Verbal Autopsy Standards

ODK for Verbal Autopsy: A Quick Guide

World Health Organization

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V2

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Contents

Purpose

The purpose of this technical ODK quick guide for verbal autopsy (VA) is to provide guidelines for installing and configuring the components needed for electronic data collection of verbal autopsy data using the electronic implementation of the 2022 WHO VA questionnaire. The instrument is compatible with Android tablets and uses the ODK software system for data collection and storage.

The guide describes:

1. ODK tools for electronic data capture: overview of the components and practical steps on how to set up the ODK system to collect VA data.
2. Introduction to the XLSForm, a standard form created to help simplify the authoring of forms (i.e., questionnaires) in Microsoft Excel.
3. VA XLSForm implementation: how to easily localize the standard 2022 WHO VA instrument.
4. Operational information: how to use the ODK system during normal operations.
5. Dealing with data encryption and data security.

Audience

This guide can be used in conjunction with the WHO VA Field Interviewer's Manual produced to assist interviewers using the electronic version of the 2022 WHO VA instrument. Both manuals can be used as a resource for trainers and implementers of the 2022 WHO VA instrument. In addition, it is recommended for IT specialists, systems analysts, data managers, field managers and all who are responsible for implementing and maintaining smooth operations of verbal autopsy field data collection and processing in countries.

1 Introduction

ODK (https://getodk.org/) is a suite of open-source tools for electronic data collection, originally developed by the University of Washington (U.S.) and since 2018 owned by getODK Inc. and supported by the ODK user community (https://forum.getodk.org/).

The core components of the suite are:

- ODK Collect, an Android app that is used for data collection using forms (i.e., questionnaires).
- ODK Central, the ODK back end for data storage, management and analysis.
- ODK XLSForm, a Microsoft Excel-based (works offline) form designer.
- ODK XLSForm converter (offline/online) tool to simplify the creation of forms. Forms designed with Microsoft Excel can be converted to XForms for use with ODK tools.
- ODK Briefcase, a desktop tool that pulls/pushes and exports data from Aggregate/Central and ODK Collect. Functionalities of ODK Briefcase are going to be replaced by ODK Central in the coming years.

2 ODK Components Used to Collect Verbal Autopsy Data

For verbal autopsy, the ODK components used for data collection are as illustrated in Fig. 1:

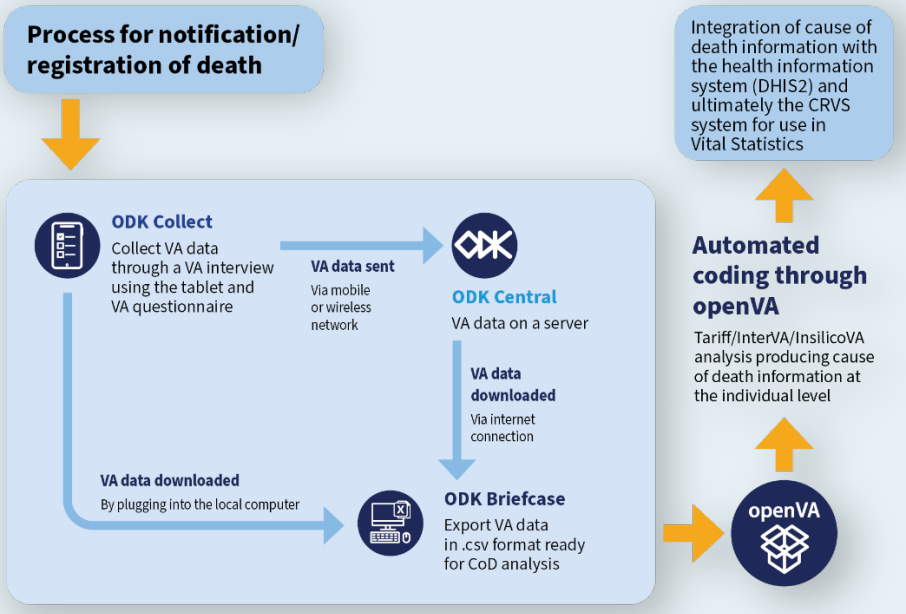
- **ODK Central**
- **ODK Collect**
- **ODK Briefcase**

The questionnaire itself has been implemented using the ODK XLSForm and can be downloaded for local adaptation[1] from the WHO website: https://www.who.int/standards/classifications/other-classifications/verbal-autopsy-standards-ascertaining-and-attributing-causes-of-death-tool

The following sections contain a detailed explanation of the ODK components used and the instructions for installing and configuring these to implement VA data collection. Fig. 1 further outlines the integration of the use of ODK tools in combination with the openVA pipeline (http://openva.net/) to run automated VA coding algorithms.

1 Users may add questions with caution according to the guidelines included within the WHO VA standards manual; but under no circumstances should questions be removed (or modified) from the list. The algorithms will not analyze new questions added, and besides, if too many questions are added on one condition it could bias cause of death assignment. Please refer to https://cdn.who.int/media/docs/default-source/classification/other-classifications/autopsy/2022-va-instrument/verbal-autopsy-standards_2022-who-verbal-autopsy-instrument_v1_final.pdf?sfvrsn=c8cf2dda_8, which has more detailed information on guidelines for augmentation and local adaptation.

Fig. 1 — ODK infrastructure needed to collect VA data



2.1 ODK Central

ODK Central is the ODK server.

It manages user accounts and permissions, stores form definitions, and allows data collection clients like ODK Collect to connect to it for form download and submission upload.

2.1.1 ODK Central Features

The features already supported at present are listed below. These include new features and existing features from ODK Aggregate:

- Projects to organize users, permissions and forms
- User accounts with role-based permissioning
- Form upload and management
  - With support for form version updates
  - With drafts and testing on initial creation, and on version updates
  - With form multimedia or data attachments
  - Encrypted forms (self-supplied or project-managed keys)
  - True deletion of forms
- Submission upload and management

    - Form filling from our mobile app or a web browser
    - From permissions-managed known users or anonymous public links
    - With submission multimedia or data attachments
    - With an interactive table preview of submission data
    - Support for reviewing, commenting on, and editing submissions after upload
    - Connectable to analysis and dashboard applications such as Microsoft Excel, Power BI or R over OData
    - Server-managed datasets for registration/follow-up workflows
- Integrated checklist-based help system
- Optional encrypted off-site data backups to Google Drive
- Clean and modern REST API for integration and extensibility
- High performance on low-cost hardware or cloud providers
- ODK Briefcase-compatible data output
- ODK Briefcase push/pull support

NOTE: ODK Central can be installed on a local server or on a cloud server. If you are interested in ODK Central, please read more here: ODK Central Instructions for installing and configuring ODK Central can be found here: Installing ODK Central

The preferred and recommended host operating system for ODK Central is Linux, preferably the latest Ubuntu Server LT. Support for other operating systems (e.g., Windows) is not guaranteed. However, if you do not have the capability to use Linux, some instructions for other systems are provided on the getODK website.

At the end of the installation process, the first administrator account must be created via the command line so a user can log in. The instructions can be found on the getODK website at this link.

Once the account is created, you do not have to go through this process again for future accounts: You can log into the website with your new account and directly create new users that way.

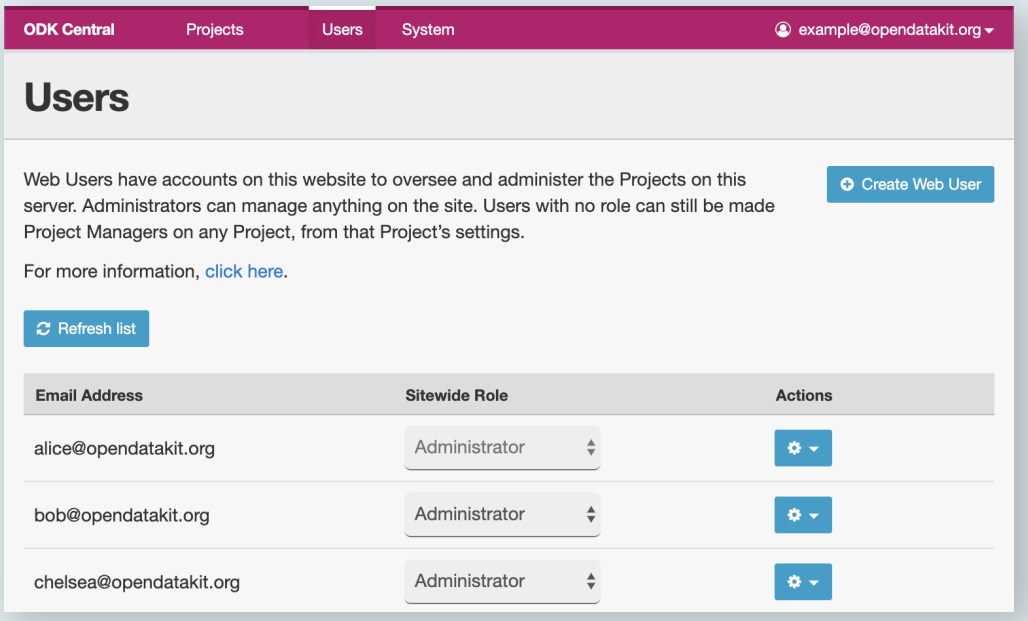
2.1.2 Creating Users in ODK Central

There are two types of user accounts in ODK Central: **Web Users** and **App Users**.

- **Web Users** have accounts on the ODK Central management website. These accounts are global across all projects on the server. They can log in to the web interface and perform administrative actions such as user management, form upload and management, and submission data viewing and download. They can also fill and submit forms directly in their web browser.
- **App Users** need to connect ODK Collect to ODK Central. App Users are limited to a single project at a time. Once connected through the app, they can see the list of forms, download the ones they need, and upload completed submissions to those forms.

Web Users are managed through the top of ODK Central management website navigating from Users → Web Users.

Fig. 2 — Web Users management



1. To create a new Web User, **click on the "Create Web User" button** on the right side of the Web Users listing page.
2. A pop-up will appear to ask for an email address; insert it and **click on the "Create" button**. That email account will receive an email with the subject line "ODK Central account created." In the email there will be a link that will allow the recipient to set a password for their new account, after which they will be able to log in.

A Web User can be:

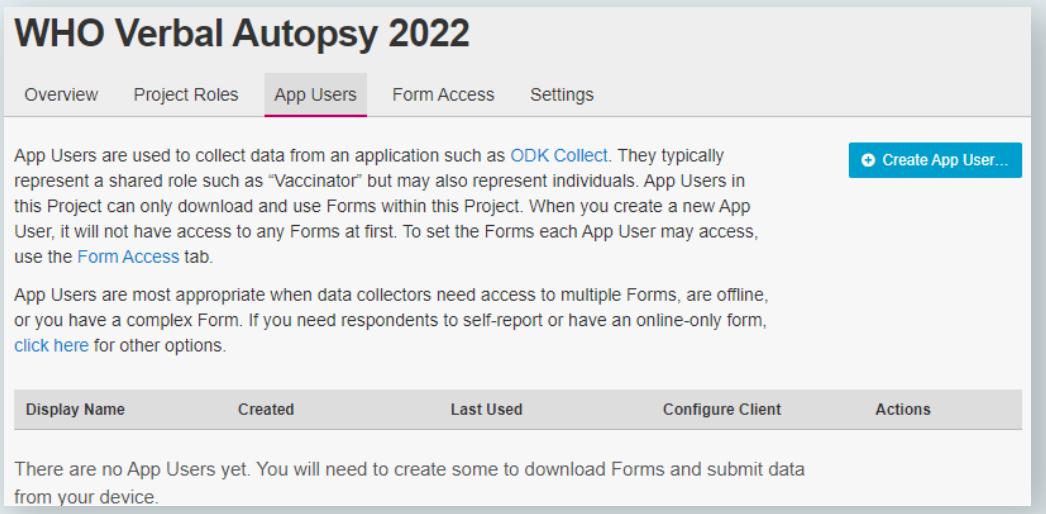
- Administrator
- Project Manager
- Project Viewer
- Data Collector

More details can be found on the Web User Roles page.

App Users never gain any access to the management website. They do not have email addresses or passwords associated with their account, only a nickname. Once a Web User (Project Manager or Administrator) creates an App User within some project, a configuration QR code will be generated, which will grant a mobile device access to that project as that App User. Access can be revoked at any time, and Web Users can see which App Users uploaded which submissions. A newly created App User does not have access to any Forms. To give them access once they are created, use the Form Access tab on the Project. You will be able to allow access to particular Forms within the Project for each App User.

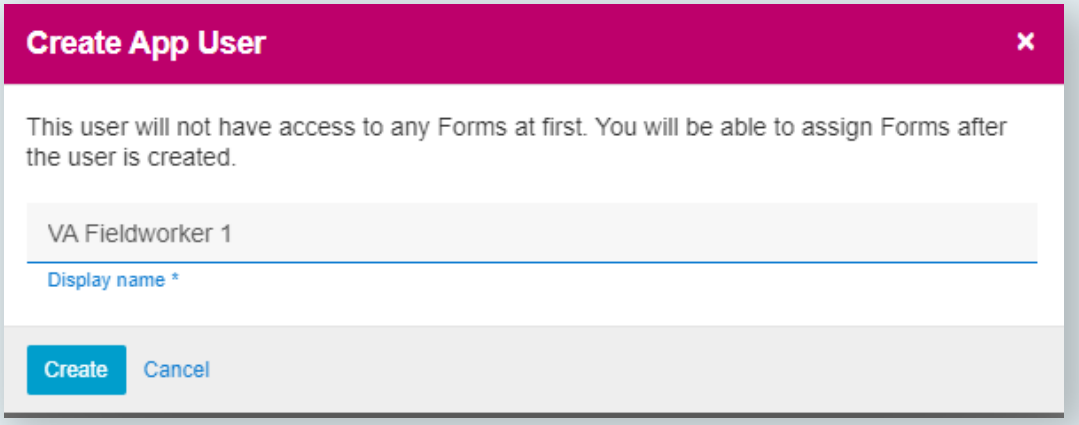
3. To manage App Users, navigate to the project whose App Users you wish to manage, and then **click on the "App Users" tab** just below the project name.
4. To create a new App User, **click on the "Create app user" button** on the right side of the App Users listing page.

Fig. 3 — App Users management



After you click on create, this pop-up will appear.

Fig. 4 — Create App User



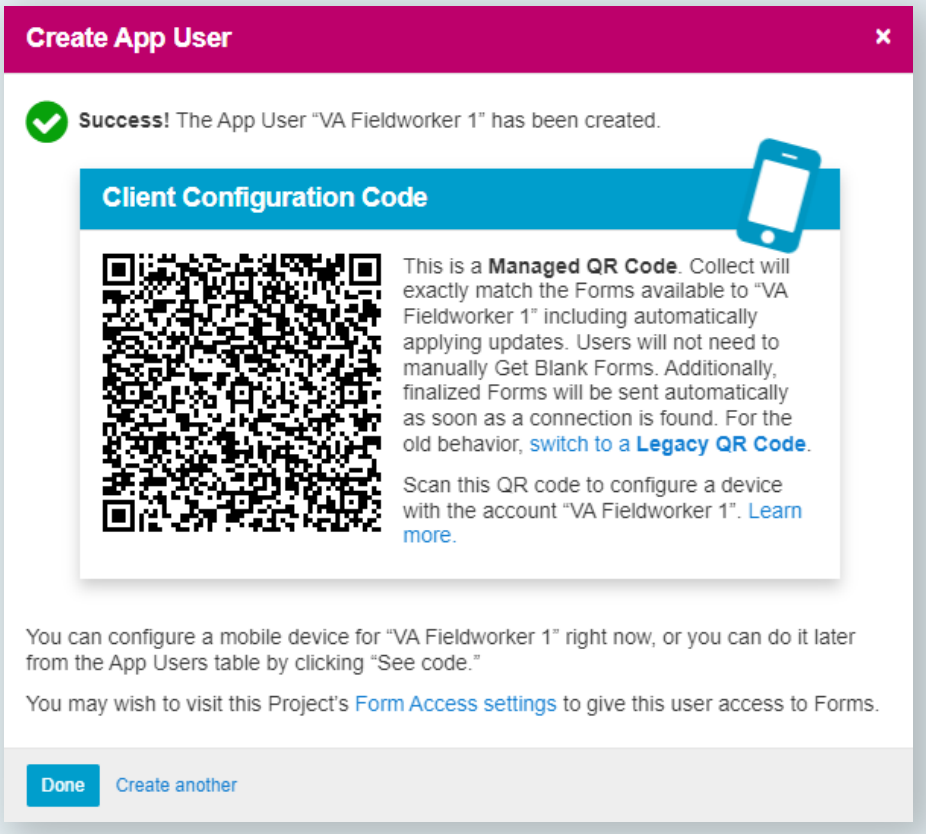
5. On **clicking the "Create" button**, the App User will be created and granted access to use their mobile device to list, download and submit to all available forms within their project.

   - To do so, however, their mobile device will have to be set up with this new account. That is what the QR code below is for. The default QR code is a managed QR code and, as shown in Fig. 5 below, "Collect will exactly match the Forms available to 'VA Fieldworker 1,' including automatically applying updates. Users will not need to manually get blank forms. In addition, finalized forms will be sent automatically as soon as a connection is found."
   - To avoid automatic downloads and submissions, click on 'switch to a Legacy QR Code' by clicking on 'Legacy QR Code' when the pop-up below appears after you create the App User."

NOTE: To obtain the **Legacy QR Code**, users will have to manually click the "Get Blank Forms" button on the device and determine which forms to update. They will also need to manually send finalized forms.

Read on to the ODK Collect configuration section to find out how to use it.

Fig. 5 — App Users QR code

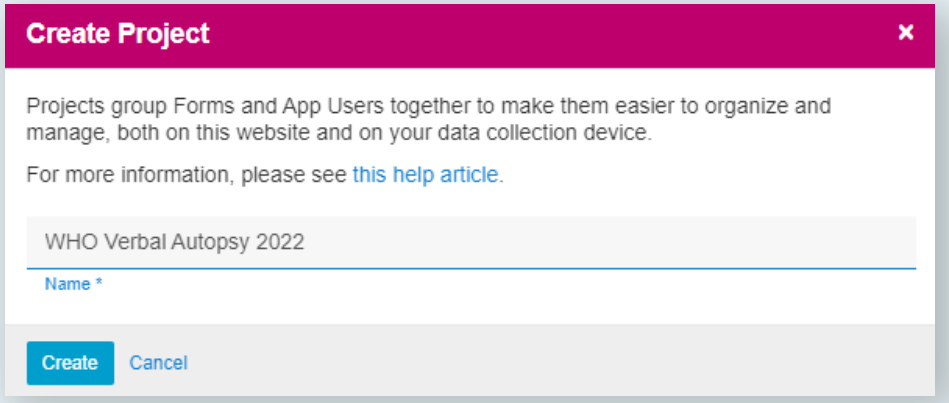


2.1.3 Creating Projects in ODK Central

Only ODK Central administrators may create projects.

1. To create a project, navigate to the Projects section of the ODK Central management homepage, and **click on the "New" button**.

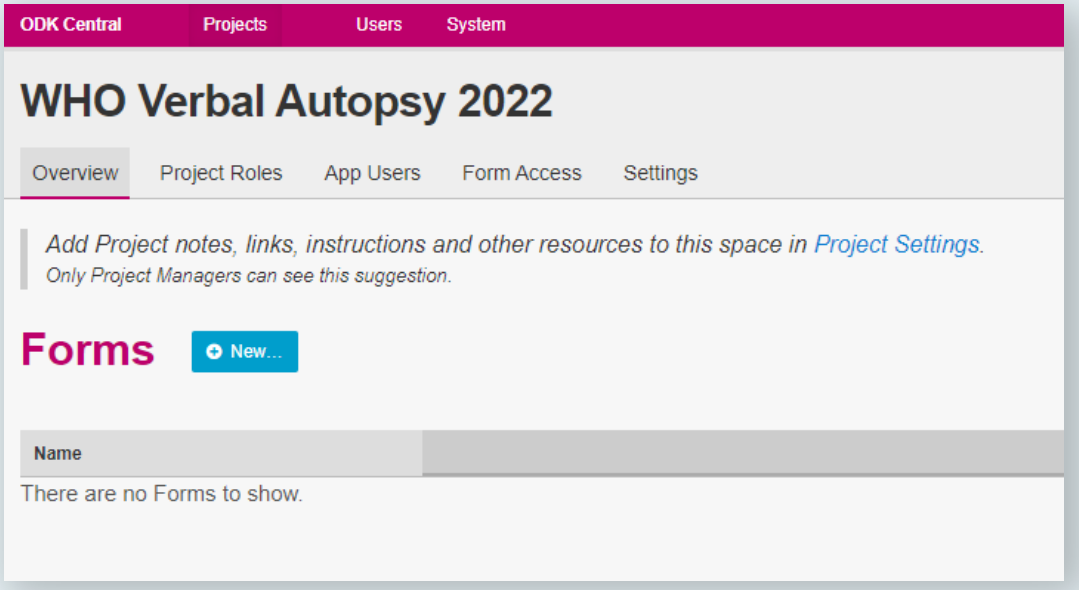
Fig. 6 — Create Project



2.1.4 Uploading Forms in ODK Central

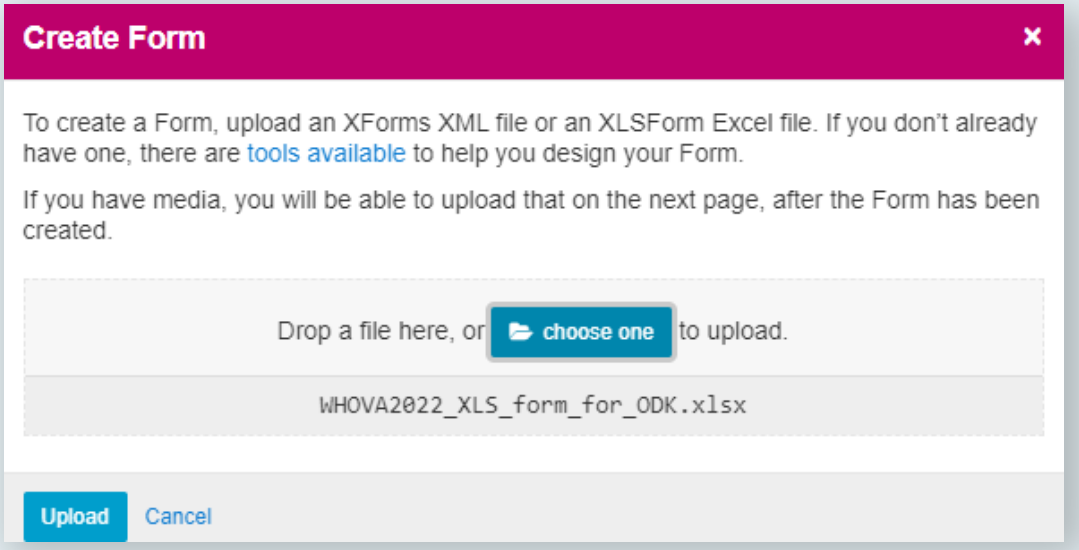
1. **Log in to your ODK Central** instance with a Project Manager user.

Fig. 7 — Project page



2. **Click on the "New" button** next to the section header, and you should see a pop-up appear:

Fig. 8 — Form upload pop-up



3. You can either **click on the "choose one" button** to browse for your .xml, .xls or .xlsx file, or, if you already have it handy somewhere, you can **drag it over the gray box and drop it in** to choose it.

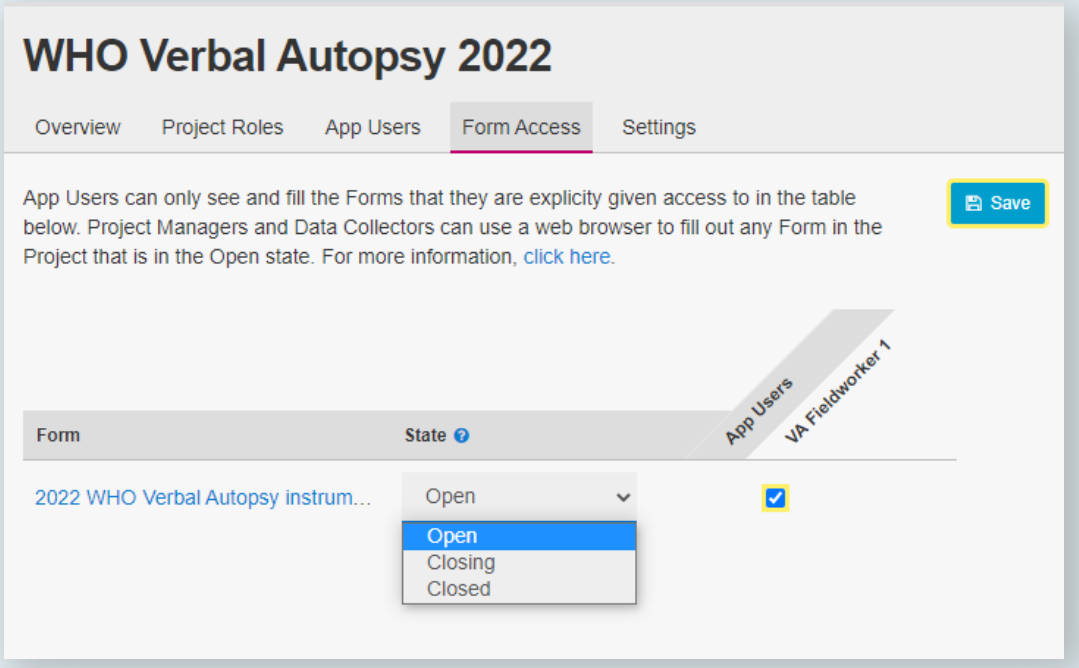
4. Either way, once you have chosen your file (you will see the file name at the bottom of the grey box when you do), you can **click the "Create" button** immediately below it to upload the form.

5. Once the form is successfully uploaded, you will be taken to the Form Draft page. It will not be accessible to data collection clients until you publish the draft. For the form to be operational you need to **click on "Publish Draft."**

    - To learn more about the draft mode, which can be used for testing or piloting, follow the link on drafts.
    - Once published, the form will be available for use.

6. Going at Project level **clicking on the "Form Access" tab** on the Project, you need to give access to the App Users you have created (and who will need to collect the data), by **ticking the user** and **clicking on the "Save" button**.

Fig. 9 — Form Access Tab



- "Form States" control the lifecycle state of each form.
    - **Open Forms** are available to download and will accept new Submissions.
    - **Closing Forms** will accept new Submissions but are not available to download.
    - **Closed Forms** are not available to download and will not accept new Submissions.

To get more details and insights on the possibilities available in ODK Central, follow this link: Using ODK Central.

2.2 ODK Collect

ODK Collect is an open source Android app source code, latest release on GitHub and Google Play store download [link] that replaces paper forms for data collection. It supports a wide range of question and answer types (see also below) and does not need network connectivity to function (i.e., data collection can be done offline).

ODK Collect renders forms into a sequence of input prompts that apply the logic (e.g., skip pattern), data entry constraints, and repeating substructures as defined in the form. Data collectors work through the prompts and can save the submission (i.e., collected data) at any

point. Finalized submissions (i.e., completely filled forms) and new blank forms for data collection can be sent to and downloaded from a server (ODK Central).

ODK Collect supports fields as free text, multiple choice, numeric answers, date, time, location (i.e., GPS coordinates), audio recordings, images, video, barcodes and signatures. ODK Collect can even accept answers from other apps on the device. The complete list of possible type of questions that can be supported by ODK Collect can be found by accessing the following link: Question Types.

2.2.1 Setting up ODK Collect

The recommended way to install ODK Collect is through the Google Play Store.

To do that, click on the Google Play Store on your Android device and search for “ODK Collect”  .

After clicking on install, you will see a prompt message to give permissions to ODK Collect.

The ODK Collect application requires permissions to access device resources. Permissions that may be requested by ODK Collect include:

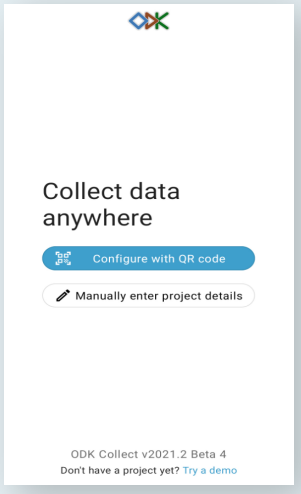
- **Storage**: required for ODK Collect to be able to access and save form data
- **Camera** (optional*): required by image and video questions to capture new media
- **Contacts** (optional*): required to configure a Google account for Google Drive, Google Sheets submissions
- **Location** (optional*): required for location questions
- **Microphone** (optional*): required by audio and video questions to capture new media
- **Phone**: required for forms that capture device metadata (e.g., automatically captured start time of the VA interview)

*Depending on the presence of the corresponding questions (not part of the default 2022 WHO VA questionnaire).

If for any reason (e.g., no internet connectivity on your Android device) you cannot install ODK Collect from the Google Play Store, you can opt to install it manually.

1. Before performing a manual installation, you must change the security parameter in your device. From your device's settings, **choose "Security"**, and make sure "**Unknown Sources" is checked**.
2. **Download the latest ODK Collect .apk file** from the following link: https://github.com/getodk/collect/releases/latest
3. Once you have downloaded it, **transfer the .apk file** to your mobile device via a USB connection and from the Explore/Files application of your device. Go to the path where you transferred the .apk file and double click on it. **Remember to grant the permissions requested during the installation phase.**
4. After the installation is successful, you need to configure ODK Collect. When you first launch ODK Collect, **tap on "Configure with QR code."**

Fig. 10 — ODK first launch



5. **Position the App Users QR Code** (Fig. 5) in the center of the camera field, under the red line. When the camera focuses on the code, it will beep and scan the code.

ODK Collect will apply the settings from the code, connect to your ODK Central server, and move you to the Main Menu.

There are many other configuration parameters that can be modified in ODK Collect. You can modify the interface (e.g., color), or the navigation behavior (e.g., swipe or click to advance from one question to another), or you can restrict users' access to particular functionalities.

Guidance hints on questions can be used to display additional information (e.g., QbyQ guidance) that is not always needed. For example, they can be used to show extra instructions to be used during training. If set to "Yes—always shown," guidance hints will always be displayed below regular hints. If set to "Yes—collapsed," the user will need to tap to view guidance hints. Guidance hints are part of the Form Management settings of ODK Collect.

To learn detailed information about the Menu, Settings and Security of ODK Collect, please click on the following link: Advanced Settings

2.3 ODK Briefcase

ODK Briefcase is a desktop application that runs on macOS, Windows and Linux. It is used for pulling, pushing and exporting forms on ODK servers such as ODK Central. You can also use ODK Briefcase to pull forms directly from ODK Collect (i.e., directly from an Android device).

With ODK Briefcase you can:

- Pull forms from ODK Collect, ODK Central.
- Push forms to an ODK Central.
- Export data from forms to CSV files.
- Decrypt encrypted forms.
- Back up forms from servers.
- Transfer forms between servers.
- Work from a command line.
- Work offline.

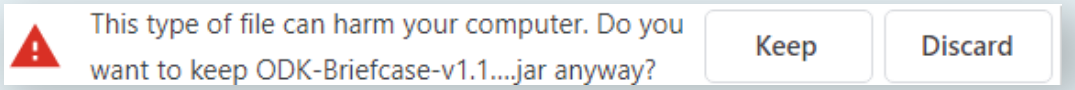
NOTE: To run ODK Briefcase, you need to install Java 8.0.221 or higher. Click here to download and install the latest stable Java release.

1. To download the latest version of ODK Briefcase, click on the following link:

Download ODK Briefcase

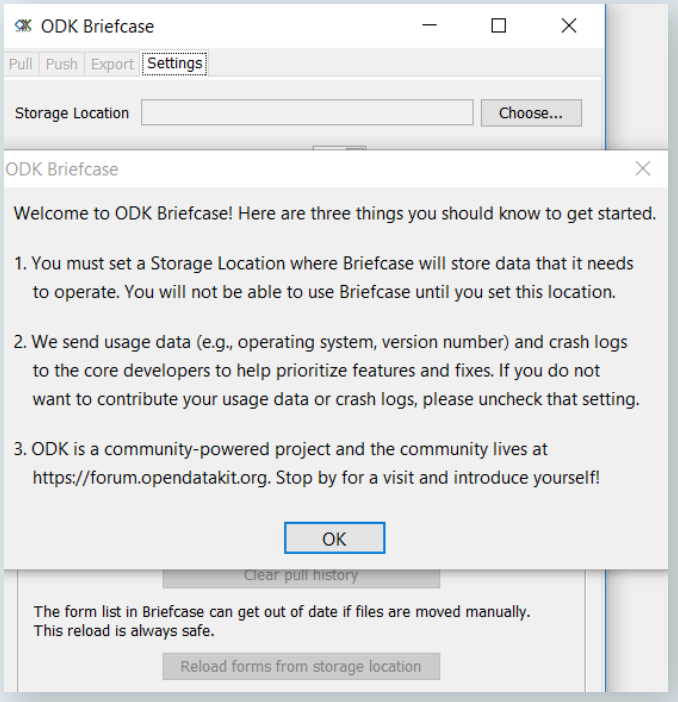
2. Some browsers may warn that JAR files might harm your computer (Fig. 11). ODK Briefcase downloaded from the GitHub page is safe; please **click on "Keep"** to authorize the download.

Fig. 11 — Browser warning



3. **Double-click the downloaded JAR file** and you will be prompted with some instructions (Fig. 12). Follow the instructions to start using ODK Briefcase.

Fig. 12 — ODK Briefcase first prompt



To use ODK Briefcase (also available in command line format) and the possible configurations of it, please read the instructions available on the following link: Using ODK Briefcase

3 ODK XLSForm

The VA questionnaire to be used with ODK Collect to gather the information on Android devices is implemented in the XLSForm.

The XLSForm is a form standard created to help simplify the authoring of forms or questionnaires in Microsoft Excel. Authoring is done in a human readable format using a familiar tool that almost everyone knows — Microsoft Excel.

The XLSForm provides a practical standard for sharing and collaborating when creating forms. XLSForms are simple to initiate, yet can be used to generate complex forms.

Once the form is complete, the XLSForm is converted to an ODK XForm (see Operational Information — Convert XLSForm to XForm below), a popular open form standard that enables creating forms with complex functionality, such as skip logic, in a consistent way across a number of web and mobile data collection platforms.

To author an XLSForm, a MS Excel spreadsheet with the following three worksheets is used:

- Survey
- Choices
- Settings

3.1 Survey

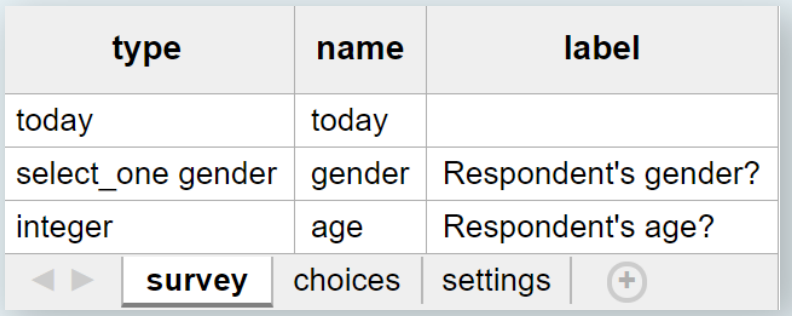
This worksheet contains most of the content of the VA form and its structure. The worksheet lists all questions, information about their presentation, and other information such as the skip logic, whether a question is required, and any hints for the interviewer.

Each row usually represents one question; however, there are certain other features that can be added to the form to improve the user experience without showing up on the tablet (e.g., calculated fields, metadata or geolocation at survey start). The survey worksheet has three mandatory columns: ***type, name and label*** (Fig. 13).

- The **type** column specifies the question type (e.g., multiple choice, free text, GPS coordinates) or another feature.
- The **name** column specifies the unique variable name for that entry, i.e., the name of the column of the table with the collected data. No two entries can have the same name. Names must start with a letter or an underscore. Names can only contain letters, digits, hyphens, underscores and periods, and are case-sensitive.
- The **label** column contains the text displayed on the tablet, i.e., the wording of the question.

For an example of the survey sheet, see Fig. 13.

Fig. 13 — Survey worksheet mandatory columns



3.2 Choices

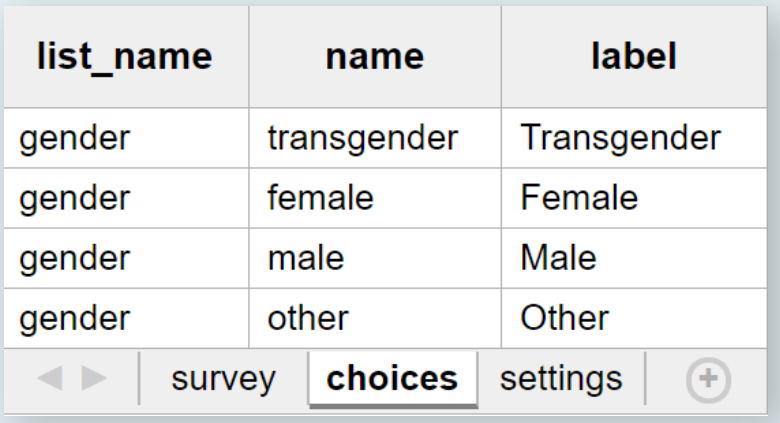
This worksheet is used to specify the answer choices for multiple-choice questions. Each row represents an answer choice. Each set of answer options that are to be shown for a question are assigned a list name (e.g., for the question “Respondent’s gender” the list name can be “gender” and the answer choices can be “transgender,” “female,” “male” and “other”). Answer choices with the same list name are considered part of a related set of choices and will appear together for a question on the tablet. This allows a set of choices, or a particular list name, to be **reused** for multiple questions (e.g., for yes-or-no questions the answer choices don’t need to be defined for each question; the list name can be defined once and then used for each of these questions).

The choices worksheet has three mandatory columns as well: **list_name, name and label**.

- The **list name** column lets you group together a set of related answer choices, or answer choices that should appear together under a question.
- The **name** column specifies the unique variable name for that answer choice. This is the value that will appear in the data table if the corresponding answer choice was selected.
- The **label** column shows the answer choice as it will appear in the tablet.

For an example of a choices sheet, see Fig. 14.

Fig. 14 — Choices worksheet mandatory columns



list_name	name	label
gender	transgender	Transgender
gender	female	Female
gender	male	Male
gender	other	Other

survey | **choices** | settings

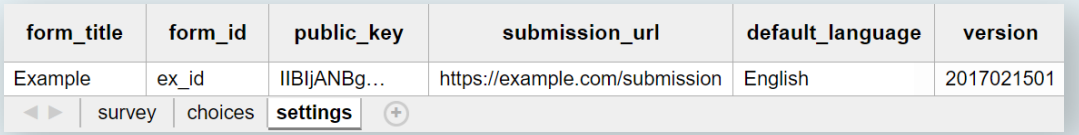
NOTE: no changes should be made to the instrument answer options, as this invalidates VA data analysis by algorithms and data comparability. Only changes for translation and local adaptation of the instrument should be made.

3.3 Settings

The settings worksheet allows the user to further customize the form, including encrypting records or setting an overall style theme for the form, among other customizations.

An example of a settings worksheet is below in Fig. 15.

Fig. 15 — Settings worksheet example



form_title	form_id	public_key	submission_url	default_language	version
Example	ex_id	MIBIjANBg…	https://example.com/submission	English	2017021501

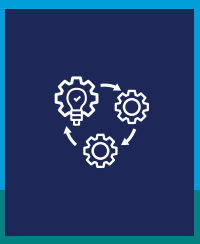
survey | choices | settings

The column headings in the referenced example of a settings worksheet do the following:

- **form_title:** The title of the form that is shown to users.
- **form_id:** The name used to uniquely identify the form on the server.
- **public_key:** For encryption-enabled forms, this is where the public key is shown.
- **submission_url:** This url can be used to override the default server where finalized records are submitted.
- **default_language:** In localized forms, this sets which language should be used as the default.
- **version:** String of up to 10 numbers that describes this revision. Revised form definitions must have numerically greater versions than previous ones. A common convention is to use strings of the form “yyyymmddrr.” For example, 2019111501 is the first revision from November 15, 2019.

Detailed information on all possible column usage of the XLSForm spreadsheet can be found in the XLSForm reference table.

4 VA XLSForm Implementation



The VA questionnaire implemented in the XLSForm can be downloaded at the two following links:

- **https://cdn.who.int/media/docs/default-source/classification/other-classifications/autopsy/2022-va-instrument/whova2022_xls_form_for_odk.xlsx?sfvrsn=51491ba1_8**
- **https://github.com/SwissTPH/WHO-VA/releases/latest**

XLSForm supports a number of question types. Here you will find the options that you can enter in the type column in the survey worksheet in your XLSForm.

The most important features of XLSForm are:

- set constraints to a question and constraints messages
- set required fields (mandatory questions)
- set relevancy to a question depending on one or more previous answers
- make calculations using operators on previous answered questions

Important features related specifically to the VA questionnaire are the ones that give the possibility to add localization fields to the questionnaire, depending on the setting being used. These are:

- **Multilanguage support**
- The **cascading select** option to add the geographical hierarchy of the area where the VA data is collected

IMPORTANT: Any modification to the original VA XLSForm should be tracked.

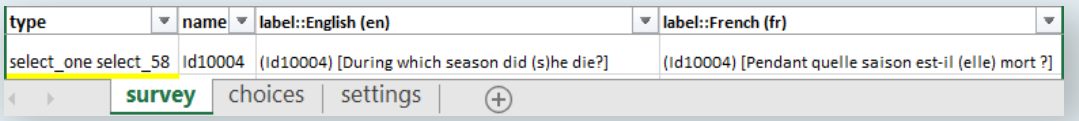
4.1 Multilanguage Support

It is easy to add multiple languages to a form. You simply have to name the columns **label::language1 (code_language1)**, **label::language2 (code language2)**, etc., and the form will be available in multiple languages. This is a standard way of adding multiple languages to the form. See the example below in Figure 16. Additional code and information can be found at this link: https://www.iana.org/assignments/language-subtag-registry/language-subtag-registry.

In the current version of the software, if an attempt to add multiple languages does not follow standard approach and codes, warning messages will appear to alert the user. Incorrect approaches may lead to strange behavior on some devices.

Select a different form language from the pulldown menu of the ODK Collect application (this may be located under the **Menu** key). For the form below, English and French will show up as the possible options.

Fig. 16 — Multilanguage support survey worksheet



The same procedure needs to be followed on the choices worksheet to translate the multiple and single choices as shown in Fig. 17.

Fig. 17 — Multilanguage support choices worksheet

A	B	C	
list_name	**name**	**label::English**	**label::French**
age_group	neonate	Neonate	nouveau-né
age_group	child	Child	enfant
age_group	adult	Adult	adulte
YES_NO_REF	yes	Yes	Oui
YES_NO_REF	no	No	Non
YES_NO_REF	ref	Refused to ansv	Refus de repondre

4.2 Cascading Select

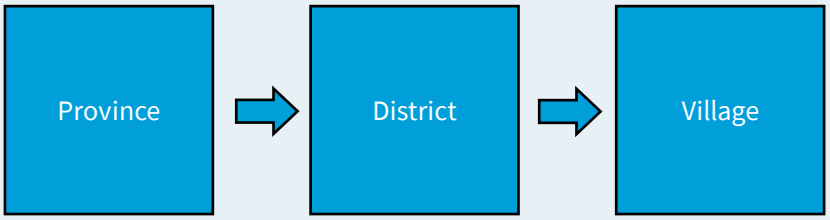
In the VA instrument there is a question about the location where the death occurred.

For this question, it is specifically required to enter detailed information (e.g., country, province, district and village).

If this question is left as a text field, the information may be incomplete, or not standardized, making it difficult to analyze.

Through the cascading select the user can, with each location selection, specify what the subsequent location choices will be (e.g., province » district » village. See Fig. 18).

Fig. 18 — Location hierarchy example



Instead of having a text field or a select_one field for each location option showing all possible locations at the same time (which can lead to inconsistent selections given that there's no link imposed through the various select_one options), we use cascading selects.

In order to use cascade selects, you need to create a choice_filter column in the survey worksheet and add the location attribute columns in the choices worksheet. See the following example (Fig. 19), with a form with three questions.

Fig. 19 — Cascading select example

Province
District
Village

type	name	label	choice_filter
select_one provinces	province	province	
select_one districts	district	district	cf=${province}
select_one villages	village	village	cf=${district}

survey | choices | settings

The three questions are all single-choice questions, but adding the **choice_filter** column to the survey worksheet specifies that the districts are filtered according to the selection made on provinces, and then villages are filtered based on the selection made on districts.

The way districts are linked to provinces and villages are linked to districts is implemented in the choices worksheet (Fig. 20).

In the example, in the column cf for “District 1” and “District 2,” we have the value PB, indicating that these two districts belong to Province B. When a fieldworker selects Province B, then in the following question he can choose only between “District 1” and “District 2.”

If the fieldworker selects “District 1,” in the question about the village the field worker can only choose between “Village A” and “Village B.” For these two villages the cf value is d1, which indicates they belong to “District 1.”

Fig. 20 — Cascading selects choices worksheet

list_name	name	label	cf
provinces	PA	Province A	
provinces	PB	Province B	
districts	d1	District 1	PB
districts	d2	District 2	PB
districts	d3	District 3	PA
districts	d4	District 4	PA
villages	a	Village a	d1
villages	b	Village b	d1
villages	c	Village c	d4
villages	d	Village d	d4
villages	e	Village e	d3
villages	f	Village f	d3
villages	g	Village g	d2
villages	h	Village h	d2

survey | choices | settings

For more advanced information for XLSForm programmers, please refer to the official XLSForm.

5 Operational Information

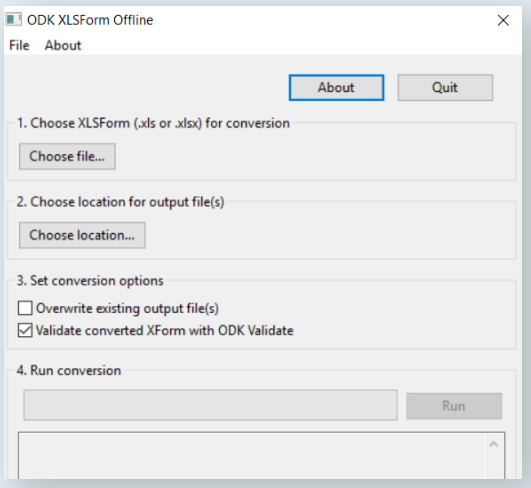
5.1 Convert XLSForm to XForm

To test whether the modifications implemented are syntactically correct, use the XLSForm Online converter, always up-to-date, which allows you to preview what the form will look like.

The XLSForm Offline converter is an option for users who do not have a reliable connection or may need to design the forms offline.

1. Once the XLSForm Offline is downloaded and unzipped, **double click on the executable file**.
2. **Click on "Choose file"** and **select the .xls file** to convert. **Select the location** on your computer where you want to place the converted .xml output file (Fig. 21).

Fig. 21 — XLSForm Offline



3. **Click on the "Run" button** to start the conversion and check in the box below for any error messages.

4. Once the test has been successful (correct syntax and expected behavior), **download the Xform** from the XLSForm Online or locate the converted form obtained from the offline converter, **and upload it** onto your ODK Central Instance.

NOTE: ODK XLSForm Offline is no longer being updated. Please use ODK XLSForm Online or pyxform instead if not strictly necessary.

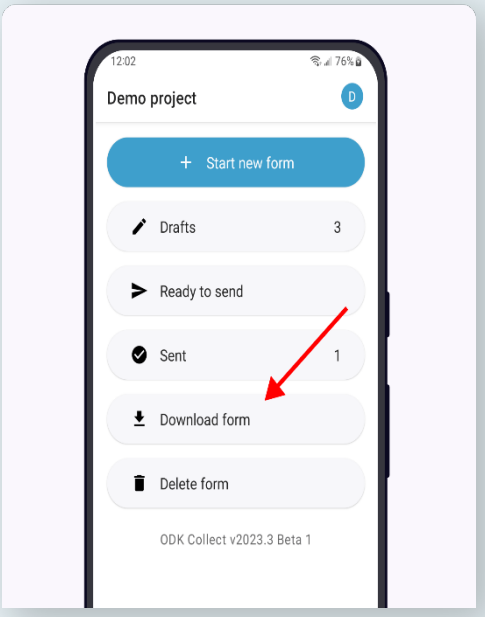
ODK Central has direct support for XLSForm uploads, so you do not need the conversion step except for external validation of your changes.

5.2 Download the VA Form to ODK Collect

After you have connected ODK Collect to the ODK Central server as indicated previously in Figures 2-4:

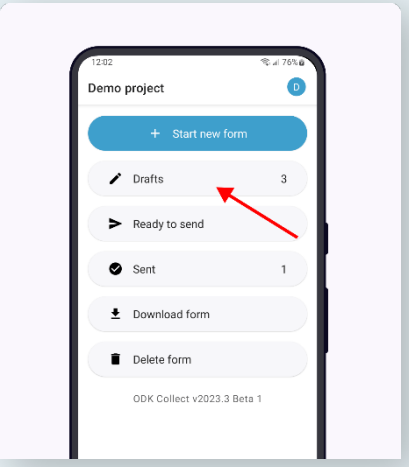
1. **Select "Download Form"** on the app home screen to browse available forms from the ODK server and download them to your device.

Fig. 22 — ODK Collect DownloadForm



2. You will see a list of available forms. Select the ones you would like to download and **tap "Get Selected."** (You can **tap to select one**, or **click the "select all" button** to select all forms and download them.)
3. You can now start to collect VA data, **selecting "Fill Blank Form"** from the main menu (Fig. 23).

Fig. 23 — ODK Collect Fill Blank Form

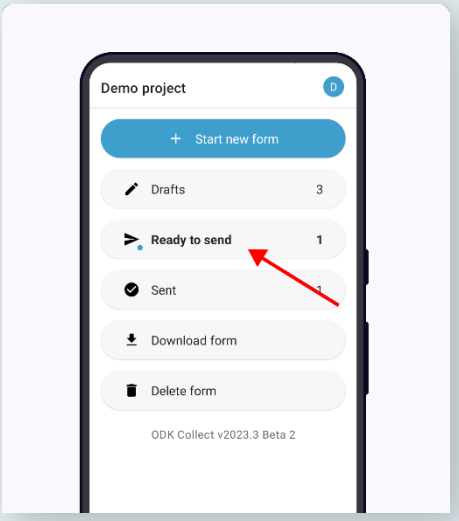


4. **Select the VA form** to fill out, and proceed with the interview.

5.3 Submit the Data Collected to ODK Central

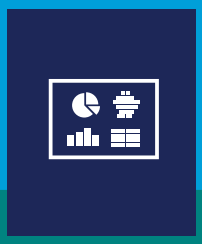
Once the VA interview is complete and you want to send the data collected to the server:

1. **Click "Send Finalized Form"** to upload finalized forms (Fig. 24).



2. Select the forms to send and **click “send”**.
3. If sending occurs successfully, you will see a prompt message indicating so. If not, check connectivity and try again.

6 Data Encryption



When we talk about data encryption in ODK we look at two different aspects:

- **Encryption of data sent through the network from ODK Collect to the ODK back-end server**
- **Encryption of data on the Android device**

The first is achieved through the implementation of **SSL (Secure Socket Layer)** on the back-end server, while the second can be achieved through **encryption of the form**.

6.1 Secure Socket Layer

Secure Socket Layer is a protocol that provides security for communication between client and server by implementing encrypted data and certificate-based authentication. To ensure that the certificate is a valid proof of identity, SSL contacts a trusted third-party server specified in the certificate, called a Certificate Authority. A Certificate Authority is a trusted company that agrees to vouch for the identity of a site, usually for a fee. Generally, the more widely the Certificate Authority is known as a reputable organization, the more they will charge you per year to verify your site's identity. The most common way that SSL is integrated into internet communication is through the HTTPS protocol, a combination of the HTTP and SSL protocols. When we say a message was sent using HTTPS, it means the message was first encrypted using SSL, transmitted and received using normal HTTP protocol, and then decrypted by the receiver with SSL.

In short:

- SSL offers security through encryption
- the encryption process is made possible through the use of digital certificates verified by a third party Certificate Authority
- the most common implementation of this process is the HTTPS combination protocol

ODK Central is shipped by default with SSL and uses Let's Encrypt (a nonprofit Certificate Authority) to obtain an SSL security certificate.

To configure ODK Central with a custom SSL Certificate please follow the information provided here.

6.2 Form Encryption

If you already implemented HTTPS, Form Encryption ensures that the data on the Android device is also encrypted. The data would have already been encrypted when sent to the server with HTTPS. If you want to add an extra level of security to the data collected, then you can implement the form encryption. This process ensures that the finalized form's data (and media attachments) are encrypted before being submitted to ODK Central, remain encrypted while stored on the server, and remain encrypted as the data and attachments are pulled into ODK Briefcase, where they are again stored in encrypted form.

The non-encrypted data is available on the ODK Collect device during data collection and whenever a form is saved without marking it as complete. Once you mark a form as complete (finalize it), ODK Collect will generate a random 256-bit symmetric key, encrypt the form contents and all attachments with this key, then construct a submission manifest which describes the encrypted submission and an asymmetric-key encryption of the symmetric key used for the encryption. This manifest is the "form" that is uploaded to ODK Server, with the encrypted form contents and its encrypted attachments appearing as attachments to this submission manifest "form."

If you are using XLSForm, then form encryption is governed by the settings on the settings worksheet. Encrypted forms must specify a submission_url and a public_key on this worksheet. If both are specified, XLSForm will generate an encrypted-form definition.

Please follow this link to learn how to generate a public-private key pair and specify the public key.

Note that when using encrypted forms, ODK Central serves only as a data aggregation point — you must download, decrypt and export the data using ODK Briefcase to access the unencrypted data. This kind of encryption is called self-supplied key encryption.

ODK Central also offers a second encryption method called project managed encryption; click on the link for detailed information about it. ODK Central will generate and securely store the cryptographic keys for you. The keys are themselves protected by a passphrase that you provide. You do not need to use ODK Briefcase: If you can supply the correct passphrase, the ODK Central administration panel will decrypt the data on the fly and provide you with exported data as usual. Without the passphrase, the data cannot be decrypted, and as ODK Central does not store the passphrase it cannot decrypt the data without your input.

NOTE: When the form encryption is used, it is not possible to look at the data through the browser in ODK Central. The data marked as finalized on the tablet cannot be edited. You need to download the data (after decryption) to look at it. The data is stored encrypted on the database side so tools or dashboards can access the data collected.