

MANUAL

Data Collection, Reporting & Management Tools

COVID-19 GLOBAL RESPONSE

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With support of



For more information regarding the use of this product, please contact the 510 Data Team by sending an email to support@510.global

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Introduction

Since March 2020, the 510 Data Team of the Netherlands Red Cross (NLRC) has supported different National Societies (NS) by providing a framework that supports data collection and management as well as reporting templates. This manual provides the information that one needs to know when planning on collecting and managing data or to create reporting templates.

Product in a nutshell

The products presented in this manual are a collection of online tools, programming scripts and documents that can improve user experience in handling data. They do this in either of the following ways:

1. By providing an organized, reliable and automatized way of **collecting data** through electronic forms.
2. By providing a clear and visually appealing overview of data in the form of **reports** through report templates or programming scripts.
3. By providing a convenient **data management system** through an online web application.

What are data collection tools and what can you do with them?

The data collection tools described in this manual can automate the data collection of NS. The 510 Data Team often uses electronic forms to collect data, a reliable way of collecting data as they are stored in one location (server) even in challenging environments. The 510 Data Team uses the KoBo Toolbox platform which supports automated data collection with the KoBo form. Some examples of the collected data by NS until now are:

- COVID-19 cases
- Rumors about COVID-19 vaccines
- Activities of the NS branches

An example of a form used to collect data is shown in the section “Overview of the tools & examples of usage” of this manual. Alongside these examples the user can find examples of data visualization. For more information on data visualization please refer to the manual “Dashboards”.

What are data reporting tools and what can you do with them?

The 510 Data Team has supported some NS in building reports that give the user a comprehensive and easily interpretable overview of data. This is done through graphs or

templates, see section “Examples of data collection tools”. Some examples of the data used for the reports are:

- COVID-19 cases
- Data about available workforce (e.g., volunteers) or resources (e.g., hand washing devices)

The 510 Data Team has used two different ways to create a comprehensive data overview:

1. an R language programming script that creates a report containing graphs of the data
2. a report template in an excel file

What are data (information) management tools and what can you do with them?

The 510 Data Team has built a volunteer management system that allows the NS to register new volunteers in an accessible and organised manner. This is done with the EspoCRM software in which the user can register the NS volunteers. An example of a volunteer database made with EspoCRM is shown in the section “Overview of the tools & examples of usage” of this manual.

Who are the data collection, reporting and management tools for?

The data tools presented in this manual can be used by any NS or other non-governmental organisation looking to improve the efficiency and accuracy of their data collection and use. Examples of NS that have used these tools until now are:

- The Philippine Red Cross
- The Red Cross Society of Ivory Coast
- The Egyptian Red Crescent Society

Why use data collection, reporting and management tools?

The data collection tools presented in this manual offer the user an open source, automated and accessible way of collecting data, even in areas with low to no internet connection or phone coverage. These are considerable advantages for NS that often work in the field, and save the NS from time-consuming manual work, increasing efficiency.

The data reporting tools offer the user a clear overview of the data which can accelerate decision-making processes. For example, a graph which shows COVID-19 cases of the last week in a certain area, allows the user to identify if restrictive measurements are necessary.

Finally, the data management tool presented in this manual, offers the user an open-source platform to easily register the volunteers working for the NS, which saves the NS time-

consuming manual work and increases efficiency. Overall, the tools presented in this manual can help the NS increase their efficiency.

Case study

Data collection, reporting, and visualizations plays a big role in Red Cross and Red Crescent Societies and are integrated in different project phases. Depending on the need of the NS, a data collection tool is selected and is often coupled with a reporting tool, making the overall reporting more efficient.

The 510 Data Team has assisted a number of NS in integrating more automated processes for data collection, reporting, and visualizations into their work. The following is a list of some of the NS that have adopted these new tools:

- The Philippine Red Cross
- The Red Cross Society of Ivory Coast
- The Egyptian Red Crescent Society
- Uganda Red Cross Society
- Nepal Red Cross Society
- Zambia Red Cross Society
- Mali Red Cross

The support given to the Mali Red Cross will be taken as an example to showcase the use of such tools and their efficiency:

Mali Red Cross has been conducting several COVID-19-related activities throughout the country, where the different Red Cross branches report back on said activities to Head Quarters (HQ). The 510 Data Team assisted the NS in the following things:

1. Developing a uniform way of collecting data from the branches

- Before: The branches, on a weekly basis, would have to report on their COVID-19 activities on either a Microsoft Word Document or a Microsoft Excel Document and send that back HQ.
- After: A KoBo form was developed that encompasses the data needed from the branches.

2. Reducing the manual work

- Before: The data specialist at HQ had to manually re-enter the data gathered from branches due to the lack of a uniform method, which lead to increased manual work.
- After: The data specialist can easily produce country-wide weekly reports on all the COVID-19 activities in a rapid and efficient way.

Data responsibility

The following section applies to all the tools mentioned in this manual.

Datasets

Data that is collected, reported on and visualized will depend on the purpose of the project or program. This information can be gathered directly from beneficiaries or can be collected from third parties. Depending on the purpose of the project, the data could include, but are not limited to, personal information such as gender and location. Certain actions can be taken to ensure that data responsibility and privacy are maintained, such as minimization and anonymization of the data.

Data processing

There are various tools available to collect data. Depending on the information being collected, some software might be preferable over others. For the case of collecting personal information, Google Spread Sheet would not be the optimal choice. If there is a need for the data to be shared within the National Society, a more suited option would be Microsoft Excel that could be easily accessible through Microsoft Teams. The same applies for reporting and visualization of data. Additionally, depending on the tool used for each of these steps, processing of information can be done automatically (using a programming script that produces reports) or manually.

Non-discrimination

The tools mentioned in the manual do not discriminate and work the same for all data types.

Human oversight

The tools mentioned that depend on human involvement are data collection, data reporting, and data management. The end user will need to be informed of the purpose behind the tool and the data needed in order to assure that all privacy and protection policies are followed. The data visualization tool, however, is something that can be done automatically.

Risks

In the case where personal data are being collected, reported on and visualised, certain harm could be caused to data subjects if data responsibility policies are not followed. Harm could also be caused if the data are not stored securely.

Requirements

User knowledge

In this section we describe the skills that someone would need to use the tools presented in this manual. In addition to the skills mentioned below, it is crucial the user has the following skills:

- Analytical thought
- Data responsibility (see also section “Data responsibility” of this manual)
- Visualization (optional)

Required skills for data collection

To collect data the user can build a digital form through KoBo. Here we list the skills needed to use this tool:

KoBo form: to create a form, the user will need to know how to use a computer, an internet browser and optionally, any spreadsheet-based program such as Google sheets or Microsoft Excel. To fill in the form, the user will need to know how to use a mobile phone, tablet or computer. In case the user wants to visualize the collected data, they will need to be experienced in data visualization programs such as PowerBI or Google Data Studio. Optionally, if the user wants to automate the process of sending the form to the target audience, they can link KoBo to Mailchimp. In this case, experience with the Mailchimp platform is desirable.

Required skills for data reporting

To use the data reporting tools, the user can either use a programming script (R script) or use the reporting template created in excel. Here we list the skills needed to use these tools:

- **R script report:** the user will need to know how to use a computer, an internet browser and have programming skills in R. It is desirable that the user has experience in R Studio (R markdown) or Jupyter notebooks to create the report containing the graphs.
- **Excel report template:** the user will need to know how to use a computer and any spreadsheet program such as Excel (Microsoft Office) or Google sheets.

Required skills for data management

To use the volunteer management system through EspoCRM, the user can use the internet to access the website hosting the system. Here we list the skills needed to use this tool:

- Experience using the internet
- Developer experience if the admin is interested in extending the possibilities of the system, e.g., create and assign tasks, notify volunteers etc.

Hardware

Below you can find the hardware requirements for each of the tools mentioned in this manual.

- **KoBo:**
 - To create the form: a computer with internet connection. Alternatively, the user could build the form offline with a spreadsheet program such as Excel (Microsoft) but they would need to have internet connection once the form is designed to upload it to the KoBo server. If the user wishes to automatize the process of sending the form to the target audience, internet connection is required.
 - To fill in the form: a mobile phone, tablet, or laptop/personal computer. Internet connection is not necessary.
 - To gather the data from the form: a computer with internet connection to upload the collected data to the server.
- **R script report:** a computer with the following requirements (if using R Studio). If there is a need to install R packages or a notebook such as Jupyter, internet connection is required.
 - Processor: 2-core
 - RAM: 2 GB
 - Disk space: 200 GB
- **Excel Microsoft Office (2019)**
 - Processor: Windows OS: 1.6 GHz, 2-core / macOS: Intel processor
 - RAM: Windows OS: 4 GB RAM; 2 GB RAM (32-bit) / macOS: 4 GB RAM
 - Disk space: Windows OS: 4 GB available disk space / macOS: 10 GB of available disk space
 - Screen resolution: Windows OS: 1280 x 768 (32-bit requires hardware acceleration for 4K and higher) / macOS: 1280 x 800
 - Graphics: Windows OS: DirectX 9 or later, with WDDM 2.0 or higher for Windows 10 (or WDDM 1.3 or higher for Windows 10 Fall Creators Update) / macOS: No graphics requirements.
- **EspoCRM:**

- Web server: Nginx, Apache 2.2.1 or IIS 5.0.0 and later
- PHP: 7.2 and later
- MySQL: 5.7 or MariaDB 10.1 and later

Software

Below you can find the software requirements for each of the tools mentioned in this manual.

Data collection tools

For the KoBo form:

- **To create the form and optionally, use Mailchimp to automatize process:**
 - Internet browser such as
 - Mozilla Firefox
www.mozilla.org/en-US/firefox/new/
 - Google Chrome
www.google.com/chrome/
 - (Optional) Spreadsheet-based program such as
 - Excel (Microsoft Office)
www.microsoft.com/en-us/microsoft-365/excel
 - Calc (Apache OpenOffice)
www.openoffice.org/download/index.html
 - Google Sheets (used in an internet browser)
www.google.com/sheets/about/
 - (Optional) Mailchimp platform
<https://mailchimp.com/>
- **To fill in the form:**
 - The KoBoCollect app
<https://play.google.com/store/apps/details?id=org.koboc.collect.android>
- **To gather the data from the form and optionally visualize the data:**
 - Internet browser
 - (Optional) Spreadsheet-based program
 - (Visualisation - optional) PowerBI
<https://www.microsoft.com/en-us/download/details.aspx?id=58494>
 - (Visualisation - optional) Google Data Studio
<https://datastudio.google.com/>

- (Visualisation - optional) ArcGIS

<https://pro.arcgis.com/en/pro-app/latest/get-started/download-arcgis-pro.htm>

Data reporting tools

For the R script that creates a report:

- R language installed
www.cran.r-project.org/mirrors.html and optionally
R Studio www.rstudio.com/products/rstudio/download/ and/or optionally
Jupyter notebooks <https://jupyter.org/>

For the reporting template in the form of an excel file, any spreadsheet-based program (see above)

Data management tools

For the volunteer management system:

- EspoCRM
<https://www.espocrm.com/download/>

Time

Here we indicate which parameters influence the duration of usage of the tools and state real-life examples of usage by NS.

Data collection tools

KoBo form: The duration of usage is the total duration of designing the form, the length and complexity of the form, creating the form, testing the form and if necessary, recreating the form, filling in the form by the target audience and collecting the form answers. All this depends on user experience with an internet browser, the amount of data that needs to be collected, the number of questions that need to be added to the form and the number of persons that need to fill out the form.

For reference, the 510 Data Team of the NLRC department typically needs 2 hours to build a simple form prototype (without user-testing it). To estimate the amount of time that is needed for the visualization of the data please refer to the manual “Dashboards”.

Data reporting tools

R script report: The duration of usage depends on the availability and the amount of data that needs to be analyzed, if the data needs to be processed (e.g., normalized), if the script has to be adjusted to the specific interests of the user and the experience of the user with R scripts.

For reference, the 510 Data Team of the NLRC department needed 1 week in assisting the Philippine Red Cross to develop the first version for the script that produces graphs regarding COVID-19 number cases. Note that the data scientist had to learn to code in R first, so this is not a typical time. For an experienced programmer, such a script takes 1-2 days. Running the script takes 5 minutes.

Excel report template: The duration of usage depends on the availability and the amount of data that needs to be inserted into the report and if the person has experience in working with a spreadsheet-based program such as Excel. The report template has not been used so far by a NS, so we are not able to provide a time indication.

Data management tools

Volunteer management system: The duration of usage depends on the users experience with using the computer and the internet as well as the number of volunteers that need to be registered.

For reference, the 510 Data Team of the NLRC department needed 5 minutes to log on and register a volunteer in the system.

Locations to download the products

Here we provide the links and locations to find the tools presented in this manual.

Data collection tools

KoBo Toolbox

- KoBo Toolbox
www.kobotoolbox.org

Data reporting tools

R markdown report script

- The script `COVID_Lab_Analytics.Rmd` can be found in the internal 510 MS Teams environment.
- The sample data can be found in the internal 510 MS Teams environment.

Excel report template

- The Excel template can be found in the internal 510 MS Teams environment.

Data management tools

Volunteer management system

- The volunteer management webpage is password protected and access is limited to the 510 Data Team

Limitations of the products

- Using Google Sheets to show KoBo-collected data limits full automatization of the reporting dashboard, as KoBo can't be easily be connected to Google sheets. A workaround is the to write a script that extracts the data from the KoBo server and inserts them into Google Sheets. An alternative route is to manually import the data.
- When creating a KoBo form, attention needs to be paid that the questionnaire contains as many closed questions as possible, to reduce data cleaning: the less open questions, the more the process can be automated.

Overview of the tools & examples of usage

Data collection tools

KoBo form

- The user can create a KoBo form directly on the website of KoBo
- The user can create an Excel spreadsheet, which has to be uploaded to the KoBo website before being deployed.

Below we showcase an example of a form used by the Zambia Red Cross Society, both in the KoBo website format and in an Excel spreadsheet format. In **figure 1** we give an example of how the collected data looks like as well as an example visualization of that data in **figure 2**. A detailed step-by-step tutorial on the use of KoBo forms falls outside of the scope of this manual but several guides and tutorials are available online, see section “Resources”.

	A	C	E	F	G	H	I	J	K	L	M
	Enter today's Date	Name of the District	Where volunteers involved this Month?	How many were males?	How many were Female?	Did you participate in any coordination meeting?	How many of Coordination meetings did you participate in?	What type of coordination meeting did you participate in?	What type of coordination meeting did you participate in?/RCCE	What type of coordination meeting did you participate in?/TWGs	What type of coordination meeting did you participate in?/WASH
1											
2	30-7-2020	Ndola	No			No	0				
3	30-7-2020	Chipata	No			No	0				
4	15-8-2020	Kitwe	Yes	4	0	No	0				
5	15-8-2020	Mansa	Yes	3	1	Yes	2	Other (Specify)	0	0	0
6	15-8-2020	Kapiri	Yes	7	13	No	0				
7	15-8-2020	Chililabombwe	Yes	5	4	No	0				
8	15-8-2020	Siavonga/Chirundu	Yes	0	10	No	0				
9	17-8-2020	Mfulira	Yes	5	2	Yes	1	RCCE	1	0	0
10	17-8-2020	Chipata	Yes	6	3	Yes	1	Other (Specify)	0	0	0
11	18-8-2020	Mpika	Yes	3	4	No	0				
12	18-8-2020	Mpulungu	Yes	5	7	No	0				
13	28-8-2020	Ndola	Yes	14	11	Yes	2	RCCEWASH	1	0	1
14	28-8-2020	Chililabombwe	Yes	3	3	No	0				
15	29-8-2020	Kitwe	Yes	6	2	No	0				
16	29-8-2020	Siavonga/Chirundu	Yes	0	6	No	0				
17	29-8-2020	Livingstone	Yes	5	3	Yes	1	Other (Specify)	0	0	0
18	29-8-2020	Mansa	Yes	12	6	No	0	Other (Specify)	0	0	0
19	29-8-2020	Kabwe	Yes	4	2	Yes	1	WASH	0	0	1
20	29-8-2020	Mpika	Yes	3	4	No	0	N/A	N/A	N/A	N/A
21	30-8-2020	Solwezi	Yes	3	5	Yes	2	WASH RCCE	1	0	1
22	30-8-2020	Kapiri	Yes	1	7	No	0				
23	31-8-2020	Lusaka	Yes	10	10	Yes	1	Other (Specify)	0	0	0
24	14-9-2020	Nakonde	No	0	0	No	0	N/A	N/A	N/A	N/A
25	15-9-2020	Chililabombwe	Yes	13	7	Yes	1	WASH	0	0	1
26	15-9-2020	Chipata	Yes	2	1	No	0	N/A	N/A	N/A	N/A
27	15-9-2020	Kabwe	Yes	8	11	Yes	2	Other (Specify)	0	0	0
28	15-9-2020	Kapiri	Yes	3	3	Yes	1	WASH	0	0	1
29	15-9-2020	Kitwe	No	0	0	Yes	1	RCCE	1	0	0
30	15-9-2020	Mansa	No	0	0	No	0	N/A	N/A	N/A	N/A
31	15-9-2020	Mpulungu	No	0	0	No	0	N/A	N/A	N/A	N/A
32	15-9-2020	Ndola	Yes	35	23	Yes	1	RCCE	1	0	0
33	15-9-2020	Siavonga/Chirundu	Yes	0	11	No	0	N/A	N/A	N/A	N/A
34	16-9-2020	Kabwe	No			No					
35	22-9-2020	Nakonde	No	0	0	No	0	N/A	N/A	N/A	N/A
36	30-9-2020	Chipata	Yes	2	1	No	0	N/A	N/A	N/A	N/A
37	30-9-2020	Kabwe	Yes	12	16	No	0	N/A	N/A	N/A	N/A
38	30-9-2020	Kitwe	Yes	7	3	No	0	N/A	N/A	N/A	N/A
39	30-9-2020	Lusaka	Yes	3	4	Yes	1	WASH	0	0	1
40	30-9-2020	Mpulungu	No	0	0	No	0	N/A	N/A	N/A	N/A
41	30-9-2020	Ndola	Yes	12	14	Yes	1	WASH	0	0	1
42	30-9-2020	Solwezi	No	0	0	Yes	1	WASH	0	0	1

Figure 1 • This screenshot shows a small part the collected data from the KoBo form showcased above. The data is shown in an Excel spreadsheet. Names and other sensitive data are not shown.

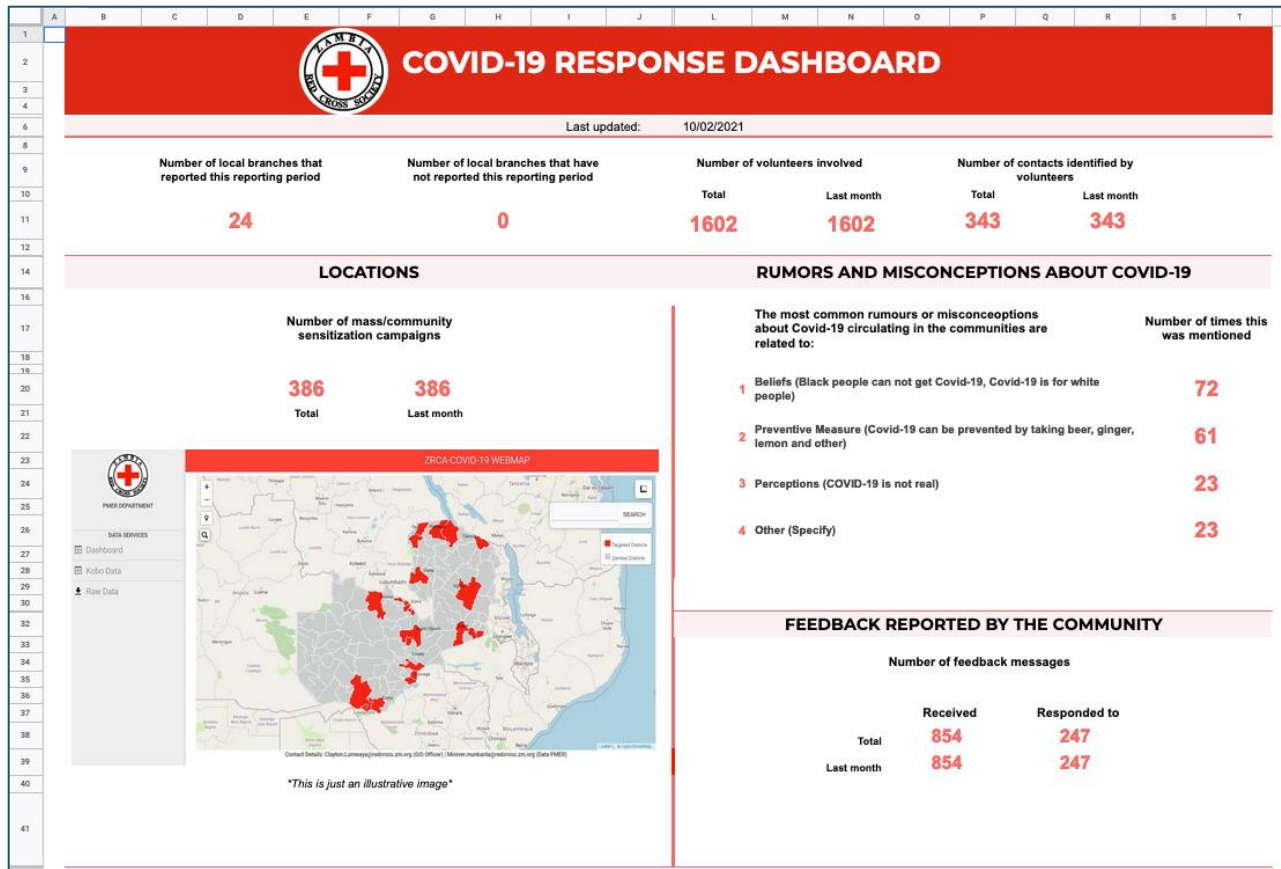


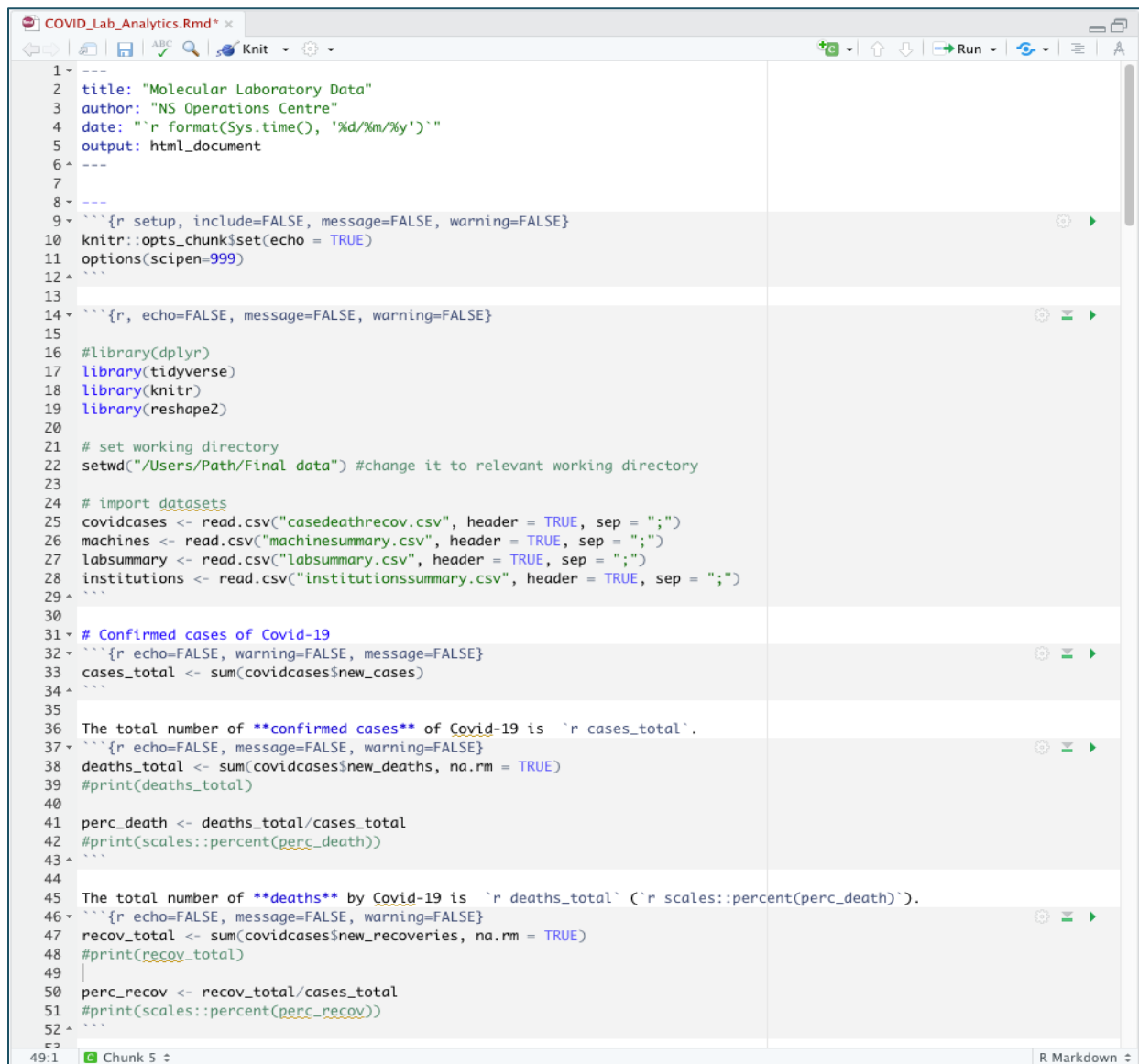
Figure 2 • This screenshot shows an example of how the collected data can be visualized. Here, the visualization is done by using a spreadsheet-based program, such as Excel or Google Sheets.

Data reporting tools

The R markdown report script

The R markdown report script `COVID_Lab_Analytics.Rmd` is a script written in the R programming language. The user can run the script in their preferred environment (e.g., R Studio) to create the report.

Below we showcase the script used for creating a report that displays the number of COVID-19 cases in the Philippines (**Figure 3**). We also give an example of the input data (**Figure 4**) and an example of the produced report (**Figure 5**).



```
1 ---
2 title: "Molecular Laboratory Data"
3 author: "NS Operations Centre"
4 date: "`r format(Sys.time(), '%d/%m/%y')`"
5 output: html_document
6 ---
7 ---
8 ---
9 ```{r setup, include=FALSE, message=FALSE, warning=FALSE}
10 knitr::opts_chunk$set(echo = TRUE)
11 options(scipen=999)
12 ```
13
14 ```{r, echo=FALSE, message=FALSE, warning=FALSE}
15
16 #library(dplyr)
17 library(tidyverse)
18 library(knitr)
19 library(reshape2)
20
21 # set working directory
22 setwd("/Users/Path/Final data") #change it to relevant working directory
23
24 # import datasets
25 covidcases <- read.csv("casedeathrecov.csv", header = TRUE, sep = ";")
26 machines <- read.csv("machinesummary.csv", header = TRUE, sep = ";")
27 labsummary <- read.csv("labsummary.csv", header = TRUE, sep = ";")
28 institutions <- read.csv("institutionssummary.csv", header = TRUE, sep = ";")
29 ```
30
31 # Confirmed cases of Covid-19
32 ```{r echo=FALSE, warning=FALSE, message=FALSE}
33 cases_total <- sum(covidcases$new_cases)
34 ```
35
36 The total number of confirmed cases of Covid-19 is `r cases_total`.
37 ```{r echo=FALSE, message=FALSE, warning=FALSE}
38 deaths_total <- sum(covidcases$new_deaths, na.rm = TRUE)
39 #print(deaths_total)
40
41 perc_death <- deaths_total/cases_total
42 #print(scales::percent(perc_death))
43 ```
44
45 The total number of deaths by Covid-19 is `r deaths_total` (`r scales::percent(perc_death)`).
46 ```{r echo=FALSE, message=FALSE, warning=FALSE}
47 recov_total <- sum(covidcases$new_recoveries, na.rm = TRUE)
48 #print(recov_total)
49
50 perc_recov <- recov_total/cases_total
51 #print(scales::percent(perc_recov))
52 ```
53
54 ==>
```

Figure 3 • This screenshot shows part of the R markdown report script that creates the report for the daily number of COVID-19 cases. The file is opened in R Studio.

	date	new_cases	cumulative_cases	X.increase_cases	new_deaths	cumulative_deaths	X.increase_deaths	new_recoveries	cumulative_recoveries	X.increase_recoveries
1	12-05-20	264	11350	2%	25	751	3%	107	2106	5%
2	11-05-20	292	11086	3%	7	726	1%	75	1999	4%
3	10-05-20	184	10794	2%	15	719	2%	82	1924	4%
4	09-05-20	147	10610	1%	8	704	1%	108	1842	6%
5	08-05-20	120	10463	1%	11	696	2%	116	1734	7%
6	07-05-20	339	10343	3%	27	685	4%	112	1618	7%
7	06-05-20	320	10004	3%	21	658	3%	98	1506	7%
8	05-05-20	199	9684	2%	14	637	2%	93	1408	7%
9	04-05-20	262	9485	3%	16	623	3%	101	1315	8%
10	03-05-20	295	9223	3%	4	607	1%	90	1214	8%
11	02-05-20	156	8928	2%	24	603	4%	40	1124	4%
12	01-05-20	284	8772	3%	11	579	2%	41	1084	4%
13	30-04-20	276	8488	3%	10	568	2%	20	1043	2%
14	29-04-20	254	8212	3%	28	558	5%	48	1023	5%
15	28-04-20	181	7958	2%	19	530	4%	43	975	5%
16	27-04-20	198	7777	3%	10	511	2%	70	932	8%
17	26-04-20	285	7579	4%	7	501	1%	70	862	9%
18	25-04-20	102	7294	1%	17	494	4%	30	792	4%
19	24-04-20	211	7192	3%	15	477	3%	40	762	6%
20	23-04-20	271	6981	4%	16	462	4%	29	722	4%
21	22-04-20	111	6710	2%	9	446	2%	39	693	6%
22	21-04-20	140	6599	2%	9	437	2%	41	654	7%
23	20-04-20	200	6459	3%	19	428	5%	41	613	7%
24	19-04-20	172	6259	3%	12	409	3%	56	572	11%
25	18-04-20	209	6087	4%	10	397	3%	29	516	6%
26	17-04-20	218	5878	4%	25	387	7%	52	487	12%
27	16-04-20	207	5660	4%	13	362	4%	82	435	23%
28	15-04-20	230	5453	4%	14	349	4%	58	353	20%
29	14-04-20	291	5223	6%	20	335	6%	53	295	22%
30	13-04-20	284	4932	6%	18	315	6%	45	242	23%
31	12-04-20	220	4648	5%	50	297	20%	40	197	25%
32	11-04-20	233	4428	6%	26	247	12%	17	157	12%
33	10-04-20	119	4195	3%	18	221	9%	16	140	13%
34	09-04-20	206	4076	5%	21	203	12%	28	124	29%
35	08-04-20	106	3870	3%	5	182	3%	12	96	14%

Showing 1 to 35 of 104 entries, 10 total columns

Figure 4 • This screenshot shows part of the data loaded in the R markdown report script that creates the report for the daily number of COVID-19 cases. The file is opened in R Studio.

Molecular Laboratory Data

NS Operations Centre

26/05/20

```
##  
## The downloaded binary packages are in  
## /var/folders/h0/w8rjnt110xndp3ztt6gz2dt80000gp/T//RtmpK5UJqN/downloaded_packages
```

```
##  
## The downloaded binary packages are in  
## /var/folders/h0/w8rjnt110xndp3ztt6gz2dt80000gp/T//RtmpK5UJqN/downloaded_packages
```

```
##  
## The downloaded binary packages are in  
## /var/folders/h0/w8rjnt110xndp3ztt6gz2dt80000gp/T//RtmpK5UJqN/downloaded_packages
```

Confirmed cases of Covid-19

The total number of **confirmed cases** of Covid-19 is 11350.

The total number of **deaths** by Covid-19 is 751 (7%).

The total number patients that **recovered** from Covid-19 is 2104 (19%).

The graph below shows the increase and/or decrease in the number of cases, deaths and recoveries over time.

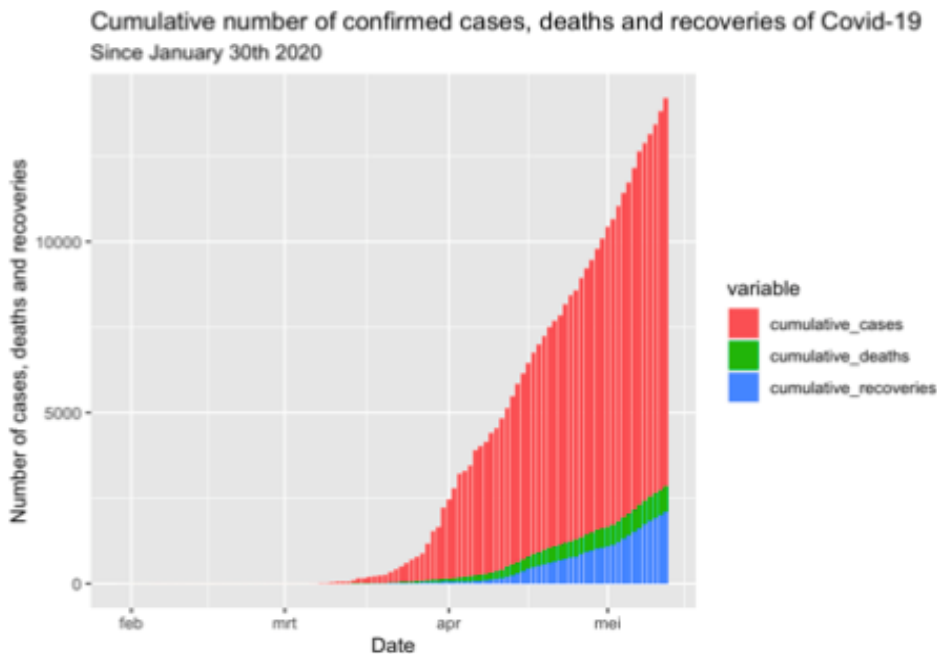


Figure 5 • This screenshot shows a small part the R markdown report file that is generated by the R markdown report script shown above. The report contains graphs and different metrics of the COVID-19 cases in the country in question.

The Excel report template

The Excel report template is an Excel spreadsheet that allows the user to create an accessible overview of the data. The user can insert the data manually, but the file could potentially be linked to a script that inserts the data automatically.

The report template that displays the number of COVID-19 cases in the country of interest and other relevant information can be found in **Figure 6**. As this template was initially built for a French-speaking country, the interface is in French but can be translated to the spoken language of the NS.

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q			
2		NOM DE LA FLAMBÉE	COVID-19		DATE DE LA FLAMBÉE	14/03/2020		RAPPORT JOURNALIER N°	XX		DATE DU RAPPORT	29/05/2020							
3	SITUATION DU PAYS																		
4	Cas confirmés au fil du temps Cumul depuis le 14 mars		Confirmed Cases Over Time													Cumulative			
5			701																
6	[carte du pays]		Source: World Health Organization																
7	Link to national website with updated numbers of COVID-19 cases																		
8	SITUATION RÉPUBLIQUE CENTRAFRICAINE																		
9							VOUS POUVEZ AJOUTER UN NARRATIF ICI SI VOUS LE SOUHAITEZ												
10	NOMBRE DE CAS CONFIRMÉS POSITIF	NOMBRE DE CAS NOUVEAU	NOMBRE DE CAS CONFIRMÉS DÉCÉDÉS	NOMBRE DE CAS EN SOINS	NOMBRE DE CAS STABLE	NOMBRE DE CAS CONFIRMÉS GUÉRIS													
11	54	5	1	X	X	X													
12	PRÉPARATION																		
13	LES PARTIES PRENANTES						VOUS POUVEZ AJOUTER UN NARRATIF ICI SI VOUS LE SOUHAITEZ						LES MATÉRIELS						
14				6 X 10 COMITÉS LOCAUX											10 COMITÉS LOCAUX			25 LITRES POUR RÉSERVES D'EAU	
15	FORMATEURS SUPERVISEURS	VOLONTAIRES AGENTS SENSIBILISATEURS	LEADERS COMMUNICATEURS										MATÉRIELS SENSIBILISATION (MÉGAPHONES+ PILES)	DISPOSITIF DE LAVE MAINS			BIDONS		
16	X	X	X				X	XX			X								
17																			
18	INFO SUPPLÉMENTAIRE																		
19	5																		
20	RÉPONSE / SENSIBILISATION																		
21		TOTAL	BEGOUA	BIMBO	1ER	2ÈME	3ÈME	4ÈME	5ÈME	6ÈME	7ÈME	8ÈME	9ÈME	10ÈME					
22	CARAVANE/ VÉHICULES CICR DANS COMITÉS LOCAUX	X																	

Figure 6 • This screenshot shows part of the Excel report template in which information about the daily number of COVID-19 cases can be imported as well as other relevant information. The file is opened in Excel Microsoft Office.

Data management tools

The volunteer management system

The volunteer management system is created with an online service named EspoCRM and provides the user an accessible way of entering and managing volunteer information. The user can insert the volunteer data manually and the website will update the volunteer archive accordingly.

The volunteer registration template that displays the interface where the user can enter volunteer information can be found in **figure 7** (form in French).

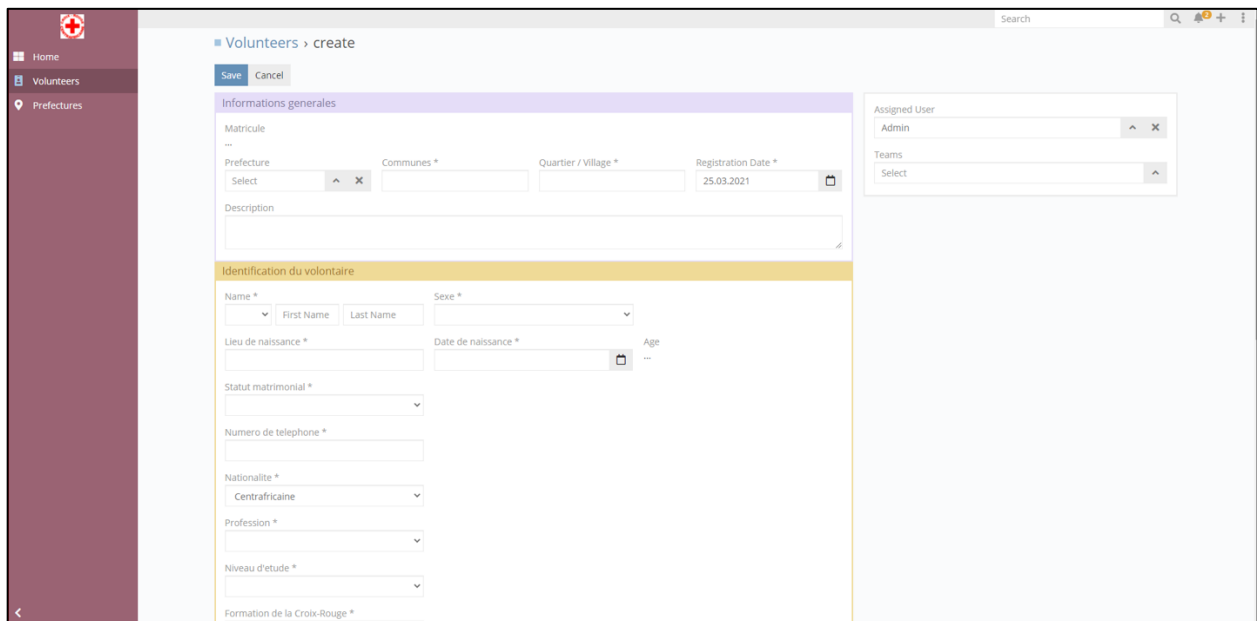


Figure 7 • This screenshot shows part of the online volunteer registration form in which information about the onboarding volunteer can be inserted.

Table of abbreviations

NLRC	The Netherlands Red Cross
NS	National Society/Societies
SARS-CoV-2	Severe Acute Respiratory Syndrome coronavirus 2
COVID-19	The disease caused by the SARS-CoV-2 virus
HQ	Head Quarters

Resources

- <https://opendatakit.org/> open-source software for collecting, managing, and using data in resource-constrained environments. It allows for offline data collection with mobile devices in remote areas. The submission of the data to a server can be performed, when Internet connectivity is available
- <https://www.kobotoolbox.org/> free open-source tool for mobile data collection, available to all. It allows you to collect data in the field using mobile devices such as mobile phones or tablets, as well as with paper or computers
- <https://www.humanitarianresponse.info/en/applications/kobotoolbox/frequently-asked-questions>
- KoBo toolbox [training](#) (internal link)
- 510 [trainings folder](#) (internal link)