

Using ArcGIS Online to Map Cases of COVID19 in Ontario

The following instructions outline a workflow for mapping confirmed cases of COVID19 in Ontario using the Summarize Within function in ArcGIS Online, the cloud version of ArcGIS software. Then we'll add census data and create some colour themed maps based on the 2016 census.

PART A: Mapping Confirmed COVID19 Cases in Ontario

Section One: Getting the data

1. To get the most up-to-date count of confirmed COVID19 cases, go to:

Confirmed positive cases of COVID-19 in Ontario (GeoJSON) (updated at noon daily)

<https://data.ontario.ca/en/dataset/confirmed-positive-cases-of-covid-19-in-ontario>

2. Scroll down and select the GEOJSON file to download. This file format can be loaded directly into ArcGIS Online. We will do this in a later step.



GEOJSON of Confirmed positive cases of ... (6.1 MiB)

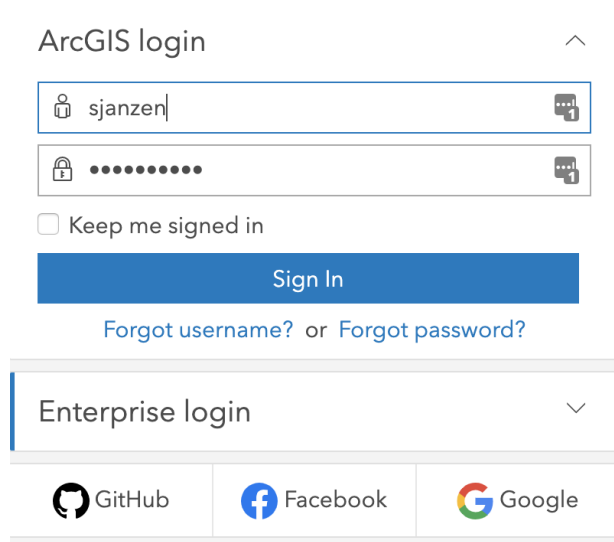
Last Updated: April 22, 2020 | **English**

3. We also require the Public Health Regions boundary file. This layer will be acquired directly within ArcGIS Online.

Section Two: Accessing ArcGIS Online

Now that we have our data, we need to sign into ArcGIS Online and load the data to the cloud. This tutorial is using the CLASSIC view of ArcGIS Online. DO NOT USE MAP VIEWER BETA.

1. Go to <https://www.arcgis.com/>
2. Click Sign in.
3. Click **Enterprise Login**.



ArcGIS login

Username: sjanzen

Password: [masked]

☐ Keep me signed in

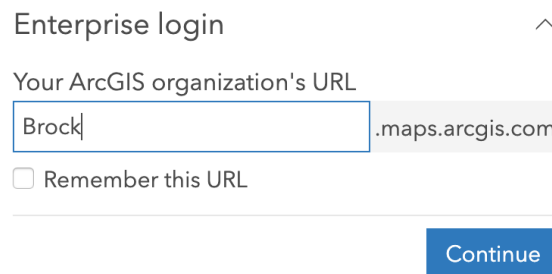
Sign In

[Forgot username?](#) or [Forgot password?](#)

Enterprise login

GitHub Facebook Google

4. Enter the **ArcGIS Organization's URL** as follows and click Continue.



Enterprise login

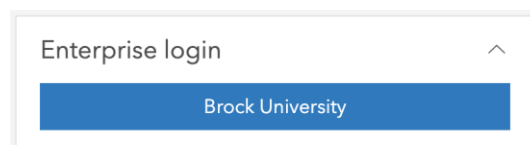
Your ArcGIS organization's URL

Brock .maps.arcgis.com

☐ Remember this URL

Continue

5. Click **Enterprise Login > Brock University**.

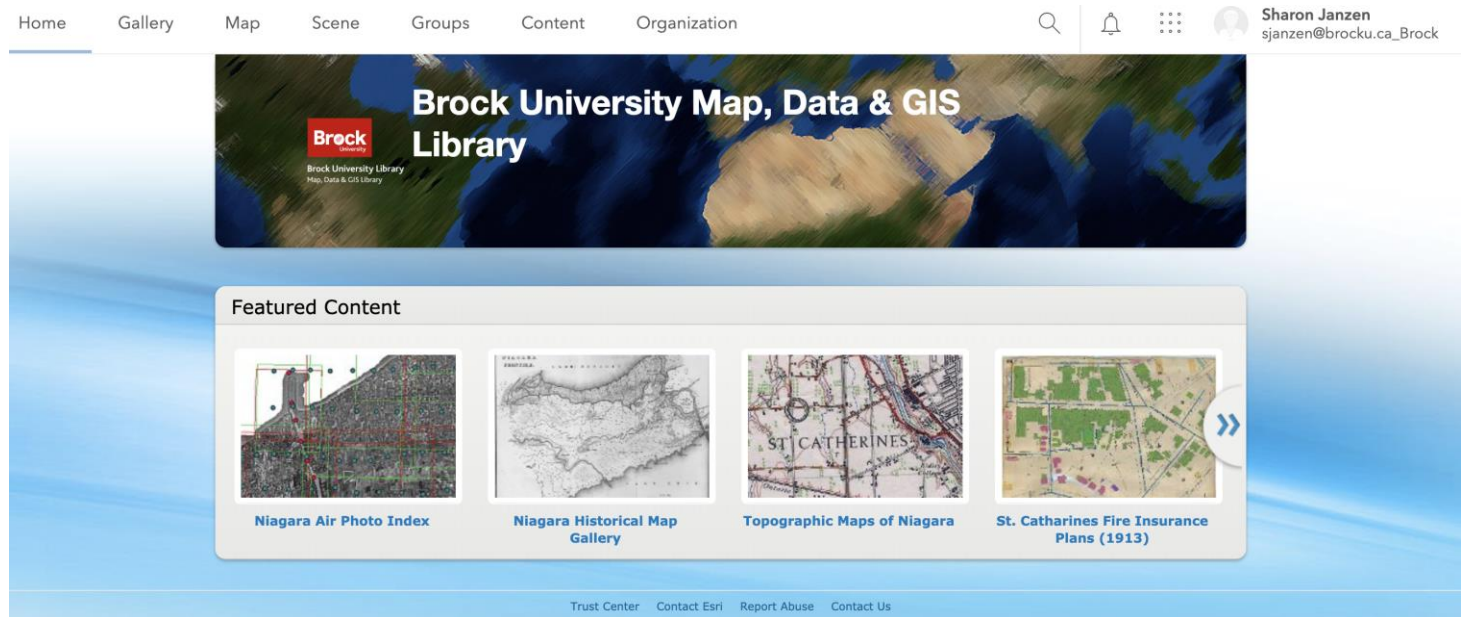


Enterprise login

Brock University

You will be taken to the Brock authentication page. If you are already signed into Brock on another tab, the app may bypass this page and take you straight to ArcGIS Online.

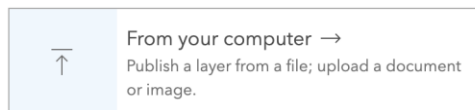
The Brock University ArcGIS Online Organization page appears:



Section Three: loading data into ArcGIS Online

1. At the top of the window, click Content.

2. On the left, click  -->



3. Browse to your DOWNLOADS directory and select the GeoJSON file downloaded in a previous step. ("conposcovidloc.geojson")
4. Provide an appropriate title. (DO NOT USE special characters. See example below.)
5. Add tags by clicking in the **Tags** box, typing a keyword and hitting enter on the keyboard.
6. Click **Add Item**.

Add an item from my computer



File:

Choose File

conposcovidloc.geojson

☒ Publish this file as a hosted layer. (Adds a hosted layer item with the same name.)

Title:

Confirmed COVID Cases April 22 2020

Tags:

COVID19

Ontario

Add tags

Add Item

Cancel

7. An Item Details page appears.

The screenshot shows the 'Item Details' page for a map item titled 'Confirmed COVID Cases April 22 2020'. The page has a top navigation bar with links: Home, Gallery, Map, Scene, Notebook, Groups, Content, Organization, and a search icon. The user profile 'Sharon Janzen, B.Sc. sjanzen' is in the top right. Below the navigation bar is a blue header bar with the item title and tabs: Overview (selected), Data, Visualization, Usage, and Settings. The main content area is divided into three columns. The left column contains an 'Edit Thumbnail' button, a thumbnail image of a map with red dots, an 'Add to Favorites' button, a 'Description' section with an 'Add an in-depth description of the item.' prompt, a 'Layers' section showing 'Confirmed_COVID_Cases_April_22_2020_0' with options to 'Open In', 'Export To', 'Time Settings', 'Enable Attachments', 'Service URL', and 'Metadata', and a 'Terms of Use' section with an 'Add any special restrictions, disclaimers, terms and conditions, or limitations on using the item's content.' prompt. The middle column has 'Edit' buttons for the thumbnail, description, layers, and terms of use. The right column contains a vertical list of actions: 'Open in Map Viewer' (selected), 'Open in Scene Viewer', 'Publish', 'Create View Layer', 'Export Data', 'Update Data', 'Share', and 'Metadata'. Below these is an 'Item Information' section with a progress bar from 'Low' to 'High' and a 'Top Improvement: Add a summary' prompt. At the bottom right is a 'Details' section.

- Each section of this page can be modified by clicking the **Edit** button to the right of a section. For now, we will add the layer to the map viewer.
- Click **Open in Map Viewer**. The feature layer is added to the map viewer and automatically symbolized according to postal code.

10. Under step **1: Choose an Attribute to Show**, select the topmost option: **Show location only**.

11. Click Done.

Change Style

Confirmed COVID Cases April 22 2020

1

Choose an attribute to show

Show location only

2

Select a drawing style

Location (Single symbol) ✓

OPTIONS

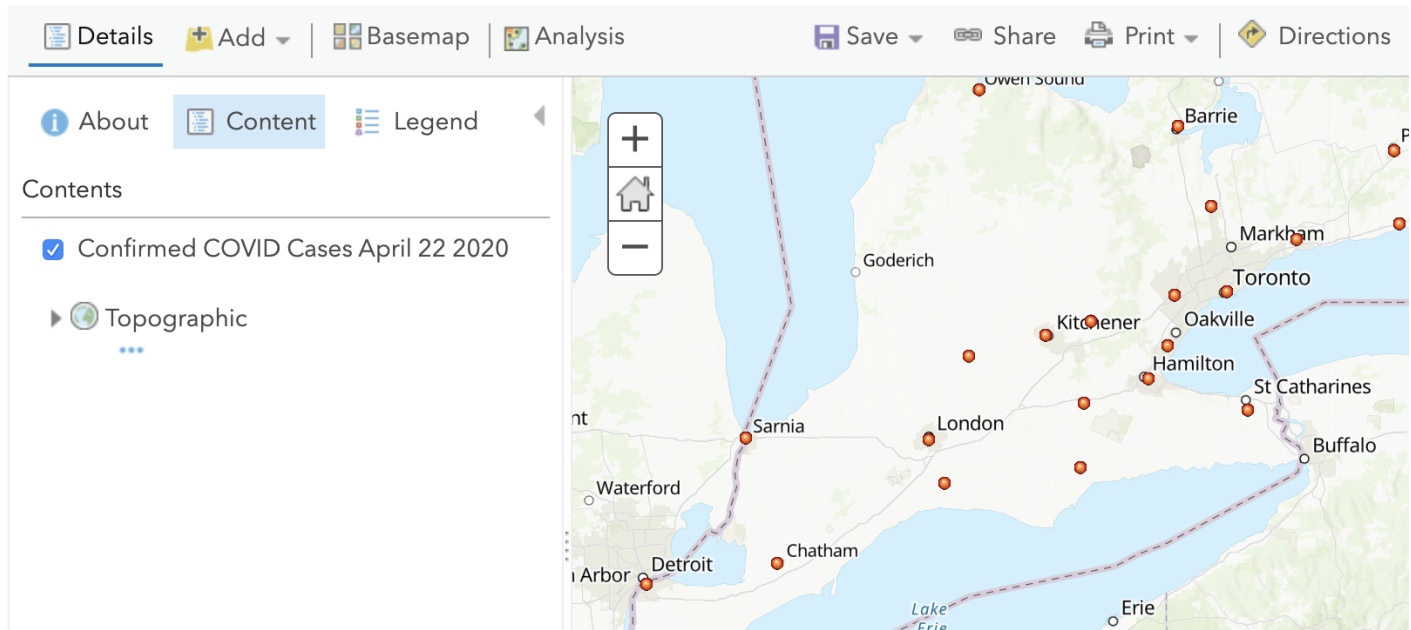
Heat Map

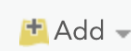
SELECT

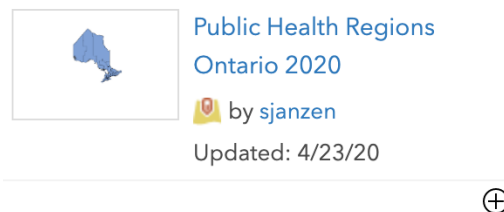
DONE

CANCEL

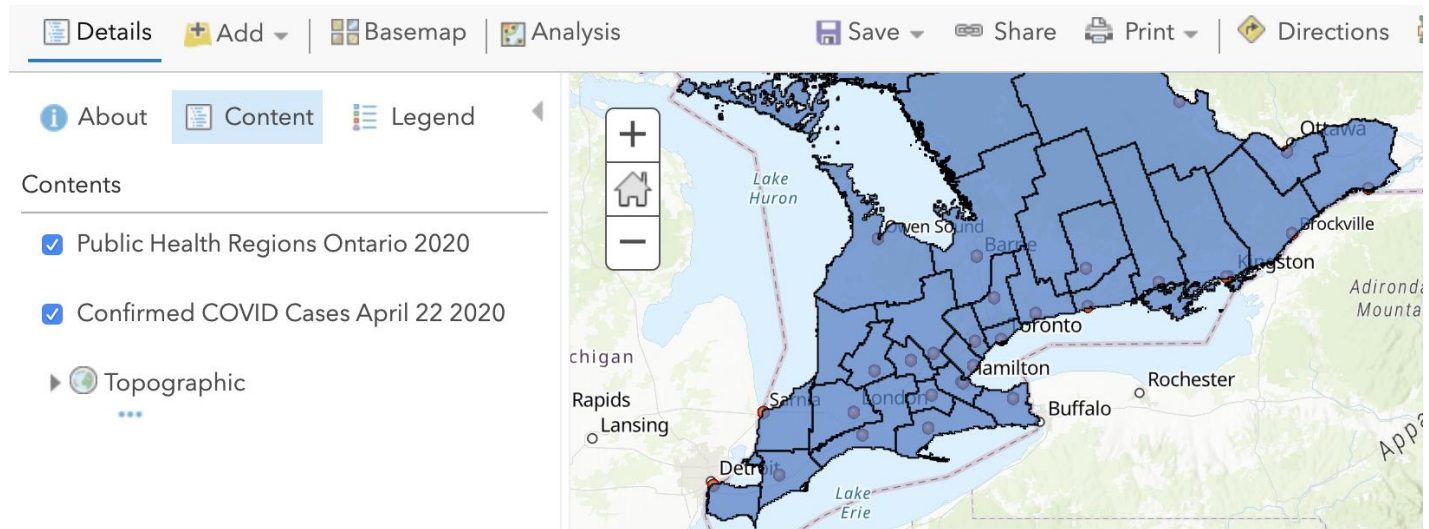
This map includes a single point per case mapped by Public Health Region. It is difficult to see the total number of cases per health unit (the points are piled on top of one another) so we will summarize this data based on the public health unit boundary and symbolize it using proportional symbols.



12. To add the **Public Health Region** boundary layer, click  **Add** > **Search for Layers**.
13. Change the location from **My Content** to **ArcGIS Online**.
14. Enter the keywords “Ontario Public Health Regions COVID19”. There are many such layers available but if you enter the keywords as described here, you should see a feature layer by sjanzen.
15. Click the plus sign to add the layer to the map.



16. To return to the layer listing, click the Details tab.



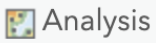

The layers are drawn in the order they appear in the layer listing (CONTENTS).



17. Rest the mouse over the Confirmed COVID cases layer and click/drag the 3 vertical dots up until it rests above the Public Health Regions layer.




Section Four: Aggregate Mapping


The **Summarize Within** tool provides an aggregate count of the points (COVID cases) within a boundary file (Public health regions) while at the same time summarizing the details of an attribute in the database (I.e. outcome of a case).


1. Click  Analysis > Summarize Data >  Summarize Within
2. The **Summarize Within** dialogue window appears to the left of the map.


 Summarize Within 

1

Choose an area layer to summarize other features within its boundaries 








Polygon


Square


Hexagon

Choose the polygon layer


Public Health Regions Ontario... 

2


Choose a layer to summarize 


Confirmed COVID Cases April... 

3

Add statistics from the layer to summarize 

☒ Count of points

Field 

Statistic 

For Step 1: Choose a polygon layer, select “Public Health Regions Ontario”.


For Step 2: Choose a layer to summarize, select “Confirmed COVID Cases...”

For Step 3: accept the defaults

For Step 4: Choose field to group by (optional), select “Outcome1” from the dropdown. And check the box beside Add percentages. This will add up the various outcomes of each case and display them as a percentage of the total cases in a pie chart.

4

Choose field to group by (optional)

Outcome1 

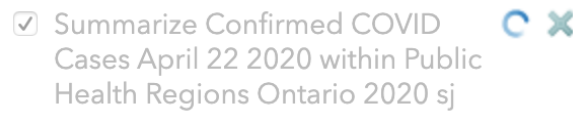
☐ Add minority, majority

☒ Add percentages

For Step 5: Result Layer Name, accept the default.

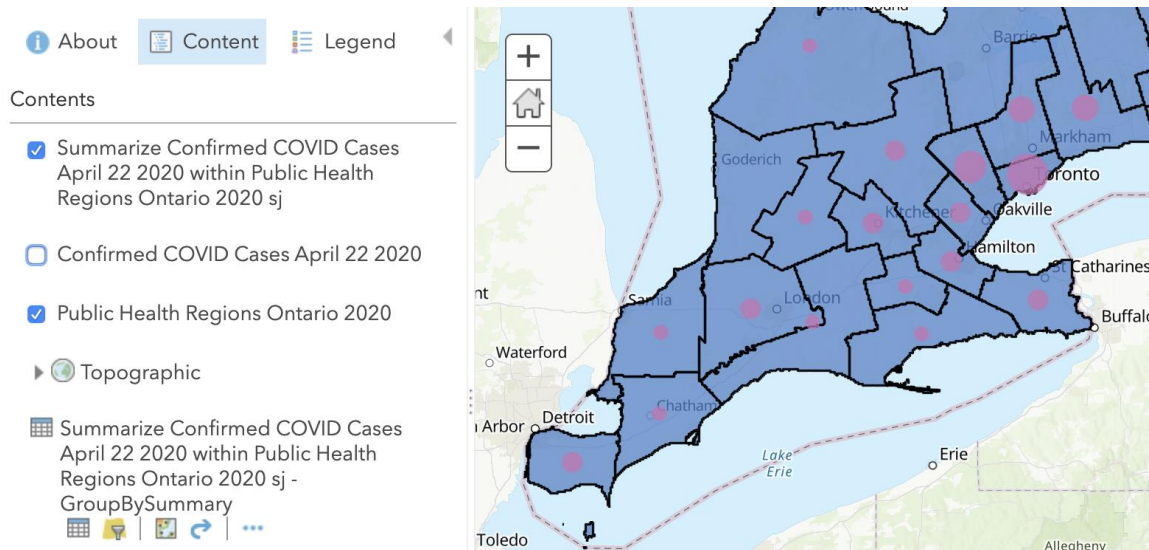
Below step 5 uncheck the box ☐ Use current map extent to ensure all of Ontario is captured in the analysis.

3. Click RUN ANALYSIS.
4. A new layer appears with a processing symbol showing the status of the tool. It may take several seconds to run the tool.



The resulting layer automatically displays proportional symbols based on the count of points within the Public Health Region boundary layer.

5. Turn off the original COVID19 cases layer (represented by orange dots). HINT: click the blue checkmark to turn the layer off.



6. Above the map, click **Save > Save as** to save the map to the cloud. Provide a suitable title, tags and summary.
7. **Click SAVE MAP.**

Save Map

Title: Confirmed COVID19 Cases in Ontario April 22, 2020

Tags: COVID19 × Add tags

Summary:

Save in folder: COVID19


SAVE MAP

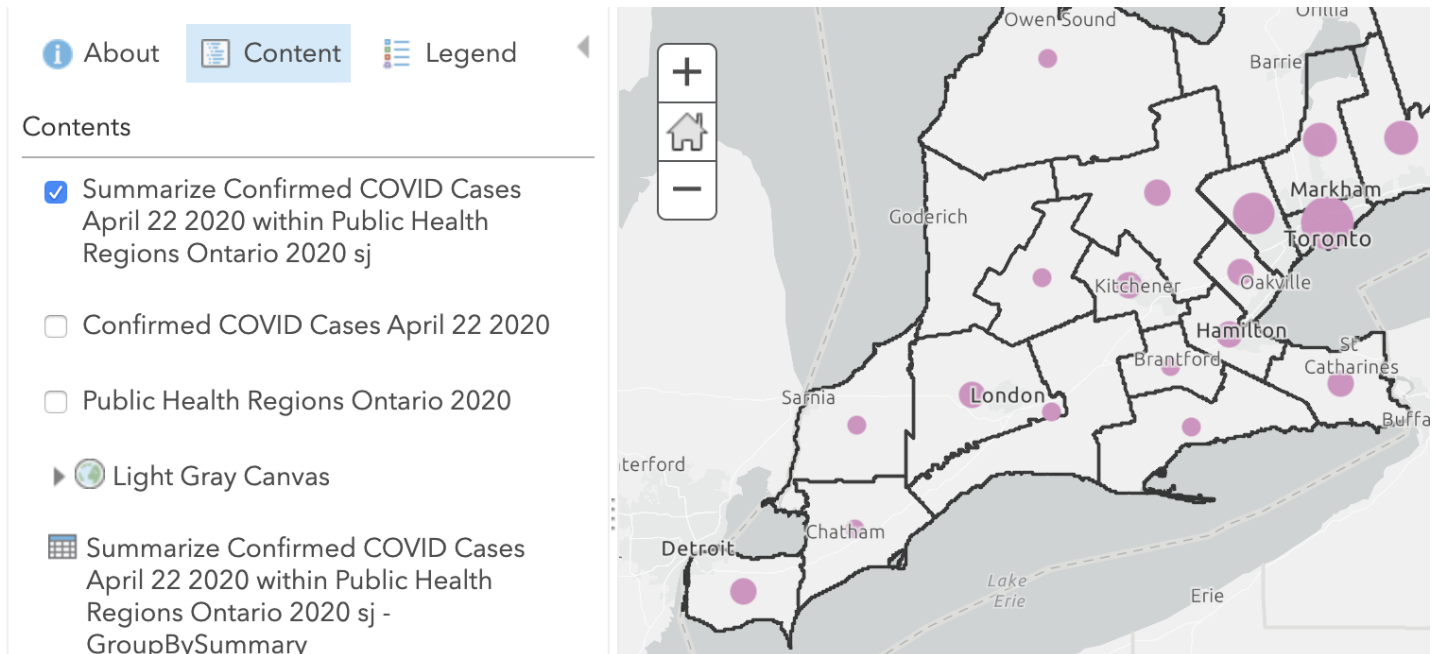
CANCEL


Section Five: Symbolology & Pop-ups

In this section, we will be looking at changing the look of our map and customizing the popup to reflect relevant information.

To make the data the focal point of the map, we will choose a different base map.

1. Click  Basemap and select the light or dark gray canvas.
2. TURN OFF Public Health Regions layer. HINT: uncheck the blue box. The summarized layer includes the boundary of each Public Health Region.

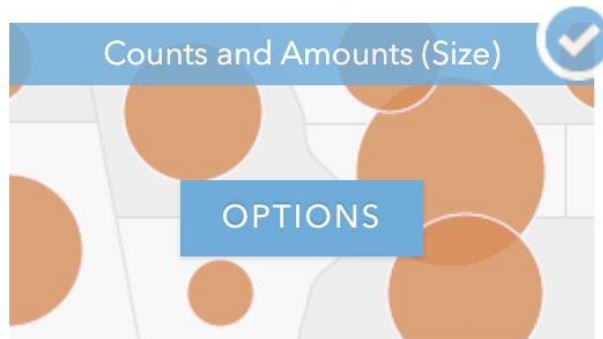


3. To adjust the intervals for the proportional symbols, click the 'change style' button  below the title of the summarized layer ("Summarized Confirmed COVID Cases April 22 2020...").
4. Click OPTIONS below 'Counts and Amounts (Size)'.

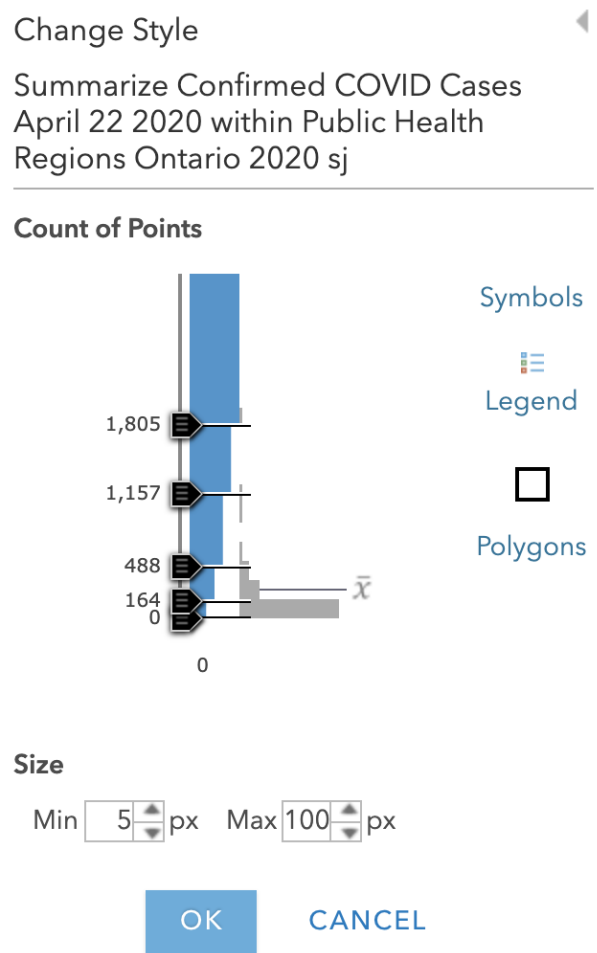
Prepared by: Brock University

Map, Data & GIS Library, 2020

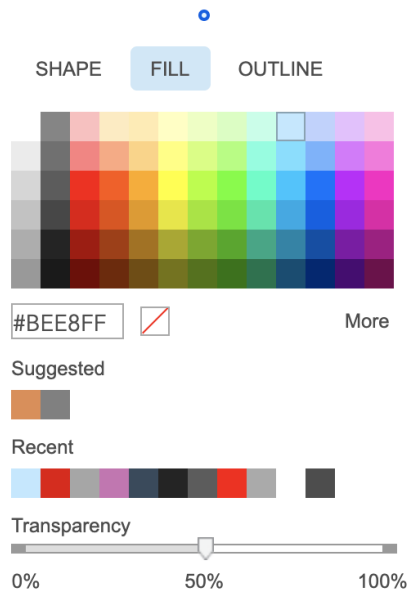
Maplib@brocku.ca



5. Adjust the max class range to be approximately double the next largest (click the number and enter a value, i.e. 1800).
6. Adjust the symbol size to be **min 5 pts** and **max 100 pts**



7. Click "Symbols" to the right of the sliding scale.
8. Click the Fill tab then select a pale blue colour.
9. Adjust the transparency to 50%.

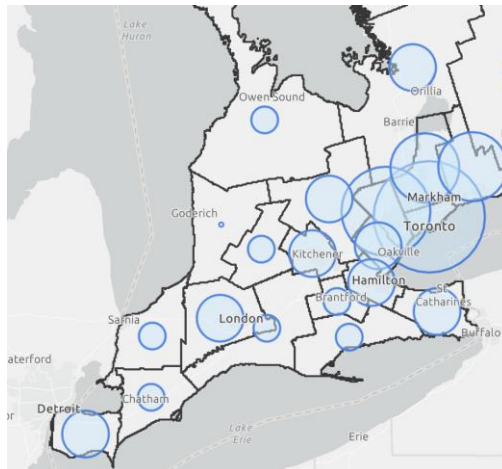


10. Click OUTLINE and select a bright blue colour and change the **Line Width** to 2.

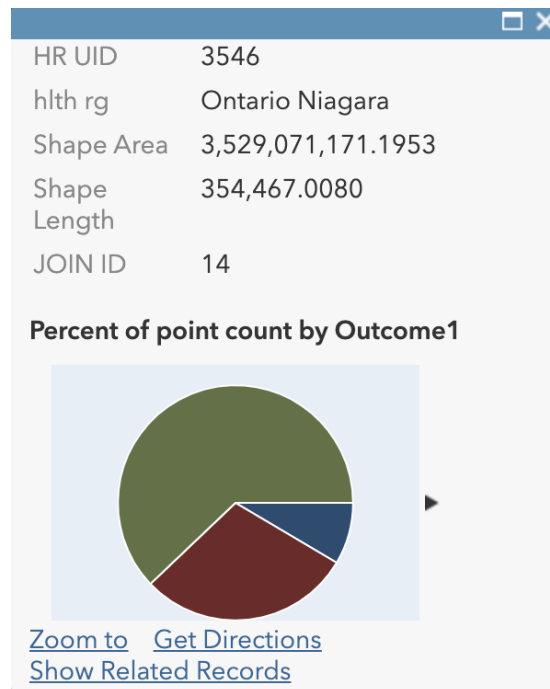


11. Click OK.

12. Click OK then Done to return to the map.



13. Click a point on the map to see the default pop-up that includes a pie chart of outcomes (you may need to scroll down in the pop-up to see the pie chart). Rest your mouse (or click) a pie wedge to see the details that include the percentage of cases unresolved, resolved or fatal.

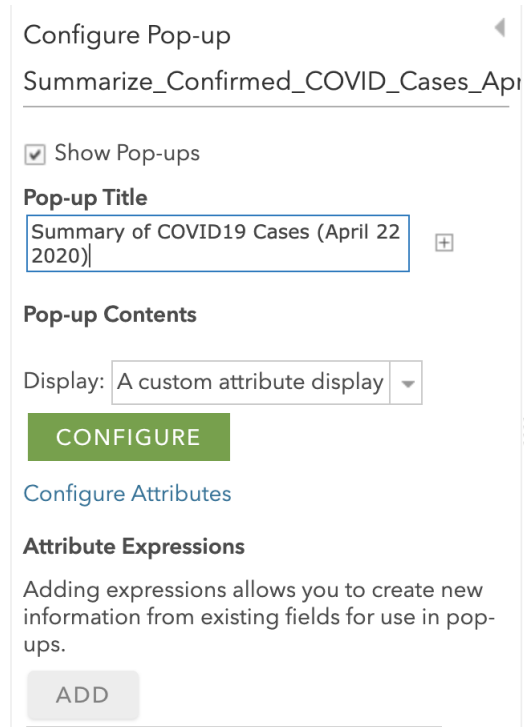


14. SAVE YOUR MAP!

Configuring the Pop-up

15. Click the title for the summarized layer and click the ellipses to access more options.
16. Click **Configure Pop-up**.
17. Enter a title for the pop-up (i.e. "Summary").

18. Beside Display, click the dropdown and select **A Custom Attribute Display**.
19. Click the green **CONFIGURE** button.



Configure Pop-up

Summarize_Confirmed_COVID_Cases_Apr

☒ Show Pop-ups

Pop-up Title

Summary of COVID19 Cases (April 22 2020)

Pop-up Contents

Display: A custom attribute display

CONFIGURE

[Configure Attributes](#)

Attribute Expressions

Adding expressions allows you to create new information from existing fields for use in pop-ups.

ADD

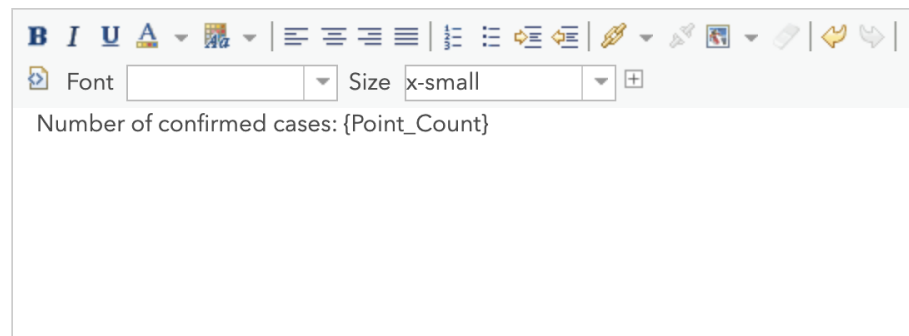
The window that opens provides you with some basic tools for creating a custom pop-up display.

20. Click in the text box and type “Number of confirmed cases:”.

21. To enter the “point count” field data, click the little plus sign to the right of **Size** x-small. The field name appears inside curly brackets.

Custom Attribute Display

Use the area below to define, format, and lay out the information you want to display.



B I U [font color] [background color] [bulleted list] [numbered list] [link] [unlink] [insert image] [other icons]

Font [] Size x-small

Number of confirmed cases: {Point_Count}

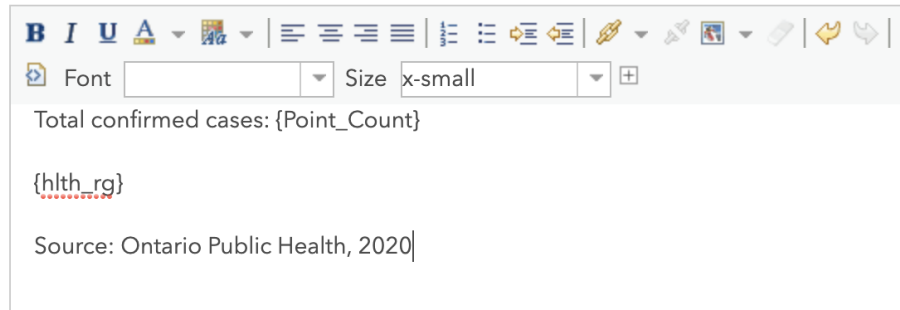
OK

CANCEL

22. Add other details such as sources for the data or other statistics of interest.

Custom Attribute Display

Use the area below to define, format, and lay out the information you want to display.



Font Size x-small

Total confirmed cases: {Point_Count}

{hlth_rg}

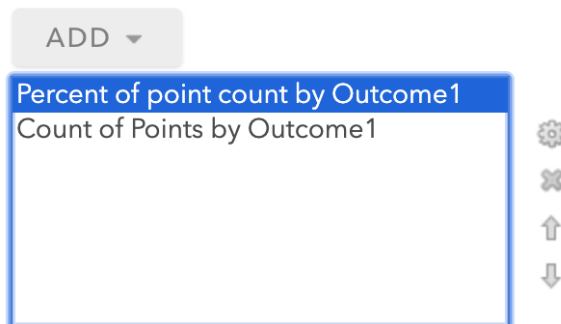
Source: Ontario Public Health, 2020

23. Click OK.

24. Scroll down to see additional details. Under **Pop-up Media**, click “Percent of point count by Outcome1” then click the gears button  to access settings.

Pop-up Media

Display images and charts in the pop-up:



ADD ▾

Percent of point count by Outcome1

Count of Points by Outcome1

25. The Configure Pie Chart dialogue box appears. Enter an appropriate title and caption (see below).
26. Accept the rest of the defaults and click OK twice to return to the map view.

Configure Pie Chart

Specify the title, caption and fields to chart.

Title:

Percent of total cases by outcome



Caption

Hover over a wedge to see the details.



Create the chart from attributes in:

- ☐ This layer
☒ A related layer or table

Layer or table:

GroupBySummary



Chart Field:

Percent of point count {



Label Field:

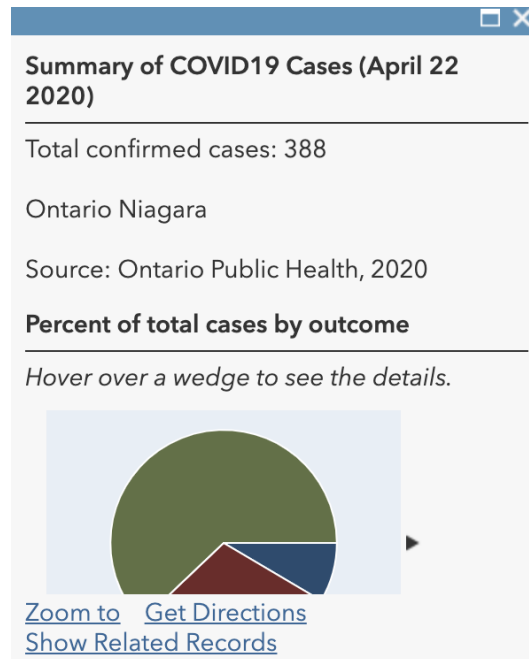
Outcome1 {relationship



OK

CANCEL

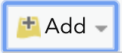
27. Click a point on the map to see the pop-up. NOTE: You may need to hit the **Next Feature** arrow next to the X in the top right corner of the popup.

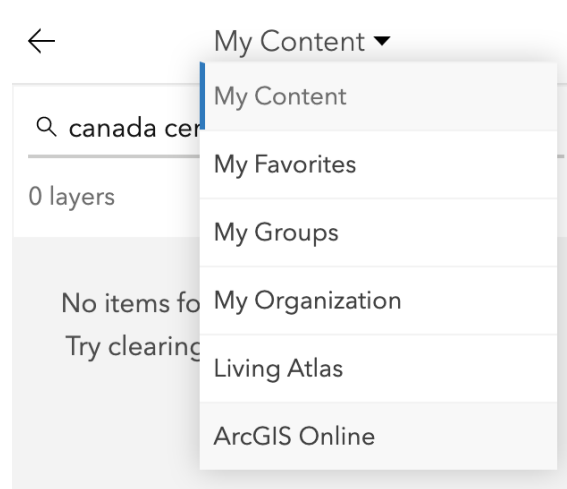


28. SAVE YOUR MAP!

PART B: Census Mapping


Section Six: Adding Census Data

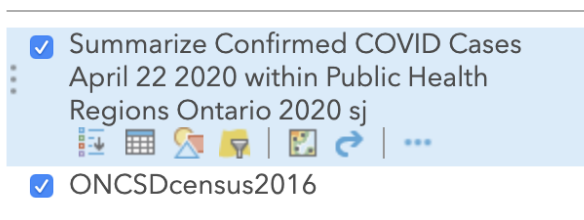
1. Click the Add button  and select **Search for Layers**.
2. Click the dropdown under **MY CONTENT** and select **ArcGIS Online**.



3. Enter the search term “Ontario census COVID19” without the quotations. The result should list an item created by “sjanzen”.
4. Click the plus sign to add the **ONCSDcensus2016** layer to the map.




5. To return to the CONTENTS listing, click the Details tab . The census subdivision layer appears on top of the summarized data layer.
6. Click the 3 vertical dots beside the Summarized layer and drag it up until you see the dashed line and drop it there.




- Turn off the summarized data layer by clicking the check box to the left of the title.

The census data layer is showing the census subdivision boundaries on the map. There are census data variables attached to these boundaries.

- Hover your cursor over the ONCSD2016 layer and click the table button . The table shows the attributes associated with each census subdivision in Ontario. The selected subset of census variables includes Population Density, Average Age, Percent Seniors and Median Household Income.

ONCSDcensus2016 (Features: 575, Selected: 0)					
CSDNAME	GeoUID	Population Density	Average Age	Percent Seniors	Median Household Income
Gravenhurst	3,544,002.00	23.80	48.60	27.40	59,648.00
Bracebridge	3,544,018.00	25.50	46.30	25.10	69,461.00
Callander	3,549,066.00	36.40	44.30	20.30	86,455.00
Orangeville	3,522,014.00	1,851.90	38.70	14.00	85,241.00
Prescott	3,507,008.00	856.20	47.10	26.70	46,293.00

- To create a classified map showing a census variable, click the Set Style button  below the **ONCSDcensus2016** title.

- Under Step 1 **Choose an attribute to show**, select Population Density from the dropdown list.

Change Style


ONCSDcensus2016

1 Choose an attribute to show

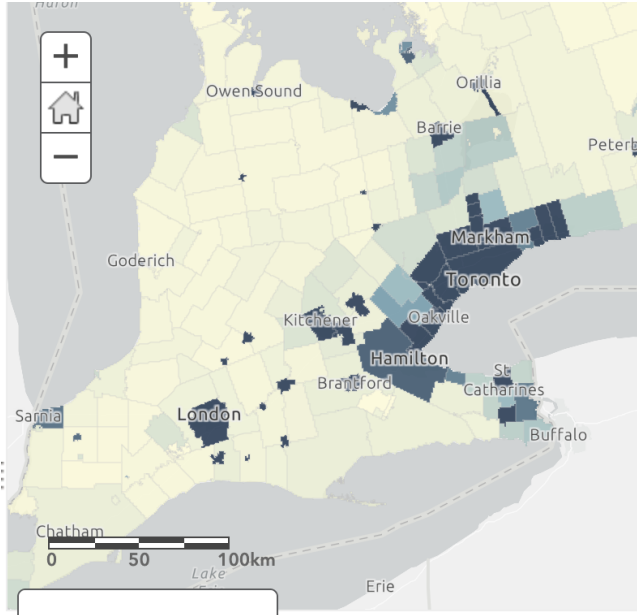
Population Density

Add attribute

2 Select a drawing style

Counts and Amounts (Color) 

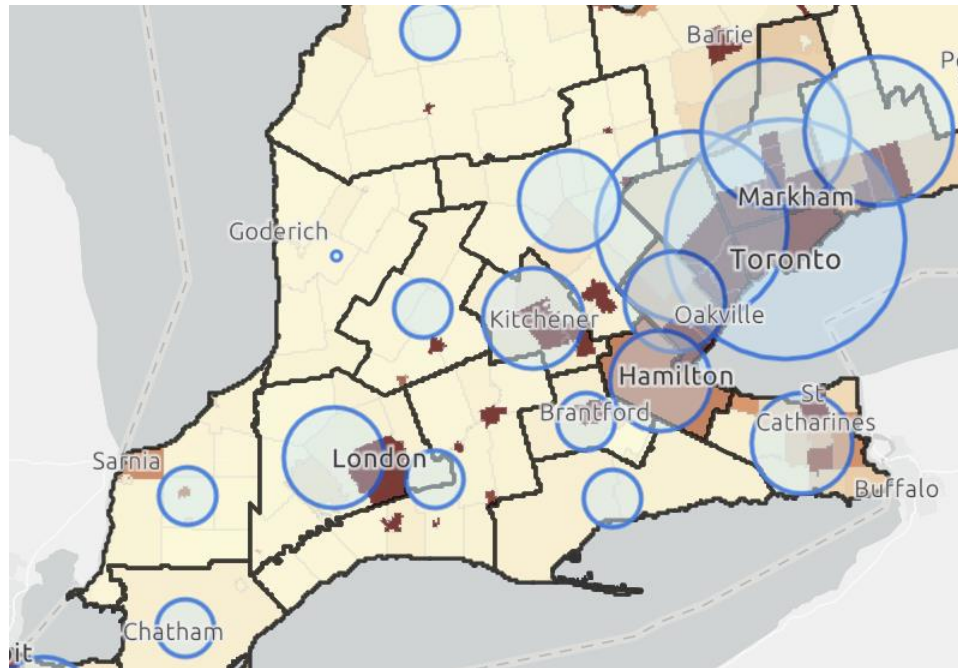
OPTIONS



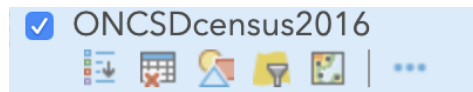
- Under Step 2 **Select a drawing style**, click **OPTIONS**.



- Click **Symbols** and choose a brown to cream colour swatch.
- Click OK then click Done to return to the map.



14. Below the title of the census data layer, click the 3 dots to the right of the tools to select More Options.



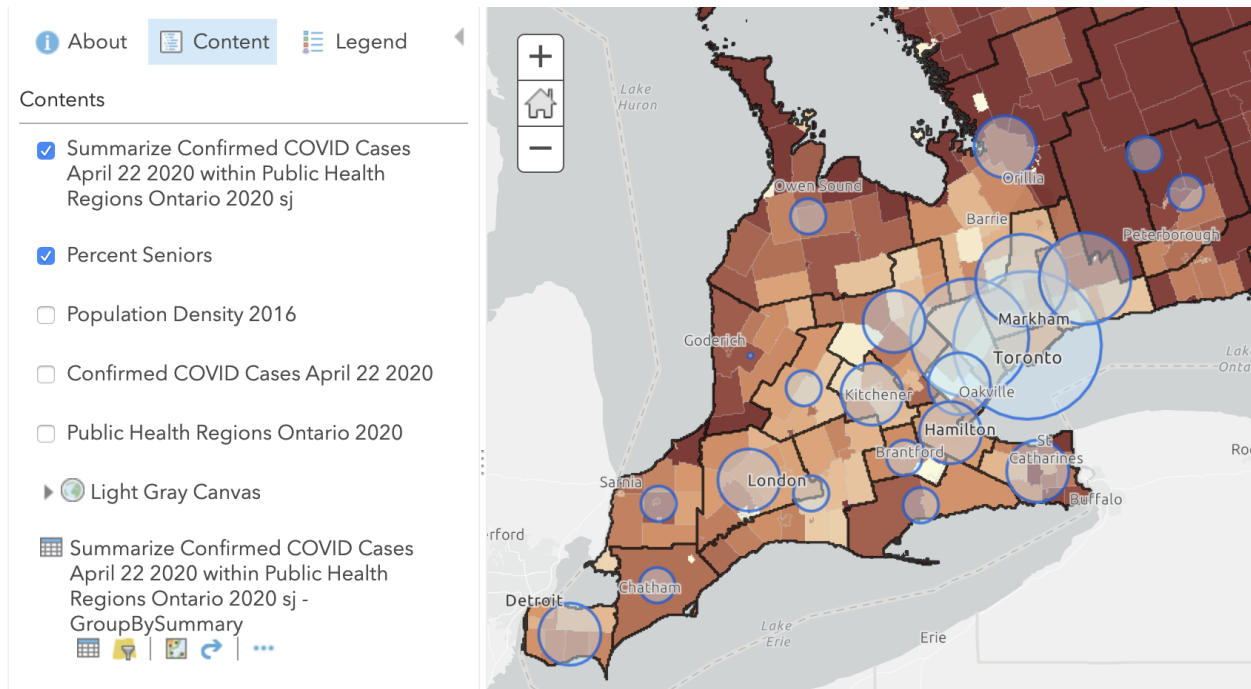
15. Click Copy and the layer duplicates itself in the layer listing. You may need to rearrange the layer order as in a previous step.

☒ ONCSDcensus2016 - copy

☒ ONCSDcensus2016


16. Click More Options on the original layer **ONCSDcensus2016** and select **RENAME**. Assign a descriptive name such as "Population Density".

17. Now, using the copied layer, change the layer style to reflect another census variable such as "Percent Seniors". This variable describes the percentage of the population who are 65 years of age and over.



18. SAVE YOUR WORK!

Section Seven: Sharing

1. Click the **Share** button  **Share** at the top of the map.
2. Select **Everyone** and you will be prompted to update sharing on the layers added to your map.
3. Click **UPDATE SHARING**.

Update Sharing

These layers in the web map may not be visible to others because they are not shared in the same way as the web map.

Item	Owner
Aggregation_of_COVIDcasesapr il7_2020_to_Ontario_Public_Hea lth_Units	sjanzen@brocku.ca_Brock

Click Update Sharing to adjust the settings of the items you can update so they can be viewed in the web map.

UPDATE SHARING

CANCEL

4. Copy the link provided or click a social media button to share the map in that way.

Link to this map

<http://arcg.is/14rLu8>

☒ Share current map extent



Facebook



Twitter

- Click DONE when finished.

Section Eight: Accessing a Previously Made Map

- Sign into ArcGIS Online (as described in SECTION TWO).
- Click on the CONTENT tab at the top of the browser window. You will see a listing of all the feature layers and web maps you've created under your Brock credentials.

<input type="checkbox"/> Title				Modified
<input type="checkbox"/> COVID19 Cases in Ontario April 22, 2020	Web Map		☆ ...	Apr 23, 2020
<input type="checkbox"/> Aggregation_of_Confirmed_COVID_Cases_April_22_2020_to_Public_Health_Regions_Ontario_2020	Feature Layer (hosted)		☆ ...	Apr 23, 2020
<input type="checkbox"/> Public Health Regions Ontario 2020	Feature Layer (hosted)		☆ ...	Apr 23, 2020

- Click the title of an item to see the Item Details page.

COVID19 Cases in Ontario April 22, 2020

Overview Usage Settings

Edit Thumbnail

Add a brief summary about the item.

Web Map by sjanzen

Created: Apr 23, 2020 Updated: Apr 30, 2020 View Count: 37

Add to Favorites

Description

Add an in-depth description of the item.

Layers

Summarize_Confirmed_COVID_Cases_April_22_2020_within_Public_Health_Regions_Ontario_2020_sj

Percent Seniors

Population Density 2016

Confirmed COVID Cases April 22 2020

Public Health Regions Ontario 2020

Open in Map Viewer

Create Presentation

Create Web App

Share

Metadata

Item Information

Learn more

Low

High

Top Improvement: Add a summary

Details

Size: 16 KB

★★★★★

- Click **Open in Map Viewer**.

Congratulations! You've completed this tutorial. There are many tutorials and resources available in the ArcGIS Online HELP pages.

STRETCH EXERCISE

Using what you have learned in the above tutorial, add another layer to your map (search ArcGIS Online for "ICU COVID19 April 22"). Explore the attribute table and try to create a colour coded map showing the number of ICU beds for each LHIN (Local Health Integrated Network). Do you see regions at risk, given the number of confirmed cases? What other data would be useful for analyzing the situation in Ontario?

For more information about COVID19 in Canada, explore this web app created by ESRI using 'live' data.

<https://resources-covid19canada.hub.arcgis.com/app/82e586188b7049e1896b771cd4875815>

University of Toronto hosts up-to-date sources for COVID19 from their site "How's my Flattening?"

<https://howsmyleftening.ca/#/home>

Sources used in this exercise:

Confirmed Positive Cases in Ontario by the Government of Ontario, <https://data.ontario.ca/en/dataset/confirmed-positive-cases-of-covid-19-in-ontario>

COVID-19 Canada Health Regions by the University of Calgary,
http://geo.scholarsportal.info/#r/details/_uri@=2735915971&_add:true_nozoom:true

Census Subdivision Boundary File 2016, Statistics Canada

2016 Canadian Census Profiles, Statistics Canada

LHIN boundaries <https://data.ontario.ca/dataset/local-health-integration-network-office-lhin-locations>

ICU capacity <https://howsmyleftening.ca/#/home>