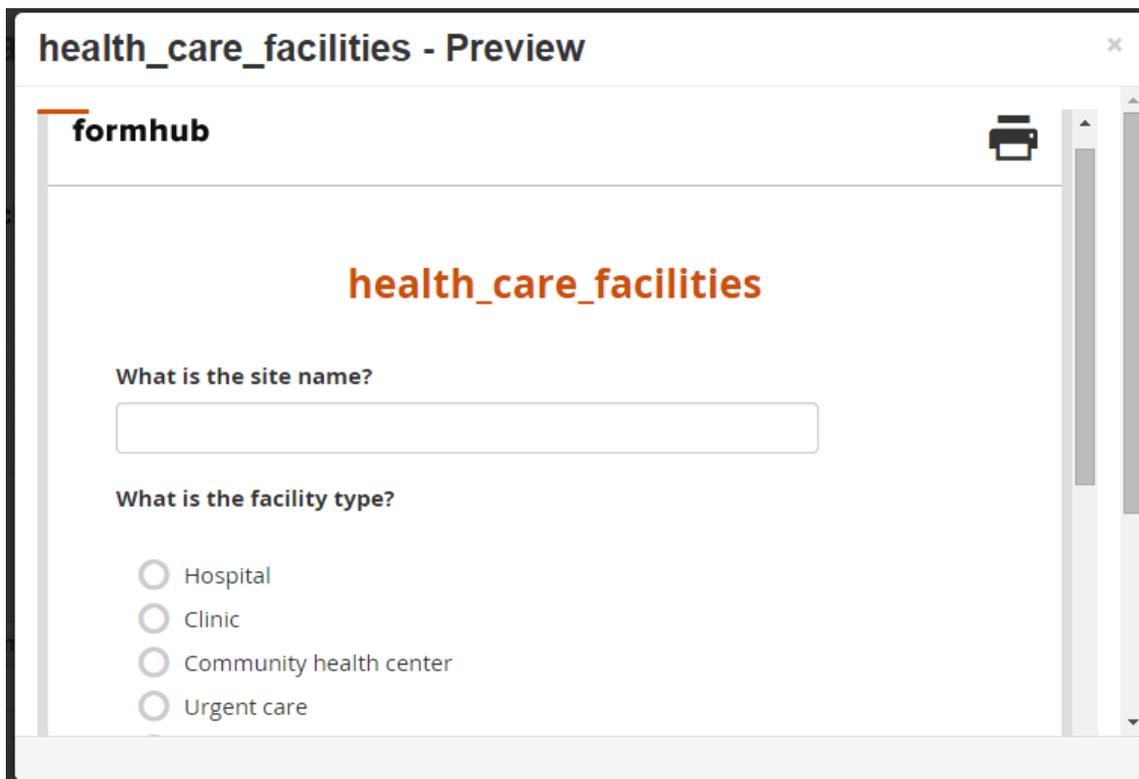
The image shows a web browser window with the title "health\_care\_facilities - Preview". The page content includes a "formhub" logo in the top left and a printer icon in the top right. The main heading is "health\_care\_facilities" in orange. Below the heading, there are two questions: "What is the site name?" followed by a text input field, and "What is the facility type?" followed by four radio button options: "Hospital", "Clinic", "Community health center", and "Urgent care". A vertical scrollbar is visible on the right side of the form area.

Figure 10. Form preview

- 8) Close the preview when done.

### Task 3. Install the ODK Collect App on Your Mobile Device

Now that you have created your form, you will set up your mobile device with the ODK Collect app.

- 1) Open the Play Store and search for ODK Collect.
- 2) Install the app.
- 3) Click the ellipsis button in the lower right corner and choose **General Settings**.
- 4) Look for **Server settings** and select **Configure platform settings**.

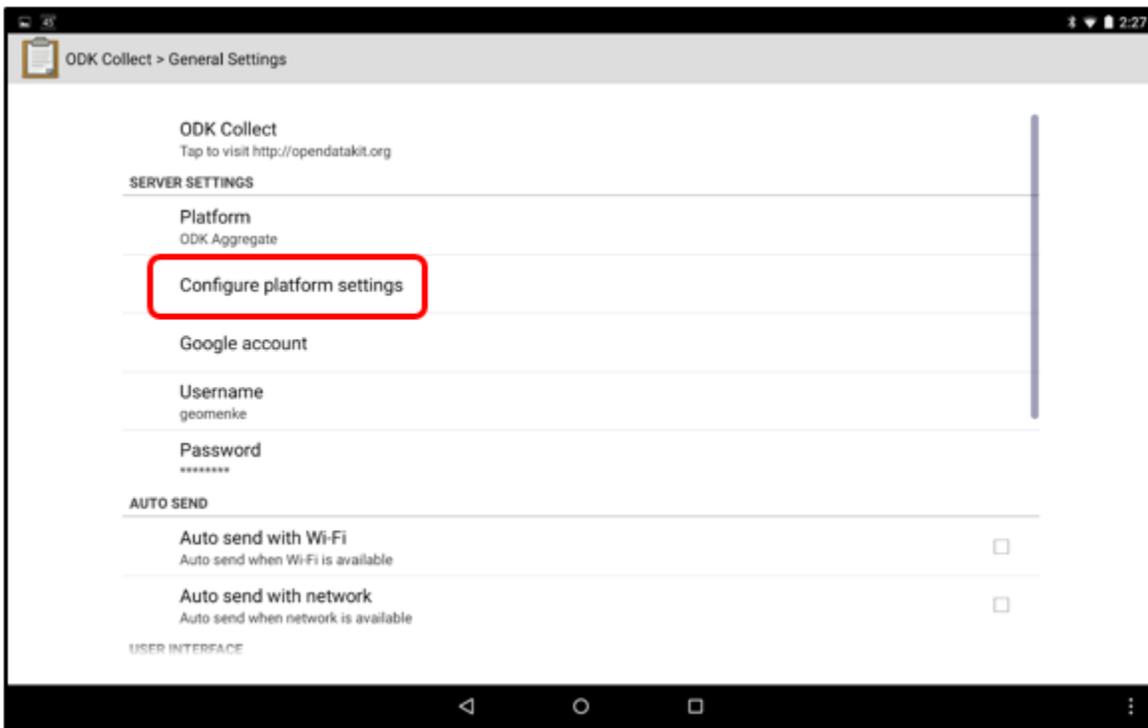


Figure 11. ODK Collect General Settings

- 5) Fill in the URL. This will be the URL for your FormHub account. You can login to FormHub and copy and paste that URL.
- 6) Enter your FormHub username and password.

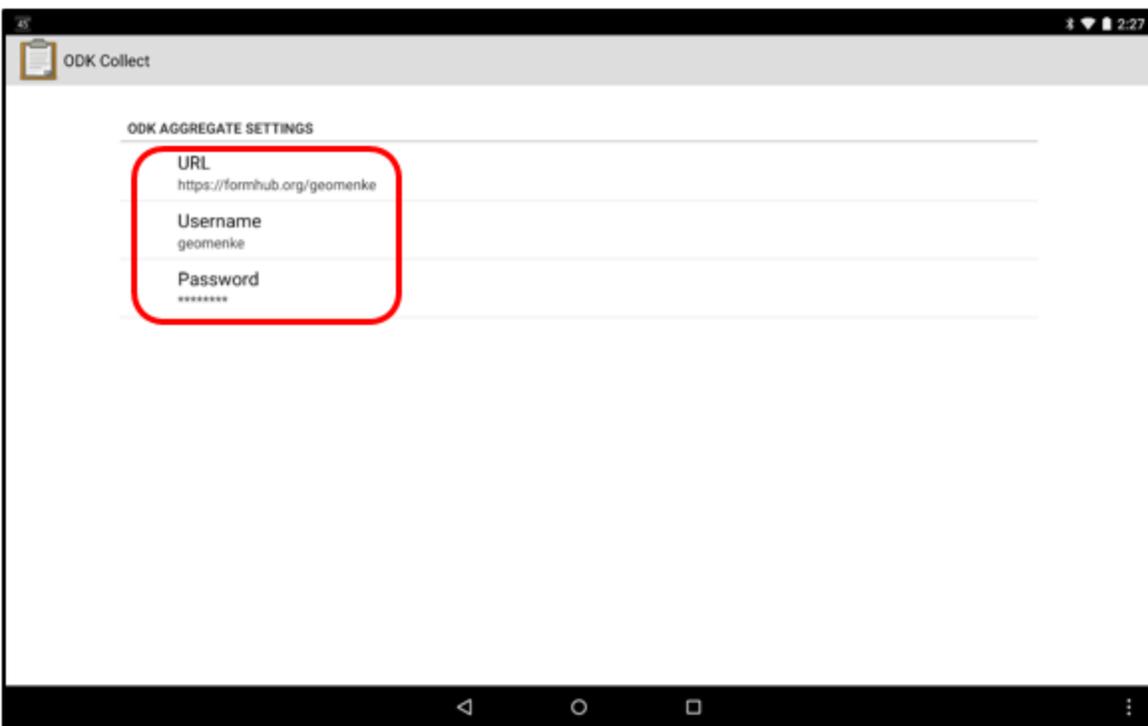


Figure 12. ODK Collect Platform Settings

- 7) Go back to the Main menu and choose **Get Blank Form**. ODK Collect may take a moment to connect to the server.
- 8) Select *health\_care\_facilities* by clicking the checkbox on the far right side. Click **Get Selected**. You will get a message that it was successfully downloaded.

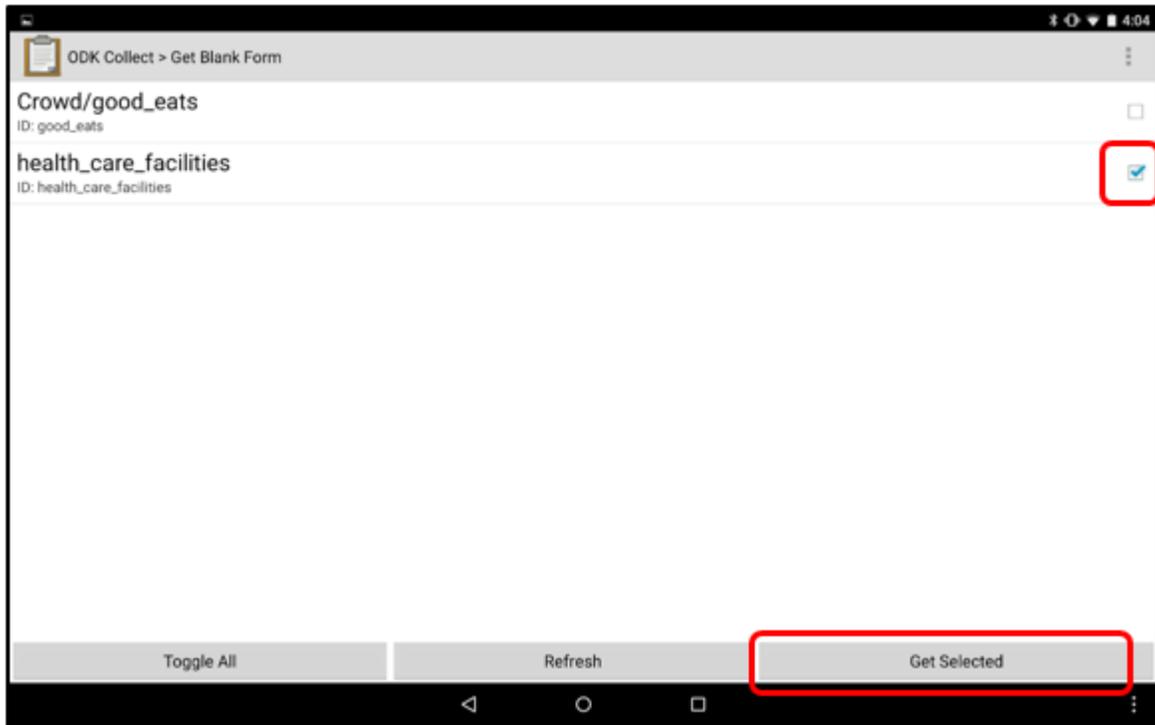
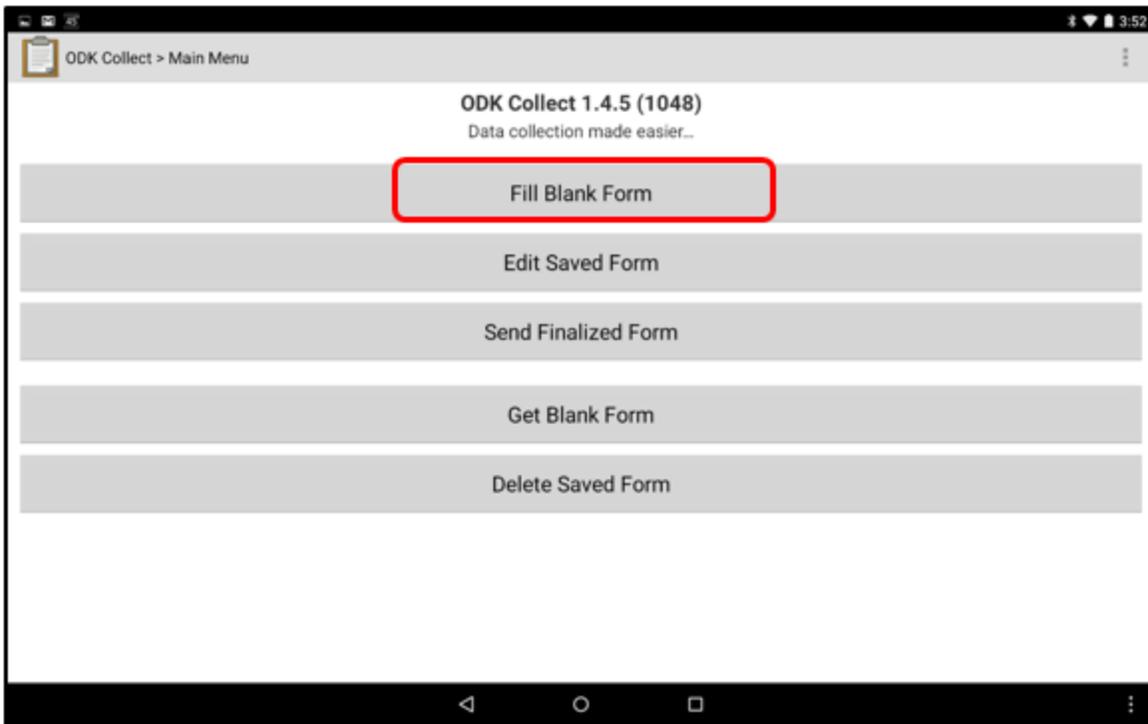


Figure 13. ODK Get Blank Form

#### Task 4. Collect Field Data

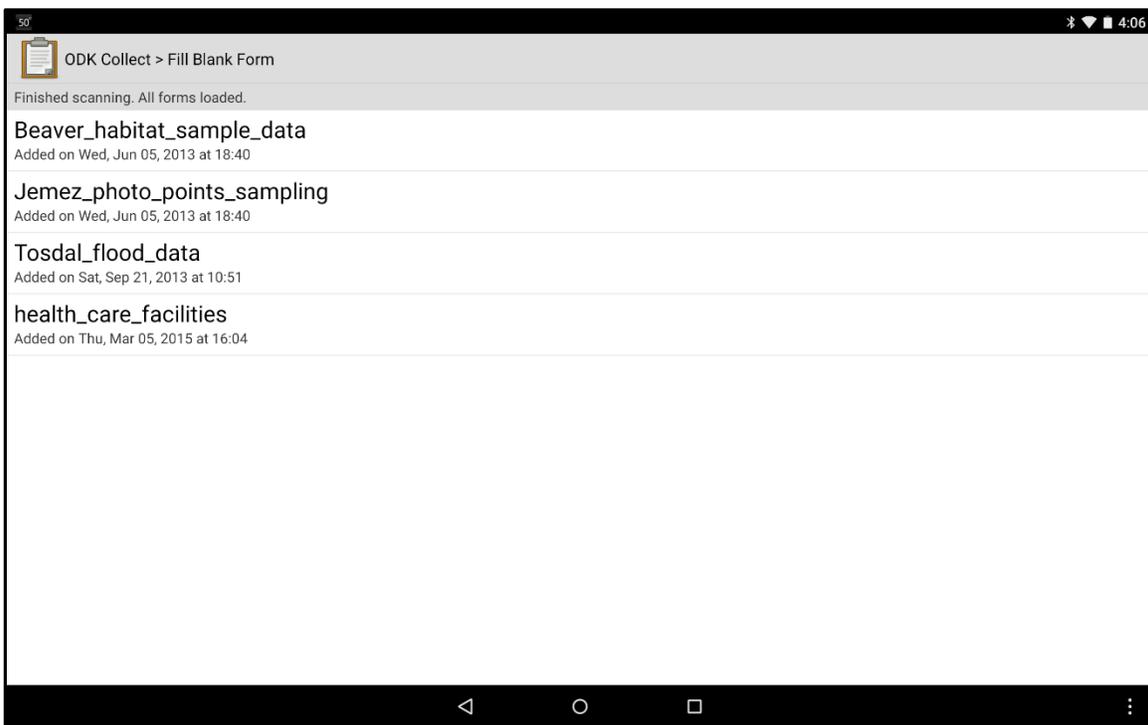
Now you are ready to collect some data. Identify an area that will be suitable. Because you may not have easy access to an area with numerous health care facilities, for the purposes of this exercise the data can be fictional. Simply go to an area with many buildings. While collecting data you can just pretend that houses, etc., are health care facilities of different types.

- 1) Open ODK Collect.
- 2) From the **Main menu** choose **Fill Blank Form**.



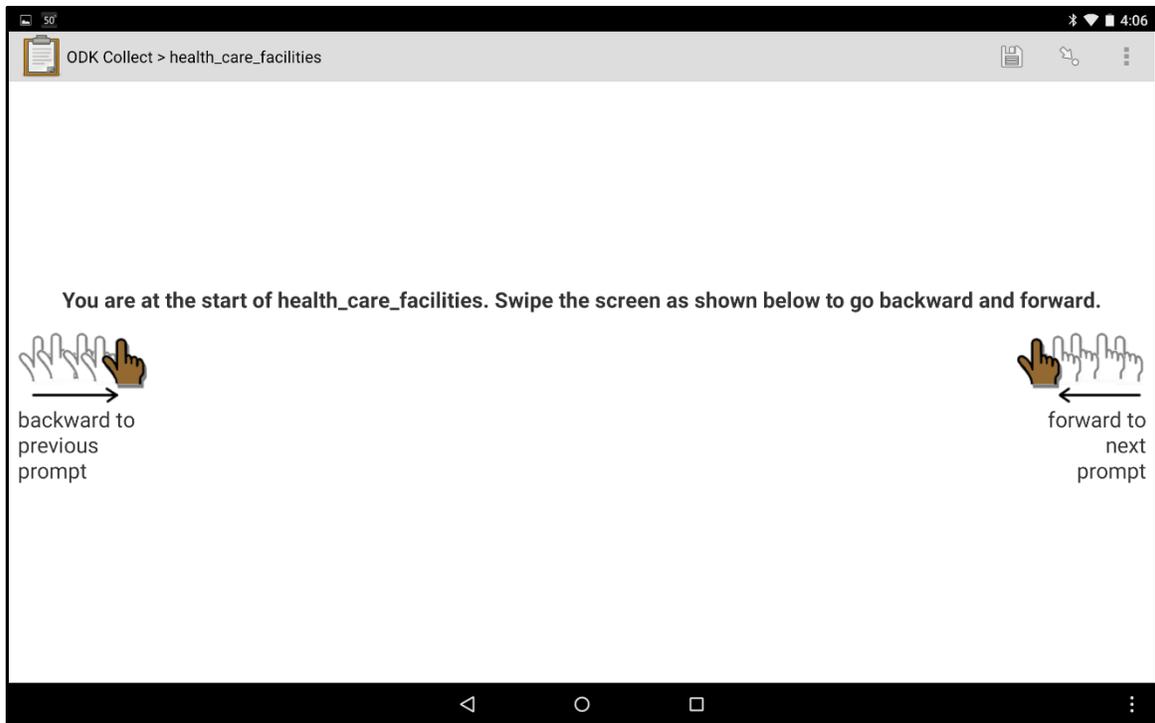
**Figure 14. Data collection form after data submittal**

3) Select *health\_care\_facilities*.



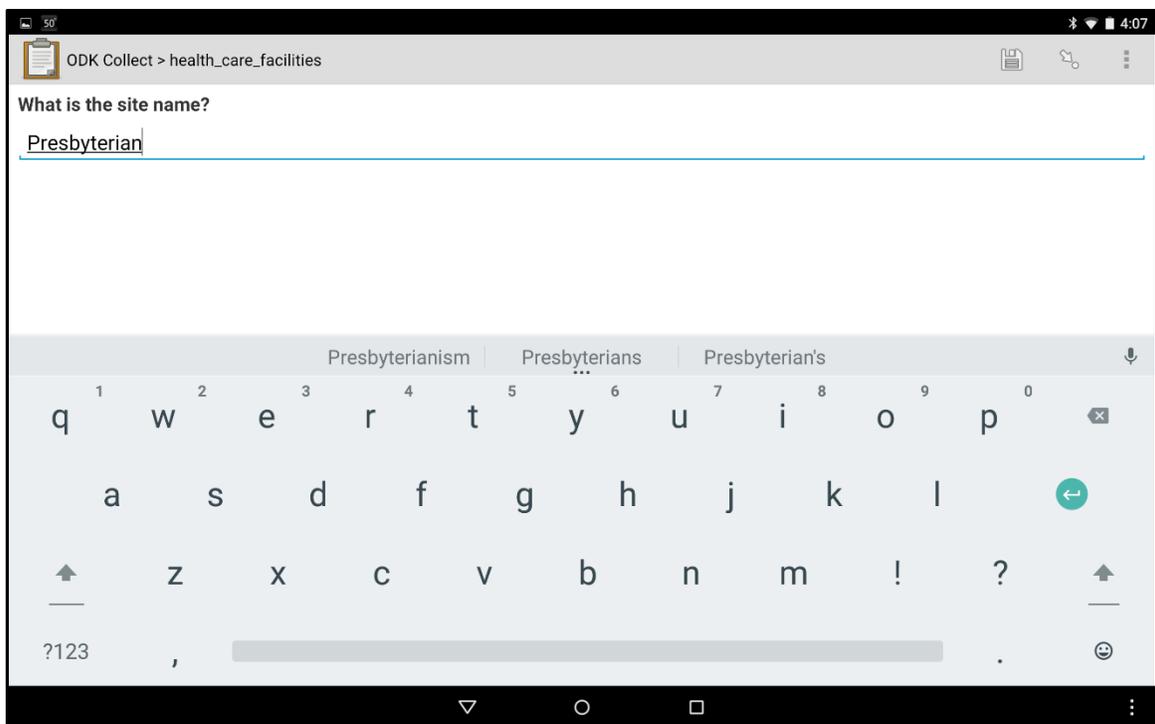
**Figure 15. Fill Blank Form**

4) You will be at the start of the *health\_care\_facilities* data collection form. Swipe to the left to move to the first question.



**Figure 16. Beginning of data collection form**

- 5) The first question and the keyboard will appear. Type in the answer. Swipe left to move to question #2.



**Figure 17. Question # 1**

- 6) The second question asks you to choose the facility type. Swipe left to continue.

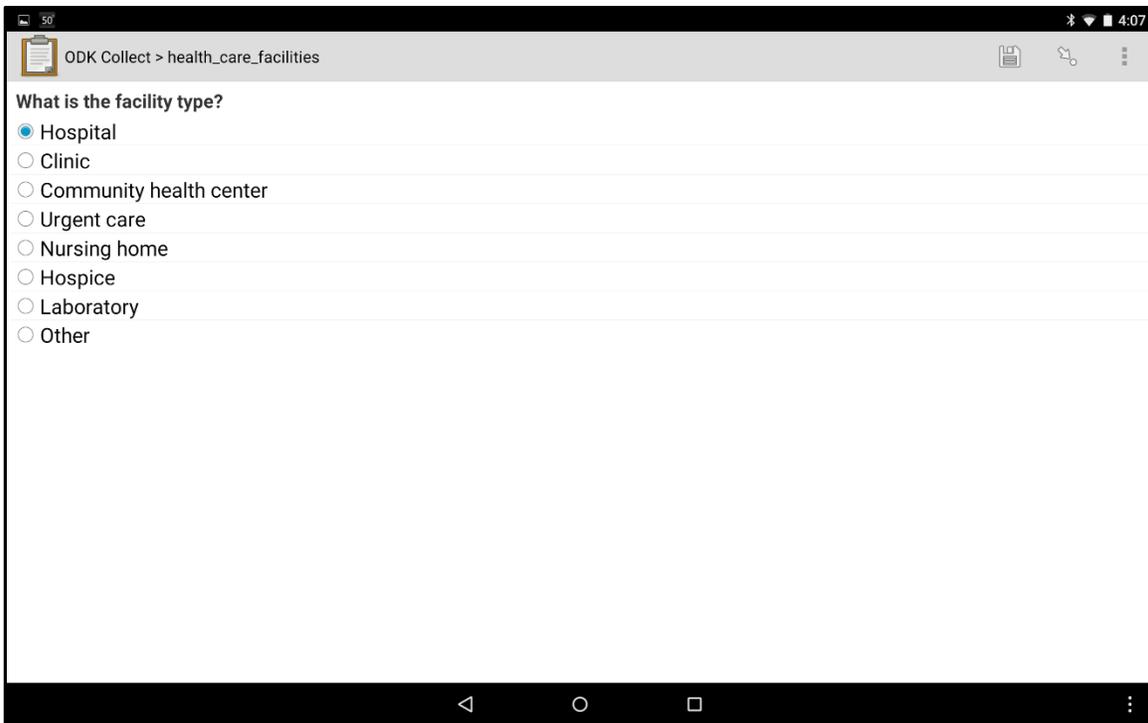


Figure 18. Question # 2

7) At any time you can click on the  button to arrange the questions in a vertical list.

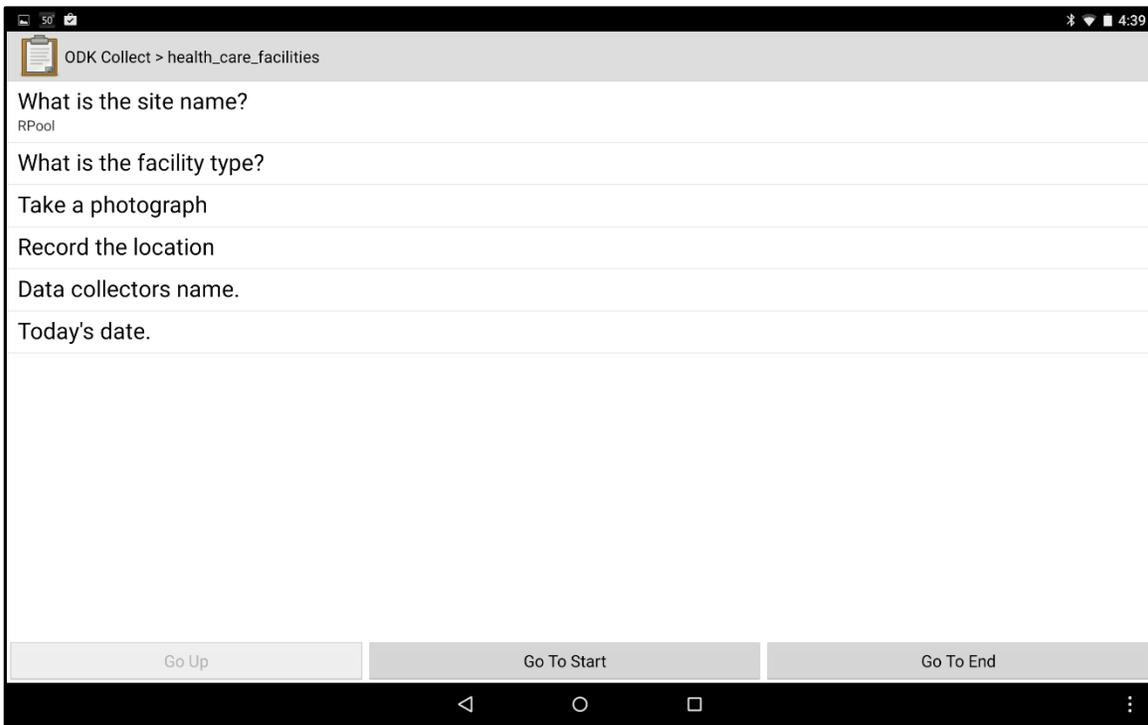
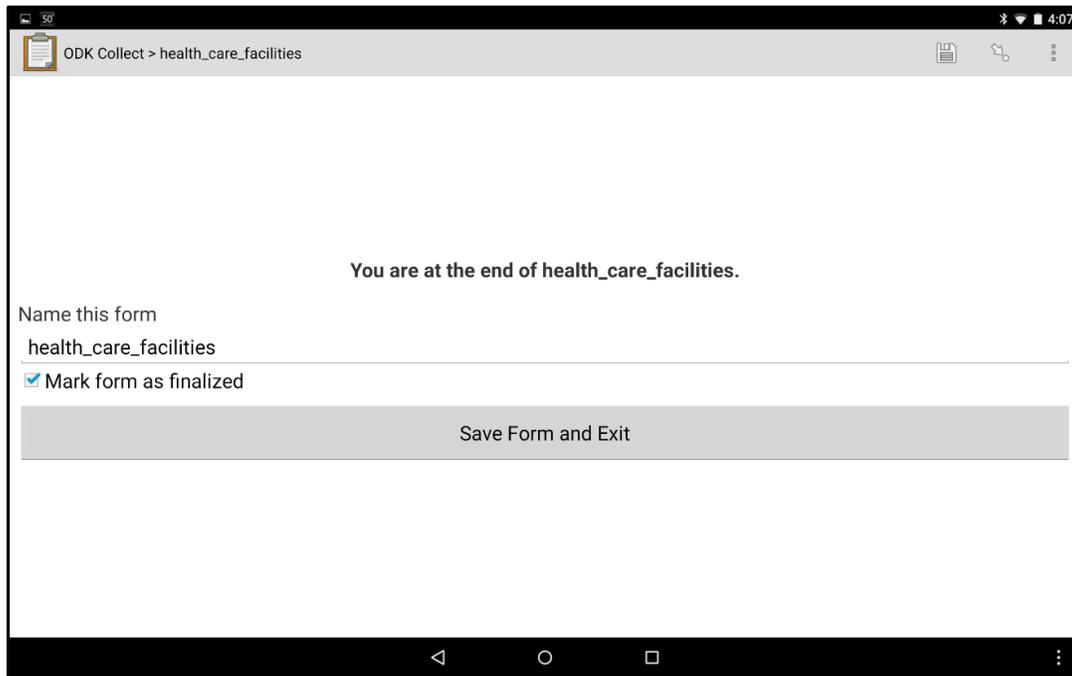


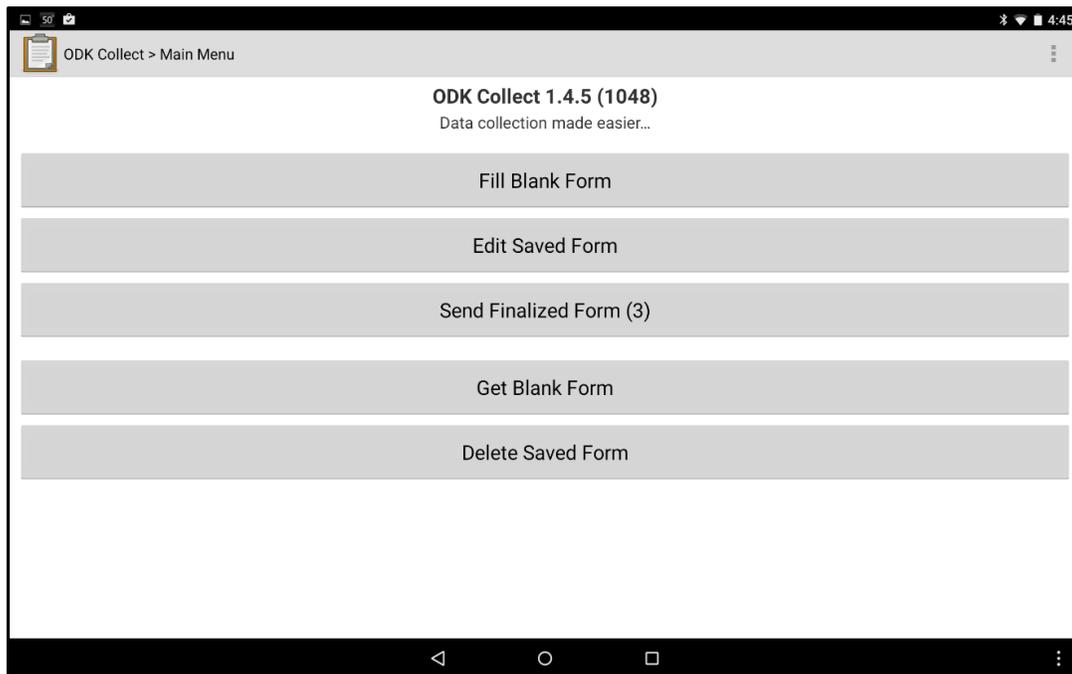
Figure 19. Questions in a vertical list

- 8) Continue until all questions are answered. On the last screen, click the **Save Form and Exit** button.



**Figure 20. End of form**

- 9) From the Main menu, choose **Fill Blank Form** to take the next point.  
10) Once you are done collecting data and are within a cellular or Wi-Fi network, you can upload your data by selecting **Send Finalized Form**. The number of records you've collected since the last upload will be displayed in parentheses.



**Figure 21. Send Finalized Form**

11) On the next screen select **Toggle All** and then **Send Selected**.

**Note:** Under General Settings you can choose to Auto Send with Wi-Fi and Auto Send with network. With these checked your data will automatically be uploaded to the FormHub server after each point is saved.

### **A Note on Collecting Data Outside of Cellular or Wi-Fi Coverage**

Being beyond cellular or Wi-Fi coverage will not affect your ability to collect data. The GPS receiver on the mobile device, and the camera, still work. The data will sync with the iForm cloud as soon as you re-enter coverage.

### **Task 5. Download Data From the Server**

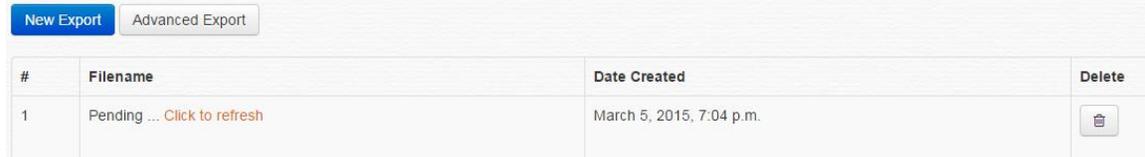
- 1) Open a web browser and navigate to the [FormHub website](#).
- 2) Click **Sign in** (upper right) and log into your account with your email and password.
- 3) Click on the hyperlink for your health\_care\_facilities form.
- 4) The form page will open.
- 5) Under the **Form Data** heading there are several download options:
  - csv – (comma delimited text file) contains the tabular data
  - csv.zip – (comma delimited text file zipped) contains the tabular data
  - xls – (Excel spreadsheet) contains the tabular data
  - kml – (Google Earth KML file) spatial data with attributes and an online link to the photographs
  - zip – zip file with the photographs
  - gdocs – (Google docs spreadsheet) contains tabular data

The screenshot displays the 'Form Web Page' for a form titled 'health\_care\_facilities'. At the top, the form name is shown in a large font with an 'edit' button to its right. Below this, the 'Form ID' is listed as 'health\_care\_facilities'. The 'Description' section is currently empty, showing 'None' and another 'edit' button. The 'XLSForm' section is marked as 'PRIVATE' and includes three buttons: 'XLSForm' (highlighted in green), 'XForm', and 'JSONForm'. Below these is a 'License' dropdown set to 'No License' with an 'edit' button. The 'Form Data' section is also marked as 'PRIVATE' and features a row of download buttons: 'csv', 'csv zip', 'xls', 'kml', 'zip', and 'gdocs'. Below the download buttons, it indicates 'Submissions: 4' and another 'License: No License' dropdown with an 'edit' button. At the bottom of this section, there are two rows of buttons: the first row contains 'Photos', 'View Data', and 'Browse Data'; the second row contains 'Enter Web Form', 'Mobile', and 'Preview Form'.

Figure 22. Form Web Page

- 6) Download the data as both **KML** and as **CSV**. After clicking the data source option, FormHub will take a moment to process and package the data for download. The data can be downloaded by clicking on a hyperlink under Filename once it is ready.

## ZIP Exports (health\_care\_facilities)



#	Filename	Date Created	Delete
1	Pending ... <a href="#">Click to refresh</a>	March 5, 2015, 7:04 p.m.	

Figure 23. Download Page

## 4. Conclusion

In this lab you learned how to design a data collection form using iForm. You went outside and collected some data and previewed the data on the mobile device.

## 5. Challenge Assignment

Now that you are familiar with setting up a custom data collection form, you will design a new form for your own data collection project.

- Identify a data collection project of interest to you that can be accomplished nearby.
- Think about the types of data you will need to gather. Once you have a list of items you want to collect, list out the questions and data input types you will need to create.
- Create your data collection form.
- Collect data.
- Preview on the mobile device.