

Indicator Dashboard Development with Power BI

Presented by: Crystal Palleschi, Epidemiologist, Lambton Public Health
2018 APHEO Conference and Workshop

Overview

1. Background
2. Choosing a Solution
3. Dashboard Development
4. Future Applications and Direction

1.

BACKGROUND

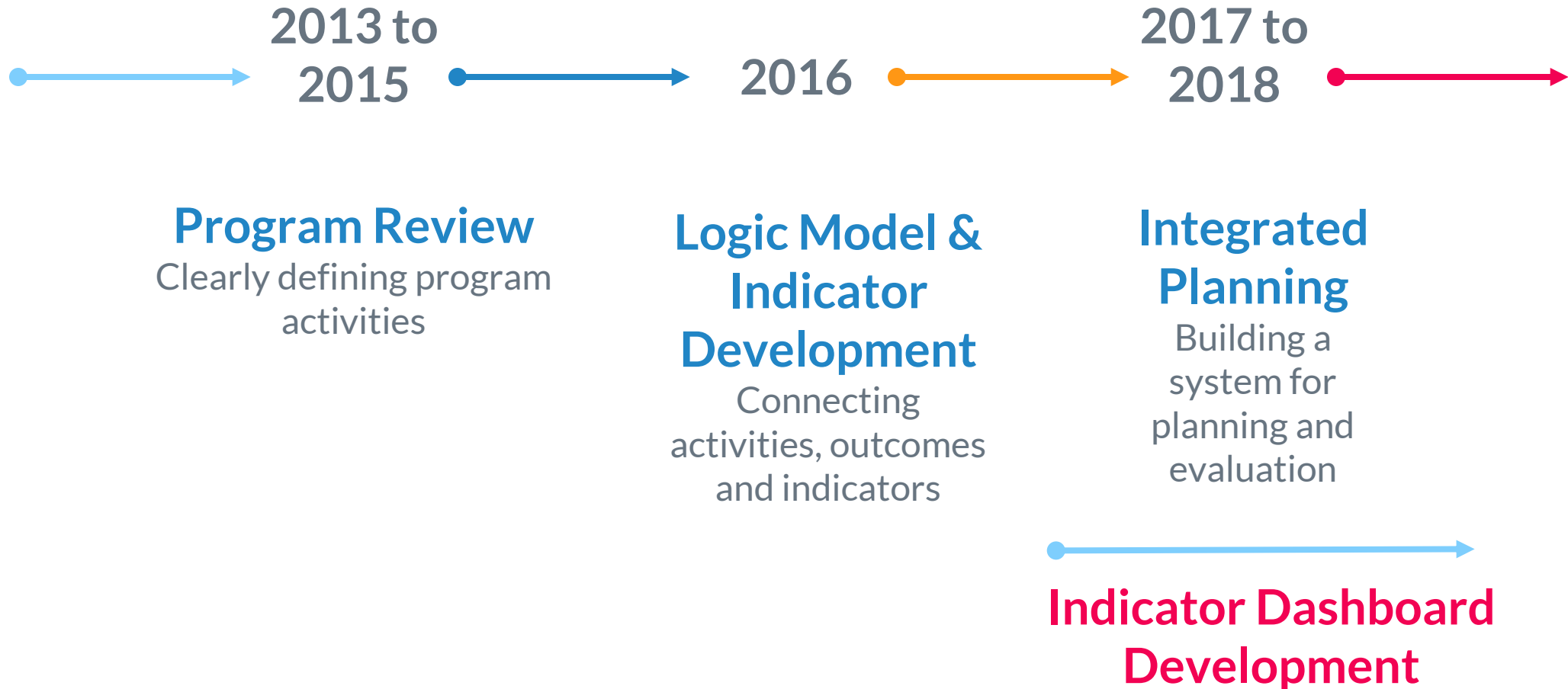
Developing a system that supports indicator monitoring

Let's go back 10 years...

- ▷ Data collection and reporting varied by program
- ▷ Multiple locations for data entry and storage
- ▷ Program data reported annually, but trends not assessed

No system for monitoring clearly defined indicators

Developing a **new system**



INTEGRATED PLANNING MODEL

Four Phases: Assess, Plan, Implement and Evaluate

1. ASSESS

PRE-PLANNING CHECKLIST

Review existing requirements and plans; identify key stakeholders to inform assessment.

SITUATIONAL ASSESSMENT

Gather evidence about need, impact, capacity and partnerships/collaboration.

PROGRAM RECOMMENDATIONS

Assess options and make recommendations.

JOINT SUPERVISOR/MANAGEMENT MEETING

Review recommendations as an organization and determine priorities.

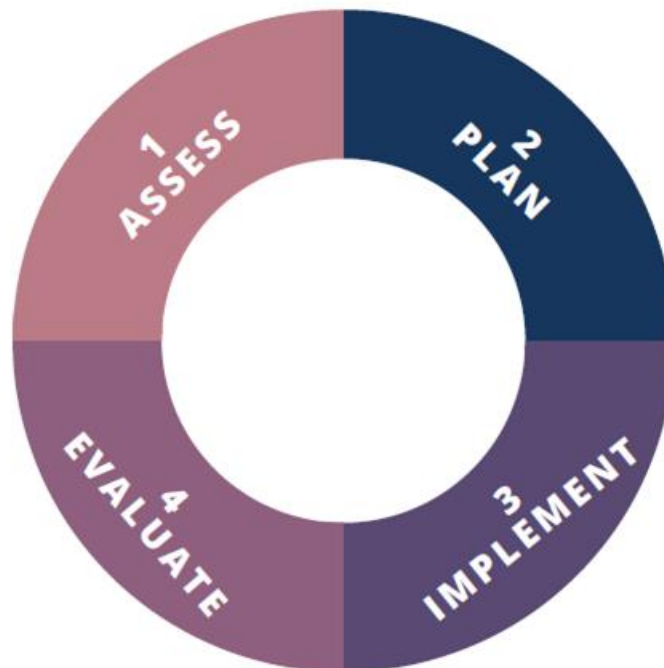
4. EVALUATE

INDICATOR DASHBOARDS

Monitor process and outcome indicators throughout; identify opportunities for quality improvement.

IN-DEPTH EVALUATION

Complete in-depth evaluation of programs as specified in multi-year workplan.



2. PLAN

MULTI-YEAR WORK PLAN

Outline objectives, activities, indicators, evaluation activities and timelines.

PROGRAM-LEVEL LOGIC MODEL

Create or update logic model that provides picture of entire program.

SUPERVISOR/MANAGEMENT APPROVAL

3. IMPLEMENT

WORK PLAN STATUS UPDATES

Report progress using work plan template; complete quarterly supervisor status reviews.

2.

CHOOSING A SOLUTION

Why Power BI?

Initial design in Excel



Intervention	Activity or Outcome	#	Indicator	Type of Indicator	2016	2017
PROCESS INDICATORS						
Assessment and Surveillance of Food Premises	Maintain an inventory and categorize food premises into high, moderate and low risk.	1.0	# of food premises located in Lambton County	Output	726	733
		1.1	# of high risk food premises located in Lambton County	Output	116	132
		1.2	# of moderate risk food premises located in Lambton County	Output	306	297
		1.3	# of low risk food premises located in Lambton County	Output	304	329
Assessment and Surveillance of Food-Borne Illness	Receive reports of suspect/confirmed cases of food-borne diseases.	2.0	# of suspect or confirmed food-borne illnesses reported to LPH	Output		
OUTCOME INDICATORS						
Assessment and Surveillance of Food Premises	All food premises in Lambton are assigned the appropriate risk rating. All food premises requiring inspection are inspected at the required frequency according to the HPPA.	6.0	% of food premises that have received an annual risk assessment	Short-term outcome		
		6.1	% of high risk food premises that have been inspected once every 4 months*	Mid-term outcome	100	100
		6.2	% of moderate risk food premises that have been inspected once every 6 months*	Mid-term outcome	100	99
		6.3	% of low risk food premises that have been inspected once every 12 months	Mid-term outcome		96

Power BI Desktop

Advantages:

- ▷ **Free**
- ▷ Full functionality
- ▷ Save documents locally and on shared drives

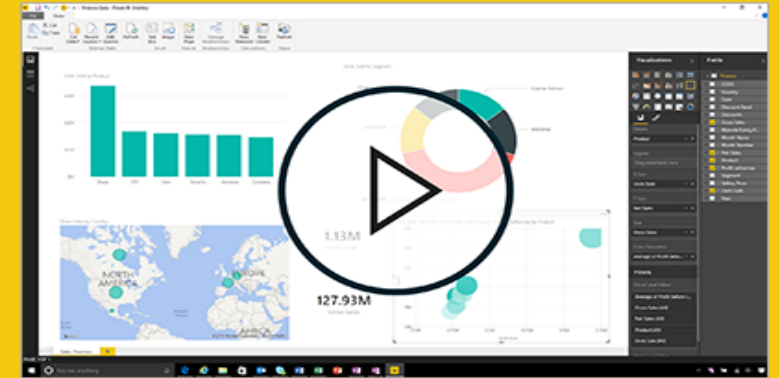
Limitations:

- ▷ Cannot publish links or embed in websites
- ▷ Can be slow

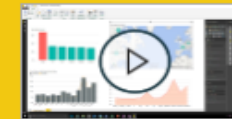
Power BI Desktop

- Get data
- Recent sources

- Food Safety Dashboard3 - ...
X: » Food Safety » Indicators
- Opioid Dashboard Oct 201...
Z: » Surveillance » Opioid Overdos...
- MH and A ED Visit Rates.p...
Z: » HEALTH INDICATORS » 7. Me...
- Food Safety Dashboard.pbix
X: » Food Safety » Indicators
- Open other reports



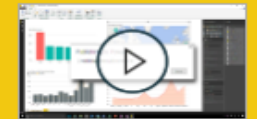
Getting started with Power BI Desktop



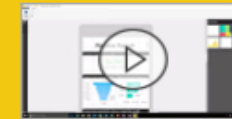
Building reports



Query view concepts



Uploading your reports



Create a Phone report

[VIEW ALL VIDEOS](#)

✓ Show this screen on startup

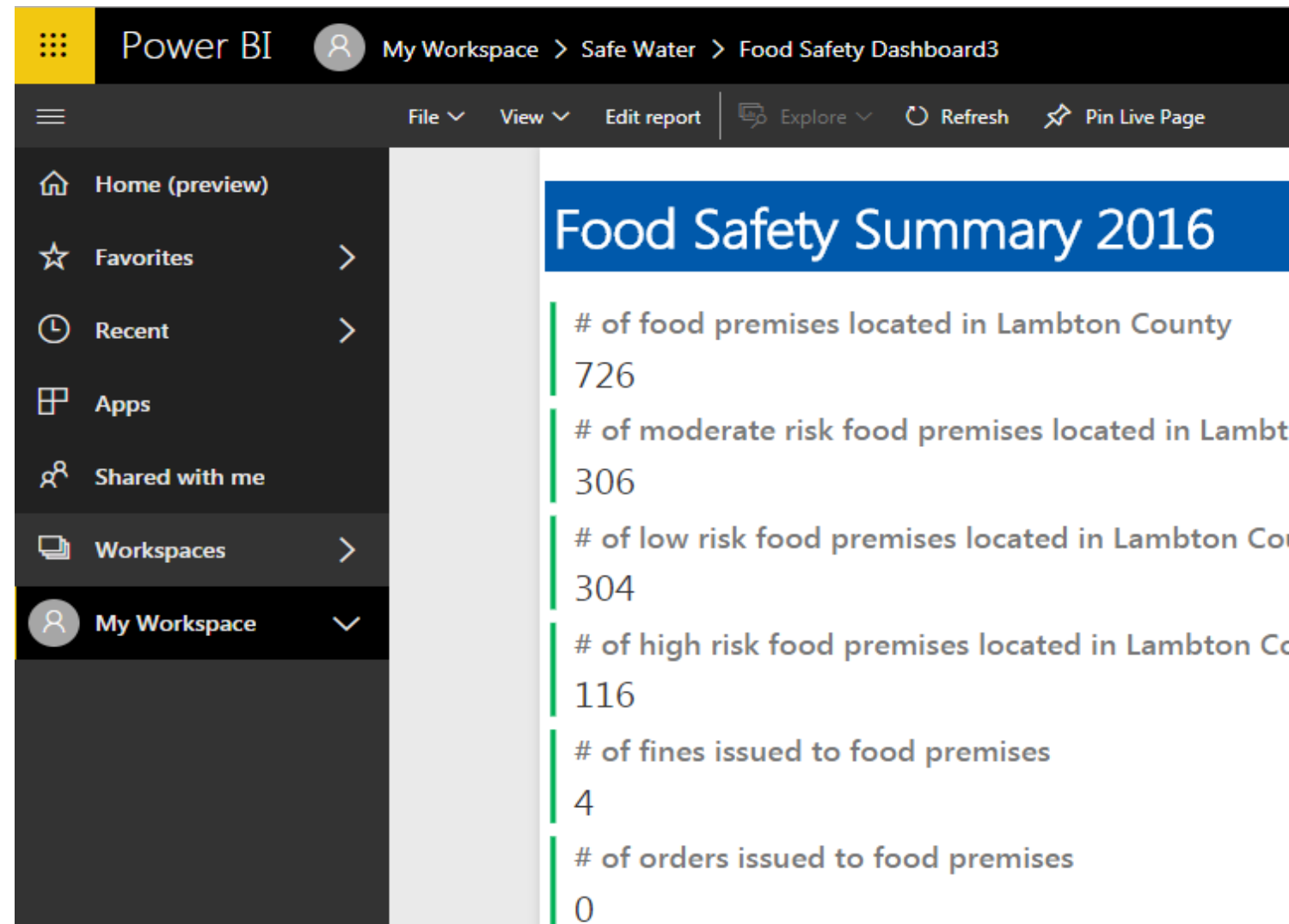
Power BI Pro

Advantages:

- ▶ **Low per user cost**
- ▶ Share reports with other users
- ▶ Publish to the web
- ▶ Create dashboards
- ▶ Subscribe to get alerts

Limitations:

- ▶ Cloud-based - privacy considerations
- ▶ Must publish to **public** website
- ▶ Restrictions on sharing links



Power BI Server

Advantages:

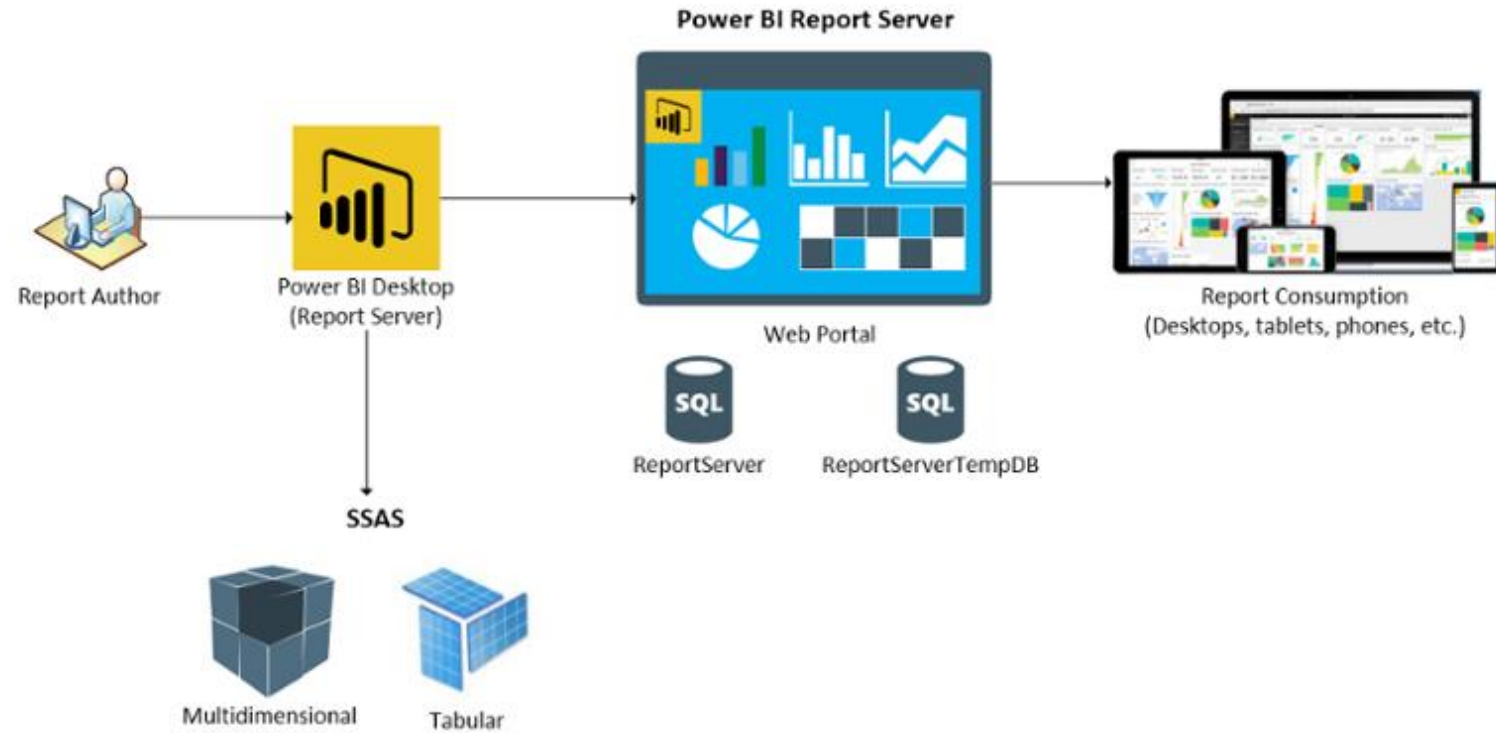
- ▷ On site storage
- ▷ More secure sharing (e.g. password protected, internal sites)
- ▷ Included in SQL Server Enterprise Edition with software assurance

Limitations:

- ▷ **High cost**
- ▷ **IT expertise and involvement**

Power BI Report Server

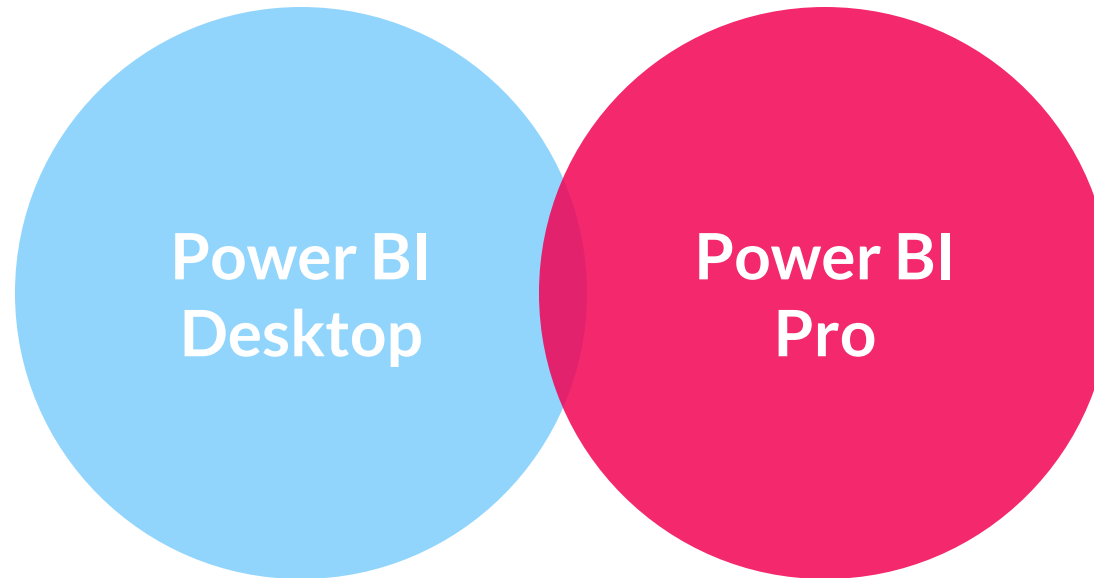
Development Workflow



Solution - \$1480 annually

- ▷ Epidemiologist and Program Evaluator

- ▷ Managers, Supervisors, Office of the MOH (n=15)



- ▷ Develop reports
- ▷ Explore sensitive and/or record level data

- ▷ Indicator Dashboards
- ▷ Non-sensitive, aggregate level data

3. DASHBOARD DEVELOPMENT

Technical details and process

Data Entry in Excel



Intervention	Activity or Outcome	#	Indicator	Type of Indicator	2016	2017
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Import into Power BI Desktop

Untitled - Power Query Editor

File Home Transform Add Column View Help

Close & Apply Close New Source Recent Sources Enter Data Data source settings Manage Parameters Refresh Preview Properties Advanced Editor Manage Query Choose Columns Remove Columns Keep Rows Remove Rows Sort Split Column Group By Data Type: Text Use First R Replace Va Transform

	A ^B _C Column1	A ^B _C Column2	ABC 123 Column3	A ^B _C Column4
1		null	null	null
2		null	null	null
3		null	null	null
4		null	null	null
5		null	null	null
6	Program Component		null	null Indicator
7		null Activity or Outcome	#	
8	PROCESS INDICATORS		null	null
9	Assessment and Surveillance of Food Premises	Maintain an inventory and categorize food premises into high, modera...		1 # of food premises located in L
10		null	null	1.1 # of high risk food premises loc
11		null	null	1.2 # of moderate risk food premis
12		null	null	1.3 # of low risk food premises loca
13	Assessment and Surveillance of Food-Borne Illness	Receive reports of suspect/confirmed cases of food-borne diseases.		2 # of suspect or confirmed food-
14	Response and Management of Food Related Issues	Conduct investigations of reported food-related complaints		3 # of food-related complaints in

Transform using Power Query

The screenshot displays the Microsoft Power Query Editor interface. The main window shows a data table with two columns: 'Column1' and 'Column2'. The data includes rows with 'null' values and text entries like 'Program Component', 'PROCESS INDICATORS', and 'Assessment and Surveillance of Food Premises'. The 'Query Settings' pane is open on the right, showing a list of applied steps. The 'Rounded Off' step is currently selected and highlighted.

QUERY SETTINGS

- PROPERTIES
 - Name: Index
 - [All Properties](#)
- APPLIED STEPS
 - Source
 - Navigation
 - Changed Type
 - Removed Top Rows
 - Promoted Headers
 - Changed Type1
 - Renamed Columns
 - Removed Columns
 - Removed Top Rows1
 - Removed Top Rows2
 - Sorted Rows
 - Removed Top Rows3
 - Filled Down
 - Unpivoted Columns
 - Renamed Columns1
 - Changed Type2
 - Rounded Off**

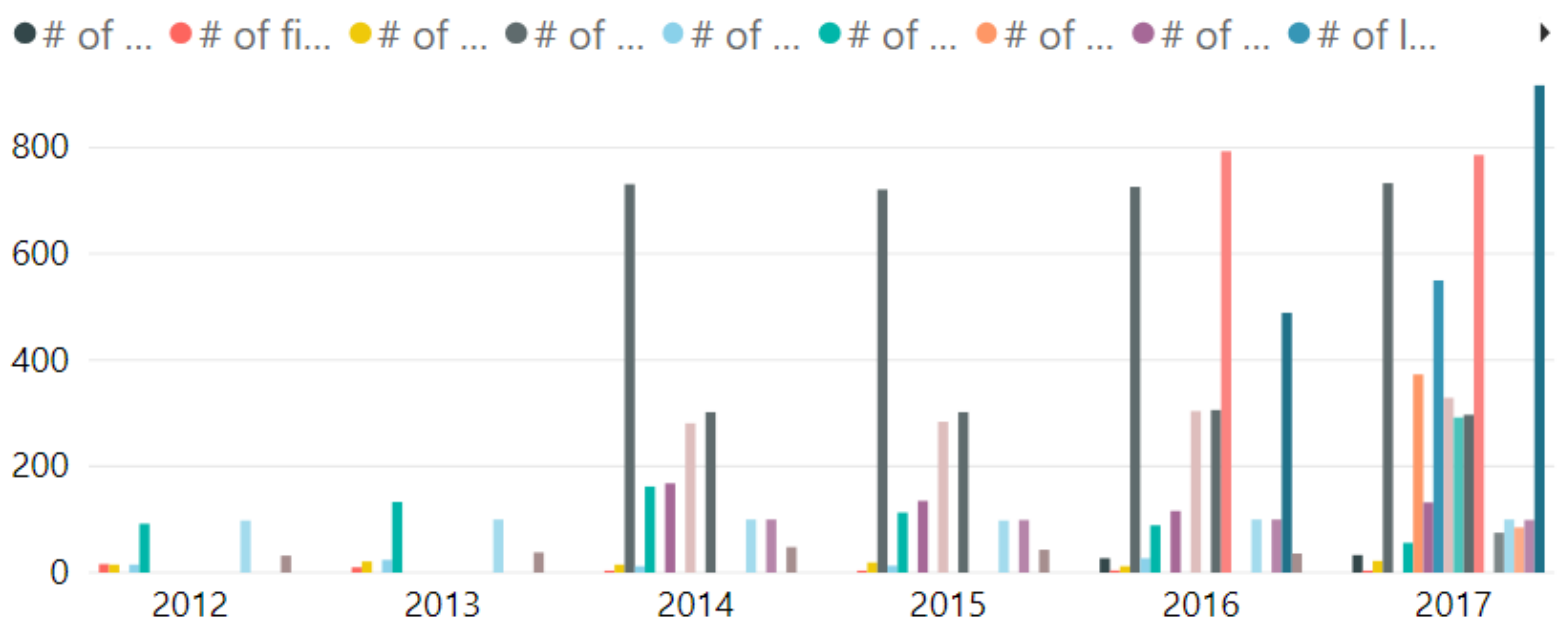
	Column1	Column2
1		null
2		null
3		null
4		null
5		null
6	Program Component	
7		null Activity or Outcome
8	PROCESS INDICATORS	
9	Assessment and Surveillance of Food Premises	Maintain an inventory and categorize food premises
10		null
11		null
12		null
13	Assessment and Surveillance of Food-Borne Illness	Receive reports of suspect/confirmed cases of food
14	Response and Management of Food Related Issues	Conduct investigations of reported food-related co

Result: Clean data in long form

	A ^B _C Intervention	A ^B _C Activity or Outcome	A ^B _C Indicator	A ^B _C T...	A ^B _C Year	1.2 Value
1	Assessment and Surveillance o...	Maintain an inventory and cate...	# of food premises located in Lambton County	Output	2014	731
2	Assessment and Surveillance o...	Maintain an inventory and cate...	# of food premises located in Lambton County	Output	2015	721
3	Assessment and Surveillance o...	Maintain an inventory and cate...	# of food premises located in Lambton County	Output	2016	726
4	Assessment and Surveillance o...	Maintain an inventory and cate...	# of food premises located in Lambton County	Output	2017	733
5	Assessment and Surveillance o...	Maintain an inventory and cate...	# of high risk food premises located in Lambton County	Output	2014	168
6	Assessment and Surveillance o...	Maintain an inventory and cate...	# of high risk food premises located in Lambton County	Output	2015	135
7	Assessment and Surveillance o...	Maintain an inventory and cate...	# of high risk food premises located in Lambton County	Output	2016	116
8	Assessment and Surveillance o...	Maintain an inventory and cate...	# of high risk food premises located in Lambton County	Output	2017	132
9	Assessment and Surveillance o...	Maintain an inventory and cate...	# of moderate risk food premises located in Lambton County	Output	2014	302
10	Assessment and Surveillance o...	Maintain an inventory and cate...	# of moderate risk food premises located in Lambton County	Output	2015	302
11	Assessment and Surveillance o...	Maintain an inventory and cate...	# of moderate risk food premises located in Lambton County	Output	2016	306
12	Assessment and Surveillance o...	Maintain an inventory and cate...	# of moderate risk food premises located in Lambton County	Output	2017	297
13	Assessment and Surveillance o...	Maintain an inventory and cate...	# of low risk food premises located in Lambton County	Output	2014	281
14	Assessment and Surveillance o...	Maintain an inventory and cate...	# of low risk food premises located in Lambton County	Output	2015	284
15	Assessment and Surveillance o...	Maintain an inventory and cate...	# of low risk food premises located in Lambton County	Output	2016	304
16	Assessment and Surveillance o...	Maintain an inventory and cate...	# of low risk food premises located in Lambton County	Output	2017	329
17	Response and Management of ...	Conduct investigations of repor...	# of food-related complaints investigated	Output	2012	92

Once set up, Power BI will pull and transform data from updated Excel file

Food Safety Indicator Trends, Lambton (select indicator at right)



Indicator	2015	2016	2017	Total
Annual rate per 100,000 of food-borne illnesses reported to LPH	43	36		197
% of restaurants with a Certified Food Handler on site at time of routine inspection*		489	917	1406
% of moderate risk food premises that have been inspected once every 6 months*	99	100	99	398
% of low risk food premises that have been inspected once every 12 months			85	85
% of high risk food premises that have been inspected once every 4 months*	98	100	100	596
# of re-inspections of food premises that occurred			75	75
# of orders issued to food premises	0	0	0	0
# of new food handlers certified in Lambton County		793	786	1579
# of moderate risk food premises located in Lambton County	302	306	297	1207
# of moderate risk food premise inspections conducted			292	292
# of low risk food premises located in Lambton County	284	304	329	1198

Intervention

- Education
- Inspections, Enforcement and Public Disclosure
- Response and Management of Food Related Issues

Activity or Outcome

- All food premises requiring inspection are inspected
- Conduct follow-up inspections for any food-related issues
- Conduct investigations of reported food-related issues
- Conduct re-inspections when there is significant risk
- Food handlers in food premises handle and store food safely
- Inspect food premises under the LPPA in...

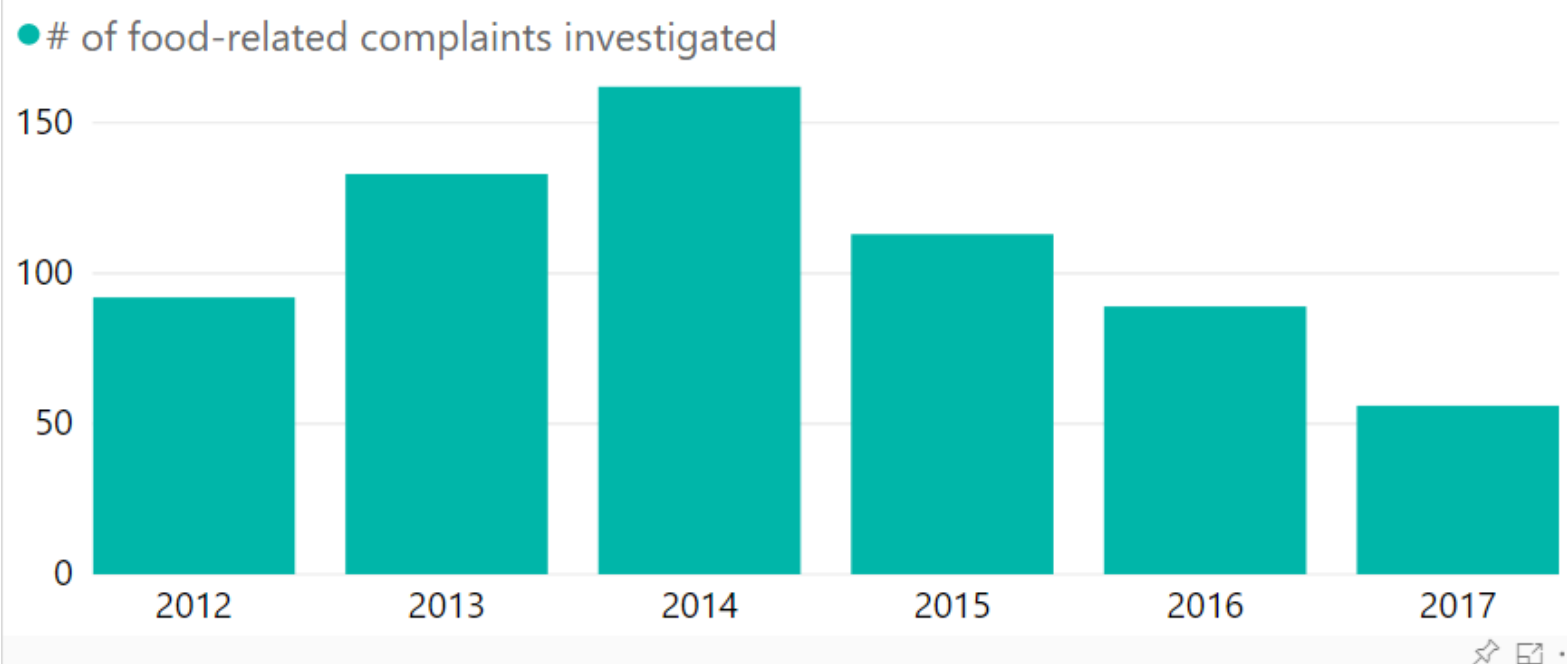
Type of Indicator

- Long-term outcome
- Mid-term outcome

Indicator

- # of certified food handler courses provided
- # of fines issued to food premises
- # of food premises inspected due to suspected issues
- # of food premises located in Lambton County
- # of food safety presentations/in-services to food handlers
- # of food-related complaints investigated
- # of high risk food premise inspections conducted

Food Safety Indicator Trends, Lambton (select indicator at right)



Indicator	2012	2013	2014	2015	2016	2017	Total
# of food-related complaints investigated	92	133	162	113	89	56	645

Intervention

- Response and Management of Food Relate...

Activity or Outcome

- Conduct investigations of reported food-re...

Type of Indicator

- Output

Indicator

- # of food-related complaints investigated

Food Safety Summary 2017

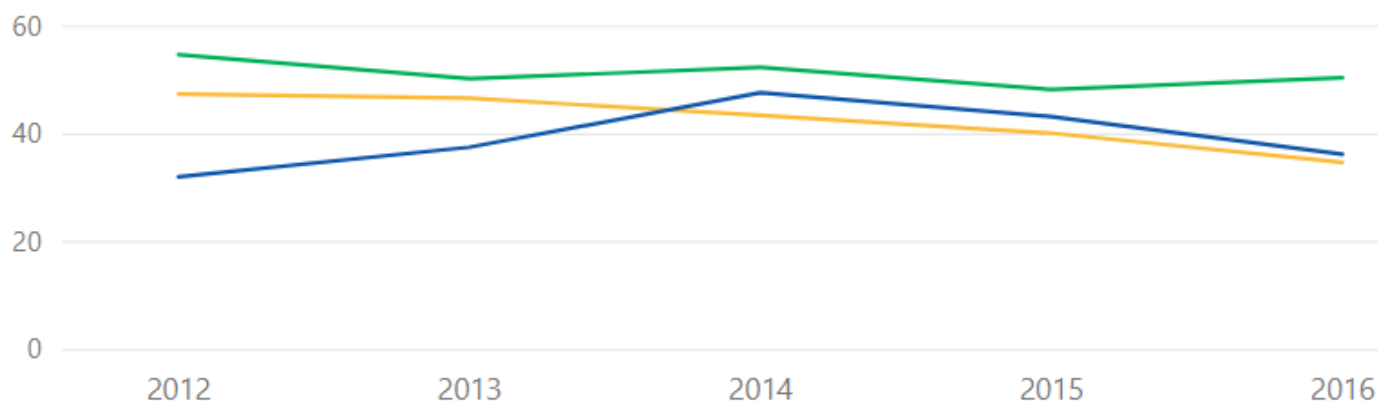
# of food premises located in Lambton County	733
# of low risk food premise inspections conducted	550
# of high risk food premise inspections conducted	373
# of moderate risk food premise inspections conducted	292
# of re-inspections of food premises that occurred	75
# of fines issued to food premises	3
# of orders issued to food premises	0

Accountability Agreement Indicators

% of high risk food premises that have been inspected once every 4 months*	100
% of low risk food premises that have been inspected once every 12 months	85
% of moderate risk food premises that have been inspected once every 6 mont...	99

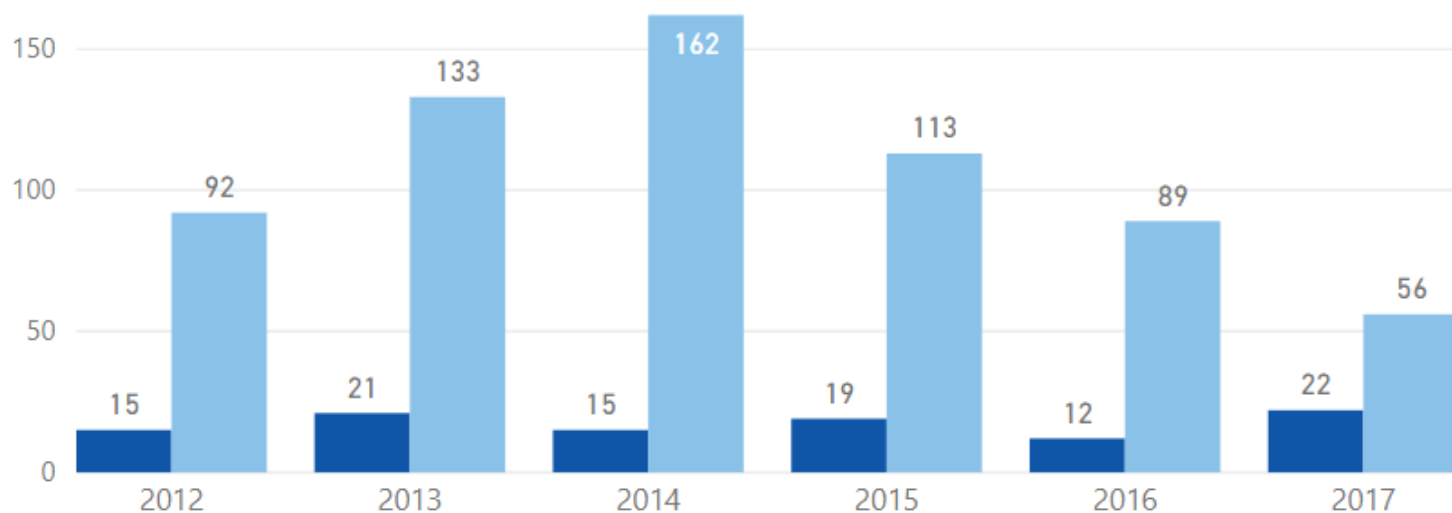
Rate per 100,000 reported enteric illnesses by year and location

Location ● ESC LHIN ● Lambton ● Ontario



Number of food-related complaints and reported enteric illnesses, by year

Indicator ● # of food premises inspected due to suspect or confirmed f... ● # of food-related complaints inv...

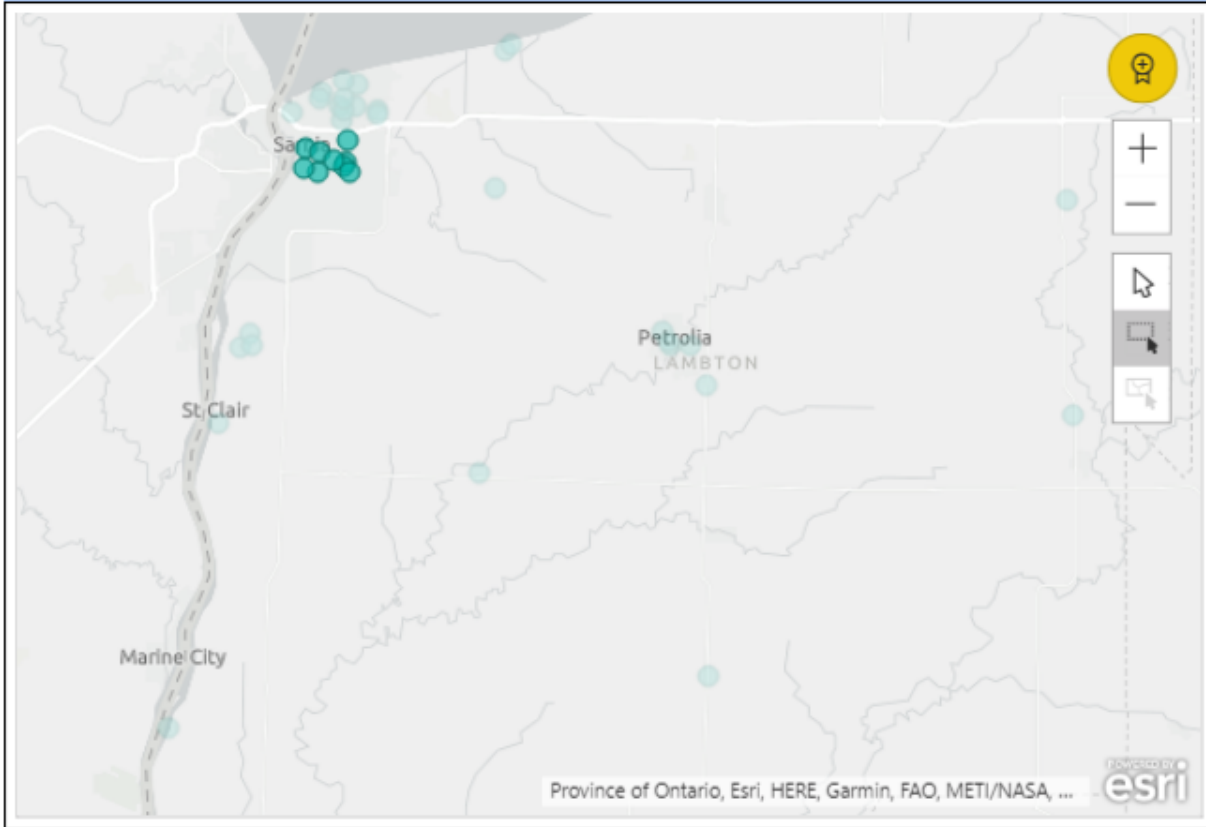


10 Draft or Completed Indicator Dashboards

- ▷ Child Health
- ▷ Reproductive Health
- ▷ Sexual Health
- ▷ Food Safety
- ▷ Safe Water
- ▷ Health Hazard
- ▷ Vector-Borne Disease
- ▷ Infectious Disease P&C
- ▷ Rabies
- ▷ Immunization

4. FUTURE DIRECTION

School Health Dashboard

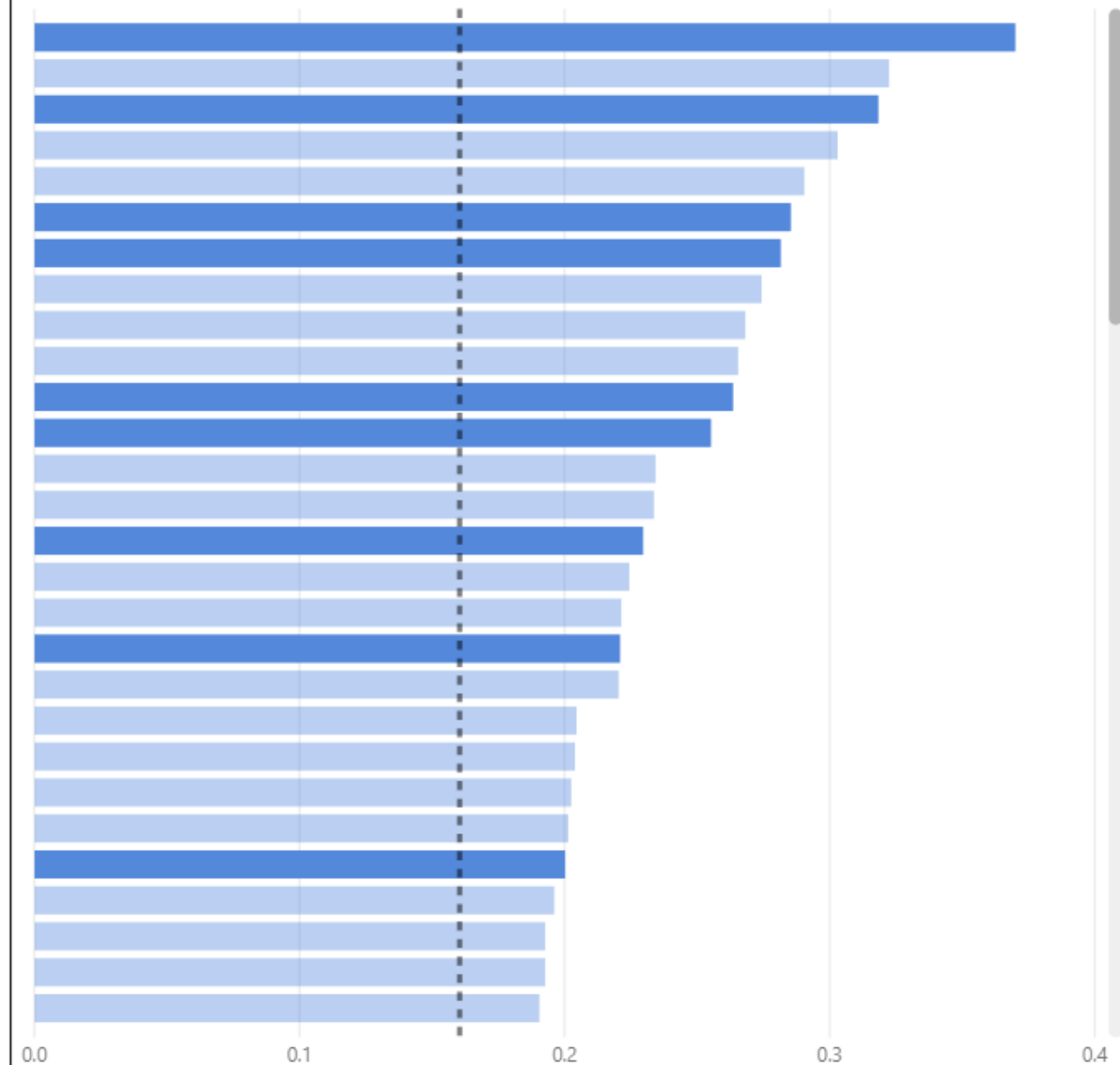


Select Indicator

Students living in lower income households



Selected Indicator by School



Board

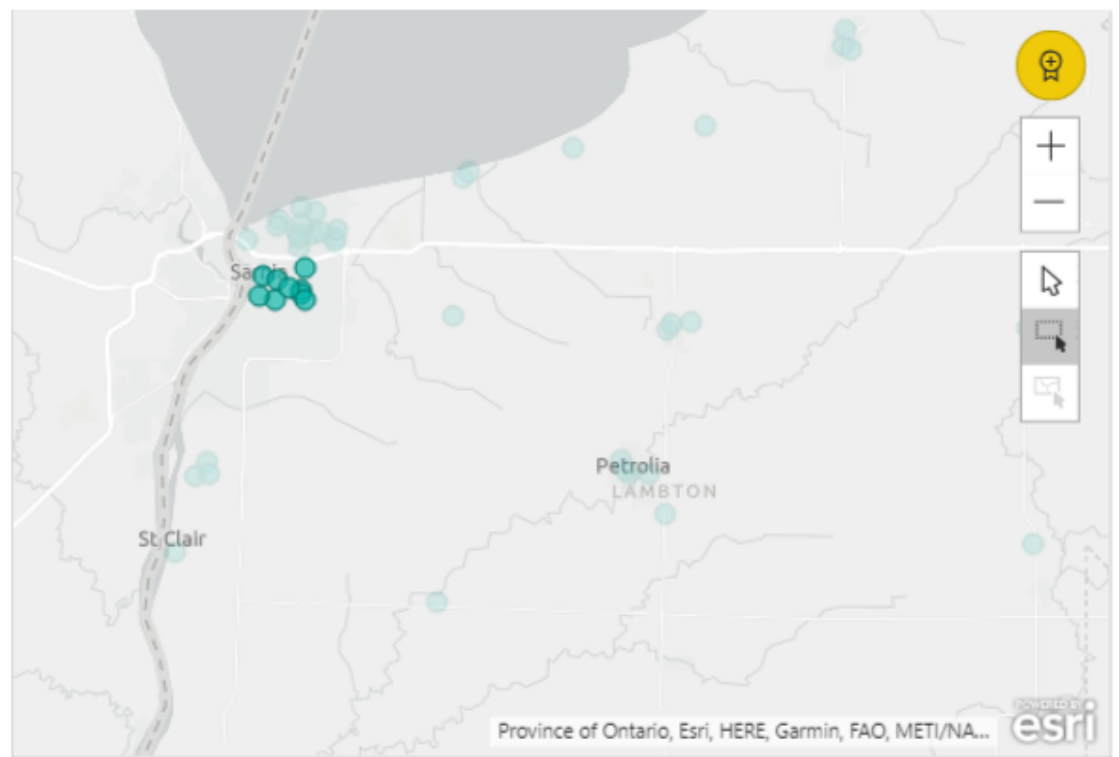
All

School

All

Grades

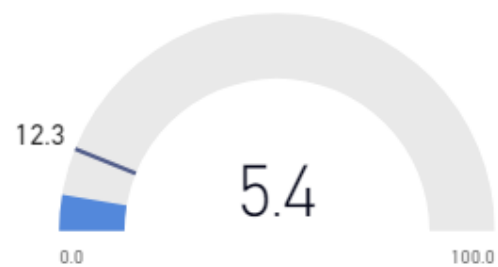
All



% in low income households



% university education



% other first language



% new to Canada



% special education



Future Direction

- ▷ Continue to build and evaluate indicator dashboards
- ▷ Review and revise indicator lists based on new work plans and Ministry-defined indicators
- ▷ Identify opportunities to use Power BI for other projects
 - Panorama inventory management
 - Clinical services utilization analysis
- ▷ Explore the need for external, public facing dashboards

Key Messages

- ▷ Power BI is a powerful tool to visualize and share population health and program indicators
- ▷ Development and monitoring of indicators must be incorporated into a larger system of planning and evaluation
- ▷ Smaller health units with fewer resources can adopt smaller scale approaches and slowly build over time

Thank you!
Any questions?

Contact me at:

crystal.palleschi@county-lambton.on.ca

Credits

Special thanks to all the people who made and released these awesome resources for free:

- ▷ [Minicons](#) by Webalys
- ▷ Presentation template by [SlidesCarnival](#)
- ▷ Photographs by [Unsplash](#)