

Spatial Distribution and Characteristics of Restaurant Inspections in Toronto, Ontario

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PURPOSE

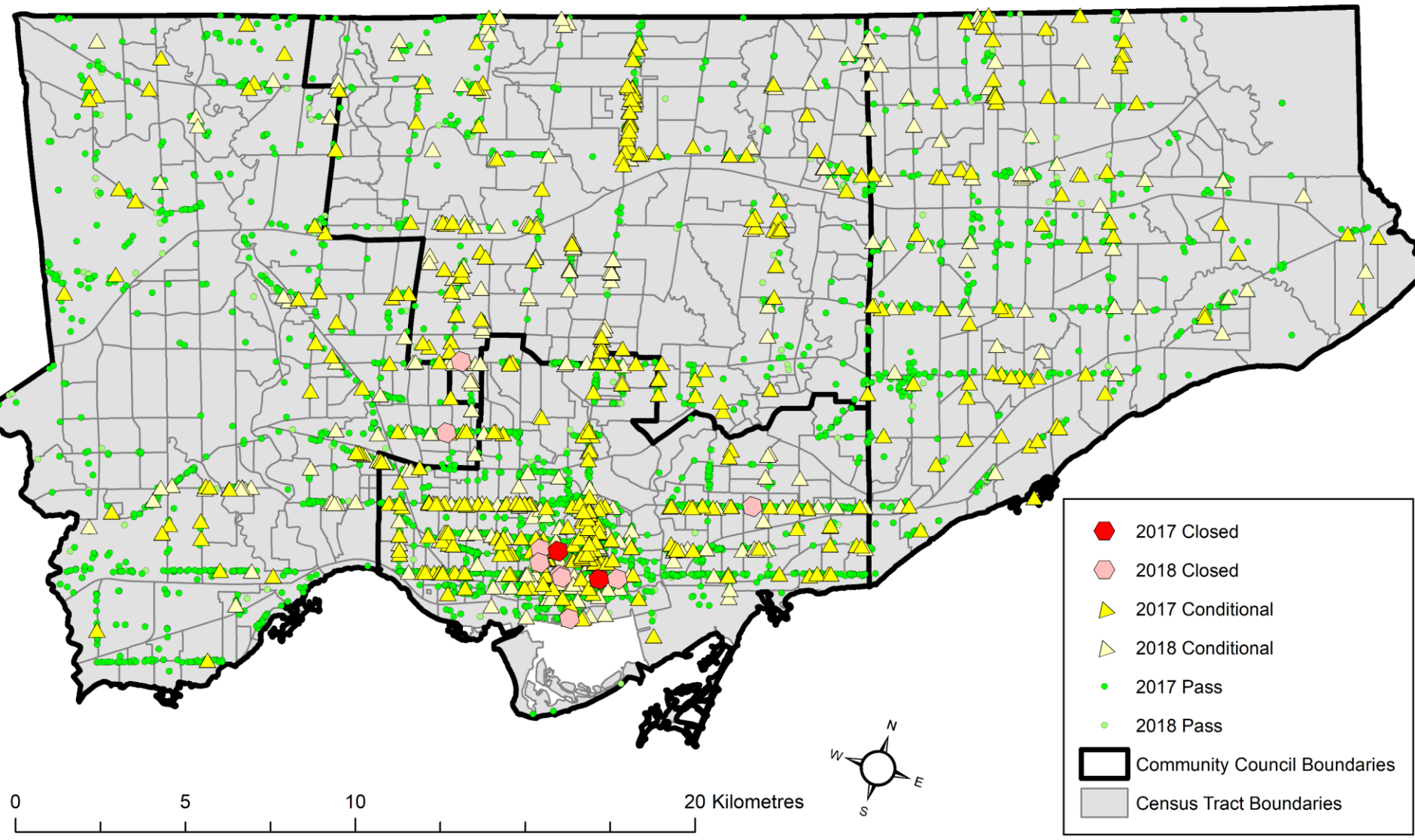
To provide a descriptive analysis of 2017/2018 inspection results (pass/conditional pass/closed) of Toronto's Public Disclosure Food Inspection System, named DineSafe. Spatial analysis was also performed to identify clusters of conditional pass/closed (CP/C) results, then compared to census data to observe association with low-income cutoff scores.

METHODS

Step	Description
DineSafe Data acquisition and organization	Only first annual inspections of restaurant premises in 2017/2018 were analyzed. Microsoft Access was used to organize then export tables as Microsoft Excel files. Restaurant locations were geocoded then spatially joined to census tracts using ArcMap.
Calculating number and percentage of first annual restaurant inspections per census tract	
Spatial analysis	Spatial autocorrelation was performed using Moran's I and Getis-Ord Gi* in ArcMap.
Socioeconomic associations	Microsoft Excel Pivot tables were used to summarize data.

Table 1 - Summary of methods

Locations of First Annual 2017/2018 Inspections by Outcome



RESULTS - Descriptive Analysis

Year	Inspection Outcomes			
	Pass (%)	Conditional Pass (%)	Closed (%)	Total
2017	5510 (92.61)	438 (7.36)	2 (0.03)	5950
2018	5907 (91.48)	540 (8.36)	10 (0.15)	6457

Table 2 - Inspection results by count and percentage of total inspections for 2017 and 2018



Year	Community Council Area				Total
	Scarborough (%)	North York (%)	Toronto and East York (%)	Etobicoke (%)	
2017	810 (13.61)	910 (15.29)	3168 (53.24)	1062 (17.85)	5950
2018	796 (12.33)	1003 (15.53)	3543 (54.87)	1115 (17.27)	6457

Table 3 - Inspection results by Community Council area for 2017 and 2018

SPECIAL THANKS

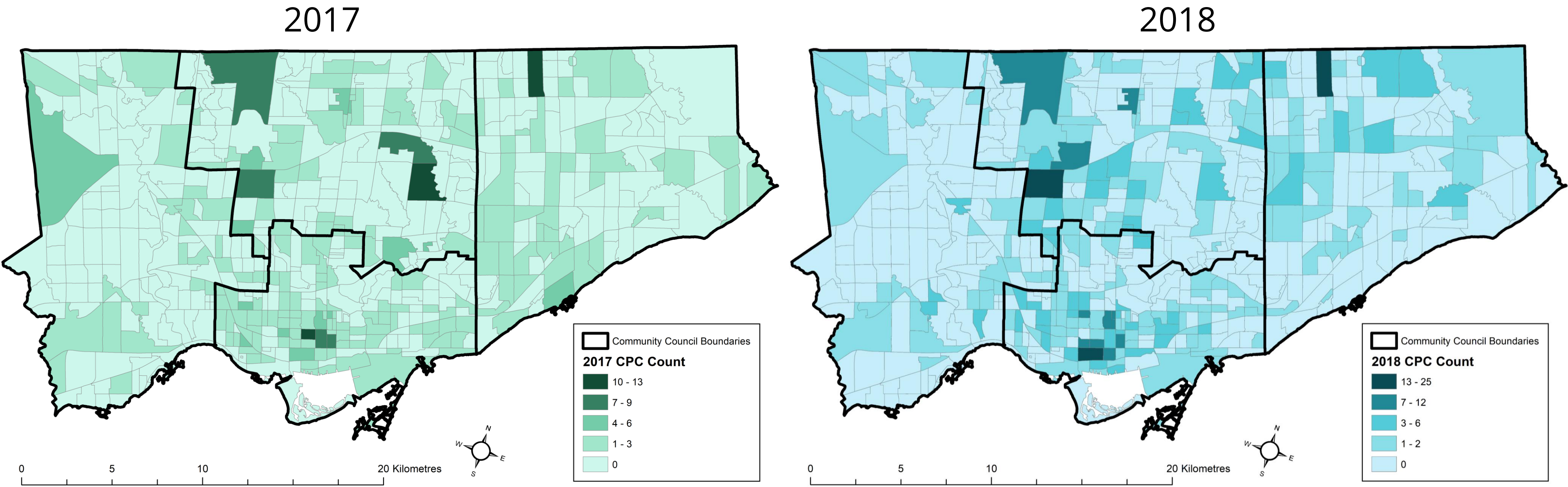
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REFERENCES

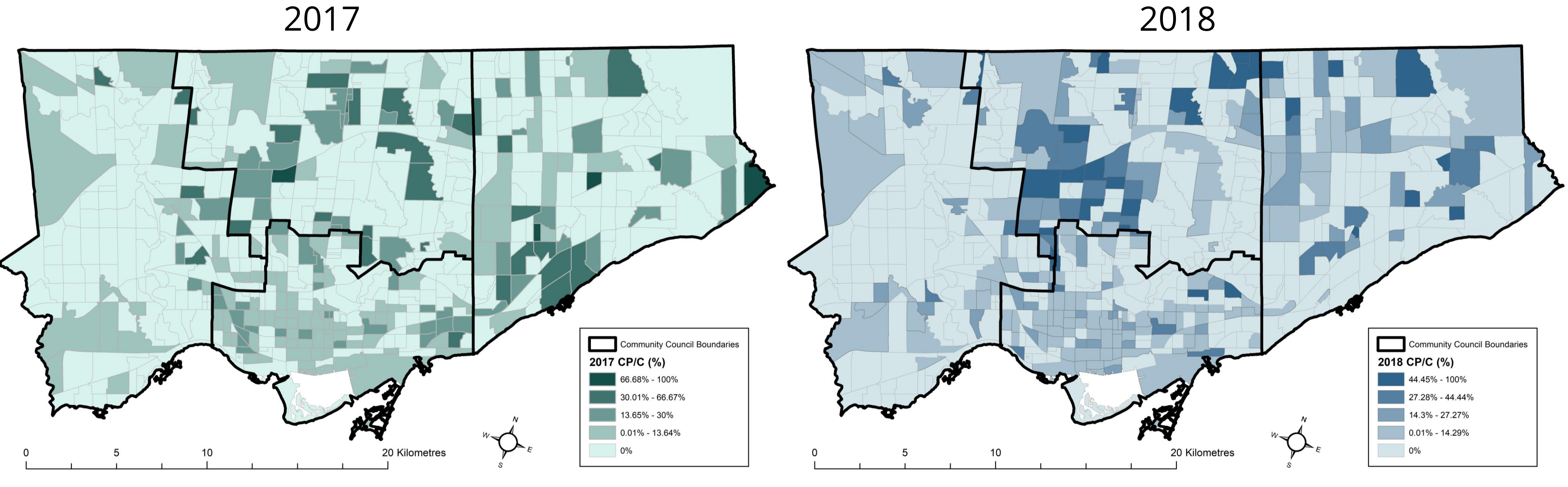
City of Toronto. (2012). DineSafe Inspection and Disclosure System - Toronto Public Health. Retrieved April 8, 2019, from <https://www.toronto.ca/health/dinesafe/system.htm>
Darcey, V. L., & Quinlan, J. J. (2011). Use of Geographic Information Systems Technology To Track Critical Health Code Violations in Retail Facilities Available to Populations of Different Socioeconomic Status and Demographics. *Journal of Food Protection*, 74(9), 1524-1530. <https://doi.org/10.4315/0362-028X.JFP-11-101>
Harris, K. J., DiPietro, R. B., Murphy, K. S., & Rivera, G. (2014). Critical food safety violations in Florida: Relationship to location and chain vs. non-chain restaurants. *International Journal of Hospitality Management*, 38, 57-64. <https://doi.org/10.1016/j.ijhm.2013.12.005>
Kramer, A. J. (2016). *Neighborhood Effects on Restaurant Food Safety Performance - ProQuest*. Tulane University. Retrieved from <https://search-proquest-com.ezproxy.lib.ryerson.ca/docview/1949407997/abstract/SC88F1639AE4C65PQ/1?accountid=13631>
Yang, Y., Roehl, W. S., & Huang, J.-H. (2017). Understanding and projecting the restaurantscape: The influence of neighborhood sociodemographic characteristics on restaurant location. *International Journal of Hospitality Management*, 67, 33-45. <https://doi.org/10.1016/j.ijhm.2017.07.005>

RESULTS - Counts and Percentages of Geocoded Conditional Pass & Closed Results

Number of Inspections Resulting in Conditional Pass/Closed Status Per Census Tract

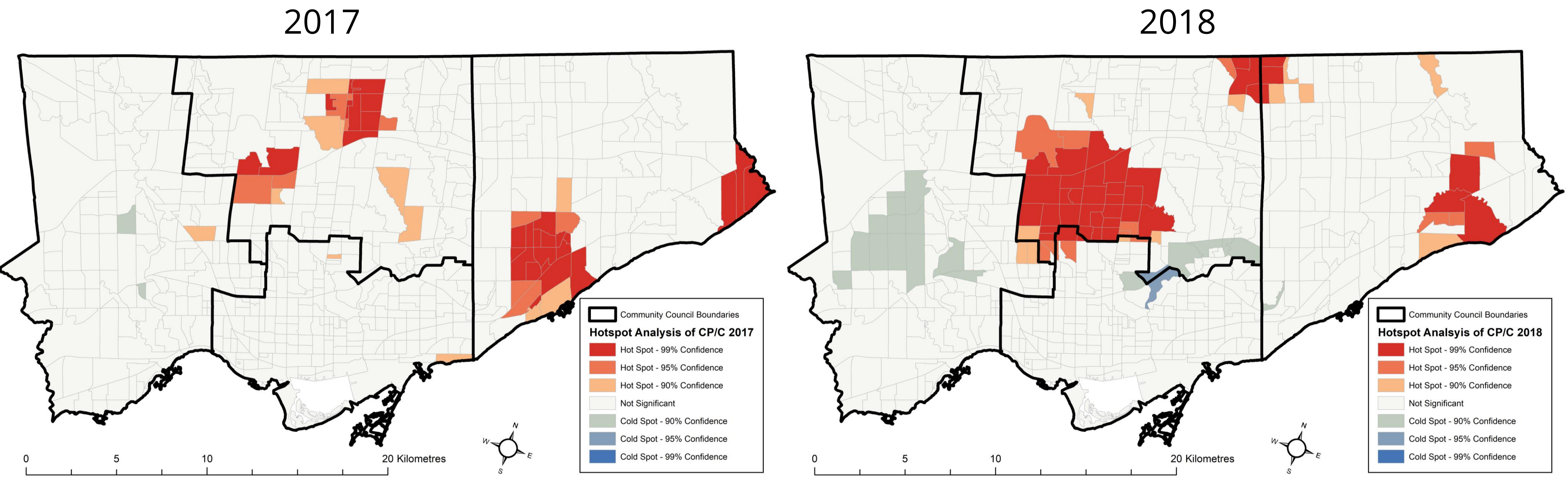


Percent of Total Inspections Resulting in Conditional Pass/Closed Status Per Census Tract



RESULTS - Spatial Analysis - Hotspot Analysis

Significant Hotspot Locations of Conditional Pass/Closed Results



Toronto/East York had the highest count of CP/C outcomes in both years, but hotspot analysis did not identify it as significant when accounting for percentage of total restaurants.

Downtown Toronto is a major tourism destination in Ontario, and restaurants are attracted to neighborhoods with higher levels of tourist activity (Yang, Roehl, & Huang, 2017). However, since real estate prices may deter smaller businesses from settling in the downtown area, perhaps the downtown core may contain a higher ratio of high-end or chain restaurants compared to other parts of the city. Chain restaurants in the United States have been found to show lower rates of violations than independently owned restaurants, due to their own quality control and food safety monitoring programs (Harris, DiPietro, Murphy, & Rivera, 2014). Future research could be done to investigate if the chain status of restaurants also plays a significant role in the City of Toronto.

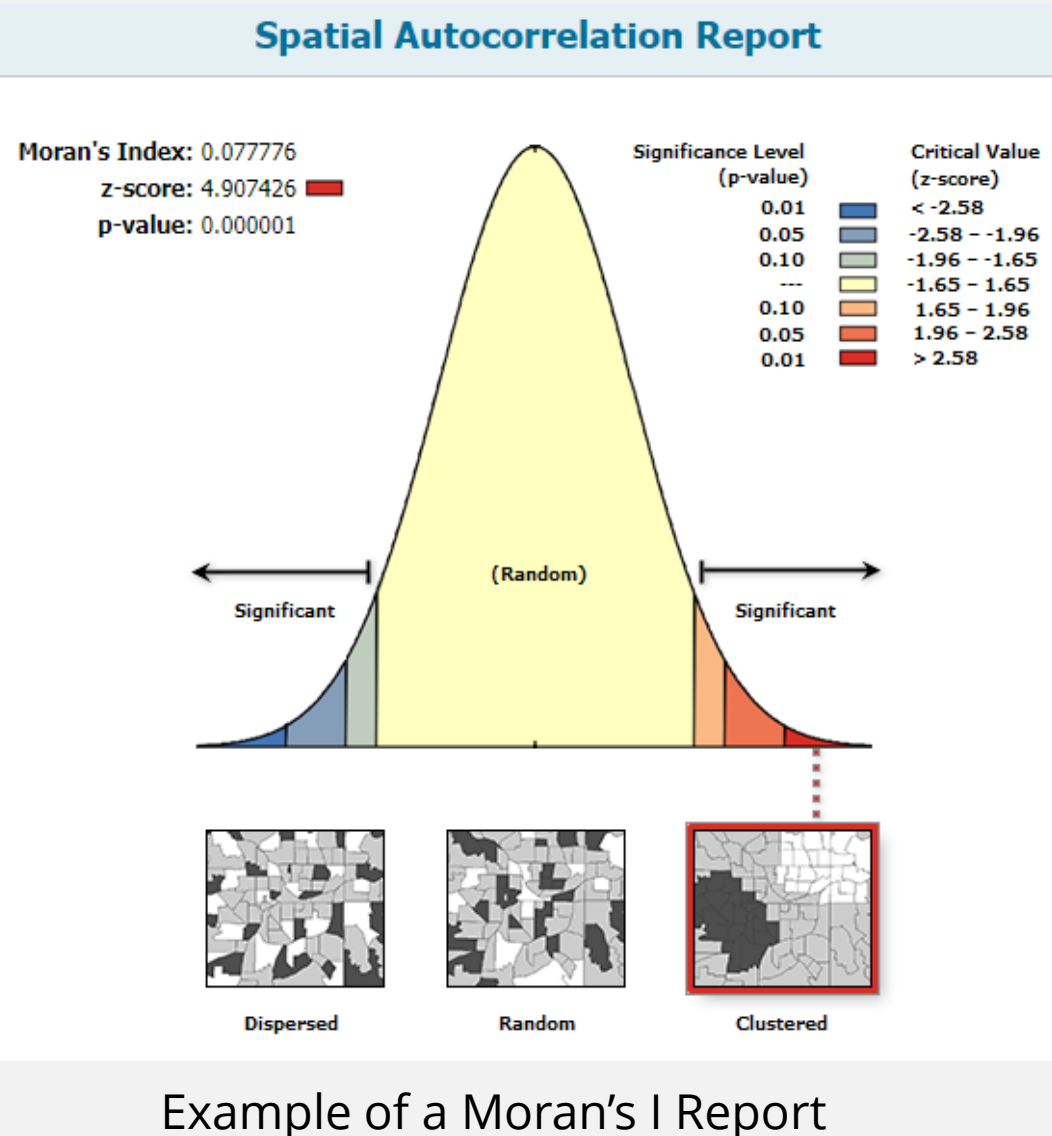
Community Council Areas in Toronto, Ontario



RESULTS - Spatial Analysis - Moran's I

Clustered, Dispersed, or Random?

Global Moran's I test is a calculation used to measure spatial autocorrelation by calculating if the distribution patterns of feature locations and values are clustered, dispersed (features are evenly spread), or random. A positive index score with a significant z-score suggests that similar rates or counts of CP/C are clustering (i.e. in close proximity to each other).



Year	Map	Moran's Index	z-score	p-value
2017	CP/C Count	0.194503	12.233087	0.000000
	CP/C %	0.03779	2.46072	0.013866
2018	CP/C Count	0.17037	10.989523	0.000000
	CP/C %	0.077776	4.907426	0.000001

Table 4 - Global Moran's I statistics

RESULTS - Neighborhood Associations

Association between Low-income cutoff scores (LICO) and CP/C results are unclear.

These findings are consistent with existing research that found conflicting associations between measures of poverty and number/type of health violations in restaurants. Darcey & Quinlan (2011) compared poverty scores to the number of critical health code violations in Philadelphia and found that although facilities in higher poverty areas had more frequent inspections, facilities in lower poverty areas had a higher average number of critical health code violations. Kramer (2016) found that sociodemographic factors had no association with restaurant food safety performance at all, but instead found that the only significant factors were the level of market competition, and the level of food handler training.

