

Esri Canada Public Health: Collaborations and Applications

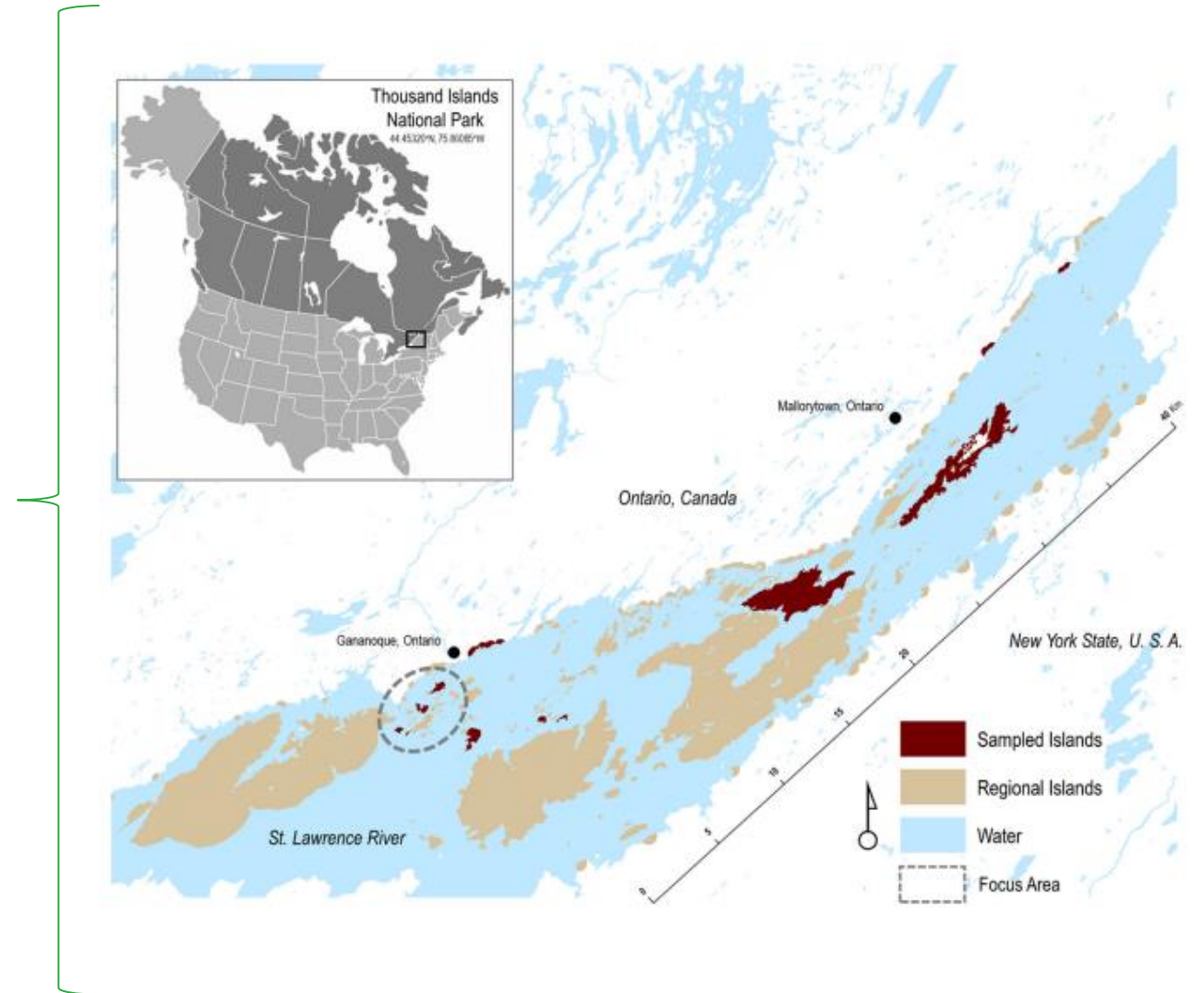
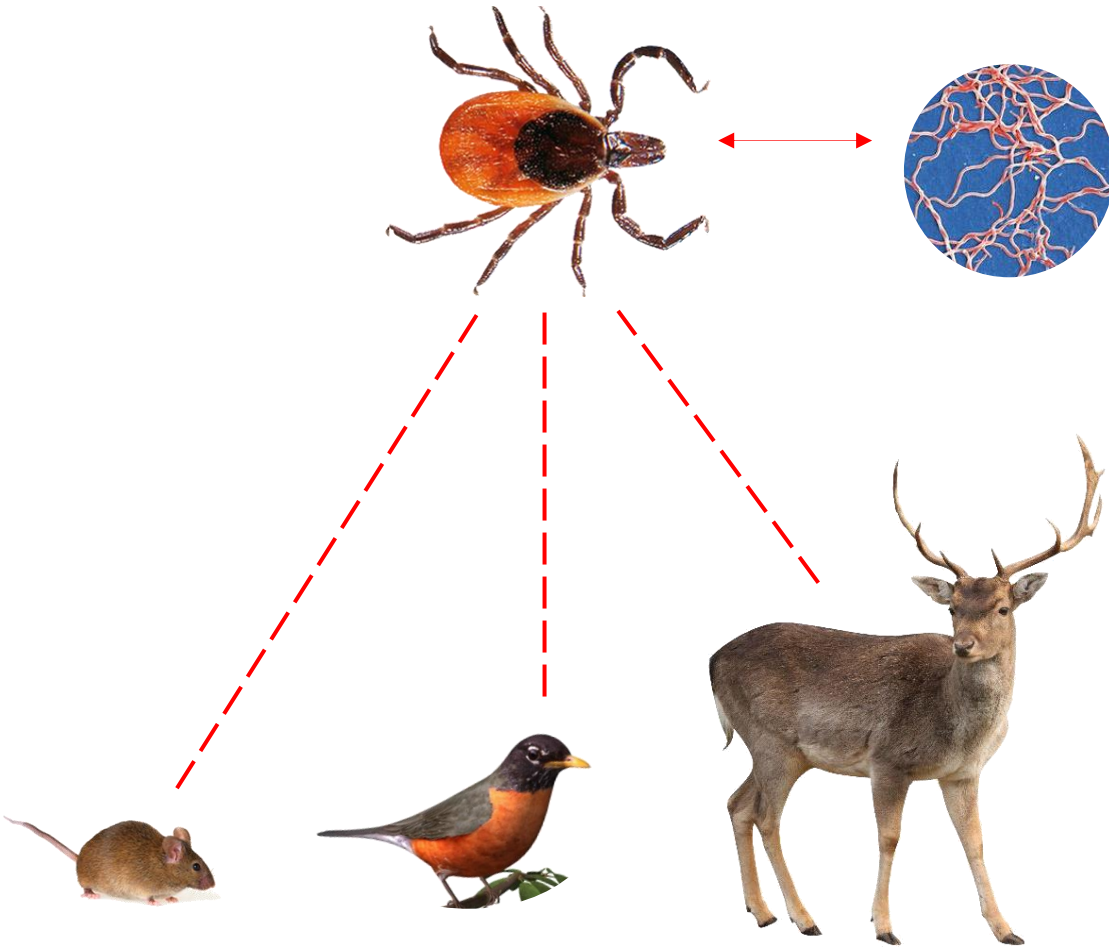
Alexander (Sandy) Watts, PhD (he / him)
Industry Manager - Public Health
Esri Canada

APEHO GIS Interest Group
April 11th, 2025

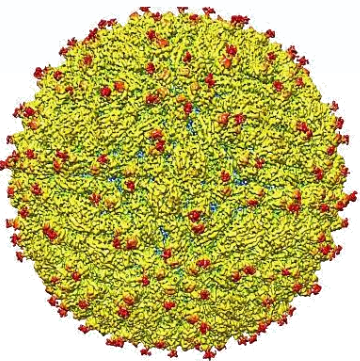
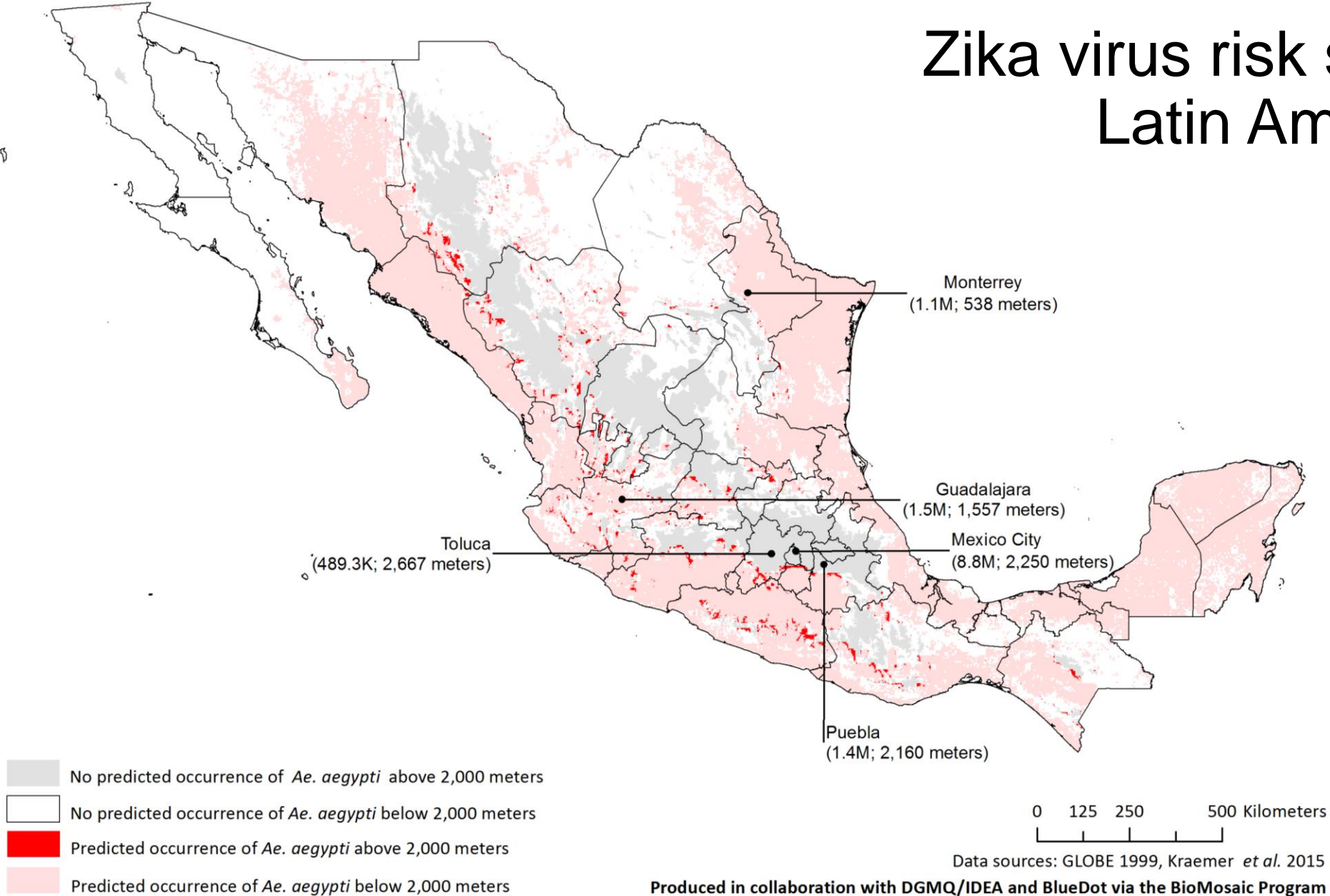
Ecology of vector-borne and zoonotic diseases



Role of landscape connectivity in Lyme disease range expansion

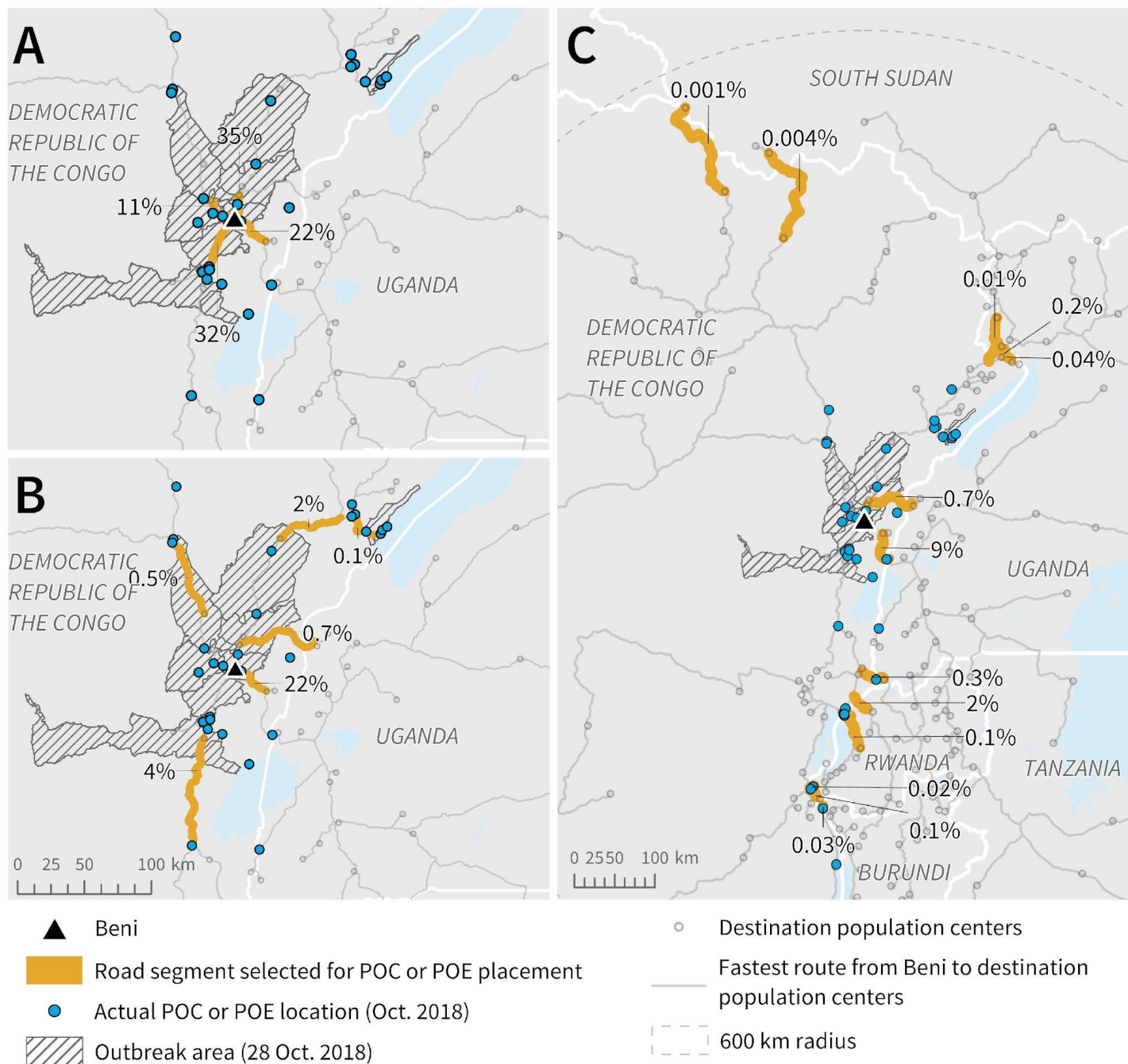


Zika virus risk suitability in Latin America



Watts et al. 2020

Points of entry (POE) and points of control (POC) for Ebola surveillance in Democratic Republic of Congo



Percentages indicate estimated proportion of travelers that could be screened

Huber et al. 2021

Esri Canada Public Health Team



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Health Geography Lead



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Senior Technical Solutions
Specialist

Total Cases
20,985

Laboratory Diagnosed **20,698**
Epi-Linked **287**

Currently Hospitalized
167

Total to Date: 1,244

Currently Admitted to ICU
50

Confirmed Deaths
290

Recovered
14,901

Last Update
11/13/2020, 7:30 PM

Distribution by Age

Unknown 103

Northern
Prince George

New Cases
617

Active Cases
5,579

New Brunswick COVID-19 Dashboard

Health Zone: All Zones Community: All Communities

Health Statistics

Maps

Inter-Provincial Travel Statistics

Active

22
New Today 3

Total Cases

367
Total Tests 110,663

Recovered

339

Deaths

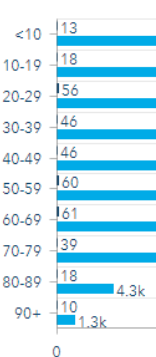
6

In Hospital

2
In ICU 1

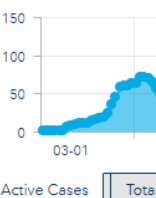
Current Total

Tests By Age



● Positive Test

Active Cases



Region of Peel - Public Health: COVID-19 Mapping Dashboard

Municipal Filters: Brampton Caledon Mississauga

Total Cases

17,562

Reported 02/23 to 11/07

Community Cases

16,825

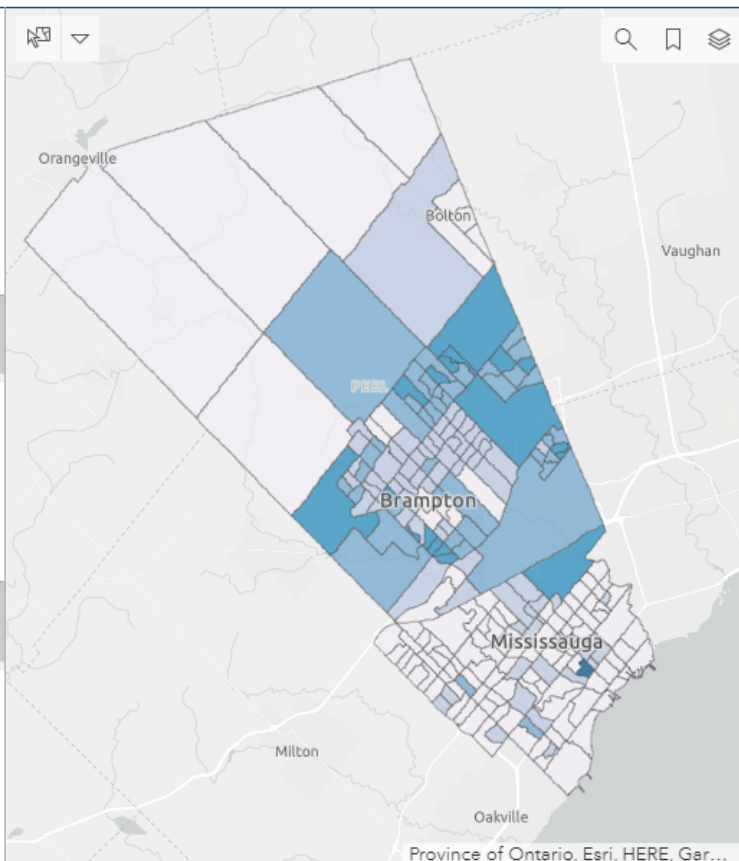
Reported 02/23 to 11/07

Institutional Cases

737

Reported 02/23 to 11/07

Total: 02/23 to 11/07



Total Cases: Incidence Rate per 100,000 by Census Tract - 02/23 to 11/07

Incidence Rate per 100,000

- ≥ 3,775
- 2,390 to 3,774
- 1,591 to 2,389
- 899 to 1,590
- ≤ 898

How is COVID-19 Incidence Rate per 100,000 Defined?

This map shows a crude incidence rate defined as the total number of new cases within a specific time period divided by the total population and multiplied by 100,000. For example, if 7 cases were reported within a census tract with a population of 4,874 then the rate per 100,000 would be $(7/4,874) * 100,000 = 144$ per 100,000. Crude rates are influenced by the underlying age distribution of the population.

10/04 to 10/10 10/11 to 10/17 10/18 to 10/24 10/25 to 10/31 11/01 to 11/07

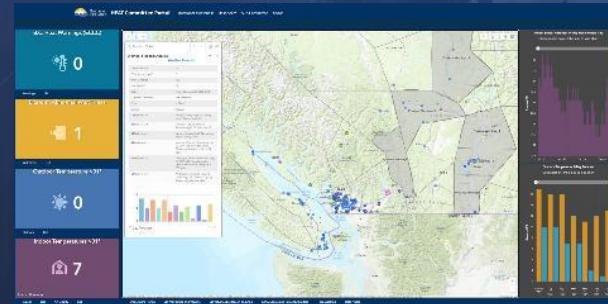
Supporting health GIS teams across Canada

Disease surveillance and response



BC COVID-19 Dashboard Project
British Columbia

Health emergency preparedness



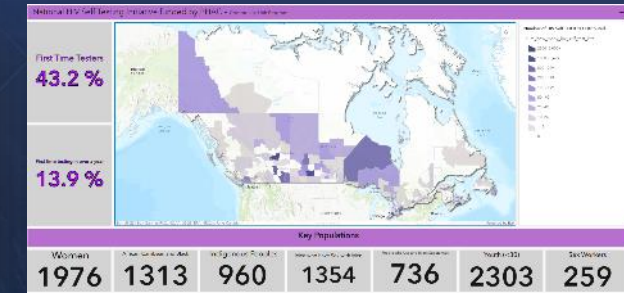
BC HEAT Committee Portal
British Columbia

Substance misuse and opioids



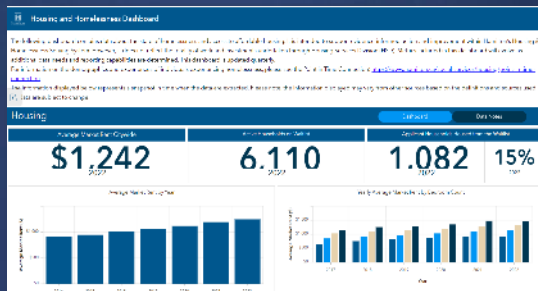
Opioid dashboard
Ontario

HIV & STBI Outreach



REACH Nexus 'I AM' Project
Ontario

Homelessness & marginalization



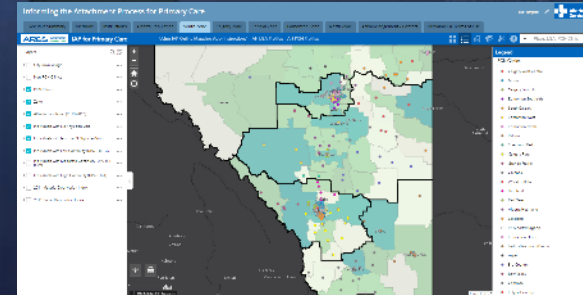
Hamilton Homelessness Reduction Program
Ontario

Social determinants of health



GeoView Project
Nova Scotia

Health systems planning



Alberta Health Services
Alberta

Hospital Capacity & Resourcing



Montreal DRMG
Quebec

British Columbia HEAT Committee GIS Portal

Internal (no link available)



HEAT Committee Portal

Situational Awareness Dashboard Sub-Committee About

B.C. Heat Warnings (ECCC)



Warnings List

ERs with Abnormal Wait Times



Wait Times List

Outdoor Temperature >31°

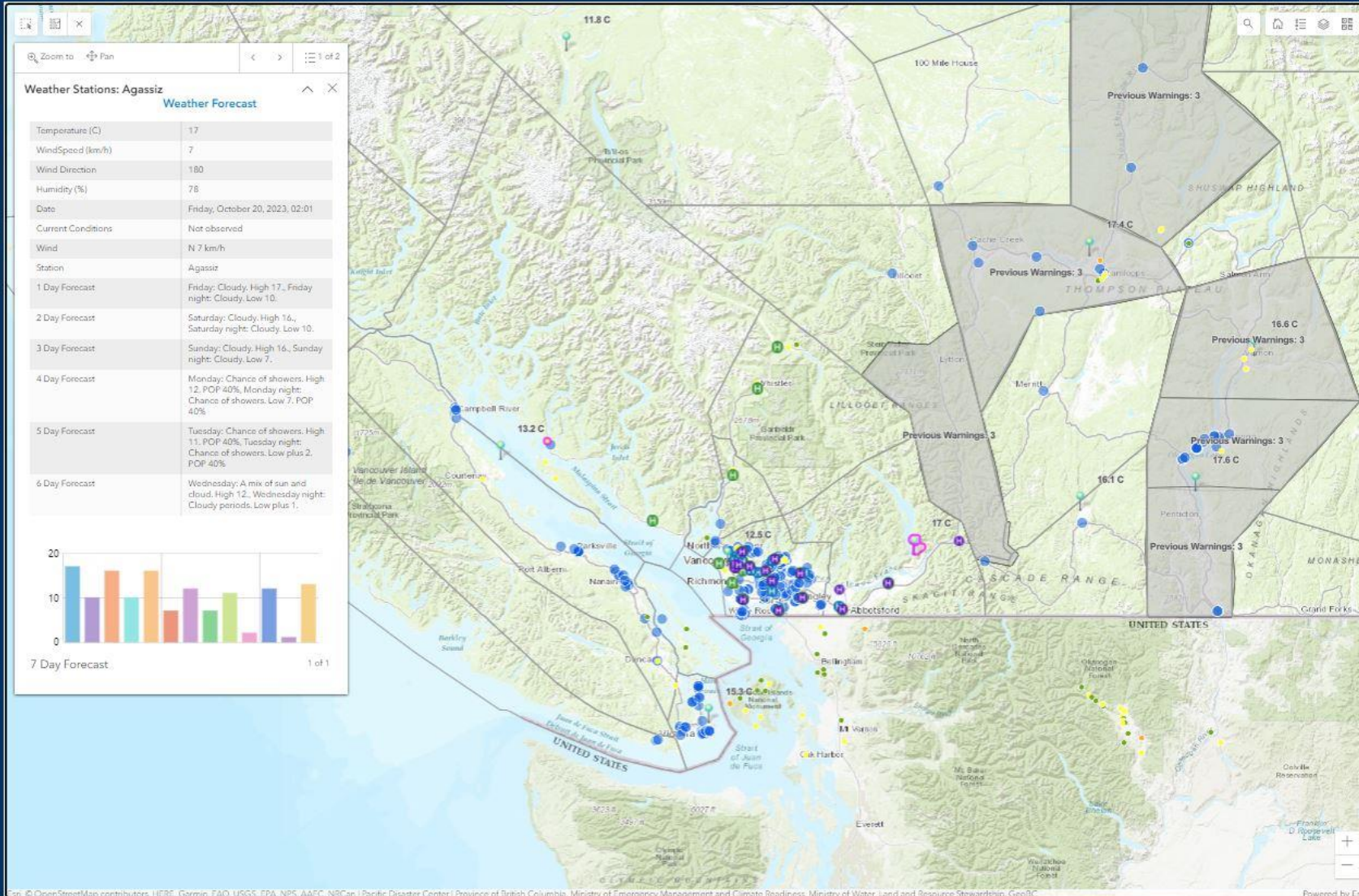


Outdoor List

Indoor Temperatures >31°

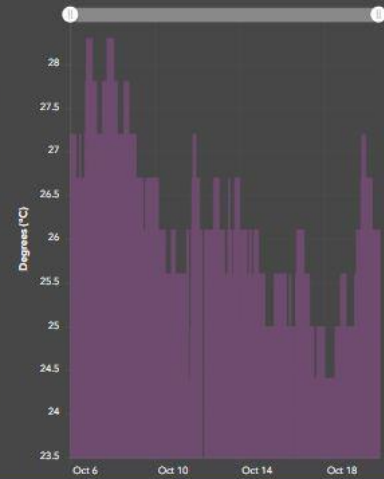


From ~120 sensors
Indoor List Air Quality List



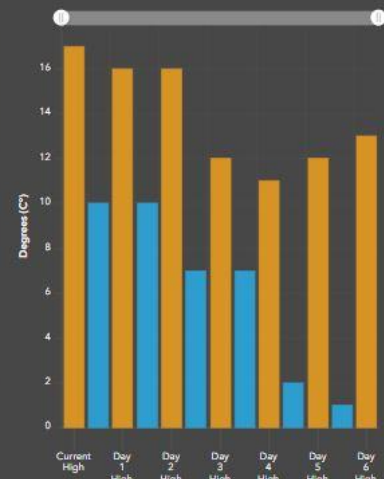
Indoor Sensor Historical 14 Day Trend (Purple Air)

Click a sensor point in the map to load chart



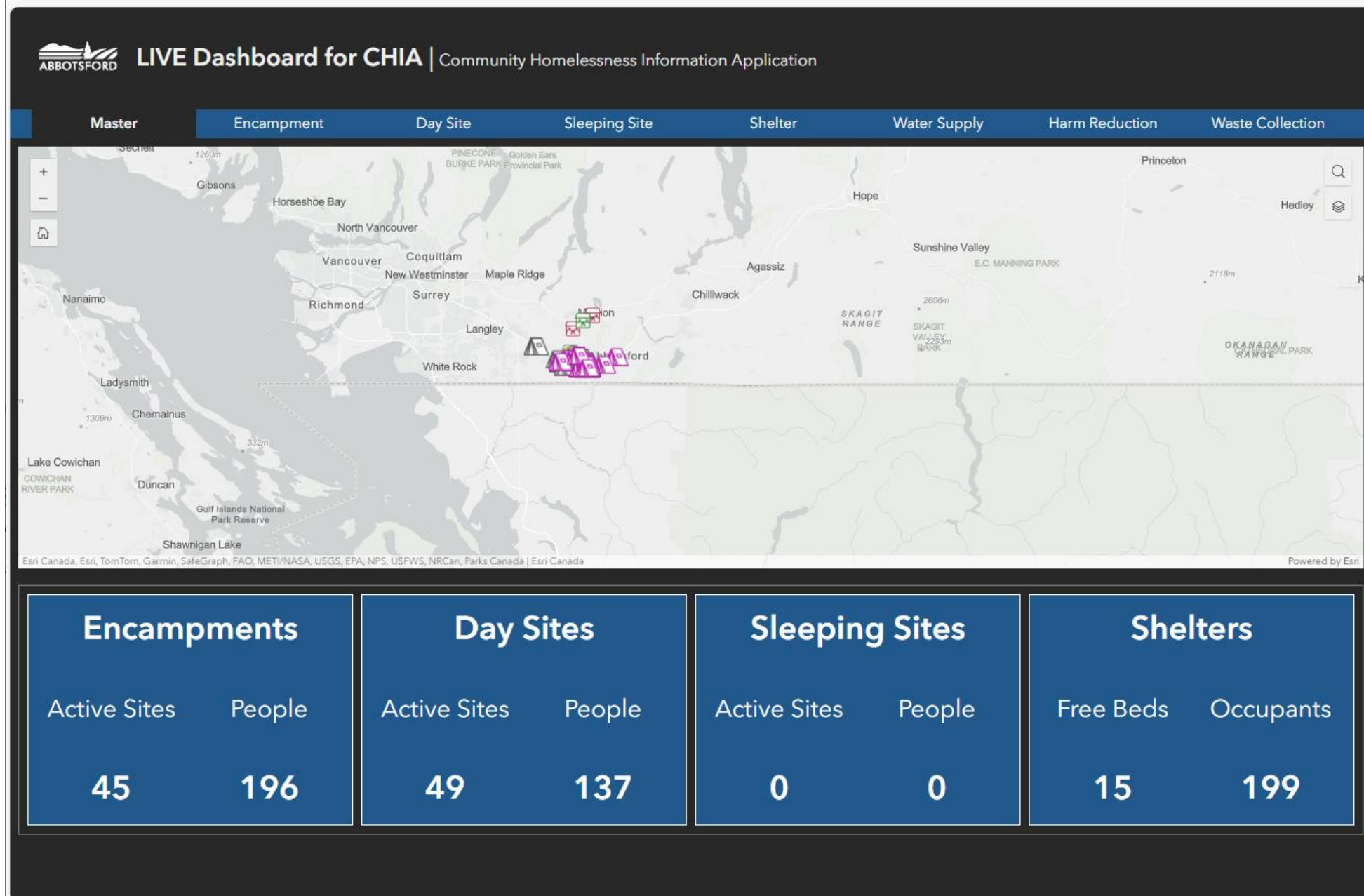
Outdoor Temperature 7-Day Forecast

Click a station in the map to load chart



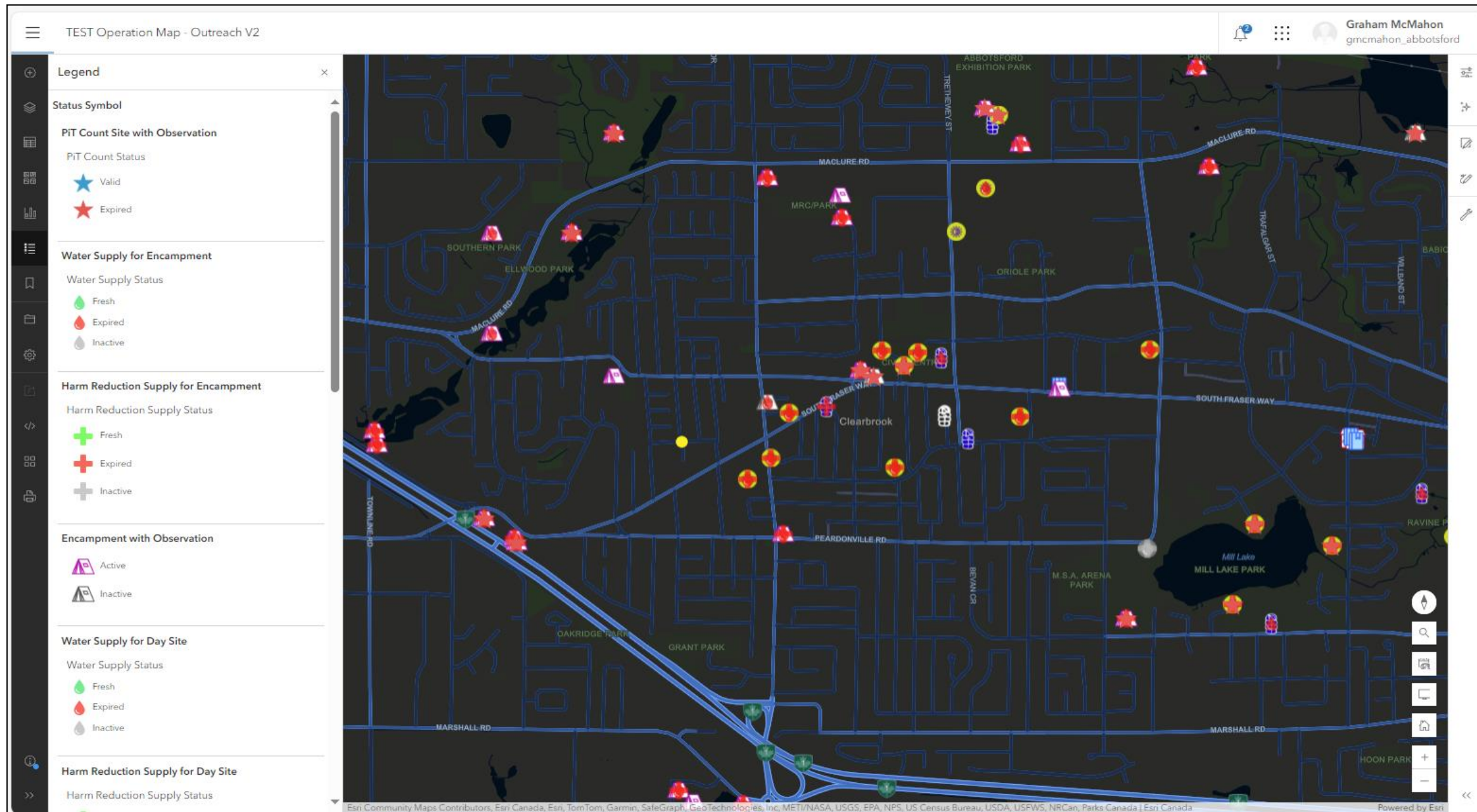
City of Abbotsford: Community Homelessness Information Application

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City of Abbotsford: Community Homelessness Information Application

Internal (no link available)



North York South Simcoe OHT and Carlton University: Mammogram Screening Application

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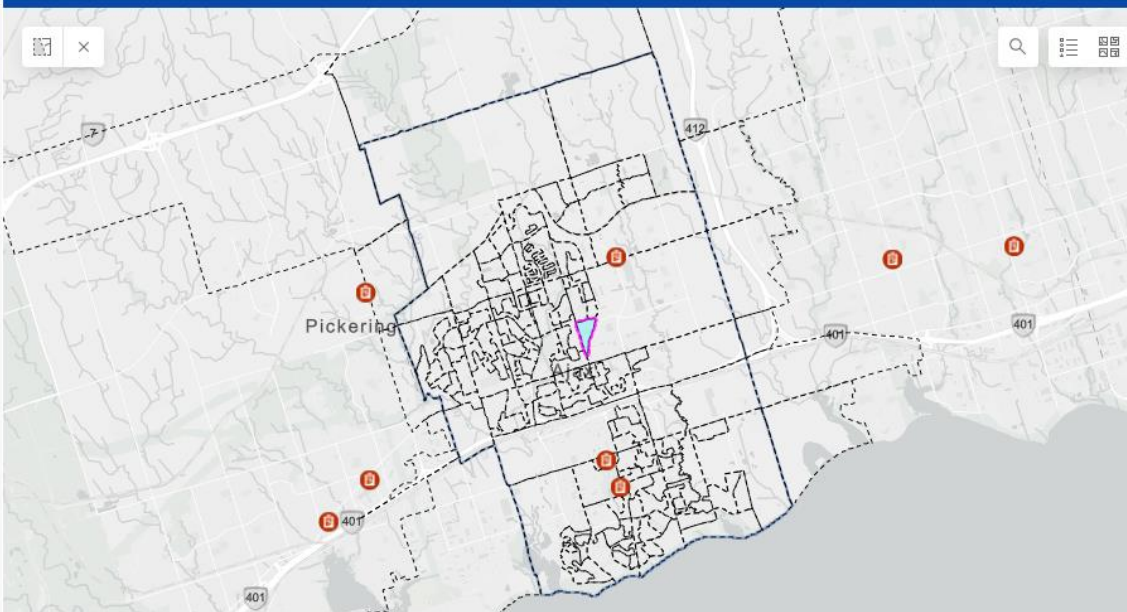
Ontario Mammogram Screening Geospatial Pilot Project

1. Find Your Municipality

Search...

- Abitibi 70
- Addington Highlands
- Adelaide-Metcalf
- Adjala-Tosorontio
- Admaston/Bromley
- Agency 1
- Ajax
- Akwesasne (Part) 59
- Alberton
- Alderville First Nation
- Alfred and Plantagenet
- Algoma, Unorganized, North Part
- Algoma, Unorganized, South East Part
- Algonquin Highlands
- Alnwick/Haldimand
- Amaranth
- Amherstburg
- Armour
- Armstrong
- Arnprior
- Aroland
- Arran-Elderslie

2. Click on a neighbourhood in map to populate data in the right panel



Province of Ontario, Esri Canada, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, NRCan, Parks Can... Powered by Esri

Map Find the closest OBSP Site

4. Review top-ranking mammogram screening model covariates

Statistically Significant Factors

Variables found to be most closely associated with a lack of uptake in mammogram screening. For more information refer to report555.

Females living Alone
⊗ No Relationship
Correlation Coefficient: 0.0008

Uncertainly Attached
⊙ Positive Relationship
Correlation Coefficient: -0.0038

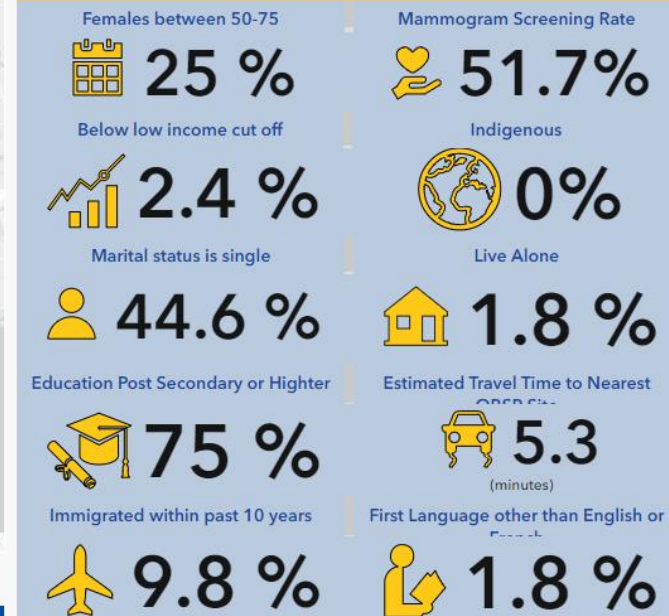
Proximity to Services
⊙ Positive Relationship
Correlation Coefficient: 0.1397

Material Resources
⊗ No Relationship
Correlation Coefficient: -0.0281

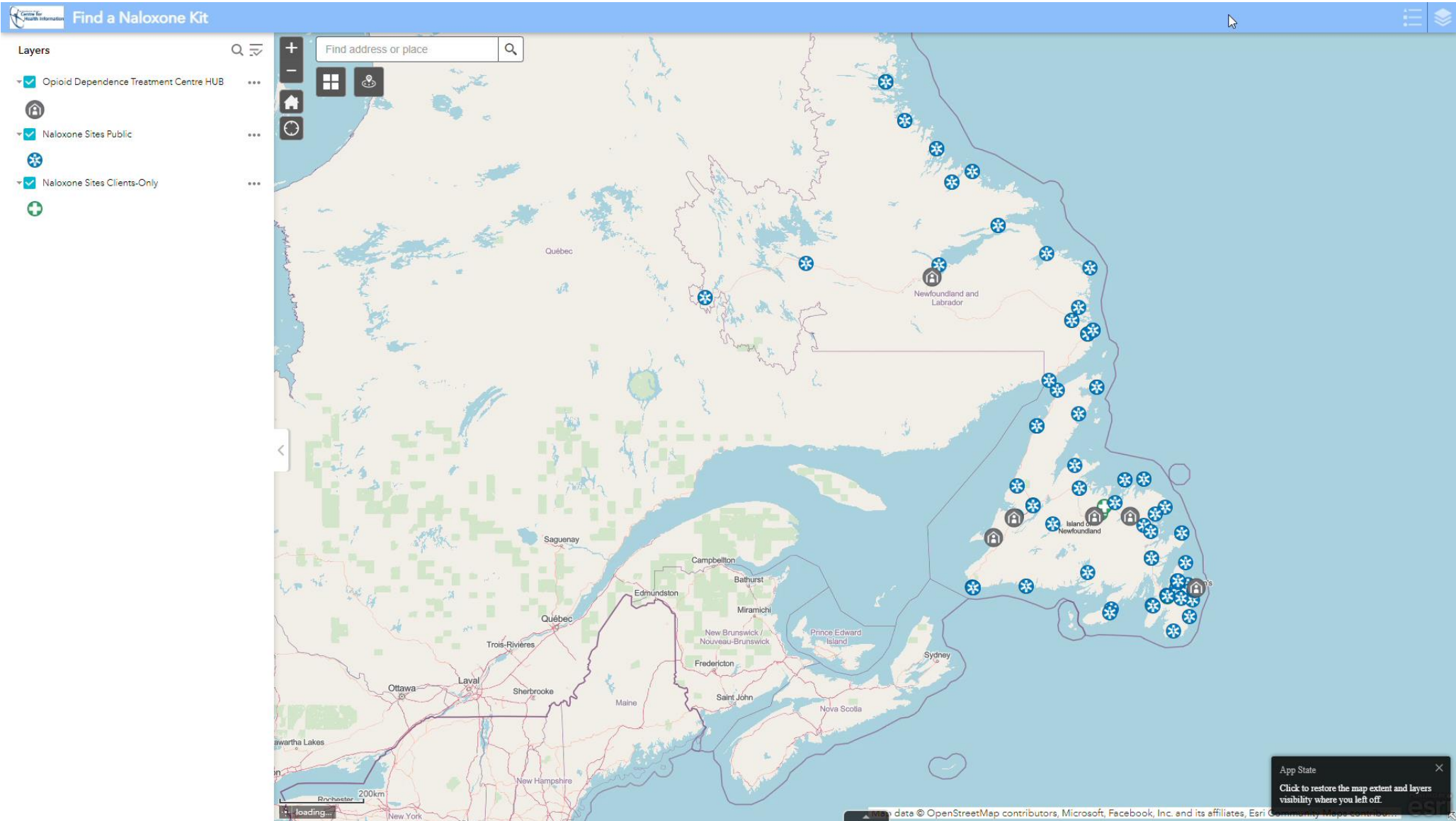
3. Review corresponding population data

Independent Factors

Factors listed below represent the female population



Newfoundland & Labrador Health Services: Naloxone Kit App



[Link to open application here](#)

Partnerships & Collaborations



Strategic Partnership with REACH Nexus

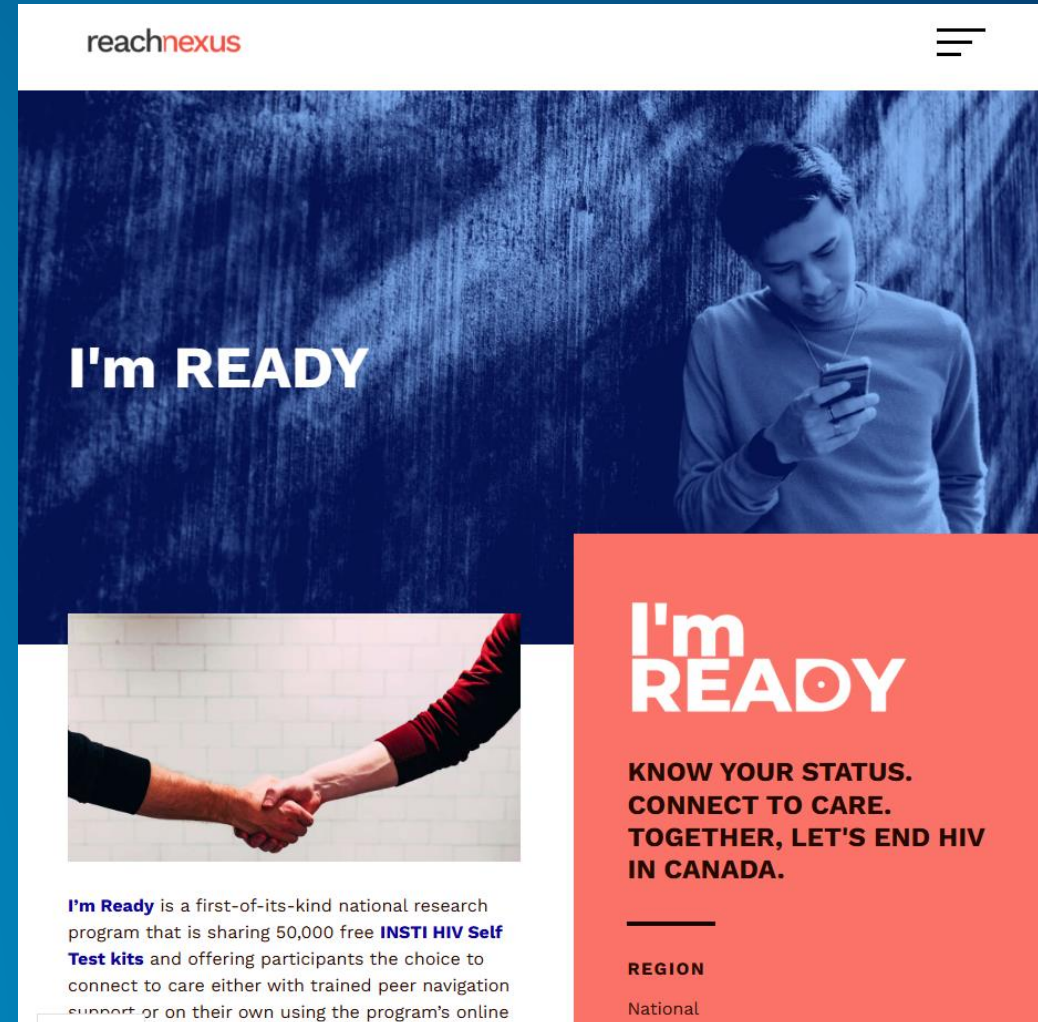
Goal: Remove gaps to HIV and STBBI resources, services, and support



I'm Ready

Sharing 50,000 free **INSTI HIV Self Test kits** and offering participants the choice to **connect to care**

Link to I'm Ready program [here](#).



The screenshot shows the reachnexus website interface. At the top left is the reachnexus logo, and at the top right is a hamburger menu icon. The main content area features a large blue-tinted image of a person looking at their phone, with the text "I'm READY" overlaid. Below this is a smaller image of two hands shaking. To the right of the handshake image is a red box containing the text "I'm READY" and "KNOW YOUR STATUS. CONNECT TO CARE. TOGETHER, LET'S END HIV IN CANADA." Below the red box is a "REGION" dropdown menu with "National" selected. At the bottom, there is a short paragraph of text describing the program.

reachnexus

I'm READY

I'm READY

KNOW YOUR STATUS.
CONNECT TO CARE.
TOGETHER, LET'S END HIV
IN CANADA.

REGION
National

I'm Ready is a first-of-its-kind national research program that is sharing 50,000 free **INSTI HIV Self Test kits** and offering participants the choice to connect to care either with trained peer navigation support or on their own using the program's online

REACH Nexus 'I'm Ready' HIV self-test kit program

Program Tracker

Internal (do not distribute)

I'm Ready Program Participants with a Self-Test Kit by Provinces/Territories

January 31st, 2025

Provinces/Territories

All

Key Population

None



Participants
n=12,060

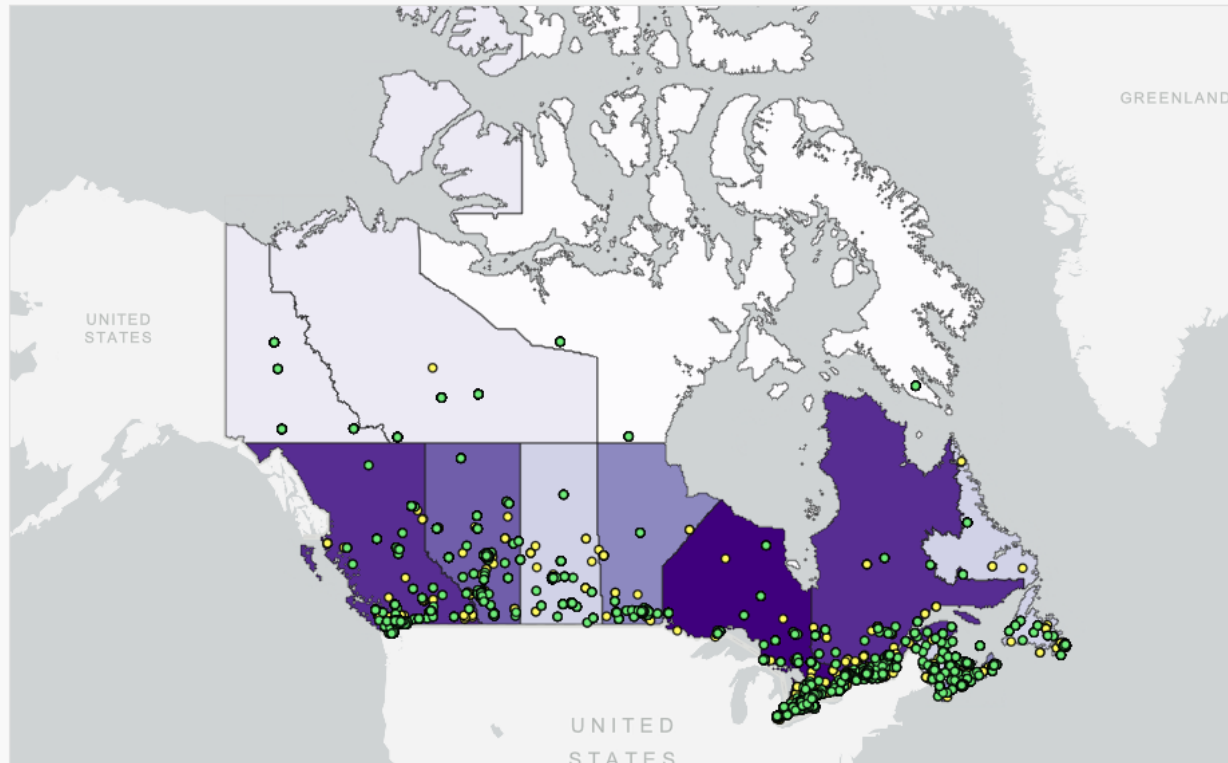
Total HIVST Kits
27,470

Submitted a Valid Test Result
n=3,120

% Who Submitted a Valid Result
26%

HIV Positive Results
n=49

HIV Positivity Rate
1.5%



Esri, TomTom, FAO, NOAA, USGS, NRCAN | Esri Canada

Powered by Esri

First Time Testers
35% n=3,885

Location:

Urban **75%** Rural **25%**

Key Population Numbers:

IV Drug Use
369

Indigenous
477

ACB (Black)
1,749

Women
3,115

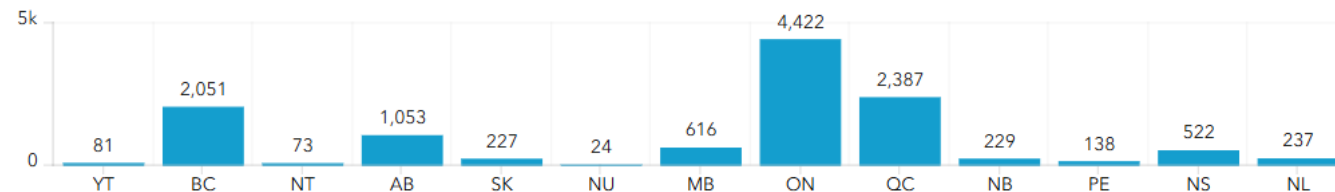
Gay/MSM
4,734

Asian
3,096

PrEP Awareness
56%

Used PrEP Before
14%

Participants by Province/Territory



I'm Ready First Time Testers

I'm Ready Participants

REACH Nexus 'I'm Ready' HIV self-test kit program

Ontario Public Health Unit View

Internal (do not distribute)

PHAC National I'm Ready Program in Ontario by Health Unit

January 31st 2025



Ontario Health Units

Toronto Public Health

Total Participants Reached: 1,340
 HIVST Kits Distributed: 3,342
 Positives Reported: 6
 --
 Active agency sites: 5

Peel Public Health

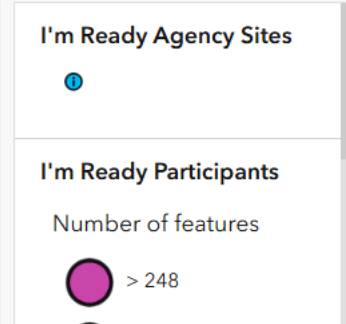
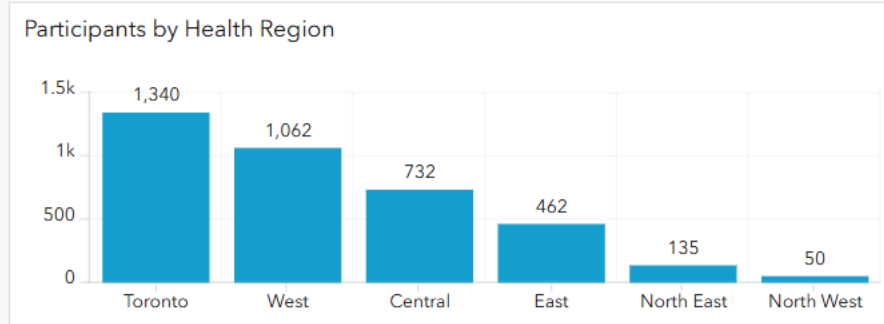
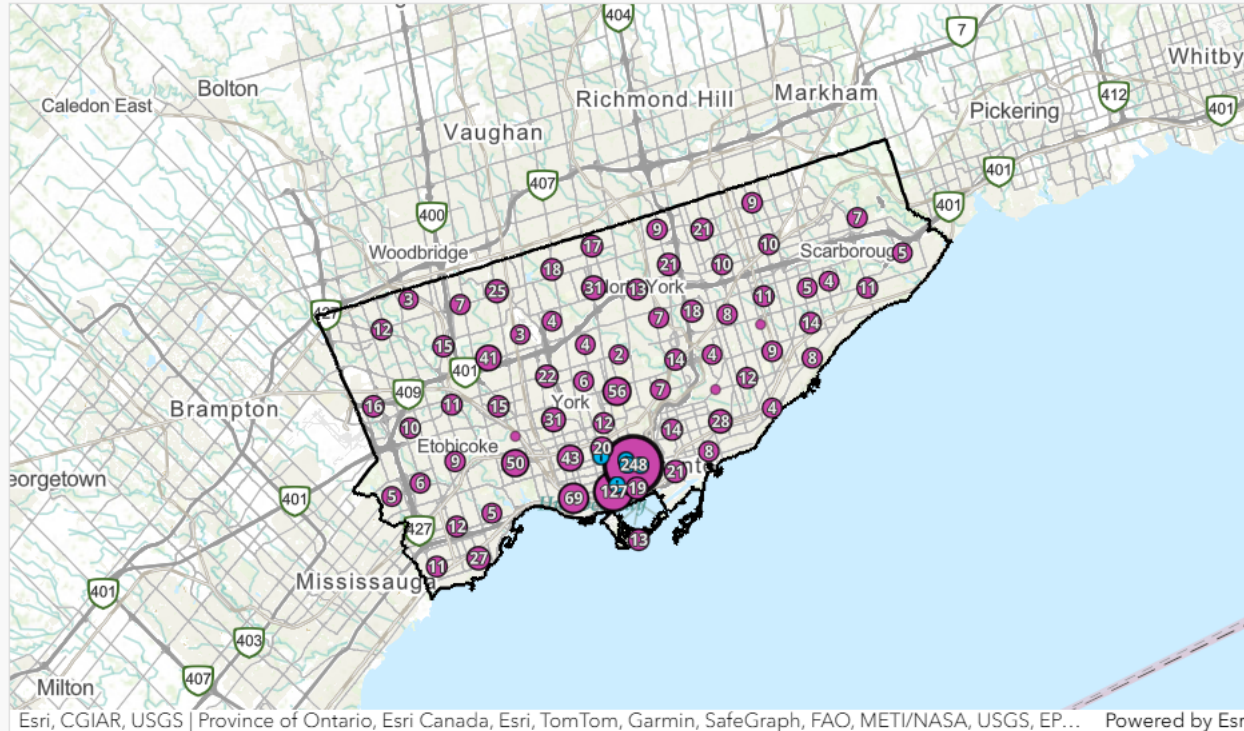
Total Participants Reached: 391
 HIVST Kits Distributed: 911
 Positives Reported: 3
 --
 Active agency sites: 1

Region of Waterloo, Public Health

Total Participants Reached: 321
 HIVST Kits Distributed: 755
 Positives Reported: 1
 --
 Active agency sites: 1

York Region Public Health

Total Participants Reached: 207
 HIVST Kits Distributed: 489



Total Participants

1,340

Total Kits Distributed

3,342

First Time Testers

26% (n=325)

Key Populations:

Youth (<25)

219

Indigenous

13

IV Drug Use

32

Women

257

Black

232

Gay/MSM

677

Health Units

Partner Agencies

Strategic Partnership with REACH Nexus

Goal: Remove gaps to HIV and STBBI resources, services, and support

Healthbox:

25 slots available for the things people need for their health — like **harm-reduction supplies, self-test kits for HIV, naloxone kits, even socks, hats and mittens**



Our Healthbox Community Dashboard

Internal (do not distribute)

Demographic and Site Usage

Data as of March/31/2025



Site:
Carlington

Launch Date:
Oct/25/2023

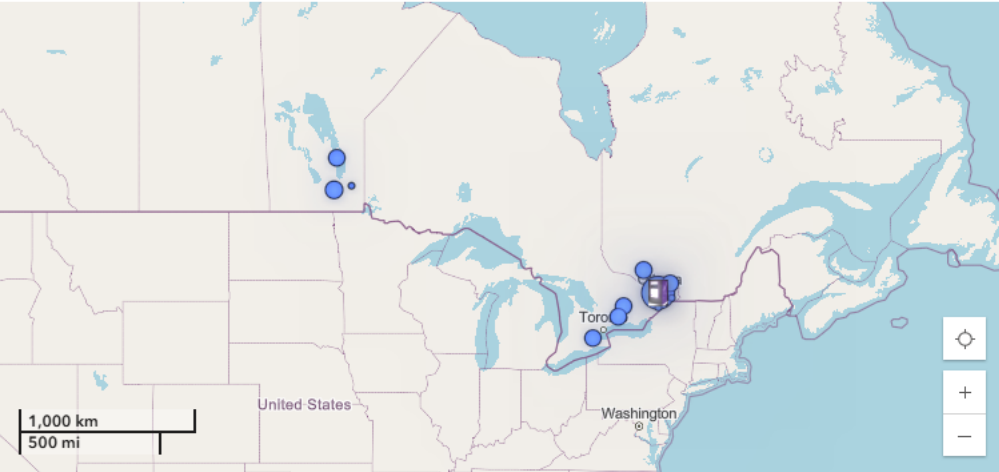
People Reached
 1,217

Machine Usage

Return Visits
38%
(n=462)

Average Visits
5
(n=6,039)

Where People are from: Participant Provided FSAs (first 3 digits of postal code)
21% (n=253) Provided an FSA



Group

Top FSA List

Persons may be counted in multiple categories for some questions e.g. employment, ethnicity, gender, sexuality and substances used.
Persons selecting "Prefer not to answer" (no answer) are not included in denominators.

Sex Assigned at Birth

Male
69%
(n=491)

Female
31%
(n=224)

No Answer: 40% (n=473)

Age (in years)

Average Age
34

Median Age
30

Gender

Cis-Men
42%
(n=393)

Cis-Women
17%
(n=160)

Trans-Men
3%
(n=29)

Trans-Women
2%
(n=20)

Other
39%
(n=367)

No answer
20%
(n=242)

Ethnicity

Black
15%
(n=109)

Indigenous
21%
(n=148)

White
39%
(n=277)

Other
30%
(n=212)

No Answer
40%
(n=472)

Sexual Orientation

Heterosexual
41%
(n=270)

Gay/Lesbian
8%
(n=51)

Bisexual
11%
(n=72)

Two-Spirit
9%
(n=59)

Other
35%
(n=230)

No Answer
44%
(n=523)

Instructions

Demographic and Usage Overview

Demographics by Key Populations

Substances Used by Key Populations

Supplies Accessed

Supplies Accessed by Key Populations

Stigma, Health, Experience & Acceptability

Visit Metrics

Strategic Collaboration: Esri Canada and DLSPH



SSHRC Grant: A National Data Platform to Inform Community Wellbeing and Flourishing Across Canada



Goal:

Generate **community-informed Canadian data** on community flourishing that is locally relevant for **research, policy and practice**

Method:

A new **national repeated survey** consisting of a series of validated questions that represent a community-informed measure of community wellbeing.

Tool:

A public GIS dashboard for decision makers and stakeholders

Canadian Community Flourishing Dashboard

Community Flourishing refers to the wellbeing of people as they live and experience life together, beyond just individual wellbeing. Community flourishing is a state in which a community thrives and emphasizes the aspects of society that promote human wellbeing, from social, economic, environmental, cultural, political and physical/psychological health factors. Flourishing communities are seen as key to improving the safety, health, and functioning of society. Many regions in Canada and around the world have started creating Community Wellbeing Plans to enhance overall community wellbeing.

Community Flourishing Domains and Indicators

<ul style="list-style-type: none">· Satisfaction with quality of life in community· Enjoyment of living in community· Community desirability· Future quality of life in community	<ul style="list-style-type: none">· Social support· Community trust· Community belonging· Community attachment· Discrimination and unfair treatment	<ul style="list-style-type: none">· Affordability· Housing· Satisfaction with social conditions and economic situation	<ul style="list-style-type: none">· Community participation· Access to leisure and cultural activities
Overall Community Well Being	Social	Economic	Cultural

Strategic Collaboration: Esri Canada and DLSPH



SSHRC Grant: A National Data Platform to Inform Community Wellbeing and Flourishing Across Canada



Live demo

(Link available soon)

Canadian Community Flourishing Dashboard

Community Flourishing refers to the wellbeing of people as they live and experience life together, beyond just individual wellbeing. Community flourishing is a state in which a community thrives and emphasizes the aspects of society that promote human wellbeing, from social, economic, environmental, cultural, political and physical/psychological health factors. Flourishing communities are seen as key to improving the safety, health, and functioning of society. Many regions in Canada and around the world have started creating Community Wellbeing Plans to enhance overall community wellbeing.

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Overall Community Well Being 	Social 	Economic 	Cultural

Southeast Public Health (KFL&A) + ACES



Proof of Concept: Geospatial Explorer for ACES

Goal:

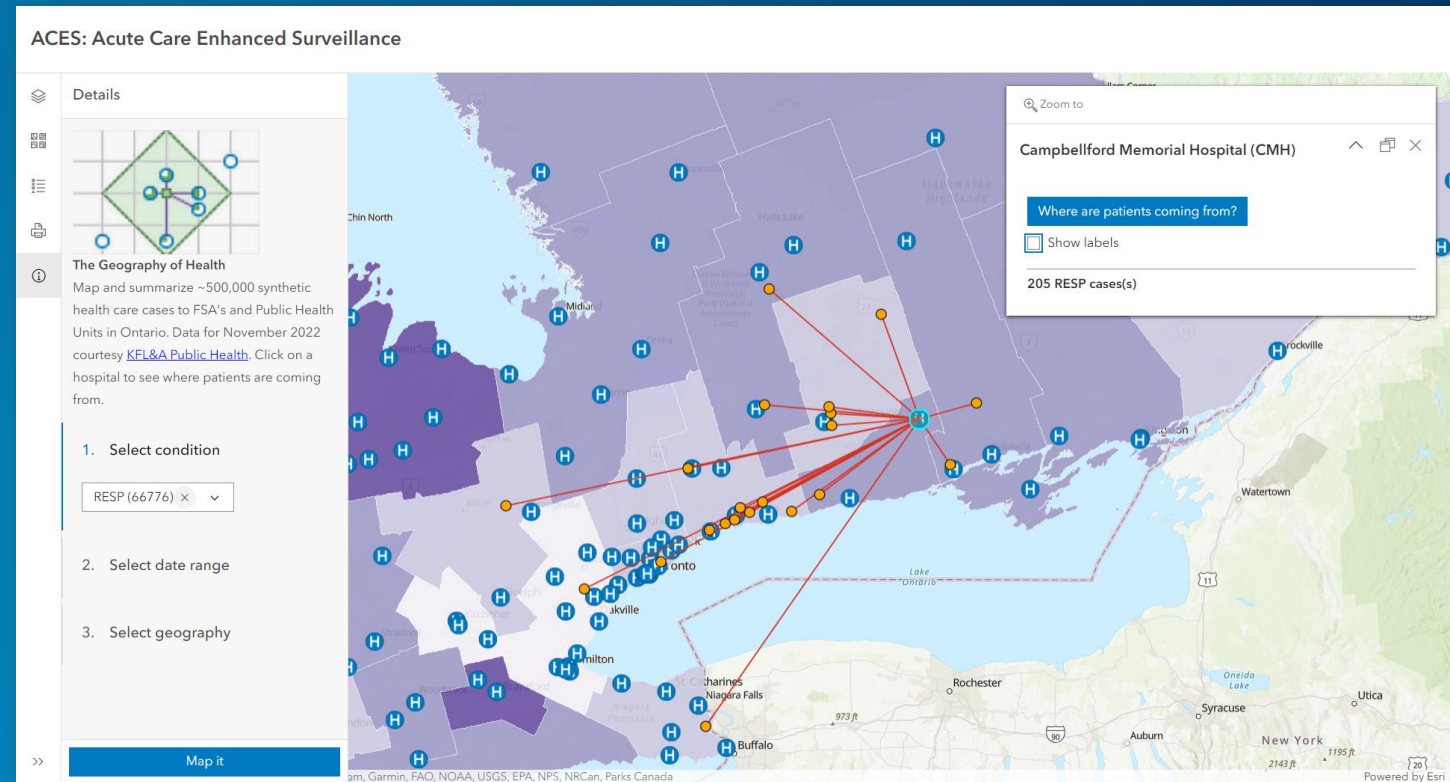
Update ACES map feature

Solution:

Custom GIS explorer tool

Outcome:

Geographic insights on health-seeking behaviour across Ontario



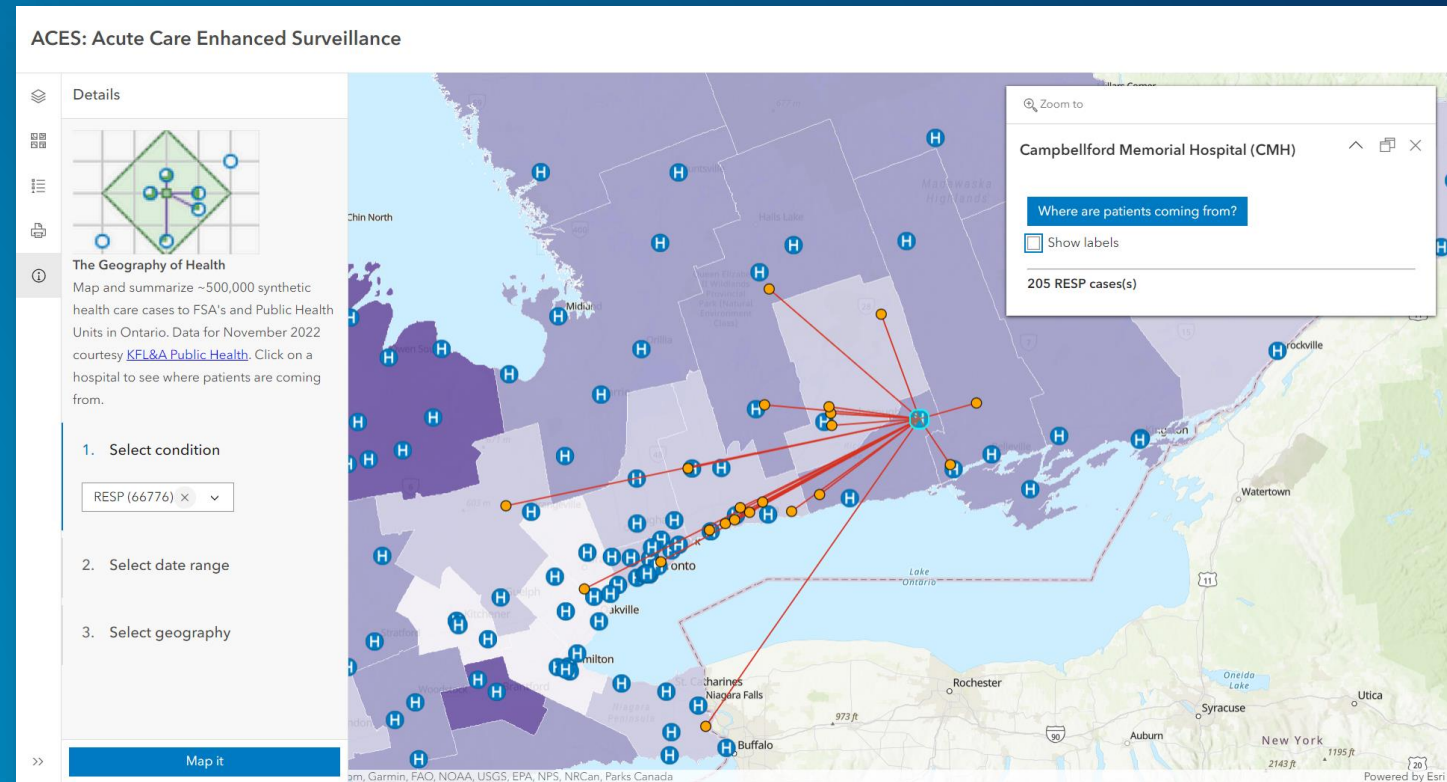
Southeast Public Health (KFL&A) + ACES



Proof of Concept: Geospatial Explorer for ACES

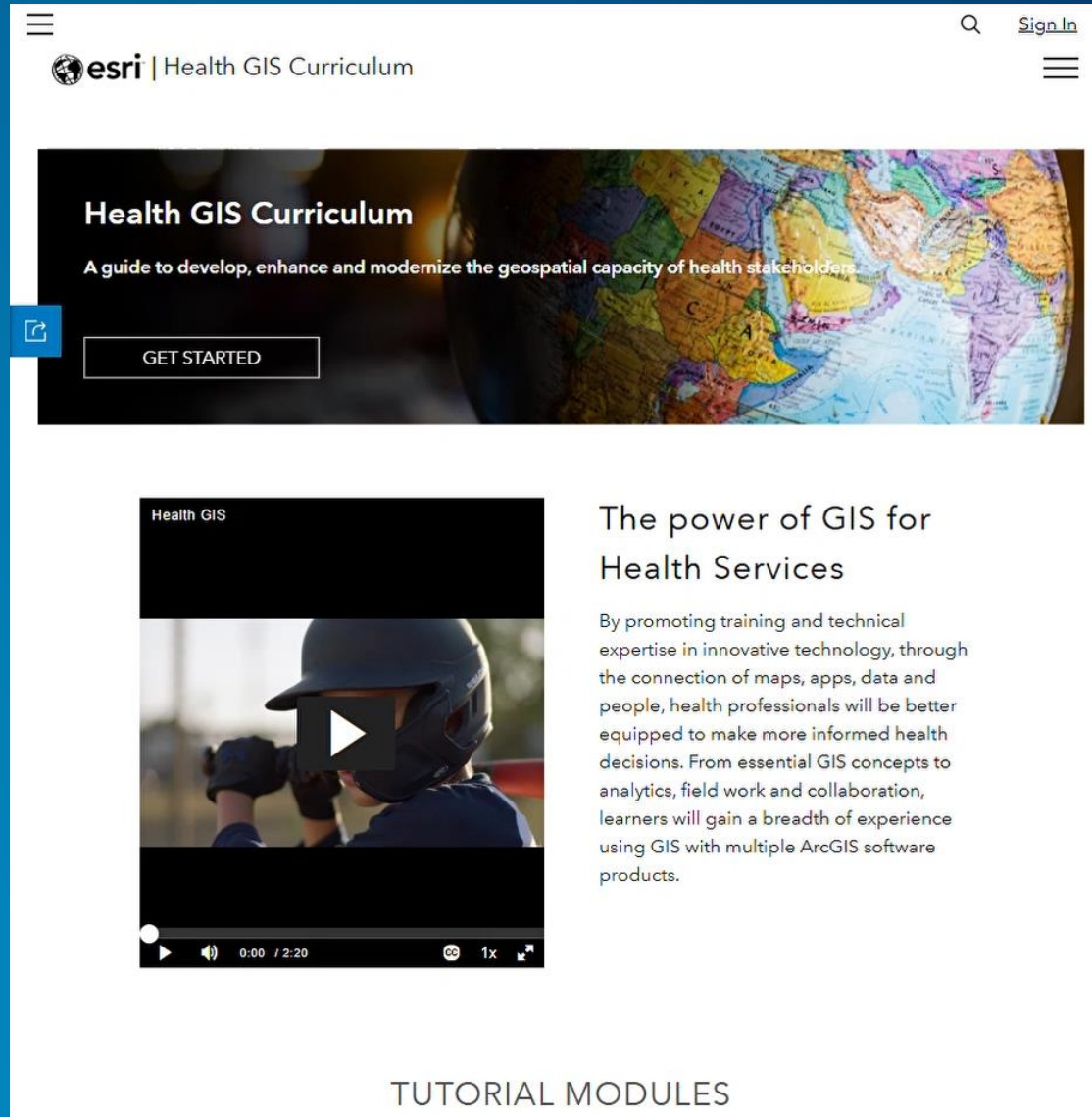
Live demo

Internal (no link available)



Check out the Health GIS Curriculum:

<https://health-gis-curriculum-learn.gis.hub.arcgis.com/>



The screenshot shows the landing page for the Health GIS Curriculum. At the top, there is a navigation bar with the Esri logo and the text "Health GIS Curriculum". To the right of the logo is a search icon and a "Sign In" link. Below the navigation bar is a large hero section with a background image of a globe. The text in this section reads "Health GIS Curriculum" and "A guide to develop, enhance and modernize the geospatial capacity of health stakeholders." Below this text is a "GET STARTED" button. To the left of the button is a share icon. Below the hero section is a video player. The video player has a title "Health GIS" and a play button. Below the video player is a section titled "TUTORIAL MODULES".

esri | Health GIS Curriculum

Sign In

Health GIS Curriculum

A guide to develop, enhance and modernize the geospatial capacity of health stakeholders.

GET STARTED

Health GIS

The power of GIS for Health Services

By promoting training and technical expertise in innovative technology, through the connection of maps, apps, data and people, health professionals will be better equipped to make more informed health decisions. From essential GIS concepts to analytics, field work and collaboration, learners will gain a breadth of experience using GIS with multiple ArcGIS software products.

TUTORIAL MODULES



Alexander (Sandy) Watts, PhD

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Q&A