Learner's Guide to Program Indicator Analysis

What is this guide?

This guide contains all exercises and detailed steps to perform them related to program indicator analysis session for the Tracker Use Level 1 academy. Please perform each of the exercises when prompted to by your instructors.

Learning objectives for this session

1. Describe what a program indicator is
2. Describe how program indicators are derived
3. Describe the difference between event and enrollment program indicators
4. Understand how program indicators can fill tracker data analysis gaps present in other visualization tools
5. Create visualizations using program indicators derived from tracker data

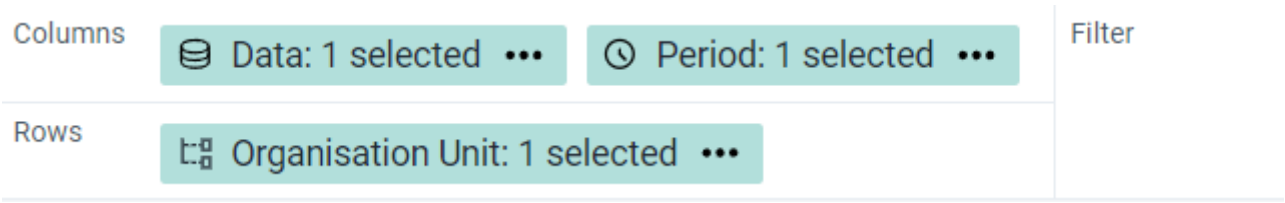
Exercise 1

Create a pivot table in data visualizer using an enrollment program indicator from the COVID-19 Vaccination Registry program

Create a pivot table using a single program indicator in data visualizer. It will have the following inputs:

- Visualization Type : Pivot Table
- Data
  - Data Type : Program Indicator
  - Program : COVID-19 Vaccination Registry program
  - Program Indicator : Underlying conditions
- Period : Last 6 months
- Org Unit : All Level 2 OUs

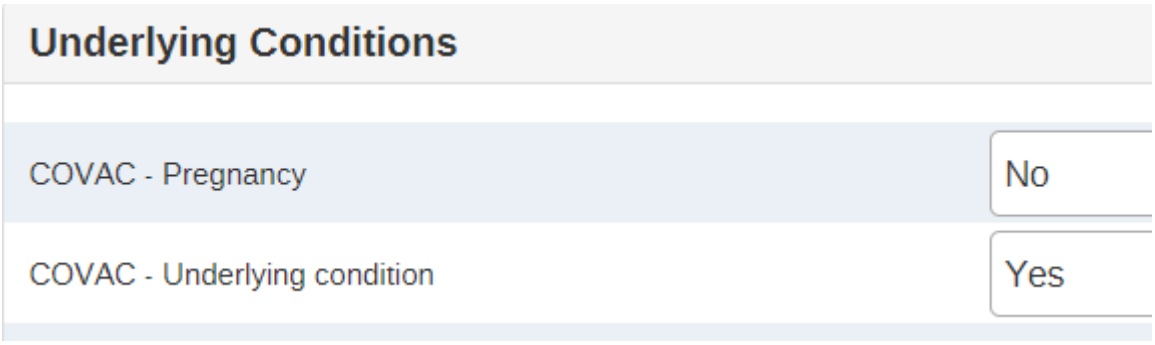
The layout can look like this



The table is saved as "COVAC - Underlying Conditions, last 6 months" as reference.

	Underlying conditions					
	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021
01 Vientiane Capital	23	25	74	74	37	34
02 Phongsali	24	36	75	90	39	34
03 Louangnamtha	15	24	69	65	39	42
04 Oudomxai	45	40	71	103	59	38
05 Bokeo	16	18	47	67	38	28
06 Louangphabang	50	45	145	174	64	55
07 Houaphan	42	49	110	121	47	57
08 Xainyabouli	68	48	134	122	62	69
09 Xiangkhouang	23	22	71	96	48	44
10 Vientiane	31	20	95	101	45	40
11 Bolikhamxai	30	26	55	64	36	36
12 Khammouan	55	32	116	114	74	59
13 Savannakhet	87	95	250	276	135	130
14 Salavan	39	44	117	123	53	79
15 Xekong	15	24	55	61	25	23
16 Champasak	41	46	158	155	82	80
17 Attapu	20	25	54	58	33	28
18 Xaisomboun	12	9	34	36	22	21

This is an enrollment type program indicator that is pulling its information from the data element "COVAC - Underlying conditions."



Enrollment is being used for this program indicator so it does not double or triple count the number of individuals with an underlying condition (remember, this program consists of a single repeated stage).

You can quickly compare the two reports by duplicating your current tab followed by opening the saved table "COVAC - Underlying Conditions (event), last 6 months."

	Underlying conditions					
	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021
01 Vientiane Capital	23	25	74	74	37	34
02 Phongsali	24	36	75	90	39	34
03 Louangnamtha	15	24	69	65	39	42
04 Oudomxai	45	40	71	103	59	38
05 Bokeo	16	18	47	67	38	28
06 Louangphabang	50	45	145	174	64	55
07 Houaphan	42	49	110	121	47	57
08 Xainyabouli	68	48	134	122	62	69
09 Xiangkhouang	23	22	71	96	48	44
10 Vientiane	31	20	95	101	45	40
11 Bolikhamxai	30	26	55	64	36	36
12 Khammouan	55	32	116	114	74	59
13 Savannakhet	87	95	250	276	135	130
14 Salavan	39	44	117	123	53	79
15 Xekong	15	24	55	61	25	23
16 Champasak	41	46	158	155	82	80
17 Attapu	20	25	54	58	33	28
18 Xaisomboun	12	9	34	36	22	21

Enrollment

	Underlying conditions (event)					
	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021
01 Vientiane Capital	33	37	87	122	81	52
02 Phongsali	41	56	91	138	92	60
03 Louangnamtha	24	32	81	110	74	63
04 Oudomxai	59	69	90	142	108	75
05 Bokeo	26	27	57	98	78	53
06 Louangphabang	84	76	172	266	168	100
07 Houaphan	71	74	138	185	109	92
08 Xainyabouli	94	100	164	210	135	103
09 Xiangkhouang	39	37	82	142	101	74
10 Vientiane	47	42	109	162	104	68
11 Bolikhamxai	50	45	69	89	76	56
12 Khammouan	85	69	133	172	144	101
13 Savannakhet	132	152	303	425	290	203
14 Salavan	63	66	148	188	115	107
15 Xekong	25	33	71	97	65	39
16 Champasak	76	76	186	256	185	128
17 Attapu	31	38	69	92	74	47
18 Xaisomboun	17	16	39	51	33	34

Event

You will see the event based indicator reports higher values as it is counting the underlying condition variable for every event; this does not make sense in this scenario if you want to know the total number of unique people with an underlying condition.

Note that you are able to create this same output in event reports using an enrollment pivot table. So far, we have not addressed any gap but are just showing that it is possible to pull filtered tracker data into data visualizer.

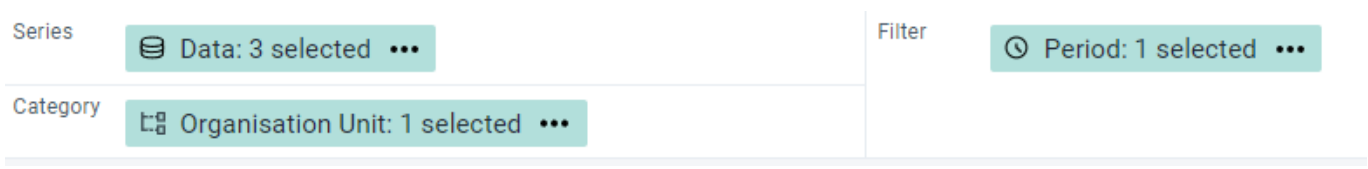
Create a chart using event indicators from different program stages from the COVID-19 Case-based Surveillance Program

One gap that we can address however is creating a pivot table, chart or map using data from different program stages. We can do this in data visualizer for any of the available visualizations using either event or enrollment type program indicators and is not something we could achieve in either event reports or event visualizer.

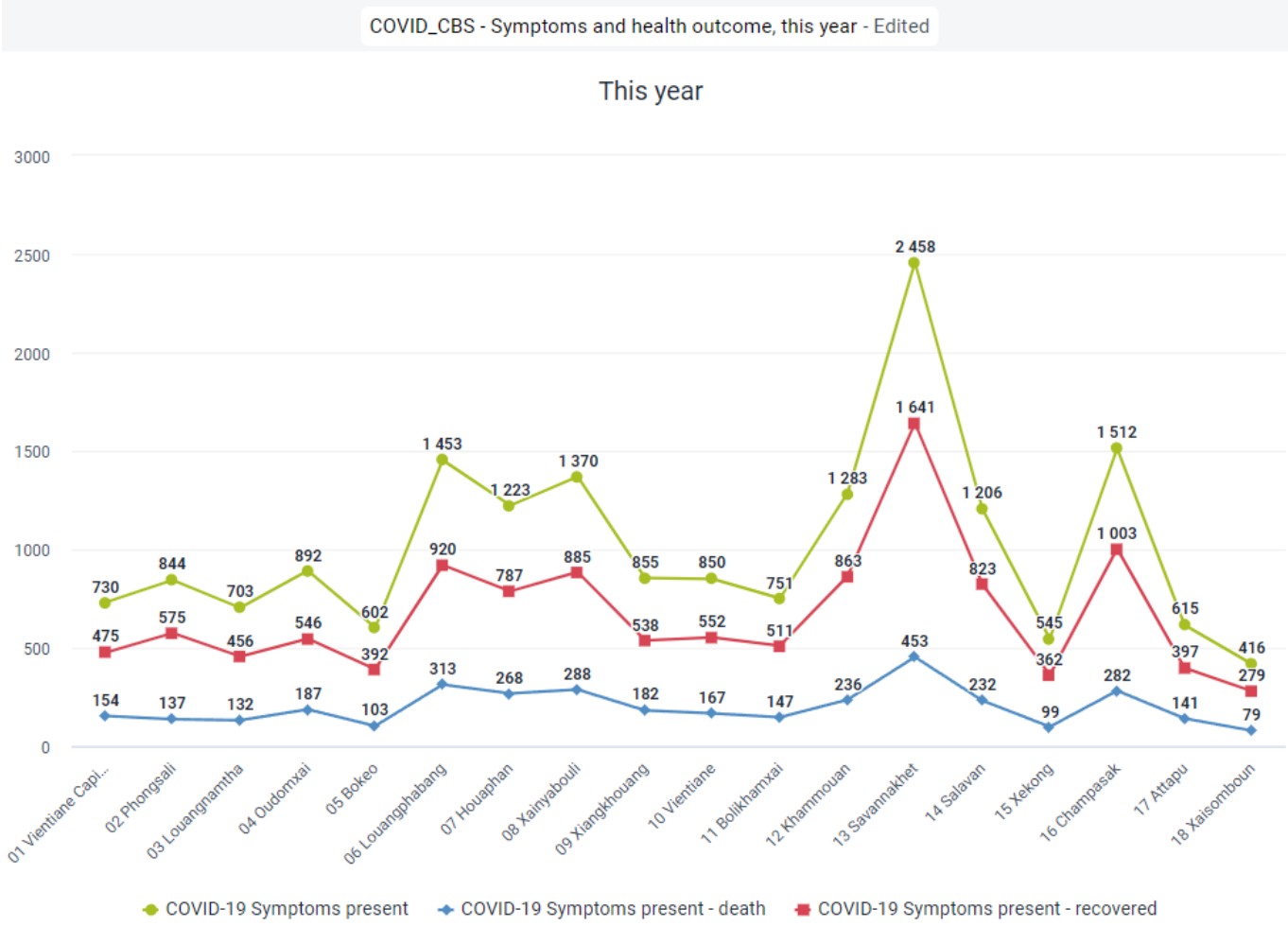
In this example, we will create a line chart with the following inputs:

- Visualization Type : Line Chart
- Data
    - Data Type : Program Indicator
    - Program : COVID-19 Case-based Surveillance Program
    - Program Indicators :
        - COVID-19 Symptoms present
        - COVID-19 Symptoms present - death
        - COVID-19 Symptoms present - recovered
- Period : This Year
- Org Unit : All Level 2 OUs

In order to create this chart, ensure your layout looks like this:



The chart is saved as "COVID_CBS - Symptoms and health outcome, this year" as reference.



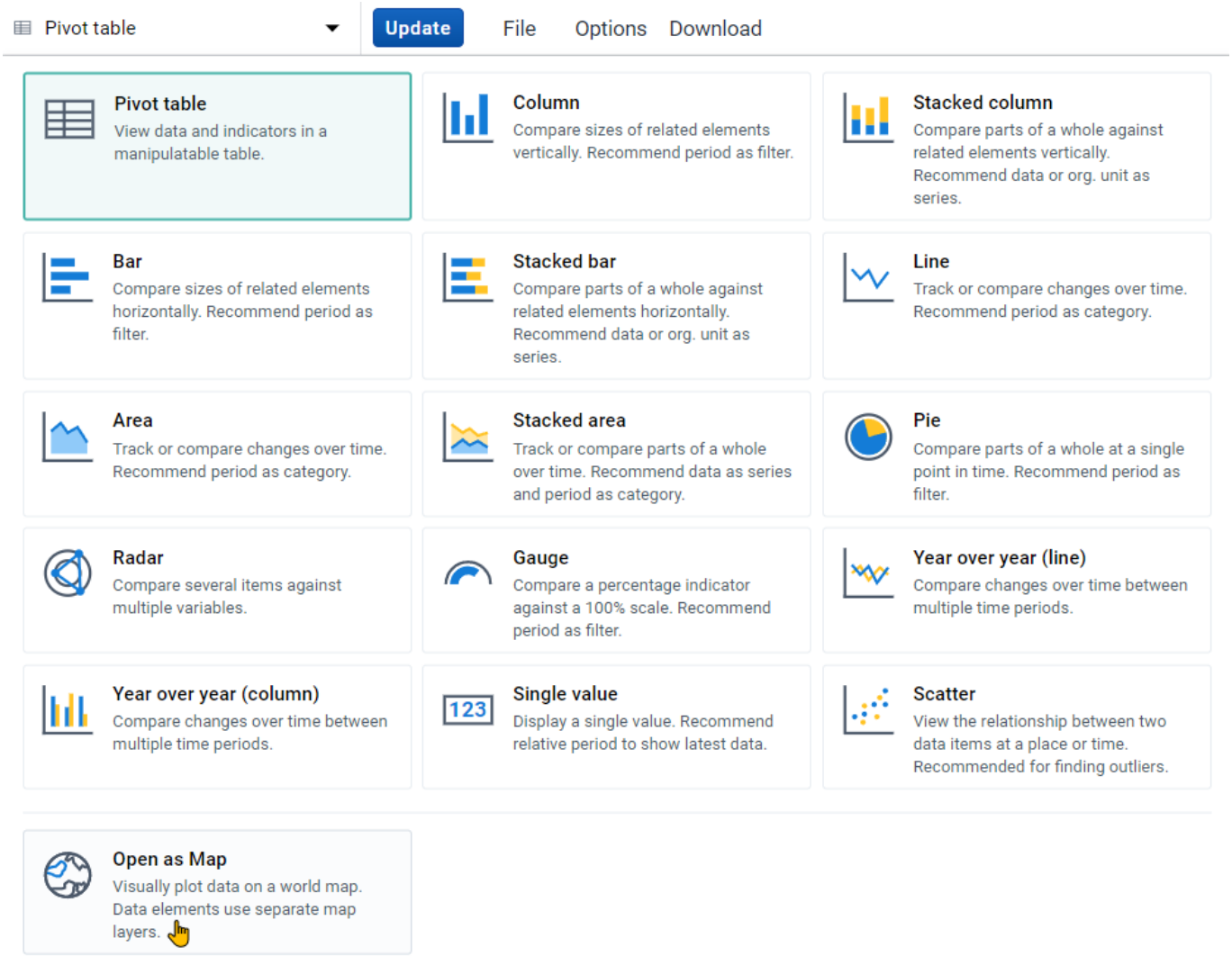
This chart uses enrollment indicators, including combining data from Stage 1 (Clinical exam and diagnosis), where it gets the data on whether or not a person has symptoms, and Stage 4 (Health Outcome), where it gets the information on whether or not the person died or recovered. It is not possible to create this type of output using event visualizer.

You can covert this chart to a pivot table to review that creating pivot tables using data from multiple stages is now possible; this is not possible in event reports.

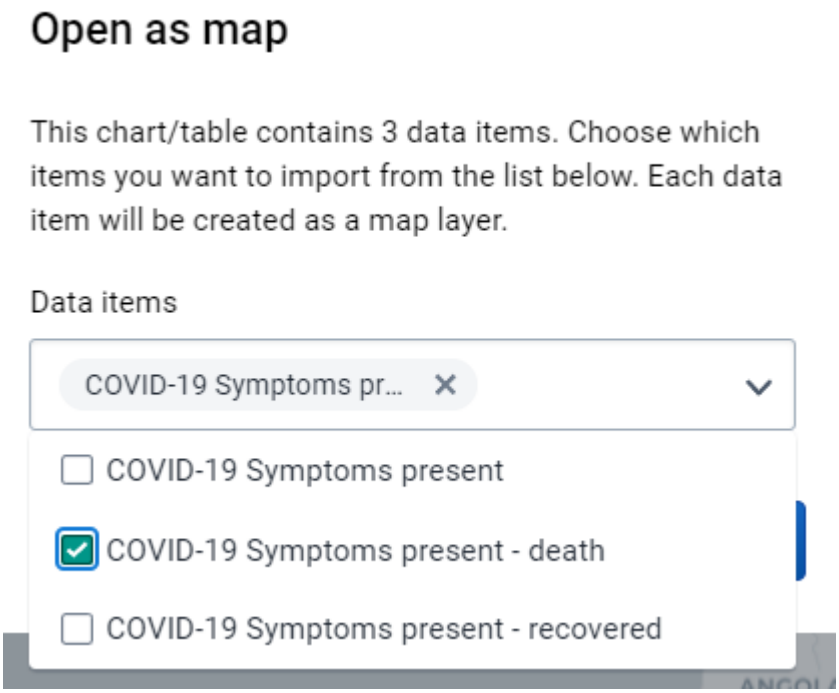
2022			
	COVID-19 Symptoms present	COVID-19 Symptoms present - death	COVID-19 Symptoms present - recovered
01 Vientiane Capital	731	154	475
02 Phongsali	844	137	575
03 Louangnamtha	703	132	456
04 Oudomxai	892	187	546
05 Bokeo	602	103	392
06 Louangphabang	1 453	313	920
07 Houaphan	1 223	268	787
08 Xainyabouli	1 370	288	885
09 Xiangkhouang	855	182	538
10 Vientiane	850	167	552
11 Bolikhamxai	751	147	511
12 Khammouan	1 283	236	863
13 Savannakhet	2 458	453	1 641
14 Salavan	1 206	232	823
15 Xekong	545	99	362
16 Champasak	1 512	282	1 003
17 Attapu	615	141	397
18 Xaisomboun	416	79	279

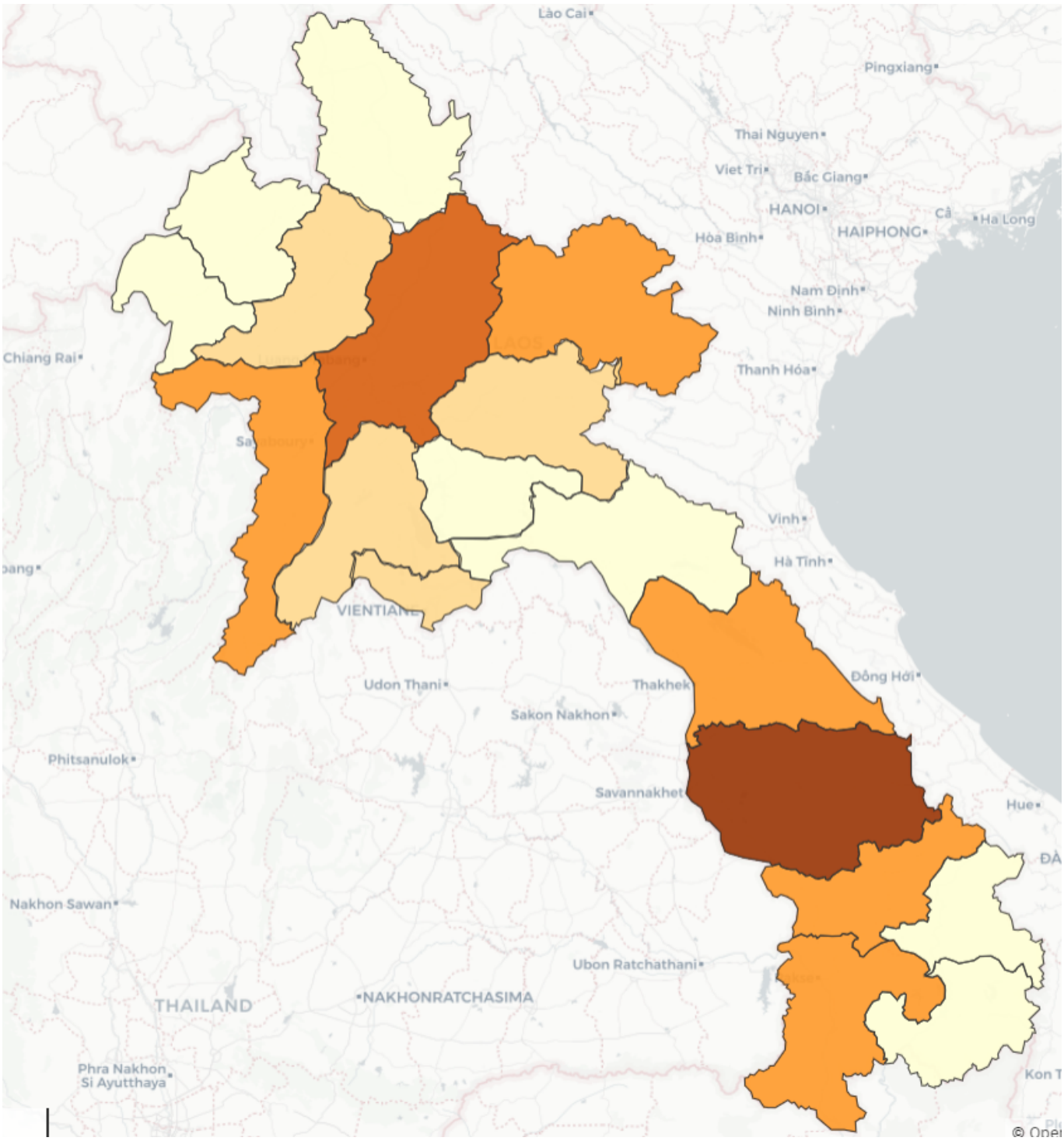
Lastly, you can open this table as a map to show you can now use the thematic layer. The thematic layer opens up a number of additional options when working with your data (we will go over an example where we create a map from scratch using a program indicator in the thematic layer during the next part of this session).

Do this by selecting "Open as Map" from the visualization selection.



When you open this as a map, you will have to select one of the data items used in the chart/table as your primary layer (you can select all 3 but since they are all displaying data at the same OU level, you will in effect only see data from the top layer). Select one of the enrollment indicators (death or recovered) using data from multiple stages to demonstrate that this type of data can be mapped.





Exercise 2

Create a map using a program indicator from the COVID-19 Case-Based Surveillance program

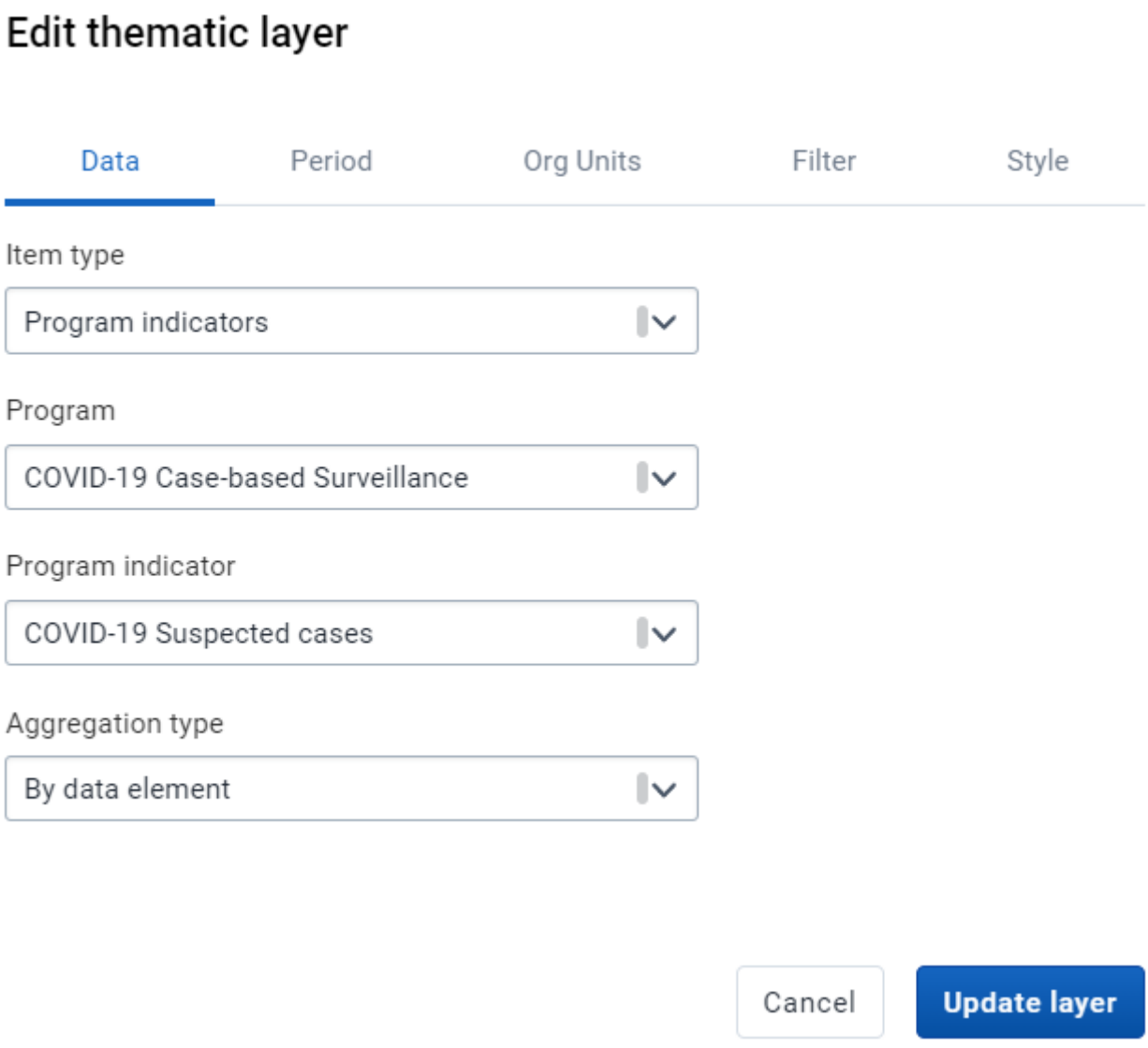
In the maps session, we had discussed how we can use the event and TEI layer to map raw tracker data (also known as event data items). While we can also use the thematic layer when dealing with tracker data, this is often less useful as the number of numeric data elements in a tracker program may be limited.

Through the use of program indicators however we are able to extend maps functionality with tracker data significantly as we can use the thematic layer to its full potential. This includes creating split view and timeline maps and using the available style options (such as creating choropleth and bubble maps) that are not available when using the event and TEI layer as examples.

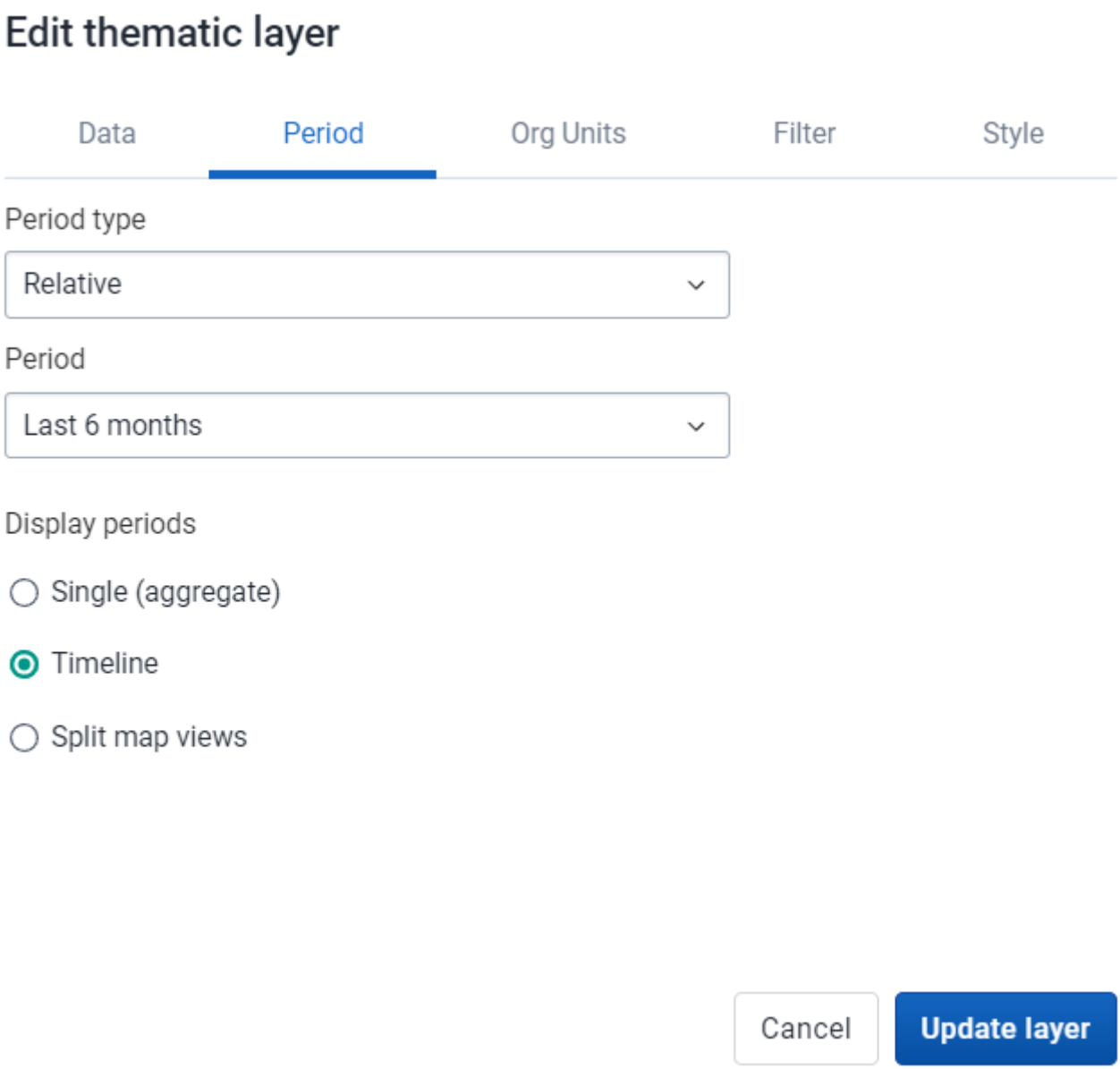
Create a map using the thematic layer with the following inputs:

- Layer Type : Thematic
- Data:
  - Item Type : Program Indicators
  - Program : COVID-19 Case-Based Surveillance
  - Program Indicator : COVID-19 Suspected Cases
  - Leave the aggregation type as default
- Period:
  - Period Type : Relative
  - Period : Last 12 months
  - Display Periods : Timeline
- Org Units : All Level 2 OUs
- Filter : None
- Style : Bubble Map, Single Color Legend

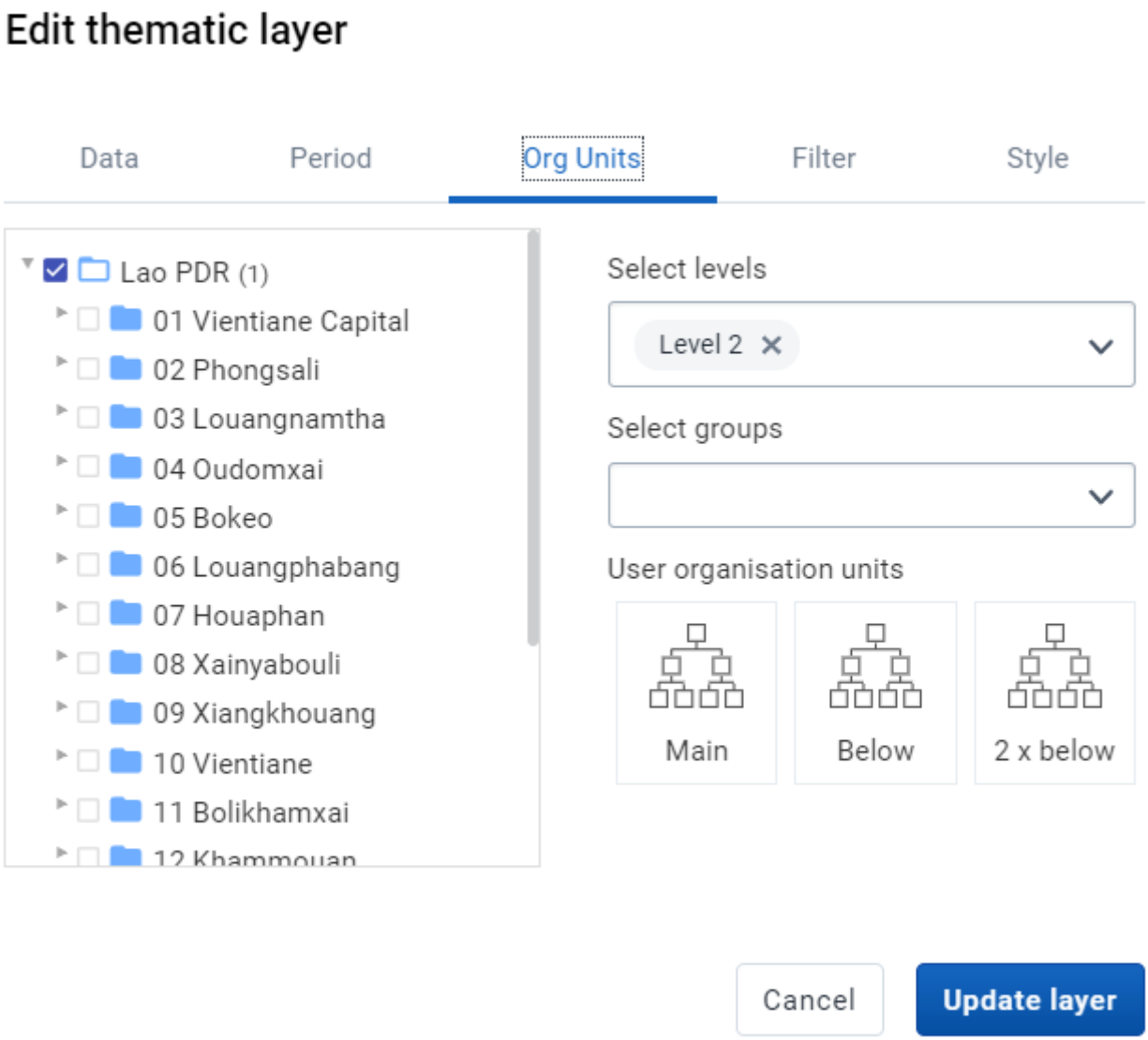
Data Tab



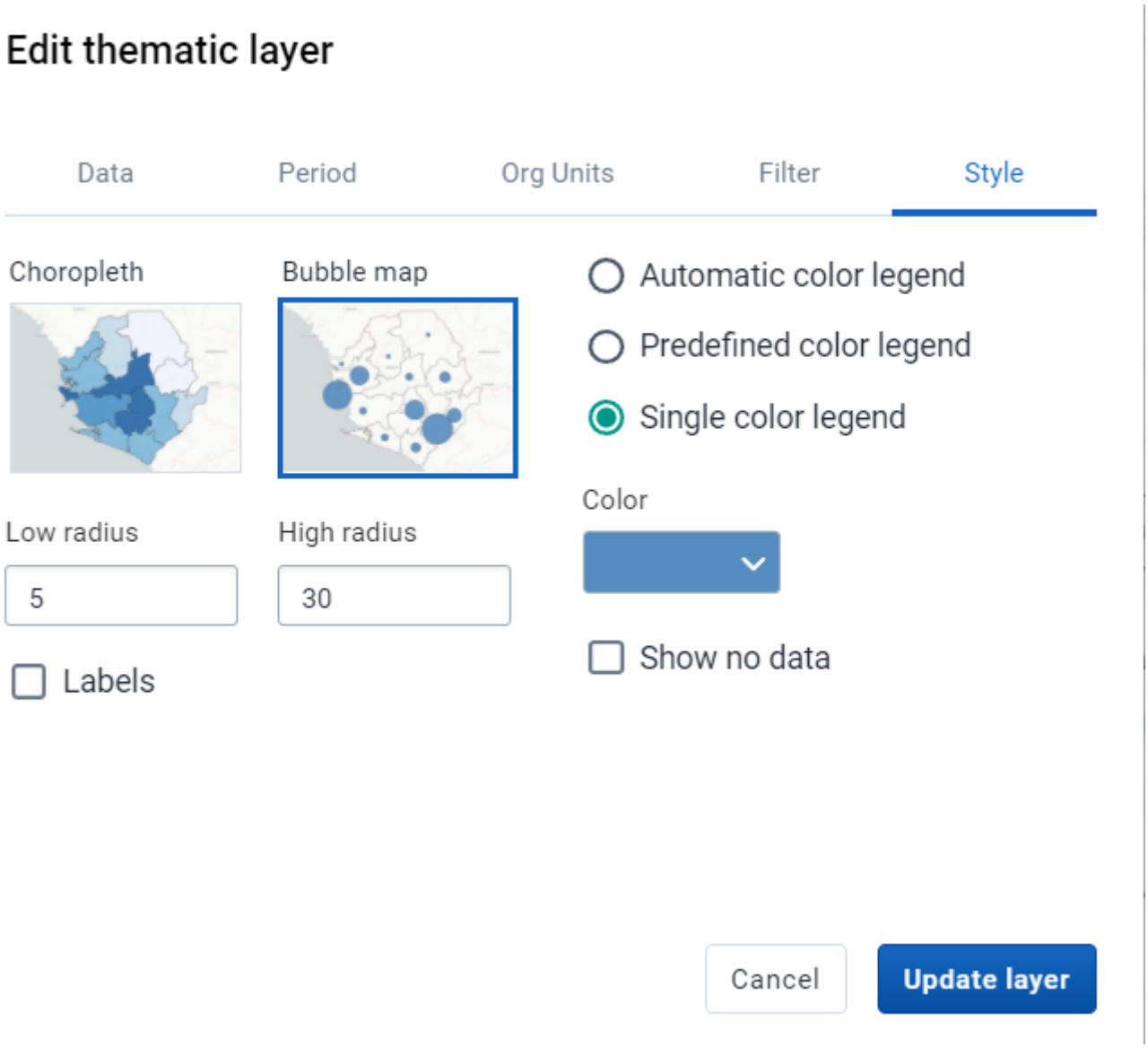
Period Tab



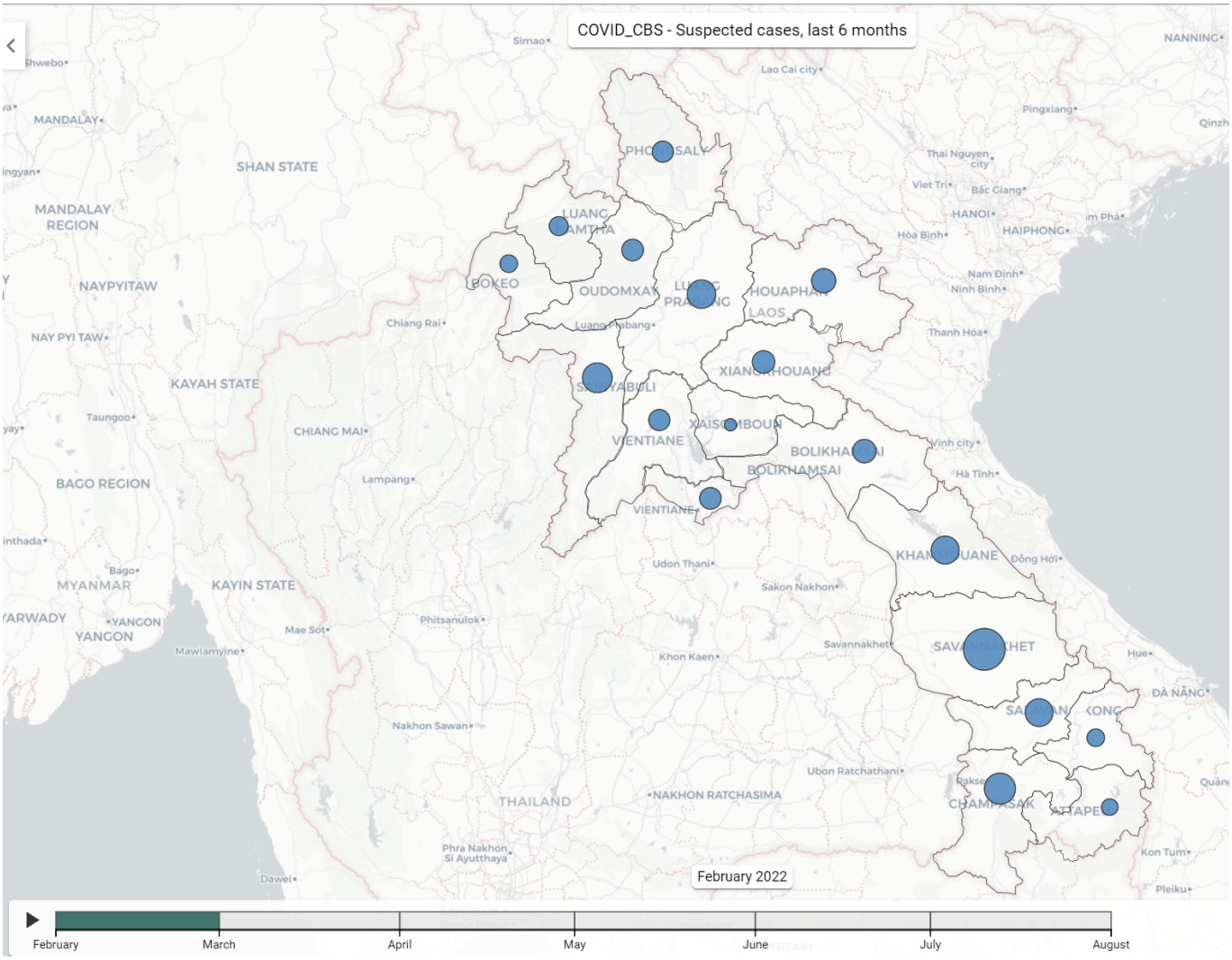
Org Units Tab


Edit thematic layer
Data
Period
Org Units
Filter
Style
Lao PDR (1)
01 Vientiane Capital
02 Phongsali
03 Louangnamtha
04 Oudomxai
05 Bokeo
06 Louangphabang
07 Houaphan
08 Xainyabouli
09 Xiangkhouang
10 Vientiane
11 Bolikhamxai
Select levels
Level 2
Select groups
User organisation units
Main
Below
2 x below
Cancel
Update layer

Style Tab



The map has been saved as "COVID_CBS - Suspected cases, last 12 months" for reference.



You can play back the timeline map. You will see over time the monthly values are increasing in line with the COVID-19 situation occurring globally (the map is showing the total number per month, not the cumulative number; cumulative can be shown however the indicator needs to be configured differently).

Exercise 3

In the line list app, create an enrollment report showing the number of relationships by TEI from the COVID-19 Case-based Surveillance Program

Program indicators can be used in event reports and event visualizer as well as within data visualizer and maps, depending on how they are defined. This is because one program indicator can work on two levels:

1. Through creating a summary output for a single TEI
2. Through creating a summary output for all TEIs within a period/org unit

We will demonstrate these principles using two program indicators that use "Average" as the aggregation type.

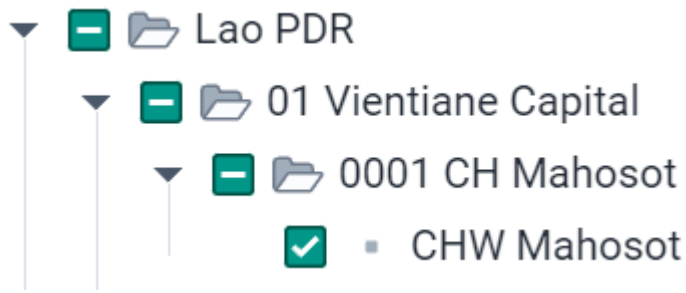
1. COVID-19 Contacts
    1. Summarizes the total number of contacts a single TEI has through the relationships that have been created in tracker capture
    2. Summarizes the average number of contacts for all TEIs based on their enrollment date and the specified period and organisation unit

2. COVID-19 days between onset and consultation
    1. Summarizes the total number of days between onset of symptoms and their initial consultation date for single TEI
    2. Summarizes the average number of days between onset of symptoms and initial consultation date for all TEIs based on their enrollment date and the specified period and organisation unit

Create a line list table with the following inputs:

- Input Type : Enrollment
- Program Dimesions
    - Program : COVID-19 Case-based Surveillance
    - Data
        - Attributes : First Name, Surname
        - Data Element: Sign/Symptoms Present
        - Program Indicator: COVID-19 Contacts
- Org Unit : CHW Mahosot
- Time Dimension : Case Registrtion Date (this is the enrollment date)

Note : here is the location of the org unit in case you are unfamiliar with this hierarchy (01 Vientiane Capital -> 0001 CH Mahosot -> CHW Mahosot)



This table has been saved as "COVID_CBS - Contacts by Person" for reference.

Case Registration Date	Organisation unit name	First Name	Surname	Sign/Symptoms Present	COVID-19 Contacts
2022-02-08	CHW Mahosot	Angela	Campbell	Yes	6
2022-10-01	CHW Mahosot	Bart	Simpson	Yes	3
2022-09-12	CHW Mahosot	Daniel	Morris	No	2
2022-09-30	CHW Mahosot	Matthew	Maker	No	2
2022-06-19	CHW Mahosot	Brandon	Barnes	No	2
2022-05-06	CHW Mahosot	Norma	Walters	Yes	2
2022-07-10	CHW Mahosot	Jorge	Kennedy		2
2022-01-09	CHW Mahosot	Brandi	Chan	Yes	1
2022-03-01	CHW Mahosot	Sydney	Lopez	Yes	1
2022-08-18	CHW Mahosot	Timothy	Malone	Yes	1
2022-02-06	CHW Mahosot	Ryan	Robinson		1
2022-10-23	CHW Mahosot				0
2022-07-12	CHW Mahosot	Randy	Newman		0
2022-04-04	CHW Mahosot	Rachel	Jones	Yes	0
2022-06-18	CHW Mahosot	James	Gonzalez	Yes	0
2022-12-20	CHW Mahosot	Michelle	Brown	Yes	0
2022-04-07	CHW Mahosot	Ryan	Pittman	Yes	0
2022-10-12	CHW Mahosot	Thai	Ng	No	0

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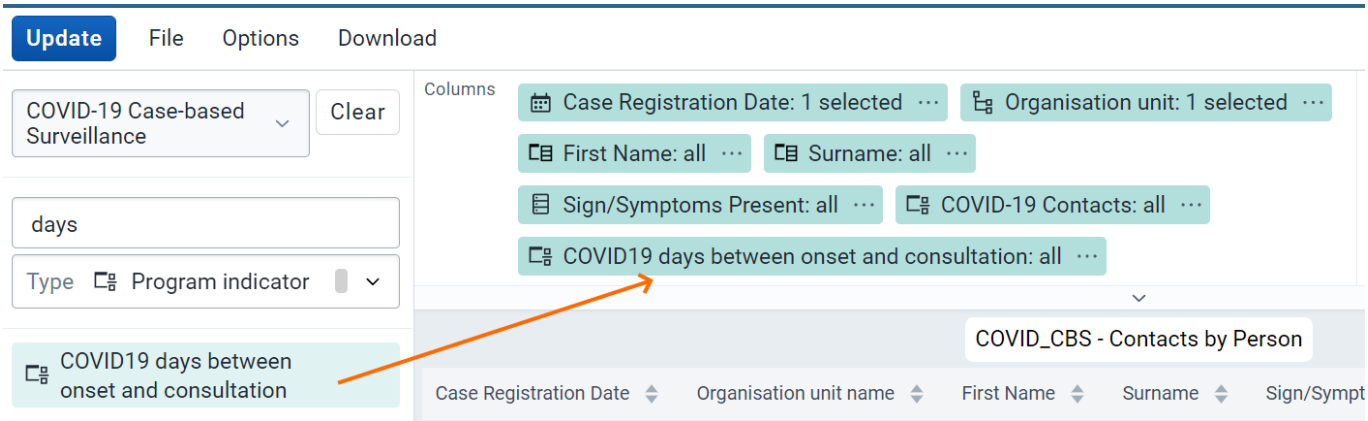
You will notice that you can select program indicators from the data tab; however some program indicators may not work as intended or not give you any meaningful output depending on how they have been configured. For example, for a single TEI, any count based indicators within a single event may not be so helpful as the maximum value they can return is 1 for a single TEI.

Sort the table by the "COVID-19 contacts" column. This is showing the number of contacts each person has had as defined through adding relationships via tracker capture.

Add the program indicator "COVID-19 days between symptoms onset and consultation" to your report and update your line list

From the program dimensions tab, add the PI "COVID-19 days between symptoms onset and consultation"



Update your table.

COVID_CBS - Contacts by Person - Edited

Case Registration Date	Organisation unit name	First Name	Surname	Sign/Symptoms Present	COVID-19 Contacts	COVID19 days between onset and consultation
2022-05-06	CHW Mahosot	Norma	Walters	Yes	2	1
2022-04-07	CHW Mahosot	Ryan	Pittman	Yes	0	1
2022-06-18	CHW Mahosot	James	Gonzalez	Yes	0	1
2022-12-20	CHW Mahosot	Michelle	Brown	Yes	0	1
2022-01-09	CHW Mahosot	Brandi	Chan	Yes	1	2
2022-02-08	CHW Mahosot	Angela	Campbell	Yes	6	2
2022-03-01	CHW Mahosot	Sydney	Lopez	Yes	1	3
2022-04-04	CHW Mahosot	Rachel	Jones	Yes	0	3
2022-08-26	CHW Mahosot	Bart	Simpson	Yes	3	4
2022-08-18	CHW Mahosot	Timothy	Malone	Yes	1	6

We now have an additional program indicator which is showing the number of days between each person's onset of symptoms and their initial consultation.

Create a bar chart showing the average days between onset and consultation across all level 3 OUs within Savannakhet

As discussed previously, these types of program indicators can function on two levels. We have reviewed how we can use various types of program indicators at the individual level, now we can use the same program indicator and create a summary output.

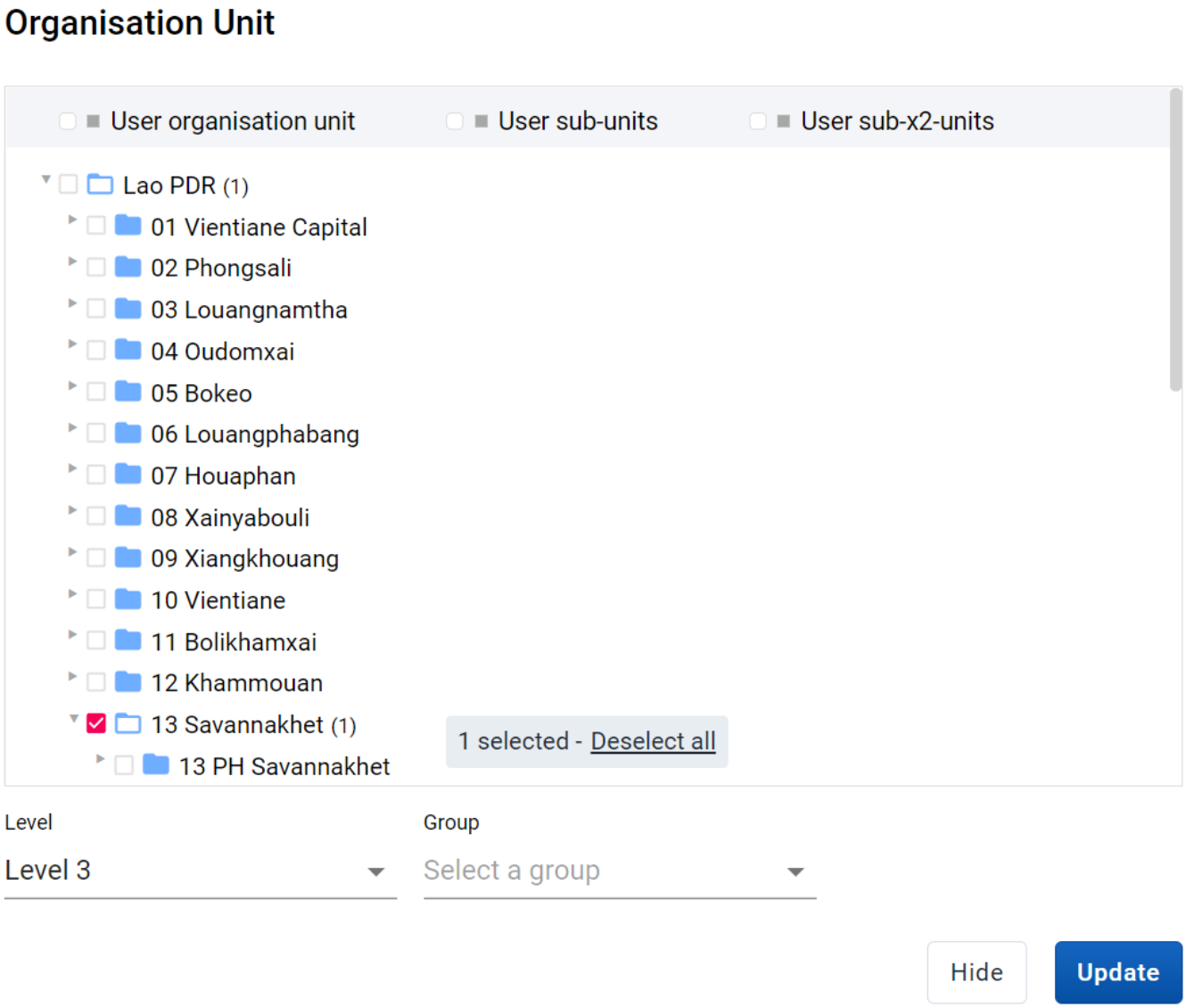
We will use data visualizer to demonstrate this.

> Note: Program indicators are available to select within event visualizer but they often do not result in any output. It is best to use data visualizer to create charts when using program indicators.

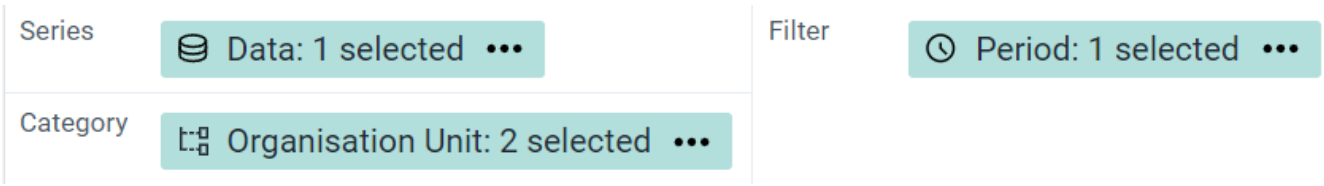
In data visualizer, create a chart with the following inputs:

- Visualization Type : Bar Chart
- Data
    - Data Type : Program Indicator
    - Program : COVID-19 Case-based Surveillance Program
    - Program Indicator : COVID-19 days between onset and consultation
- Period : This Year
- Org Unit : Level 3 OUs within Savannakhet

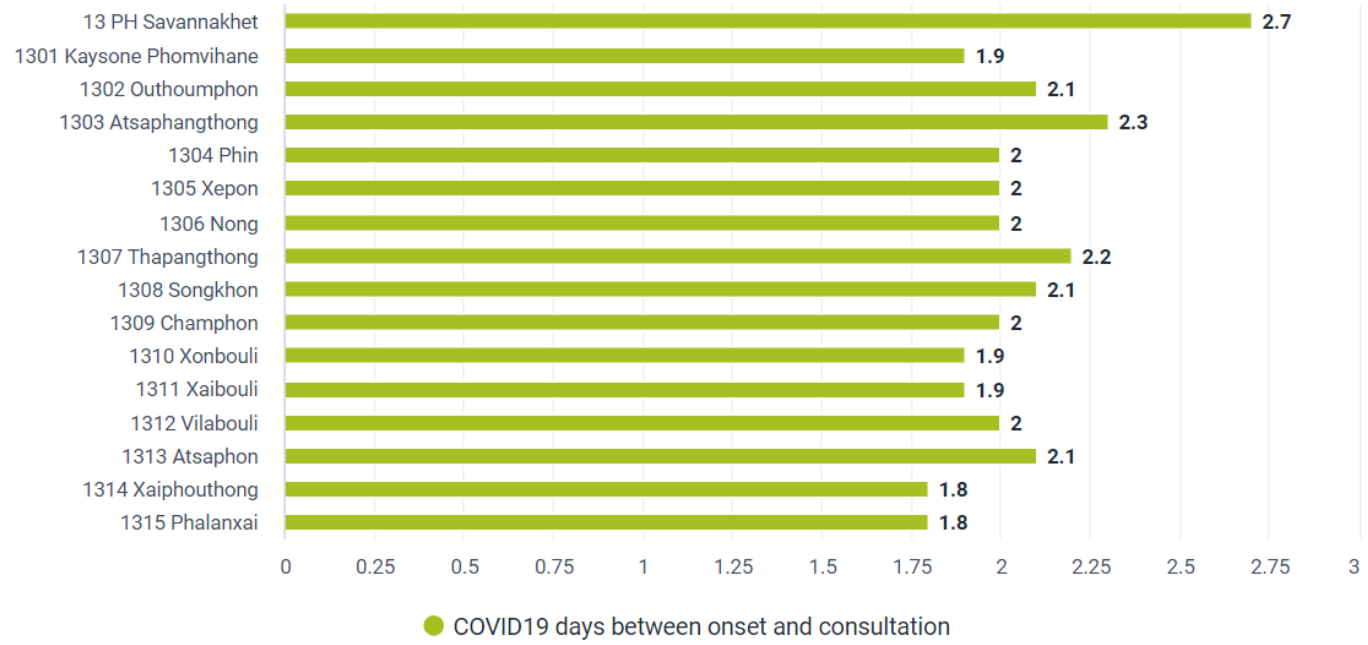
Note : here is the location of the org unit in case you are unfamiliar with this hierarchy



And here is the layout that should be used for the chart



The chart is saved as "COVID_CBS - Average days between symptoms onset and consultation, this year" as reference.



When we review this chart, we no longer see values that are representative of one individual person, but using the same indicator we are able to take an average for all individuals within the organisation units and period that we have selected.

Summary on these two indicators

From these two program indicator examples, we can see that program indicators can have multiple functions at both the individual and aggregate level. These various functions can be quite useful depending on what information you are looking to review within your system. There are many other advanced possibilities that are available when using these types of indicators. The best source of this information will be the documentation.