Spatial Analysis of Residential Break & Enter

Inferential spatial statistics and per-dwelling normalization across Toronto neighbourhoods, 2015–2025

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Seneca College — GIS Micro-Credentials · Advanced Topics in Geospatial Analysis
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Project objectives

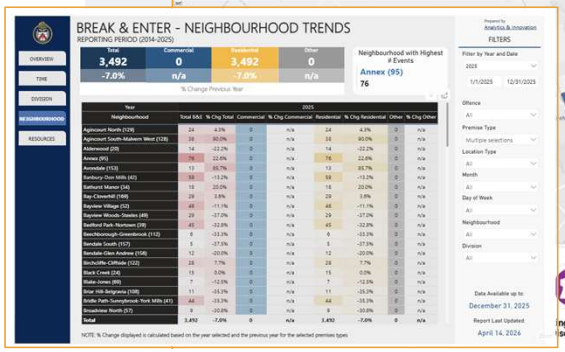
The Toronto Police Service Power BI dashboard already maps break-and-enter counts.

This project investigates: ***Where*** *is residential break-and-enter risk concentrated in Toronto?*
Which hot spots are ***real*** *and not just coincidence?*
Is it changing ***over time****?*

How the answer differs for ***houses*** *versus* ***apartments****.*

TPS dashboard shows

- Raw incident counts by neighbourhood
- Time and premises-type filters
- Operational, descriptive mapping



[Break & Enter- Toronto Police Service]

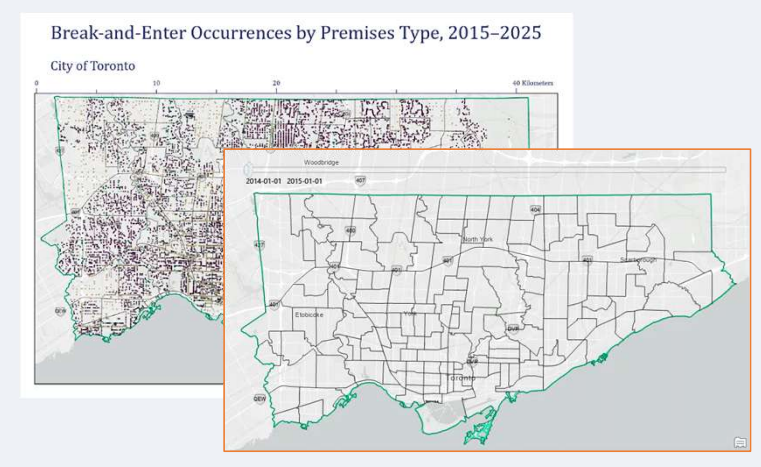
[Maps- Toronto Police Service]

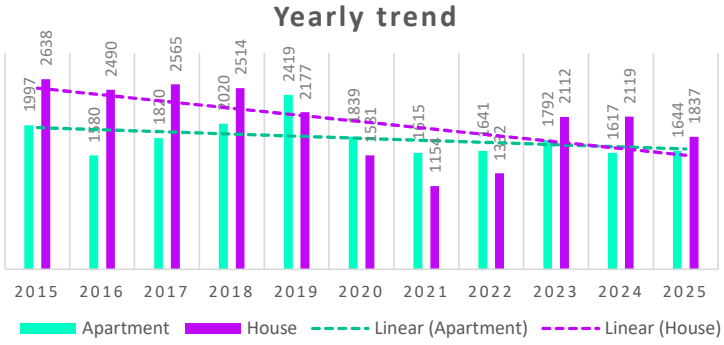
This project adds

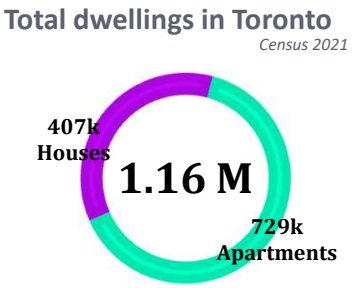
- Rate normalization — break-ins per 100 dwellings, not raw counts or rate per population
- Choropleth maps and their overlay comparison
- Inferential spatial statistics — Hot Spot Analysis and Emerging Hot Spot Analysis
- Cluster-significance testing — Cluster and Outlier Analysis (Moran's I)

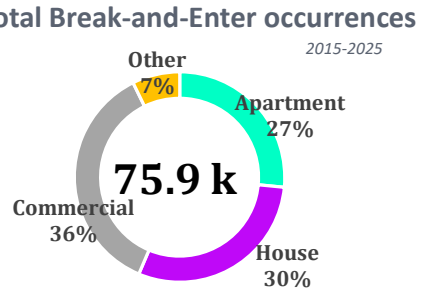
Sources: TPS Open Data (OCC_DATE); City of Toronto census dwellings; neighbourhood profiles and boundaries.

City-wide context









Apartments = 2/3 of dwellings, 1/4 of all Break-and-Enter occurrences

What the numbers say

1 in 200 houses

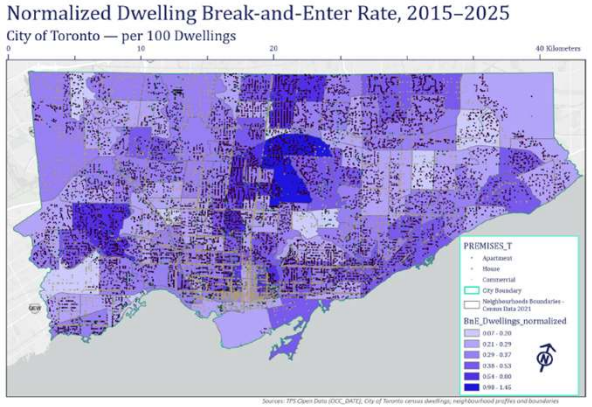
1 in 400 apartments

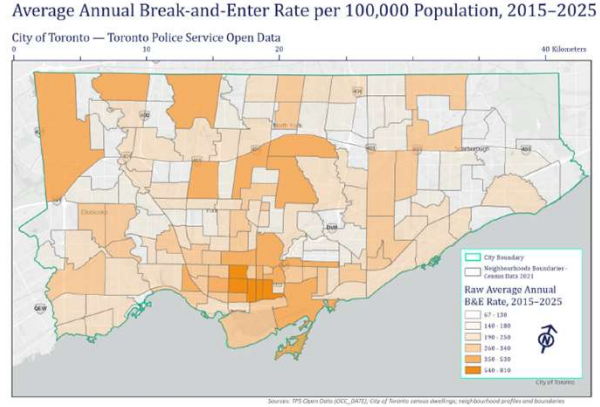
were broken into each year, on average, since 2015

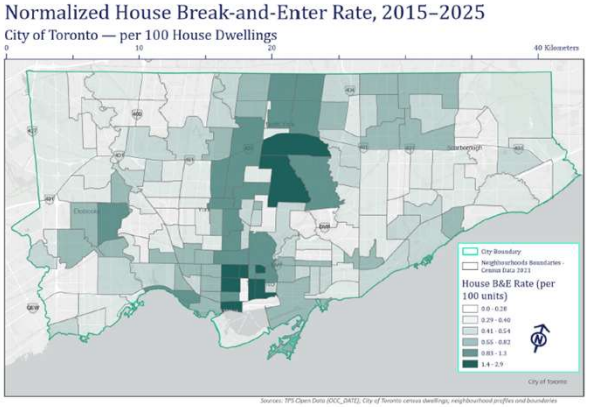
Sources: TPS Open Data (OCC_DATE); City of Toronto census dwellings; neighbourhood profiles and boundaries.

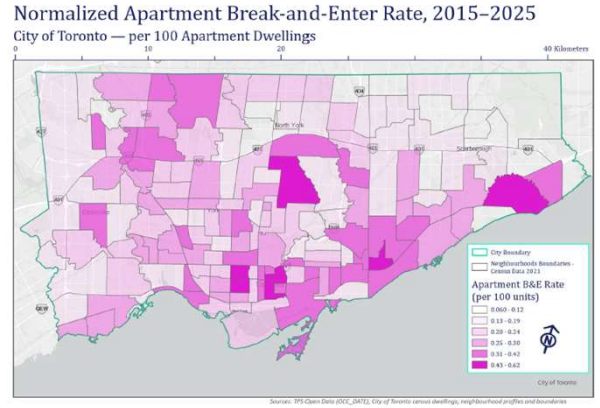
Break-ins per 100 dwellings

vs. per 100,000 population





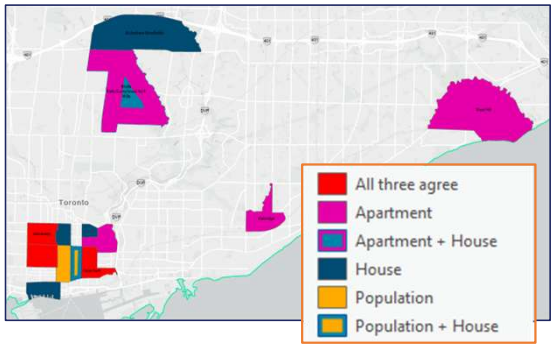




House top class 1.4–2.9
≈ 1 in 71 to 1 in 34 houses per year.

Apartment top class 0.43–0.62
≈ 1 in 233 to 1 in 160 apartments per year.

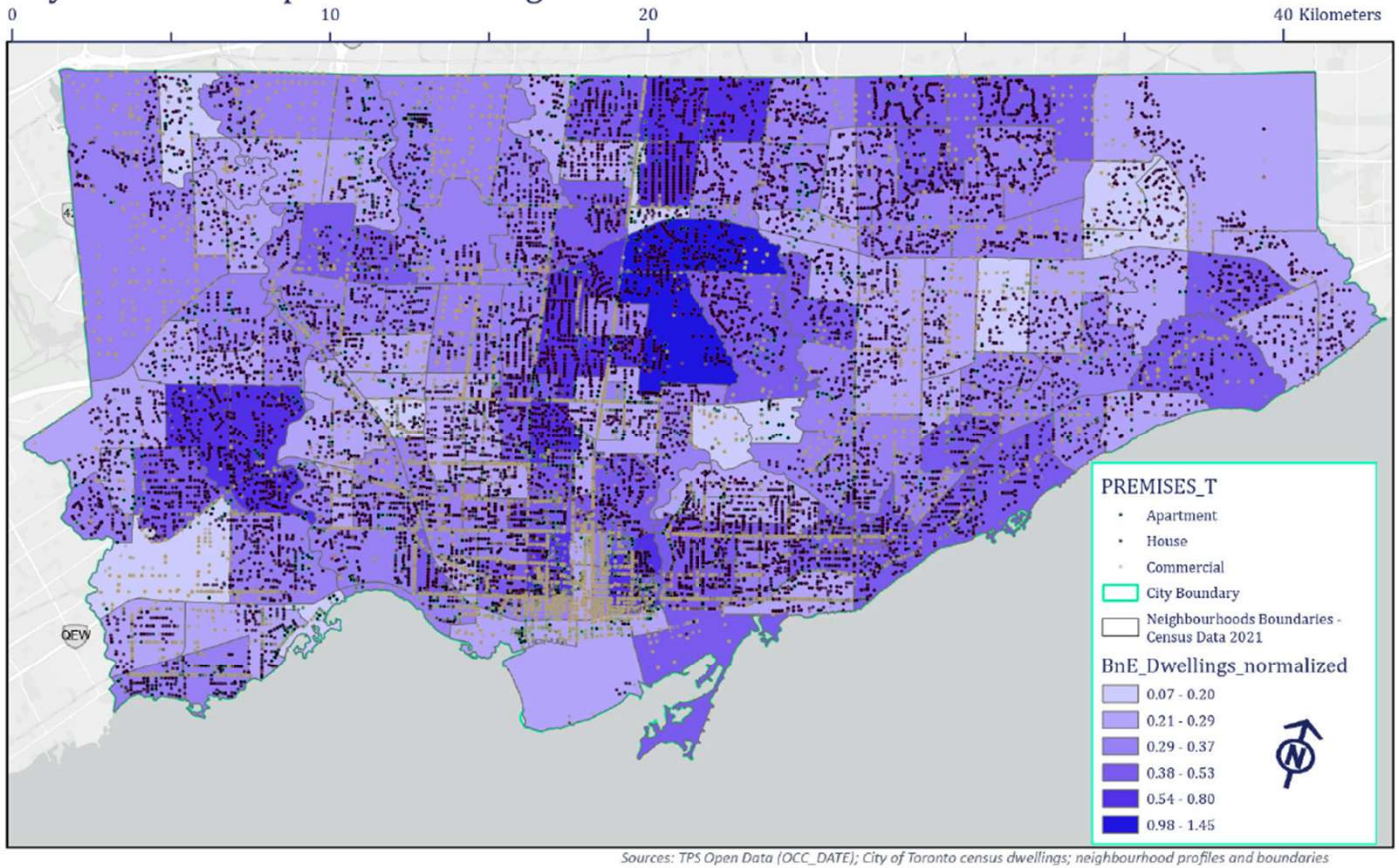
Per dwelling, houses face 3–5× the apartment risk



Per-population rates point to different neighbourhoods.

Normalized Dwelling Break-and-Enter Rate, 2015–2025

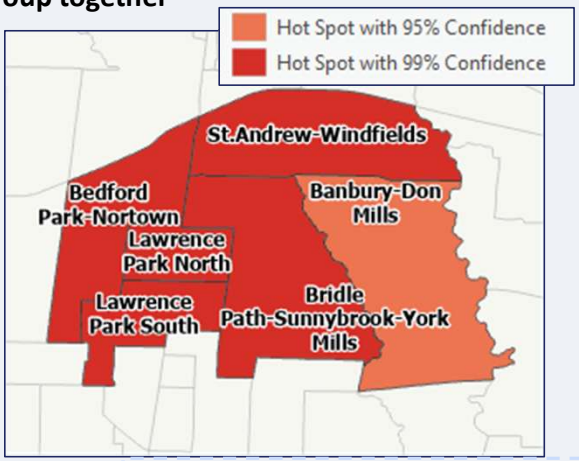
City of Toronto — per 100 Dwellings



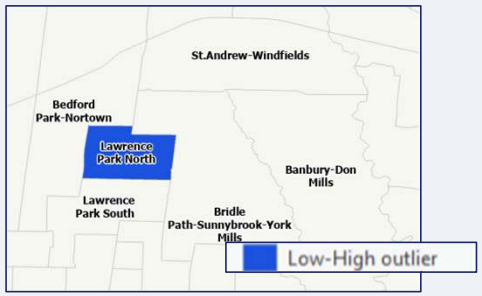
Sources: TPS Open Data (OCC_DATE); City of Toronto census dwellings; neighbourhood profiles and boundaries

Hot spots and cluster significance

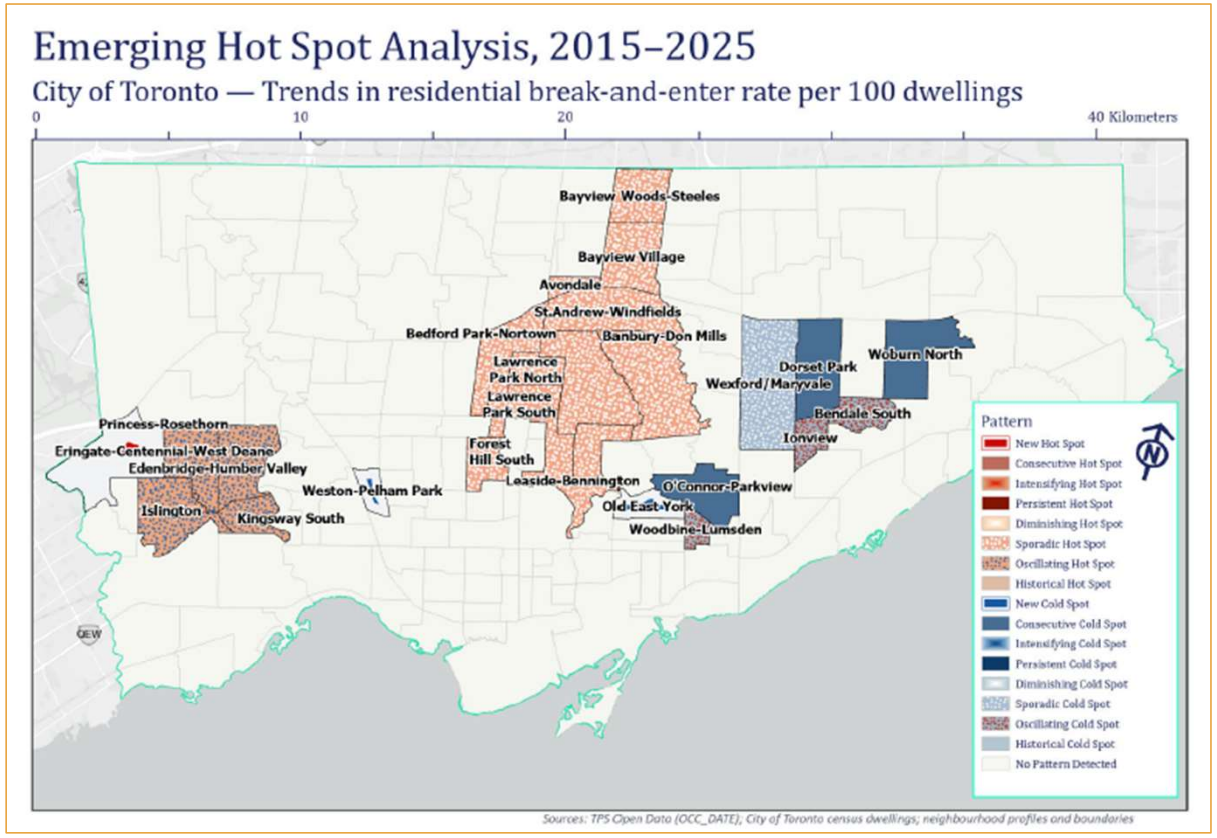
Hot Spot Analysis (HSA) — where high rates group together



Cluster and Outlier Analysis — one outlier

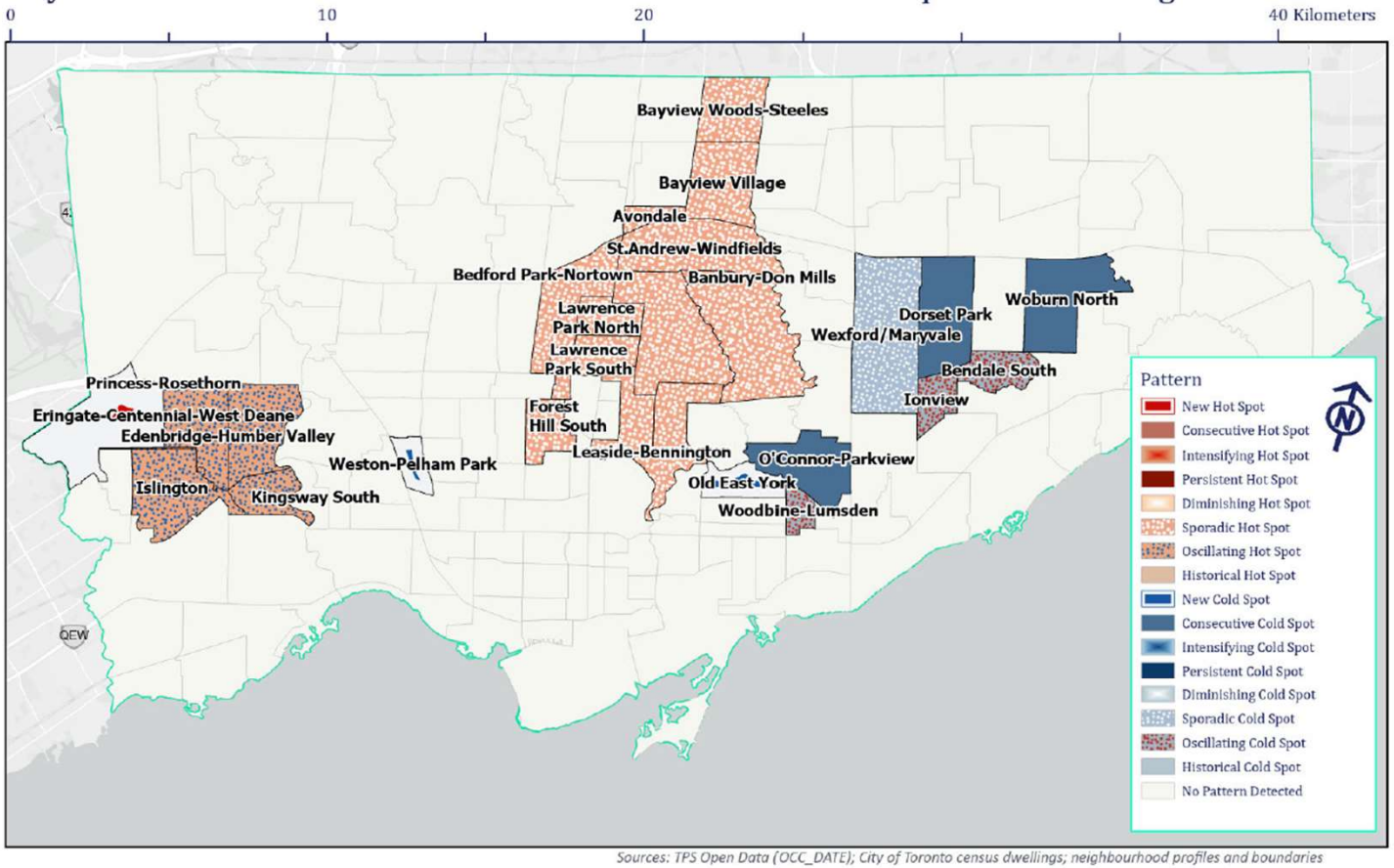


Emerging HSA — how it moves



Emerging Hot Spot Analysis, 2015–2025

City of Toronto — Trends in residential break-and-enter rate per 100 dwellings



Sources: TPS Open Data (OCC_DATE); City of Toronto census dwellings; neighbourhood profiles and boundaries

Findings & limitations

Findings

- **Per dwelling, houses face 2× the apartment risk** — 1 in 200 houses vs. 1 in 400 apartments, every year
- **Normalization reorders the map** — the highest rates sit in low-density house neighbourhoods, not in the high-count core
- **Hot Spot Analysis confirms one real hot spot at 99% - north-central Toronto**, but Cluster and Outlier Analysis finds no discrete clusters — the neighbourhoods inside it are only moderately above average, not extreme enough to form one.
- **Emerging Hot Spot Analysis classifies it as a sporadic hot spot** — hot in some years, not others, and never cold

Limitations

- **Dwelling denominators are point-in-time** — 2016 and 2021 Census, split at 2020; not annual
- **The 140→158 boundary change** forced split denominators for the affected neighbourhoods
- **Neighbourhood-level results describe areas, not properties** — no individual dwelling's risk can be read off these maps
- **Reported incidents only** — under-reporting is not observable in TPS open data

You would expect downtown to be the highest-risk area.
Per dwelling, it is not — north-central Toronto is.

Downtown has the most break-ins because it has the most dwellings — and north-central's elevated rate is intermittent, not every year.

Thank you · yuliiachepurna.com