



GARC Data Logger (GDL) FAQs

Global Alliance for Rabies Control Data Logger (GDL)

Frequently Asked Questions

General information

1. What is the GARC Data Logger?

The Global Alliance for Rabies Control Data Logger (GDL) is a lightweight, user-friendly, cost-effective and portable data-capturing device custom-developed to support rabies control programs. The GDL was primarily designed for use in the field by animal rabies vaccinators, so vaccinators can quickly and easily record data relevant to each vaccination event. It can also be customised to collect other rabies-related local level data (e.g. post-vaccination surveys) as well as other purposes (including for other diseases). See “*Customisation of campaign details*” section, question 3 for more details.

2. How does the GARC Data Logger work?

The GDL has 7 buttons – 6 buttons for “user options” and 1 to confirm the final selected combination of buttons (see figure 1). The 6 buttons relating to “user options” are broken down into 3 questions, each with 2 options. When using the GDL with its default settings (i.e. animal vaccination campaign), the user will capture the following information (Species of animal – either dog or cat; Sex – either male or female; and Age – either adult or juvenile) (Figure 1). The seventh button is then used to confirm the selected options. After confirming, the device will record each option selected, as well as the time, date and satellite triangulated GPS coordinates for that record. For instance, an output can be “Dog, Female, Adult, Date, Time, GPS coordinates”. All of this information is collected by simply pressing 4 buttons.



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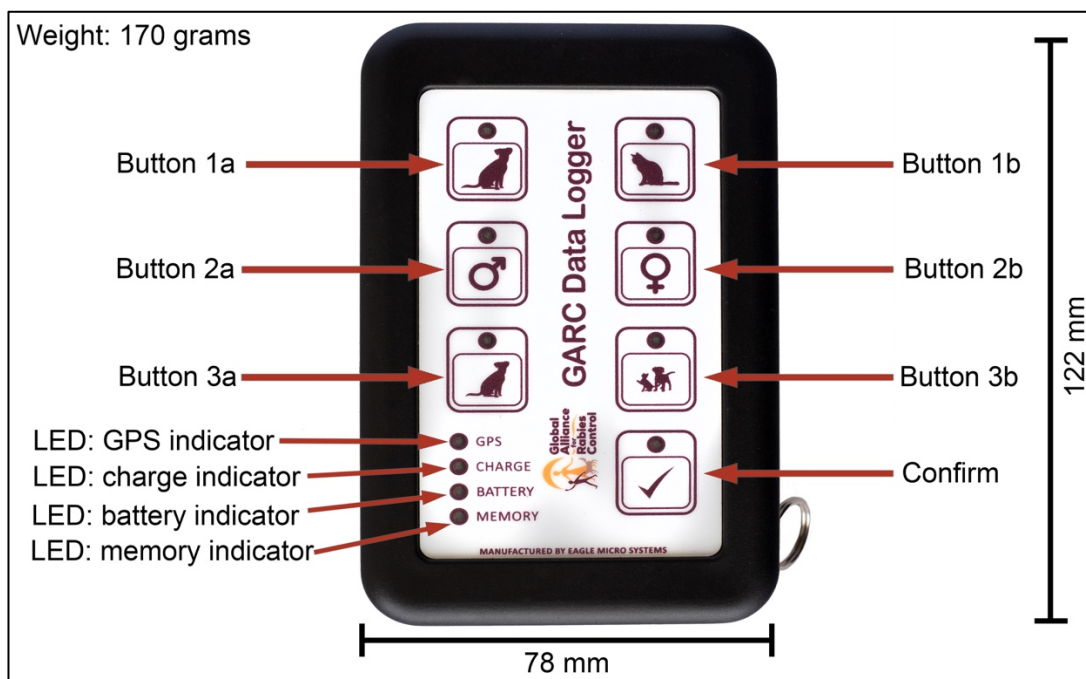


Figure 1: The GARC Data Logger (GDL) – Front view.

Button 1a and 1b represent 2 options for 1 question. In this case, choosing the animal species where option 1a is “Dog” and option 1b is “Cat”. Similarly, for Buttons 2a, 2b, 3a and 3b. The “Confirm” button will record the 3 options selected from buttons 1-3 above as well as record the time, date and GPS coordinates. Indicator lights are situated on the left-hand side of the device with colour changing LED lights to indicate: GPS lock (red → green); Charge status (red when charging, green when fully charged); Battery indicator (green, orange, red) and the memory status (green, orange, red, blue).

3. Do I need an internet connection or mobile data to use the GARC Data Logger?

No. The GDL relies solely on GPS triangulation information. This means that it does not rely on mobile phone networks to triangulate the location of the device. The data is stored directly on the device memory and there is also no automatic upload of data to a server, so no internet connection/mobile data is required when using the GDL (See “Data Download and Analysis” section for more information).

4. Can I use the GARC Data Logger anywhere in the world?

Yes. As the GDL relies solely on GPS triangulation, the device can be used anywhere in the world. This includes extremely remote areas where there is no other infrastructure.



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5. What information does the GARC Data Logger record?

The GDL automatically records the following data as soon as the “Confirm” (✓) button has been pushed: GPS coordinates (latitude and longitude recorded in the decimal degrees format), time (GMT) and the date. In addition, the GDL records the “user options” that are selected on the device when the user clicks the specified buttons (e.g. Dog, Male, Adult). While the data collected by the GDL is limited to three questions (each with two variables), additional campaign details and information (e.g. vaccine lot number, site number, vaccination campaign format, etc.) can be added when downloading the data (*See “Data Download and Analysis” section for more information*).

6. Where does the data go once it has been recorded, and is it safe?

The data collected by the GDL device is stored on the device itself until the user decides to download it to a personal computer. This means that the data is only recorded and stored by the person using the device. Because the user decides when to download the data, the data is completely secure and is **not uploaded** onto any server. **GARC does not require any of the data nor does it have access to any of the data on the device** – the data solely belongs to the user and that user can then choose what to do with the data. The data collected can be downloaded onto the user’s computer from where it can be used for multiple different purposes wherever required. The Rabies Epidemiological Bulletin (see question 6 in the *See “Data Download and Analysis” section for more information*) has been designed to use GDL data outputs directly for easy upload onto the system itself, so that maps and data can be automatically generated. However, this is done at the discretion of the user.

7. How many GARC Data Loggers do I need for a mass vaccination campaign?

The number of GDL devices depends on the type of vaccination event you plan on having. Ideally, each vaccinator should have their own GDL device to ensure that every vaccination can be captured. For a **roving or door-to-door campaign**, each vaccinator must have a GDL device so that each vaccination can be captured before they move on. The benefits of the GDL become evident during roving campaigns, as the vaccinators themselves can use the GDL without the assistance of another specialised data capturer. This therefore reduces the overall costs of campaigns and also moves valuable human resources to vaccinating more dogs. For a **fixed-point / central point campaign**, a single data capturer can record the information on a GDL while several



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vaccinators vaccinate the animals, but we would not recommend this as a lack of training and communication could result in confusion and missed data.

8. Who developed the GARC Data Logger?

The GDL was developed by the Global Alliance for Rabies Control (GARC) and the 'Intellectual Property' (covering the design rights, product name, and software) associated with the GDL thus resides with the Global Alliance for Rabies Control.

9. Are there any restrictions on the use of the GARC Data Logger?

There are no restrictions placed upon the use of the GDL device by GARC, nor does GARC have any access to any of the data on the device. However, if data that has been collected using the GDL is published, "Global Alliance for Rabies Control" must be acknowledged in the methods section of the paper, poster or presentation.

Basic use of the device

1. How do I turn the GARC Data Logger on?

There is a small red button on the right, side-panel, of the GDL device. The button is labelled "Power" (Figure 2). Press and release this button once to turn it on. You will hear a series of beeps and various LEDs will light up as the device turns on. This process will only last a few seconds.

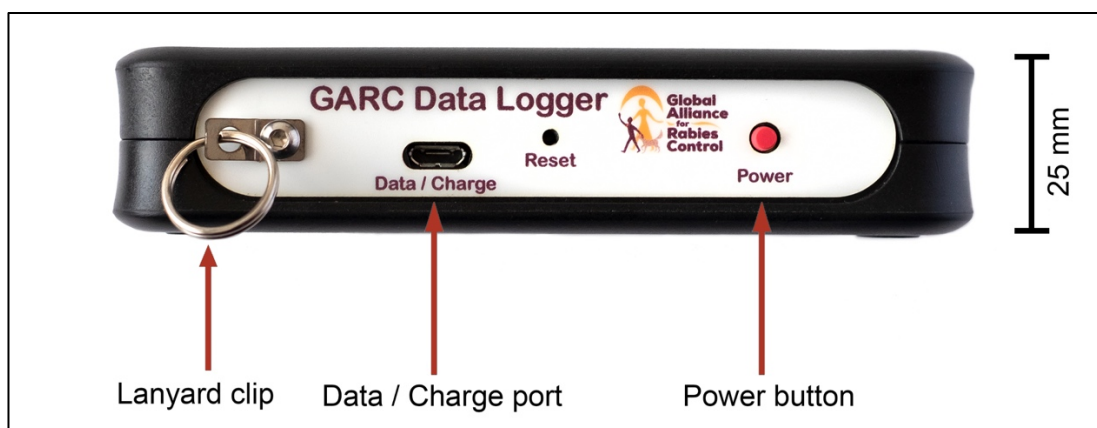


Figure 2: The GARC Data Logger (GDL) – Side view.

The "Data / Charge" port is where the micro USB cable is plugged in during charging and data download. The "Power" button is used to turn the GDL on and off.



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2. Can I start collecting data as soon as the GARC Data Logger has switched on?

No, the GDL can only start collecting data once the GPS inside the GDL has connected to a satellite and detected your exact location (known as a GPS lock). When switching on your GDL device, you will notice that the “GPS” light on the bottom left of the front of the device (Figure 1) is red. The red light indicates that the GPS has not locked, and you must wait a little while longer (preferably in an area where there is nothing blocking your view from the sky). Once the GPS lock has been secured, the “GPS” light will turn green and the device can be used to capture data.

3. How do I collect the data on the GARC Data Logger?

The GDL has a series of buttons (each represented by a picture) on the front of the device (Figure 1). Working from the top to the bottom, choose either button 1a or 1b. When you touch one of the buttons, a light above the picture will light up to indicate that it has been selected. Now choose either button 2a or 2b checking that the light above the chosen button reflects your selection. Lastly, choose either button 3a or 3b, checking that the light above the chosen button reflects your selection. Once you have touched one button from each row, you can review the selected data (using the lights above each button) and press the confirm (✓) button. You will hear a series of short beeps and all of the lights above the buttons will switch off, indicating that the data has been stored and the device is ready to collect the next round of data.

4. What do the different colours mean on each of the LED indicator lights?

- *Memory:*
 - Green - between 500 and 200 records can still be captured on the device;
 - Orange – between 200 and 50 records can be captured on the device;
 - Red – between 50 and 1 record(s) can be captured on the device;
 - Blue – device memory full (no more data can be collected until the data has been downloaded and the device’s memory has been cleared).
- *Charge:* The charge light (red) will only appear when the device is charging. If the device is not charging, the light will be off. The charge light will change to green when the device is fully charged.
- *GPS:*
 - Red – no GPS lock, no data can be recorded on the device;



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- Green – GPS locked, data can be recorded on the device.

5. How do I turn the GDL off after use?

The GDL can be turned off by holding down the red 'power' button on the side of the device (Figure 2). Be sure to hold the button in for several seconds, after which you will hear several beeps and all of the indicator lights will turn off. The device is now turned off. Alternatively, each device will turn off automatically as a power-saving option. This is 2 minutes by default but can be changed in the software (Refer to the GDL protocol).

6. How do I charge the GARC Data Logger?

The GDL can be charged using any cable that has a micro USB extension. The GDL comes in a box containing a standard South African charger plug and a USB–micro USB cable. The micro USB side (smaller side) of the cable can be plugged into the side of the device (Figure 2), whilst the USB side can be plugged into any charger plug where a USB can be plugged in (therefore, not limiting it to being used with the South African plug provided), enabling the GDL to be charged at a wall socket. Alternatively, the GDL can be charged on any device that can charge via a USB cable, including a laptop. If you have a smartphone with a micro USB cable, the phone charger can be used to charge the GDL. This also includes vehicle chargers for a smartphone.

7. I have charged the device all night and am worried that I may have overcharged the battery – should I be concerned about damaging the battery from overcharging it?

No. The GDL works on a 'trickle charge' function to ensure that it is not overcharged. This means that the device will charge up to 99% very quickly (Charge light changes to "green") and will subsequently take many hours to charge the last 1%. This is a safety mechanism that has been built into the device to ensure a long-lived and healthy battery. This safety mechanism ensures that the batteries also do not overheat when charging.

8. When recording data, I accidentally pressed the wrong button and I want to change my selected option before confirming my data (✓ button) – is this possible?

Yes. The selection can be changed by simply pressing the other option (e.g. instead of '1a', select the '1b' button; e.g. changing from 'Dog' to 'Cat'). The light will change to the new selection and you can continue with your work.



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9. I have accidentally recorded data that is incorrect. Can I change this or delete my last entry?

Unfortunately, you cannot. This data cannot be changed or removed once the data has been successfully recorded (after pressing the ✓ button). What we suggest for good user practice is that you select all of the relevant buttons (e.g. dog, male, adult) before taking any action (e.g. before handling the animal). When you are ready to save the data (e.g. *after* administering the vaccine), check the selections and then press the confirm button (✓ button) to record the data.

10. The GDL unit turned off automatically before I could get a GPS lock. Is it not working?

To prolong the battery life, the GDL will automatically turn off within a certain time-period (default: 2 minutes) if it is not actively used. Sometimes, depending on the availability of satellites in your region, GPS lock may take several minutes, and the device might automatically turn off before a satellite lock can be made. If the device turns off before the GPS lock is obtained, simply turn the device on again and wait for GPS lock. In rare situations, this may take 3-4 attempts when the device is turned on for the **first time in a new location** and standing out in the open might help. Once the GPS lock has been obtained, the next time the device is turned on in a similar area, the GPS lock should be much quicker. Therefore, if the device automatically turns off during the vaccination campaign, the device should be switched back on and the GPS lock should be acquired within a few seconds. If you are experiencing trouble with the GPS lock, the default time period in which the device will automatically power off can be changed in the software under “Configure GDL” (Refer to the GDL protocol) so that the device has a longer time to obtain a GPS lock before automatically turning off.

11. I have turned the GDL on but every time I press a button, the error beep sounds and none of the buttons work – what is wrong?

The GDL has not yet obtained a GPS lock. The GDL can only capture data once the GPS lock has been established with the device. As such, if the GDL gives several error beeps every time a button is pressed, and nothing seems to be working on the device, the GDL has not yet obtained a GPS lock and you will notice that the “GPS” light on the bottom left (Figure 1) is still red. In these situations, the GDL gives the error beep sound and the light for each button does not work. This is to ensure that the user does not believe that they are entering data when none is being recorded – this is a safety mechanism that has been specifically built into the device to ensure that all of the data is collected. The GPS LED light will change to green as soon as a GPS lock has been



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obtained and you will then be able to record data. GPS locks typically take less than 2 minutes, but in some cases, can take up to 5 minutes to lock. If after 5 minutes, you are still unable to obtain a GPS lock, please try moving to a clearing where no other obstacles (such as buildings and trees) that may interfere with the GPS signal are present.

12. The “Memory” light has gone blue and the device is beeping when I try to press a button, what is wrong?

When the LED light for the “memory” turns blue it means that the memory on the GDL is full. The GDL with the “blue” memory light (Figure 1) has stored 500 records and there is no more space to record any further data. The error sound beeps to ensure that the user is aware that data is no longer being captured and stored on the device. We recommend that you download the data onto a computer (*See “Data Download and Analysis” section and the GDL Protocol*), save the file and then clear the data from the device so that you can continue to use it.



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Data download and analysis

1. What software do I need to download the data?

You will require the “GDL Manager” software to access the data on the GDL. The “GDL Manager” software, **that can only run on a computer with a Microsoft Windows operating system**, will enable you to download the data from the device, add or alter any additional campaign information, or customise the GDL device. The “GDL Manager” software is provided to you on Google drive, along with full tutorial videos and user protocols on how to use the device and the software.

Please follow this link to access the Google Drive folder:

https://drive.google.com/drive/folders/1NivekXRO0srnbdR4ifmYhOg_2NBUoQzW?usp=sharing

In addition, if you do not have access to Google Drive or accidentally delete the software, the software is freely available from the GARC development team at any time. Software updates will also be made available on the Google Drive folder, so please check the folder or contact the GARC team periodically for the latest version of the software.

2. How do I install the software onto my computer?

The GDL software can be downloaded from the Google Drive as the following file: ‘GDL Manager.msi’. This file is an install file that needs to be run to install the software on your computer **with a Microsoft Windows operating system**. Simply double-click on the icon and the GDL Manager setup wizard will open. Follow the instructions to complete the installation. A desktop icon will be created for you for easy access to the software at a later stage.

For more help on installing the GDL Manager software, please refer to the Google Drive folder called “Tutorial Videos” or “Protocols and instructions”. In these folders, you will find a step-by-step video and a detailed protocol on how to install the GDL Manager software.

3. How do I download the data from the GDL onto my computer?

Please refer to the GDL Protocol (available in the Google Drive folder:

https://drive.google.com/drive/folders/1NivekXRO0srnbdR4ifmYhOg_2NBUoQzW?usp=sharing) to see a comprehensive overview on how to download data from the GDL device.



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4. My downloaded data does not have all the required campaign information – how can I add in this information?

It is easy to add additional information about the campaign using the “GDL Manager” software. In this instance, you will need to go to the “Campaign Information” in the GDL software where additional campaign information can then be typed into the relevant fields. Please refer to the GDL Protocol for more information on how to add additional campaign information to your data.

5. Who has access to my data?

Only you have access to your data. The data recorded on the GDL device is stored on the device itself and is **not shared or uploaded onto any server**. As the data is solely stored on the device, it is the user’s decision as to who has access to the data. After downloading the data onto the user’s computer, the data remains as an Excel file on that computer. There is absolutely **no obligation from GARC** for users to share their data or upload it onto any server or website.

6. How can I use and analyse the data recorded by the GARC Data Logger?

The output file for the GDL is either a Comma Separated Values (.csv) file format or a standard Microsoft Excel file. This means that both the files can be opened in Microsoft Excel, Numbers (iOS), and any other programme capable of opening these file-types. Therefore, any computer should be able to view and edit the data downloaded from the GDL device. From here, the data can be used in any way that you feel best. Graphs can be generated in Excel or alternatively, the data can be uploaded directly into the Rabies Epidemiological Bulletin for the automatic generation of maps, graphs and tables*. The .csv file format is also compatible with a wide variety of other software tools, such as Tableau, QGIS, ArcGIS as well as other databases for import. This includes all DHIS2 national instances available in many countries around the world.

**For the GDL to be integrated directly into the Rabies Epidemiological Bulletin, your country must be using the Rabies Epidemiological Bulletin, and the Rabies Epidemiological Bulletin development team must be contacted to ensure that all of the relevant information has been built into the system to accommodate the GDL integration and generation of the relevant visuals. Please contact the Rabies Epidemiological Bulletin administrators at: reb@rabiesalliance.org*



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Operational information

1. Can I use the GARC Data Logger with nitrile/latex gloves?

Yes. The user can wear any type of glove and still operate the device. This also means that the device can be operated through a plastic bag (*see question below*).

2. Can I use the GARC Data Logger in the rain? How can I waterproof the device?

Yes. As mentioned in the question above, the GDL can be placed into a plastic bag and used through the bag. The cheapest and most effective way to waterproof the device would be to place the device into a ziplock bag (or any other airtight plastic bag) and then use it in the rain. This will ensure that the device remains safe from water damage and will also ensure that it remains clean.

3. Can I use the GARC Data Logger under a dense canopy of trees or indoors?

Yes. The GDL can be used under a dense canopy of trees and in most buildings with a basic roof (thatch, tin, thin concrete, tiles etc.) as the GPS signal is strong enough to go through these barriers. Please note that in these instances, you might need to be out in an open area to get a GPS lock before entering the covered area. The only places where the GDL cannot be used are underground or under a thick concrete roof (multiple story buildings, parking garage structures etc.). However, this should typically not pose a problem as most vaccinations will likely occur outside or in smaller buildings. Alternatively, the GDL can be placed at the entrance to the building and data can be recorded as the animal exits the building after being vaccinated.

4. How do I care for my GARC Data Logger and ensure its longevity?

The GDL is a robust device designed for use in various conditions, however, the device must still be maintained to ensure proper working order. We would recommend the following care guidelines to ensure that you get the most from your GDL device:

- a) Use a damp cloth to clean your device. Do not submerge it in water or wet it.
- b) In rainy or dusty climates, place the device in a sealed plastic bag to protect it.
- c) Never use damaged or broken charging cables to charge the device. This includes cables that have been repaired with tape.
- d) Use the lanyard (supplied with each GDL) to prevent the device from dropping to the ground.
- e) Always pack the GDL into its respective box when not in use.



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Customisation of campaign details

1. How do I customise the GARC Data Logger for my own campaign?

The campaign details can be entered on the software of the device (Please see Question 4 in the “Data Download and Analysis” section). In the GDL Manager software, you can navigate to the “Campaign information” screen. In this screen, you will be able to change all the campaign information, adding in information such as the name of the vaccinator who is using the particular GDL, the site name, type of campaign, vaccine brand and lot number and any other additional information. All of this information will be added to the data when it is downloaded from the device.

2. As a campaign manager, how do I keep track of each team and ensure that all of the GDLs are accounted for at the end of the day?

Each GDL has a unique serial number on the back of the device. This serial number will match the serial number on the front of the box in which the GDL was delivered. In addition, the electronic serial number will match these serial numbers and is hard-coded into the device and can be found on the “campaign information” screen. This serial number cannot be changed and is part of each device. On this same screen, the name of the vaccinator can be added to keep track of which vaccinator used each device – this information will be coupled to the data that is then downloaded at the end of the day. We also recommend that each campaign manager keeps a log book of each device and who has them on each day to ensure that all devices (and more importantly all of the data) are accounted for at the end of each day.

3. Is the GARC Data Logger limited to only being used for dog vaccinations?

No. The GDL has been developed to be completely customisable. This includes the decal sticker on the actual device as well as what each button on the device represents. This means that the GDL can be used for almost any purpose, ranging from post-vaccination surveys, use in a clinic situation to track bite patients, dog vaccination, and dog population surveys. The GDL can also be used to collect data for other diseases such as Foot and Mouth Disease, Cholera, Tuberculosis and many others.

Please contact the development team for more information about customising your GDL for use other than for rabies vaccination at the following address: gdl@rabiesalliance.org We will be able to assist in providing more details and information, as well as streamline the process for the customisation of your device



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and development of the decal sticker. Please note that any new decal sticker must include the GARC logo and the name of the device.