Kicking Plastic's Butt: A cigarette butt litter outreach and collection project in St. James Town

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Background

- Cigarette butts are one of the most littered items in the world[1] and contain over 4,000 toxic chemicals that can leach into the surrounding environment.[2]
- Most cigarette butt filters are made of plastic, which many people are not aware of.
- Improper disposal of cigarette butts is more common than with other types of litter.[3]
- In 2022, the U of T Trash Team ran a "Kicking Plastic's Butt" outreach campaign along the Harbourfront that successfully reduced cigarette butt litter; we wanted to find out if installing receptacles along with running outreach would be even more effective.

This study aims to measure how receptacle installation and an accompanying outreach campaign affect cigarette butt litter in St James Town, Toronto, ON.

Community partnership

We worked with Community Matters Toronto (CMT), an organization of St James Town neighbours. Volunteers assisted us with outreach and data collection, and we ran outreach events through their programming.

Figure 1. Events supported by Community Matters, including (from left) receptacle emptying, transect collection, and an outreach table.

Methods

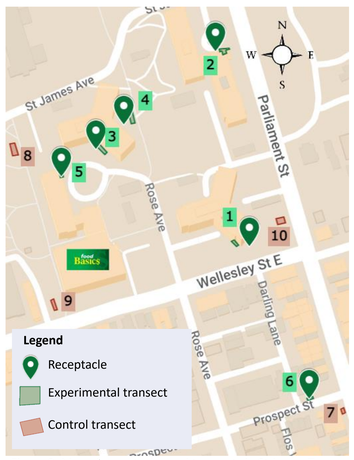

Figure 2. Map of receptacles and transects in St James Town.

Table 2. Dates and types of transect quantifications.

Quantification type	Date
Baseline	May 8
Pre-receptacle install	May 12, 19
Post-receptacle install	June 21, July 12, August 2

Table 1. Locations of receptacles and transects for cigarette butt quantification.

#	Location	Transect area (m^2)	Receptacle installation date
1	280 Wellesley	24.50	June 19, 2023
2	650 Parliament	48.86	June 19, 2023
3	260 Wellesley Front	60.90	May 24, 2023
4	260 Wellesley Back	75.00	June 28, 2023
5	240 Wellesley	27.60	May 24, 2023
6	Parliament & Prospect North	15.40	June 12, 2023
7	Parliament & Prospect South	17.00	N/A
8	St James & Ontario	70.11	N/A
9	238 Wellesley	41.28	N/A
10	600 Parliament	51.84	N/A

1. Receptacle installation

Six receptacles were installed around high rise buildings in St. James Town (Fig. 2), on the dates outlined in Table 1.

2. Transects to measure changes in litter

Cigarette butt litter was quantified in transects around the community (Table 1). Transects #1-6 are adjacent to a receptacle ("Experimental transects"), while Transects #7-10 are further away ("Control transects"). Quantifications were conducted on the days outlined in Table 2, and the number and mass of cigarette butts were recorded. For all quantifications after Baseline, the number of cigarette butts counted were standardized by days between transects to account for irregular street sweeping.

3. Receptacle emptying

Beginning June 7, the receptacles were emptied every 2 weeks with the assistance of CMT volunteers. We took the mass of cigarette butts collected per receptacle. Using the estimated weight of a cigarette butt from the transect data, we estimated the number of cigarette butts collected.

4. Outreach and community engagement

Notes on community engagement, including the number of volunteers and conversations with passerby, were made every time researchers went out for transect collection or receptacle emptying. As well, the following outreach activities were run with the goal of raising awareness about the receptacles and increasing waste literacy, particularly around the fact that cigarette butts are plastic pollution.

Posters and stickers

Figure 3. A Kicking Plastic's Butt! poster designed by Chelsea Wang.

Tabling events

Figure 4. U of T Trash Team members at an outreach table by the local Food Basics.

Seniors Connection Bingo

Figure 5. A plastic pollution themed bingo at the Community Matters Seniors Connection.

Facebook posts

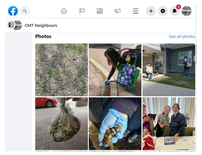

Figure 6. A snapshot of the Community Matters Facebook page, where we have been making posts about the Kicking Plastic's Butt project.

Results

Receptacles and transects

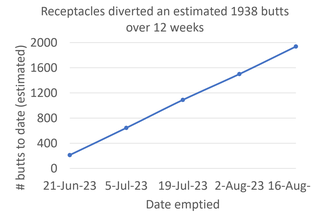

Figure 7. Cumulative cigarette butts diverted by all receptacles. Number of cigarette butts was estimated based on an experimental mass of 0.23 g/butt from transects.

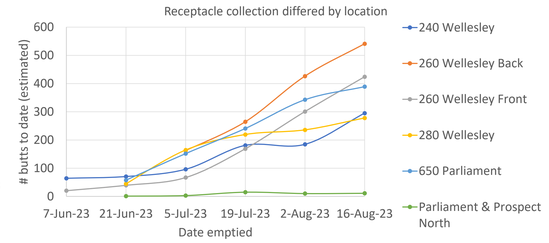

Figure 8. Cumulative cigarette butts diverted per receptacle. Number of cigarette butts was estimated based on an experimental mass of 0.23 g/butt from transects. The receptacles installed outside high rise buildings collected more than the one outside the community garden (P&P North).

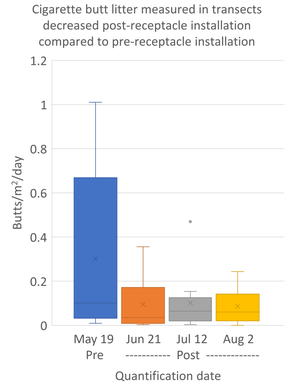

Figure 9. Cigarette butts counted per transect quantification date. All transects are included.

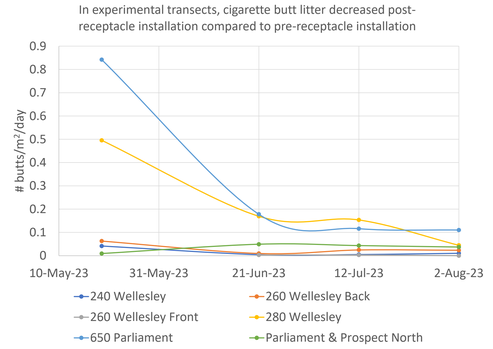

Figure 10. Cigarette butts counted per transect quantification date, experimental transects. All showed a decrease in litter, except for P&P North.

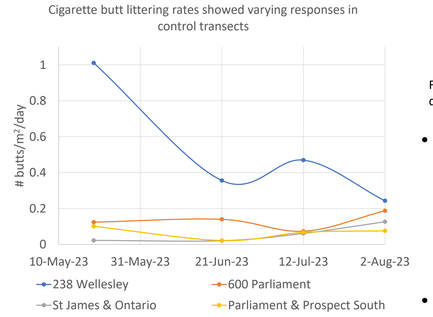

Figure 11. Cigarette butts counted per transect quantification date, control transects. Compared to pre-receptacle installation, 600 Parliament and St James & Ontario showed a slight increase in litter, while P&P South showed a slight decrease. 238 Wellesley showed a major decrease.

Community engagement

Table 3. The number and content of conversations with passerby we had at different transect locations.

Transect location	#	Comments
238 Wellesley	7	Explained the project to curious passerby, including people who were actively smoking. Some thought we were city workers. People commented that there should be a receptacle in this area.
240 Wellesley	1	Explained the project to a curious passerby.
260 Wellesley Back	3	One passerby helped us with our transect tape; others asked what we were doing, and one thanked us for our work.
P&P South	3	Explained the project to curious passerby.
St James & Ontario	3	Explained the project to curious passerby.

Figure 12. Pictures with some winners from our Seniors Connection plastic pollution bingo event, attended by around 13 people!

- Receptacles diverted 1938 butts in total, and receptacle usage was relatively consistent throughout the study period (Fig. 7).
- Receptacles were effective at reducing cigarette butt litter in their immediate surroundings (Figs. 9, 10), but less effective in areas further away (Fig. 11).
- Our Facebook posts received 339 engagements (reactions, comments, shares, and clicks).
- 53 people attended our community events in total.

Discussion

- To be most effective, receptacles should be placed in areas known to be cigarette litter hotspots, as the data suggests that receptacles are not as effective in reducing litter outside of the immediate surroundings.
- 238 Wellesley saw a drastic reduction in littering rates compared to other control transects. This was an area in front of a grocery store with high smoker activity. The reduction may have been due to the increased visibility of our team at that area, which led to higher community engagement (Table 3), or other factors.
- Researchers and volunteers were met with curiosity and encouragement by passerby, indicating a shared belief in reducing litter.
- It is unknown to what extent community outreach reduced cigarette butt litter compared to receptacles alone; this could be an area for further research.
- Moving forward, Community Matters Toronto will independently maintain the receptacles to be used by the community.
- A policy brief can be prepared from the results to share with policymakers and other communities in Toronto.

References

1. Baechler, B., Victoria, F., De Frond, H., Lewis, J., & Black, M. (2022). *Connect & Collect: 2022 Ocean Conservancy Report*. Ocean Conservancy.
2. Kurmus, H. & Mohajerani, A. The toxicity and valorization options of cigarette butts. Waste Manag. 104, 104–118 (2020).
3. Schultz, P. W., Bator, R. J., Large, L. B., Bruni, C. M., & Tabanico, J. J. (2013). Littering in Context: Personal and Environmental Predictors of Littering Behavior. *Environment and Behavior*, *45*(1), 35–59. https://doi.org/10.1177/0013916511412179

Acknowledgments

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Learn more about Kicking Plastic's Butt and the U of T Trash Team here!