Using Tableau to Visualize COVID-19 Data

To repeat the old cliché' seeing is believing. Sometimes we must see a pattern before believing there is something worth reporting.

A pivot table that groups countries, sums the number of deaths by month and sub-divides the totals by month, may not reveal spikes or dips as apparently as a line graph or bar chart.

Interactive COVID-19 dashboards such as this one from Tableau Public have allowed users to process more information at a glance than would be the case if they were reading a print or online story.

While there are many easy-to-use visualization programs, some are clearly better than others. Tableau Public falls into the superior category, which is why we are taking the time for this introduction.

Though it may have a steeper learning curve than a popular tool such as Datawrapper or infogram, Tableau Public packs more visual and analytical power in its ability to create a greater variety of visualizations, the calculated fields that we learned in our previous pivot table tutorial, and interactive dashboards.

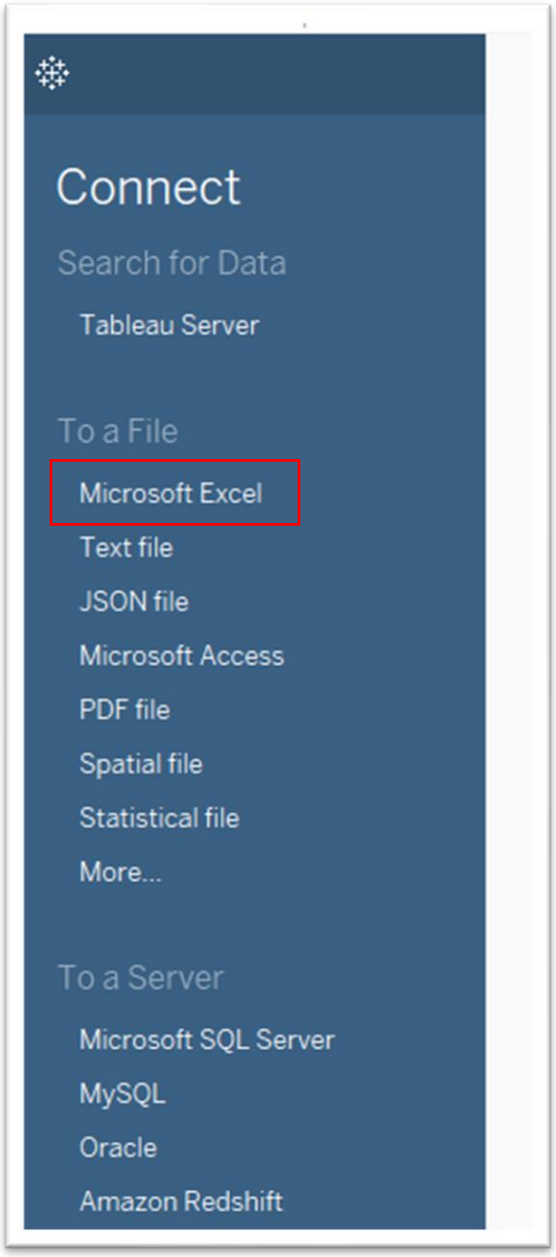
In this tutorial, we will work the most recent COVID-19 data from the European Centre for Disease Prevention and Control website that was the subject of our first two Excel tutorials.

What we will learn:

1. Import tables into Tableau and format columns
2. Create worksheets (a map, and two bar charts for deaths and infections)
3. Create an interactive dashboard
4. Export and embed your graphic

1. Import tables into Tableau and format columns

Open Tableau Public.

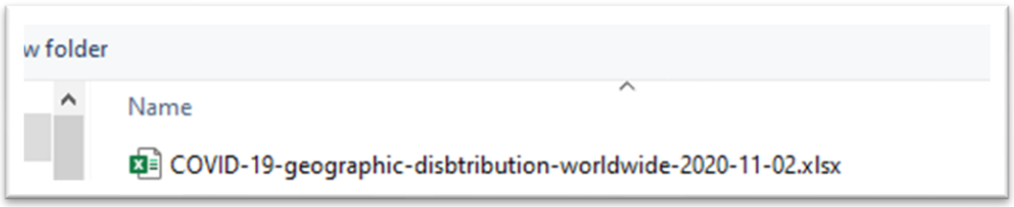


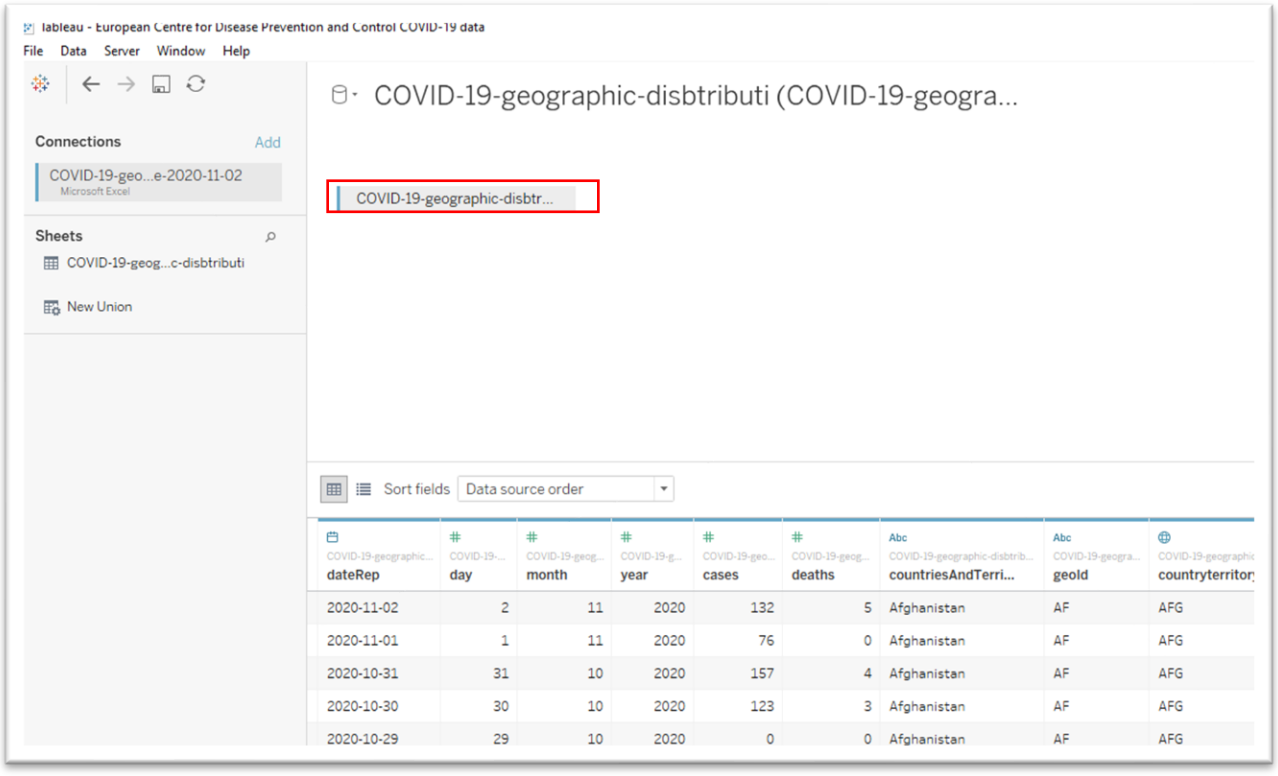
You will see this menu on the left-hand side.

Select “Microsoft Excel.”

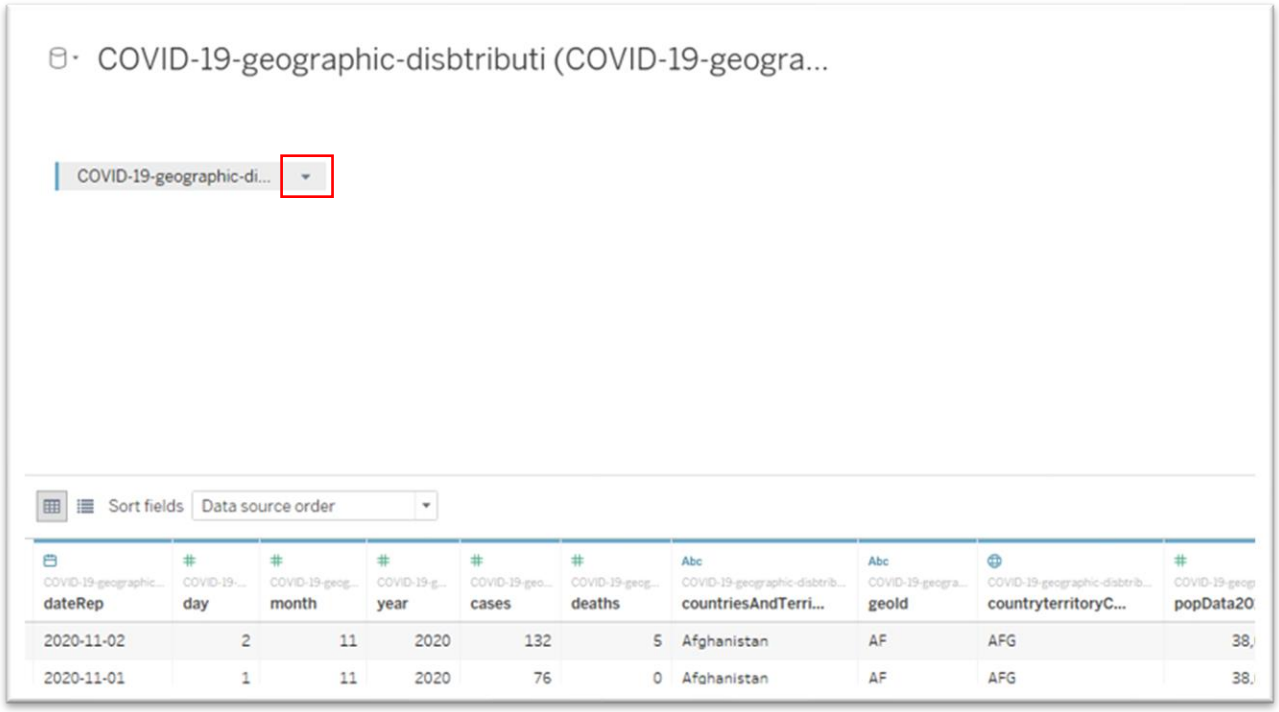
Browse to your folder that contains the COVID-19 Excel workbook from the first two exercises and select. Or you can download the most recent version from the European Centre for Disease Prevention and

Control website. If you choose the latter, your numbers will differ slightly from the ones in the screen grabs that accompany this tutorial, which is working with COVID-19 data downloaded on Nov. 2.

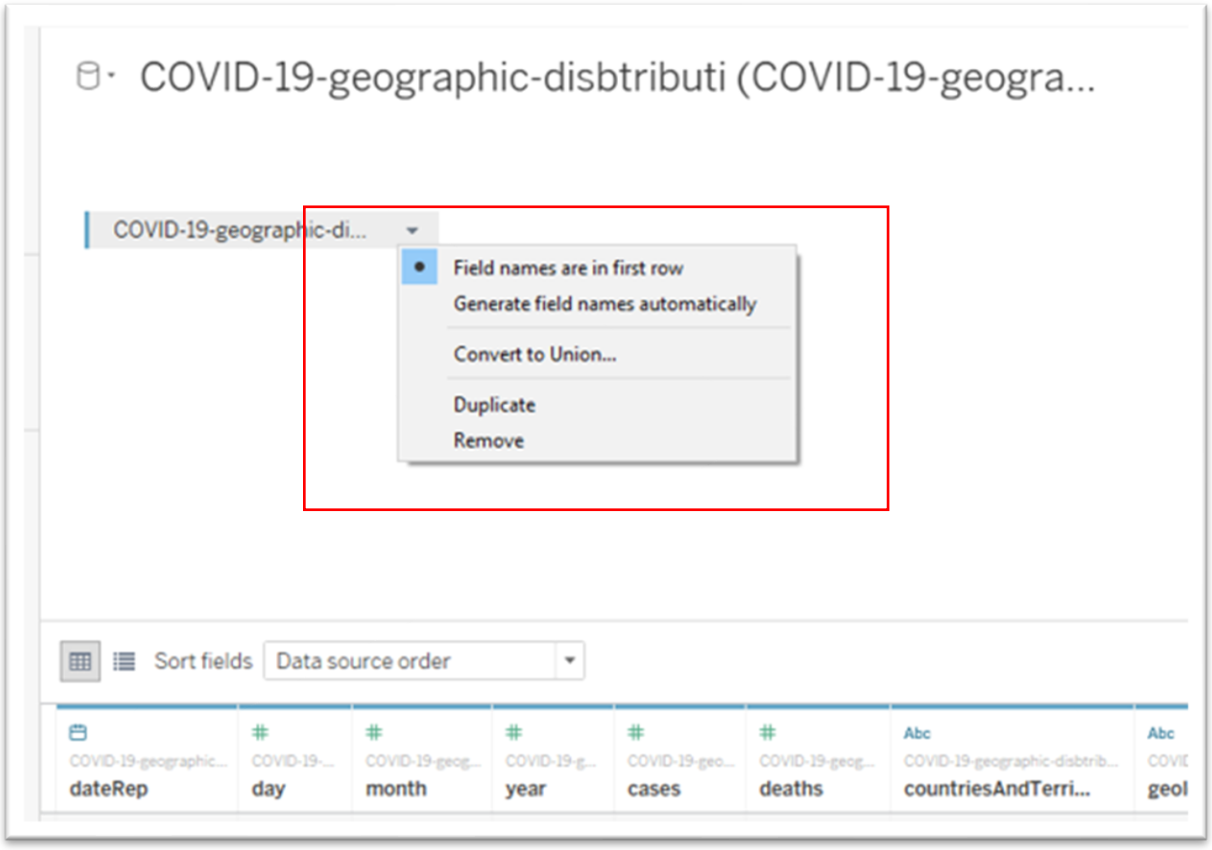




Hover your cursor over the COVID-19 tab above the table until a caret appears on the right-hand side.

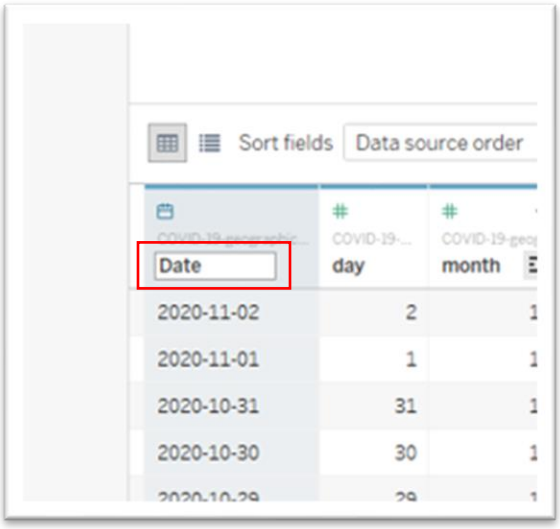


Select the caret on the right side of the “COVID-19-geographic-disbtr” tab to obtain choices from a drop-down menu.



As you can see in the titles in the table, Tableau has correctly guessed that you want the first cell in each row to contain the “field names” or titles. Because this is a clean dataset, the first row does, indeed, contain the column heads. Such would not be the case if we imported a dirty dataset, a no-no when working with data-visualization tools. The cleaner the data, the less work you have to do, though Tableau is equipped more than many of its competitors to do quite a bit of data cleaning.

You can rename the column names by double-clicking the titles and typing.



Save the Tableau file in the same folder that contains your data.

Now, let's look at the column headings.

A closer examination reveals icons across the very top.

The icons tell you how the information in each column is formatted. As we learned in the previous Excel tutorials, formatting numbers is a constant task.

Let's begin with the first column. Selecting the calendar-shaped icon above the date field produces a drop-down menu (much like in Excel)

that reveals the formatting options.

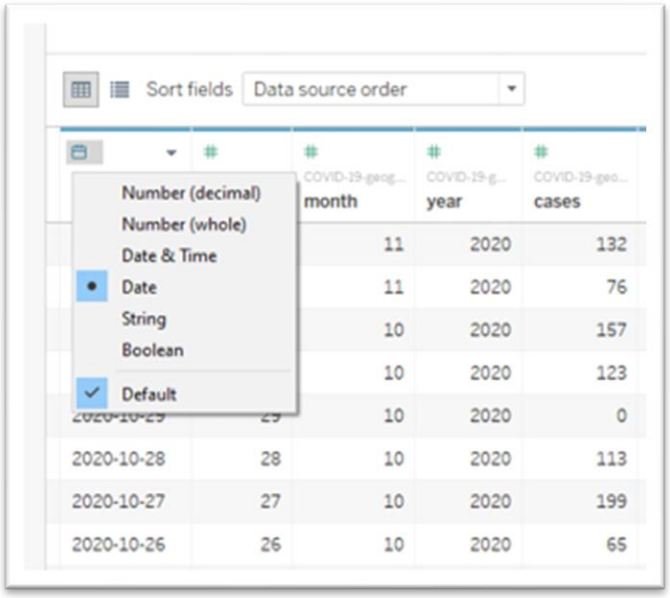


Tableau recognizes the data in the first colums as dates, which is what we want. So, let's keep moving to the right.

The hashtag icons ("#") stand for a number, important because we'll want to perform math on the numbers just like we did in Excel.

The "abc" icon above countries is a problem. Click the icon to find out why.

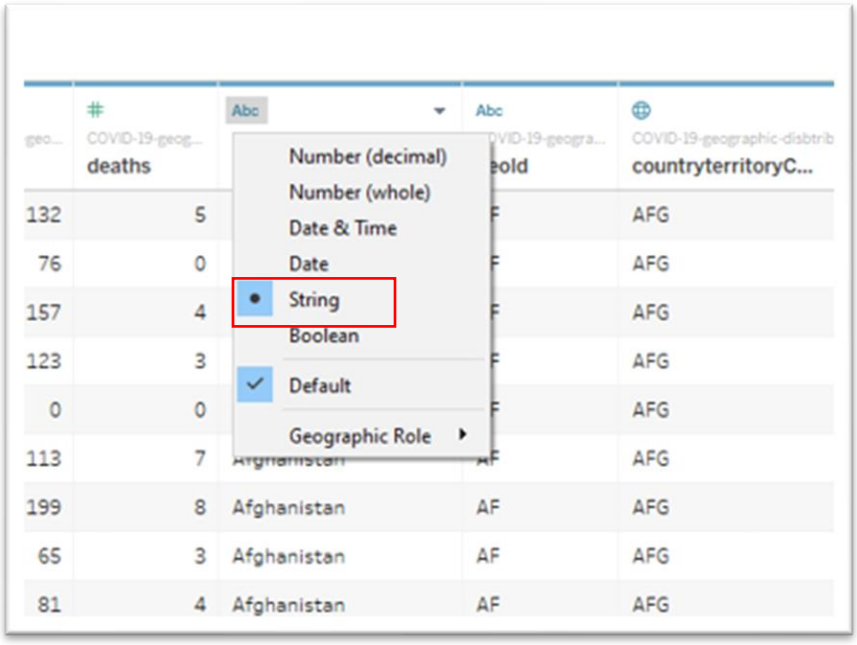
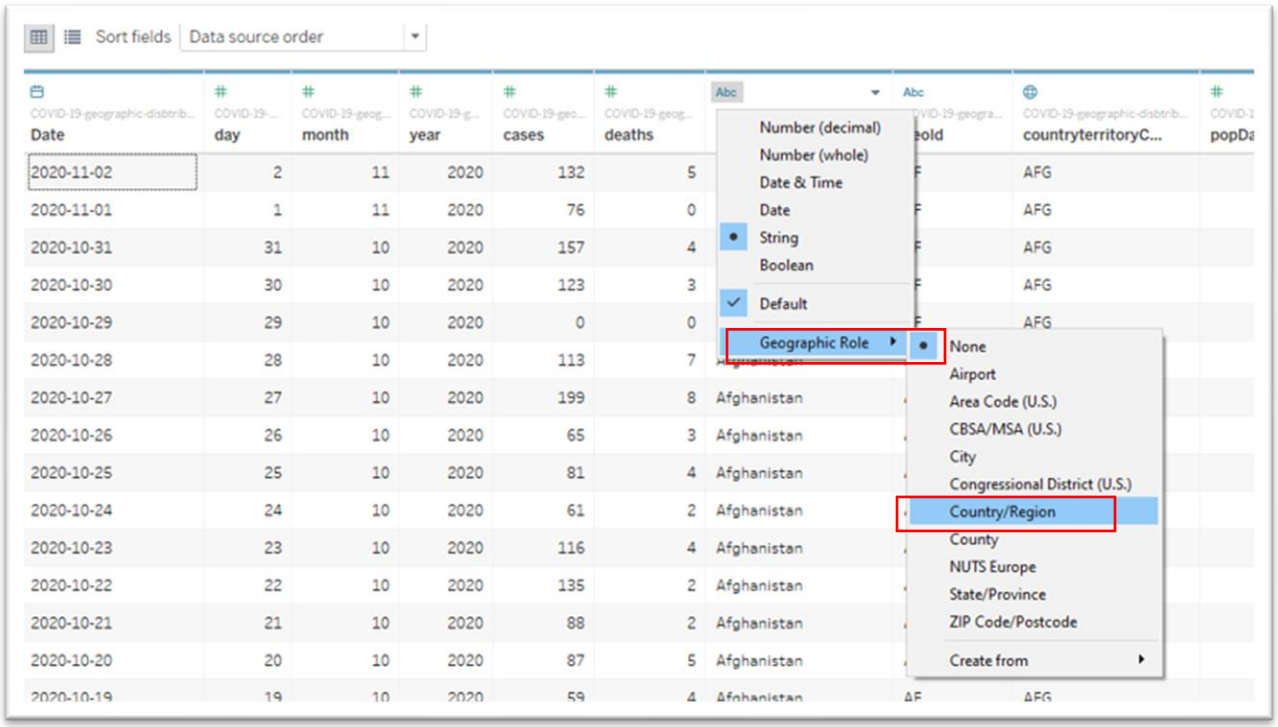


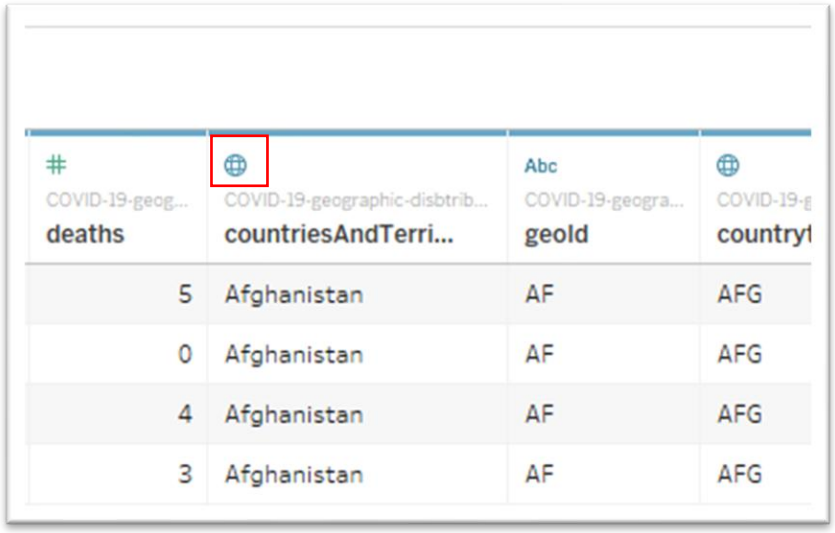
Tableau is interpreting the country names as a “String”, or text.

To allow Tableau to map the countries, we must change the formating to a geographic marker.

Click the arrow to the right of “Geographic Role”.



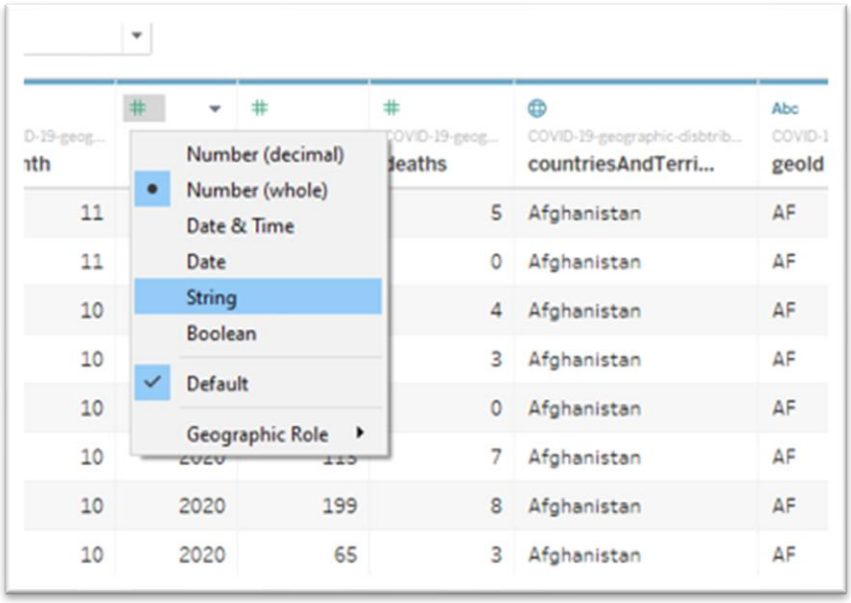
Select “Country/Region.”

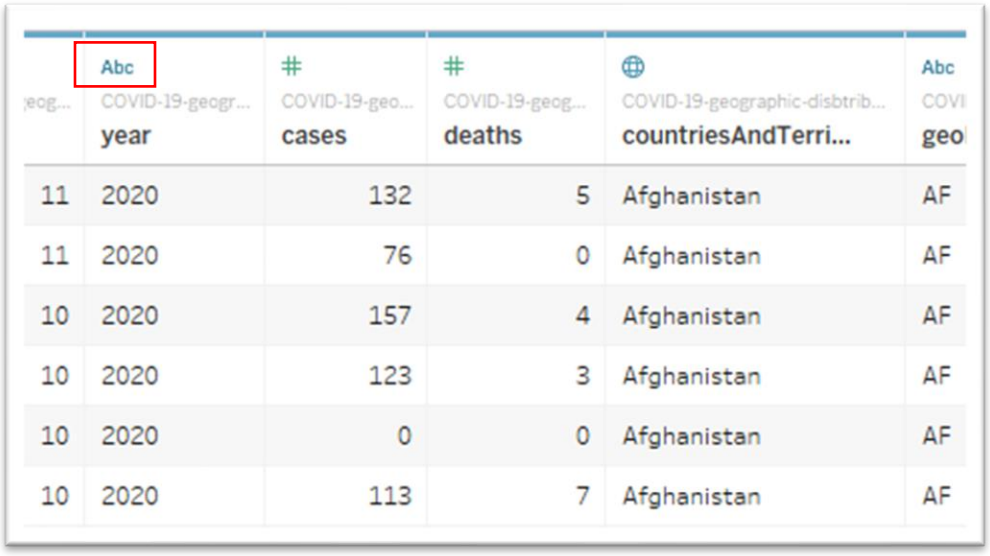


# COVID-19-geog... deaths	COVID-19-geographic-disbtrib... countriesAndTerri...	Abc COVID-19-geogra... geoId	COVID-19-g countryt
5	Afghanistan	AF	AFG
0	Afghanistan	AF	AFG
4	Afghanistan	AF	AFG
3	Afghanistan	AF	AFG

The icon has changed to a globe. Exactly what we want.

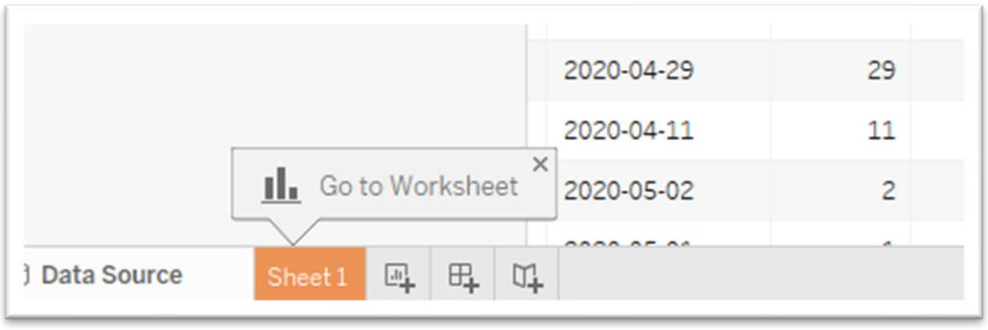
Since we don’t want Tableau to do math on the numbers in the “year” column, let’s reformat them as a “string” or text.





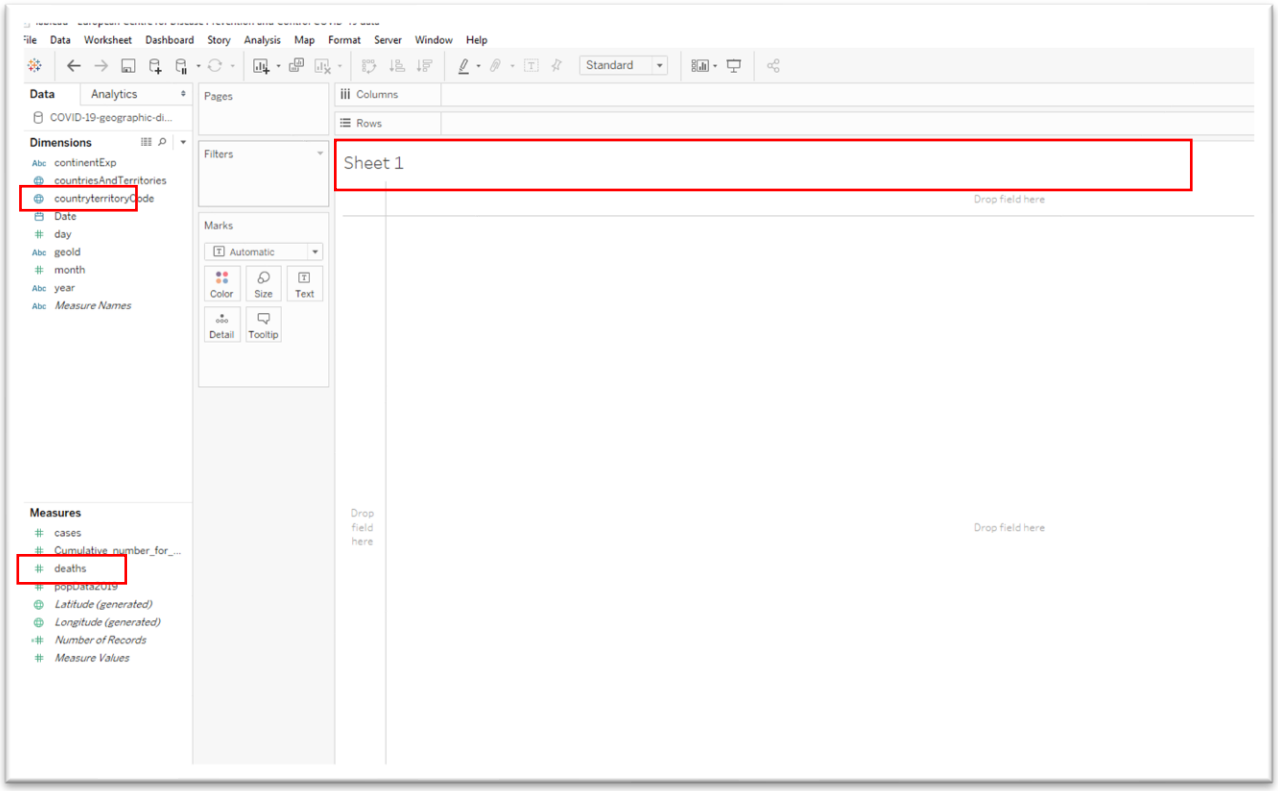
Formating for the other columns is fine. With all the columns properly formatted, we're ready to begin creating visualizations.

At the bottom, you'll notice the first sheet ("Sheet 1") – similar to what you see in Excel -- is highlighted with a prompt.



Clicking "Sheet 1" produces a new worksheet.

2. **Create worksheets (a map, and two bar charts for deaths and infections)**



This interface looks similar to a pivot table in reverse, with a large area for the table itself on the right side (instead of the left in Excel or Google

Sheets) and a smaller, narrower space for the column names on the left (instead of the right side in Excel or Google Sheets).

Measures – at the bottom left – is for columns that contain numbers.

Dimensions is for columns that contain text. If anything is out of place – such as a number in the “Dimensions” section, you can simply drag the icon and drop it to the correct location.

Drag “CountriesAndTerritories” and drop the column header into the largest space to your right.

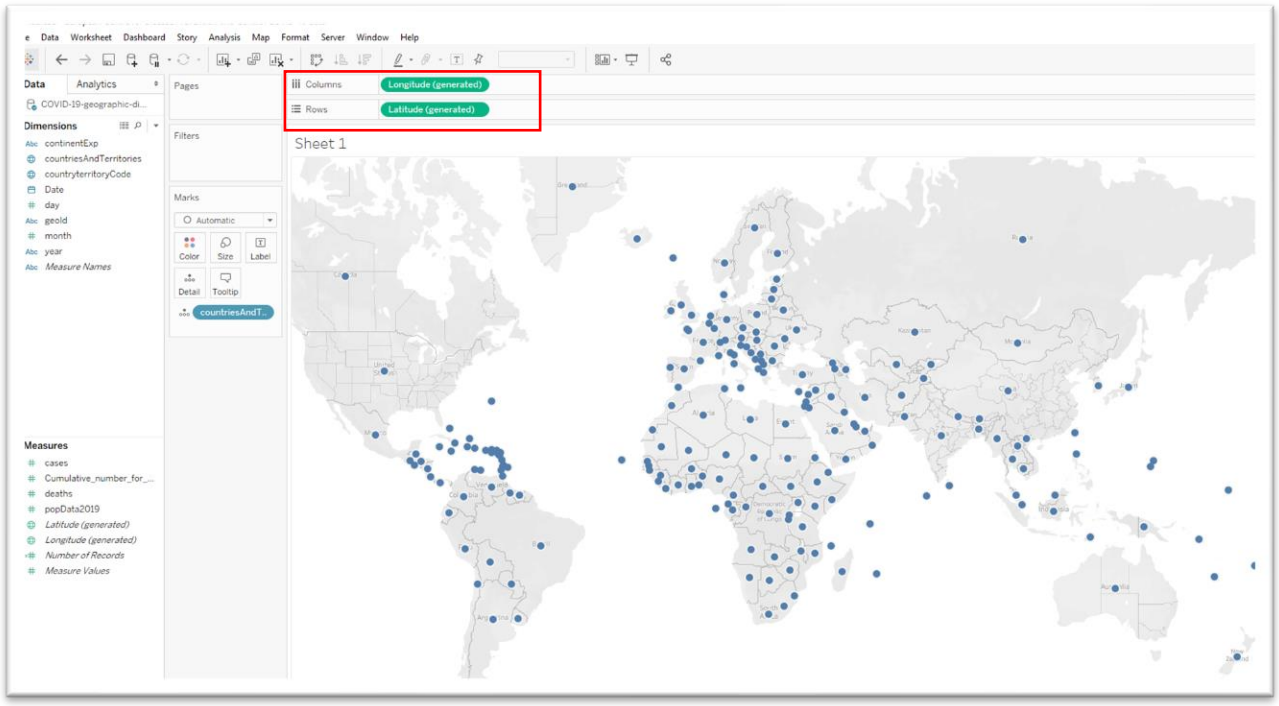
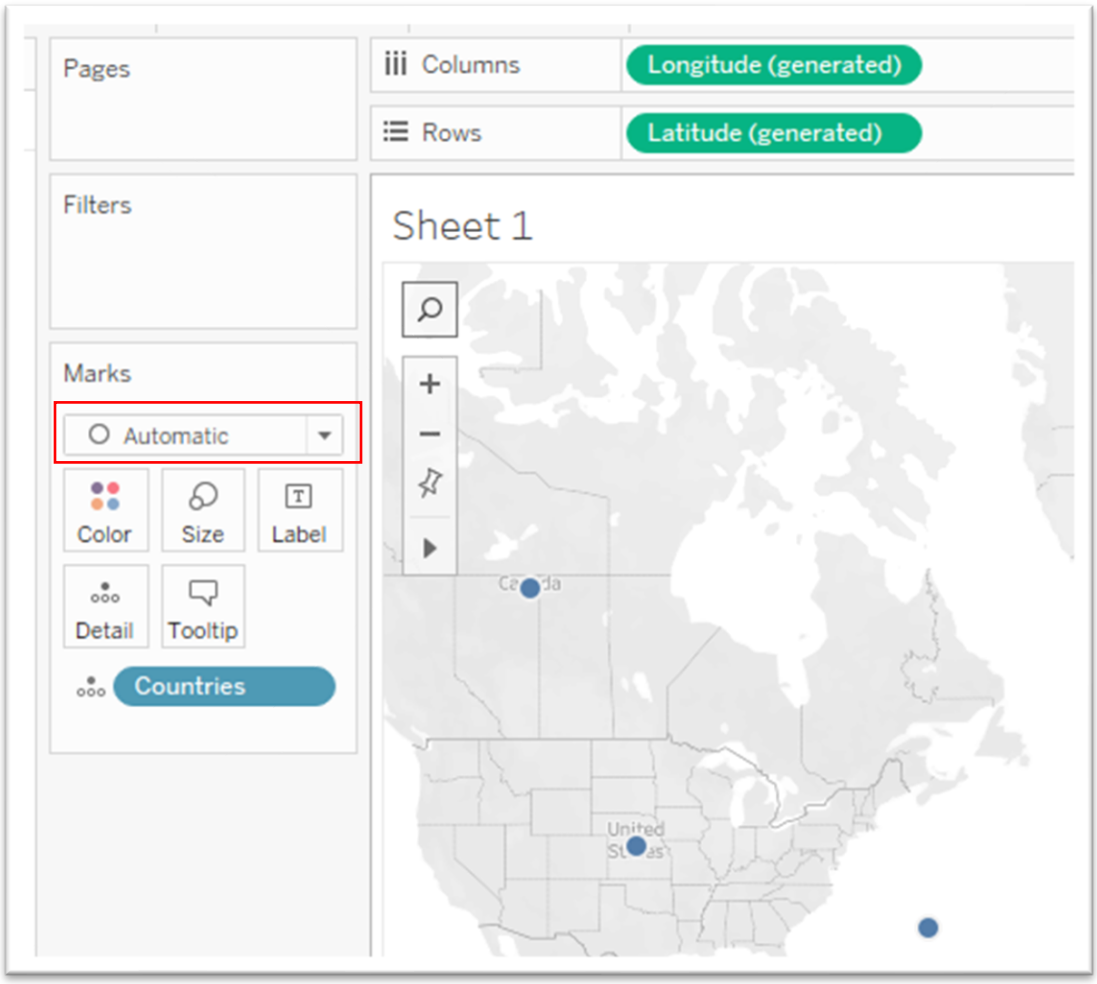


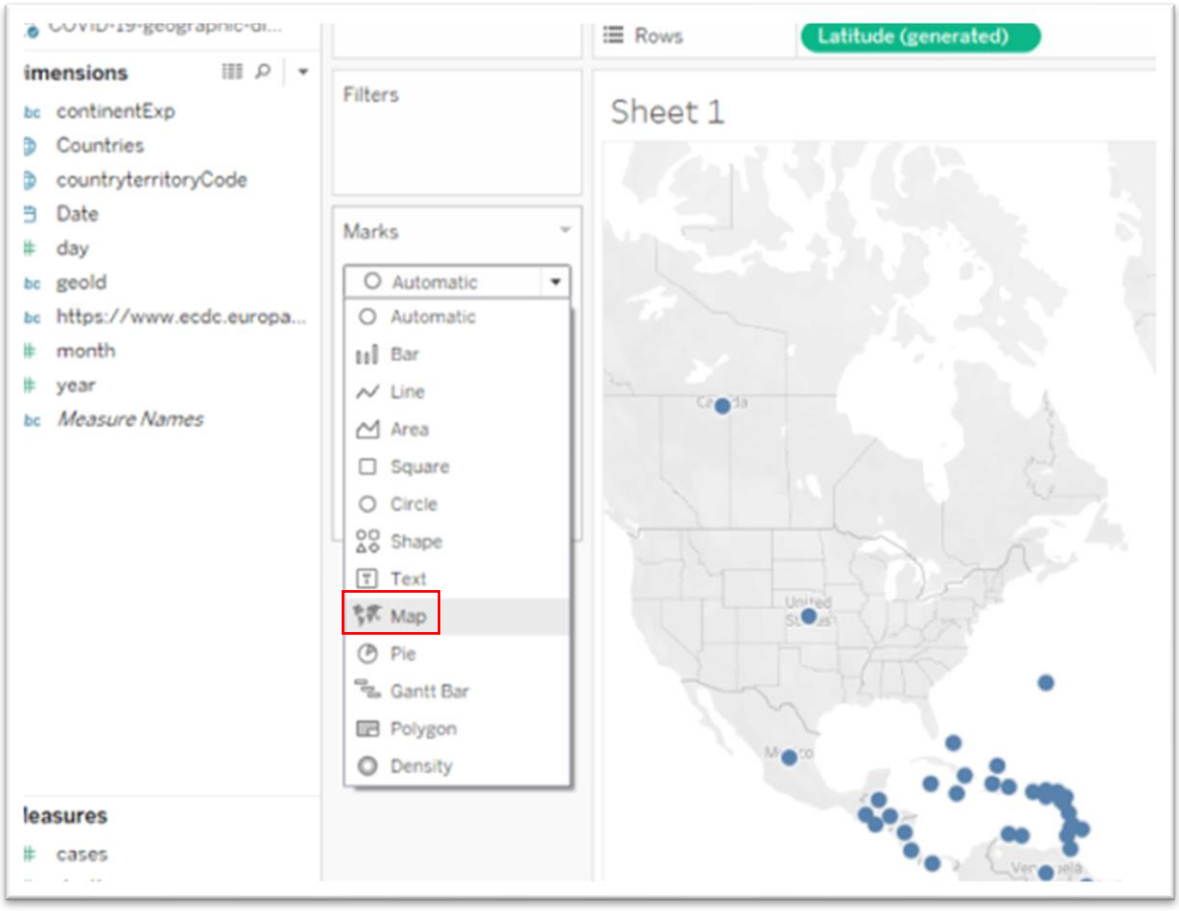
Tableau has placed the longitude and latitude coordinates in the columns and rows, respectively, resulting in the displayed map.

Instead of large dots, we may want a better visualization.

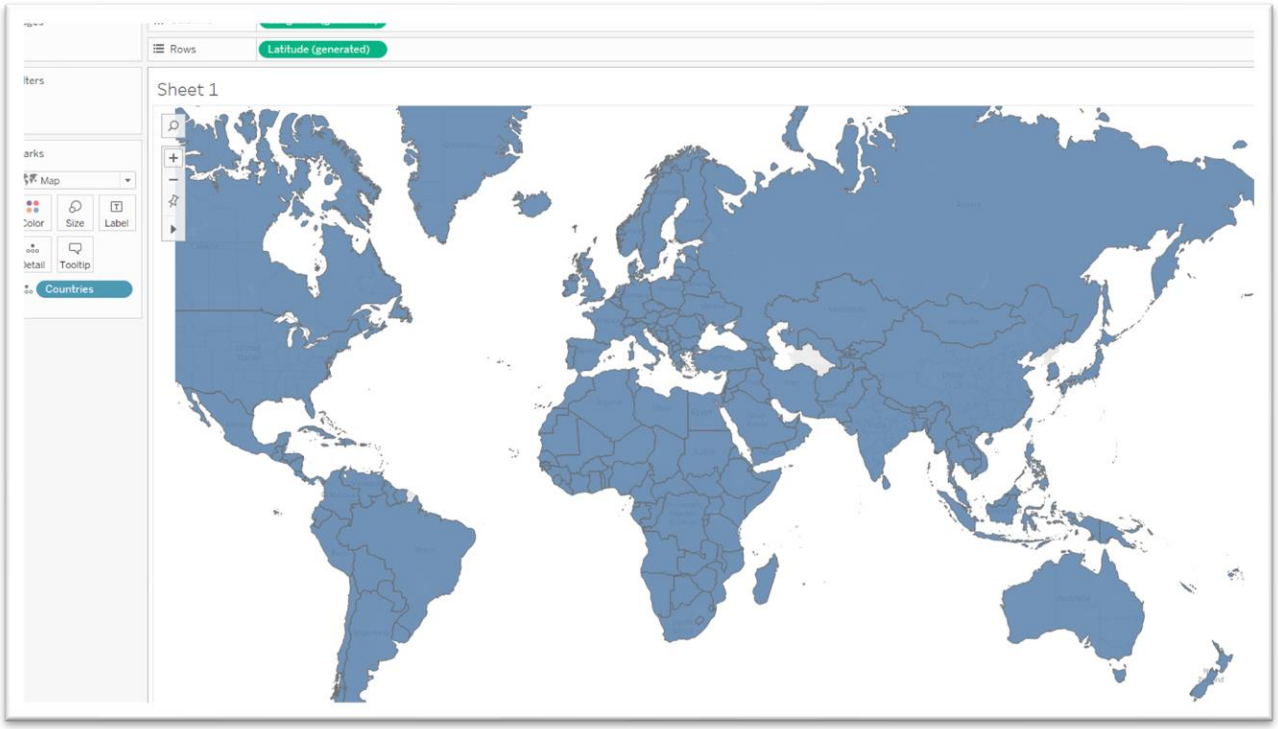
The heavy lifting is done in the menus to the immediate left of the large pain containing the map.



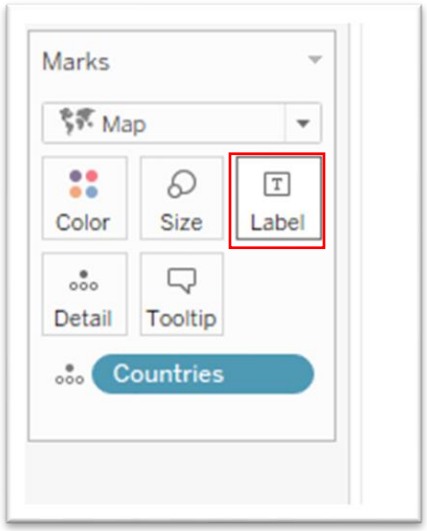
Click the arrow to the right of the “Automatic” tab under Marks.



Select “Map”.



That looks better. To make the country labels appear, return to “Dimensions” and drag “CountriesAndTerritories” into the “Label” section under “Marks.”


Marks
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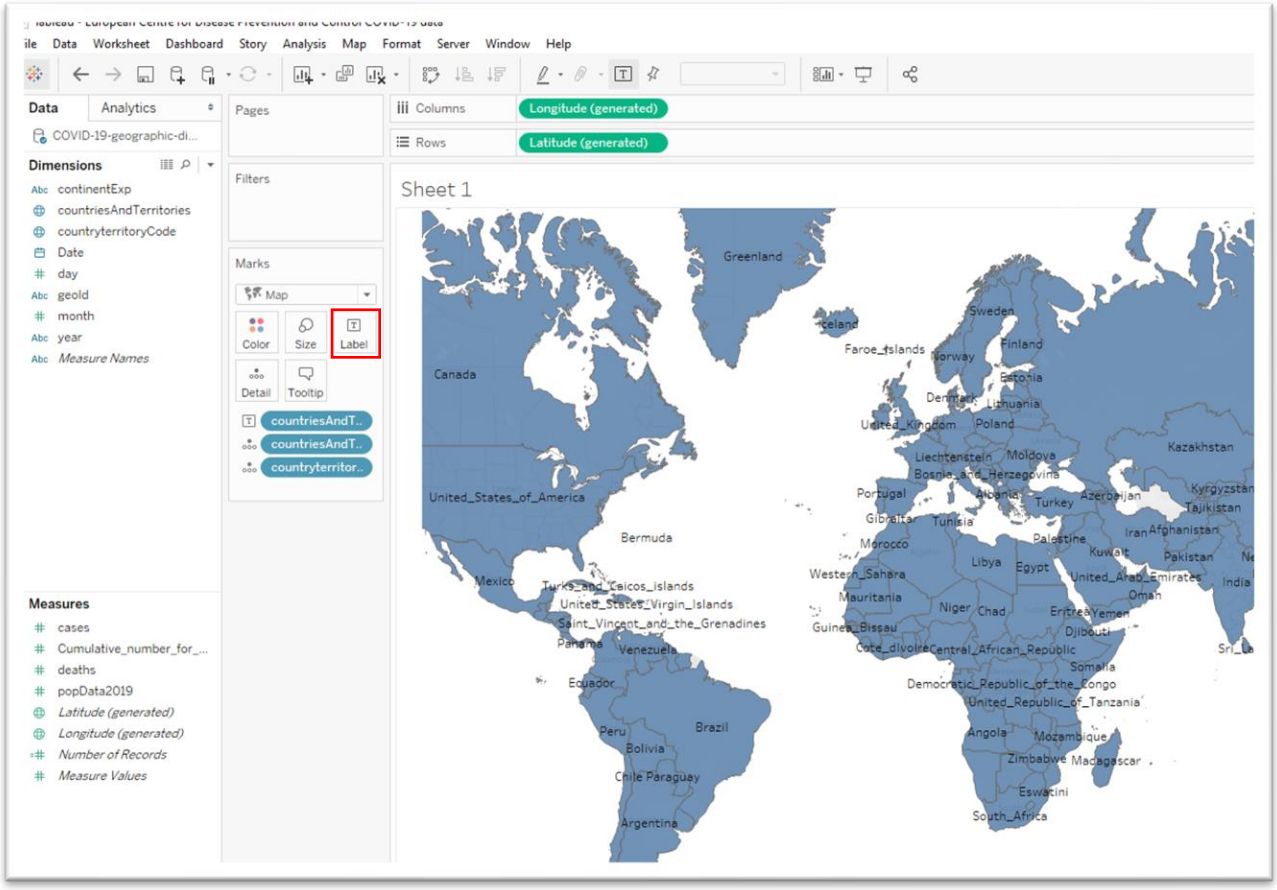
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Data
Analytics
COVID-19-geographic-di...
Dimensions
continentExp
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countryterritoryCode
Date
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geoId
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Measures
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Columns
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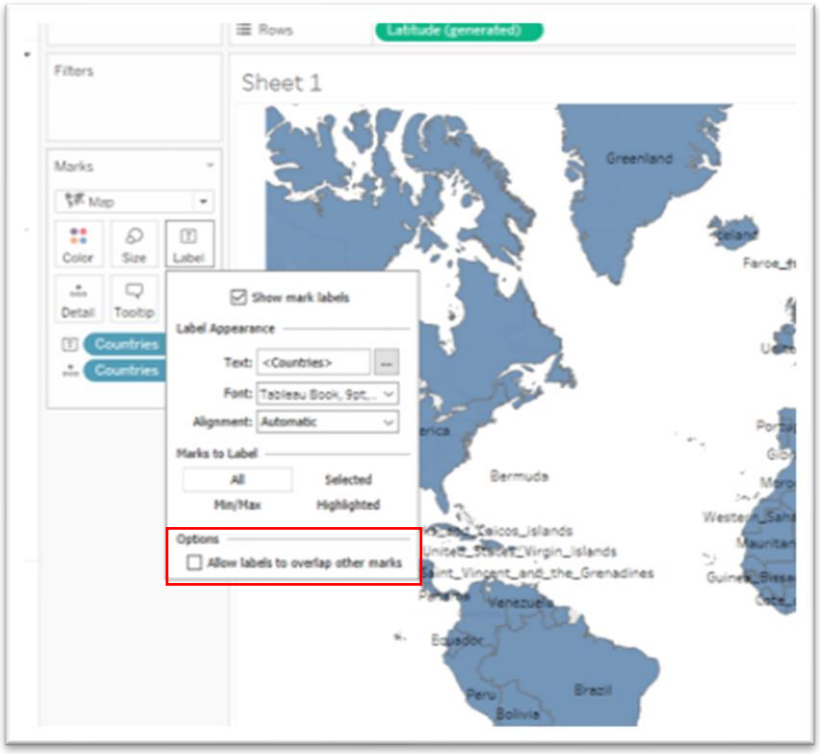
Sheet 1
Greenland
Canada
United_States_of_America
Bermuda
Mexico
Turks_and_Caicos_Islands
United_States_Virgin_Islands
Saint_Vincent_and_the_Grenadines
Panama
Venezuela
Ecuador
Peru
Brazil
Bolivia
Chile
Paraguay
Argentina
Iceland
Faroe_Islands
Sweden
Finland
Norway
Estonia
Denmark
Lithuania
United_Kingdom
Poland
Liechtenstein
Moldova
Bosnia_and_Herzegovina
Portugal
Algeria
Turkey
Azerbaijan
Kazakhstan
Kyrgyzstan
Tajikistan
Gibraltar
Tunisia
Iran
Afghanistan
Morocco
Palestine
Kuwait
Pakistan
Western_Sahara
Libya
Egypt
United_Arab_Emirates
India
Mauritania
Oman
Niger
Chad
Eritrea
Yemen
Guinea_Bissau
Djibouti
Cote_dIvoire
Central_African_Republic
Somalia
Democratic_Republic_of_the_Congo
United_Republic_of_Tanzania
Angola
Mozambique
Zimbabwe
Madagascar
Eswatini
South_Africa

If you want to make sure that the country labels do not overlap, as is the case in this visualization, click the same icon to obtain a menu.

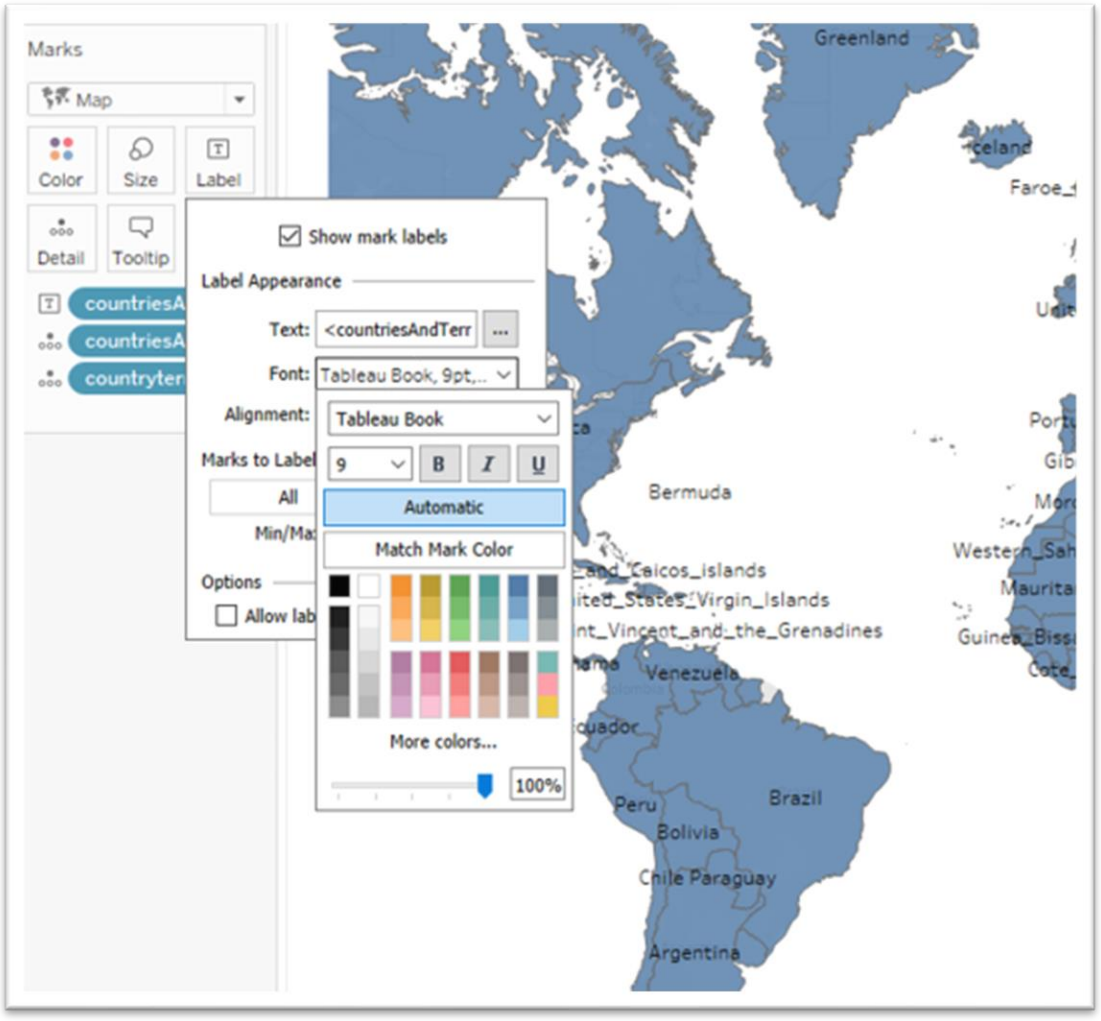


You'll notice that the box under "Options" allowing the labels to overlap is unchecked. Checking it produces a mess that looks like this.

Needless to say, this is an unappealing look.

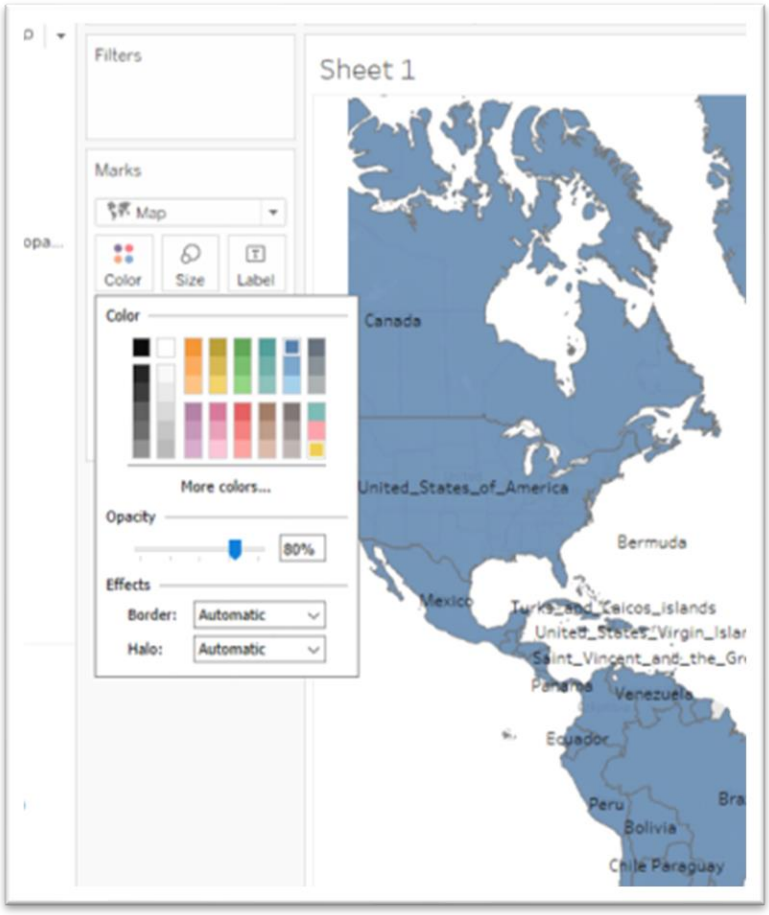
Uncheck the box.

You can also change the font size and colour from the same drop-down menu.



Let’s leave the font size and font colour.

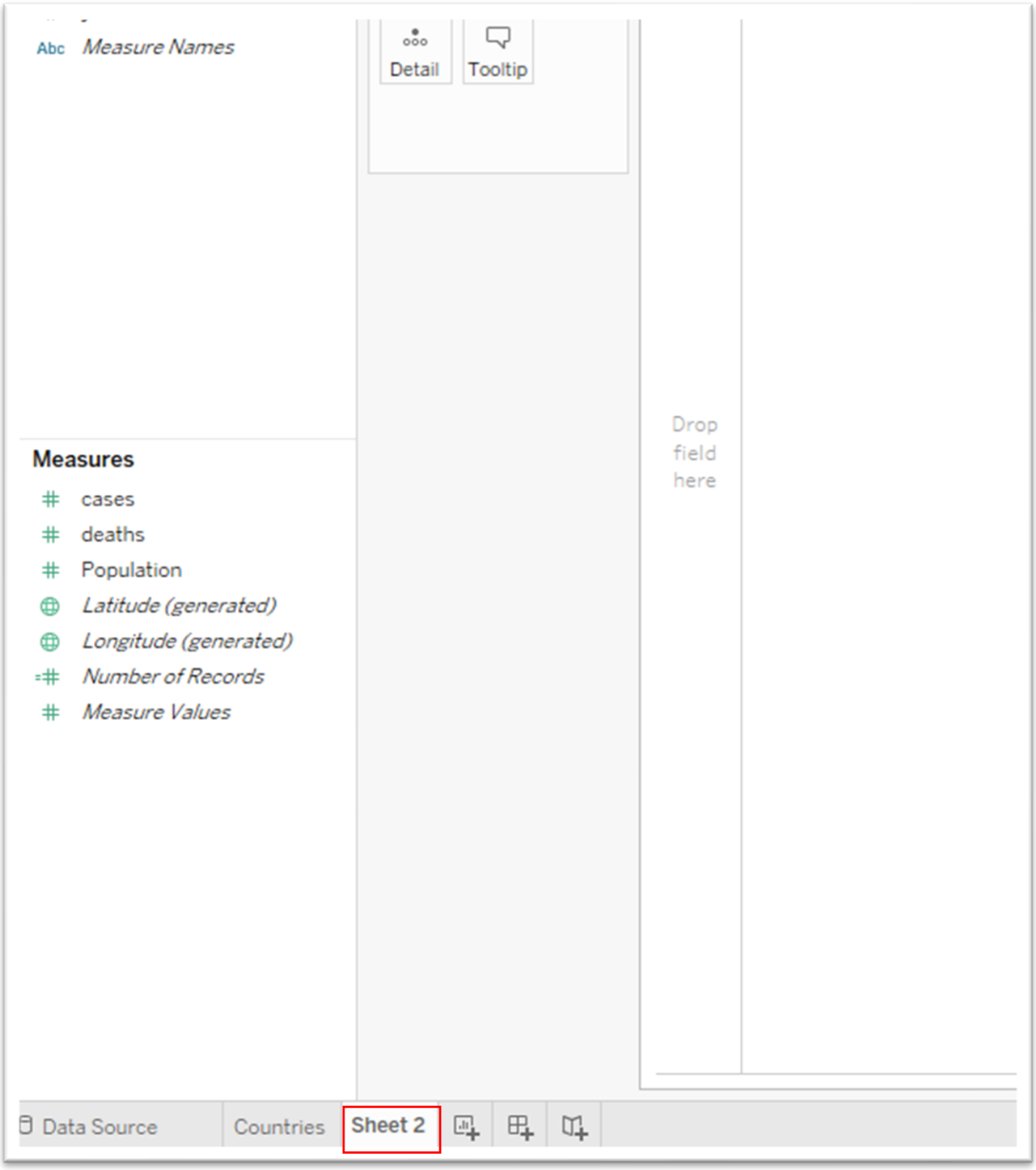
You can also change the map's colour from blue to something else by clicking the "Color" icon in the same section.



Let's leave the colour as is.

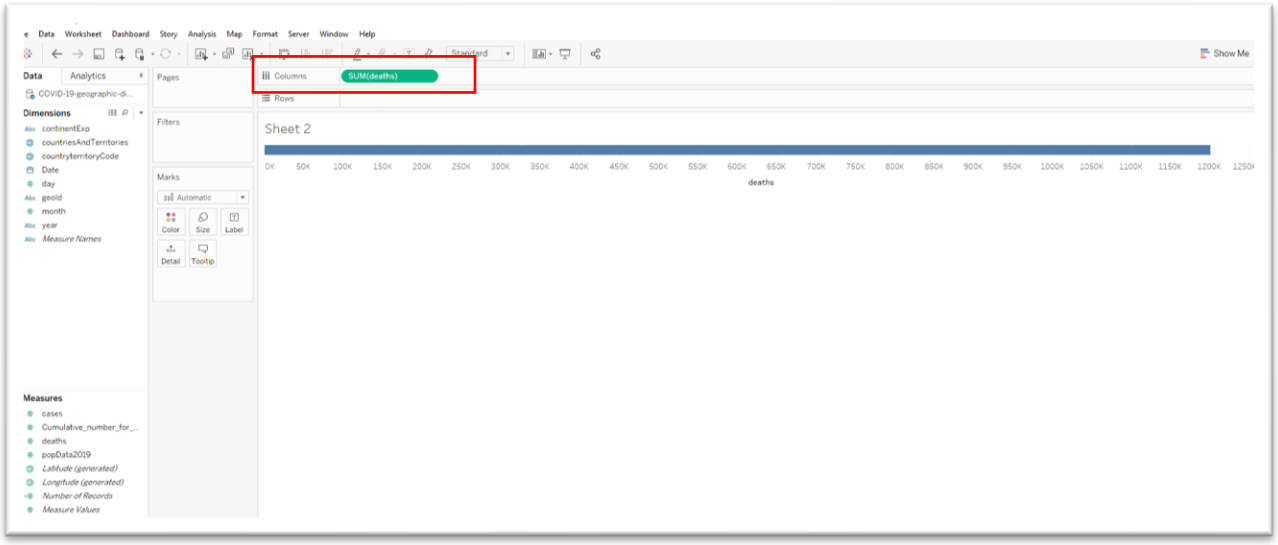
Label the worksheet "Countries."

Open a second worksheet.

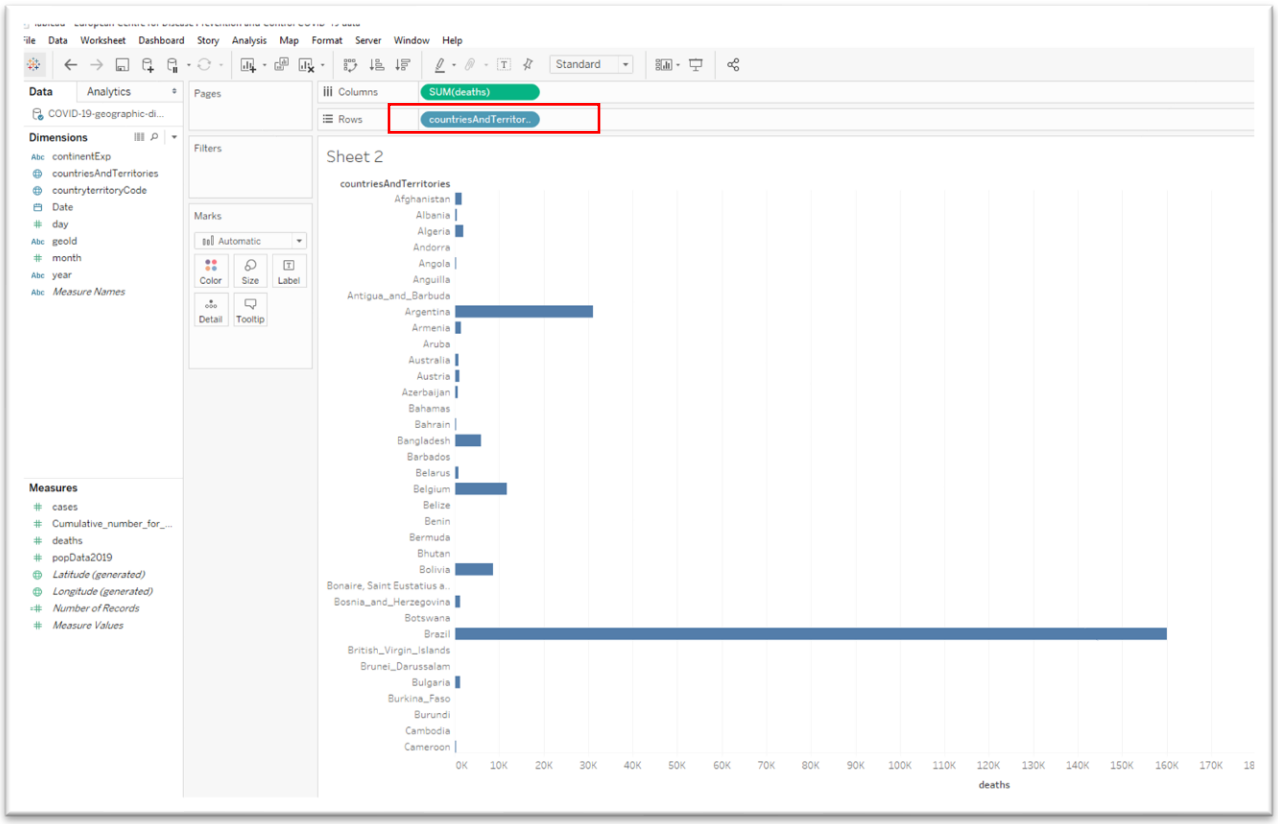


We'll create a vertical bar chart tracking deaths per country.

Drag "#deaths" from the measures section and drop it into the "Columns" section in the pane to the right.

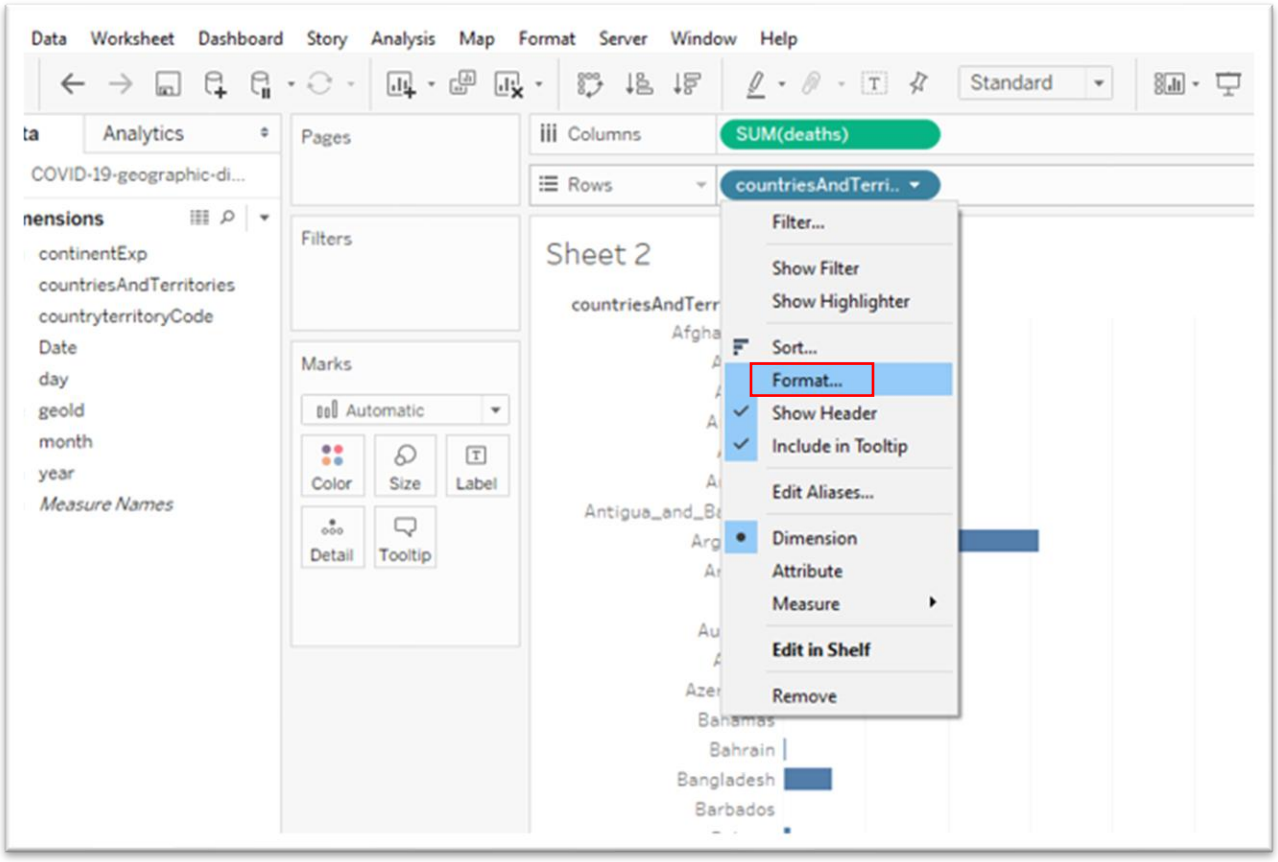


Drop "CountriesAndTerritories" into "Rows."

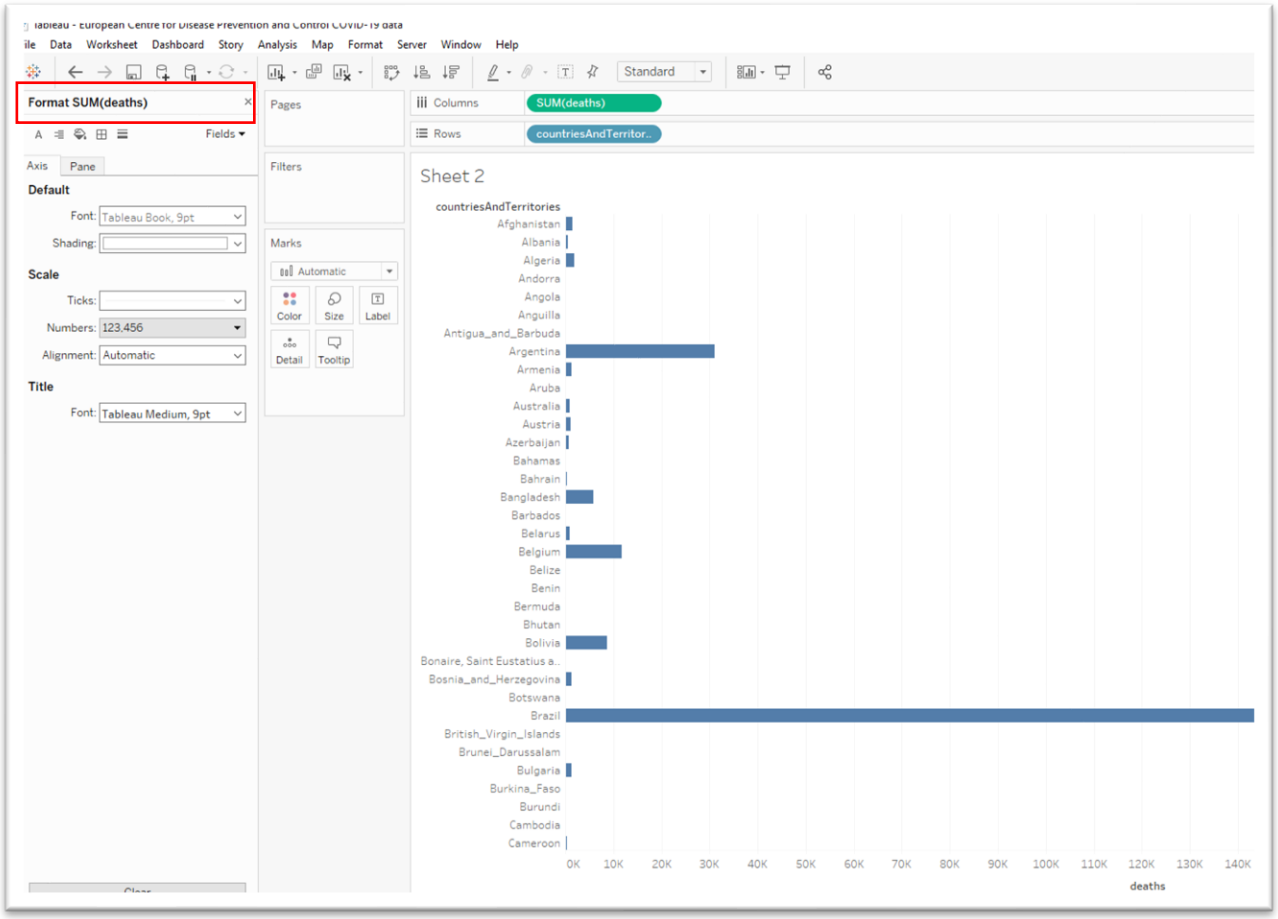


Reformat the death numbers by hovering your cursor over the “SUM(deaths)” tab next to “Columns”, click on the downward arrow that will appear on the right.

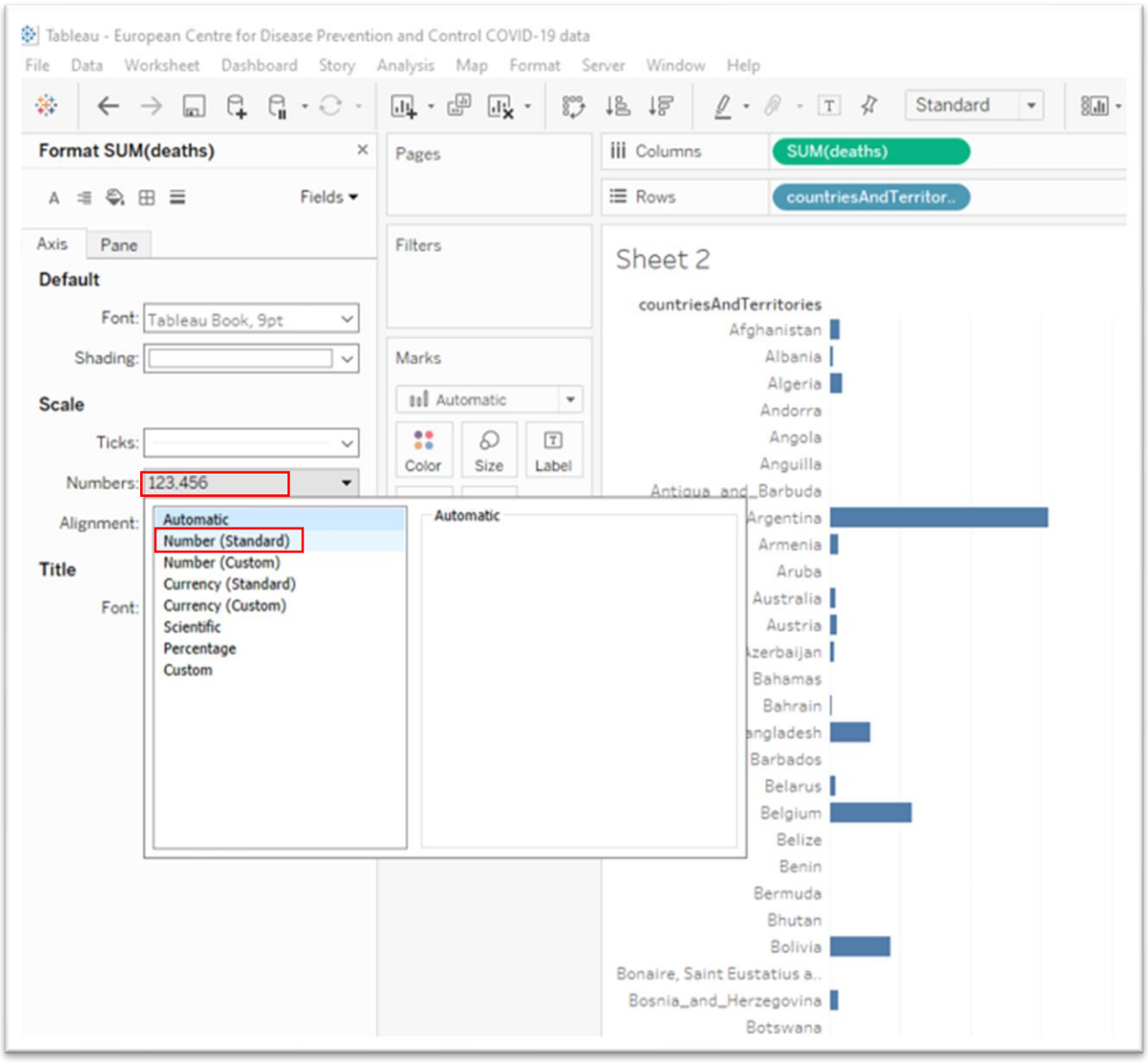
Select “Format” from the shortcut menu.



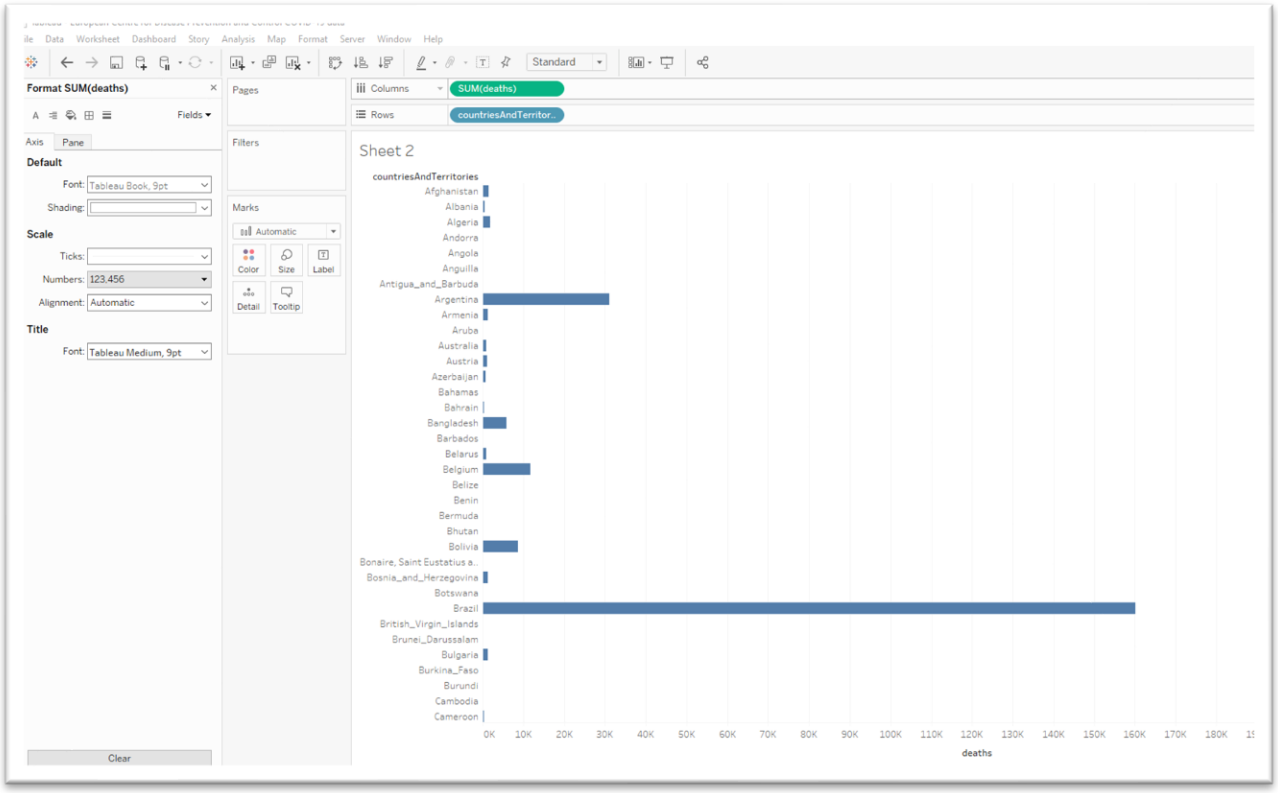
A new “Format” menu will appear on the left.



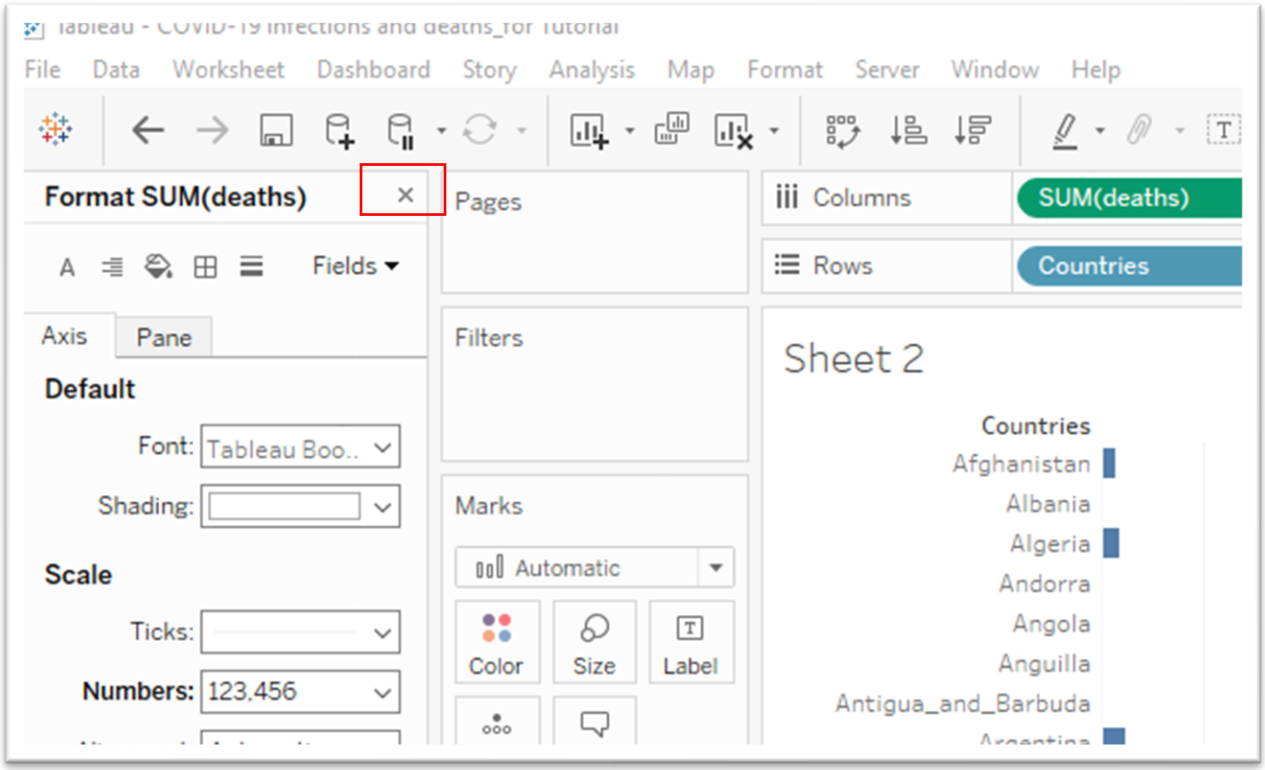
Click the arrow to the left of numbers highlighted in the screen grab above.



Choose “Number (Standard)” from the shortcut menu.



If you’re happy with the result, close the format menu by clicking the “X”.


File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
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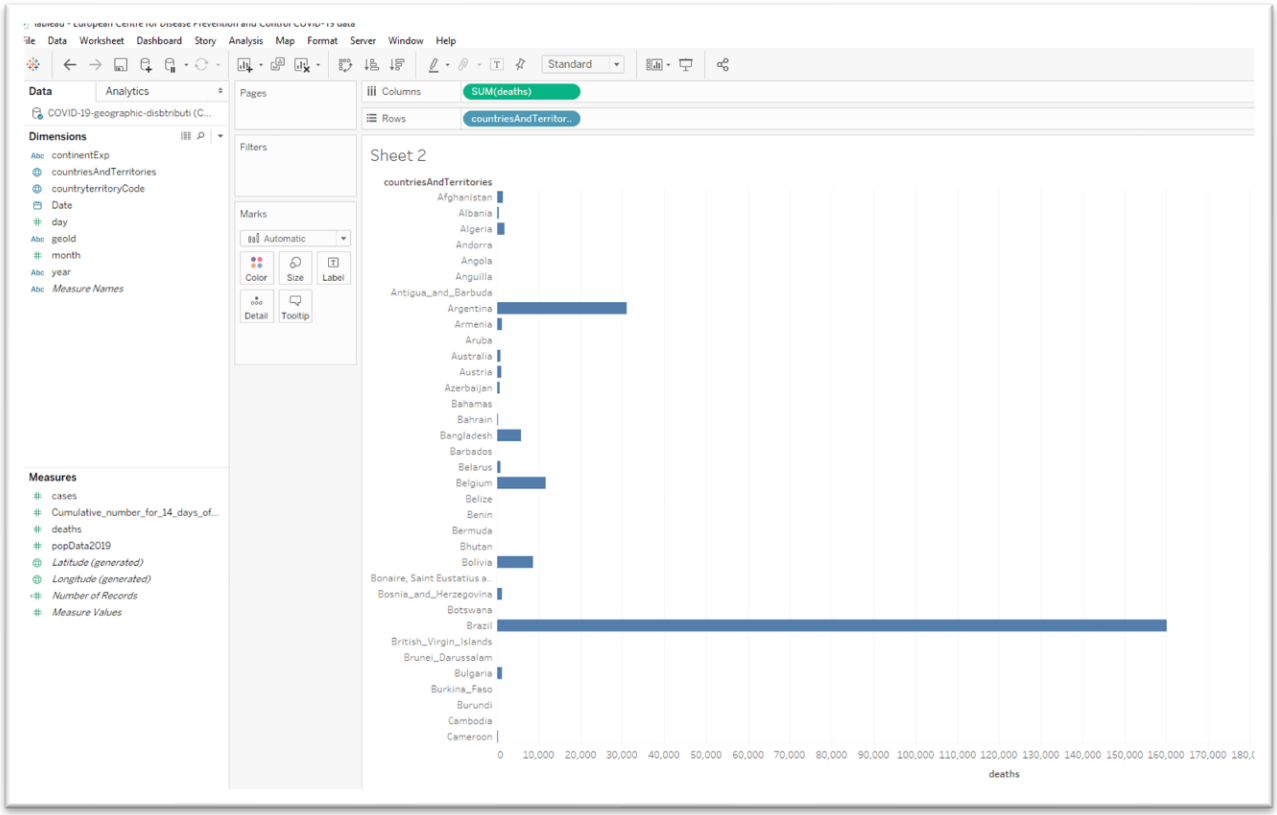
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Australia
Austria
Azerbaijan
Bahamas
Bahrain
Bangladesh
Barbados
Belarus
Belgium
Belize
Benin
Bermuda
Bhutan
Bolivia
Bonaire, Saint Eustatius a...
Bosnia_and_Herzegovina
Botswana
Brazil
British_Virgin_Islands
Brunei_Darussalam
Bulgaria
Burkina_Faso
Burundi
Cambodia
Cameroon
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10,000
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30,000
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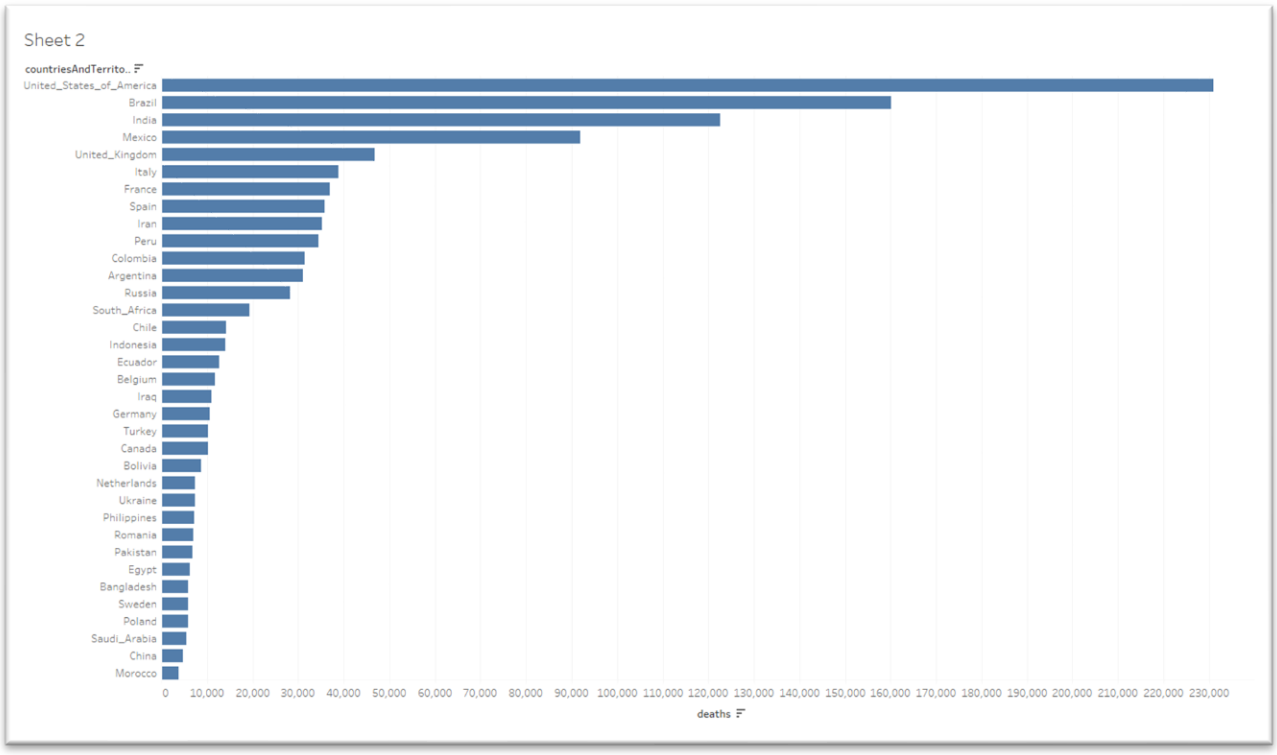
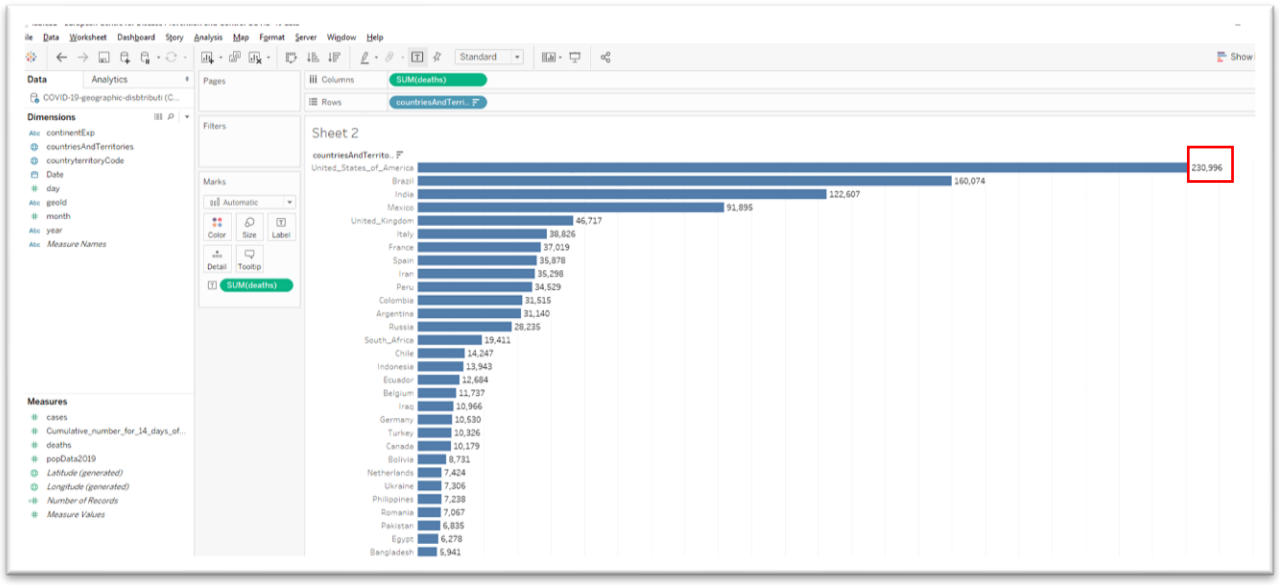
60,000
70,000
80,000
90,000
100,000
110,000
120,000
130,000
140,000
150,000
160,000
170,000
deaths

Hover your curser over the “deaths” label below the table’s X-axis below the number “120,000”

Sort in descending order.



If you want the labels to appear at the end of each bar, drag “#deaths” into the “Label” tab under “Marks”.



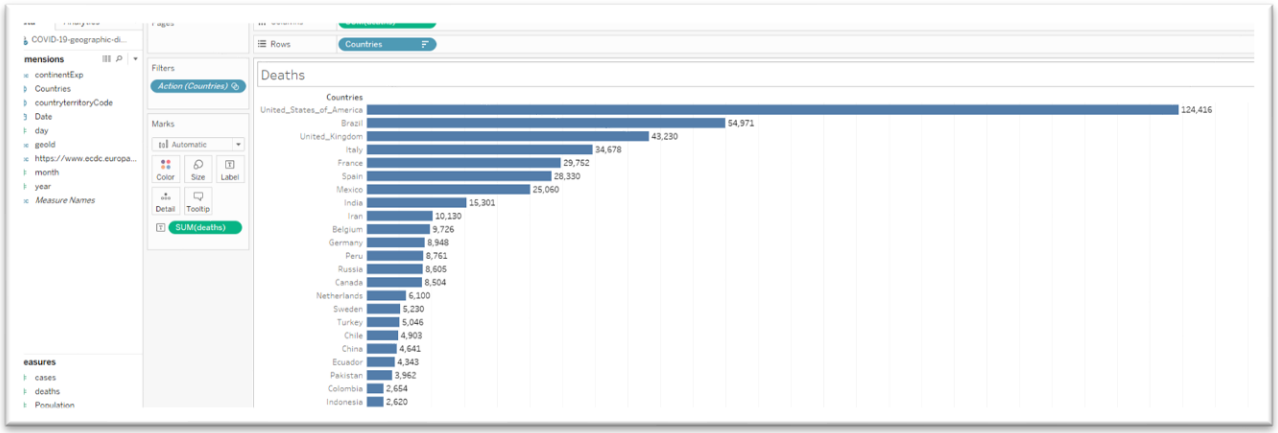
You can also play around with the colour, just like we did for the map.

If you’re happy with this result, name the worksheet “Deaths.”

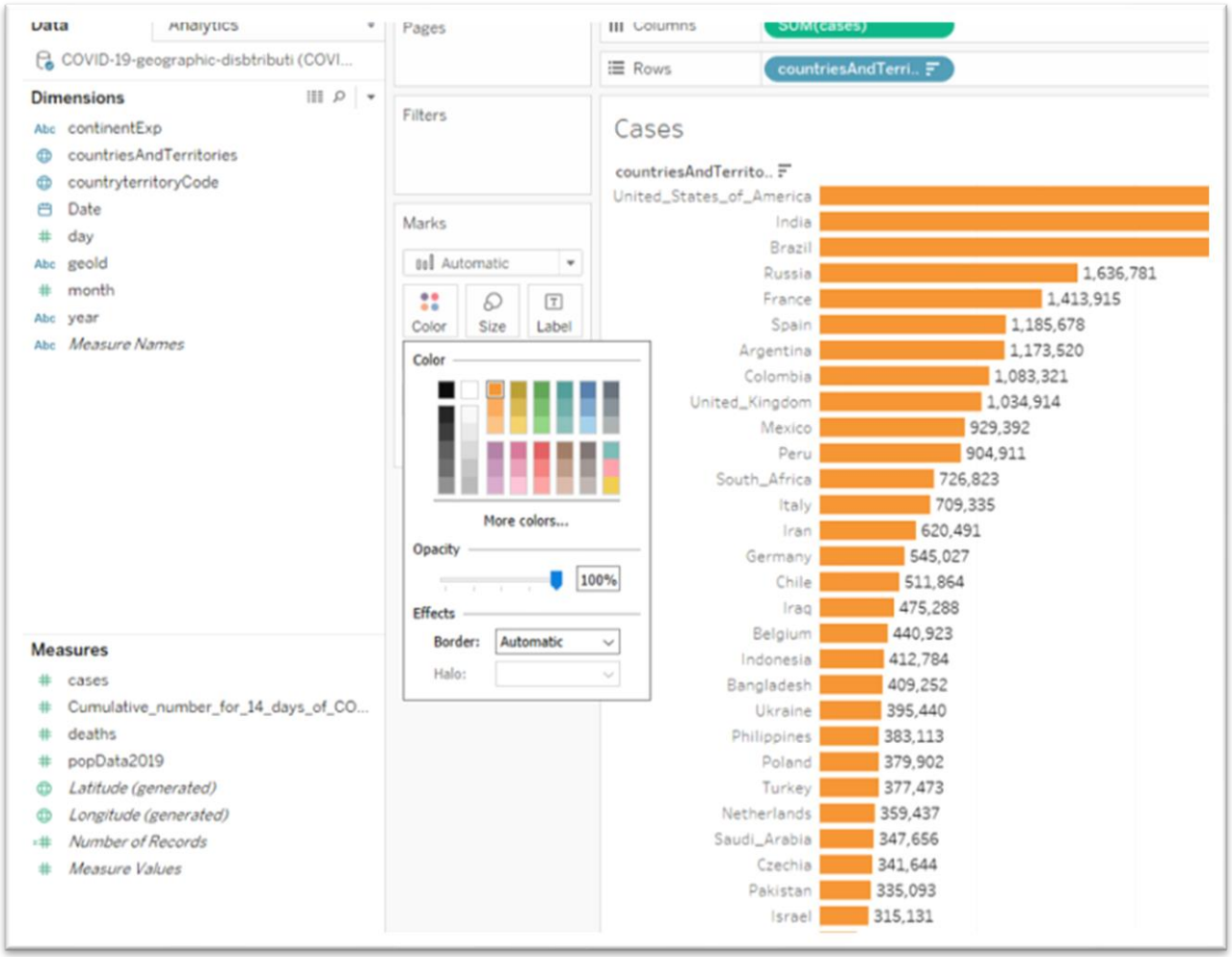
Be sure to save your work as you go.

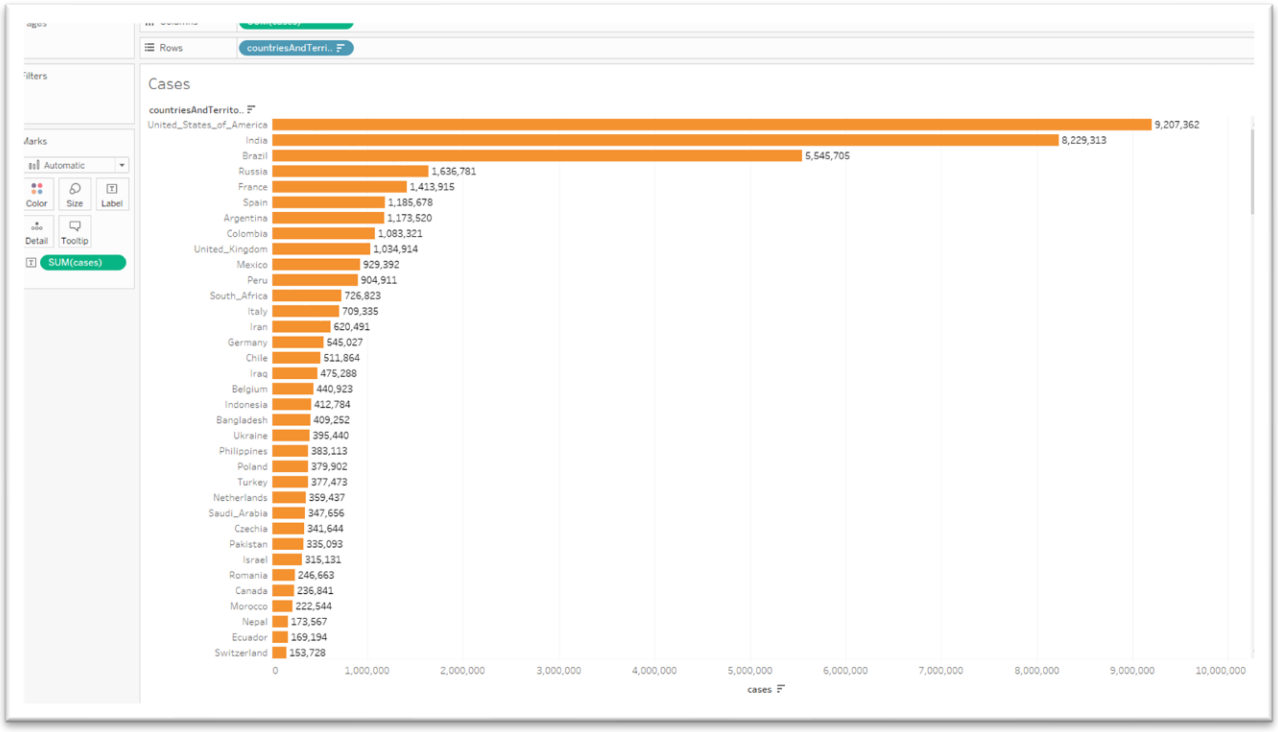
Create a new worksheet for the “cases” or infections.

Repeat the steps we used to create the previous deaths table.



We can also change the colour.



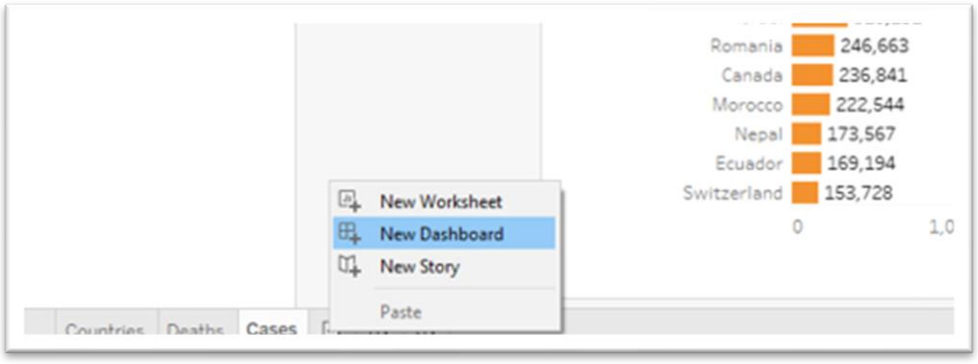


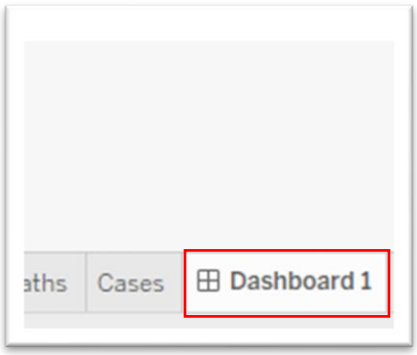
3. Create an interactive dashboard

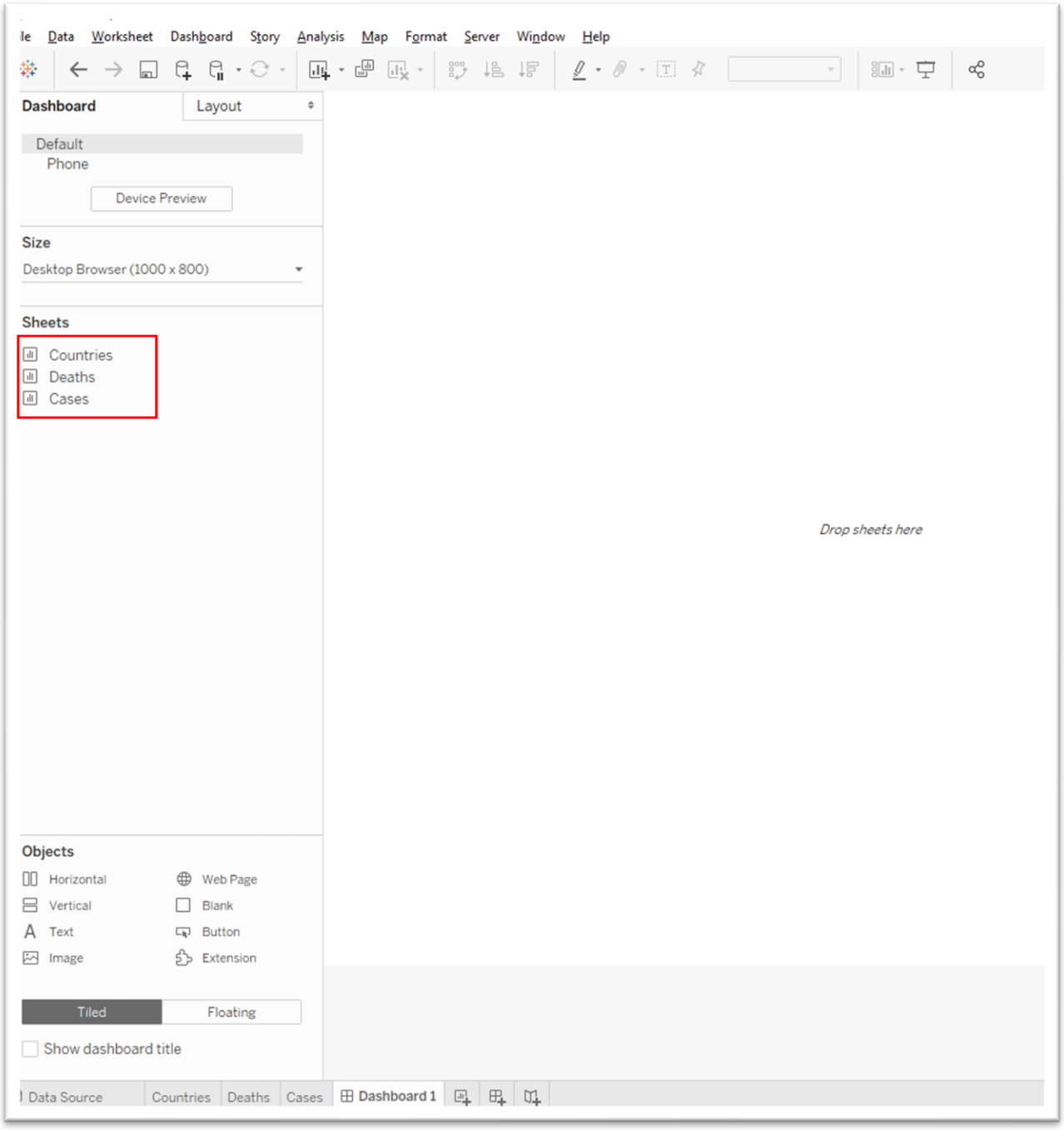
Now it’s time to create our interactive dashboard, the place where the real visualization happens.

The dashboard will combine our three visuals: map, death graph and cases graph.

Instead of a worksheet, we'll add a dashboard.

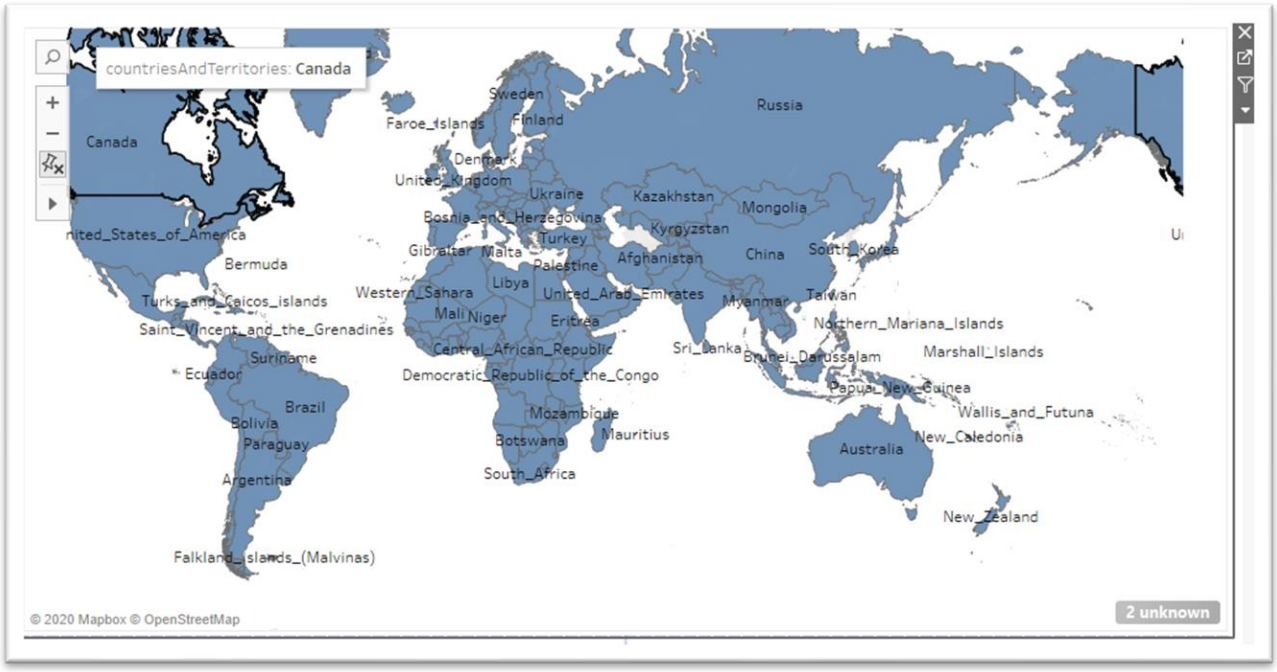




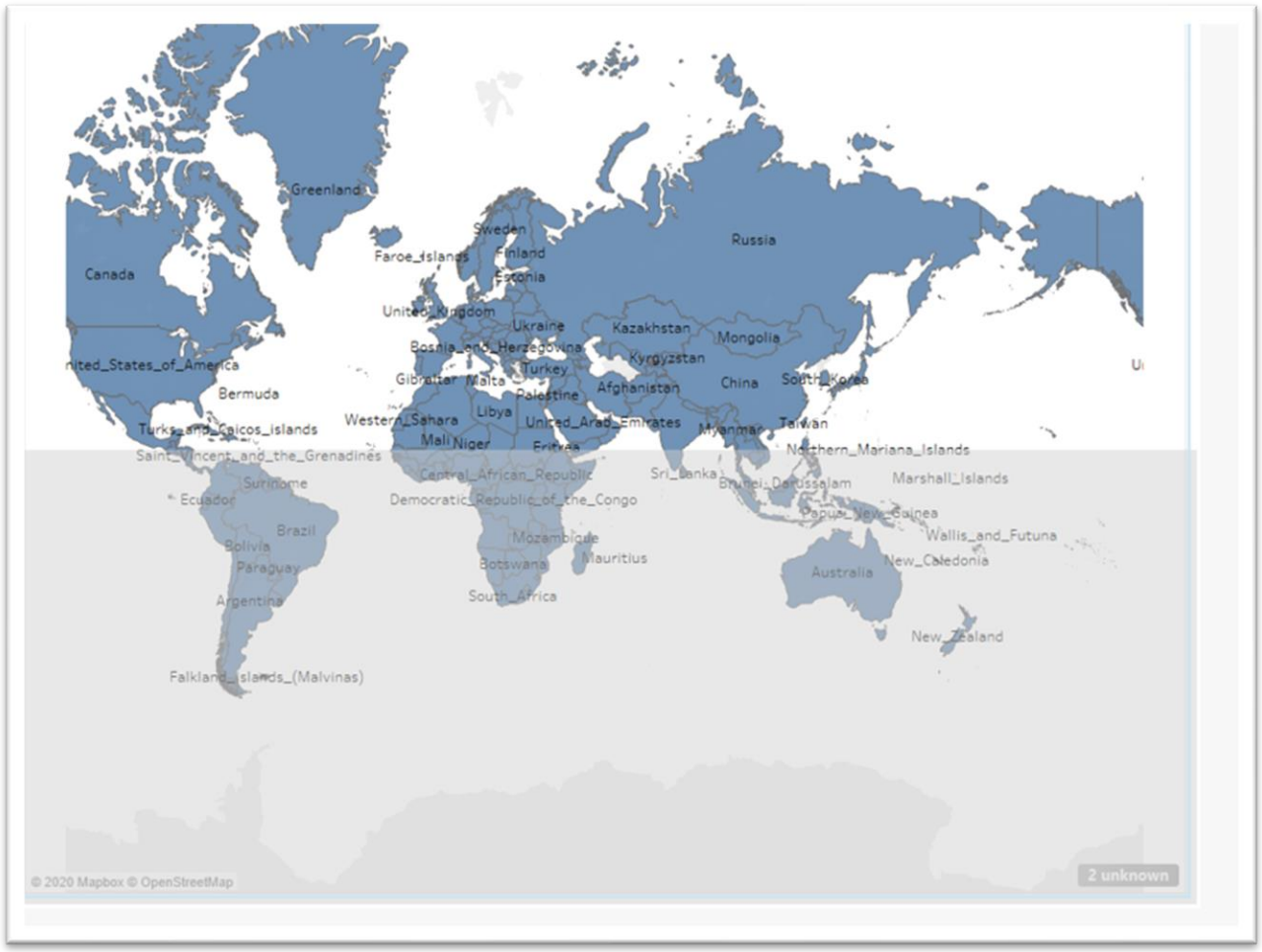


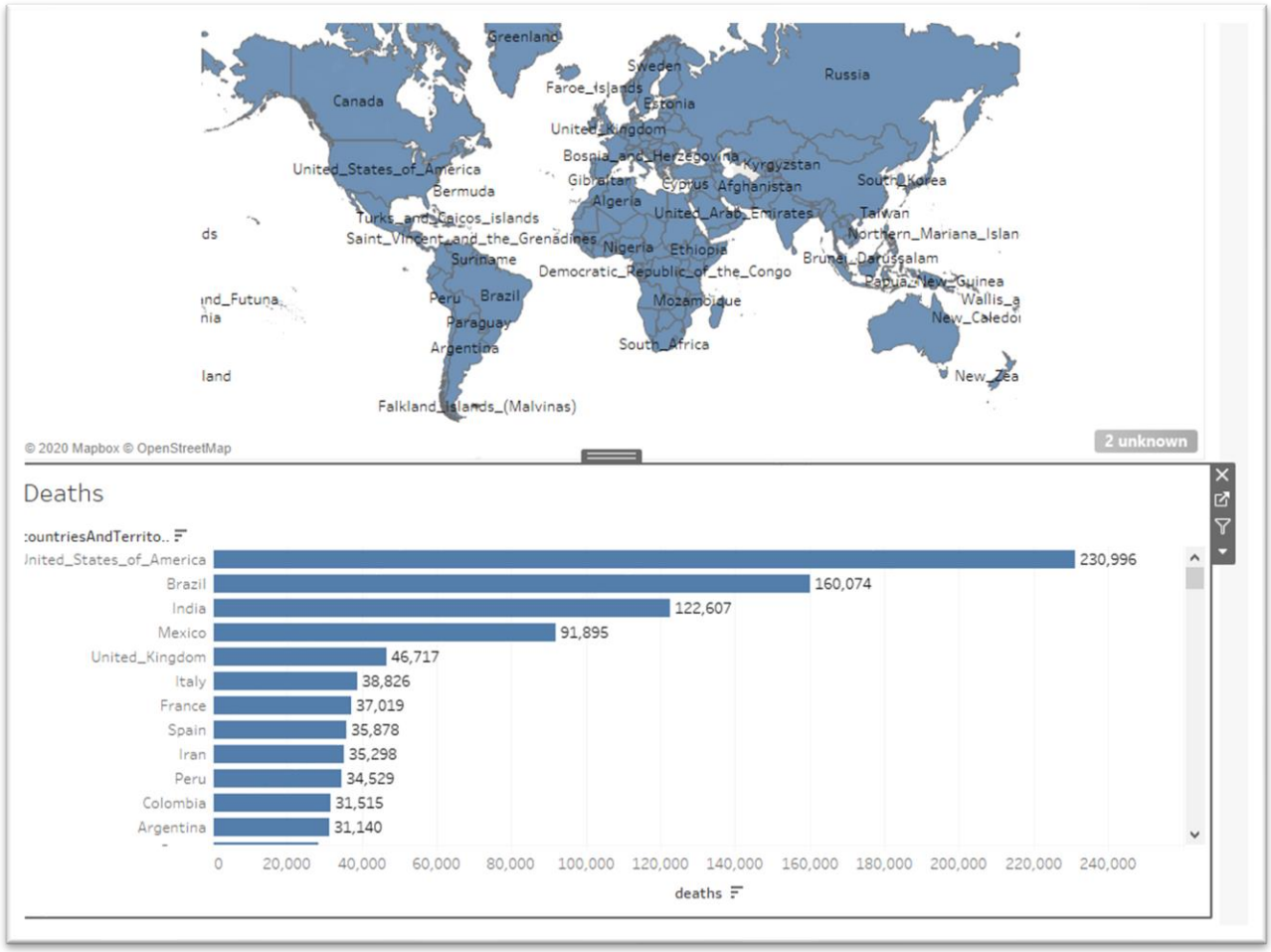
Our three worksheets are highlighted on the left.

Drag “Countries into the drop area to the right.

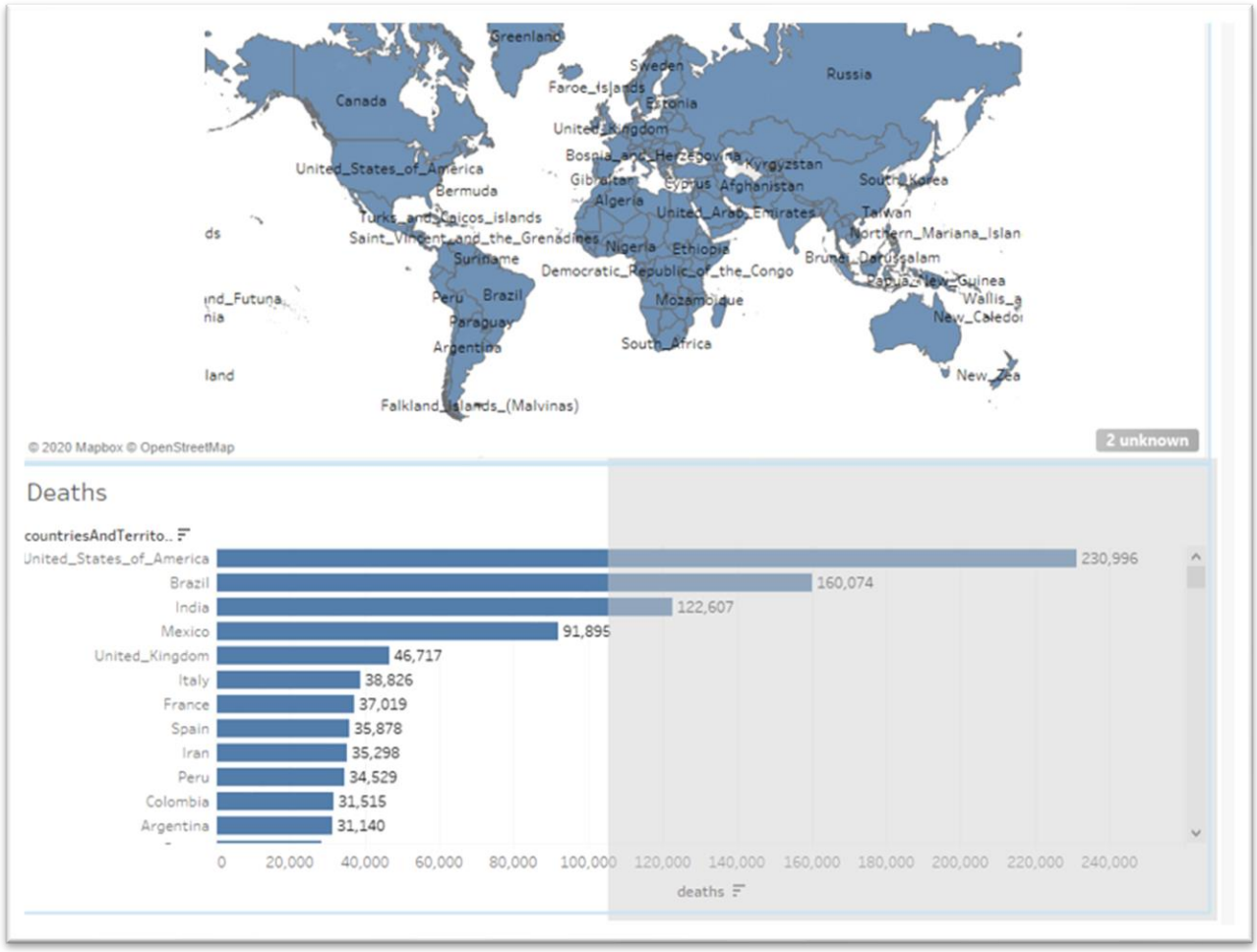


Drag “Deaths” into the same pane until the grey area covers the lower half of the space, and release your finger from the cursor.



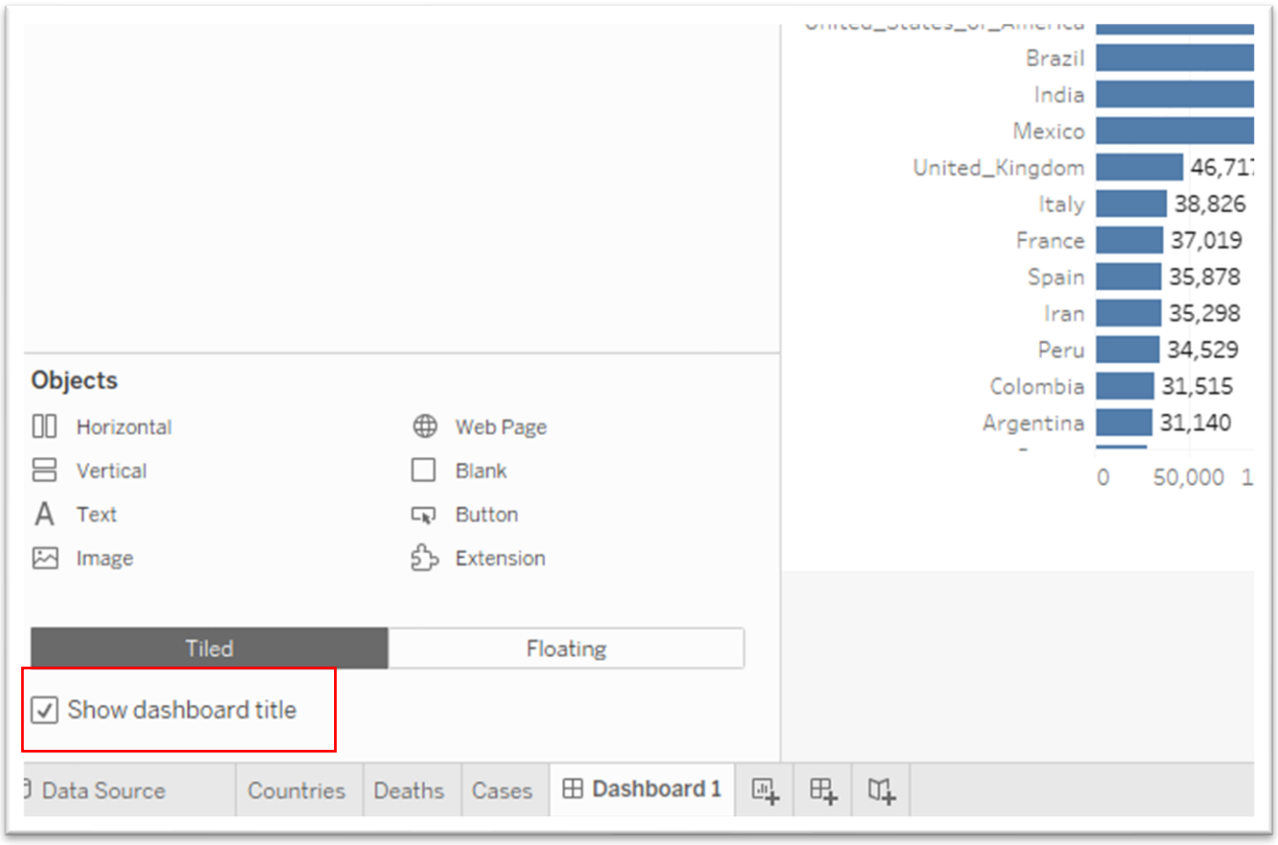


Drag “Cases” and drop it into the area to the bottom right of the pane.

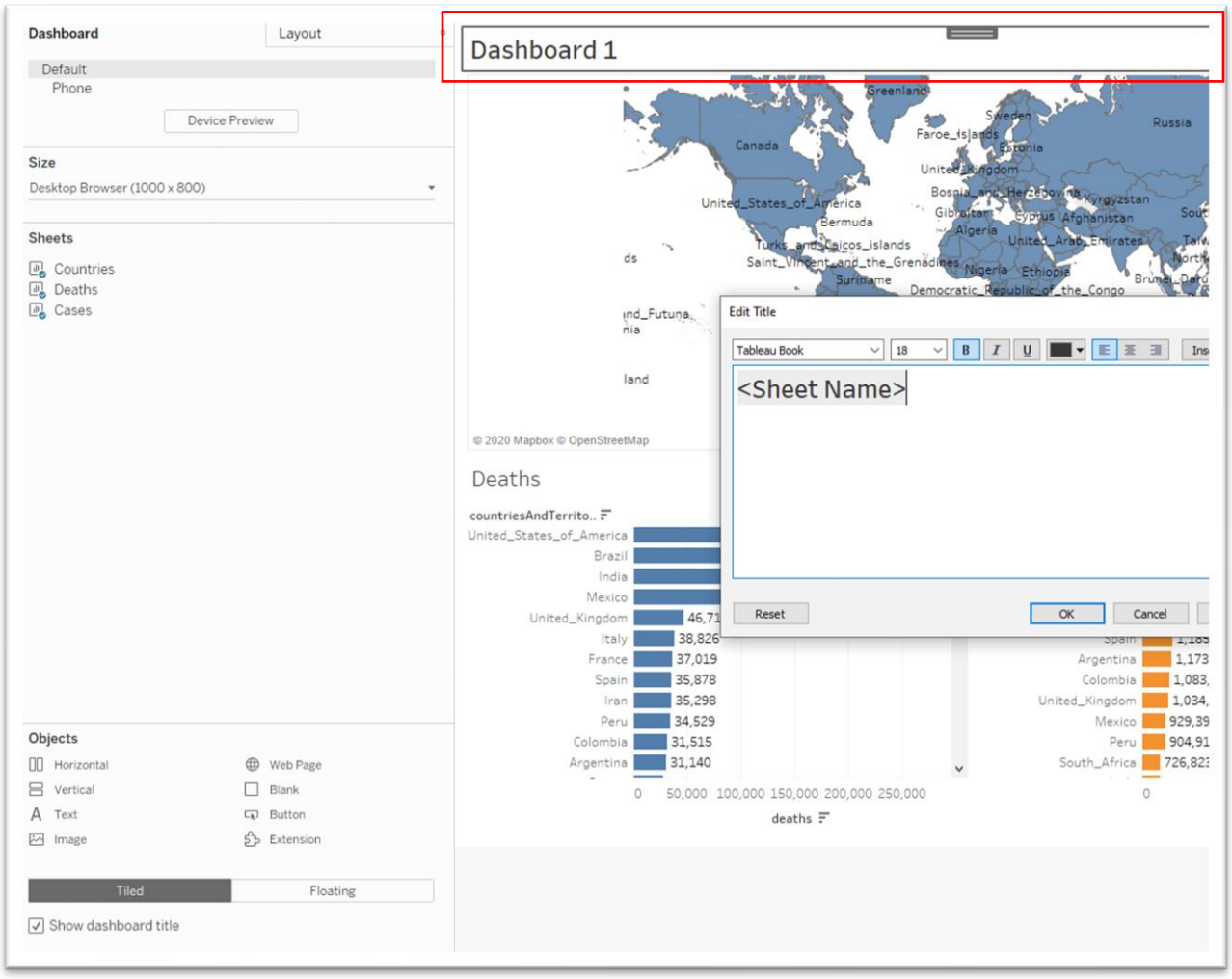

Greenland
Sweden
Russia
Faroe_Islands
Canada
Estonia
United_Kingdom
Bosnia_and_Herzegovina
Kyrgyzstan
United_States_of_America
Gibraltar
Cyprus
Afghanistan
South_Korea
Bermuda
Algeria
Taiwan
Turks_and_Caicos_islands
United_Arab_Emirates
Northern_Mariana_Islan
Saint_Vincent_and_the_Grenadines
Nigeria
Ethiopia
Suriname
Brunei_Darussalam
Democratic_Republic_of_the_Congo
Papua_New_Guinea
Peru
Brazil
Mozambique
Wallis_a
Paraguay
New_Caledo
Argentina
South_Africa
New_Zea
Falkland_Islands_(Malvinas)
© 2020 Mapbox © OpenStreetMap
2 unknown
Deaths
countriesAndTerrito..
United_States_of_America 230,996
Brazil 160,074
India 122,607
Mexico 91,895
United_Kingdom 46,717
Italy 38,826
France 37,019
Spain 35,878
Iran 35,298
Peru 34,529
Colombia 31,515
Argentina 31,140
0 20,000 40,000 60,000 80,000 100,000 120,000 140,000 160,000 180,000 200,000 220,000 240,000
deaths

You can adjust the map's depth by clicking on the map until the grey boundary appears and dragging the edge downwards.

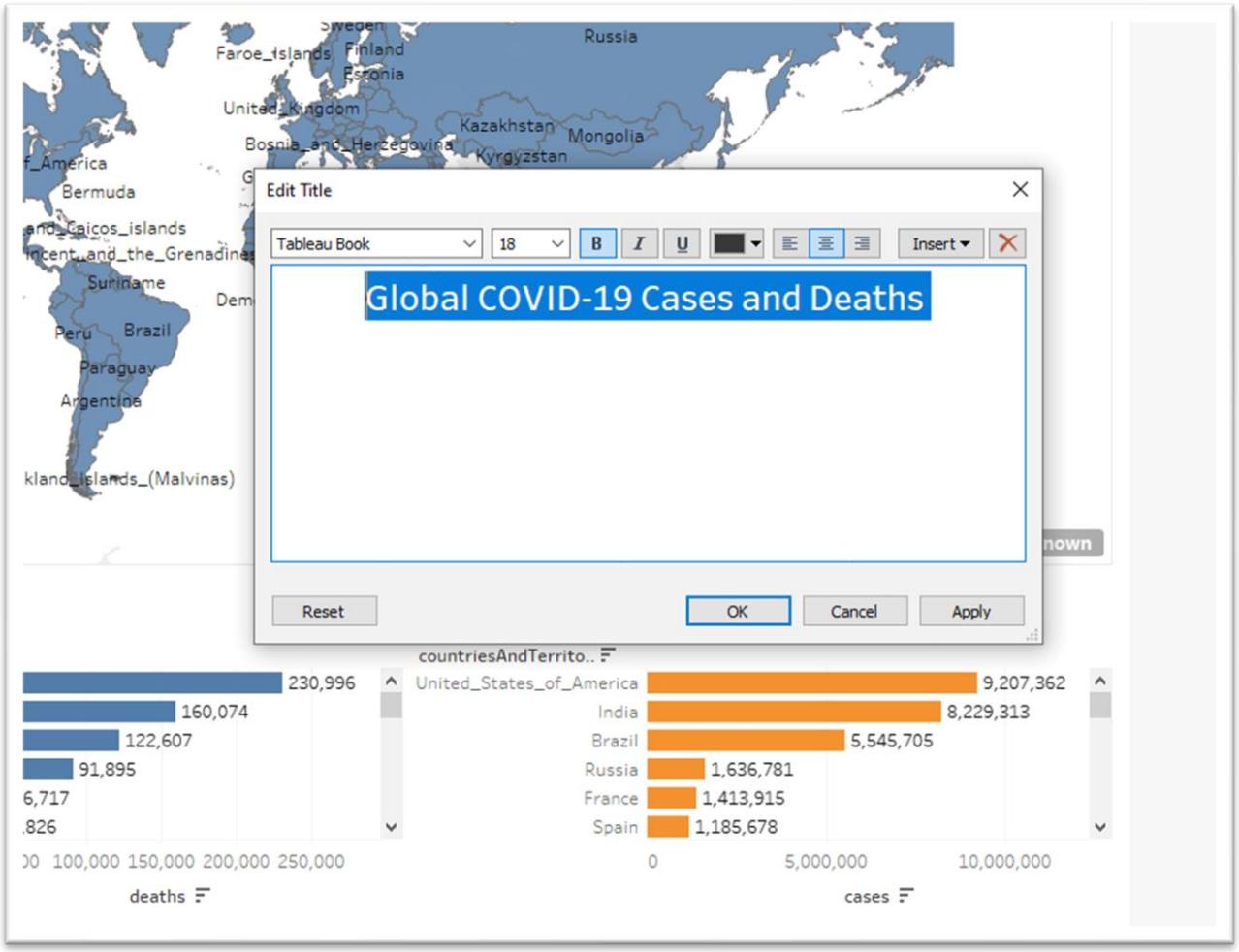
To give the dashboard a title, check the box to the left of the “Show dashboard title” prompt at the bottom left of your screen.



Double click on “Dashboard 1” at the top of the map to produce a dialog box.

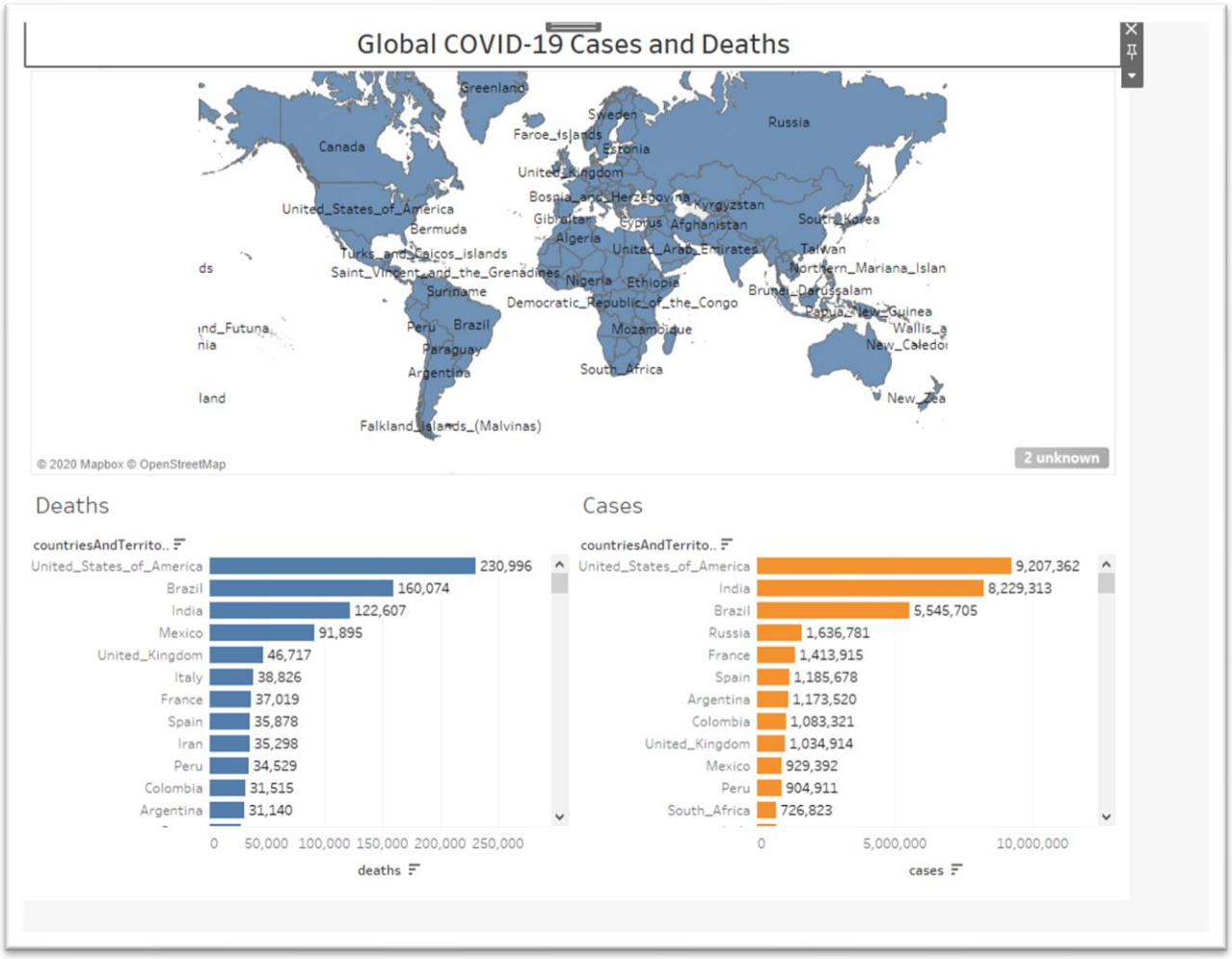


We can call the dashboard something like “Global COVID-19 Cases and Deaths.”



You can also select a different font type, point size, colour, etc. from the menu across the top, and choose alignment, in this case centre. Once

you’re happy with the result, select the OK tab.



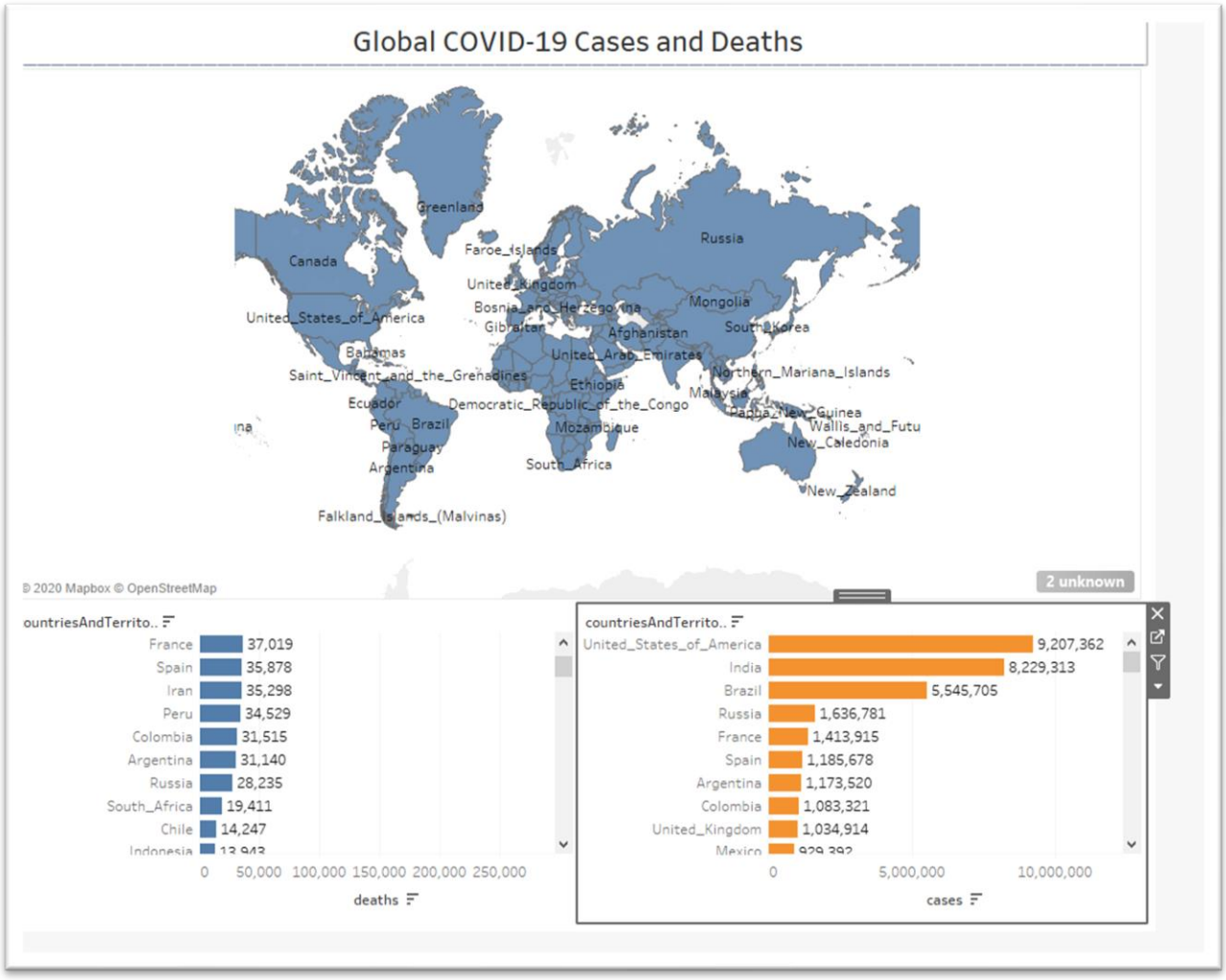
Now a bit of clean-up.

We will hide the labels for the map and two tables.

First the “Countries” label above the map. Right click over the name to obtain a short-cut menu.

Hide the title.

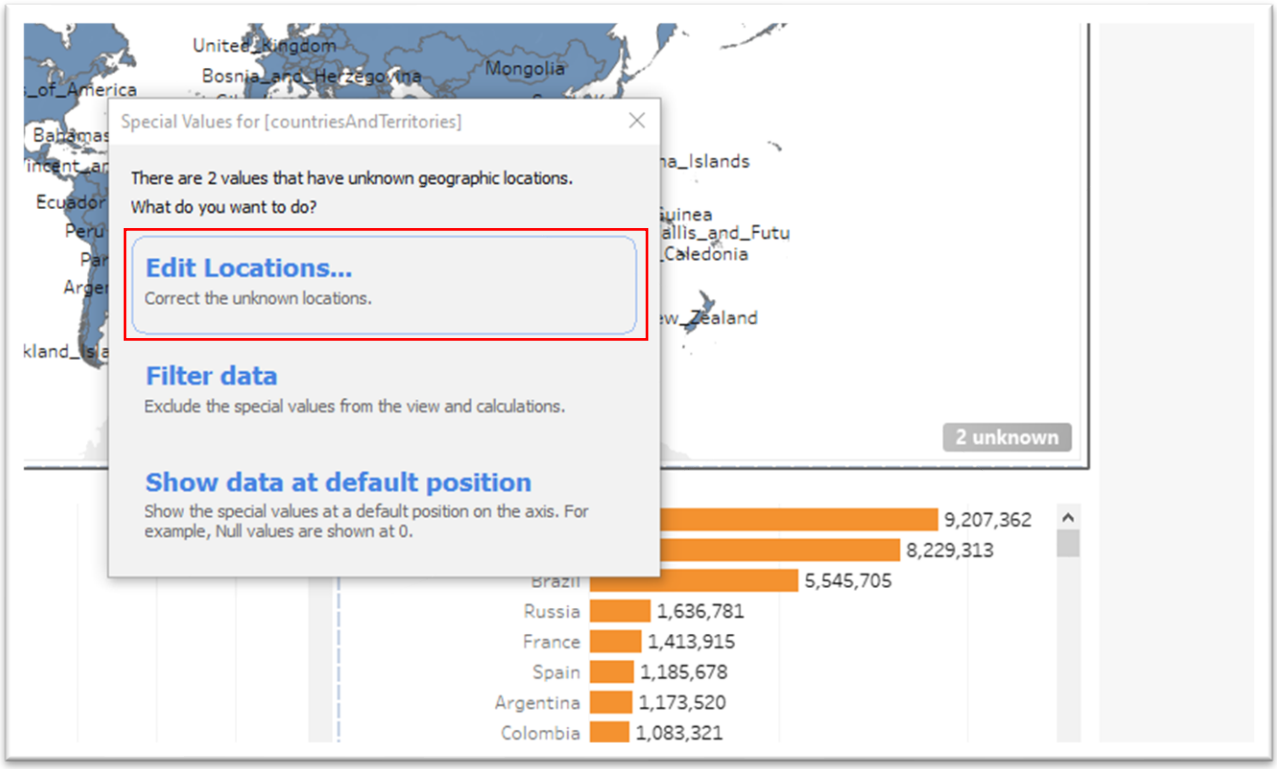
Repeat the steps for the bar graphs.



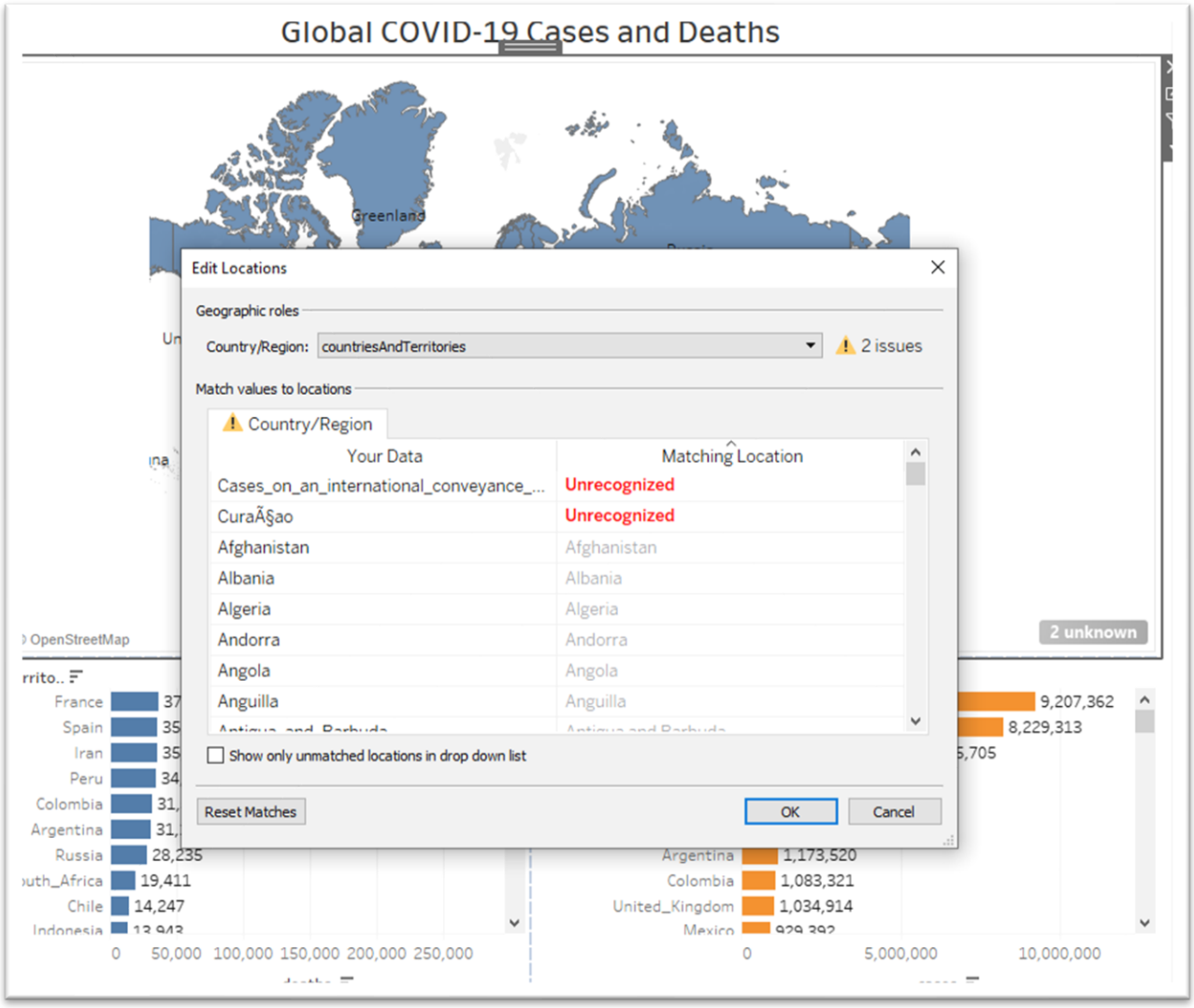
We’re getting there. Much tider.

The “2 unknown” tab at the bottom right of the map means there are two locations Tableau is unable to map. Click on the tab to produce a pop-up

box.


Special Values for [countriesAndTerritories]
There are 2 values that have unknown geographic locations.
What do you want to do?
Edit Locations...
Correct the unknown locations.
Filter data
Exclude the special values from the view and calculations.
Show data at default position
Show the special values at a default position on the axis. For example, Null values are shown at 0.
2 unknown
9,207,362
8,229,313
5,545,705
Russia 1,636,781
France 1,413,915
Spain 1,185,678
Argentina 1,173,520
Colombia 1,083,321

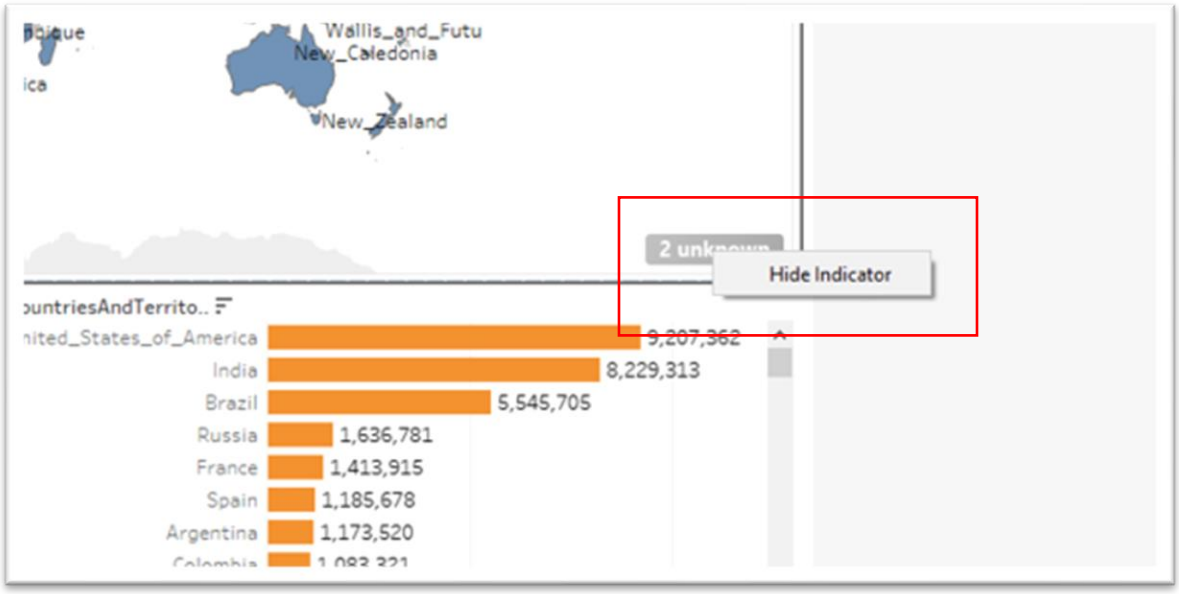
And then “Edit Locations.”

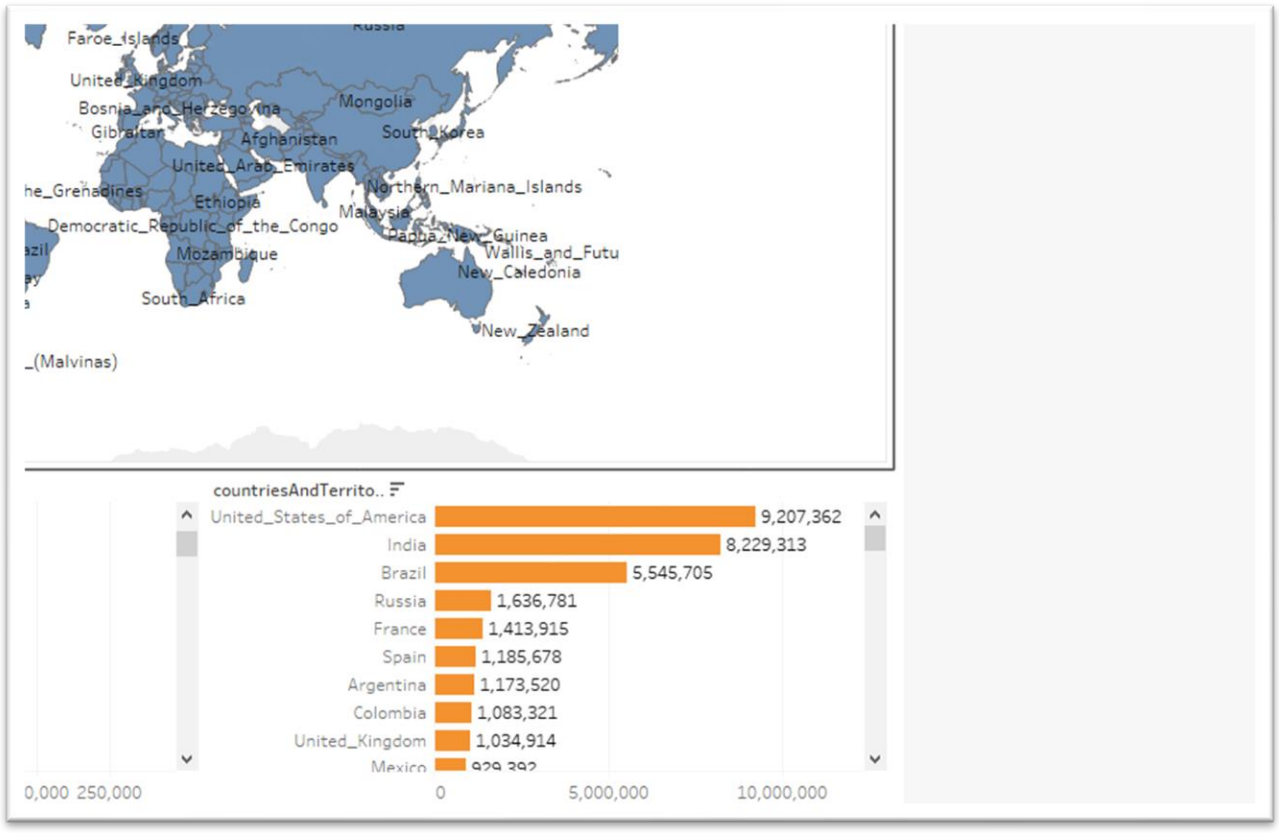


The locations it doesn’t recognize are unimportant to us. If they were, we could type in the correct spelling or geographic coordinates (longitude and latitude) of the country in question.

Close the edit box.

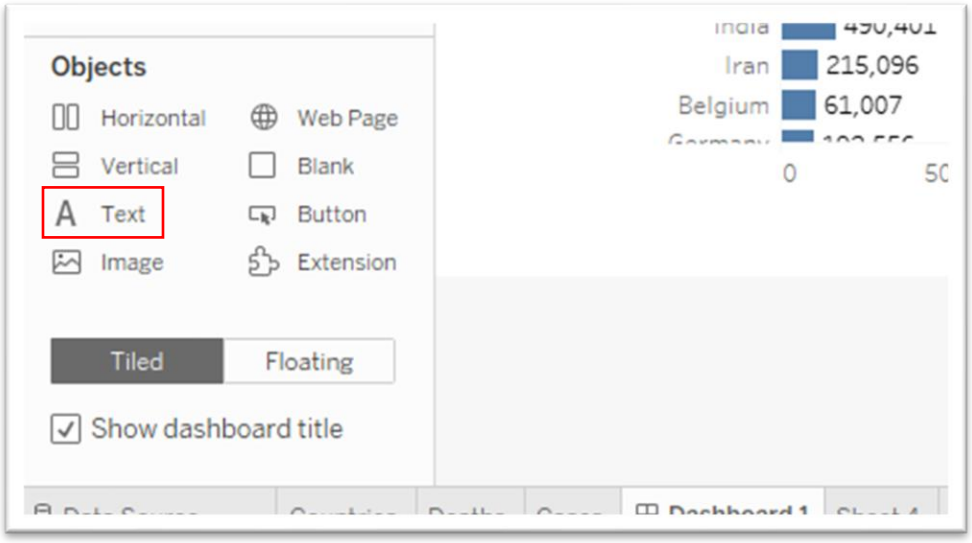
Right-click on the tab and hide it.





We need to cite the source of the graphic, along with the URL and the name of the brilliant individual who created the visualization.

Select “A Text” under “Objects” at the bottom left .

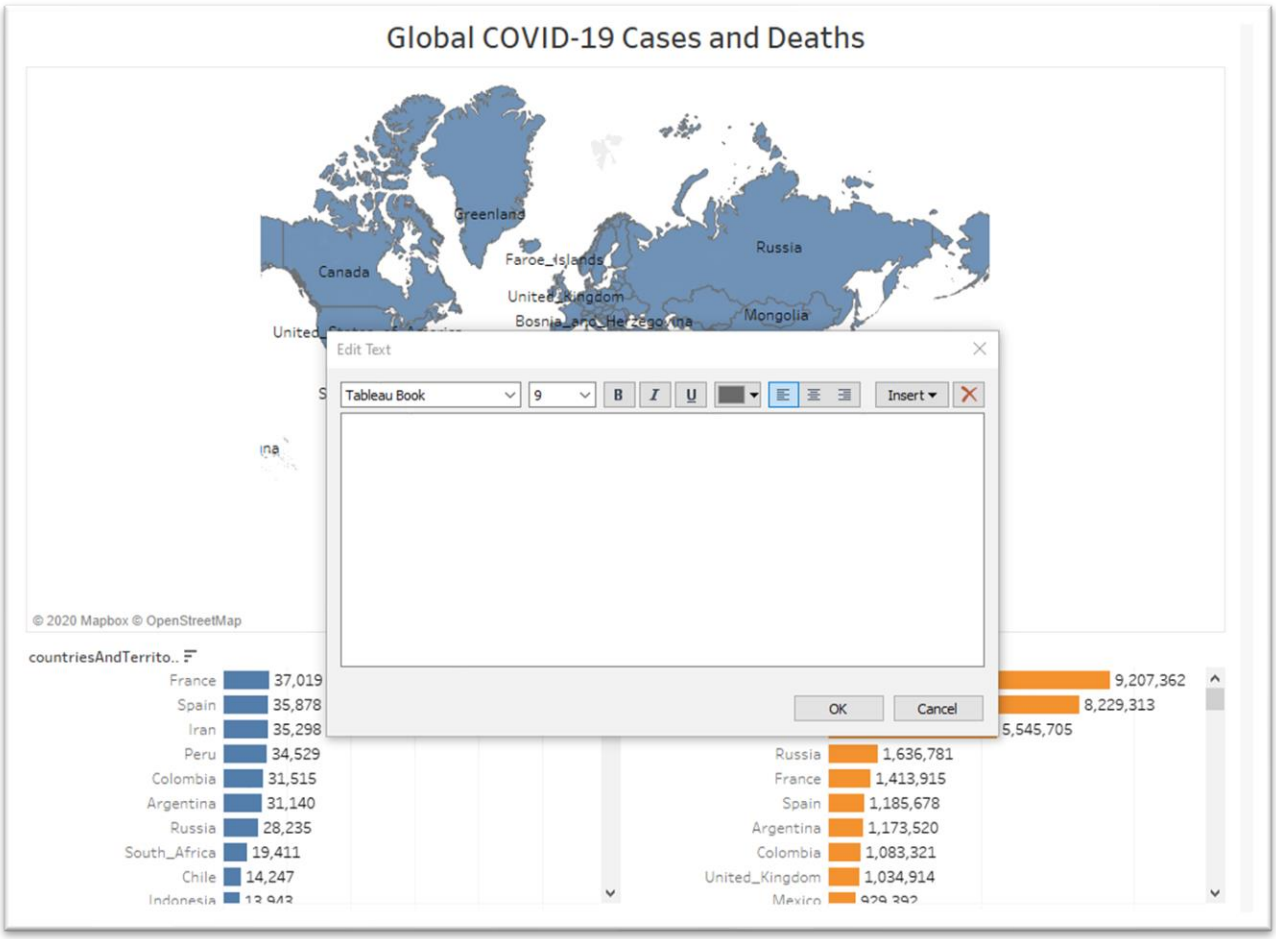


This is a bit tricky. So, you may have to attempt it a few times.

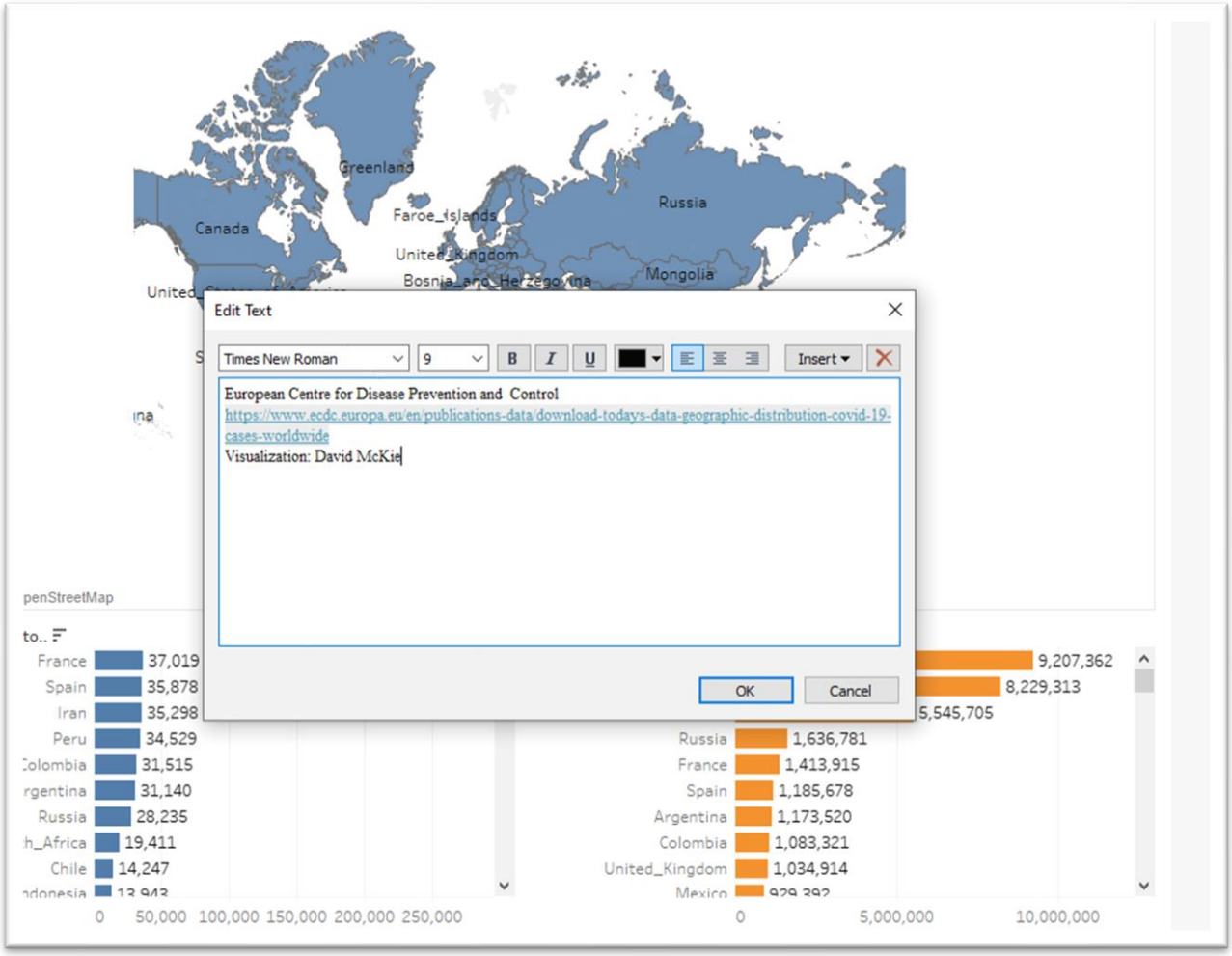
Drag the icon to the bottom edge of the visualization until the grey area covers the width of your screen area that contains the visualization.

Release your finger from the mouse to produce the same edit dialog box we used to give the dashboard a title.

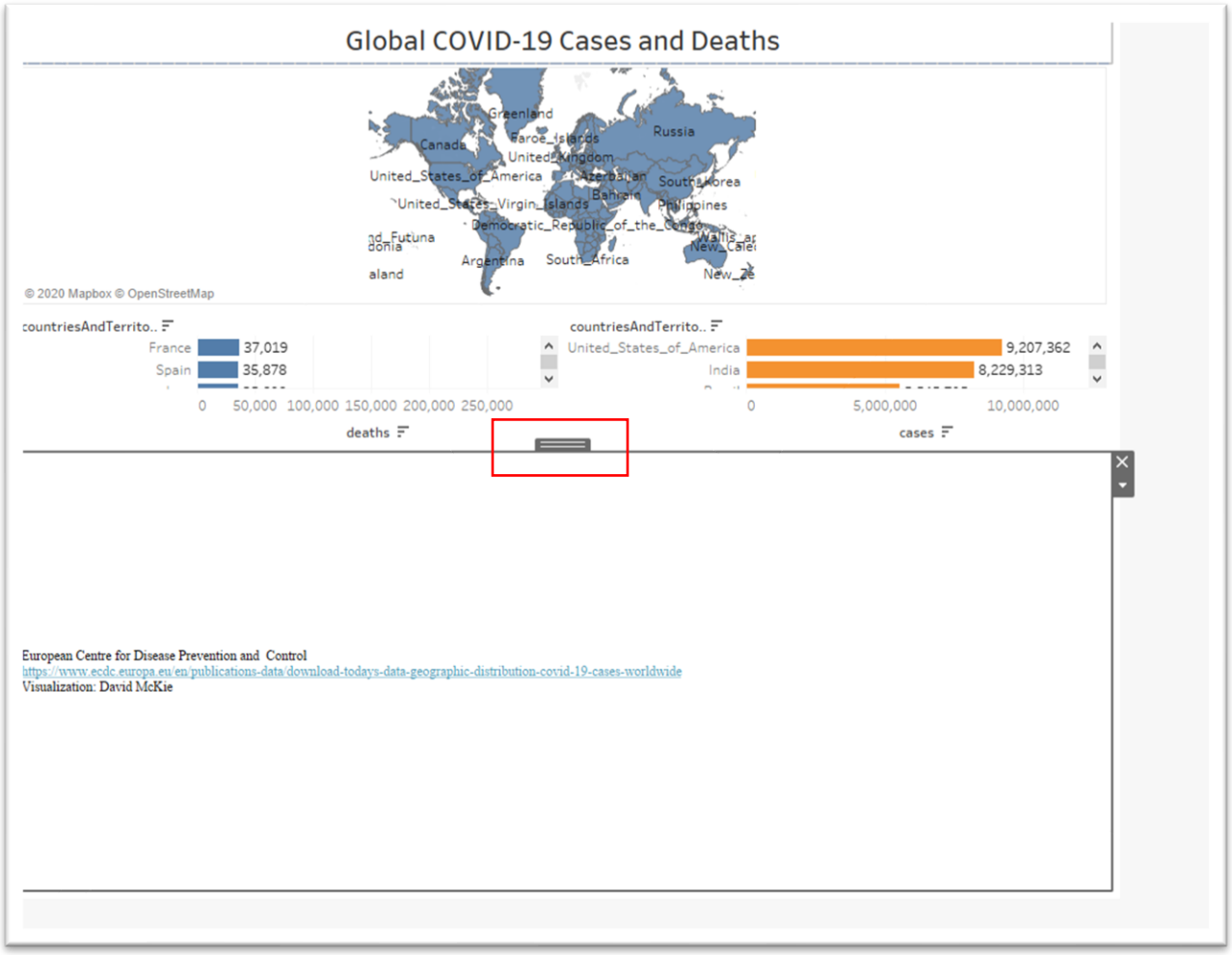

Iran 35,298
Peru 34,529
Colombia 31,515
Argentina 31,140
Russia 28,235
South_Africa 19,411
Chile 14,247
0 50,000 100,000 150,000 200,000 250,000
deaths
Brazil 5,545,705
Russia 1,636,781
France 1,413,915
Spain 1,185,678
Argentina 1,173,520
Colombia 1,083,321
United_Kingdom 1,034,914
0 5,000,000 10,000,000
cases


Global COVID-19 Cases and Deaths
Greenland
Canada
Faroe_Islands
United_Kingdom
Russia
Mongolia
Edit Text
Tableau Book
9
Insert
OK
Cancel
© 2020 Mapbox © OpenStreetMap
countriesAndTerrito..
France 37,019
Spain 35,878
Iran 35,298
Peru 34,529
Colombia 31,515
Argentina 31,140
Russia 28,235
South_Africa 19,411
Chile 14,247
9,207,362
8,229,313
5,545,705
Russia 1,636,781
France 1,413,915
Spain 1,185,678
Argentina 1,173,520
Colombia 1,083,321
United_Kingdom 1,034,914

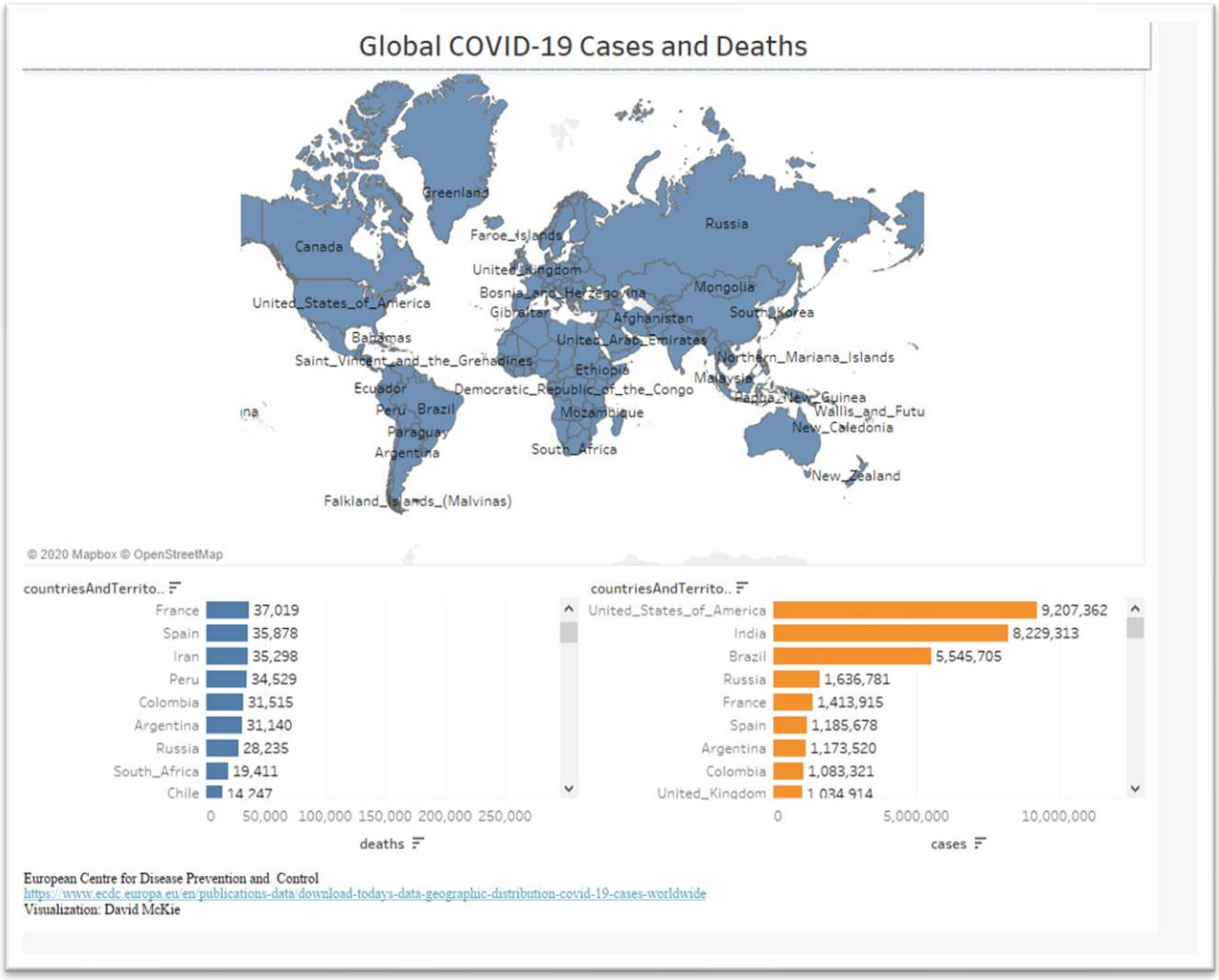
We'll need the source, URL and name of the individual who created the visualization.



If you’re happy with the result, select OK. Be sure to save as you go.

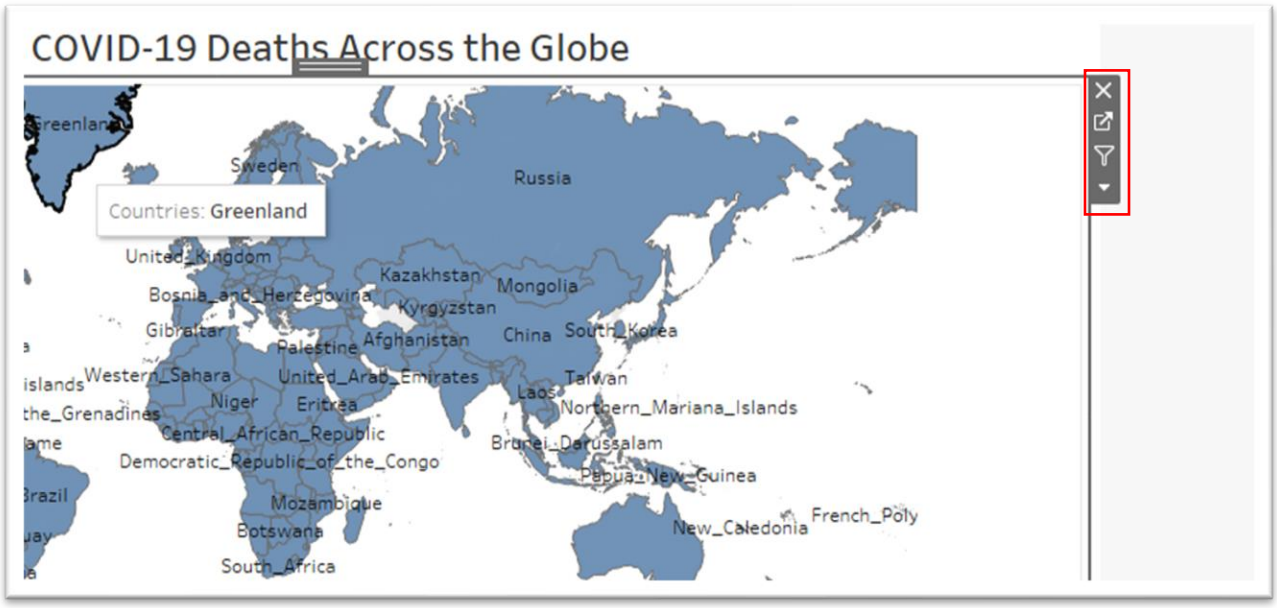


Re-adjust the height by placing your cursor above the black tab in the middle of the upper border and scrolling down until you reach the desired location.



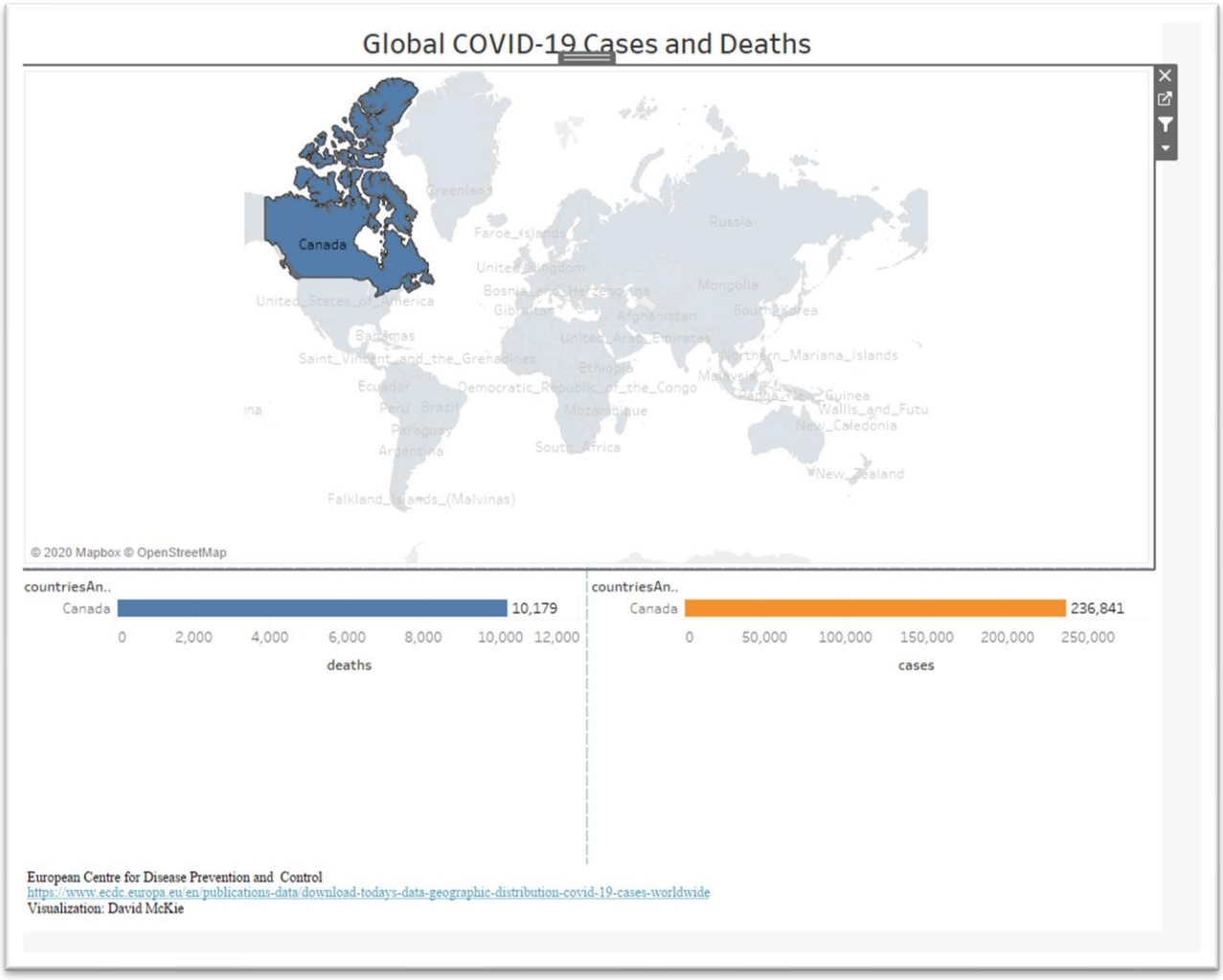
Now for the really cool part, making the dashboard interactive.

Click inside the map to make icons appear on the edge of the border to the top right.



Selecting the funnel icon, will allow the map to act as the filter for the two tables. In other words, clicking on a country produces the corresponding values in the deaths and cases bar graphs below.

Click Canada and see what happens.



Return to all countries by clicking anywhere inside the map.

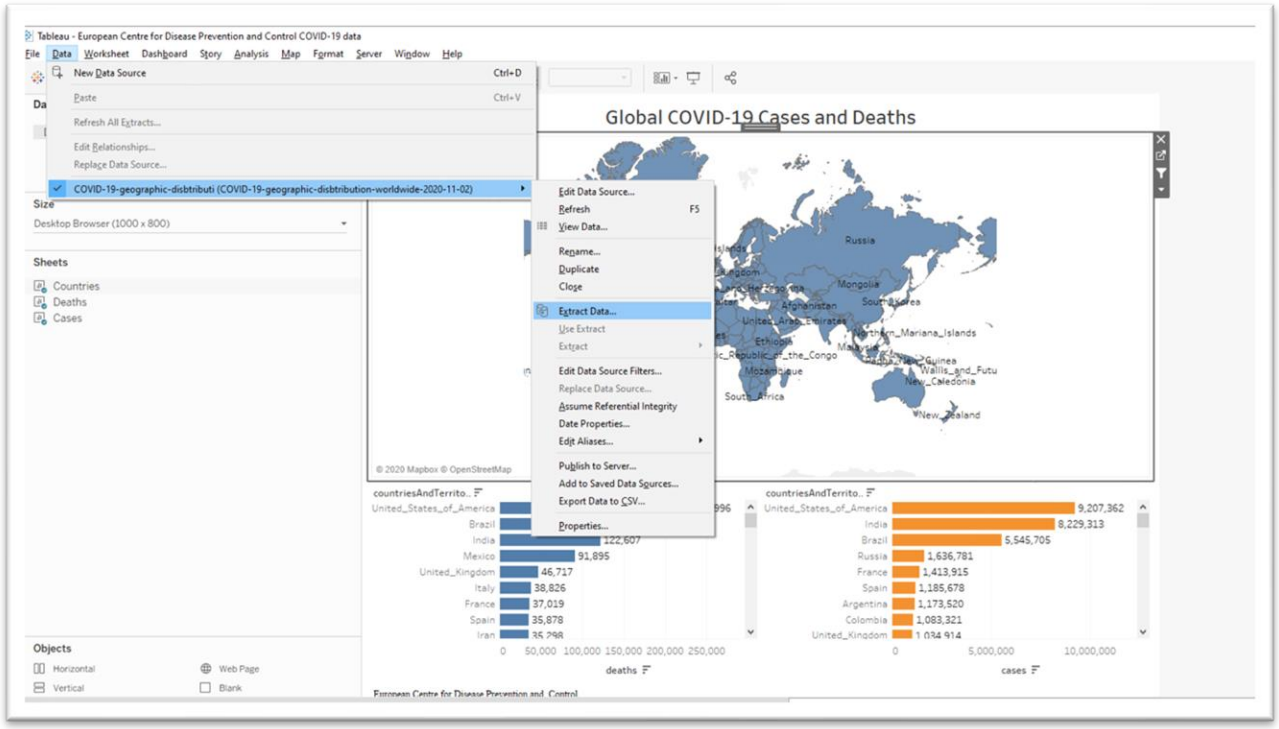
If you're happy with the result, you can publish the visualization, assuming that you have registered for Tableau Public. Make sure that the default visualization is all the countries displayed on the map. If we were to leave it as "Canada", then that's the visualization that people would initially see.

When you save to Tableau Public, it MUST be done from the dashboard.

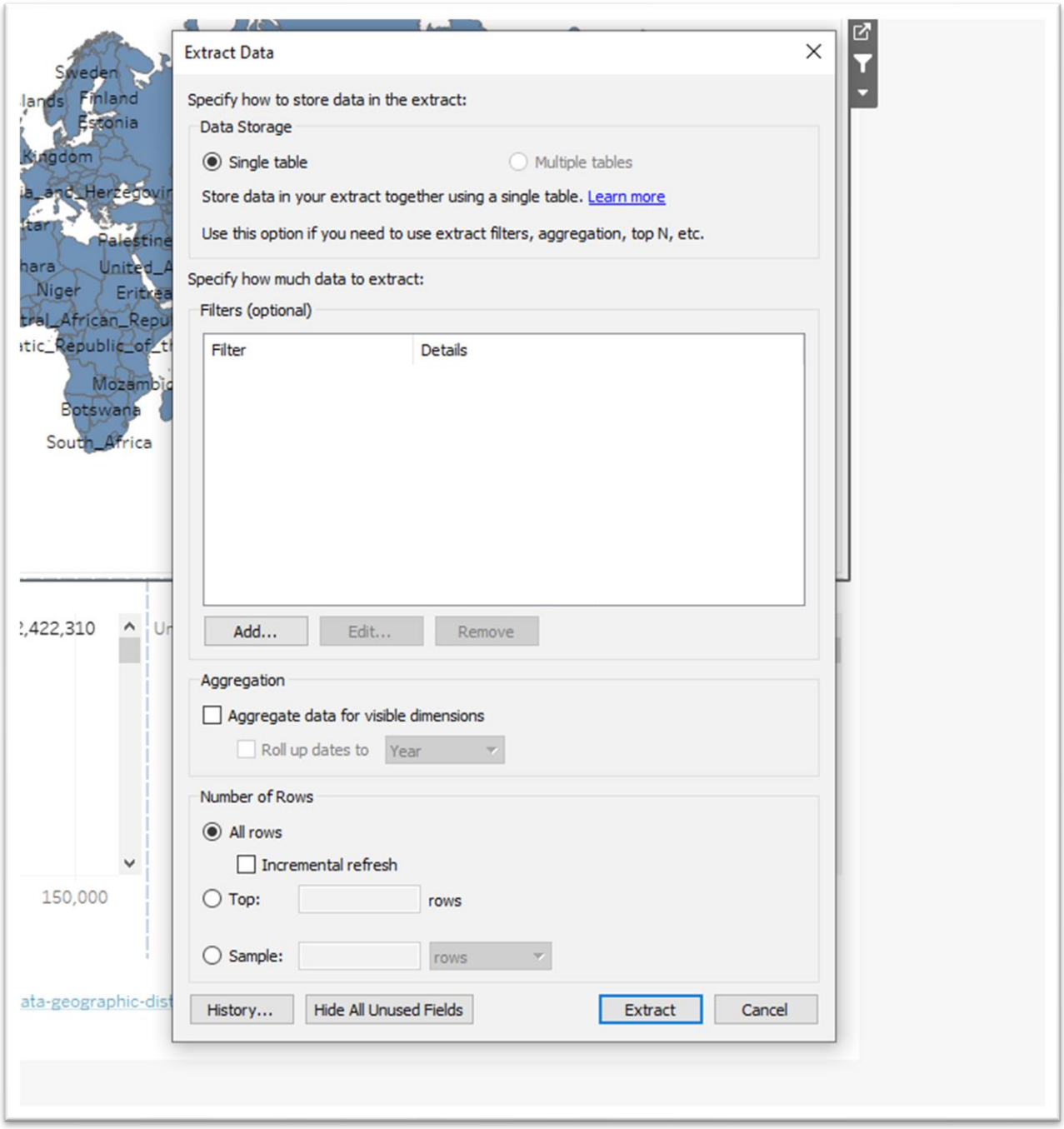
Saving Tableau Public produces an error message that we will only see once. It will say: "The Tableau server you are publishing to does not permit external database connections. Use the Data menu to create an

extract for the following data sources.” An extract is a set of the data that Tableau stores in its own format.

Go to the “Data” section on the horizontal menu at the top and select the “Extract Data” option from the drop-down menu.

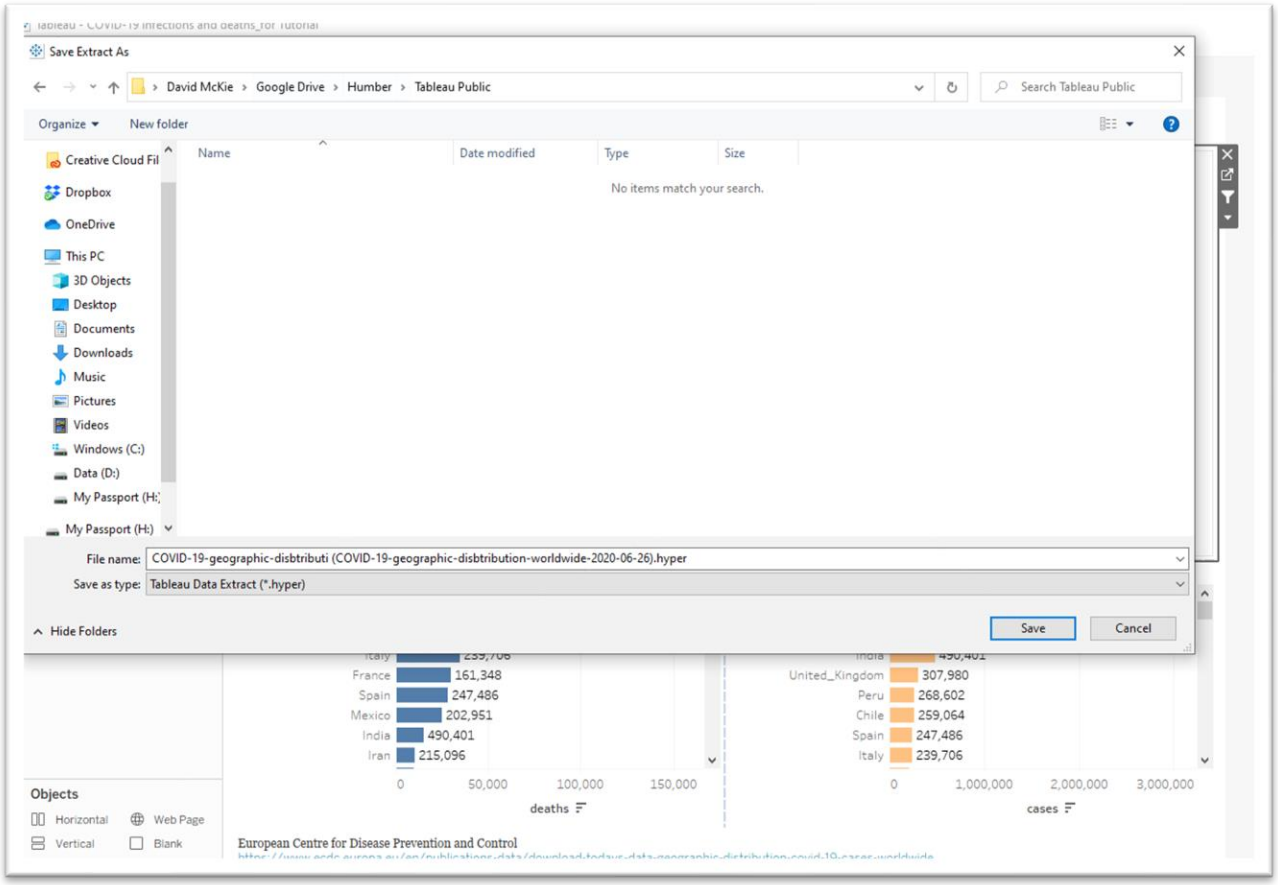


Your interface may look slightly different, but the key is the “Extract Data” option, which produces an “Extract Data” box.



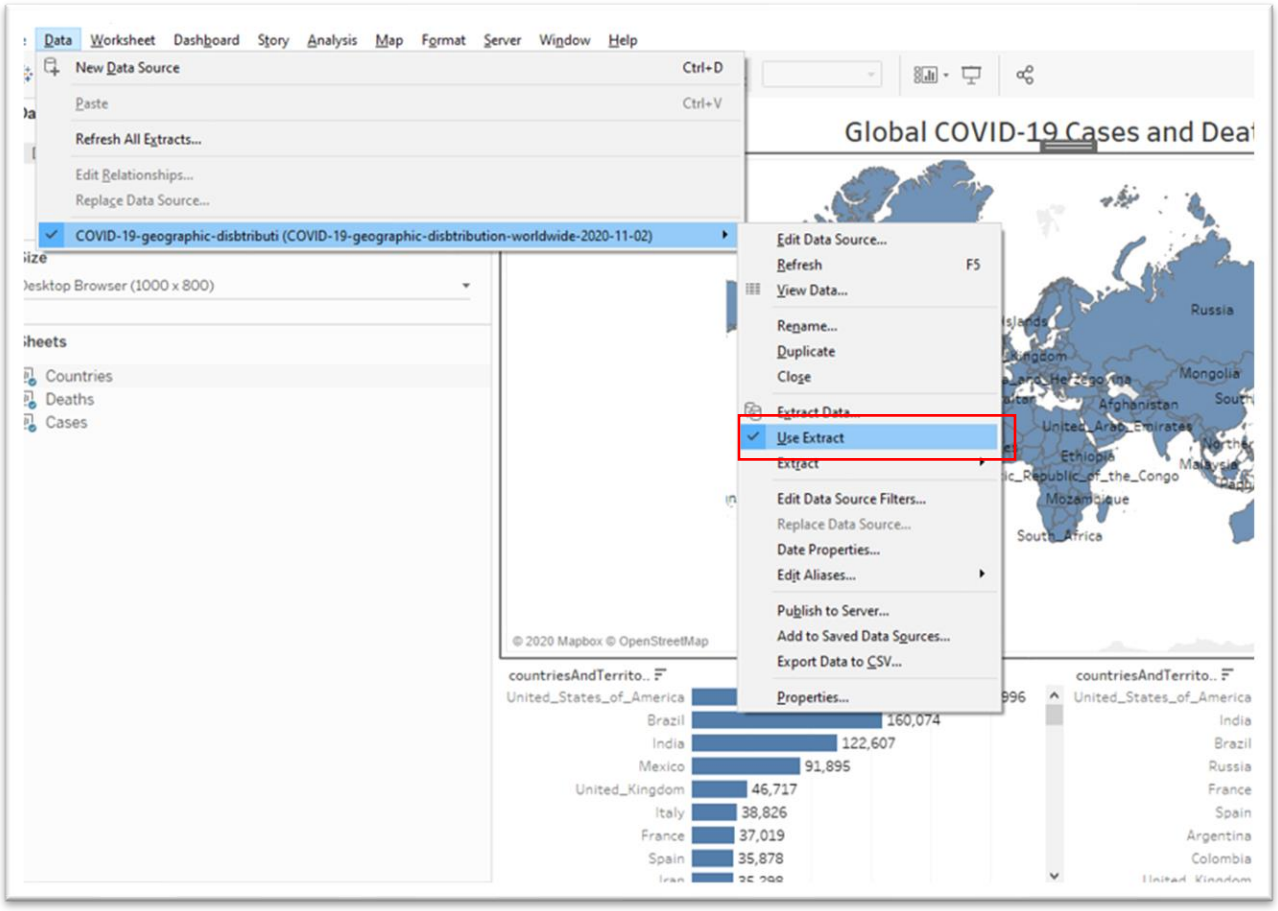
Select “All rows” and the “Extract” tab.

Save the extract to the same folder that contains your Tableau files.



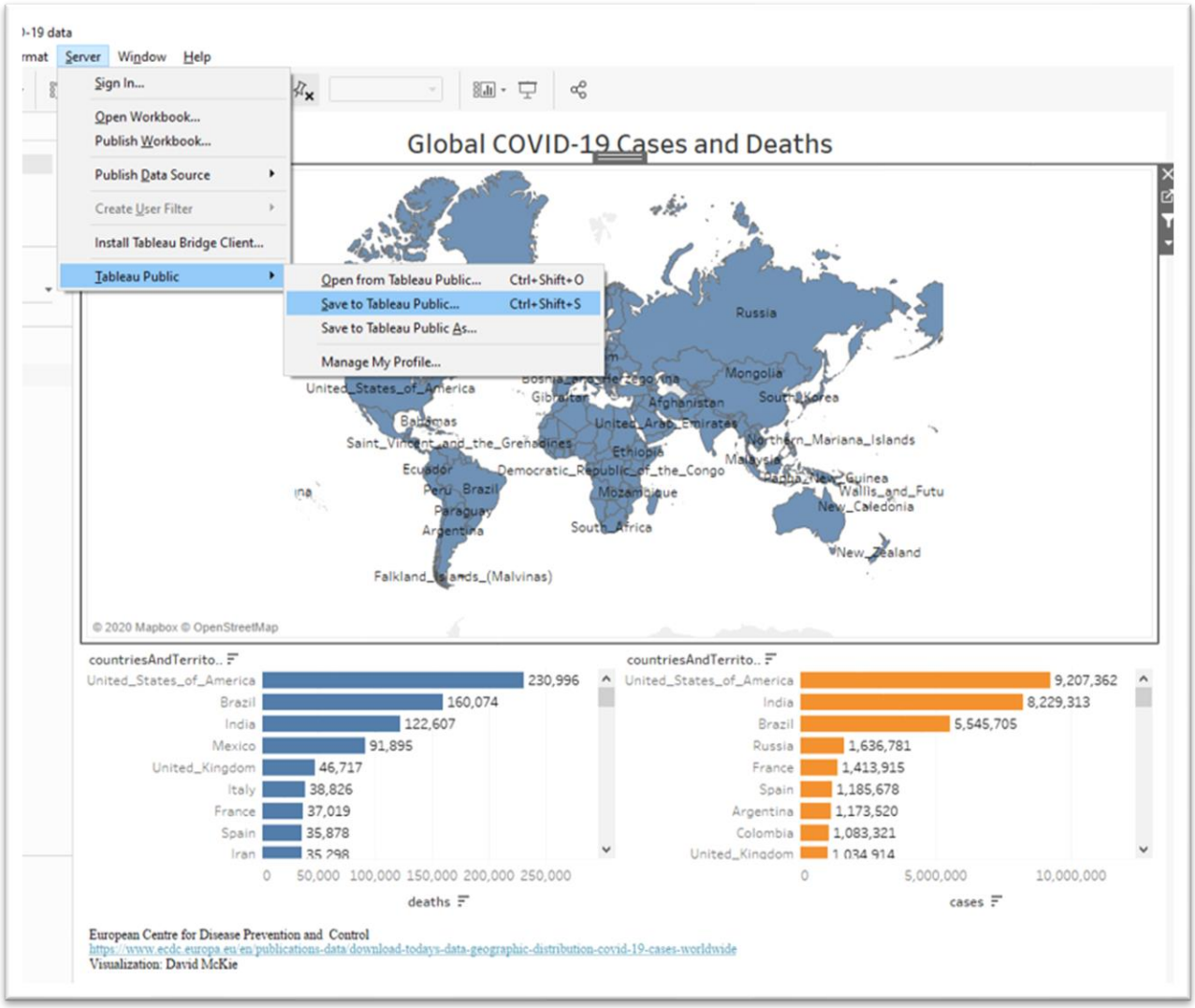
If you return to “Data” in the menu above, you’ll see that the “Use

Extract” option has now been selected.

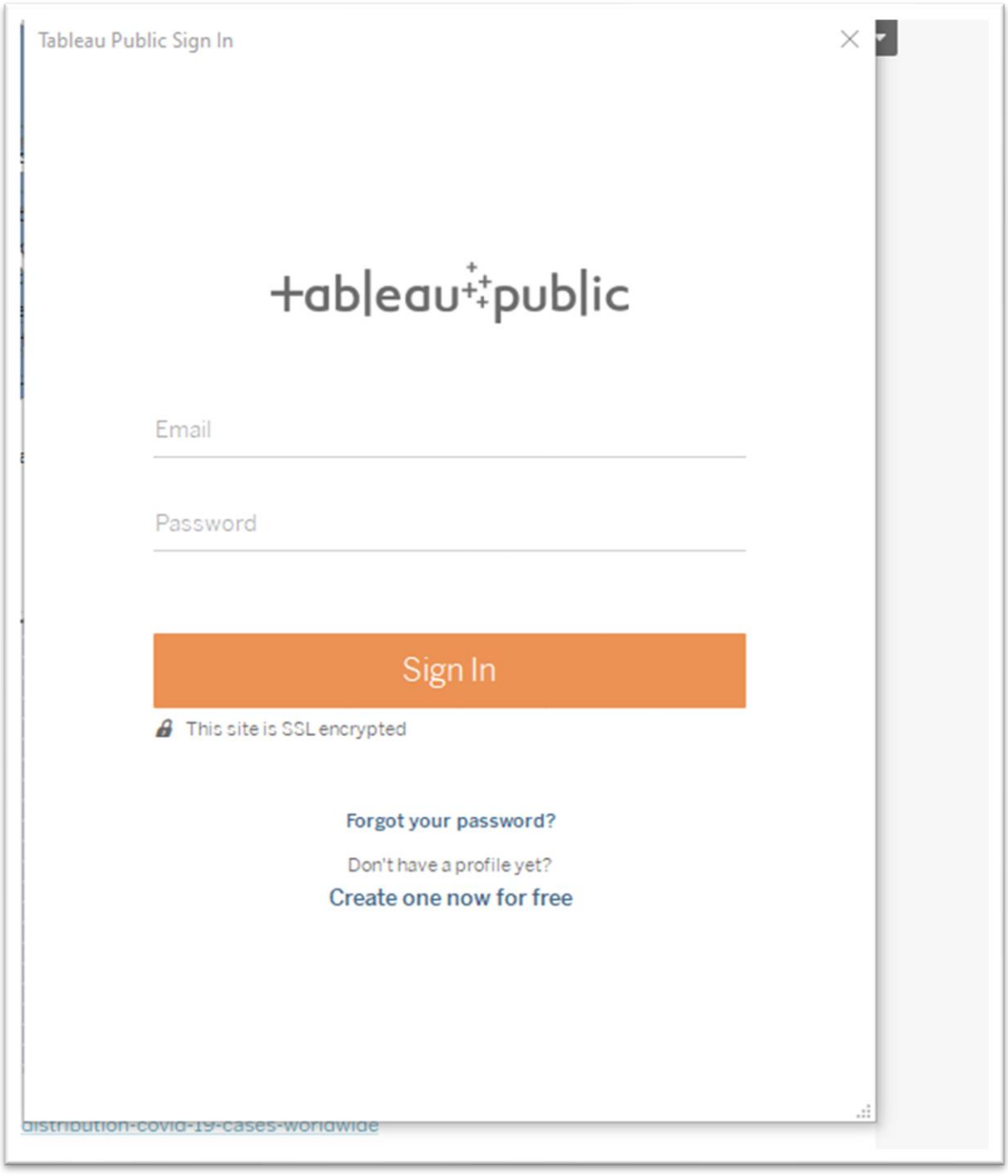


Now you can upload the dashboard to the server.

Go to “Server” and select “Save to Tableau Public…” from the shortcut menu.



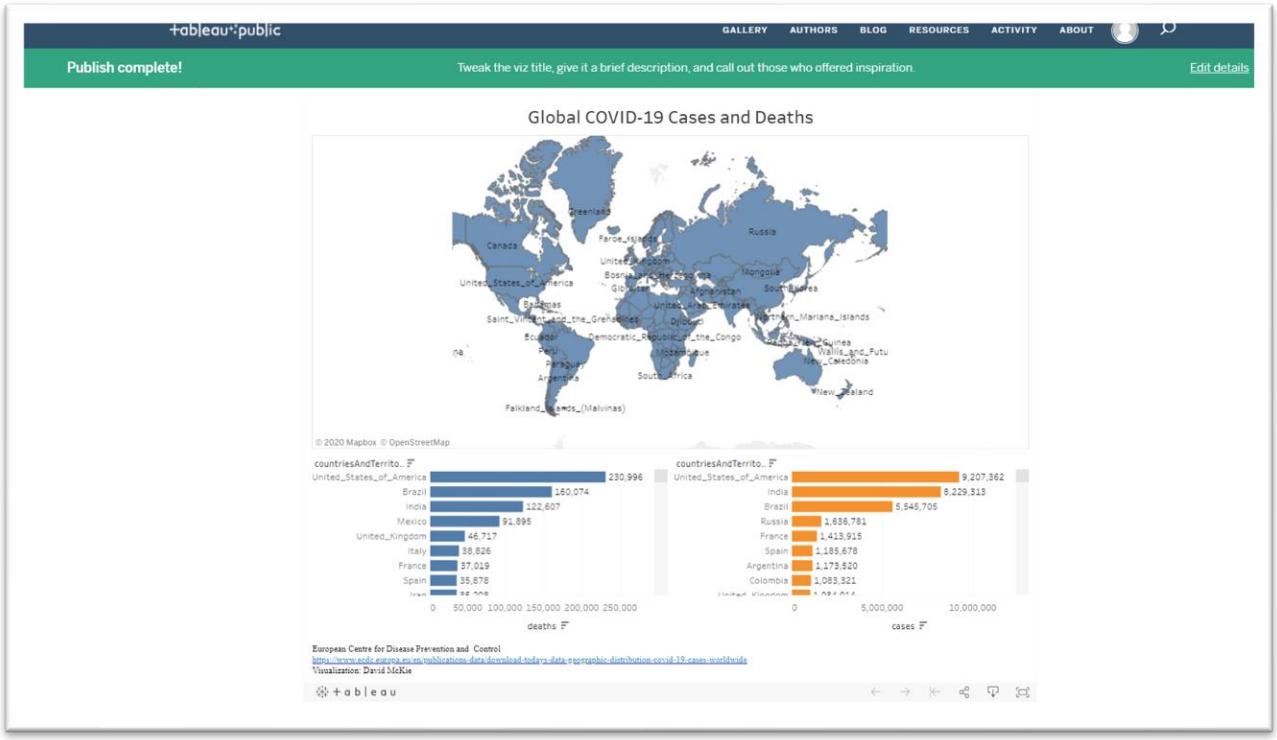
This prompt will appear.



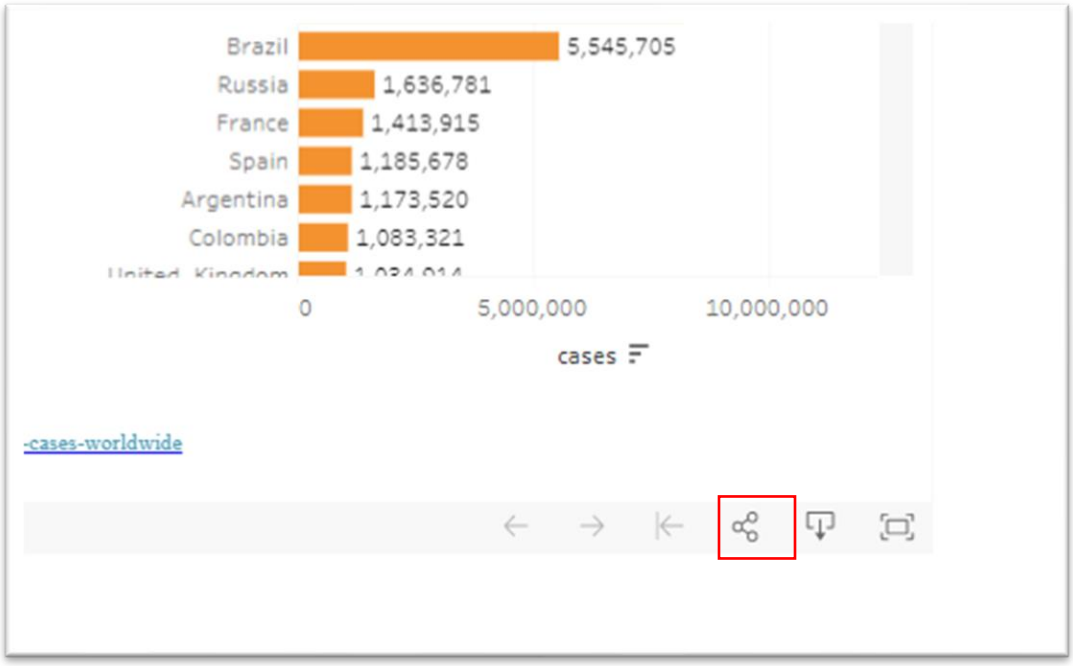
Enter your email address and the password used to set up your Tableau Public account.

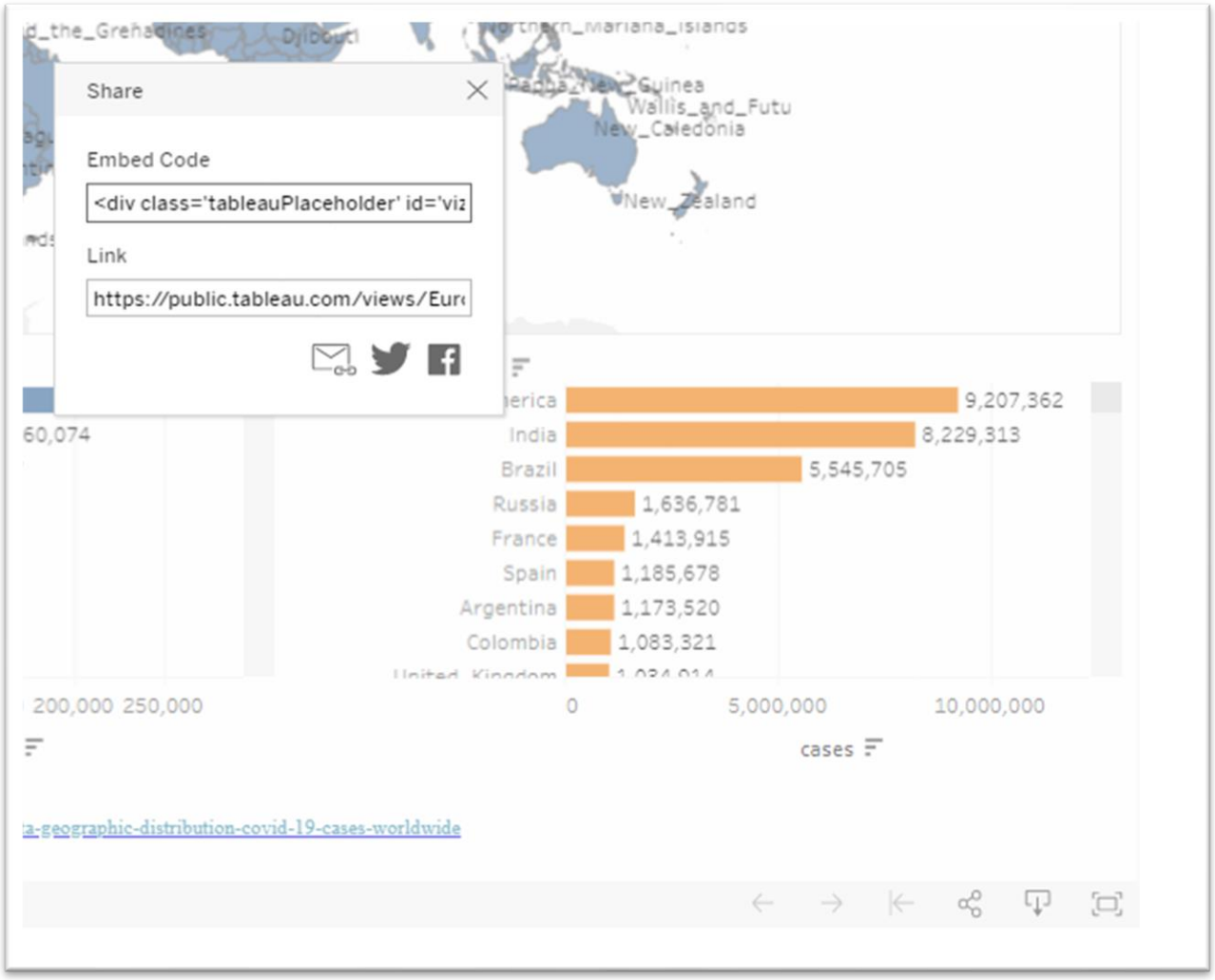
Your visualization will appear in your browser. Once you've signed, in you can always make adjustments to the dashboard, save the result and

paste the new embed code.

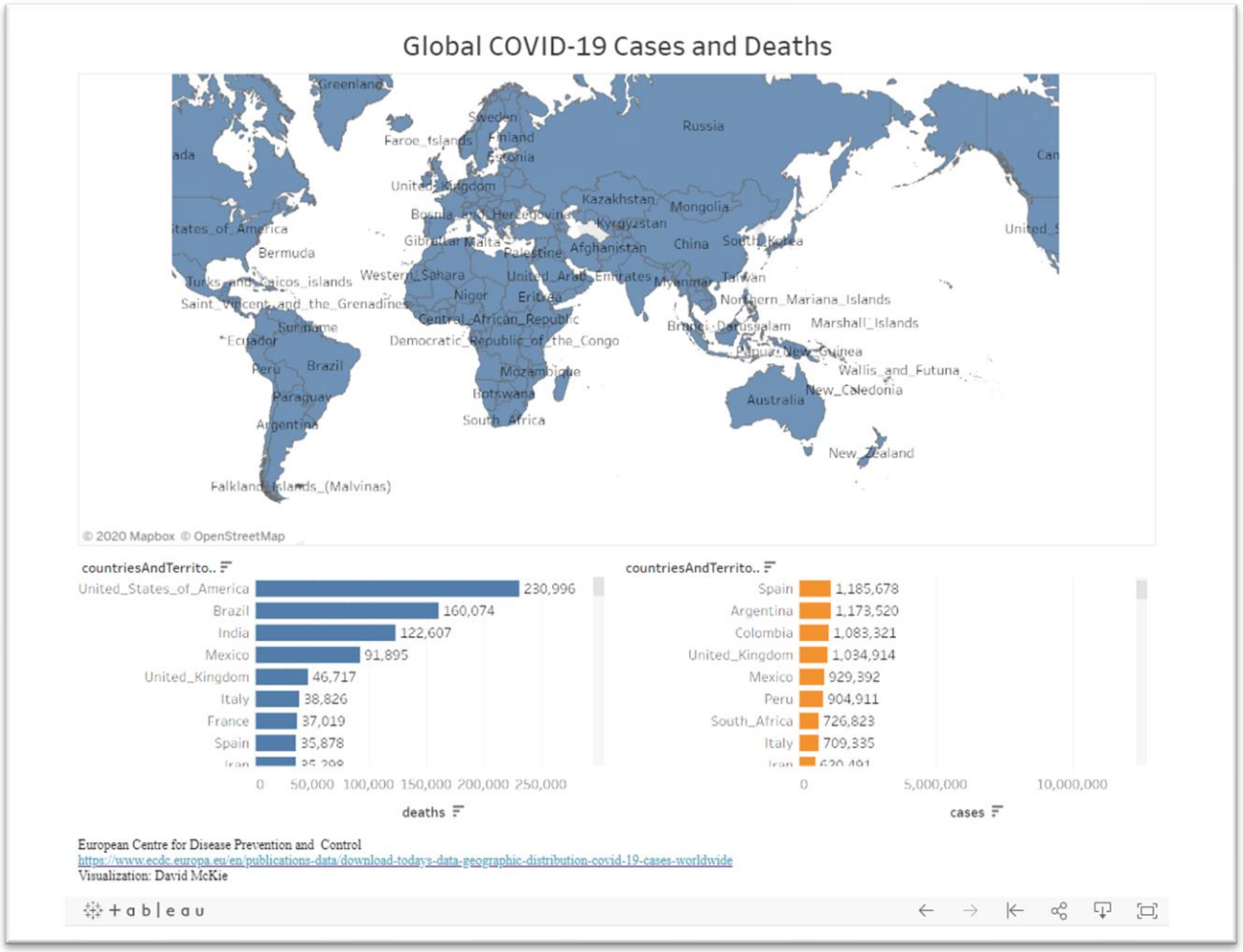


Select the share icon to obtain the embed code.





Paste the embed code into the content management system that contains your story.
http://www.davidmckie.com/30805-2/


Global COVID-19 Cases and Deaths
Greenland
Sweden
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Faroe_Islands
Estonia
Russia
United_Kingdom
Kazakhstan
Mongolia
Kyrgyzstan
Bermuda
Gibraltar
Malta
Palestine
Afghanistan
China
South_Korea
Western_Sahara
United_Arab_Emirates
Myanmar
Taiwan
Turks_and_Caicos_islands
Saint_Vincent_and_the_Grenadines
Niger
Eritrea
Northern_Mariana_Islands
Central_African_Republic
Brunei_Darussalam
Marshall_Islands
Suriname
Ecuador
Democratic_Republic_of_the_Congo
Papua_New_Guinea
Peru
Brazil
Mozambique
Wallis_and_Futuna
Paraguay
Botswana
New_Caledonia
Australia
Argentina
South_Africa
New_Zealand
Falkland_Islands_(Malvinas)
© 2020 Mapbox © OpenStreetMap
countriesAndTerrito..
United_States_of_America 230,996
Brazil 160,074
India 122,607
Mexico 91,895
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deaths
countriesAndTerrito..
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Colombia 1,083,321
United_Kingdom 1,034,914
Mexico 929,392
Peru 904,911
South_Africa 726,823
Italy 709,335
0 5,000,000 10,000,000
cases
European Centre for Disease Prevention and Control
https://www.ecdc.europa.eu/en/publications-data/download-todays-data-geographic-distribution-covid-19-cases-worldwide
Visualization: David McKie
+ableau