

Epi Info Vector Surveillance Mobile Application

Vector Surveillance



Powered by  epiinfo™

User Manual

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1 Installation Instructions

1.1 System Requirements

Ensure that your mobile device meets the following requirements:

1. is capable of running Android version 4.0 or higher,
2. has as 256MB RAM or more,
3. has 6MB free space,
4. has a rear-facing camera capable of auto focus.

The app can run on either a phone or tablet, however users should be aware that some device manufacturers may change the position and/or appearance of elements such as menus and buttons. If data will be transferred from the mobile device to a PC you will also need to meet the system requirements for a PC listed below.

Data analysis may require Epi Info for Windows. To use Epi Info for Windows you will need the following:

1. Windows Vista, 7, 8 or 10,
2. Microsoft .NET Framework version 4.5,
3. Permissions to read, write, and execute on the desktop (Note: administrative privileges are NOT needed).

To use a cloud service for syncing data from one or more devices you may need they following:

1. An account with a supported cloud service (see Section 1.4)
2. An internet connection using Wi-Fi or a cellular service

1.2 Downloading the App to a Mobile Device

The app can be installed directly to your mobile device. To download the latest version of the app, open the following link on your mobile web browser:

<https://goo.gl/ziM77M>

If your Android device meets the minimum system requirements, an “install” button will appear. Click it to install the app. Note that the app requires access to key device features such as the internal storage and the built-in GPS.

1.3 App Settings

Prior to using the app it may be necessary to configure it based on the intended use, i.e., whether or not the app will be used in the field or lab, the use of a cloud service, etc. Select **Settings** from the menu button displayed as three vertical dots in the far upper right hand corner of the screen to access the screen shown in Figure 1. Before using the app on your device it is suggested to select a Device ID by clicking the item labeled “Device ID” in the Identification section of the settings screen. Choosing your own Device ID rather than defaulting to the value provided may simplify the process of syncing file names in a multi-user environment.

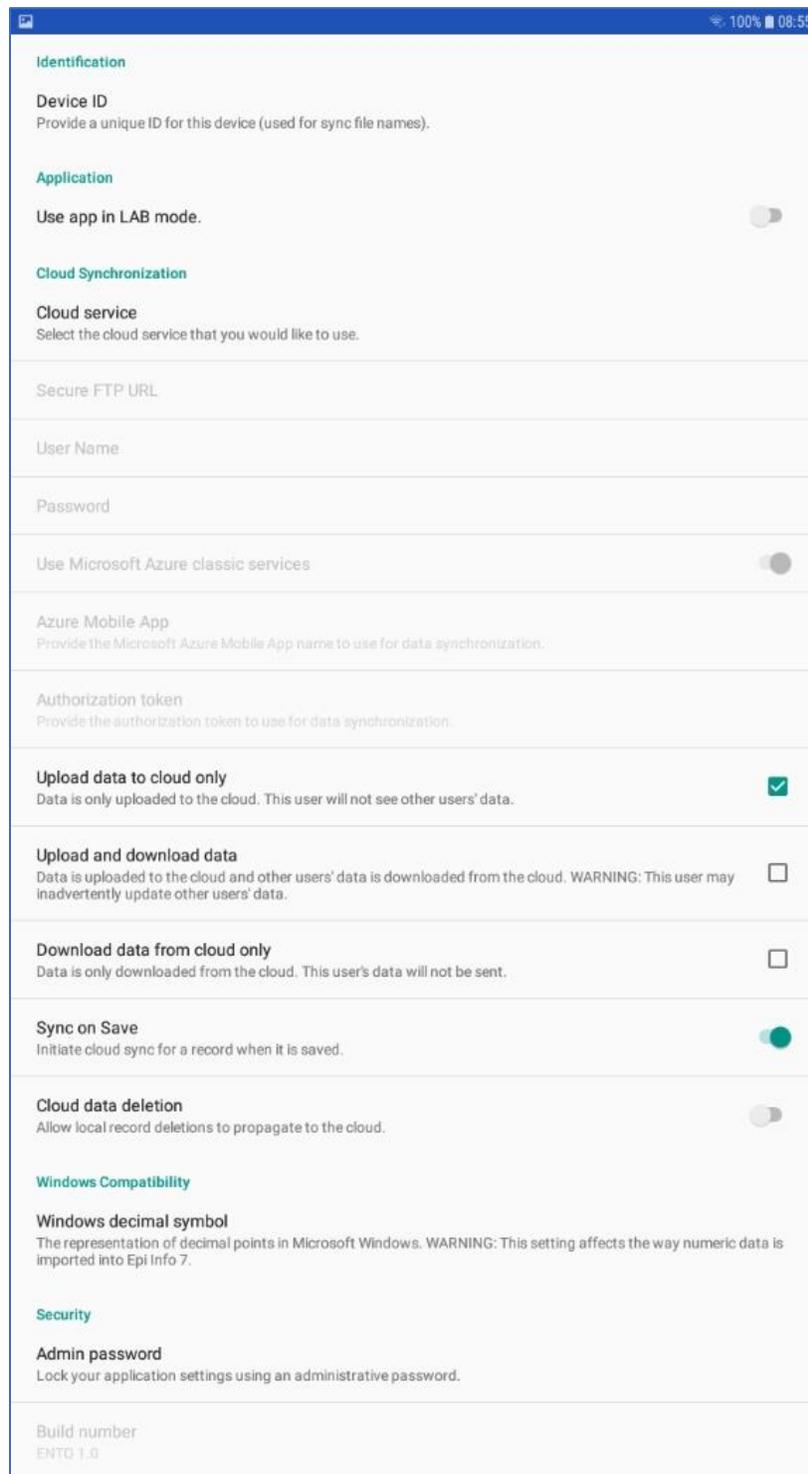


Figure 1. App Settings Menu

1.4 Lab Mode

By default, the app is installed in Field Mode, i.e., the mode that allows technicians to conduct surveys in the field, record the setting and collection of traps, etc. For simplicity in data entry, this mode hides questions that can only be answered by looking under a microscope, such as the exact number of eggs or the species/sex of a

mosquito. To set up a device for use in the lab, simply switch on the setting labeled “Use app in LAB mode”. Note that while this mode will enable the types of questions described above, it also disables functions that do not apply to the stationary laboratory setting, such as capturing the GPS coordinates of a house or interviewing household residents.

1.5 Cloud Configuration and Syncing Data

Data collected on a mobile device can be transferred using a cloud service, i.e., a service made available to users from an Internet connection that provides a shared data storage resource on demand. In order to use the app in a multi-user environment, a cloud service can be used to aid in data collection. Depending on how the app is used, you may need to configure cloud access to enable certain data access features. Settings can be changed at any time.

1.5.1 Suggested Cloud Settings for Field Collection

If you are using the app for field data collection, the suggested cloud settings are to upload data to cloud only, enable sync on save, and enable cloud data deletion. These settings are shown in Figure 2.

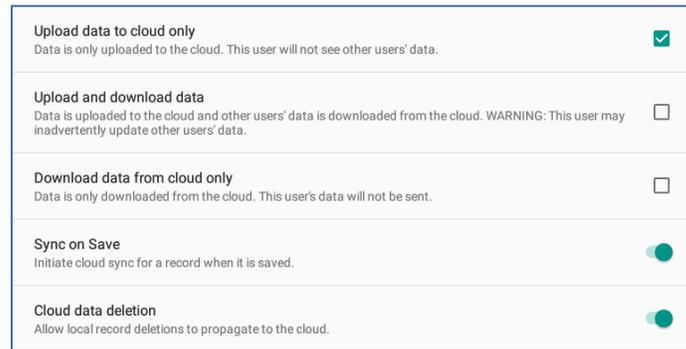


Figure 2. Suggested Cloud Settings for Field Data Collection

1.5.2 Suggested Cloud Settings for Lab Collection

If you are using the app for lab data collection the suggested cloud settings are to upload and download data to cloud, enable sync on save, and disable cloud data deletion. These settings are shown in Figure 3.

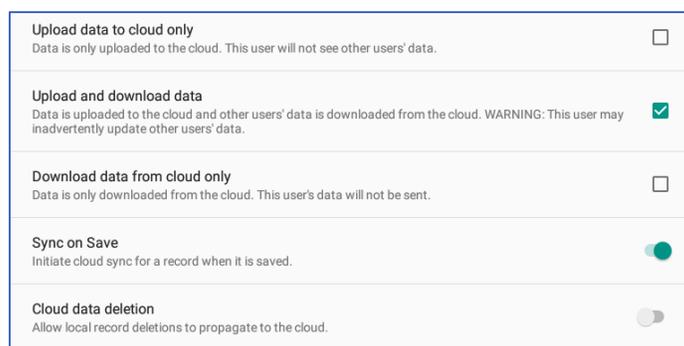


Figure 3. Suggested Cloud Settings for Lab Data Collection

1.5.3 Suggested Cloud Settings for Syncing Data Only

If you are using a dedicated mobile device for syncing with a desktop version of Epi Info for data analysis the suggested cloud settings are to download data from cloud only, disable sync on save, and disable cloud data deletion. These settings are shown in Figure 4.

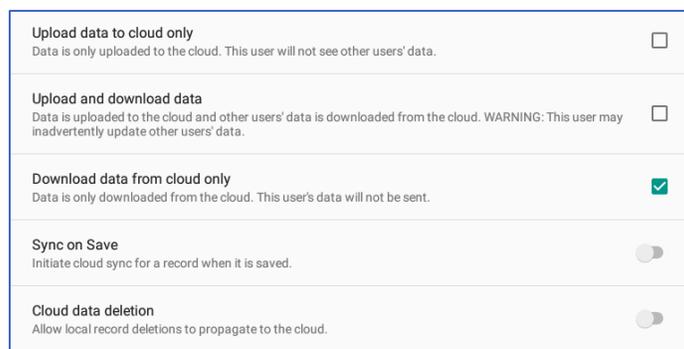


Figure 4. Suggested Cloud Settings for Syncing Only

1.5.4 A Note about “Suggestions”

We understand that circumstances will vary by region and type of organization utilizing the app. The settings above have been piloted in several countries and have shown to be useful when field technicians share tablets for collecting data and there is a single lab tablet for entering lab results. However, your circumstances (for example, limited bandwidth or multiple labs, may call for a different combination of settings. Before establishing a protocol for your group, we recommend piloting the app with a few devices and users to determine the best settings for your circumstances.

1.5.5 Setting up a Cloud Service

One advantage of using a mobile device for data collection is the ability to synchronize wirelessly with a cloud service, allowing a team to collect data together. Several options are available for a cloud service: Box, Secure FTP, and Microsoft Azure. The use of a Secure Shell FTP server or a Microsoft Azure account requires IT staff familiar with the respective technologies to configure the app, administer the cloud service, and maintain the

data. The rest of this section will describe a typical process of setting up a Box account. While not as feature rich as the other options, a Box account is easier and quicker to setup and can allow for syncing of data between field and lab versions of the app running on separate tablets.

From the App Settings Screen, Figure 1, click on Cloud Service in the “Cloud Synchronization” section and select Box as shown in Figure 5.

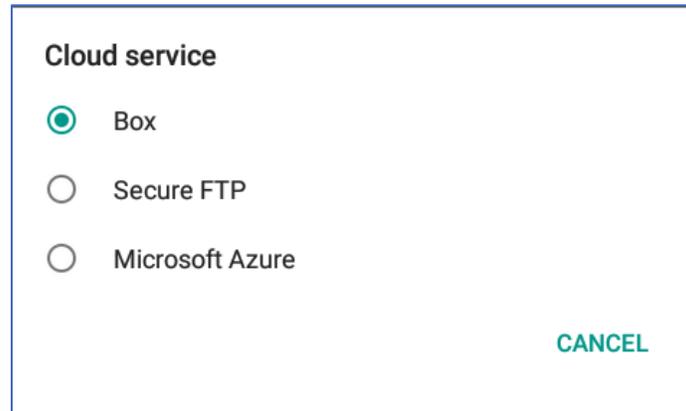


Figure 5. Cloud Service

Use the back button on your android device to return to the main screen and choose “Sign in to Box account” from the menu. You should see a screen prompting you for the email address and password of your Box account, as shown in Figure 6. If you do not have a box account, visit <http://www.box.com> and choose an appropriate plan (there is a free “individual” plan available as of the time of this document). After you have entered an email address and username for an active Box account, click the “Authorize” button to continue. Please be sure to “Grant access to Box” if you are prompted to do so.

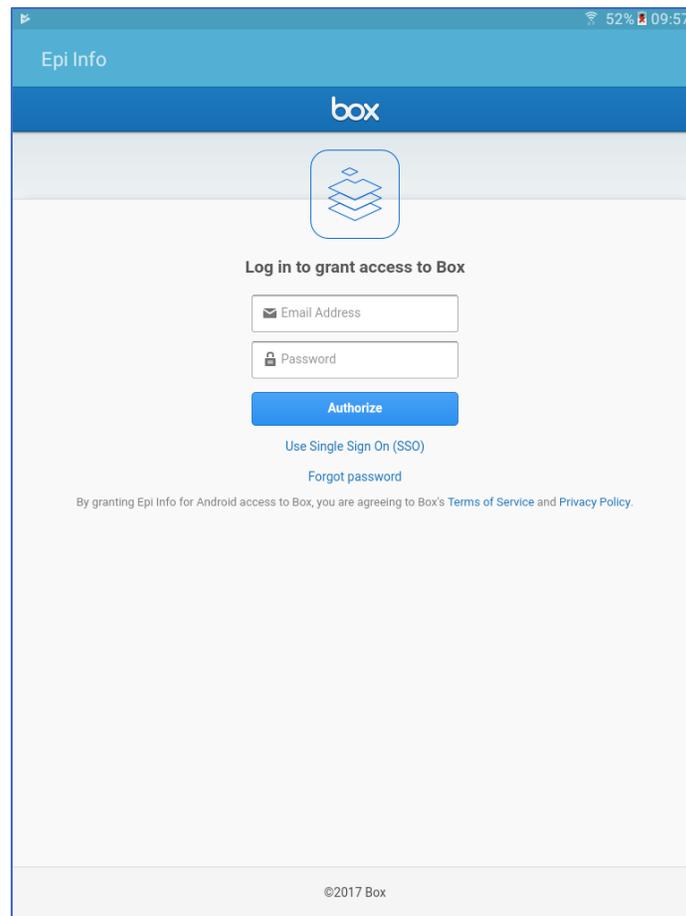


Figure 6. Login Screen for Box Account

1.5.6 Syncing with the Cloud

From any of the Records screens (i.e., Locations, Figure 14; Trapping, Figure 22 and Figure 80; Collection, Figure 27 and Figure 91; Cone Bioassay, Figure 62 and Figure 104; and Adult Vector Control, Figure 65), you can click the cloud icon(s) next to an individual record to sync individually, Figure 7. Alternatively, from the Home screen of the app, choose “Sync with Cloud” from the menu (vertical ellipse) in the upper right of the screen to sync all of the records, Figure 8.

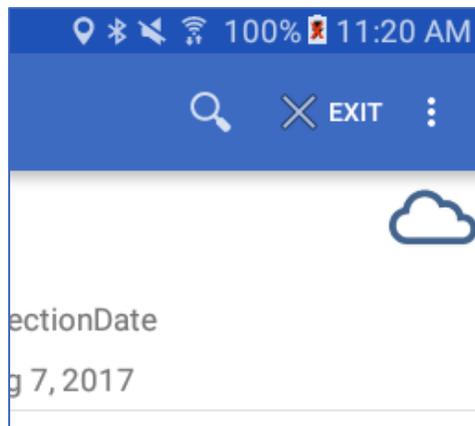


Figure 7. Menu and Cloud Icon for Syncing Data

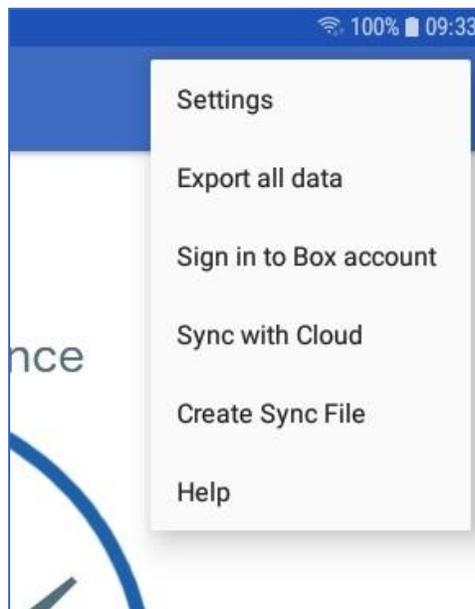


Figure 8. Menu Items from the Home screen

1.6 Geography

As you may have gathered while installing it, the app allows users to capture GPS coordinates in the field. Along with the coordinates, it will also capture the altitude and accuracy in meters and try to determine the name of the geographic region the user is in, Figure 9. The latter is useful for categorical data analysis and meaningful stratification of vector indices, Figure 10.

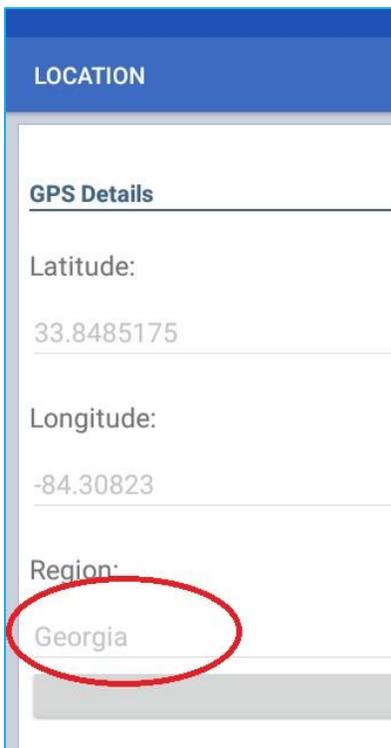


Figure 9. Capturing Region



Figure 10. Stratifying by Region during analysis

The Epi Info Vector Surveillance App captures the region information by referencing a KML or KMZ file located in the device's storage. The app installs with a default KML file of US States. If you are not seeing a valid region name being captured, you can replace the default KML file with a KML or KMZ file of your own, Figure 12. Up to date KMZ files for countries can be found here: <http://gadm.org>, Figure 11, and KML files of various breakdowns of US States and territories can be found here: <https://go.usa.gov/xnTdX>.

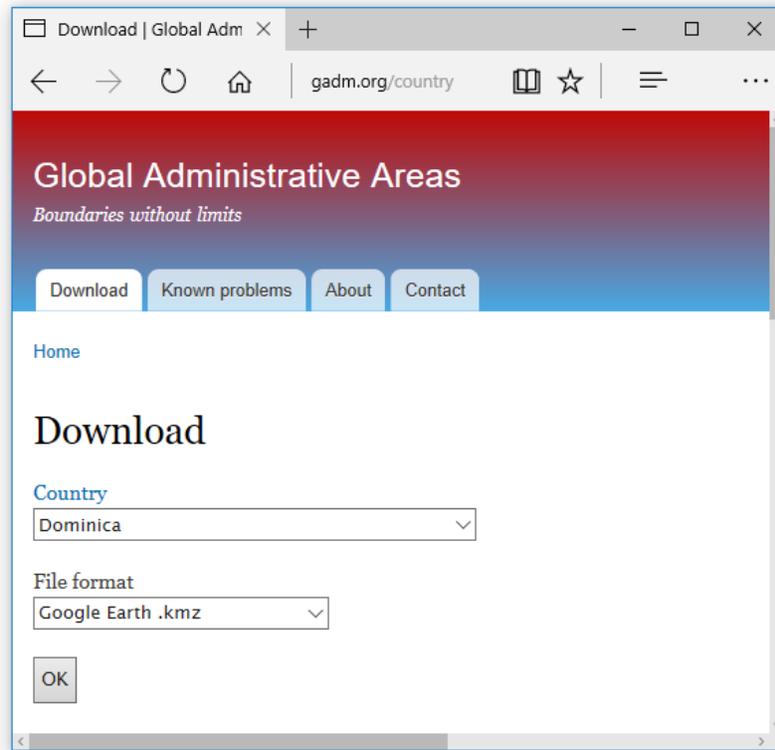


Figure 11. Download a KML or KMZ file of your location

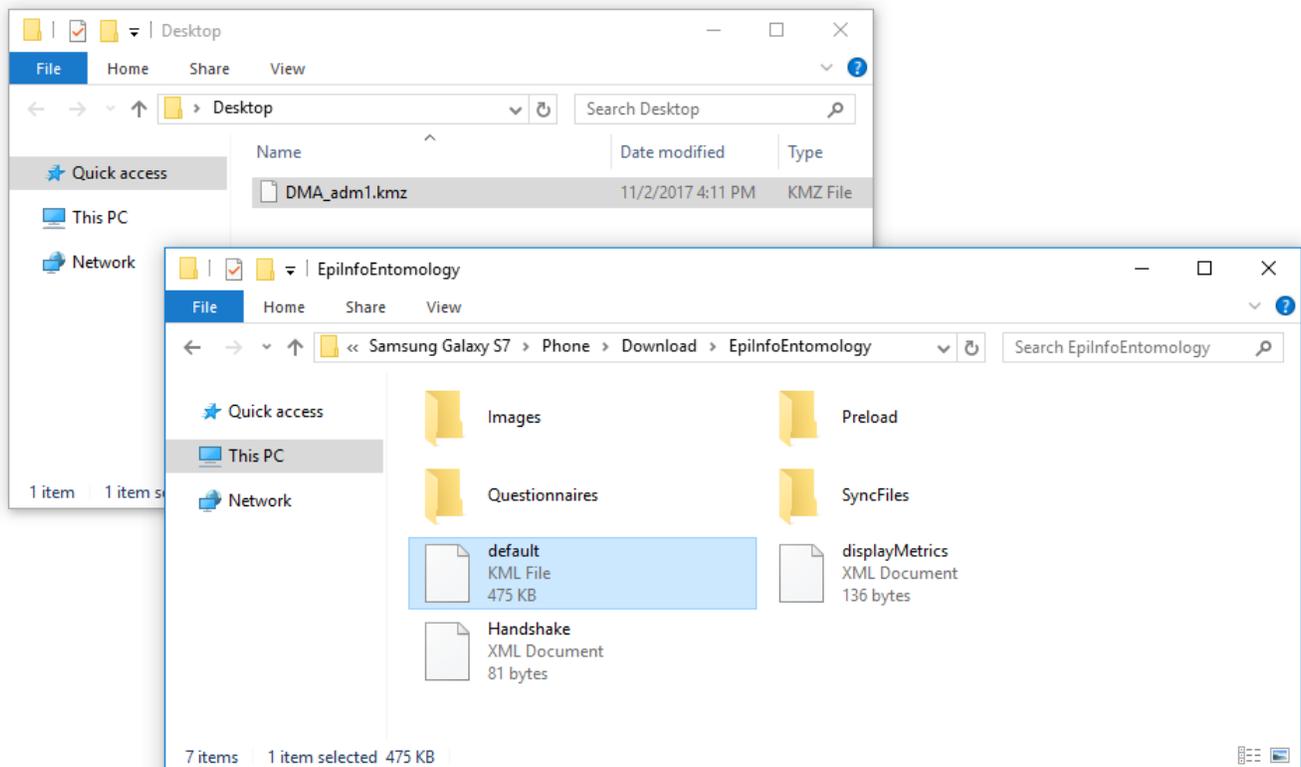


Figure 12. Delete the “default” KML and replace it with the one you downloaded

The default KML file is located in your device’s Download\EpiInfoEntomology folder. Please ensure that you delete the default KML file as the app only supports one reference geography file at any given time, Figure 12.

2 Overview

The Epi Info Vector Surveillance App allows you to conduct entomological data collection on android phones or tablets. The app allows data collection activities. e.g., trapping, collection, cone bioassays, and adult vector control, to be related to individual locations. The data can be collected using a cloud service or, if cellular service is unable, stored locally until service is available. Data can also be manually transferred to a PC using a USB connection.

3 Collecting Field Data

Samples collected during field activities are performed using the Field version of the app. All collection activities begin from the main screen shown in Figure 13 by clicking on the “Collect Data” button at the bottom of the screen.

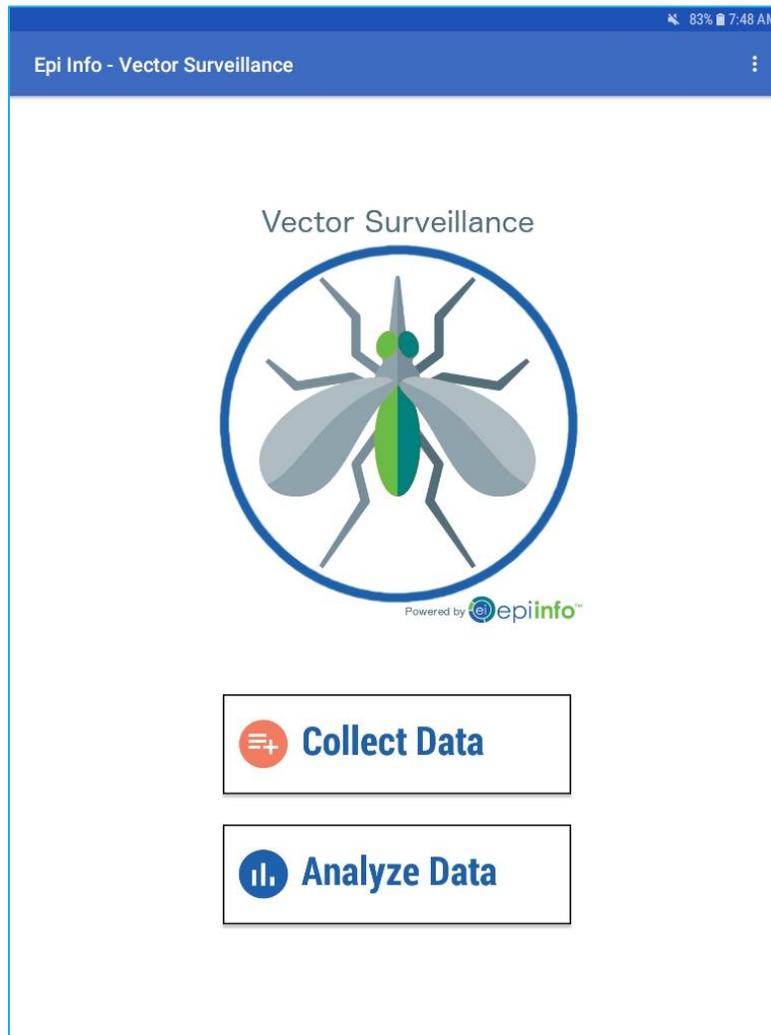


Figure 13. Main Screen

3.1 Location

A location is defined as a place of residence or other setting where human–vector contact can occur (e.g. house, cemetery, place of worship, school, etc.). Once a location record is made, trapping, collection, and/or assay activities can then be performed as described in subsequent sections of this manual. All locations should be identified with a unique ID using a barcode or QR code. Barcodes should be affixed to the structure in such a way as to prevent contact with rain or sunlight, and should be located in a location that is easy to scan when returning to the location.

3.1.1 New or Existing Records

If this is the first time using the app you will see a screen with (0) records as shown in Figure 14. A new record is added by clicking the “+” button in the lower left corner of the screen.

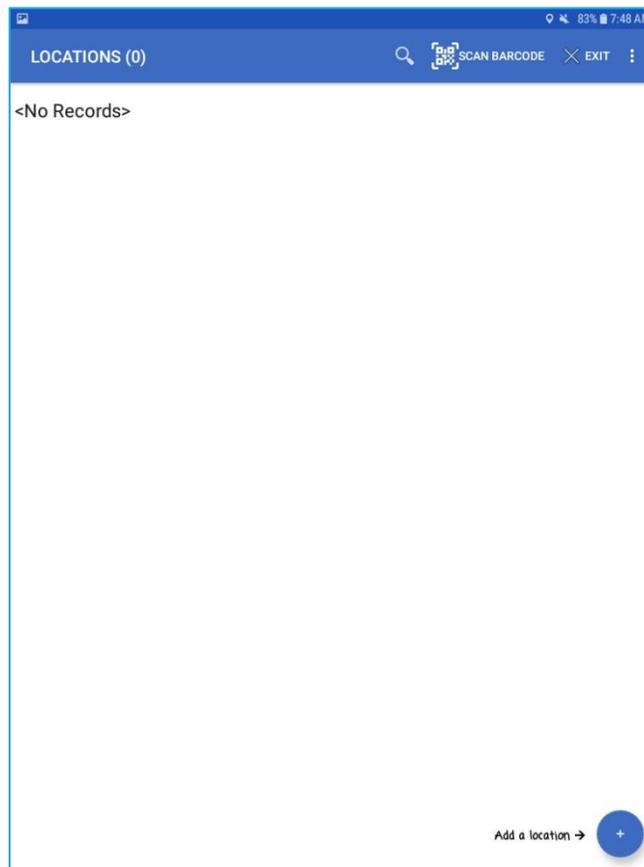


Figure 14. Default New Record Screen

Once a location has been added it will appear in the Locations record list, an example of which is shown in 5. Records on this screen will list the following details:

- Structure Barcode, the ID from a scanned barcode;

- Latitude, from where the barcode was scanned, and
- Inspection Date, the date the record was created.

Clicking an existing record from the list with a valid barcode value will take you directly to the Entomology Menu (covered in Section 3.1.8). Associated with each record in the list is a cloud icon which if clicked will sync with a cloud account if one has been setup for the device when cellular or Wi-Fi service is available.

LOCATIONS - Records (8)			
Record ID: 1	StructureBarcode	Latitude	InspectionDate
Preview:	2F5L	33.7983	Jun 21, 2017
Record ID: 2	StructureBarcode	Latitude	InspectionDate
Preview:	3A51	33.7984	May 24, 2017
Record ID: 3	StructureBarcode	Latitude	InspectionDate
Preview:	2F72	33.7983	Jun 21, 2017
Record ID: 4	StructureBarcode	Latitude	InspectionDate
Preview:	2F75	33.7983	Jun 21, 2017
Record ID: 5	StructureBarcode	Latitude	InspectionDate
Preview:	2FAR	33.7983	Jun 21, 2017
Record ID: 6	StructureBarcode	Latitude	InspectionDate
Preview:	2EWJ	33.7983	Jun 21, 2017
Record ID: 7	StructureBarcode	Latitude	InspectionDate
Preview:	2EWE	33.7983	Jun 21, 2017

Figure 15. Sample Location Data

3.1.2 Scan a Barcode

A barcode should be attached to each location, preferably in a place that is protected from rain and sunlight. The latitude and longitude of your Location is automatically entered upon scanning the barcode. It is important to not scan until you are physically at the location. Also keep in mind that the tablet may not be able to obtain latitude and longitude information from inside certain structures. If you cannot obtain latitude and longitude information, move to another position until the data can be collected.

To use the barcode scanning feature, you will need to have a barcode scanning app installed. There are several freely available apps available in the Google Play Store. A barcode or a QR Code can be used, as long as the barcode content consists of a unique number. A 3-5 digit alpha, numeric, or alpha-numeric value encoded in plain format is suggested for the Structure ID.

3.1.2.1 Scanning a New Location

To associate a barcode with a new Location record, click the “SCAN BARCODE” button on the Structure Type Screen, Figure 16. It is also possible to update an existing Location with a new barcode value using this method, however the previous value will be permanently deleted and overwritten with the new barcode result. New barcodes cannot be entered from the menu of the main Locations record screen – that feature is only used for scanning existing locations as described next.

3.1.2.2 Scanning Existing Locations

Barcodes for existing Location records can be scanned by clicking the “Scan Barcode” button in the menu bar of the Location Records screen, shown in Figure 15. Scanning a barcode that has not been attached to a Location will result in a “No matching records found” message displayed on the screen of your device. Once a barcode is associated with a Location, scanning it again will take you directly to the Entomology Menu for that Location (see Section 3.1.8).

3.1.3 Structure Type

Indicate the structure type as either a house, cemetery, place of worship, school, or other. If selecting “other”, you can specify it in more detail. Note: depending on the screen size of your mobile device it may be necessary to manually scroll vertically to see the value entered when choosing “other”. See Figure 16 for an example of the Structure Type entry screen when choosing “other” as the type. Again, keep in mind that you may need to scroll down on your device to see all data entry fields.

If the selected structure type is a house, you will be taken to the Demographic, Family screen, discussed in Section 3.1.5. For all other structure types you will be directed to the Demographic, Address page discussed in Section 3.1.6.

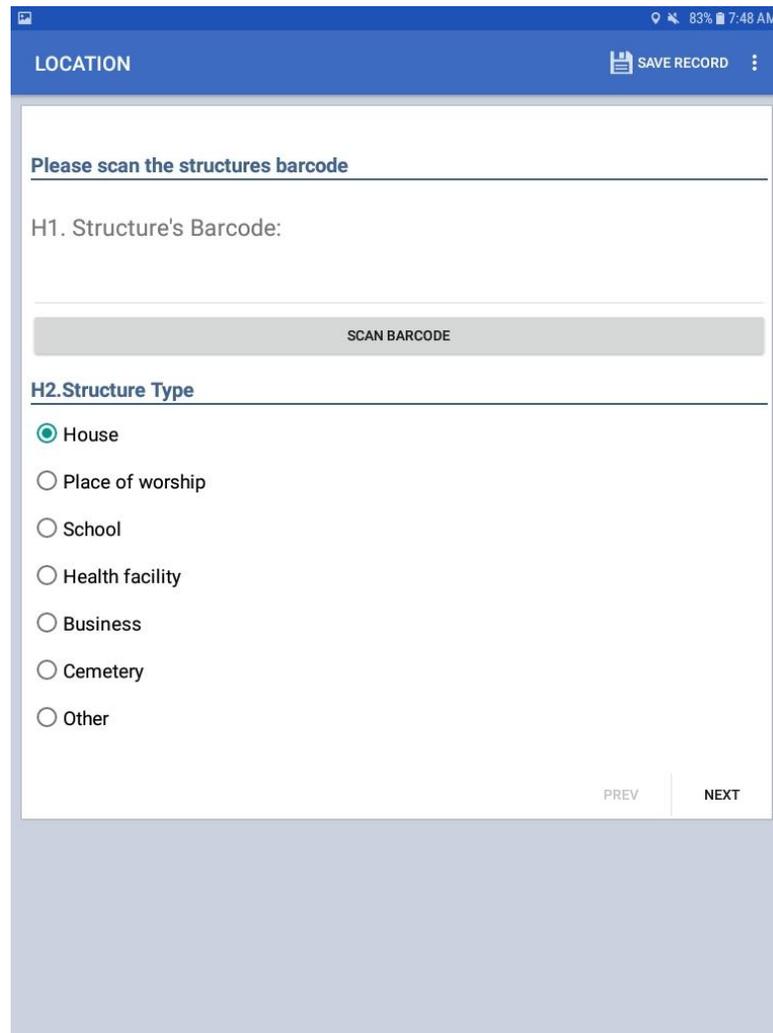


Figure 16. Structure Barcode and Structure Type

3.1.4 GPS Details

The app will automatically capture the coordinates of the user's location along with altitude and accuracy in meters and the geographic region (see section 1.6). However, if due to various circumstances such as obstructed view of the sky or weather, the coordinates may be blank or highly inaccurate. The "retry" button, Figure 17, is available to try capturing the coordinates again. If you are satisfied with the information captured, simply proceed to the next page.

The screenshot shows a mobile application interface for capturing location data. The top bar is blue with the text 'LOCATION' and a 'SAVE RECORD' button with a document icon. Below the bar, the form is titled 'GPS Details'. It contains the following fields and values:

- Latitude: 33.8485175
- Longitude: -84.30823
- Region: Georgia
- Altitude (in meters): 265

A grey 'RETRY' button is positioned below the 'Region' field. At the bottom right of the form, there are 'PREV' and 'NEXT' navigation buttons.

Figure 17. Opportunity to retry capturing GPS information

3.1.5 Demographics, family

Family demographics data include the name of head of household, head of household's phone number, the number of people who normally sleep in the house and the number of people who slept in the house the previous night. These items can be entered in this section as shown in Figure 18. This page is only available for entry when the structure type is a house.

The screenshot shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text 'Interviewer' on the left and a 'SAVE RECORD' button on the right. Below the header, the main content area is titled 'Demographics, family' and contains four questions, each followed by a text input field:

- H3. Name of Head of Household:
- H4. Head Household's Phone Number:
- H5. How many people normally sleep in the house?
- H6. How many people slept in the house last night?

At the bottom right of the form area, there are two buttons labeled 'PREV' and 'NEXT'. The bottom of the screen is a solid grey bar.

Figure 18. Demographics, Family for a House

3.1.6 Demographics, address

Address and location fields are available for all structure types, as shown in Figure 19. The address should be the proper address (e.g., the mailing address), and the location field can be used to provide additional details. Keep in mind latitude and longitude values for the Location are not derived from values entered on this page, the geolocation information is associated with the Location upon scanning the barcode as explained in Section 3.1.2.

The image shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the header, the main content area is titled "Demographics, address" and contains two input fields: "H7. Address:" and "H8. Location". At the bottom right of the form area, there are two buttons labeled "PREV" and "NEXT". The entire interface is set against a light gray background.

Figure 19. Demographics, Address Details for All Structure Types.

3.1.7 Place Details

Location name and other location info are available for all records, as shown in Figure 20. This page can be used for any structure type to provide additional information, however it is intended primarily for locations that lack a specific or formal address (which can include residential locations). These fields are optional.

The screenshot shows a mobile application interface titled 'Interviewer'. At the top right, there is a status bar with icons for location, signal, and battery (79%), and the time 8:28 AM. Below the status bar is a blue header with the text 'Interviewer' and a 'SAVE RECORD' button with a document icon. The main content area is titled 'Place details' and contains two text input fields. The first field is labeled 'H9. Location Name:' and the second is labeled 'H10 Other Location Info'. At the bottom right of the form area, there are two buttons: 'PREV' and 'NEXT'. The bottom of the screen is a solid grey bar.

Figure 20. Place details for All Structure Types

3.1.8 Entomology Menu (Field)

The entomology menu, as shown in Figure 21, is the primary access point for creating new records associated with the current location for the following activities:

- Trapping
- Collection
- Bottle Bioassay
- Cone Bioassay
- Adult Vector Control

Each of these activities are discussed in more detail in their respective sections that follow. For existing locations, the Entomology menu will be displayed when scanning the barcode as described in Section 3.1.1.

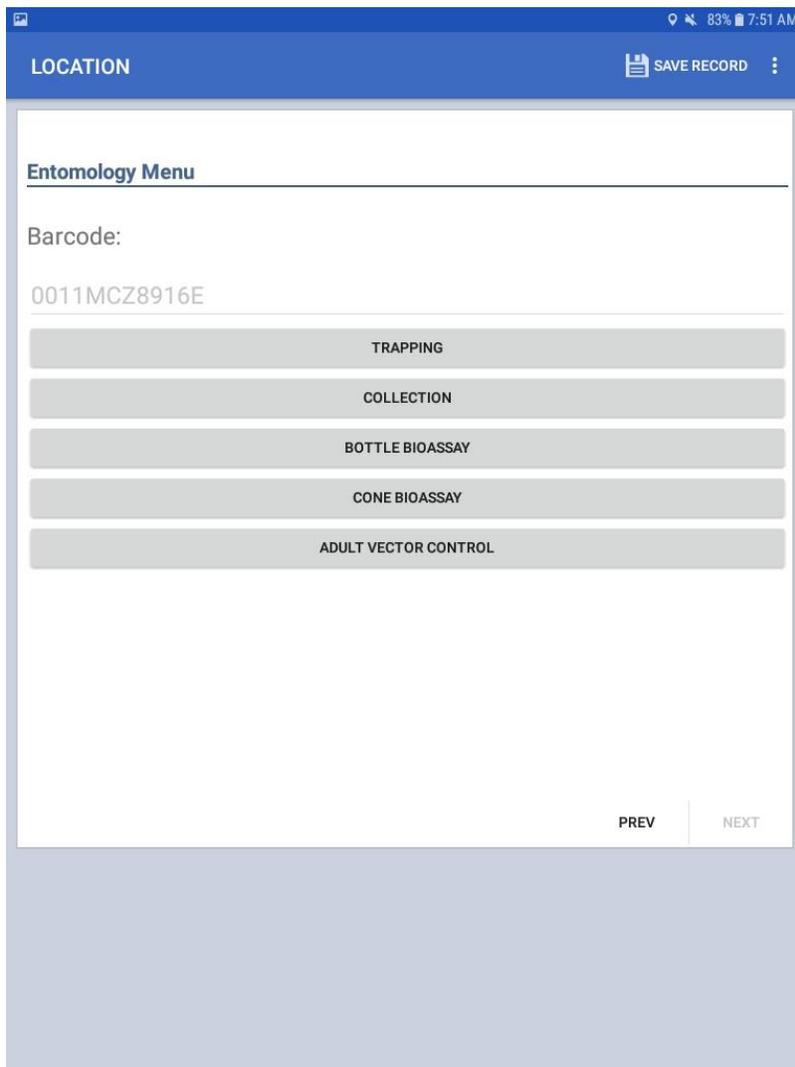


Figure 21. Entomology Menu

3.2 Trapping (Field)

Multiple field trapping events can be associated with a location. A variety of traps can be used for surveillance efforts; for further information on which trap(s) to use please consult the references provided in Section 10.

3.2.1 New or Existing Traps

Similar to the Locations list, a blank list will appear until the first trapping record is entered, as shown in Figure 22. A new trapping event is entered by clicking on the large circular “+” button in the lower right corner of the page.

It is during the activity of setting a trap that a new record is created, which is then available later when retrieving the trap. A Trapping record will have different data screens that appear depending on whether the trap is being set for the first time (i.e., when the record is created) or when a trap is retrieved.

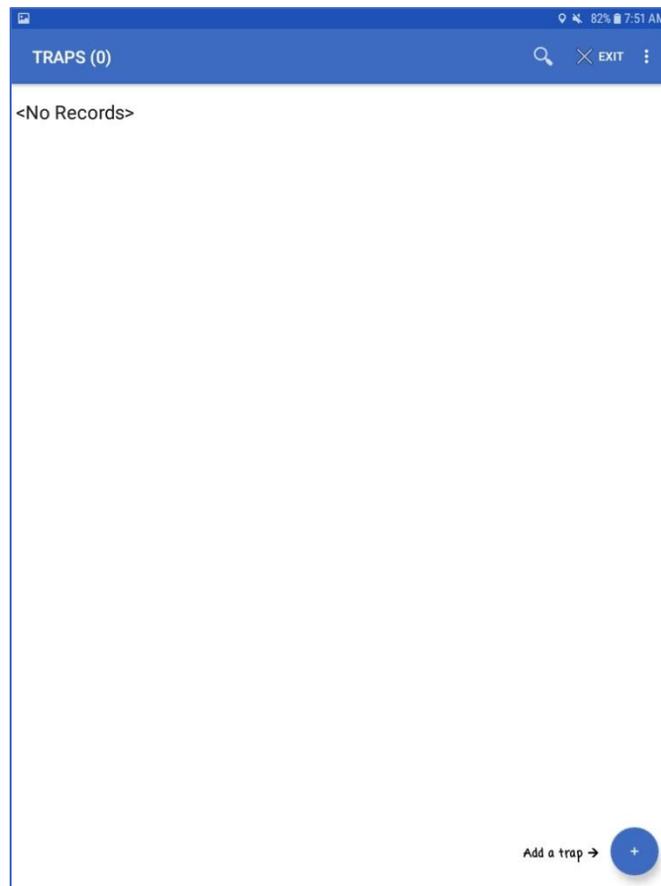


Figure 22. Trapping Records Screen

3.2.2 Trap Type

Upon setting a new trap, the app allows for recording five different types of traps as shown in Figure 23:

- Ovitrap
- Gravid
- GAT
- BG
- Light

Other than Ovitrap, which are for egg collection, all other traps refer to adult specimens. For more information on the individual traps and when to use them, please refer to the References in Section 10 of this document.

In addition to the trap type, the location of the trap should be indicated as either inside or outside the structure.

The screenshot shows a mobile application interface titled "Interviewer" with a "SAVE RECORD" button in the top right corner. The status bar at the top indicates 79% battery and 8:34 AM. The form is divided into two sections: "T1. Trap Type" and "T2. Location of the Trap".

T1. Trap Type

- Ovitrap (eggs)
- Gravid (Adult)
- GAT (Adult)
- BG (Adult)
- Light (Adult)

T2. Location of the Trap

- Inside
- Outside

Navigation buttons "PREV" and "NEXT" are located at the bottom right of the form area.

Figure 23. Trap Type and Location

After saving the trapping record, the user is returned to the trapping records list and a new entry is now present, indicating the set date, set time, and trap type. An example of a trapping record is shown in Figure 24. At this point you can return to this trapping record to enter retrieval information, or click on the “+” button to create a new trapping event.

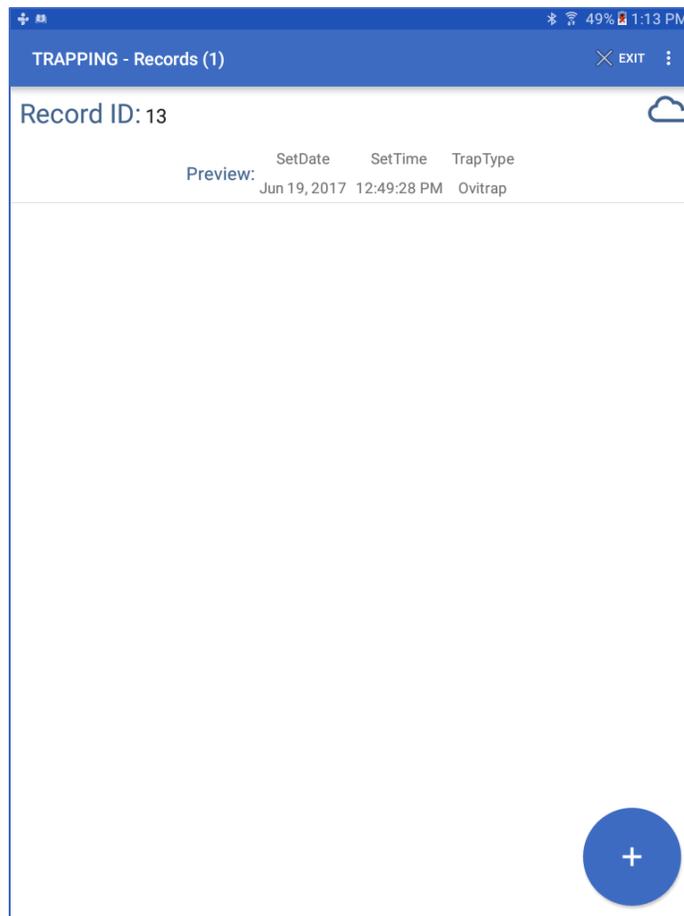


Figure 24. Example Trapping Record Screen

3.2.3 Trap Retrieval

The trap retrieval page, Figure 25, is shown when clicking on an entry in the Trapping records list. The barcode associated with this event should be displayed on this page (in Figure 25 the example value is “3PE9”). You will need to record this value, along with the date, for retrieving a trap.

Click the checkbox labeled “Trap Retrieved” to document the retrieval activity. You should see a dialog box reminding you to write the barcode number and the date on your sample. Next, indicate any issue with the trap. Typically you will enter “none”, however if something happened that prevented the successful retrieval of the trap it can be documented here. Common issues with a trap that may prevent retrieval include the trap being stolen, removed, damaged, or not working. You can also specify “other” issues with a trap, as shown in the example in Figure 25. Lastly, indicate whether the retrieved trap was positive or negative for presence of

mosquitoes. When finished, please save your record by clicking the “Save Record” menu item on the next page in the app, shown in Figure 26.

The screenshot shows a mobile application interface for an interviewer. The title bar is blue and contains the text "Interviewer" on the left and a "SAVE RECORD" button on the right. The main content area is white and titled "Retrieval". It contains the following elements: a "Barcode" field with the value "3PE9"; a checkbox labeled "T3.Trap Retrieved" which is currently unchecked; a dropdown menu labeled "Issue with trap:" with the selected option "Other"; a text input field labeled "If Other, Please specify" which is currently empty; and another dropdown menu labeled "Is the trap positive?" with the selected option "<Not Selected>". At the bottom right of the form, there are two buttons: "PREV" and "NEXT". The entire form is set against a light blue background.

Figure 25. Trap Retrieval



Figure 26. Save Record

3.3 Collection (Field)

The field collection module is used for adult mosquitoes and larvae/pupae. The larvae/pupae section of the module can also be used to record larval vector control when applicable (for Adult Vector Control, please see Section 3.6).

When accessed for the first time for a given location, no records will appear in the Collection Record List, as shown in Figure 27. Create a new collection record by clicking the large “+” icon in the lower right corner of the page.

Once Collection records have been entered they will appear in this list with the following details (see example in Figure 28):

- Collection Type, either Adult or Larvae/Pupae;
- Collection Date, the date the record was created; and
- Container State, either Positive, Negative, or Unknown.

The meaning and significance of these values will be further explained in this section.

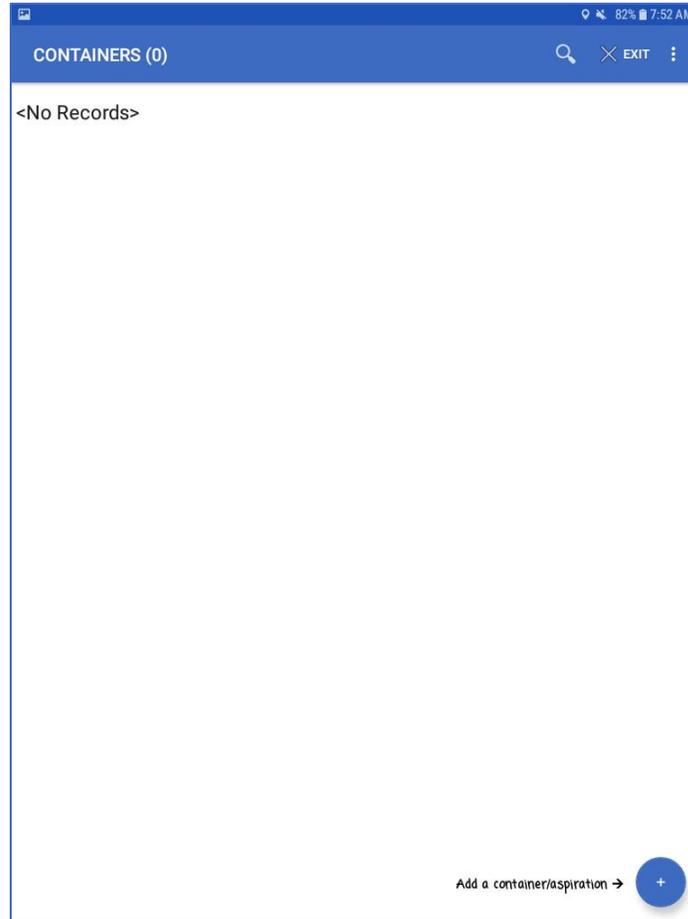


Figure 27. Field Collection Record Screen, No Records.



Figure 28. Field Collection Records Screen, With Example Records

3.3.1 New Collection Activity

Select whether you are collecting adults or larvae/pupae, as shown in Figure 29. The selection will determine which set of entry forms will appear next. If you are collecting both adults and larvae/pupae, you must create a new collection record for each type. When collecting larvae/pupae, a new, separate collection record will be created for each container that is positive.

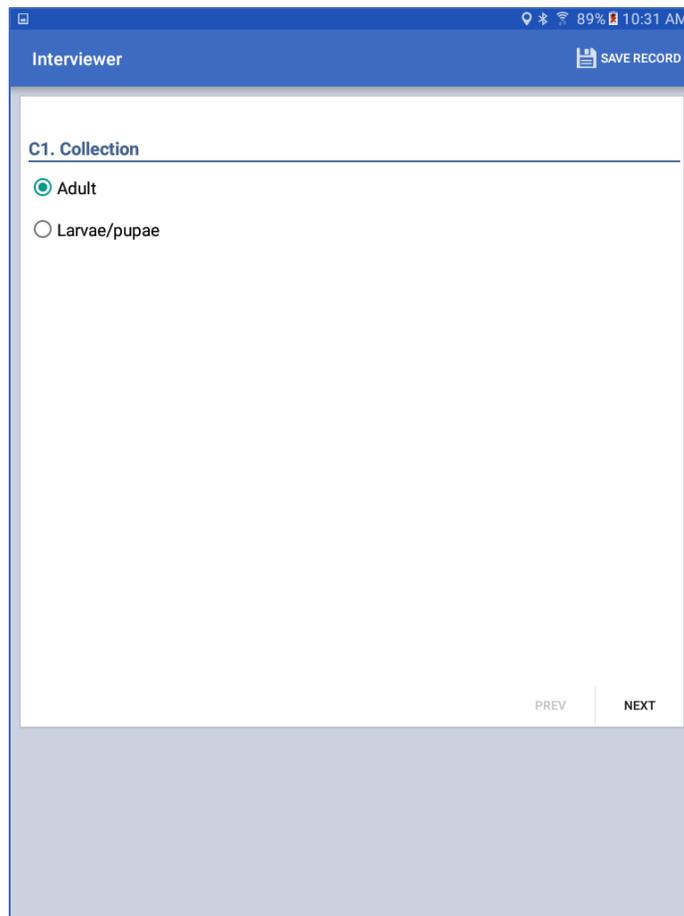


Figure 29. Field Collection Life Stage

3.3.2 Adult

Field collection data for adult specimens, collected with an aspirator, include the start and stop times as shown in Figure 30, as well as whether or not any mosquitos were caught. You will be prompted to save your data on the subsequent page by clicking the “save record” button in the menu (this is the same screen shown in Figure 26) and return to the Collection Records screen where you can enter additional records, or exit the app.

Figure 30. Aspirator

3.3.3 Larvae/Pupae

When collecting larvae and pupae samples, a dialog window will appear to remind you to record all containers that have water in them, even if they are covered, and exclude all containers that do not contain water inside, shown in Figure 31.

When determining container status, Figure 32, indication of positive, negative and unknown larvae/pupae container status will be handled differently and result in a different set of questions presented. Negative containers will not require a count of larvae/pupae, or further intervention, therefore it is only necessary to count all negative containers and the total number of each type. You will only need to create a single collection record that will consist of a count of all negative container types. For positive containers, create a new, separate collection record for each container that is positive. If you encounter a mix of positive and negative containers, you should have separate records for each positive container and one record for all negative containers.

It may not be possible to determine whether or not a container is positive or negative, in which case you can select “unknown” for the status. Create a new, separate collection record for each container that is unknown. All three scenarios for larvae/pupae status, i.e., positive, negative, and unknown, are addressed in further detail below.

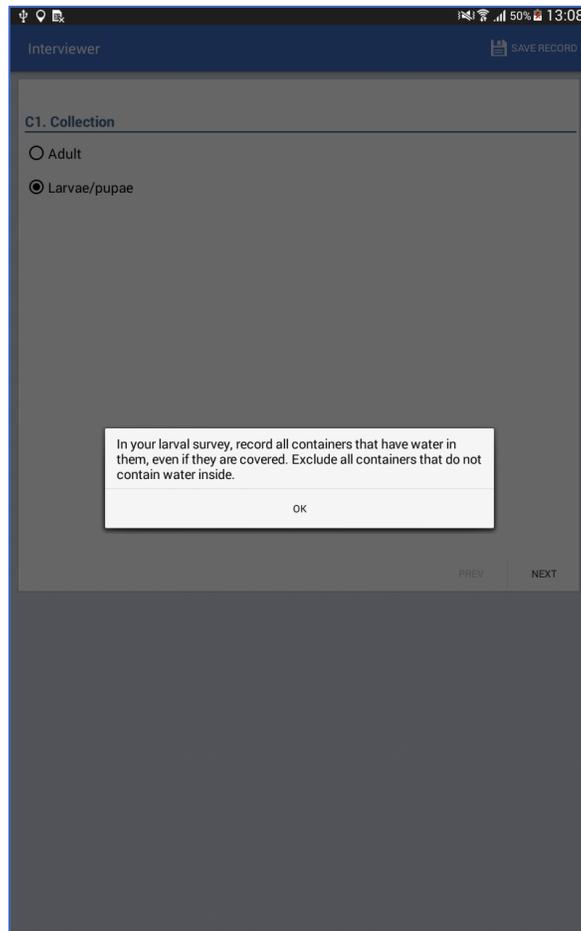


Figure 31. Larvae/Pupae Field Collection

The screenshot shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the header, the main content area is white and contains the question "C4.Does this container have any larvae or pupae?". Underneath the question, it asks "Is it positive?" and displays a dropdown menu with the selected option "<Not Selected>". At the bottom right of the white area, there are two buttons labeled "PREV" and "NEXT". The bottom portion of the screen is a solid grey bar.

Figure 32. Larvae/Pupae Container Status

3.3.3.1 *When Larvae or Pupae are Present*

When positive identification of samples is made, estimate numbers of both pupae and larvae as a range using the following extents:

- 0
- 1-10
- 10-50
- >50+

Record separate values for both larvae and pupae, see Figure 33.

The screenshot shows a mobile application interface titled "Interviewer" with a "SAVE RECORD" button in the top right. The main content area contains the following questions and responses:

- Question: **C4.Does this container have any larvae or pupae?**
- Text: Is it positive?
- Response: 1-Yes
- Question: C4a2. Roughly how many pupae are visible?
- Response: <Not Selected>
- Question: C4a1. Roughly how many larvae are visible?
- Response: <Not Selected>
- Question: C4b. Intervention type
- Response: <Not Selected>

At the bottom right of the form, there are two buttons labeled "PREV" and "NEXT".

Figure 33. Positive Identification of Larvae/Pupae

Additionally, indicate any intervention performed from the following three options:

- no intervention,
- physical intervention,
- or larvicide.

An accurate response is necessary to determine which set of questions need to be answered next. If “No Intervention” was indicated, the user is prompted to specify the reason, see Figure 34. You can then enter any additional remarks, Figure 39.

The screenshot shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the header, the main content area is white and contains the following text: "C4b3. Please specify the reason why you did not apply the larvicide". Underneath this text are three radio button options: "The owner refused", "Do have larvicide right now", and "Other". At the bottom right of the white area, there are two buttons labeled "PREV" and "NEXT". The bottom portion of the screen is a solid grey bar.

Figure 34. Reason for Not Applying Larvicide

When larvicide is selected as the intervention type, select form the following:

- Abate,
- Altosid,
- Bti (Bacillus thuringiensis israelensis),
- other

Figure 35 shows an example of the prompt that will appear when selecting “other” for indicating a larvicide that is not listed.

Interviewer SAVE RECORD

C4b1. Select the larvicides used

Abate

Altosid

Bti

Other

If other, please specify

PREV NEXT

Figure 35. Specify Larvicide Used.

After selecting a larvicide, enter the formulation and amount added to the container. See the fields in Figure 36.

Interviewer SAVE RECORD

C4b2. Indicate the formulation of larvicides and the amount added to the container

Briquette:
Enter the number (units):

Granules:
Enter the number (spoon):

Liquide:
Enter the number (cc):

PREV | NEXT

Figure 36. Field Collection Larvicide Formulation and Amount

For example, if half a briquette of Bti was used to treat a container, enter 0.5 as the number of units for Briquettes, and either leave the number of units for Granules and Liquid blank or enter 0.

Physical intervention implies emptying, moving, or covering the container of water with larvae/pupae.

Select the type of container from the list shown in Figure 37, which consists of the following:

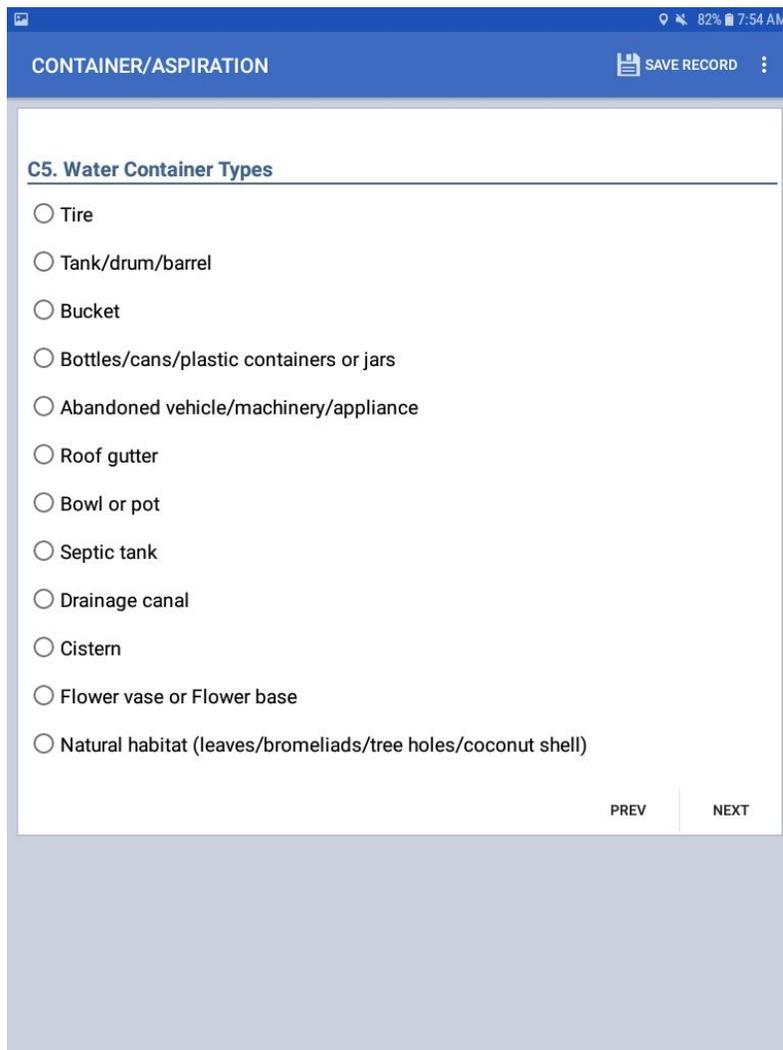


Figure 37. Field Collection Larval Water Container Types

Please note that you may need to scroll through the screen to see the entire list of container types. If “other” is selected, describe the container when prompted. Next, select the container location, either outside or inside the location structure, as shown in Figure 38.

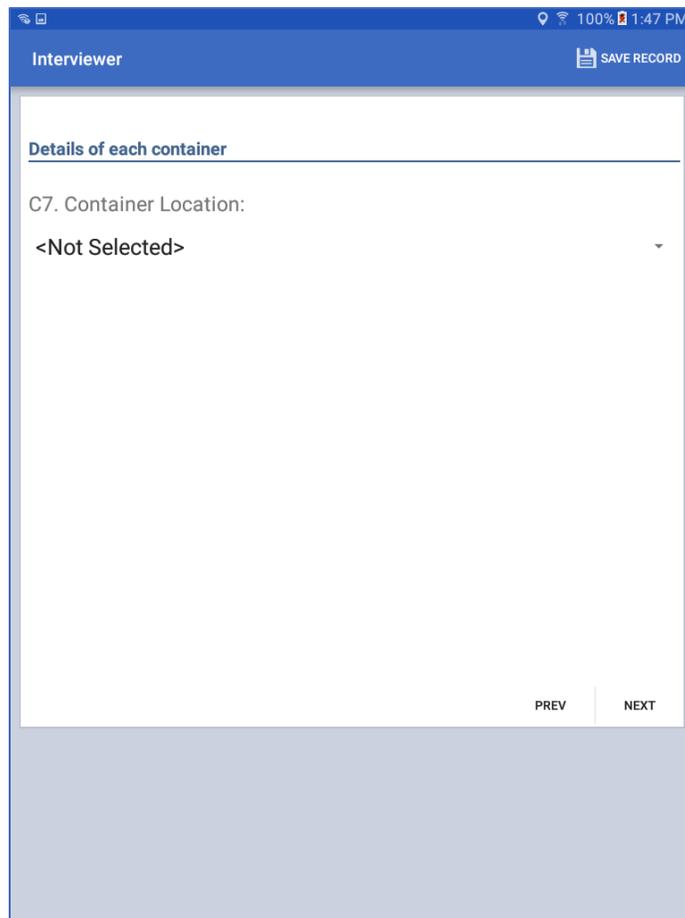


Figure 38. Field Collection Container Details

The final entry screen provides an opportunity to record any additional remarks as shown in Figure 39.

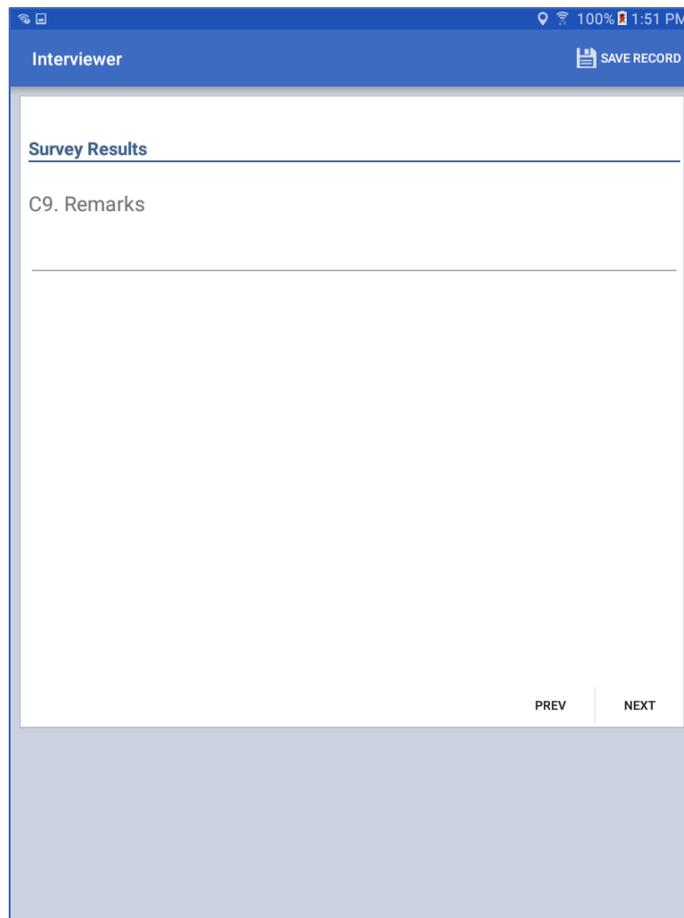


Figure 39. Field Collection Survey Results

When finished, save and return to the main collection screen, Figure 27. You can now enter more records if you observe more than one positive container. Remember, you should have a separate record for each container that is positive or unknown for larvae/pupae.

3.3.3.2 When Larvae or Pupae are Not Present

When you have containers with water that have no larvae/pupae present, count all of the negative containers and enter the total amounts as shown in Figure 40. You may have to scroll to see all the container types.

Interviewer 89% 10:40 AM

SAVE RECORD

C5. The total of negative water containers by type

Pot (Ceramic earthenware)

Bowl (Toilet or fish bowl or pet dish)

Flower vase

Tire

Coquille de noix de coco

Discarded bottles or plastic containers or broken jars

Habitat of natural reproduction (leaves or bromeliads or underarm)

Sewer

PREV | NEXT

Figure 40. Count of negative containers when larvae/pupae are not present

You can also enter additional remarks if needed; the screen is the same as Figure 39. When finished, save and return to the main collection screen, Figure 28. You can enter additional records if you have positive or unknown containers, but you should only have one record for all negative containers.

3.3.3.3 When Larvae or Pupae Presence is Unknown

There may be situations in which a container’s status cannot be determined (e.g., the container is out of reach, there is a barrier between you and the container, etc.). If you cannot tell if a container is negative or positive, create a new record and select “Unknown”. Then indicate if the container is accessible, and the type of intervention performed, as shown in Figure 41. If the container is accessible, state why the presence of larvae is unknown, as shown in Figure 41.

Indicate any intervention performed, type of water container, container location, and any remarks as described in Section 3.3.3.1.

Save the record and return to the main collection screen, Figure 28. You can enter another record if you have additional containers that are unknown for larvae/pupae presence. Similar to positive containers, you should have a separate record for each container that is unknown.

The screenshot displays a mobile application interface for recording container status. The top bar is blue and contains the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the bar, the form is titled "C4.Does this container have any larvae or pupae?". It includes a dropdown menu for "Is it positive?" with the selection "3-Unknown". Below this is a section for "The accessibility status of container:" with a dropdown menu set to "2-Accessible". A text input field is provided for "Please specify why the presence of the larvae is unknown:". The form also includes a section for "C4b. Intervention type" with a dropdown menu set to "<Not Selected>". At the bottom right of the form, there are "PREV" and "NEXT" buttons. The bottom of the screen is a solid grey bar.

Figure 41. Unknown status of container.

3.4 CDC Bottle Bioassay (Field)

The CDC bottle bioassay modules allow for collection of time mortality data with diagnostic, synergist, and intensity testing of insecticides, according to the standards methods outlined [here](#). It is possible to record data for three types of bioassays: diagnostic, synergistic, or intensity. The module can be used for any insect species, but is optimized for *Aedes* and *Anopheles* diagnostic testing.

Note: When clicking on an existing record you may receive a popup window indicating the time at which the bioassay test was done.

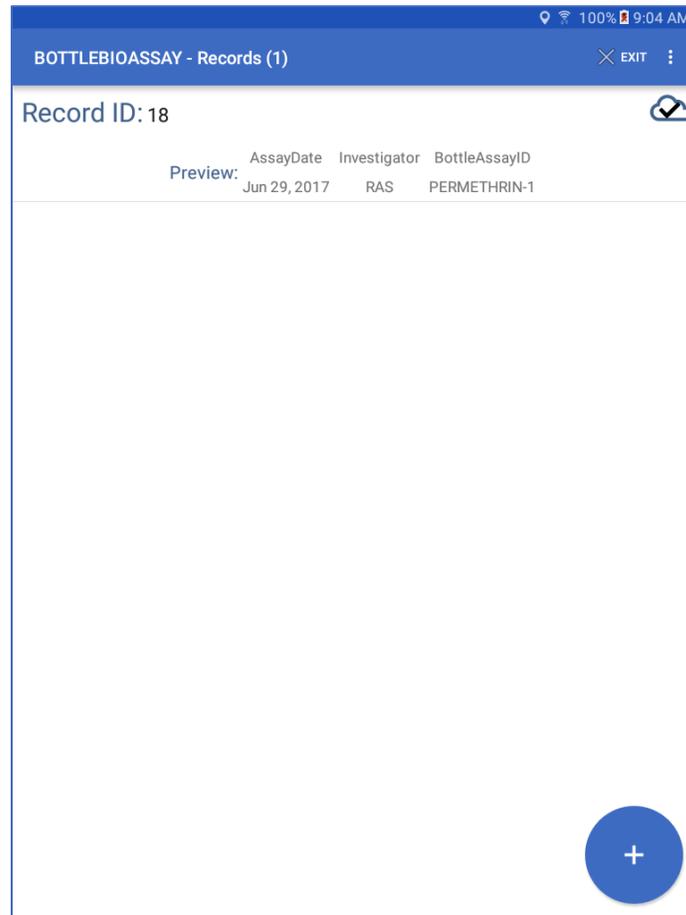


Figure 42. CDC Bottle Bioassay Records Example

3.4.1 Mosquito Population Parameters

The first screen of the CDC Bottle Bioassay module is for recording information related to the mosquito population being tested, as shown in Figure 43.

Interviewer SAVE RECORD

B2. Mosquito Population

B2a. Stage and Origin
<Not Selected>

B2e. Physiological Status
<Not Selected>

B2i. Minimum Age (days)

B2k. Maximum Age (days)

PREV | NEXT

Figure 43. CDC Bottle Bioassay Mosquito Population Form

The stage and origin of mosquitoes are selected from the options shown in Figure 44.

B2. Mosquito Population

B2a. Stage and Origin

<Not Selected>

Adults, wild collected

Adults, from wild larvae

Adults, progeny of wild adults

Figure 44. CDC Bottle Bioassay List of Mosquito State and Origins

If the first option, Adults, wild collected, is selected, enter a collection method, as shown in Figure 45.

B2b. Collection Method

<Not Selected>

Trapping

Cattle Collect

Human Landing

Aspiration

Other

Figure 45. CDC Bottle Bioassay List of Collection Methods

If choosing Other for a collection method, specify the collection method used. Next, the physiological status of the mosquitoes is selected from the following options in Figure 46.

B2e. Physiological Status

<Not Selected>

Unfed

Blood fed

Semi-gravid

Gravid

Mixed

Unknown

Figure 46. CDC Bottle Bioassay List of Physiological Status

Finally, the minimum and maximum age of the mosquitoes can also be entered as integer values on the form.

3.4.2 Mosquito Genus

The mosquito genus used in the CDC Bottle Bioassay module can be either

- *Aedes*,
- *Anopheles*,
- *Culex*, or
- Other

If “Other” is selected, specify the genus when prompted, as in Figure 47. It is possible to specify a different species for the control used in the CDC Bottle Bioassay. The default is to use the same genus as the test genus, in which case no change is needed. A notes field is also provided on the screen to enter additional information, such as the species used.

The screenshot shows a mobile application interface for recording mosquito genus data. At the top, a blue header bar contains the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the header, the form is divided into sections. The first section is titled "B3. Mosquito Genus" and contains a sub-section "B3a. Mosquito Genus" with a dropdown menu currently showing "Other". Below this is "B32b. Other Mosquito Genus" with a text input field. The next section is "B3c. Same genus for controls?" with a checked checkbox. The final section is "B3f. Notes" with a large text input area. At the bottom right of the form, there are "PREV" and "NEXT" navigation buttons. The entire form is set against a light gray background.

Figure 47. CDC Bottle Bioassay Mosquito Genus Form

3.4.3 Assay Test Type

Select the assay type, as shown in Figure 48. Three types of bioassays can be recorded: diagnostic, synergistic, or intensity.

The screenshot shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text 'Interviewer' on the left and a 'SAVE RECORD' button on the right. Below the header, the main content area is titled 'B5. Test'. Underneath this title, there is a section labeled 'B5a. Assay Type' with a dropdown menu currently displaying '<Not Selected>'. At the bottom right of the form, there are two buttons: 'PREV' and 'NEXT'. The entire form is set against a light blue background.

Figure 48. CDC Bottle Bioassay Test Selection Form

When selecting a diagnostic test, the insecticide used will be based upon pre-defined diagnostic doses for the genus selected, discussed in Section 3.4.4. When selecting a synergist test, the synergist name and concentration are entered in the form, Figure 49. Available synergists are listed in Figure 50.

Interviewer SAVE RECORD

B5. Test

B5a. Assay Type
Synergist

B5e. Synergist
<Not Selected>

B5f. Synergist Concentration (ug/ml)

PREV | NEXT

Figure 49. CDC Bottle Bioassay Test Selection Form, Synergist Test Options

B5e. Synergist

<Not Selected>

CF - Chlorfenethol

DM - Diethyl maleate

EA - Ethacrynic acid

PBO - Piperonyl butoxide

DEF - S,S,S-tributylphosphorotrithioate

Figure 50. CDC Bottle Bioassay Synergist List

When selecting an intensity test, a user-specific concentration will be required (see Section 3.4.4).

3.4.4 Insecticide Selection

The choices of insecticide used depend upon the genus and the test type. For diagnostic and synergist tests, the available choices are listed for *Anopheles* and *Aedes* as shown in Figure 51.

Insecticide	Anopheles Diagnostic Dose	Aedes Diagnostic Dose	Diagnostic Time
Bendiocarb	12.5	12.5	30
Cyfluthrin	12.5	10	30
Cypermethrin	12.5	10	30
DDT	100	75	45
Deltamethrin	12.5	10	30
Fenitrothion	50	50	30
Lambda-cyhaolthrin	12.5	10	30
Malathion	50	50	30
Permethrin	21.5	15	30
Primiphos-methyl	20	--	30

Figure 51. Table of Diagnostic Doses and Diagnostic Times for *Anopheles* and *Aedes* Mosquitos

These options are presented as a drop-down selection for *Aedes* as shown in Figure 52, and *Anopheles* as shown in Figure 53.

Figure 52. CDC Bottle Bioassay Insecticide Form for *Aedes* Species

Interviewer

SAVE RECORD

B4. Insecticide

B4b. Insecticide (Anopheles)

Permethrin, 21.5 ug/ml

PREV NEXT

Figure 53. CDC Bottle Bioassay Insecticide Form for Anopheles Species

For Culex and Others where diagnostic doses are not available, select both the insecticide and concentration for the test as shown in Figure 54.

Interviewer SAVE RECORD

B4. Insecticide

B4c. Insecticide

Other

B4d. Other Insecticide

B4e. Insecticide Concentration

PREV NEXT

Figure 54. CDC Bottle Bioassay Insecticide Form for Other Species

3.4.5 Replicate Parameters

All test types (diagnostic, synergist and intensity) can be recorded with either 1 or 2 controls. For diagnostic and synergist tests, the number of replicates can be selected from 1 to 4, Figure 55.

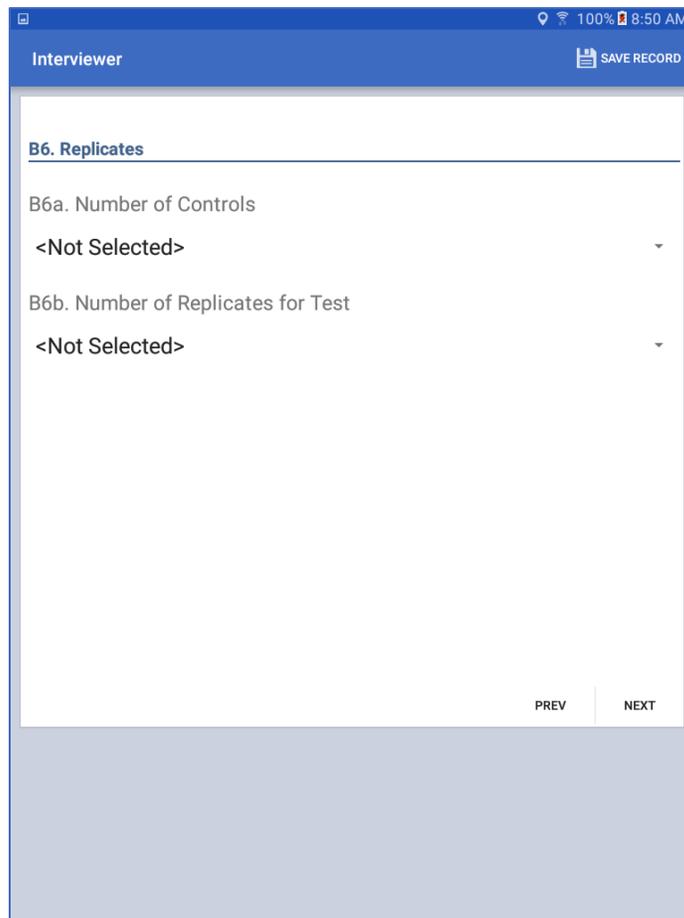


Figure 55. CDC Bottle Bioassay, Replicate Selection for Diagnostic and Synergist Tests

When performing an Intensity test, data is entered similar to a diagnostic test, however diagnostic doses do not apply; i.e., a concentration value is entered manually. Any number of concentrations can be recorded as each concentration, or intensity, is entered as a separate record in the module.

Figure 56. CDC Bottle Bioassay, Replicate Selection for Intensity Tests (Example)

3.4.6 Review

Prior to entering time mortality data, a review screen is available to display the values selected for the test; an example is shown in Figure 57. It may be necessary to scroll down the screen to view all values.

The screenshot shows a mobile application interface for an interviewer. At the top, there is a blue header with the text 'Interviewer' and a 'SAVE RECORD' button with a floppy disk icon. Below the header, the form is titled 'B7. Review'. It contains several text input fields with the following values: 'Test Species' is 'Aedes, Adults, wild collected, Unfed'; 'Control Species' is 'Aedes'; 'Insecticide' is 'Permethrin, 15 ug/ml'; 'Test Type' is 'Diagnostic'; 'Number Test Replicates' is '4'; and 'Number Controls' is '1'. At the bottom right of the form, there are two buttons labeled 'PREV' and 'NEXT'. The bottom portion of the screen is a solid grey bar.

Figure 57. Example CDC Bottle Bioassay Review Form

3.4.7 Time Interval Testing

After reviewing the values selected, a series of data entry screens, one for each time interval from 0 minutes through 120 minutes, are available for entry of time mortality data. Note that it may be necessary to scroll the screen to view all data fields. For each control and replicate, the option is provided to record both alive and dead mosquito counts. It is not necessary to provide a value for both fields. Only one is needed, usually whichever is easier to count based upon the status of a particular bottle. However, the number of dead mosquitoes is recommended. Each control and replicate is highlighted to facilitate data entry.

At the bottom of each time interval screen is an option to indicate termination of the test. If this option is selected, further time interval screens will not appear and you will go directly to a summary screen.

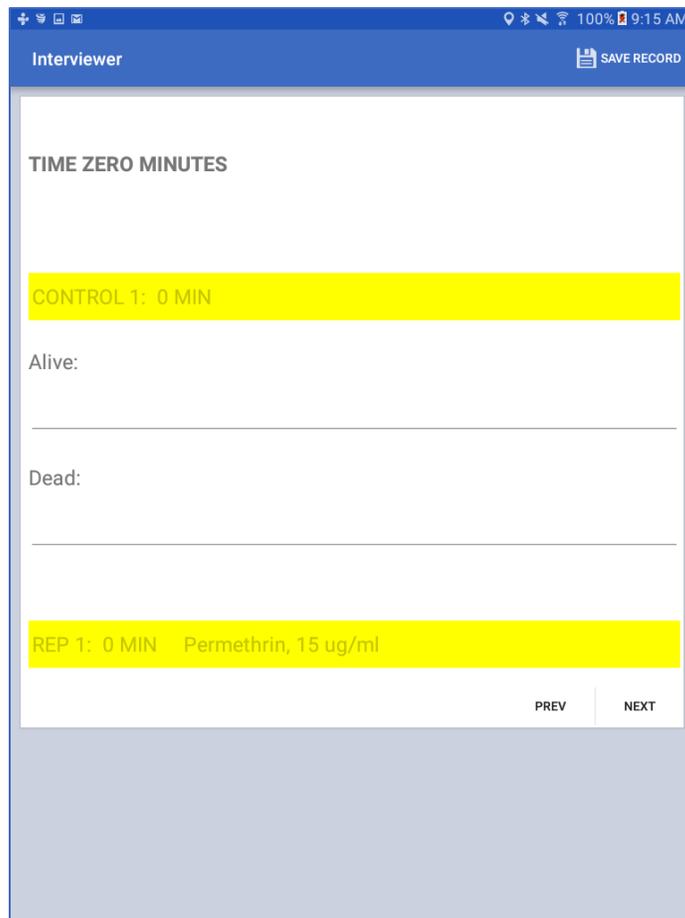


Figure 58. CDC Bottle Bioassay Example Time Interval Screen

3.4.8 Total Mosquito Counts

After selecting to terminate a test or 120 minutes, whichever is earlier, enter total mosquitos in each bottle on the summary screen, Figure 59. To assist in counting final totals and error checking, the total (dead + alive) number of mosquitoes recorded at each time interval is highlighted for each control and replicate on this screen.



Figure 59. CDC Bottle Bioassay Example Total Mosquito Count Screen

3.4.9 Optional Parameters

The final screen for the CDC Bottle Bioassay provides fields for entering the assay date, the Investigator name or initials, an optional assay ID, and the ambient temperature, as shown in Figure 60. All fields are optional and not required for determining the outcome of the test. The assay date defaults to the current date and may be changed as necessary. An assay ID can be used to associate multiple tests with each assay, as in the case of an intensity test run at multiple concentrations.

Interviewer SAVE RECORD

B1. Setup

B1a. Assay Date
 Jul 6, 2017 [Calendar Icon] ×

B1b. Investigator

B1c. Assay ID (optional)

B1d. Temperature (F)

PREV | NEXT

Figure 60. CDC Bottle Bioassay Optional Parameters

3.5 Cone Bioassay (Field)

The effectiveness of an insecticide sprayed surface can be determined using a cone bioassay. The Cone Bioassay module for field collection consists of two forms; the Cone Bioassay Records Screen listing all cone bioassay records associated with the location, Figure 61, and a form for entering the actual test data, shown in 63 and 64.

The screenshot shows a mobile application interface for a 'Cone Bioassay'. At the top, there is a blue header bar with the text 'ASSAY' on the left and 'SAVE RECORD' with a document icon and a menu icon on the right. The status bar above the header shows a signal strength icon, 80% battery, and 7:58 AM. Below the header, the title 'Cone Bioassay' is displayed. The form contains several input fields: 'Species' (text input), 'Strain' (text input), 'Age' (text input), 'Cone Location' (dropdown menu showing '<Not Selected>'), 'Location description:' (text input), 'Mosquitoes Exposed:' (text input), and 'Time Cone Placed:' (datetime picker). At the bottom right of the form, there are two buttons: 'PREV' and 'NEXT'. The entire form is set against a light blue background.

Figure 61. Cone Bioassay

Create a new cone bioassay record by clicking the large “+” icon in the lower right corner of the page.

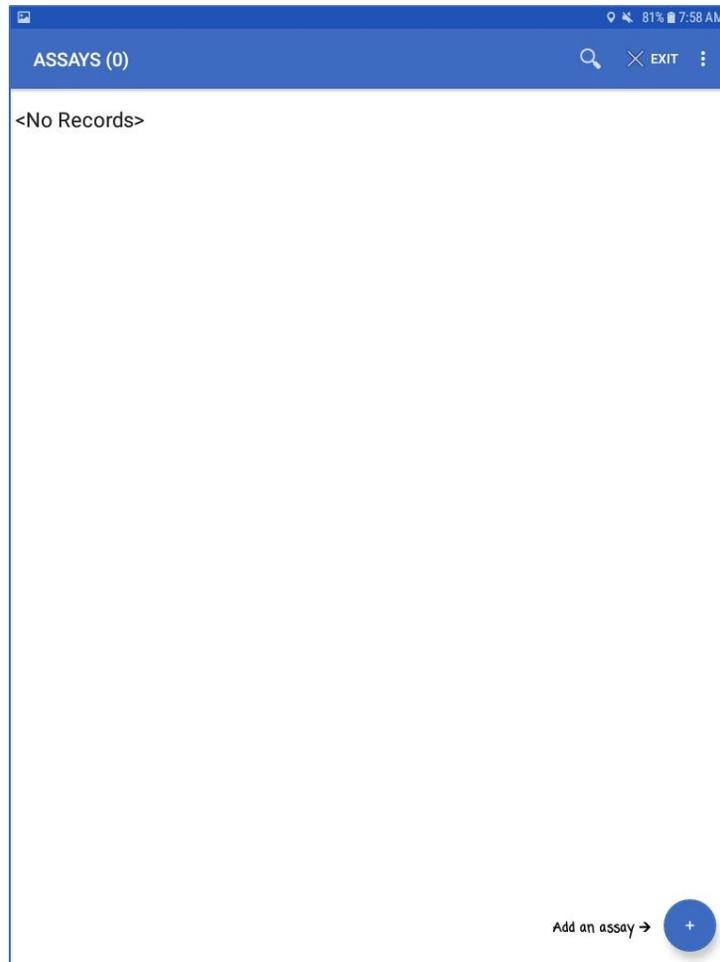


Figure 62. Cone Bioassay Records Screen

3.5.1 Field Cone Bioassay Data Form

The following fields are available on the Cone Bioassay Data Form, Figure 63, and you will have to scroll to see all the fields:

- Mosquito species, strain, and age
- Cone location – specify location of the cone (wall, bednet, or other)
- Location description (for example “bednet panel 1”)
- Number Mosquitos exposed – typically five non-blood fed adults per cone
- Time Cone Placed – the initial time at which the test commenced

Figure 63. Cone Bioassay Data Field Collection Form

Complete all the entry of the fields in Figure 63 and then press the clock on “time cone placed” as soon as you begin the assay, then press “next” to proceed to the second page of the assay entry, shown in Figure 64. The fields in Figure 64 are:

- Time Cone Picked – time after the Time Cone Placed
- KD_{60} minutes – number of mosquitoes knocked down after 30 minutes
- KD_{60} min Percent – A calculated field (read-only) represented as

$$KD_{60}\% = \frac{KD_{30}minutes}{N} \times 100$$

Where N is the Number of mosquitoes exposed

- Calculate button – press to calculate and display the KD 60 min Percent value

You will have to set your own timer for one hour, but as soon as the one hour is up, touch the clock for “time cone picked” in Figure 64 to record the time that you ended the assay. Then enter the number of mosquitoes knocked down after 60 minutes and press the calculate button. This will cause the KD60 percent to be automatically calculated.

The screenshot shows a mobile application interface for data collection. At the top, a blue header bar contains the word "ASSAY" on the left and a "SAVE RECORD" button with a document icon on the right. Below the header, the form is divided into several sections. The first section is labeled "Time Cone Picked:" and features a horizontal input line followed by a clock icon. The second section is titled "Number of Mosquitoes" and contains a horizontal input line. The third section is labeled "KD 60 minutes:" and also has a horizontal input line. Below this is a section for "KD 60 min Percent" with a horizontal input line. A prominent grey button labeled "CALCULATE" is positioned below the input fields. At the bottom of the form, there is a text instruction: "Click the SAVE button above." and two small buttons labeled "PREV" and "NEXT" separated by a vertical line. The status bar at the top of the phone shows a signal strength icon, a location icon, 80% battery, and the time 7:59 AM.

Figure 64. Cone Bioassay Data Field Collection Form

Save the record and return to the Cone Bioassay Records Screen. You can now enter another cone bioassay record or exit the app.

3.6 Adult Vector Control

Vector Control activities can be entered in the field version of the app via the “Adult Vector Control” button from the Entomology Menu (see Section 3.1.8). When opened for the first time for a new location, no records will appear in the Vector Control List, as shown in Figure 65.

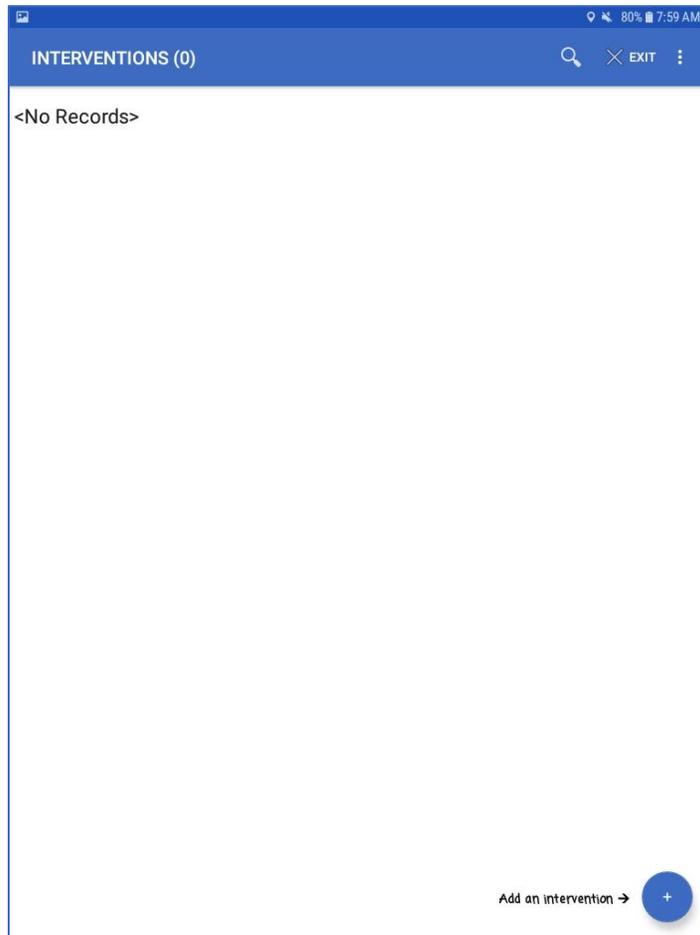


Figure 65. Vector Control Initial Records Page

First, indicate if this is a study, as shown in Figure 66.

The image shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the header, the main content area is titled "Study Design" and contains a question: "V1. Is this a study?". Below the question is a dropdown menu currently displaying "<Not Selected>". At the bottom right of the form, there are two buttons: "PREV" and "NEXT". The entire form is set against a light gray background.

Figure 66. Vector Control Study Form

If “yes”, indicate the type of study, either case or control, shown in Figure 67.

The image shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the header, the main content area is titled "Study Design(cont.)" and contains a question: "V2. Which kind of study site is this?". Below the question is a dropdown menu currently displaying "<Not Selected>". At the bottom of the form, there are two buttons: "PREV" and "NEXT". The entire form is set against a light grey background.

Figure 67. Vector Control Kind of Study Site Form

Next (or if the answer to the previous question was “no”), you will be asked if you are using the ring design, as shown in Figure 68. For more information on using the ring design, see Karl S, Halder N, Kelso JK, Ritchie SA, Milne GJ., in the References section.

The image shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the header, the main content area is titled "Study Design (cont.)" and contains a question: "V3. Are you using the ring design?". Below the question is a dropdown menu currently displaying "<Not Selected>". At the bottom of the form, there are two buttons: "PREV" and "NEXT". The entire form is set against a light grey background.

Figure 68. Vector Control Form to Determine Use of Ring Design

If “yes”, indicate whether or not the site is in the center of the ring, Figure 69.

The image shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the header, the main content area is titled "Study Design (cont.)" and contains a question: "V4. Is this site in the center of the ring?". Below the question is a dropdown menu currently displaying "<Not Selected>". At the bottom right of the form, there are two buttons labeled "PREV" and "NEXT". The entire form is set against a light gray background.

Figure 69. Vector Control Form To Determine Center Of Ring

3.6.1 Indoor Spraying

For all Adult Vector Control records, either a study design or ring design, indicate if the site is receiving indoor spraying, Figure 70. If not, go to Outdoor Spraying, Section 3.6.2.

Interviewer

SAVE RECORD

Insecticide spraying and larviciding

V5. Is this site receiving indoor spraying?

<Not Selected>

PREV | NEXT

Figure 70. Vector Control Form to Determine Indoor Spraying

When Indoor Spraying occurs, indicate the type of indoor insecticide used. If your insecticide is not listed in the drop-down box. If the insecticide is not listed, select “Other” and specify the insecticide as shown in Figure 71.

Interviewer

SAVE RECORD

Insecticide spraying and larviciding

V6. Type of indoor insecticide:

Other

If Other, Please specify

PREV NEXT

Figure 71. Vector Control Form for Indoor Insecticide

3.6.2 Outdoor Spraying

For all Adult Vector Control records regardless of study design or use of the ring design, you will be prompted to indicate whether or not the site is receiving outdoor spraying and larviciding. Begin with Outdoor Spraying at the site, Figure 72.

Interviewer

SAVE RECORD

Insecticide spraying and larviciding

V7. Is this site receiving outdoor spraying?

<Not Selected>

PREV | NEXT

Figure 72. Vector Control Form to Determine Outdoor Spraying

If yes, next indicate the type of outdoor insecticide used, Figure 73. If the insecticide is not listed, select “Other” and specify the insecticide.

Interviewer

SAVE RECORD

Insecticide spraying and larviciding

V8. Type of outdoor insecticide:

Other

If Other, Please specify

PREV | NEXT

Figure 73. Vector Control Form for Outdoor Spraying

Next indicate whether or not larviciding is used at the site, Figure 74.

Interviewer

SAVE RECORD

Insecticide spraying and larviciding

V9. Is this site receiving larviciding?

<Not Selected>

PREV NEXT

Figure 74. Vector Control Form for Larviciding

If yes, indicate the type of larvicide used, Figure 75. If a larvicide is not listed, select “Other” and specify the larvicide.

The screenshot shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text "Interviewer" on the left and a "SAVE RECORD" button on the right. Below the header, the main content area is titled "Insecticide spraying and larviciding". Under this title, there is a question "V10. Type of larvicide:" followed by a dropdown menu currently showing "Other". Below the dropdown is a text input field with the prompt "If Other, Please specify". At the bottom right of the form area, there are two buttons: "PREV" and "NEXT". The entire form is contained within a white box with a thin border, set against a light gray background.

Figure 75. Vector Control Form for Larvicide Type

3.6.3 Source Reduction

For all Adult Vector Control records indicate whether or not source reduction is being done at the site, Figure 76.

The screenshot displays a mobile application interface for an interviewer. At the top, a blue header bar contains the text 'Interviewer' on the left and a 'SAVE RECORD' button on the right. Below the header, the main content area is titled 'Insecticide spraying and larviciding'. Underneath this title, a question is posed: 'V11. Is source reduction being done at this site?'. Below the question is a dropdown menu with the text '<Not Selected>'. At the bottom right of the form area, there are two buttons labeled 'PREV' and 'NEXT'. The entire application window is set against a light blue background, and a grey bar is visible at the very bottom of the screen.

Figure 76. Vector Control Form for Source Reduction

After entering a response, save the record to return to the Vector Control Records screen. You can then enter additional records or exit.

4 Collecting Lab Data

Samples collected during field activities are available for lab analysis using the Lab mode of the app (see Section 1.4). While similar to the Field mode, key differences of the Lab mode are:

- No barcode scanning capability
- Search capability (to navigate to a specific record ID)
- Location records are read only, new locations records cannot be created
- Bidirectional (upload and download) data transfer when syncing records to the cloud (the suggested transfer mode for the field version of the app is upload only)

Different activities performed by the lab and field modes of the app are shown in Figure 77.

Activity	FIELD	LAB
Locations	Create new locations	Read only
Trapping	Setting and Retrieving Traps	Counting eggs and adults and differentiating species
Collection	Adult and Larvae/Pupae Collection	Counting larvae/pupae and adults and differentiating species
Bottle Bioassay	Calculate percent resistant to certain insecticides	--
Cone Bioassay	Calculate percent knockdown at 60 minutes	Calculate mortality after 24 hours
Adult Vector Control	Record vector control studies	--

Figure 77 Differences between Field and Lab Functions

4.1 Retrieving Records for Lab Activities

Similar to the field mode, records are listed on the locations screen that appears after clicking on the “Collect Data” button on the main screen (see **Error! Reference source not found.**). Note that in order for records to appear in this list, they must first be successfully entered in field mode or downloaded from the cloud. In case of the latter, the data would have been uploaded to the cloud previously from a device that was in field mode.

From the Locations screen shown in Figure 78, records can be selected by either clicking directly on an item in the list, or by clicking on the magnifying glass icon in the app menu and manually entering a value to search for a specific location ID.

LOCATIONS - Records (0)			
Record ID: 1	StructureBarcode	Latitude	InspectionDate
Preview:	2F5L	33.7983	Jun 21, 2017
Record ID: 2	StructureBarcode	Latitude	InspectionDate
Preview:	3A51	33.7984	May 24, 2017
Record ID: 3	StructureBarcode	Latitude	InspectionDate
Preview:	2F72	33.7983	Jun 21, 2017
Record ID: 4	StructureBarcode	Latitude	InspectionDate
Preview:	2F75	33.7983	Jun 21, 2017
Record ID: 5	StructureBarcode	Latitude	InspectionDate
Preview:	2FAR	33.7983	Jun 21, 2017
Record ID: 6	StructureBarcode	Latitude	InspectionDate
Preview:	2EWJ	33.7983	Jun 21, 2017

Figure 78. Lab Location Records

When a record is selected from the list, you will see the lab version of the entomology menu as shown in Figure 79. You will not see any field records associated with field trapping, collection, or cone bioassays entries for this location; the lab version of the app is only for entering records for trapping, collection, and cone bioassays performed in the lab.



Figure 79. Lab Entomology Menu

4.2 Trapping (Lab)

The lab trapping module is used to record mosquito counts for traps returned to the lab that were set in the field. From the lab entomology menu, select “Trapping” to reach the Lab Trapping Records screen as shown in Figure 80. A new record can be added by clicking the “+” button in the lower left corner of the screen.

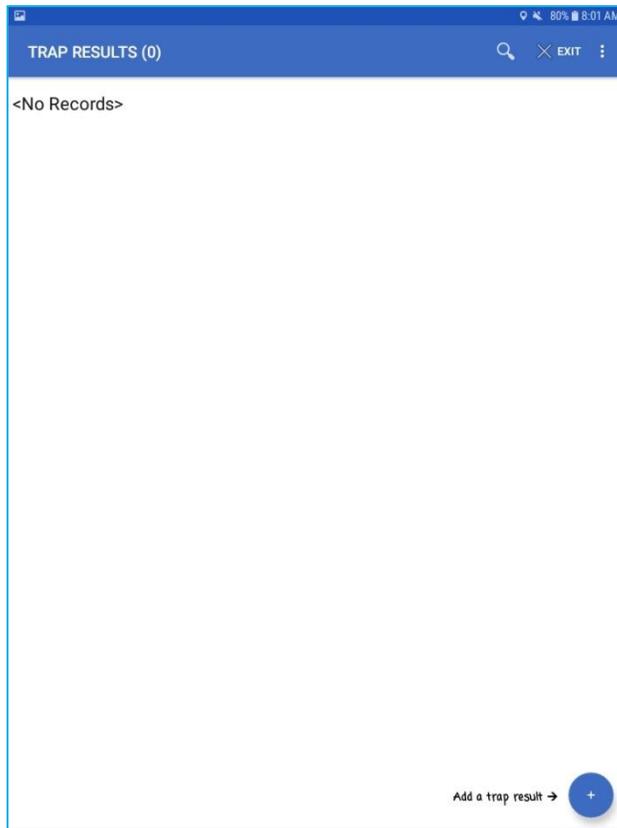


Figure 80. Lab Trapping Records Screen

You can have many traps of the same type or different types from one location, but remember each trap requires a new record in the app. Enter the set date for the trap and the trap type you are evaluating as shown in Figure 81.

Interviewer SAVE RECORD

Date the trap was set

T1. Trap Type

- Ovitrap (eggs)
- Gravid (Adult)
- GAT (Adult)
- BG (Adult)
- Light (Adult)

PREV | NEXT

Figure 81. Lab Trapping, Verifying Trap Date and Type

4.2.1 Ovitrap

For ovitrap, the only information requested is the egg total as shown in Figure 82.



Figure 82. Lab Trapping, Egg Total for Ovitrap

Save the record to return to the Lab Trapping Records screen. You can enter more trapping records for the location or exit from the app.

4.2.2 All Adult Traps

All adult traps (Gravid, BG, GAT, and light traps) collect similar information, starting with whether or not *Aedes* species are present, as shown in Figure 83.

The screenshot shows a mobile application interface titled "Interviewer". At the top right, there is a "SAVE RECORD" button. Below the title bar, the word "Aedes" is displayed. The main content area contains the question "Aedes Present?" followed by a dropdown menu showing "<Not Selected>". At the bottom right of the form area, there are two buttons labeled "PREV" and "NEXT".

Figure 83. Lab Trapping, *Aedes* Present

If yes, enter separate values for:

- *Aedes aegypti* females, blood fed females, and males
- *Aedes albopictus* females, blood fed females, and males

These fields are shown in Figure 84. You will have to scroll to see all the fields.

Interviewer SAVE RECORD

Counts

Aegypti females:
0

Aegypti Bloodfed females:
0

Aegypti males:
0

Albopictus females:
0

Albopictus Bloodfed females:
0

Albopictus males:
0

PREV NEXT

Figure 84. Lab Trapping, Counting *Aedes* Adults

If there are no *Aedes* species present, continue with *Culex* and *Anopheles* species, respectively, shown in Figure 85 through Figure 88.

Interviewer SAVE RECORD

Culex

Culex Present?

<Not Selected> ▾

PREV | NEXT

Figure 85. Lab Trapping, *Culex* Present

Interviewer SAVE RECORD

Counts

Culex females
0

Bloodfed females:
0

Culex males
0

PREV | NEXT

Figure 86. Lab Trapping, Counting *Culex* Adults

Interviewer SAVE RECORD

Anopheles

Anopheles Presente?

<Not Selected> ▾

PREV | NEXT

Figure 87. Lab Trapping, *Anopheles* Present

The screenshot shows a mobile application interface titled "Interviewer". At the top right, there is a "SAVE RECORD" button. The main content area is titled "Counts" and contains three input fields:

- Anopheles females: 0
- Bloodfed females: 0
- Anopheles males: 0

At the bottom right of the form, there are two buttons: "PREV" and "NEXT".

Figure 88. Lab Trapping, Counting *Anopheles* Adults

After entering data for *Aedes*, *Culex*, and *Anopheles*, indicate if other species are present. If yes, enter the names of other species as shown in Figure 89.

The screenshot shows a mobile application interface for an interviewer. At the top, there is a blue header bar with the text 'Interviewer' on the left and a 'SAVE RECORD' button on the right. Below the header, the main content area is titled 'Other species'. It contains the question 'Any other species caught?' followed by a dropdown menu currently displaying 'Yes'. Below the dropdown is a text input field with the prompt 'If Other, please specify:'. At the bottom right of the form area, there are two buttons: 'PREV' and 'NEXT'. The entire form is set against a light gray background.

Figure 89. Lab Trapping, Other Species Present

The final screen during Lab Trapping will display a summary of the information you entered for the adult trap, as shown in Figure 90. You will have to scroll to see all the results.

96% 2:41 PM

Interviewer SAVE RECORD

Counts

Total females:
0

Aedes aegypti females:
0

Aedes albopictu females:
0

Culex females:
0

Anopheles females:
0

Total males:
0

Aedes aegypti males:
0

Aedes albopictus males:
0

Culex males:
0

Anopheles males:
0

Mosquitoes Total:
0

PREV NEXT

Figure 90. Lab Trapping Total Mosquitoes Summary

If needed, return to a previous screen to correct an entry or entries. If the information is correct, save the record to return to the Lab Trapping Records screen where you can enter additional trapping records or exit.

4.3 Collection (Lab)

The lab collection module is used to record mosquito counts from samples collected in the field. From the entomology menu, select “Collection” to reach the Lab Collection Records screen, Figure 91. A new record can be added by clicking the “+” button in the lower left corner of the screen.

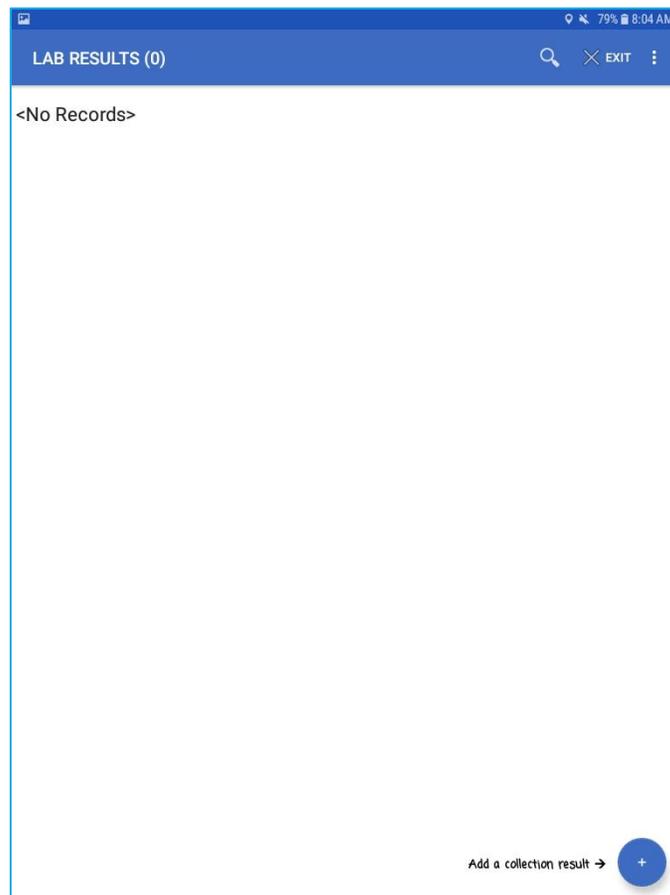


Figure 91. Lab Collection Records Screen

A new lab collection record should be created for each sample returned from the field. First, indicate whether the sample collected is adults or larvae/pupae as shown in Figure 92.

The screenshot shows a mobile application interface for an interviewer. At the top, there is a blue header with the text 'Interviewer' and a 'SAVE RECORD' button with a document icon. Below the header, the main content area is titled 'C1. Collection'. Under this title, there are two radio button options: 'Adult' (which is selected, indicated by a green dot) and 'Larvae / Pupae'. At the bottom right of the main content area, there are two buttons labeled 'PREV' and 'NEXT'. The bottom of the screen is a solid grey bar.

Figure 92. Lab Collection, Life Stage Selection

4.3.1 Adult

Recording of adult mosquitoes is similar to recording adult mosquitoes from trapping activities described in Section 4.2.2. Start with whether or not *Aedes* species are present, Figure 93. If the answer is yes, enter separate values for the following:

- *Aedes aegypti* females, blood fed females, and males
- *Aedes albopictus* females, blood fed females, and males

These fields are shown in Figure 94. If there are no *Aedes* species present, you will be prompted for *Culex* and *Anopheles* presence, respectively, as shown in Figure 95 through Figure 98.

Interviewer SAVE RECORD

Aedes

Aedes Present?
<Not Selected>

PREV | NEXT

Figure 93. Lab Collection, *Aedes* Present

Interviewer SAVE RECORD

Counts

Aegypti females:

Aegypti males:

Albopictus females:

Albopictus males:

PREV | NEXT

Figure 94. Lab Collection, Adult *Aedes* Counts

Interviewer SAVE RECORD

Culex

Culex Present?

<Not Selected>

PREV | NEXT

Figure 95. Lab Collection, *Culex* Present

Interviewer SAVE RECORD

Comptes

Culex females

Culex males

PREV | NEXT

Figure 96. Lab Collection, Adult *Culex* Counts

Interviewer SAVE RECORD

Anopheles

Anopheles Present?

<Not Selected> ▾

PREV | NEXT

Figure 97. Lab Collection, *Anopheles* Present

Interviewer

SAVE RECORD

Comptes

Anopheles females

Anopheles males

PREV NEXT

Figure 98. Lab Collection, Adult *Anopheles* Counts

After entering data for *Aedes*, *Culex*, and *Anopheles*, indicate whether or not any other species are present. If the answer is yes, enter the names of other species, Figure 99. Save the record to return to the Lab Collections Records screen where you can enter additional collection records or exit.

The screenshot shows a mobile application interface titled "Interviewer". At the top right, there is a "SAVE RECORD" button with a document icon. The main content area is titled "Other species" and contains the following elements:

- A question: "Any other species caught?"
- A dropdown menu with "Yes" selected.
- A text input field with the label "If Other, please specify:" and a horizontal line below it.
- Navigation buttons "PREV" and "NEXT" at the bottom right of the form area.

Figure 99. Lab Collection, Other Species Present

4.3.2 Larvae/Pupae

Larvae/Pupae Lab Collection starts with indicating whether or not larvae are present, Figure 100. If the answer is yes, enter separate values for the number of *Aedes*, *Anopheles*, and *Culex* larvae, Figure 101.

Interviewer SAVE RECORD

Larvae

Larvae present?

Yes ▾

PREV | NEXT

Figure 100. Lab Collection, Larvae Present

The screenshot displays a mobile application interface for data collection. At the top, a blue header bar contains the title 'Interviewer' on the left and a 'SAVE RECORD' button on the right. Below the header, the main content area is titled 'Counts' and features three vertically stacked input fields for recording larval species counts: 'Aedes Larvae', 'Anopheles Larvae', and 'Culex larvae'. At the bottom right of the form, there are two small navigation buttons labeled 'PREV' and 'NEXT'. The bottom portion of the screen is a solid grey bar.

Figure 101. Lab Collection, Larvae Species Counts

Next, indicate whether or not pupae are present, Figure 102. If the answer is yes, enter separate values for the number of

- *Aedes aegypti* females emerged,
- *Aedes aegypti* males emerged,
- *Aedes albopictus* females emerged,
- *Aedes albopictus* males emerged,
- *Culex* females emerged,
- *Culex* males emerged,
- *Anopheles* females emerged,
- and *Anopheles* males emerged.

These fields are shown in Figure 103. You may need to scroll down the screen in order to view and enter all fields on this form. Save the record to return to the Lab Collection Records screen and either enter additional collection records for the location or exit from the app.

Interviewer SAVE RECORD

Pupae

Pupae Present?
<Not Selected>

PREV | NEXT

Figure 102. Lab Collection, Pupae Present

The screenshot shows a mobile application interface titled "Interviewer". At the top right, there is a "SAVE RECORD" button. The main content area is a form with the following sections:

- Counts** (Section Header)
- Aedes aegypti females emerged :
- Aedes aegypti males emerged :
- Aedes albopictus females emerged:
- Aedes albopictus males emerged:
- Culex females emerged:
- Culex males emerged:
- Anopheles females emerged:
- Anopheles males emerged:

At the bottom right of the form, there are two buttons: "PREV" and "NEXT".

Figure 103. Lab Collection, Emerged Pupae Counts

4.4 Cone Bioassay (Lab Only)

The lab cone bioassay module is similar to the field cone bioassay, the difference being the endpoint for determination efficacy of the insecticide. For the lab cone bioassay, the assay endpoint is mortality after 24 hours, whereas the field cone bioassay uses percent knockdown at 60 minutes (KD_{60}). From the entomology menu, select "Cone Bioassay" to reach the Lab Collection Records screen, Figure 9183. A new record can be added by clicking the "+" button in the lower left corner of the screen.

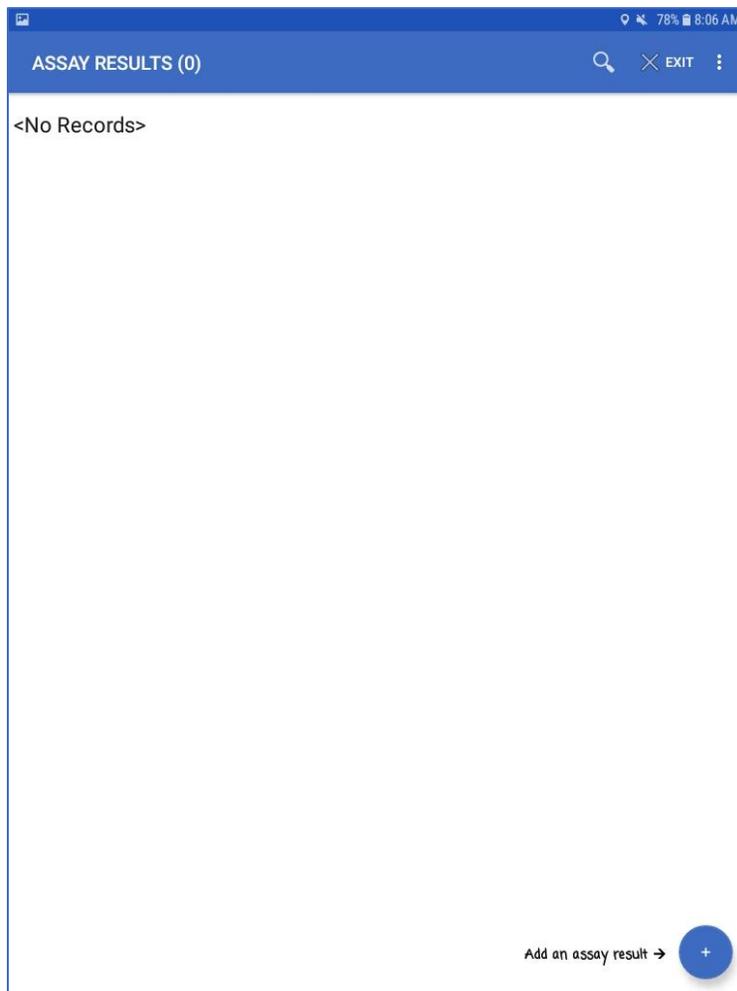


Figure 104. Initial Lab Cone Bioassay Records Screen

4.4.1 Lab Cone Bioassay Data Form

The following fields are available on the Cone Bioassay Data Form as shown in Figure 84, you will have to scroll to see all fields:

- Date that cone was placed in the field
- Time Cone Placed in the field – the initial time at which the test commenced
- Cone location – specify the location that the cone was placed
- Location description – describe the location, for example bednet panel 1
- Time after 24 hours – enter the time that you are recording the data for mortality after 24 hours
- Number Mosquitos exposed – typically five non-blood fed adults per cone
- Mortality 24-hour – number of dead mosquitoes after 24 hours
- Percent Mortality 24-hour – A calculated field (read-only) represented as

$$Mortality_{24\text{ hr}}\% = \frac{Mortality\ 24\ hours}{N} \times 100$$

Where N is the Number of mosquitoes exposed

- Calculate button – press to calculate and display the Percent Mortality 24-hour value

After entering the date and location information for the cone (which will be used to link the data to the appropriate cone in the field), enter the number of mosquitoes that were originally exposed in the cone and then the number that were knocked down after 24 hours and press the calculate button. This will cause the KD24 percent to be automatically calculated.

Figure 105. Cone Bioassay Data Lab Collection Screen

5 Transfer Data

5.1 Export Data to CSV format

A convenient way to get all of the raw data from the device is to export it to CSV format. From the home screen menu of the app, select “Export all data”. This process may take a few seconds (or minutes, depending on the amount of data) and will provide a notification when completed. All CSV files are generated and saved under the device’s Download\EpiInfoEntomology\Output folder. If the device has an app capable of reading CSV files, such as Google Sheets, the user can view the raw data using the device itself. Otherwise, the files can be copied to a PC via USB.

5.2 Sync to Epi Info for Windows

In order to transfer data from a mobile device to Epi Info for Windows, you will need to have the latest version of Epi Info installed on your PC and a copy of the app’s project file, which is available [here](#).

1. From the home screen menu on the app, select “Create Sync File” to create one or more sync files.
2. Create a password for the sync file(s). This password will be required to access the sync file(s) when connecting to Epi Info on your PC.
3. Connect the mobile device to your PC and open the Epi Info™ software on your PC.
4. From the Epi Info™ main menu, select Enter Data or select Tools > Enter Data. The Enter tool opens.
5. Open the project and form used to collect the data on the mobile device.
6. From the File menu, select Import Data > From mobile device.
7. Click the Browse button next to the Mobile sync file text box and select the sync file created with the mobile device. The file will be located in the Downloads > EpiInfoEntomology> SyncFiles folder on the mobile device.
8. Click Open. Note the file format, “Epi Info for Android” sync files.
9. Select the Type of Import from the options listed.
 - a. Update and append records – Records in the destination form containing the same GlobalRecordId values as the source form will be updated (overwritten) if there is new information. However, values in the destination table will never be overwritten with a null or missing value. All other records will be appended (added) to the end of the table.
 - b. Update records only – Records in the destination form containing the same GlobalRecordId values as the source form will be updated (overwritten) if there is new information. However, values in the destination table will never be overwritten with a null or missing value. All other records will be ignored.
 - c. Append records only – All records in the source form will be appended (added) to the end of the table. No records will be updated (overwritten).
10. Click Import. “Import Complete” will appear at the bottom of the dialog box upon successful completion of the import.
11. The data displays in the Enter tool at the end of the Record List. This information is now ready to be analyzed with the Visual Dashboard.

6 Data Analysis: From the app itself

The app provides automatic calculation of various indices and presents the data in charts and maps, Figure 106. The indices will automatically be stratified by region if the information is being captured (see Section 1.6). The filter icon in the bottom right-hand corner can be used to further filter the results by date range. Note that the analysis results are based on the data that are currently residing in the device. Data that have been uploaded from other devices to the cloud but not downloaded to the current device will not be reflected in the analysis.

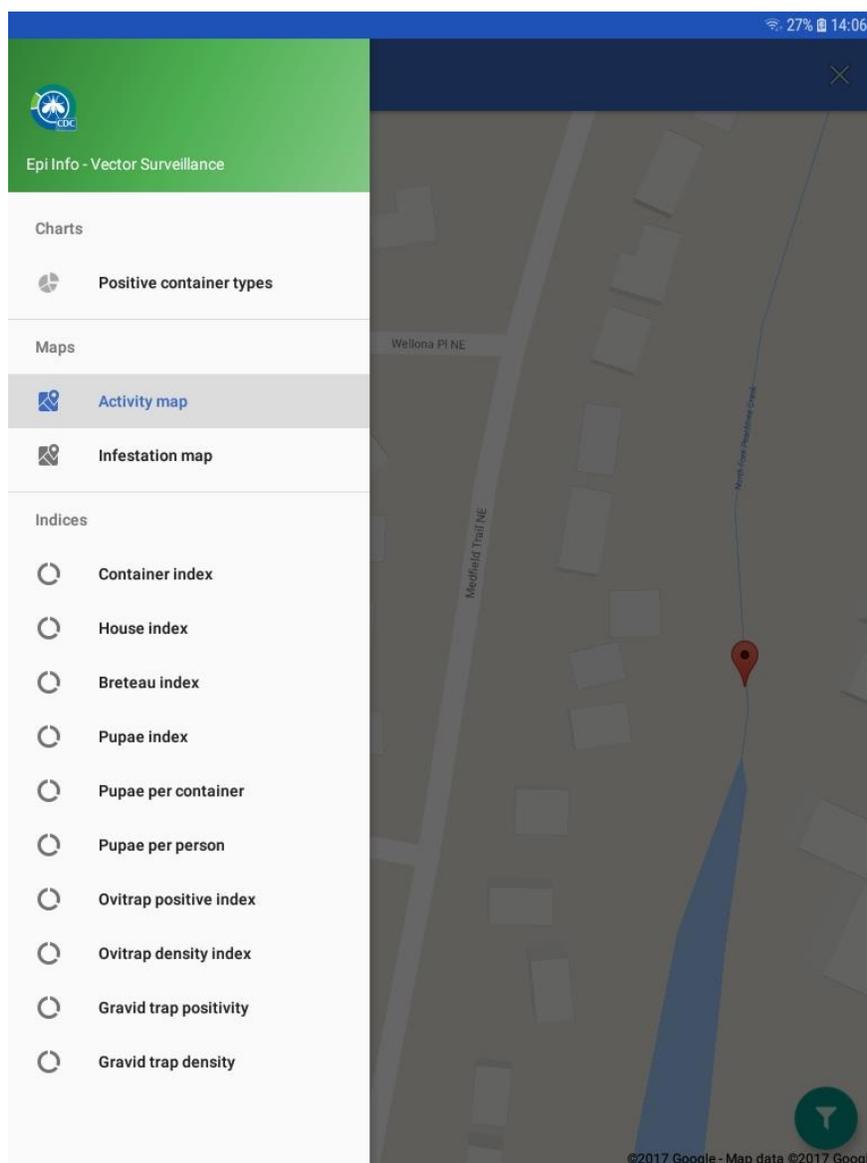


Figure 106. Analysis Screen

7 Data Analysis: Using Epi Info for Windows

The desktop version of Epi Info can be used to analyze the data collected from the mobile app, with results that can be displayed using a collection of user-configured gadgets such as rate gadgets. An example is shown in Figure 1076. Note that in order to use the rate gadgets shown in the example, you will need Epi Info version 7.2.2.0 or higher (earlier versions of Epi Info do not include the rate gadget).

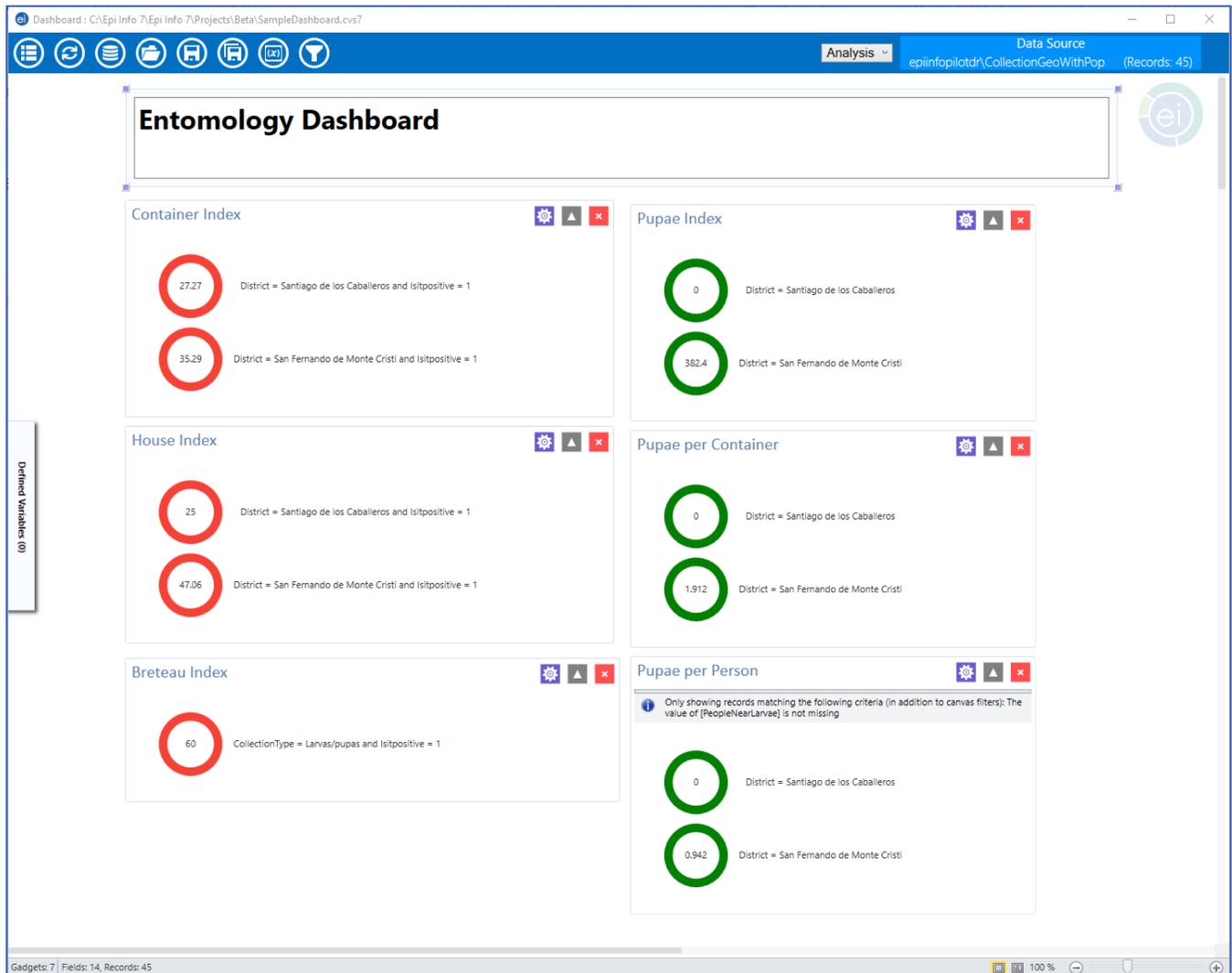


Figure 107. Epi Info Example Dashboard

A dashboard can be configured to display data in many different ways and can be used to calculate many different indices. Suggested indices include:

- Container Index
- House Index
- Breteau Index
- Pupae Index
- Pupae per Container
- Pupae per Person

8 Process Flow Diagrams

Figure 108 through Figure 114 show the flow for each data collection module of the app. All data collection activities begin with the creation of a Location record, Figure 108. Data collection for trapping, collection, cone bioassays and adult vector control activities are accessed via an Entomology Menu. Collection and cone bioassays have separate process flow diagrams for the field of lab versions of the app, respectively.

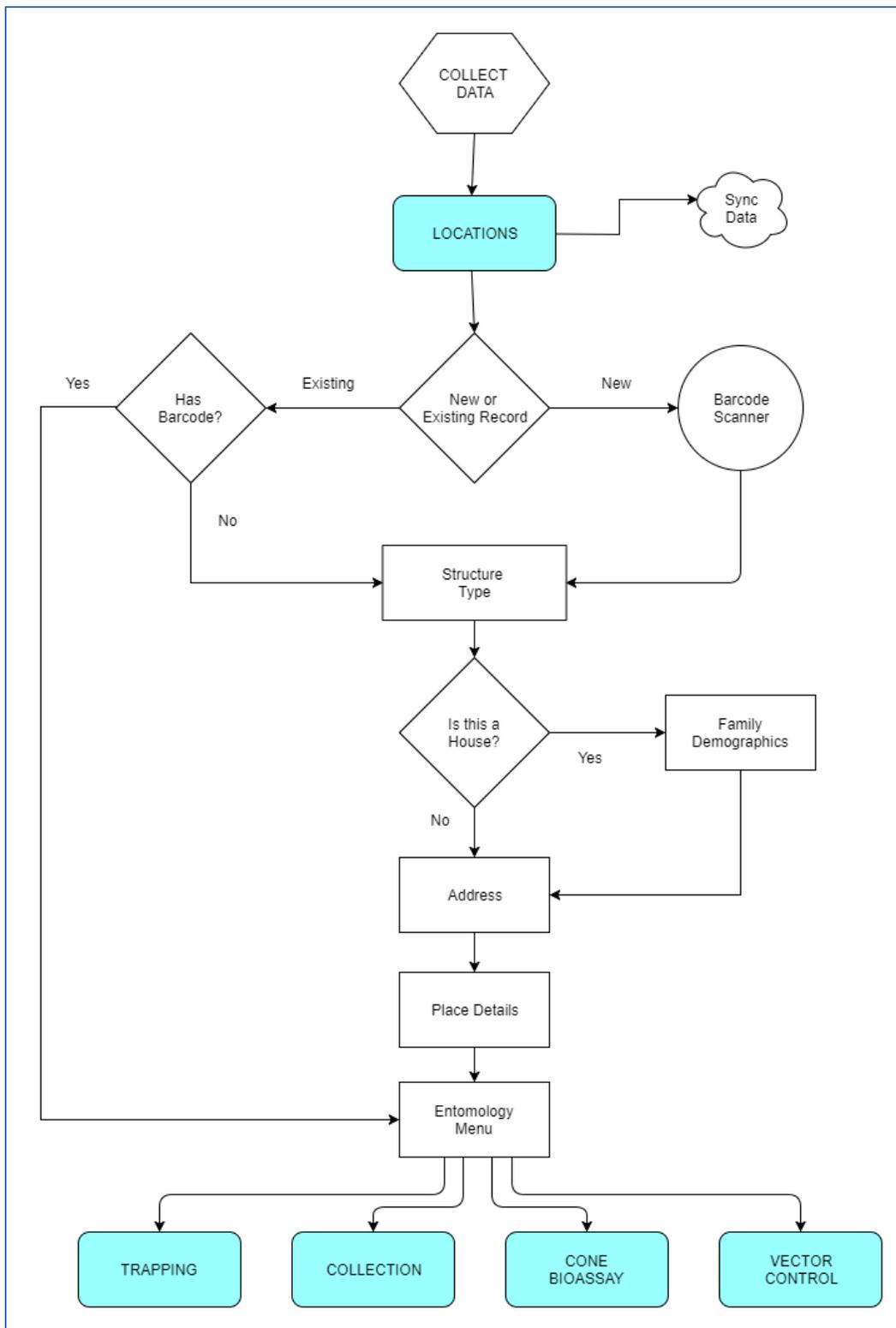


Figure 108. Flow Diagram for a Location Record

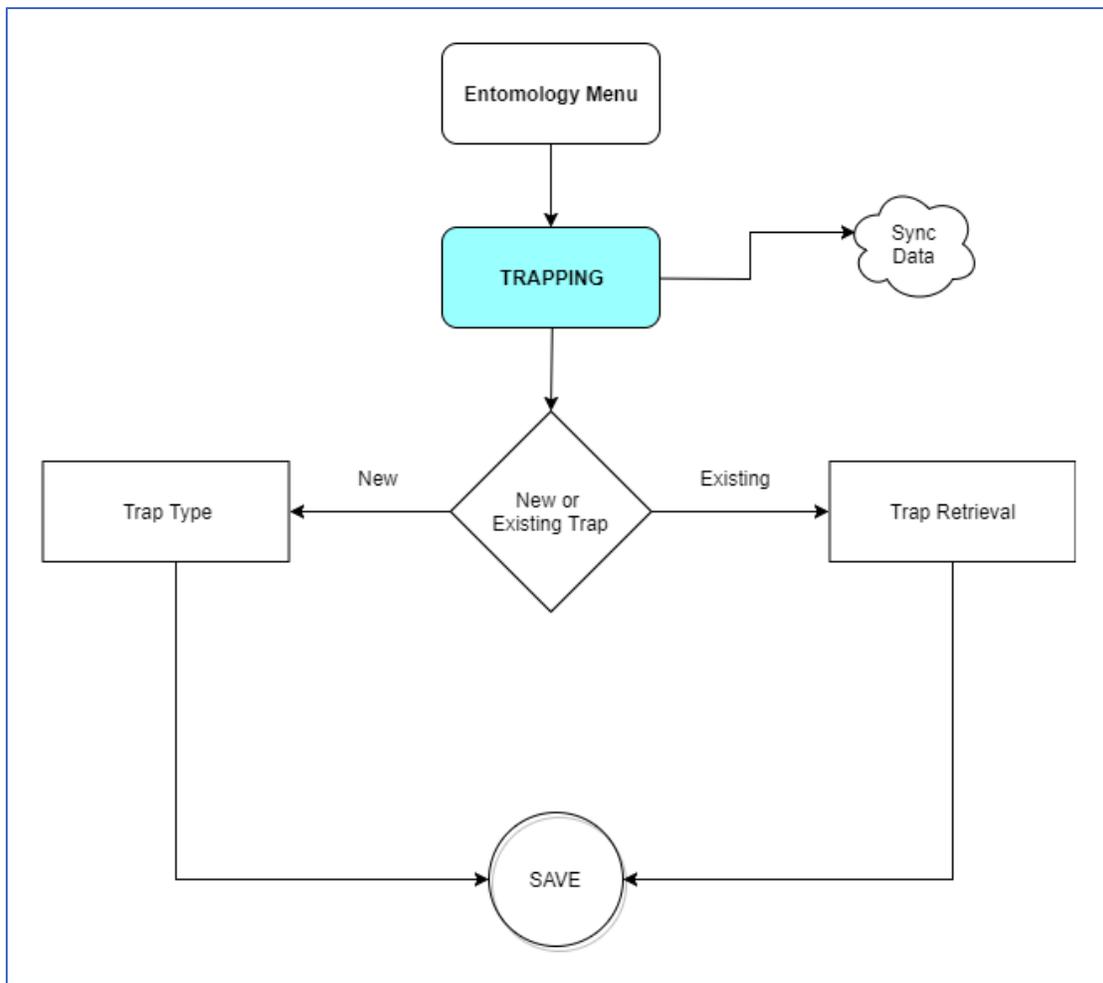


Figure 109. Flow Diagram for Field Trapping Records

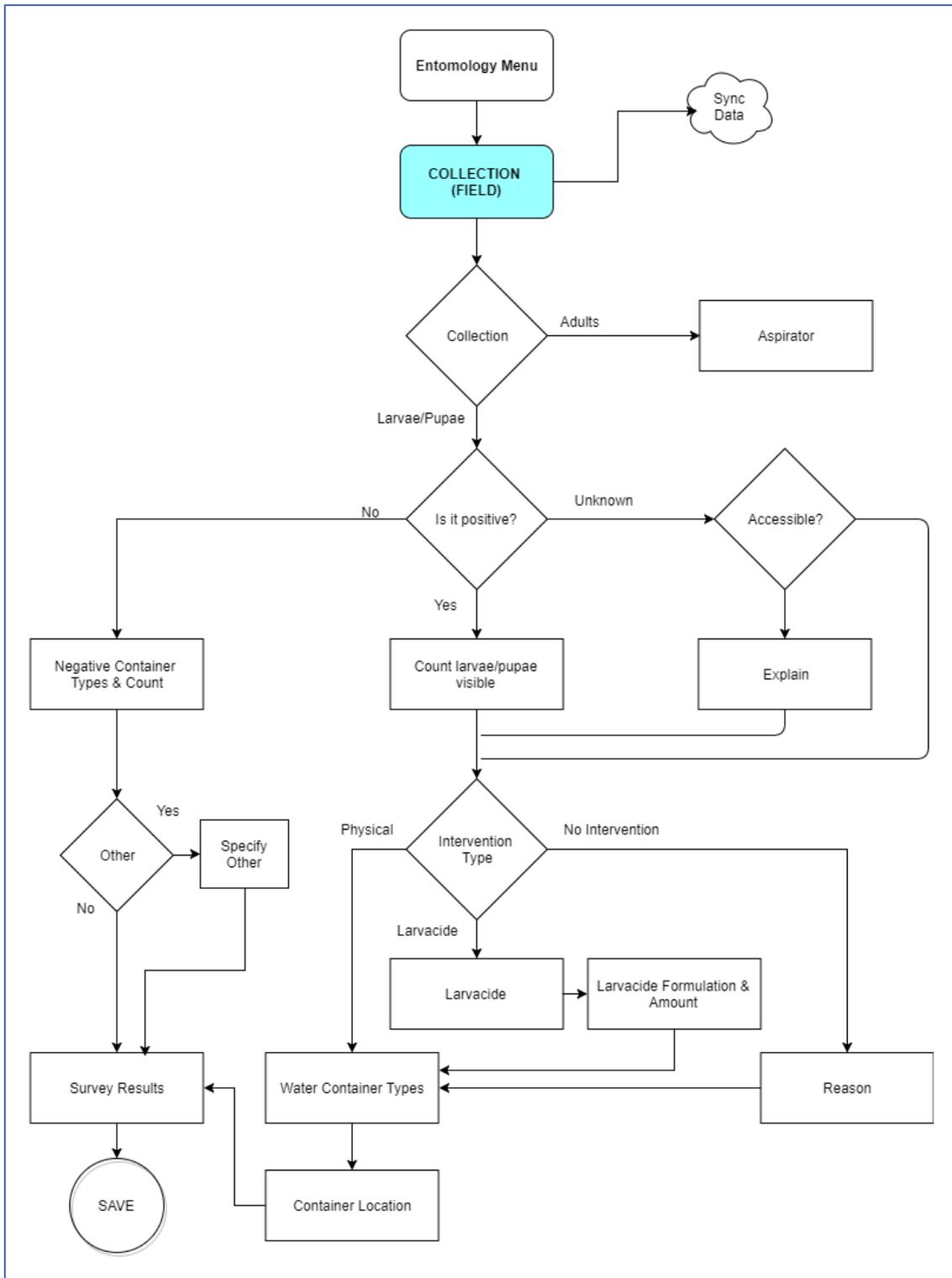


Figure 110. Flow Diagram for Field Collection Records

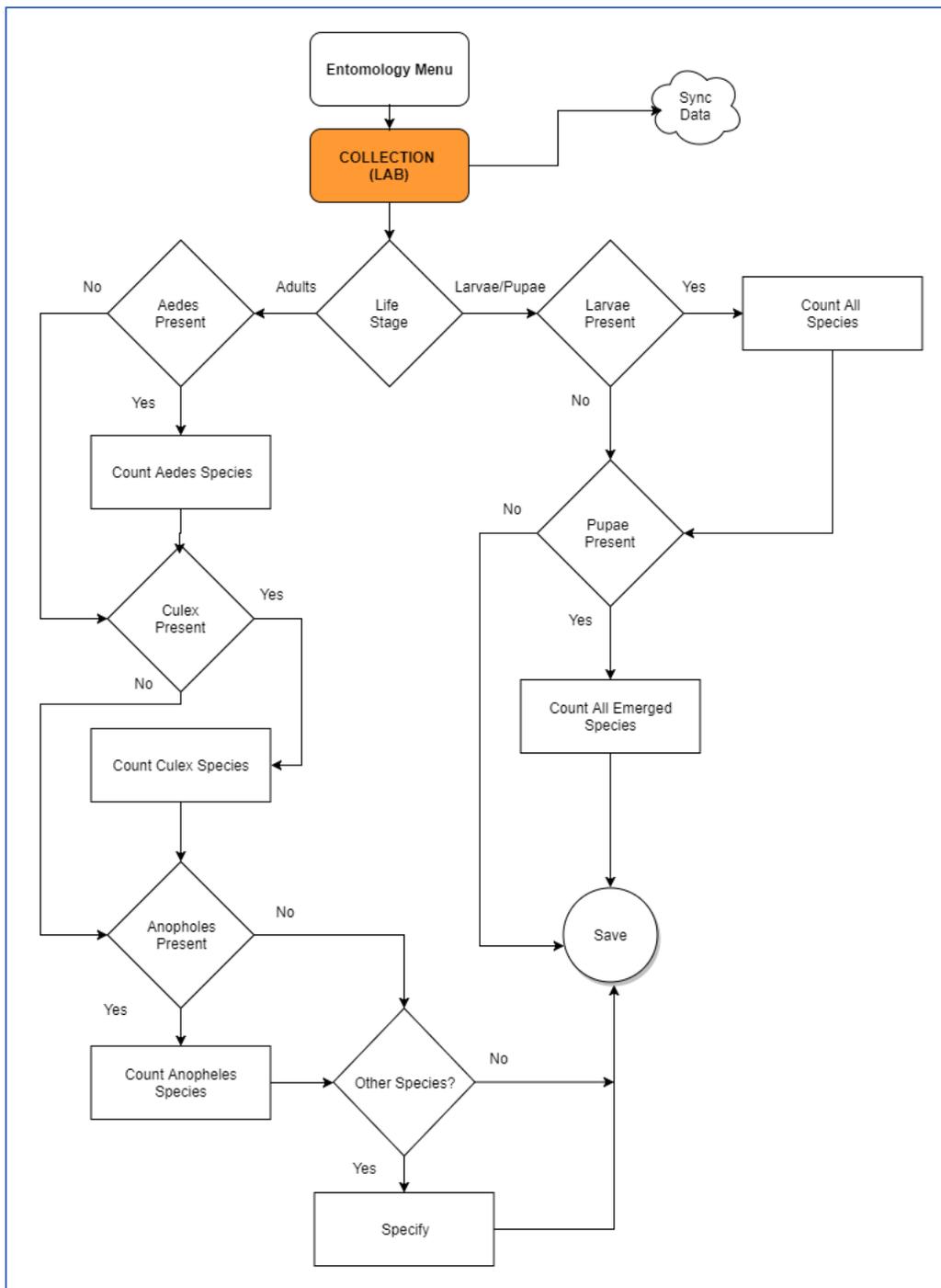


Figure 111. Flow Diagram for Lab Collection Records

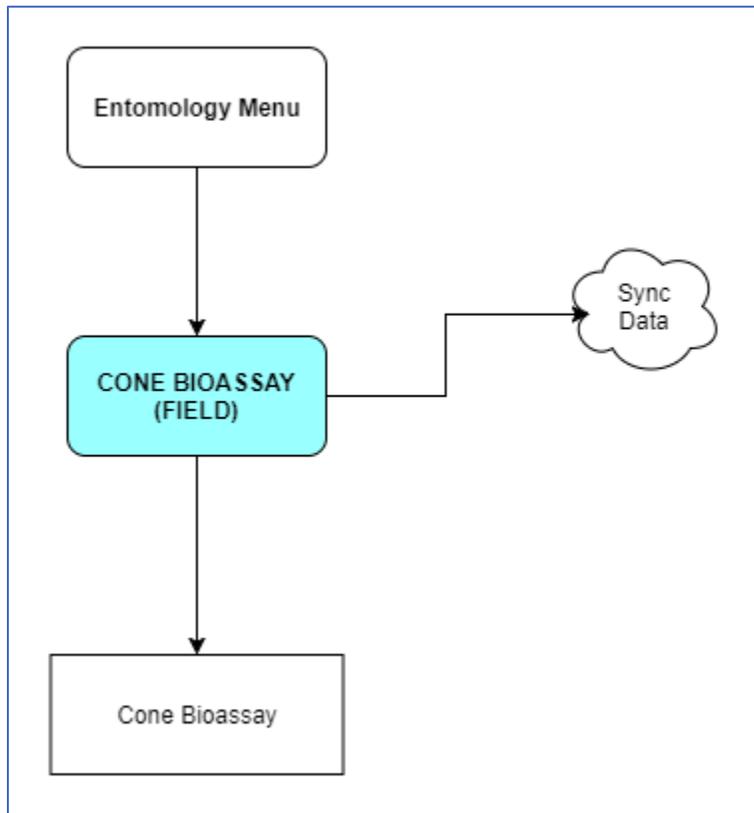


Figure 112. Flow Diagram for Field Cone Bioassay Records

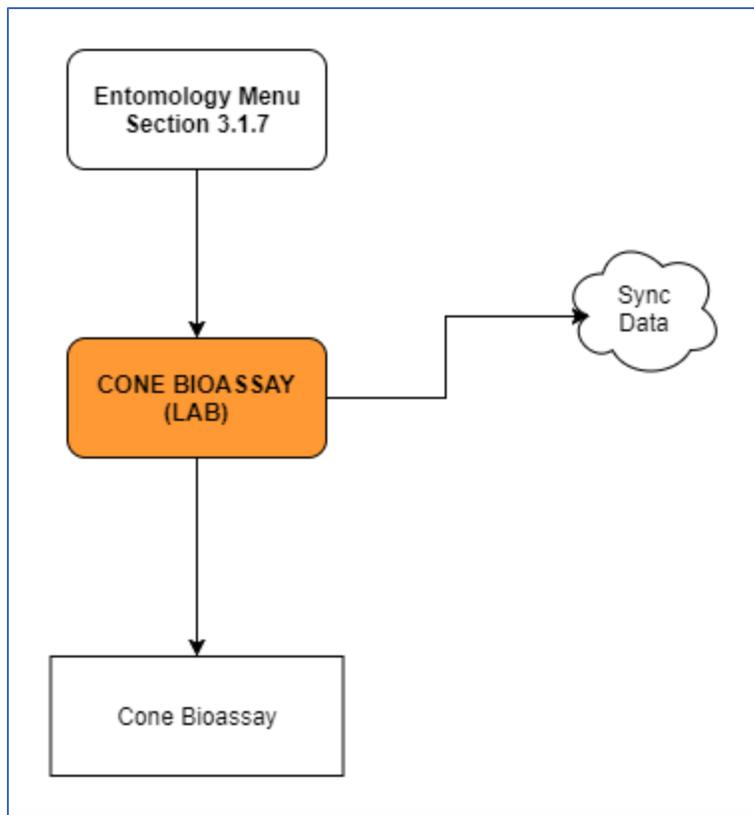


Figure 113. Flow Diagram for Lab Cone Bioassay Records

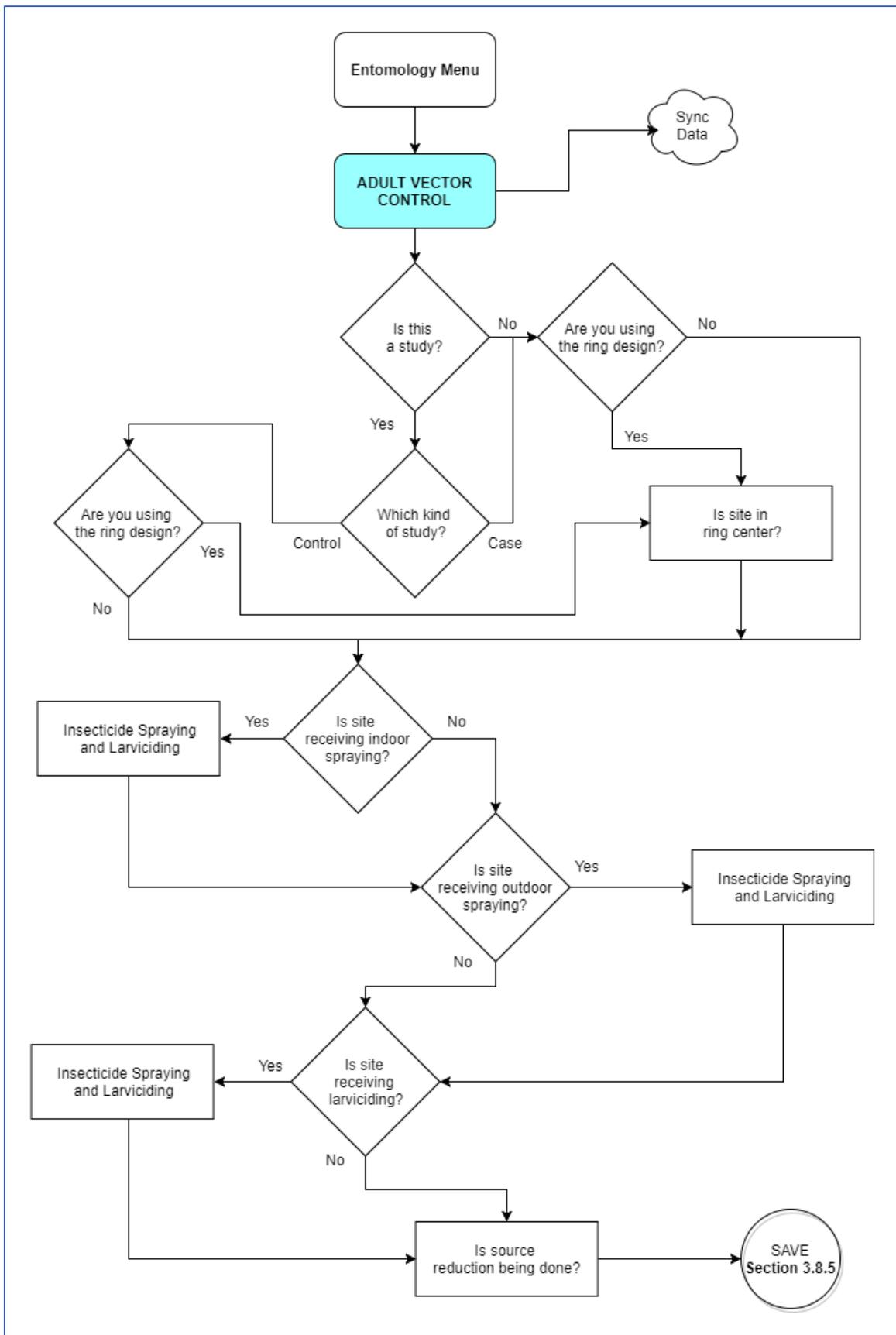


Figure 114. Flow Diagram for Adult Vector Control Records

9 Contacts for Troubleshooting Issues With The App

If you encounter a problem with the app or need technical assistance, please contact the Epi Info Help Desk at:

Epi Info Help Desk for Technical Assistance

mii0@cdc.gov

(404) 498-6190 voice

For answers to commonly asked questions, please visit the Epi Info website at www.cdc.gov.

Also, the Epi Info Web Board provides a forum for user questions and answers. Join the group by creating a user account at phconnect.org. Follow the instructions to join.

10 References

[CDC Zika Virus Website](#), CDC.

[Epi Info Visual Dashboard: Performing Statistical Analyses with Visual Tools](#), CDC

[Epi Info™ User Guide](#), CDC.

Karl S, Halder N, Kelso JK, Ritchie SA, Milne GJ. [A spatial simulation model for dengue virus infection in urban areas](#). BMC Infect Dis. 2014 Aug 20;14:447. doi: 10.1186/1471-2334-14-447.

[Vector control operations framework for Zika virus](#), World Health Organization.

[Zika Virus Fact Sheet](#), World Health Organization.

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12 Frequently Asked Questions

1. Can I use the Epi Info™ Companion for Android app from the Google Play Store to work with the Vector Surveillance data?

No. The Vector Surveillance app is distinct from the generic Epi Info Companion for Android. Please ensure that you download the Vector Surveillance app from <https://goo.gl/ziM77M>. Both apps can be installed safely on the same device.

2. Can I use both the field and lab versions of the app on the same mobile device?

Yes. Please refer to Section 1.4.

3. How do I delete a record?

When viewing a list of records, press down on the record you want to delete for several seconds, a “Delete Record” dialog window will appear, click to delete the record.