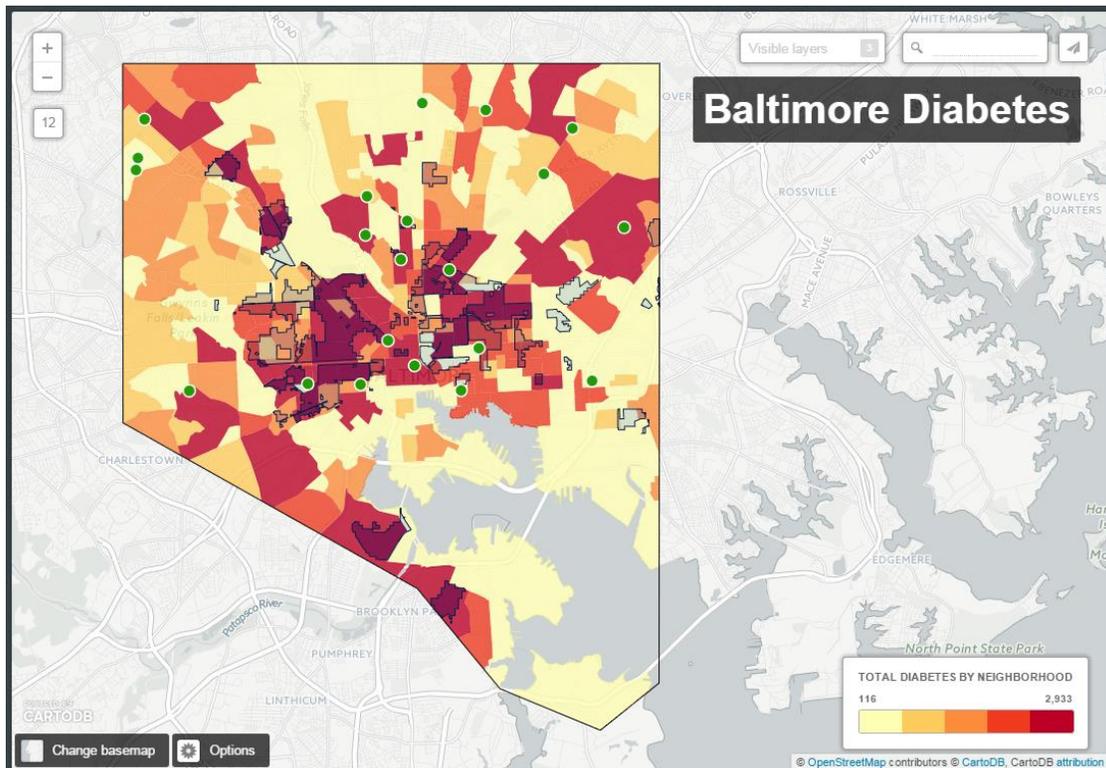


Community Health Maps Lab Series:

Lab 6—Data Visualization With CartoDB

Objective: Understand How To Use CartoDB To Create an Online Visualization of Your Data

Document Version: 2015-09-15 (V2)



This course is a collaborative effort between the National Library of Medicine, the Center for Public Service Communications, and Bird's Eye View.

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1. Introduction

You have learned how to collect field data, conduct analyses, and make maps in QGIS Desktop. In this final exercise, you will learn how to use CartoDB to map your data. CartoDB is an online cloud-based platform for storing and visualizing spatial data. You can sign up for a free account, which gives you 50Mb of storage space. This goes farther than you might think. The data for this lab will consume only slightly more than 2Mb. You can then style your data, choose from an assortment of basemaps, and share a dynamic map with colleagues.

2. Objective: Understand How To Use CartoDB To Create an Online Visualization of Your Data

In this lab exercise, you will learn the basics of working with CartoDB and how to upload data, style it, and publish a map. This lab includes the following tasks:

- Task 1 – Getting Started
- Task 2 – Upload Your Data
- Task 3 – Style Your Data
- Task 4 – Create and Share Your Visualization

3. How Best To Use Video Walkthrough With This Lab

To aid in your completion of this lab, some lab tasks have an associated video that demonstrates how to complete the task. The intent of these videos is to help you move forward if you become stuck on a step in a task, or if you wish to see every step required to complete the tasks.

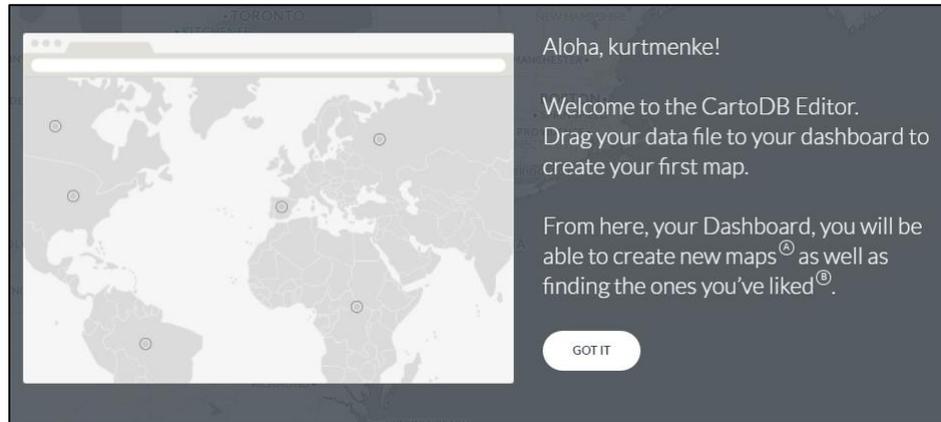
We recommend that you do not watch the videos before you attempt the tasks. The reasoning for this is that while you are learning the software and searching for buttons, menus, and other features, you will better remember where these items are and, perhaps, discover other features along the way if you discover them on your own. With that being said, please use the videos in the way that will best facilitate your learning and successful completion of this lab.

4. Lab Tasks

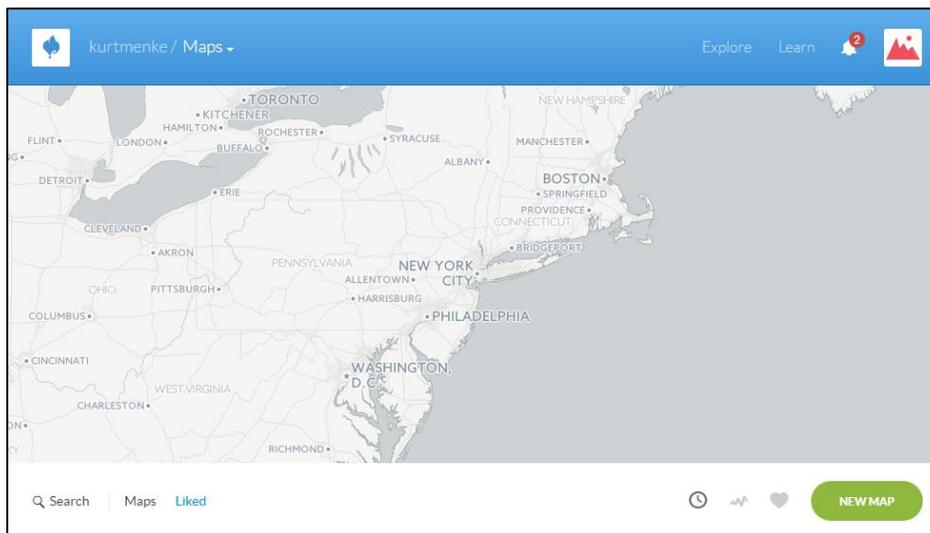
Task 1. Getting Started

In this task, you will learn how to set up a free account on CartoDB. Then you will get oriented to the basic layout of CartoDB.

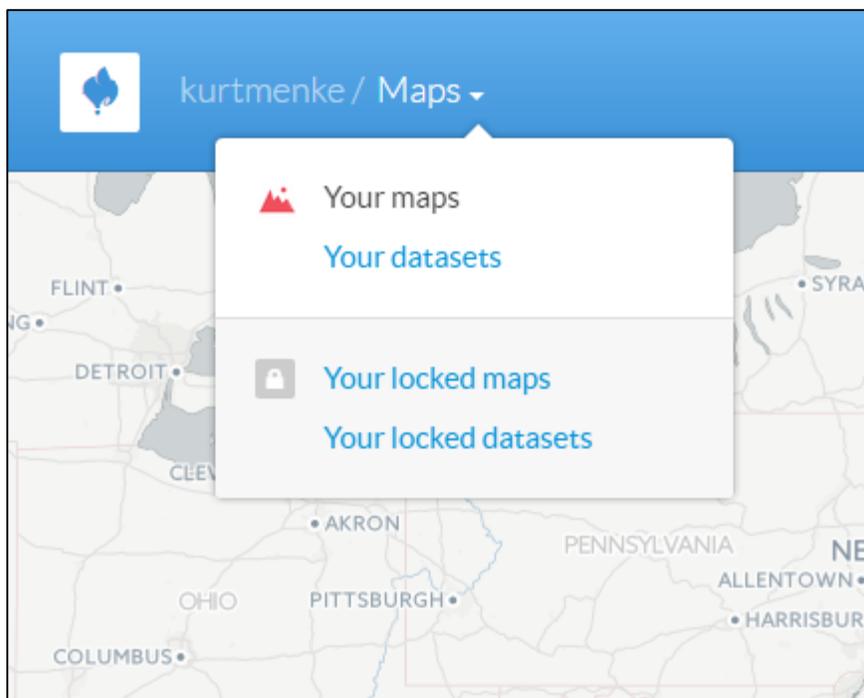
- 1) Open a web browser.
- 2) Navigate to the [CartoDB site](#).
- 3) Sign up for a free account by providing a login name, email, and password.
- 4) After a moment, you will be presented with a welcome message and some information. You will also receive a welcome email from CartoDB.



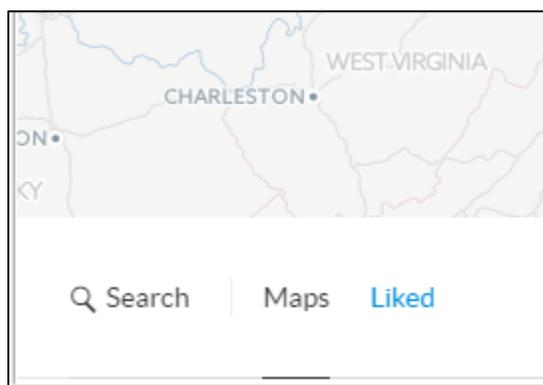
- 5) You will be presented with your Dashboard, which consists of a gray basemap and some links. Now you will get oriented.



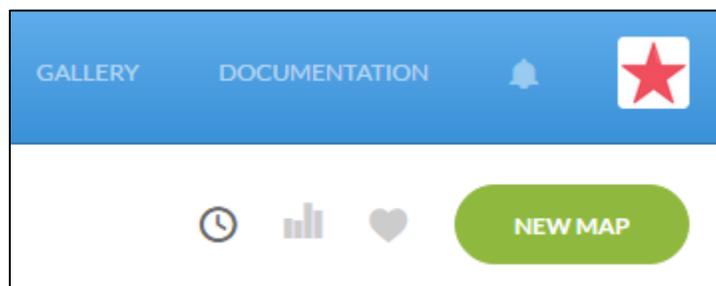
- 6) In the top left corner is your *user name* / **Maps** with a dropdown arrow. Clicking the arrow allows you to navigate to **Your datasets** along with any locked maps or locked datasets. Since you have just signed up, you have no maps or datasets.



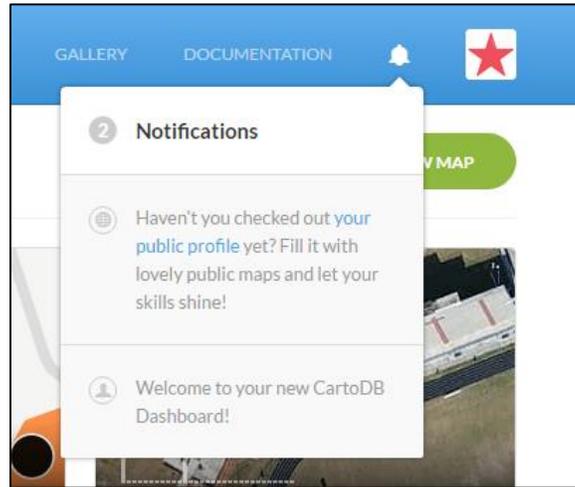
- 7) In the lower left corner are links that allow you to search for maps and data by names or tags. Next to that is a link to **Maps** and a link to maps you have **Liked**. Since you have not created a map yet, you do not have any “liked” maps.



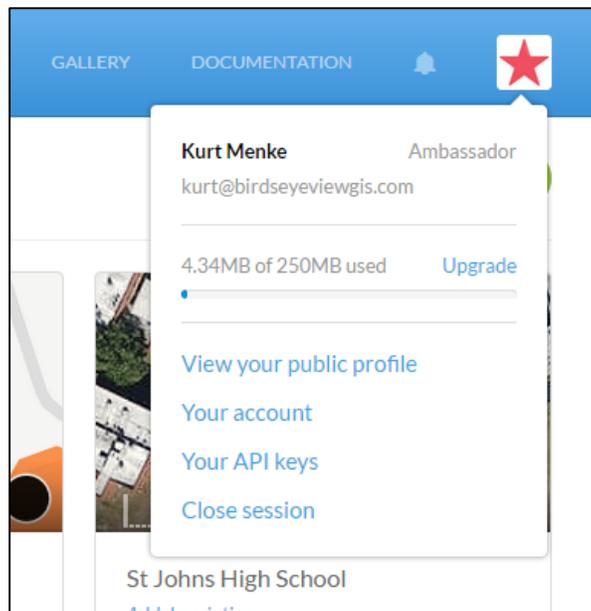
- 8) In the upper right corner is a link to **Gallery**. This takes you to the CartoDB Map Gallery where you can find maps that others have created sorted by categories. Next to that is the **Documentation** link, which takes you to the CartoDB documentation and other learning resources such as the [Map Academy](#).



- 9) The next icon alerts you to any **Notifications** you have. Here there are two notifications: one welcoming you to CartoDB and one prompting you to complete your CartoDB profile.



- 10) The last icon in the upper right allows you to access your account settings.



- 11) The icons below that on the right, allow you to sort maps by date, number of visits, number of likes, and to create a New Map.

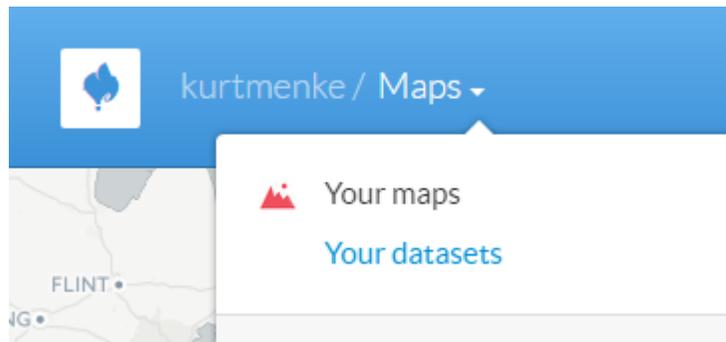


Task 2. Upload Your Data

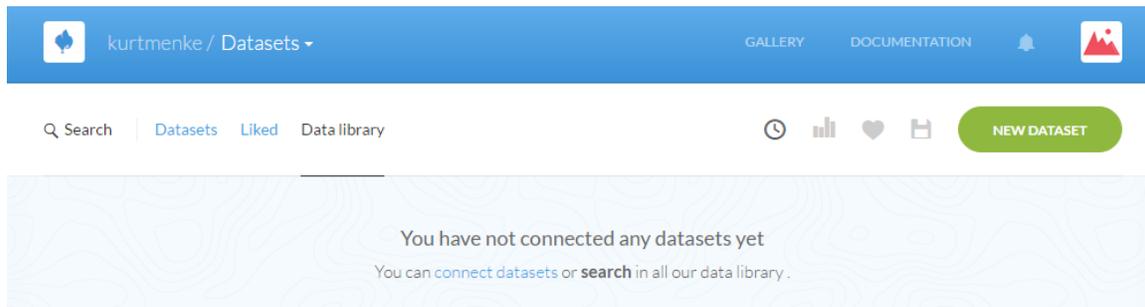
Watch a [Task 2 Video Walkthrough](#) on YouTube.

Now that you have started your account, you will upload some data. Uploading data into CartoDB is easy. Here you will upload some data you have used in previous labs. It was collected using iForm in Baltimore City representing dialysis clinics. This is the raw data downloaded from iForm as a spreadsheet.

- 1) Open Windows Explorer or Mac Finder and navigate to the data folder for this lab. Open the *Balt_Dialysis_Centers.xls* spreadsheet. This was data collected using iForm and downloaded as an XLS file.
- 2) Notice that there is an extra row across the top. Select this and delete it. Save your changes. This will give the data proper column headers.
- 3) Open a web browser, open the CartoDB webpage and log in to your CartoDB account.
- 4) In the top left corner, click the down arrow next to your *user name / Maps* and choose **Your datasets**.



- 5) This takes you to your Datasets page.



- 6) CartoDB accepts data in many formats as shown in the following table:

File Format	Definition
.CSV, .TAB	Comma-separated values and Tab delimited file
.SHP	ESRI shapefiles
.KML, .KMZ	Google Earth format
.XLS, .XLSX	Excel Spreadsheet
.GEOJSON	GeoJSON
.GPX	GPS eXchange Format
.OSM, .BZ2	Open Street Map dump
.ODS	OpenDocument Spreadsheet

Data can be uploaded via the following options:

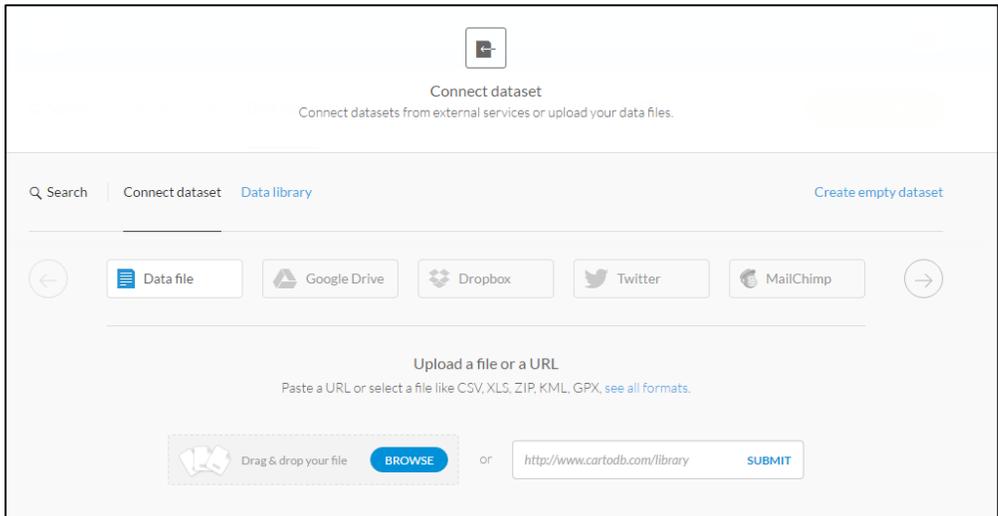
- Upload a local file or import directly from a public URL
- Sync using Google Drive
- Sync using Dropbox
- Import directly from Twitter (only available for some paid accounts)
- Create an empty table

The most common method is uploading local files. This will be how you upload your field data to CartoDB.

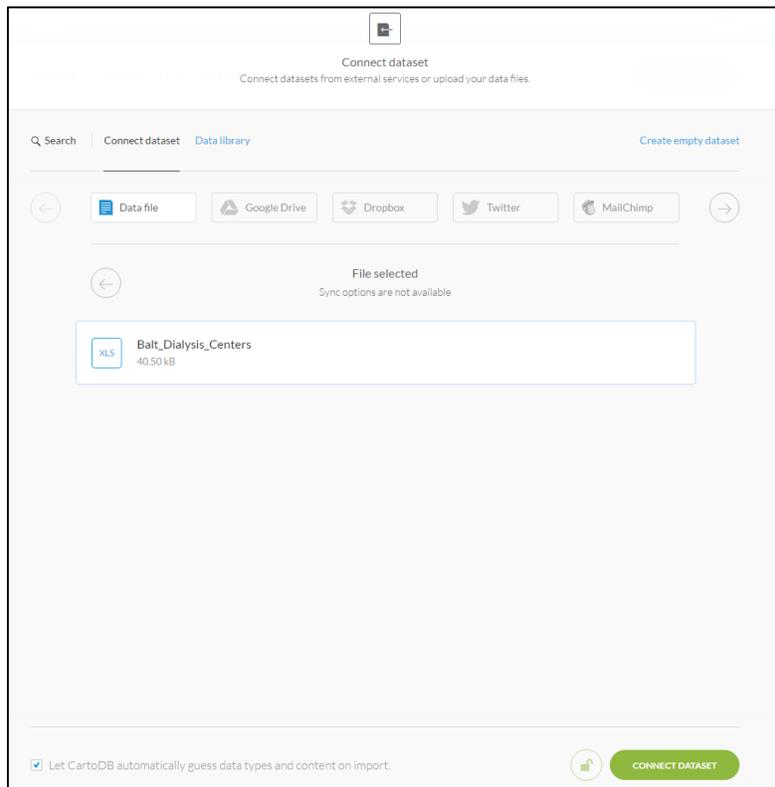
- 7) Click the green **NEW DATASET** button. Some help will pop up giving you information on uploading data. Click the **GOT IT** button to dismiss.



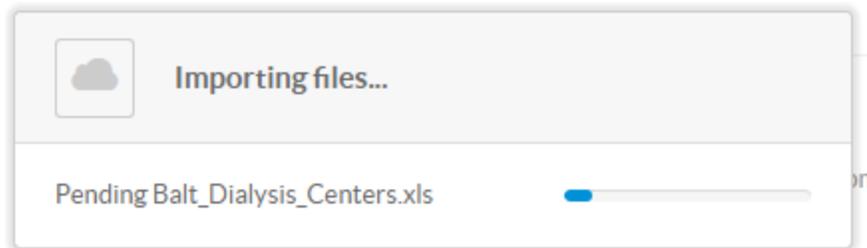
- 8) Since your data is a local Excel spreadsheet, click the blue **BROWSE** button. Navigate to the *Lab6/Data* folder and select the *Balt_Dialysis_Centers.xls* spreadsheet. Click **Open**.



9) Click the green **CONNECT DATASET** button.



10) While it imports you will see the following progress bar in the lower left corner.



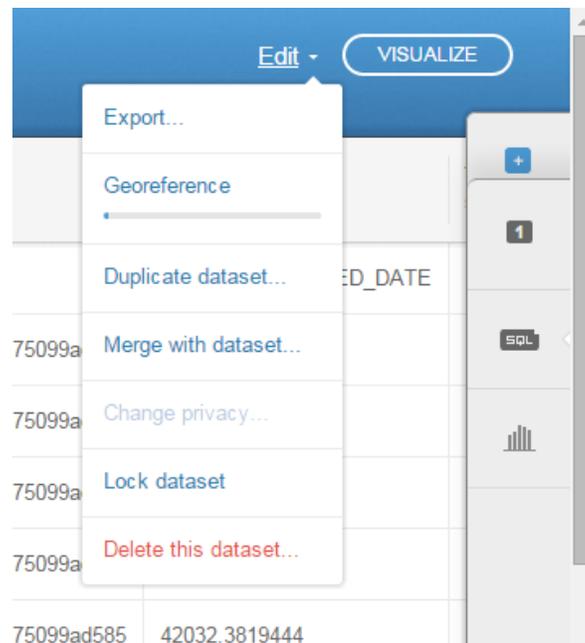
NOTE: What you just did was actually the hard way! You can also simply drag and drop files like this from Windows Explorer or Mac Finder to your browser window with CartoDB open and they will be uploaded to your account!

11) Once the import process is complete, the spreadsheet will appear in your browser.

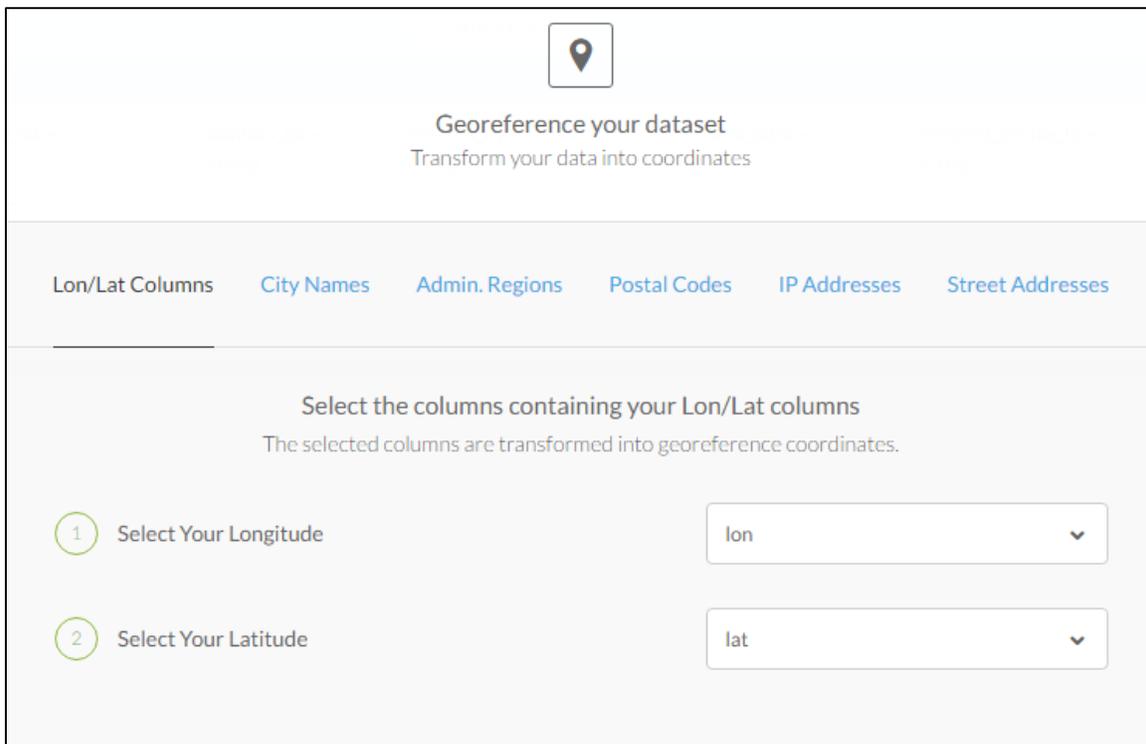
cartodb_id - number	the_geom - geometry	address - string	contact_na - string	contact_ph - string	created_by - string	created_date
1	-76.5417, 39.3290	5009 FRANKFORD AVE	KIM SYLVESTER, RN, MS	(410) 532-4907	kurt@birdseyeviewgis.com	2015-01
2	-76.6308, 39.2879	840 HOLLINS STREET	KATHY SMITH	(410) 468-0900	kurt@birdseyeviewgis.com	2015-01
3	-76.5525, 39.2889	333 CASSELL DRIVE, SUITE 2300	CELE JOHNSON	(410) 550-0644	kurt@birdseyeviewgis.com	2015-01
4	-76.7061, 39.3472	4701 MOUNT HOPE DRIVE, SUITE C	GENNY MURRAY	(410) 585-0467	kurt@birdseyeviewgis.com	2015-01
5	-76.5968, 39.2863	409 NORTH CAROLINE STREET	MICHAEL PRZYWARA	(410) 955-0722	kurt@birdseyeviewgis.com	2015-01
6	-76.6291, 39.3271	3303 CHESTNUT AVENUE	JOAN ROGERS	(301) 366-5400	kurt@birdseyeviewgis.com	2015-01
7	-76.5908, 39.2974	600 N WOLFE ST		(301) 955-2567	kurt@birdseyeviewgis.com	2015-01
8	-76.6008, 39.3179	920 E 25TH STREET	MICHAEL PRZYWARA	(410) 235-1611	kurt@birdseyeviewgis.com	2015-01
9	-76.6487, 39.2881	2000 W BALTIMORE STREET, 2ND FLOOR	HILDA LIVELY	(410) 362-3094	kurt@birdseyeviewgis.com	2015-01
10	-76.6215, 39.2994	821 N EUTAW STREET SUITE 401	TOBY PANTING	(410) 383-3456	kurt@birdseyeviewgis.com	2015-01
11	-76.6888, 39.2862	22 SOUTH ATHOL AVENUE	MAURA GRAZIANO	(717) 730-6164	kurt@birdseyeviewgis.com	2015-01
12	-76.6099, 39.3616	5820 YORK ROAD	TIMBERLY TAYLOR-CURE	(419) 532-9311	kurt@birdseyeviewgis.com	2015-01
13	-76.6172, 39.3206	2700 NORTH CHARLES STREET SUITE 102	HILDA LIVELY	(410) 243-4193	kurt@birdseyeviewgis.com	2015-01

12) In order to get the points to show up on the map you need to tell CartoDB which column has the latitude and which has the longitude. Scroll across until you see the columns with the latitude and longitude data. They are named “lat” and “lon”.

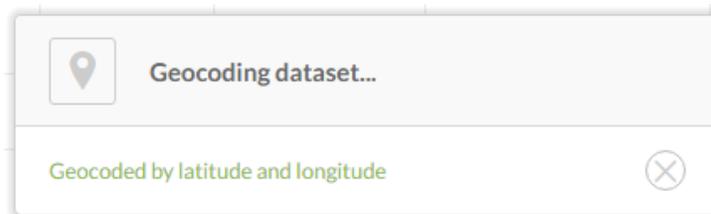
13) In the upper right corner click the **Edit** link and then choose **Georeference**.



14) The **Georeference your dataset** window opens. Select the longitude and latitude columns (long and lat) and click **Continue**.



- 15) In the lower left corner you will see the **Geocoding dataset...** progress window. Click the X to close that popup window.



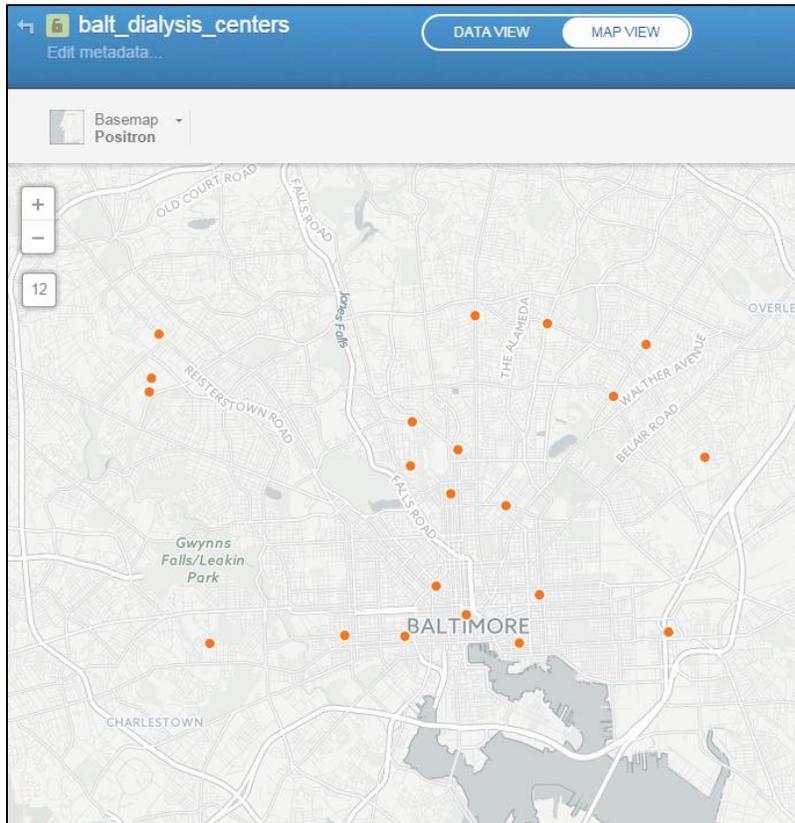
- 16) You are now in **DATA VIEW**. Click the **MAP VIEW** button.



- 17) Use the Zoom and Pan tools to zoom into Baltimore and your data points.



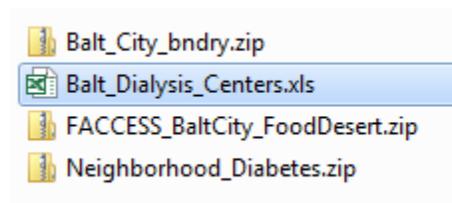
- 18) Now the points collected in the field are mapped in CartoDB.



Information on how to map Excel data and sync it from a DropBox account can be found on the [CartoDB tutorials page](#).

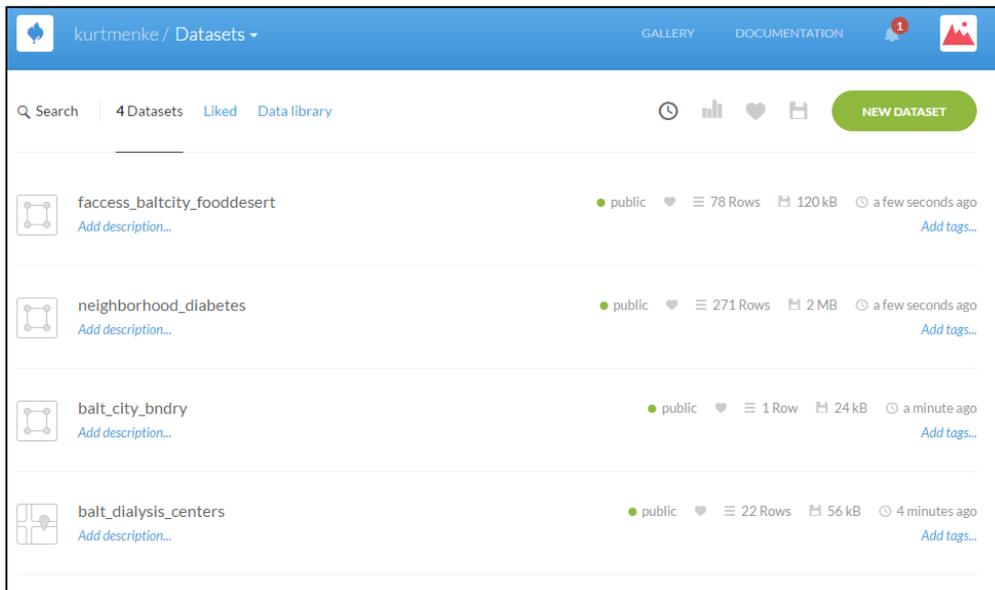
Adding Shapefiles

- 1) Now you will add several shapefiles to the map.
- 2) Open the Lab 6/Data folder in Windows Explorer or Mac Finder. Notice the spreadsheet you have already uploaded to CartoDB. Also notice that there are three zip files. Each of these contains a shapefile. If you are going to upload a shapefile it is best to zip the component files of that shapefile into a zip file of the same name. The entire shapefile needs to be included: .shp, .dbf, .shx, and .prj minimally. ([7-Zip](#) is a great free compression software you can use to do this.) CartoDB will unpack them.

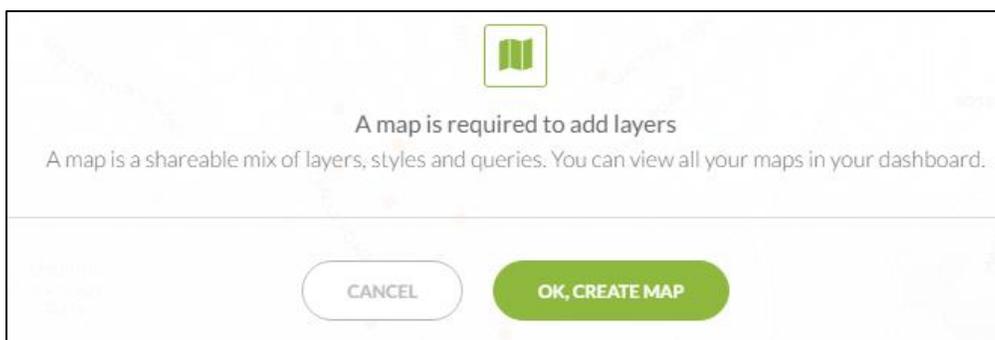


- 3) Click the  button in the upper right corner to return to your **Datasets** page.
- 4) Click the green **NEW DATASET** button.
- 5) Click the **BROWSE** button, navigate to your *Lab 6/Data* folder, and select the *Balt_City_bndry.zip* file. Click Open.
- 6) Click the green **CONNECT DATASET** button.

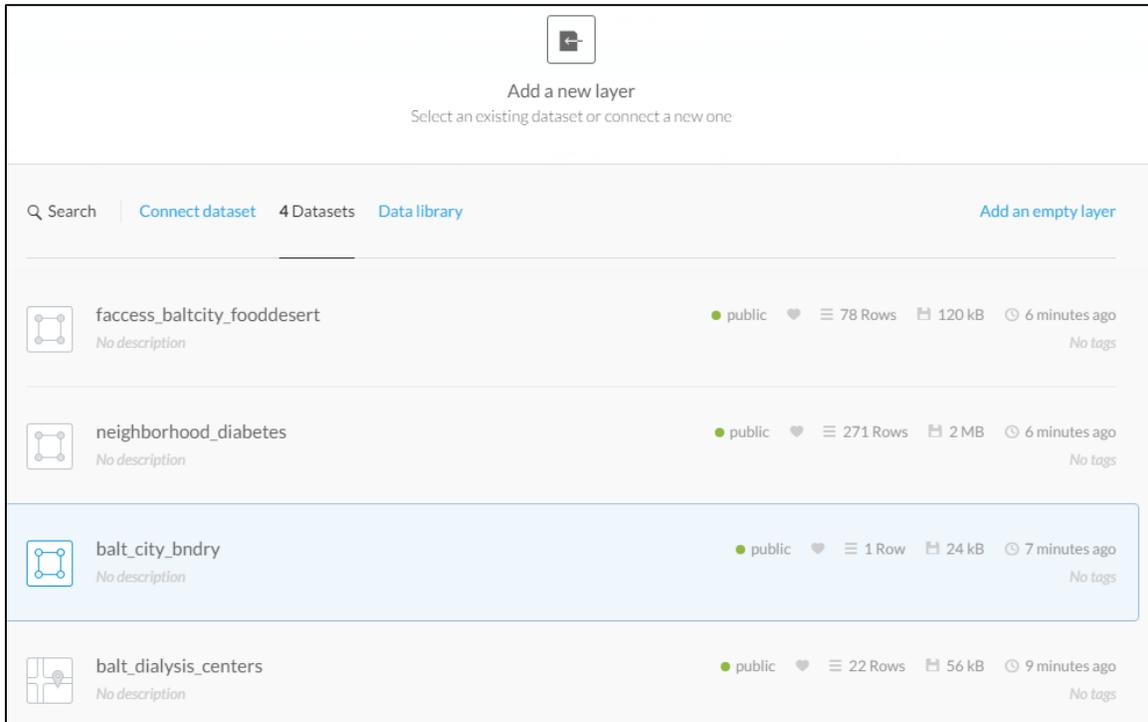
- 7) Repeat steps 3–6 to add the food deserts and the neighborhood diabetes to CartoDB.
- 8) Click the  button in the upper right corner to return to your **Datasets** page. You will see all four datasets listed. There are details about the number of rows (features) and the size of the data.



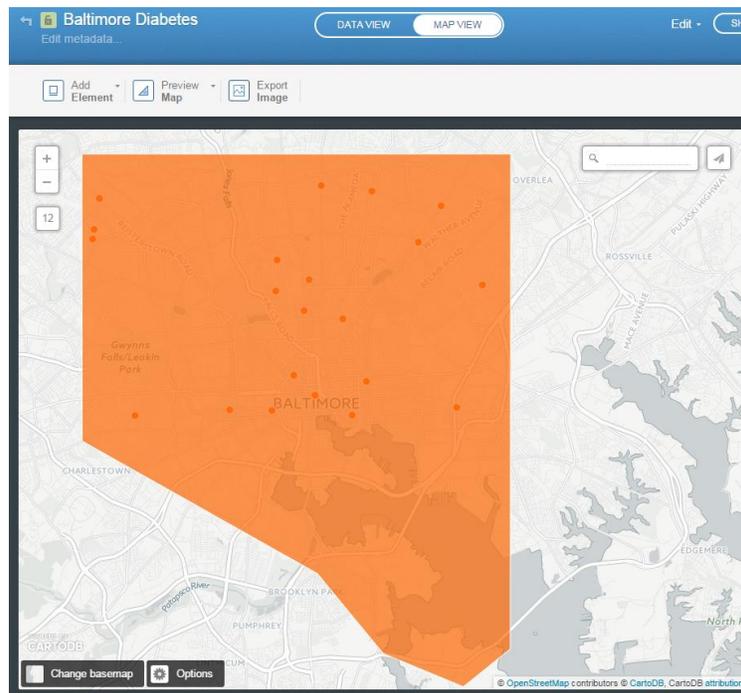
- 9) Click the *balt_dialysis_centers* dataset to open it, and click on **MAP VIEW**.
- 10) Now you will add the other layers to your map. Click the  button, which is a blue plus on the toolbar running vertically along the right side of the map.
- 11) You will get the message “**A map is required to add layers.**” Click **OK, CREATE MAP**.



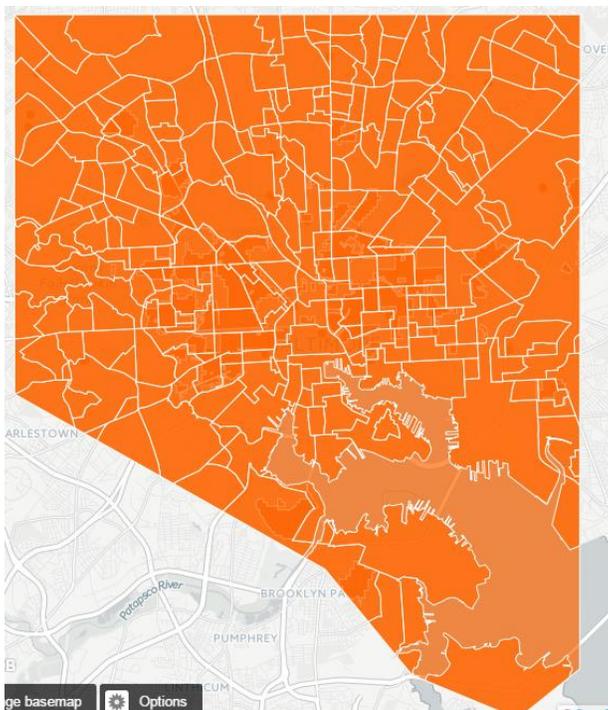
- 12) From your available layers choose the *bal city bndry* and click the **ADD LAYER** button.



- 13) The Baltimore City boundary is added to the map. Don't worry about the layer styling yet. You will do that in Task 3.



- 14) Using the  button, add the other two layers to the map. All your changes are automatically saved, so there is no need to save anything yourself.

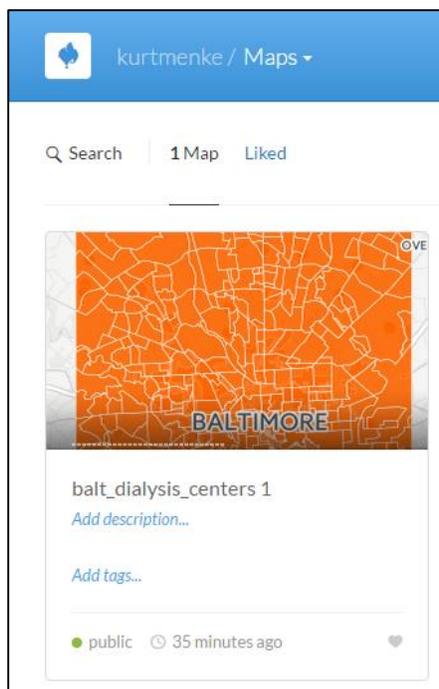


Task 3. Style Your Data

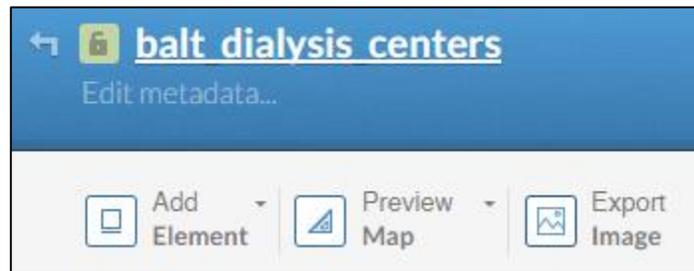
Watch a [Task 3 Video Walkthrough](#) on YouTube.

Now that you have all the data uploaded into CartoDB and a map created, you will work on styling the data layers. You can also change the basemap, zoom level, and add info windows.

- 1) From your CartoDB Dashboard choose Maps and click on *balt_dialysis_centers* to open the map.



- 2) Click the **Add Element** menu and choose **Add title item** to add a Title to the map.



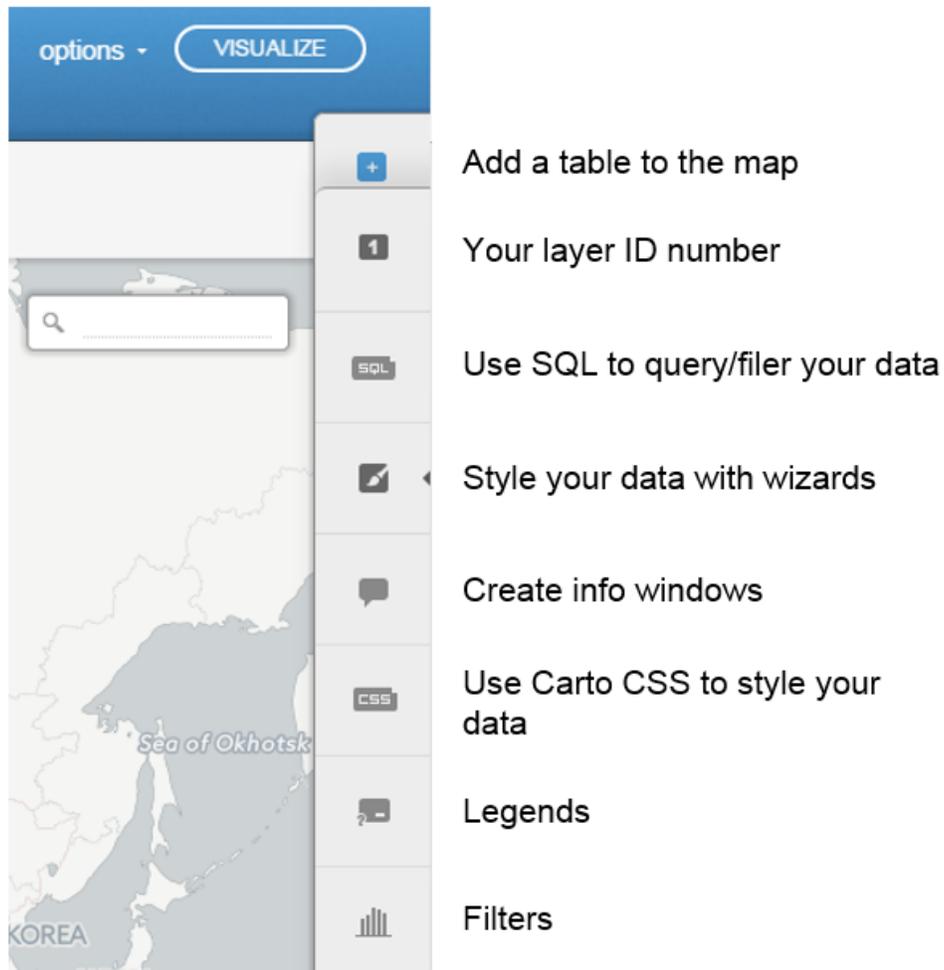
- 3) This element menu also lets you add text and images to your map.
- 4) Name it “Baltimore Diabetes”.



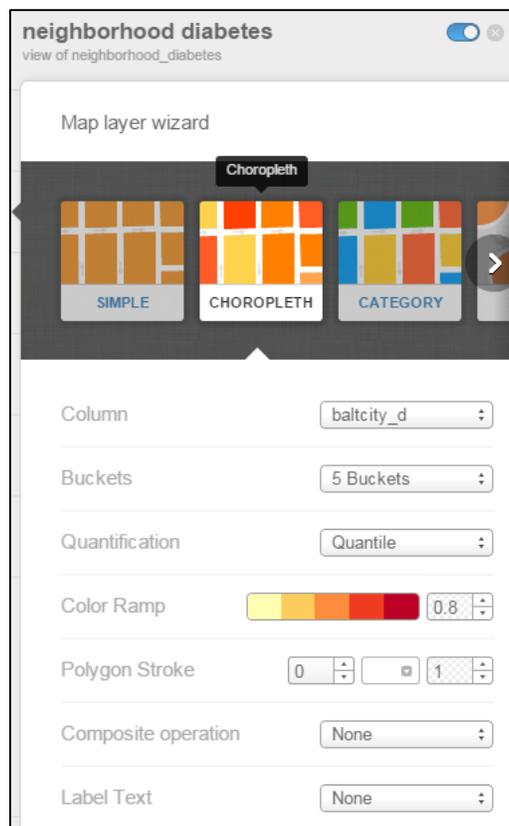
- 5) You can rename your map by clicking on the Edit metadata link in the upper left corner. Click on that and rename your map Baltimore Diabetes. Click Save.

A screenshot of the 'Map metadata' form in CartoDB. The form has a title 'Map metadata' and a subtitle 'Edit the attributes of your map'. It contains several input fields: 'Map Name' with the value 'Baltimore Diabetes', 'Description' with a placeholder 'Type your description here...' and a 'Markdown supported' indicator, and 'Tags' with a placeholder 'Add tags'. At the bottom, there is a 'Privacy' section with a radio button selected for 'public'.

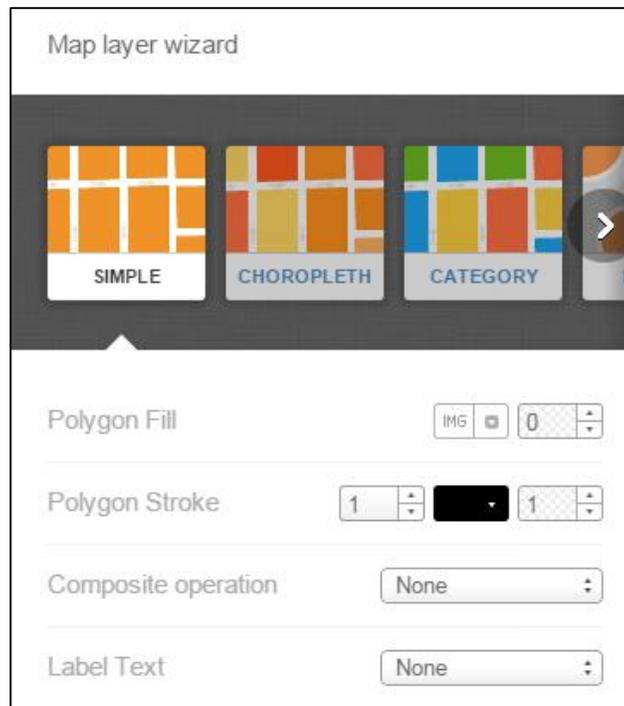
6) Layers can be styled using the **CartoDB Sidebar**.



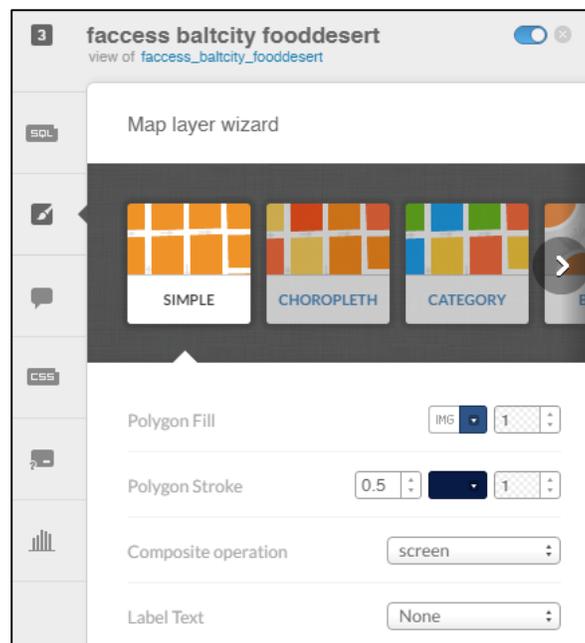
- 7) You will start with the Neighborhood Diabetes layer using a Wizard. Click the  tab. NOTE: You can hover over the layer ID number to see a popup window of which layer is which.
- 8) Choose CHLOROPLETH, which will classify the neighborhoods by a data value, as you did with QGIS.



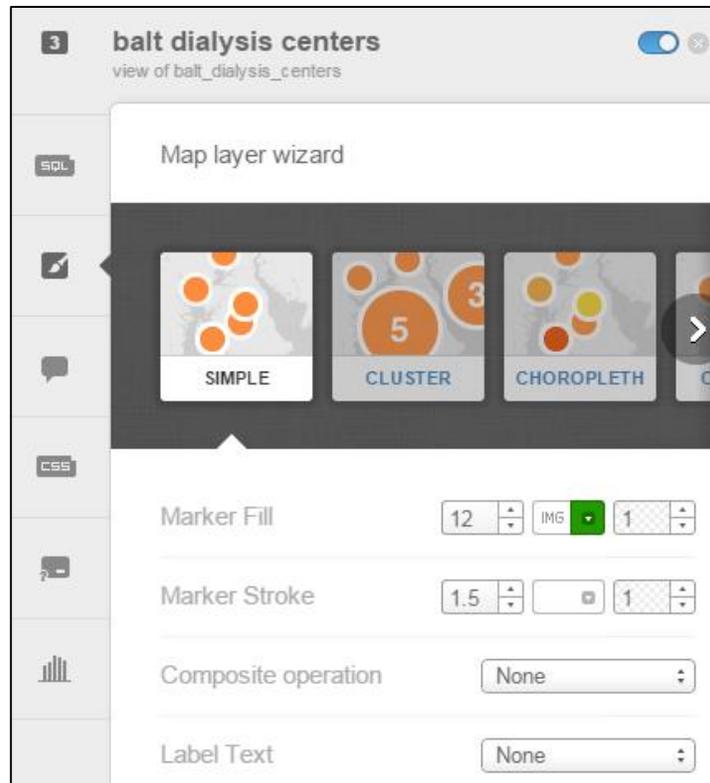
- a) For the **Column** choose *baltcity_d* which has the total number of diabetics per neighborhood. If you recall you joined these data to the neighborhoods in Lab 3 Task 2.
 - b) For **Buckets** choose 5. This is the number of classes the data will be broken into.
 - c) For the **Color Ramp** choose the *yellow to red* ramp.
 - d) For **Polygon Stroke** set it to 0.
- 9) At the bottom of the **Sidebar**, you will see the other three layers. Drag the *balt city bndry* so that it is the topmost layer (if it isn't already).
 - 10) Click on the *balt city bndry* layer name to style it. You will give it no fill with just an outline.
 - a) Use a **Simple** renderer
 - b) **Polygon Fill** transparency set to 0 so that the fill is completely transparent
 - c) **Polygon Stroke** set to black with a width of 1 (this is the outline color)



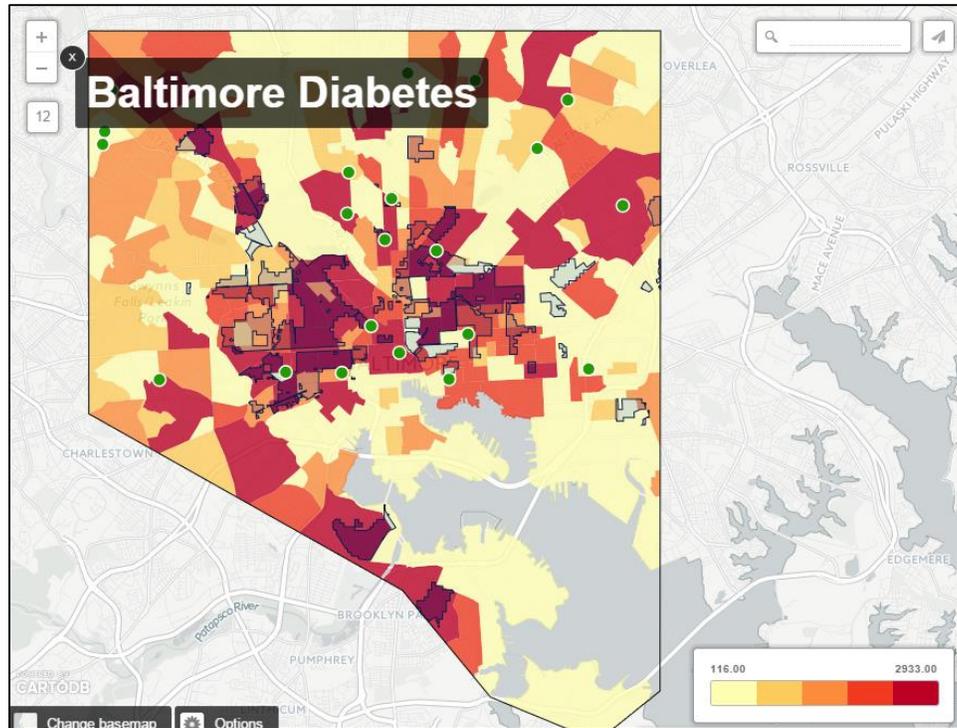
- 11) Now drag the *food deserts* layer above *neighborhood diabetes* but below the *balt city bndry* layer.
 - a) Use a **Simple** renderer
 - b) **Polygon Fill** color of a *light navy blue* with the transparency value set to *1*
 - c) **Polygon Stroke** set to a *dark navy blue* with a width of *1*
 - d) **Composite operation** set to *screen*. These are blending modes that help when you have two overlapping layers. You can experiment with different blending modes here. There are several to choose from.



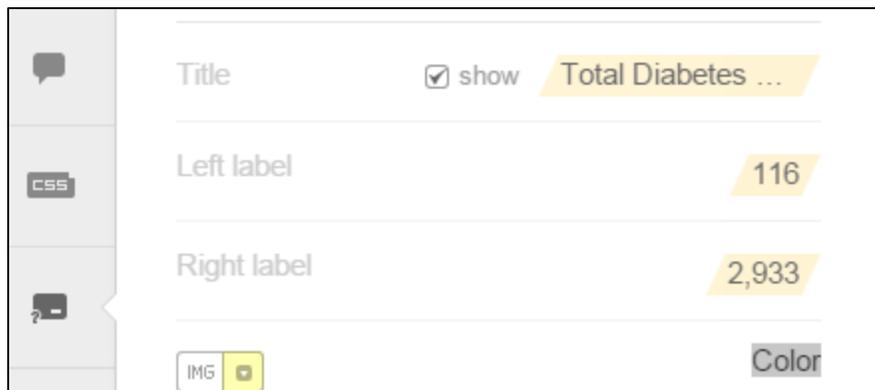
- 12) Drag the *dialysis centers* layer above the *food deserts* and below the *balt city bndry* layer. At this point the layer ordering should be (in descending order): *balt city bndry* on top, then *dialysis centers*, then *food deserts*, and *neighborhood diabetes* on the bottom.
- 13) Style the *dialysis centers* as follows:
 - a) Use a **Simple** renderer
 - b) **Marker Fill** color of a *forest green* with a size of *12* and the transparency value set to *1*
 - c) **Marker Stroke** set to a *1.5*



- 14) Click on the map so that the **Sidebar** retracts. The map you made in QGIS has been remade online in CartoDB.



- 15) The legend for the neighborhood diabetes needs some editing. Click the neighborhood diabetes layer (layer # 1) and select the  tab.
- Next to **Title** click show and enter a title of *Total Diabetes by Neighborhood*.
 - Edit the **Left label** to read *116* (remove the decimal places, since you cannot have a portion of a person).
 - Edit the **Right label** to read *2,933*.

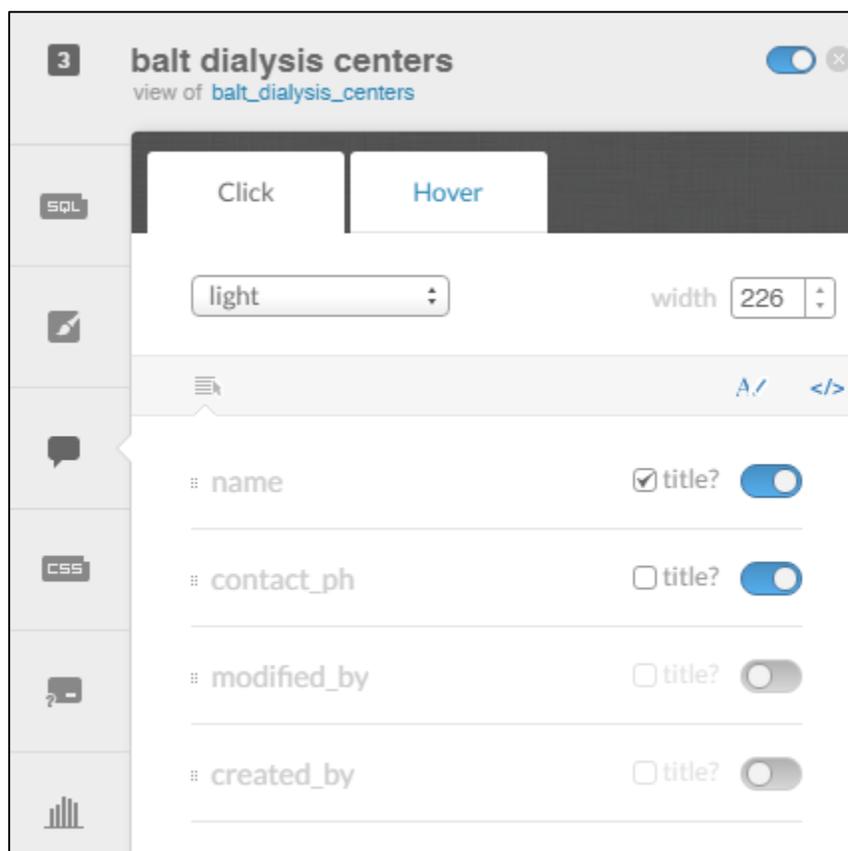


- 16) The legend now allows the map reader to know what the data represent.

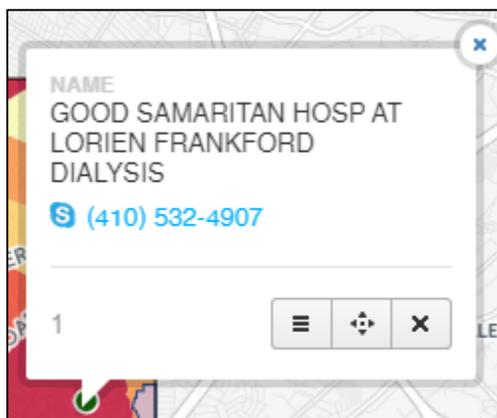


Information Windows

- 1) From the **Sidebar** select the *dialysis centers* layer, which is in position number 3. Click the  tab. This allows you to set up information windows that will open either when the user clicks on a dialysis center or hovers over it.
- 2) The attribute columns are listed. Toggle on the *name* and *contact_ph* columns. Uncheck title for the *contact_ph* item. Doing this will show just the data without the column name. Reorder the columns so that *name* is above *contact_ph*.



- 3) Click on a dialysis clinic. You will see a popup window with the name and phone number.

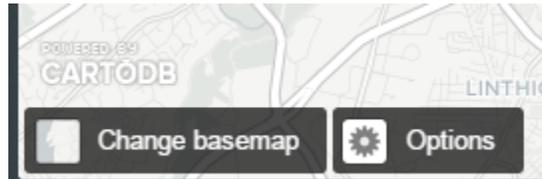


Renaming Datasets

- 1) It is also possible to rename your layers.
- 2) Click the  button to access your **Dashboard**.
- 3) If you're not already viewing datasets, click the menu at the top and choose **Your Datasets**.
- 4) Click on *faccess_baltcity_fooddesert*. Once the dataset opens in **DATA VIEW** click the **Edit metadata** link.
- 5) Edit the name to read *Food Deserts* and click **SAVE**.
- 6) Repeat this procedure to rename the *balt_dialysis_centers* to just *dialysis centers*.
- 7) From the **Dashboard** choose **Your maps**.
- 8) You will see your *Baltimore Diabetes* map. Click on it to reopen it.

Changing Basemaps

The default basemap actually works well for this map. However, click the **Change basemap** button and experiment with other basemaps and explore the options.

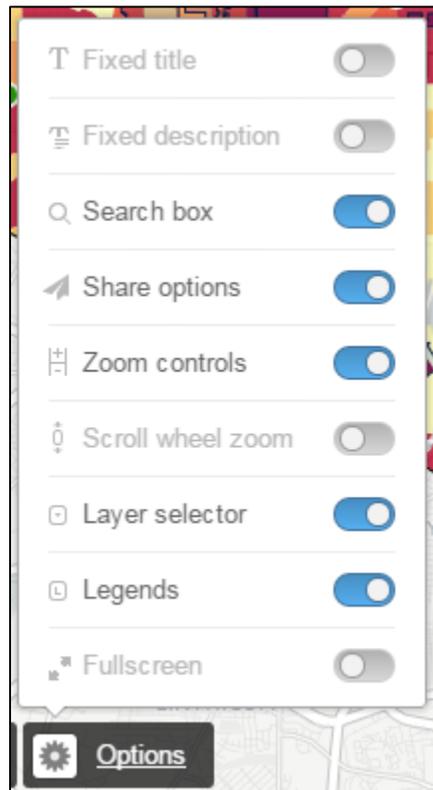


Task 4. Create and Share Your Visualization

Watch a [Task 4 Video Walkthrough](#) on YouTube.

Now that you have uploaded your data and styled your map you will share your visualization.

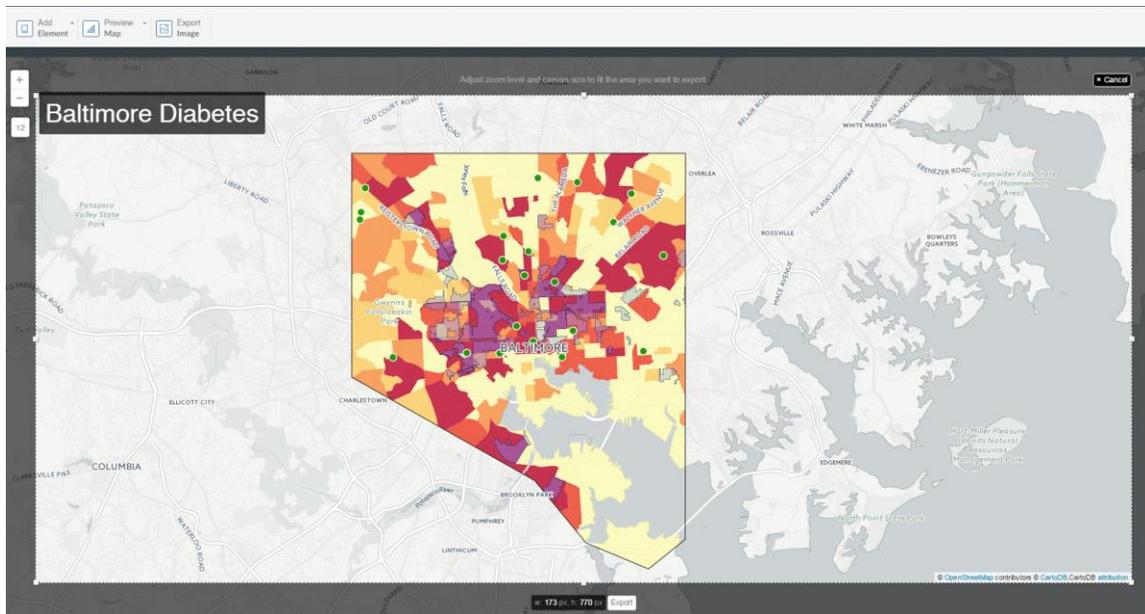
- 1) You can control several map parameters by clicking on the **Options** button in the lower left corner.



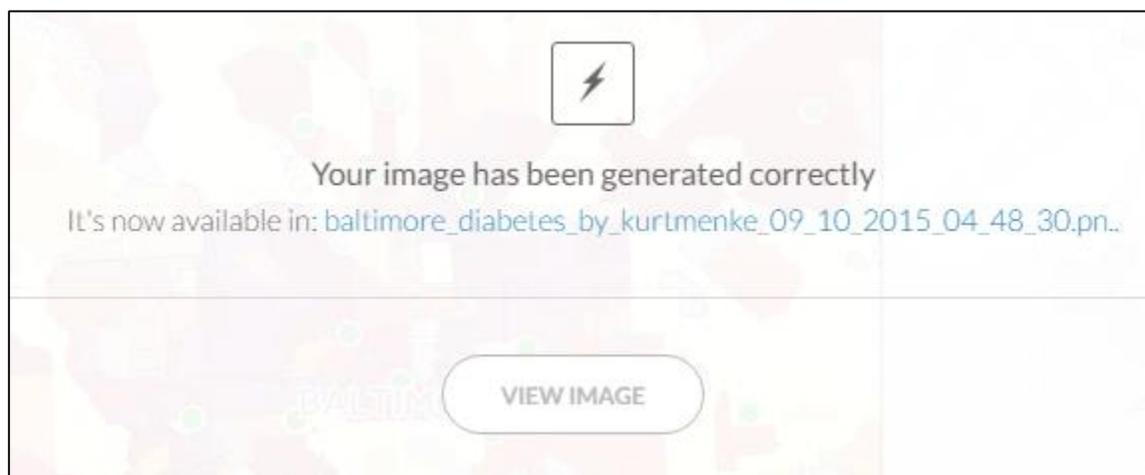
- 2) Click the **Layer selector** option. This will allow users to toggle map layers on and off.

Saving a Static Map

- 1) The easiest way to share your map is to click the  button.
- 2) Select the area you wish to save using the handles around the perimeter.

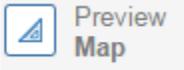


- 3) Then click Export.
- 4) You will receive the message that **Your image has been generated correctly**.



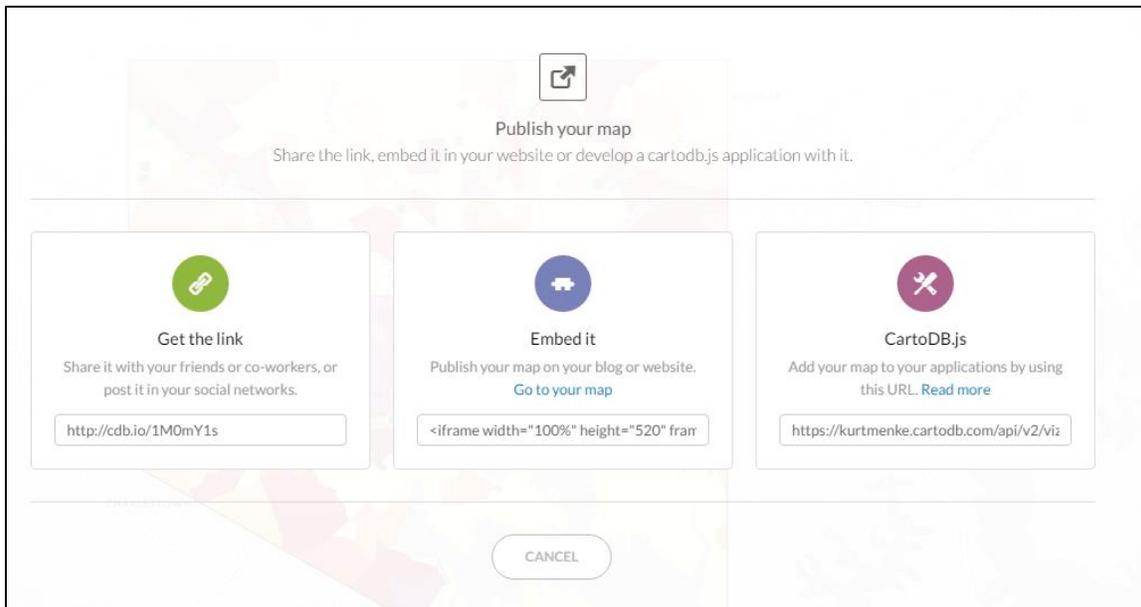
- 5) Click the blue hyperlink, navigate to your lab data folder, rename the file Lab 6.png, and click Save.
- 6) You can also click the VIEW IMAGE button to see a preview in a new tab.

Sharing a Dynamic Map

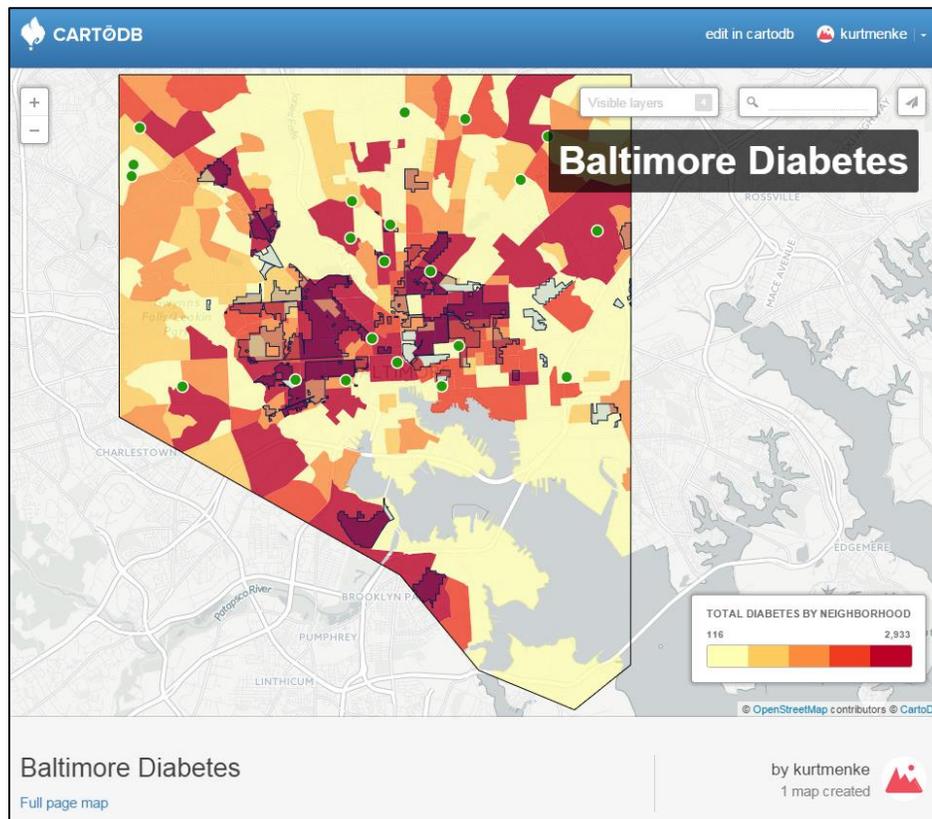
- 1) You can use the  button to preview both a desktop and a mobile version of the map. For this lab you will keep the preview on the Desktop setting.
- 2) Click the **PUBLISH** button in the upper right corner to open the **Publish your map** window.



- 3) These are the options for sharing your dynamic online map with others. The most basic options are copying the link to the map and inserting the map into a blog by copying the Embed it HTML code. CartoDB also offers a simple JavaScript library called CartoDB.js. This lets you add the map to a website with much more control over the parameters of the map.



- 4) Use the **Get the link** option to copy the link, and click the **Cancel** button to close the **Publish your map** window.
- 5) Paste the link in a new browser window to see the result. Note that there is a Layer Selector widget since you enabled that option.



6) You have created a dynamic online map of your data!

5. Conclusion

In this lab, you learned the basics of using CartoDB. You learned how to upload data, style it, and share your visualization. There is a lot more you can do with CartoDB, especially if you want to learn the map layer styling language CartoCSS. CartoDB has a lot of good documentation, including:

- [CartoDB Editor documentation](#)
- A comprehensive [series of tutorials](#) breaking tasks up into Basic, Medium, and Advanced categories
- [Tips and Tricks](#)
- [FAQs](#)
- [Long-form lessons](#) in Map Academy